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## Important

The DR 3.7L, 4.7L, and 5.7L vehicles are equipped with the Powertrain Control Module and Transmission Control Module combined in a single control module. This module is the Next Generation Controller (NGC) for DaimlerChrysler and will be referred to as the Powertrain Control Module (PCM). The PCM has four color coded connectors C1/A through C4/D, (C1/A-BLK, C2/B-ORANGE, C3/C-WHITE, C4/D-GREEN), with each connector containing 38 pins. The 5.9L Electronic Fuel Injection 24 valve Turbo Diesel has an Engine control module (ECM) CM845. New Diagnostics procedures and New DTC numbers are two of the changes you will see which reflect the new combined module technology. There are new Verification tests and module replacement procedures for the new PCM. Two tools are required to diagnose and repair the PCM terminals and harness connectors:

1. Miller #3638 Terminal Removal Pick must be used to release the connector terminals or harness and connector damage will occur.
2. Miller #8815 Pinout Box must be used to probe the PCM terminals or terminal damage will occur.

## 1.0 INTRODUCTION

**The diagnostics in this manual are based on the failure condition or symptom being present at the time of diagnosis. Once a component has been disconnected or the state of the ignition switch has been changed during a diagnostic procedure, it will remain that way for the entire test or until you are advised otherwise.**

Please follow the recommendations below when choosing your diagnostic path.

1. First make sure the DRBIII® is communicating with the appropriate modules; i.e., if the DRBIII® displays a "No Response" condition, you must diagnose this first before proceeding.
2. Read DTCs (diagnostic trouble codes) with the DRBIII®.
3. If no DTCs are present, identify the customer complaint.
4. Once the DTC or customer complaint is identified, locate the matching test in the Table of Contents and begin to diagnose the symptom.

All component location views are in Section 8.0. All connector pinouts are in Section 9.0. All system schematic diagrams are in Section 10.0. All charts and graphs are in section 11.0.

An \* placed before the symptom description indicates a customer complaint.

When repairs are required, refer to the appropriate service manual for the proper removal and repair procedure.

Diagnostic procedures change every year. New diagnostic systems may be added; current systems may be enhanced. **READ THIS MANUAL BEFORE TRYING TO DIAGNOSE A VEHICLE DTC.** It is recommended that you review the entire manual to become familiar with all new and enhanced diagnostic procedures.

After using this book, if you have any comments or recommendations, please fill out the form at the back of the book and mail it back to us.

1.1 SYSTEM COVERAGE

This diagnostic procedure manual covers Powertrain and Transmission diagnostics for Dodge Truck (DR) vehicles equipped with the Next Generation Control Module 3 (NGC3) and the Cummins (CM848) 24-valve turbo diesel engine with electronic Fuel Injection (ECM).

1.2 SIX-STEP TROUBLE SHOOTING PROCEDURE

Diagnosis of the Powertrain/Engine Control Module (PCM)/(ECM) is done in six basic steps:

- verification of complaint
- verification of any related symptoms
- symptom analysis
- problem isolation
- repair of isolated problem
- verification of proper operation

## 2.0 IDENTIFICATION OF SYSTEM

The Powertrain/Engine Control Module (PCM)/(ECM) monitors and controls:

- fuel system
- ignition system
- charging system
- speed control system
- The NGC module is only used on trucks with 3.7L, 4.7L and 5.7L engines.

## GENERAL INFORMATION

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- Cummins CM848 24 Valve electronic fuel injection 5.9L Turbo Diesel engine.
- The 45RFE/545RFE transmission is used with 3.7L, 4.7L, and 5.7L engines.
- The RE transmission is used with 5.9L Diesel engine.

### 3.0 SYSTEM DESCRIPTION AND FUNCTIONAL OPERATION

#### 3.1 GENERAL DESCRIPTION

##### POWERTRAIN

The on-board OBDII diagnostics incorporated with the PCM are intended to assist the field technician in repairing vehicle problems by the quickest means.

##### ELECTRONIC THROTTLE CONTROL

5.7L engines are equipped with a NGC control module, which controls the Throttle Plate Position, based on torque management (request). This system has a throttle cable that is attached to two Accelerator Position Sensors instead of the throttle body. The throttle plate will not move with the ignition on while pressing the Accelerator Pedal. The only way to move the throttle plate with the ignition on is by using the DRBIII®. The ETC Motor Assembly contains two Throttle Position Sensors, two springs, and the ETC Motor, which are replaced as a complete assembly. The TP Sensors inform the PCM of the position of the throttle plate. The ETC Motor has a positive and negative circuit. The PCM controls these circuits using Pulse Width Modulation. To open the throttle plate the PCM provides pulse width voltage to the positive side of the ETC motor and grounds the negative side. To close the throttle plate the PCM provides pulse width voltage to the negative side of the ETC motor and grounds the positive side. One of the springs is used against opening the throttle plate and the other is used against closing the throttle plate. The PCM uses the APP Sensor inputs along with inputs from the other Sensors to determine throttle opening. Duplicate sensors are used to check one sensor against its counterpart. Two TP Sensor, two, APP Sensors, two Brake Switch inputs, and two Speed Control inputs are used with the NGC system. When duplicate Sensors are not used, the single Sensor is checked against a value that is calculated by the PCM. When a sensor fails, the PCM limits the engine RPM and the opening of the Throttle blade. The customer may complain limited power and throttle control after the MIL and or ETC light illuminate. The ETC Light will constantly illuminate or flash

depending on which component has failed. The ETC Motor Assembly will be referred to as Throttle Body Assembly in the Diagnostic and Service Manual. A slight delay in cranking may be noticed when starting the engine. When starting the vehicle the ETC Motor is tested before the engine is allowed to crank. The test includes opening and closing the throttle plate to verify proper operation before starting the engine for safety reasons. A No Crank Condition may occur if the Ignition is left in the on position for a period of time before actually cranking the engine. The PCM will test the throttle plate as often as it wants and will not allow cranking during this procedure. If this occurs, the mileage at which this happened will be stored in the PCM and can be looked at using the DRBIII® under ETC Starter Inhibit.

**NOTE: The battery must be disconnected before replacing the Throttle Body (ETC Motor Assembly). After replacing the Throttle Body Assembly, PCM, and/or the APP Sensor Assembly, with the DRBIII®, under the Miscellaneous Menu, select the ETC RELEARN feature and follow the directions on the DRBIII® screen.**

##### TRANSMISSION

The 45RFE/545RFE electronic transmission is a conventional transmission in that it uses hydraulically applied clutches to shift a planetary gear train. However, the electronic control system replaces many of the mechanical and hydraulic components used in conventional transmission valve bodies.

The 45RFE/545RFE electronic transmission is a fully electronically controlled transmission. The Powertrain Control Module (PCM) is similar to (but not the same as) the one used in the 41TE and 42LE transmissions, therefore many similarities exist in function and diagnosis.

The 45RFE/545RFE has an overrunning clutch (used in 1st gear), an electronically controlled torque converter clutch, 3 planetary gearsets, and six clutch packs. The clutches are called 2nd Clutch (2C), 4th Clutch (4C), Low/Reverse Clutch (LR), Reverse Clutch (RC), Underdrive Clutch (UD), and Overdrive Clutch (OD).

Although the 45RFE is considered a 4 speed transmission, it really has 5 forward gear ratios., the 545RFE is considered a 5 speed transmission, it really has 6 forward gear ratios. 2nd gear (1.67:1) and 2nd prime (1.50:1) gear are so close in ratio that they are not considered to be different gear ratios, although both are used as 2nd gear under certain conditions. During most upshift and downshift maneuvers, 2nd gear will be used. 2nd prime gear is only used for a high speed 4-2 downshift. The

545RFE transmission is essentially a software change to the PCM that allows an additional over-drive ratio of (.667:1). The gear ratio of 4th Prime is achieved by applying the 2C and OD clutches. The 4th Prime is used above 52 MPH. All gear ratios in the 45RFE/545RFE are achieved by applying two elements (clutches). During a shift, one element is released and another is applied, resulting in a different ratio. This is called a clutch to clutch shift. In order to perform a 4-2 downshift, two elements would have to be released and two different elements applied. The 2nd prime gear ratio allows a clutch to clutch 4-2' (2nd prime) downshift.

The oil pump in the 45RFE/545RFE is a dual stage positive displacement gear type pump. At idle and low engine speeds, both stages are working. Once the engine speed reaches a point where one side of the pump can supply the necessary system requirements, the second stage is vented. This pump configuration gives the pressure and flow of a large displacement pump at low speeds, and the economy of a small displacement pump at higher engine speeds. The oil pump housing also contains some of the valves that are found in the valve body in a 41TE or 42LE transmission. The Converter Clutch Switch Valve, Converter Clutch Regulator Valve, Torque Converter Limit Valve, and the Pressure Regulator Valve, are all found in the oil pump housing.

The electronic control system consists of a Powertrain Control Module (PCM), a Transmission Range Sensor (TRS), an Input Speed Sensor (ISS), an Output Speed Sensor (OSS), a Line Pressure Sensor (LPS), a Transmission Temperature Sensor (TTS), five pressure switches, and seven solenoids. Each clutch pack has a corresponding solenoid and pressure switch except for the reverse clutch which is controlled by the manual valve. The other two solenoids are called the Multi Select (MS) solenoid and the Pressure Control Solenoid (PCS).

The PCS is used to control line pressure. The 45RFE/545RFE controls line pressure based on inputs to the PCM. The line pressure is torque based (line pressure increases with torque) most of the time, however it is set to a predetermined value just prior to a shift and reverts back to torque based after the shift.

The MS solenoid is used to control the LR clutch during P-R and N-R garage shifts and to control the OD clutch when the Manual Valve is in the "D" position as reported by the TRS. If the manual valve is slightly out of position, the TRS will indicate a temporary zone (T3 or T4). In this case the OD clutch will be controlled by the OD solenoid. Note that if the TRS indicates a temporary zone, this is a valid PRNDL code and will not set a DTC P0706(28). If the PRNDL code consistently indicates a temporary zone while the shift lever is in the

"D" position, this would indicate some sort of mechanical problem in the shift linkage as opposed to an electrical TRS problem. Note: vehicle operation in the T3 temporary zone can set a DTC P1715(65).

## 3.2 FUNCTION OPERATION

### 3.2.1 FUEL CONTROL (GAS)

The PCM controls the air/fuel ratio of the engine by varying fuel injector-on time. Mass air flow is calculated using the speed density method using engine speed and manifold absolute pressure (IAT is a modifier in Speed Density).

Different fuel calculation strategies are used depending on the operational state of the engine. During crank mode, a prime shot fuel pulse is delivered followed by fuel pulses determined by a crank time strategy. Cold engine operation is determined via an open loop strategy until the O2 sensors have reached operating temperature. At this point, the strategy enters a closed loop mode where fuel requirements are based upon the state of the O2 sensors, engine speed, MAP, throttle position, air temperature, battery voltage, and coolant temperature.

### 3.2.2 ON-BOARD DIAGNOSTICS

The PCM/ECM has been programmed to monitor any circuit or system that has an effect on vehicle emissions, or is used by the PCM/ECM to determine the proper functionality of these systems. This monitoring is called "on-board diagnosis."

Certain criteria or, "arming conditions", must be met before a trouble code will be entered into the PCM/ECM memory. The criteria range from engine rpm, engine temperature, and/or input voltage to the PCM/ECM. If a problem is detected with a monitored circuit, and all of the criteria or arming conditions are met, a trouble code will be stored in the PCM/ECM.

It is possible that a trouble code for a monitored circuit may not be entered into the PCM/ECM memory even though a malfunction has occurred. This may happen because one of the trouble code criteria (arming conditions) has not been met.

The PCM/ECM compares input signal voltage from each input component to specifications (the established high and low limits of the range) that are preprogrammed for that component. If the input voltage is not within specifications, and other trouble code criteria (arming conditions) are met, a trouble code will store in the PCM/ECM memory.

The On Board Diagnostics have evolved to the second Generation of Diagnostics referred to as OBDII. These OBDII Diagnostics control the functions necessary to meet the requirements of Cali-

## GENERAL INFORMATION

California OBDII and Federal OBD regulations. These requirements specify the inclusion of a Malfunction Indicator Light (MIL) located on the instrument panel for all 1994 and subsequent model-year passenger cars, light duty trucks, and medium-duty vehicles. The purpose of the MIL is to inform the vehicle operator in the event of the malfunction of any emission system or component failures that can affect emissions and which provide input to, or receive output from, the PCM/ECM.

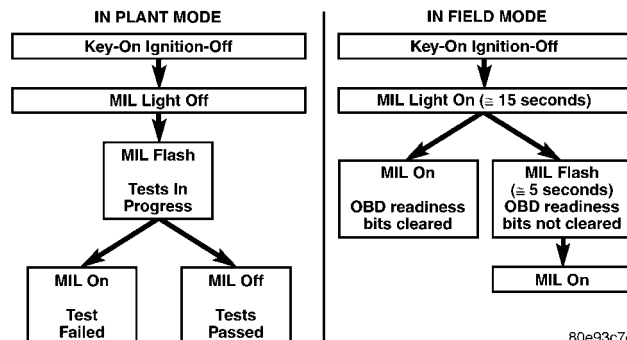
### MIL Lamp Strategy

I/M Readiness OK to test = **Key On Engine OFF**  
- MIL Lamp will remain on until the vehicle is started or Ignition is turned off.

I/M not ready for testing = **Key On Engine OFF**  
- MIL Lamp on solid for (15) seconds then MIL Lamp will flash on/off for (5) seconds then it will remain on until the vehicle is started or the Ignition

is turned off.

In order to meet mandated regulations, a new feature has been added to engine control modules for 2002 to provide an OBDII I/M (In-Field Inspection & Maintenance) readiness indicator. When the engine controller is in in-field mode, turning the key on with the engine off will activate the MIL light for approximately 15 seconds. After this time, if the vehicle is ready for I/M testing the MIL light will remain fully illuminated. If the vehicle is not ready, the MIL light will blink for approximately 5 seconds and then remain on until the first engine crank or the key is turned off. This differs from the previous behavior of the MIL light, which was only activated with a failure in the system. For in-plant mode, the MIL light will function as in previous model years. Below are diagrams of how the MIL light will operate.



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The following table summarizes the various OBDII monitors operation.

## OBD II Monitor Operation

Comprehensive Components Monitor	Major Monitors Non Fuel Control & Non Misfire	Major Monitors Fuel Control & Misfire
Run constantly	Run Once Per Trip	Run constantly
Includes All Engine Hardware Sensors, Switches, Solenoids, etc.	Monitors Entire Emission System	Monitors Entire System
Most are One Trip Faults - Usually Turns On The MIL and Sets DTC After One Failure	Most are Two Trip Faults - Turns On The MIL and Sets DTC After Two Consecutive Failure	Two Trip Faults - Turns On The MIL and Sets DTC After Two Consecutive Failure
<b>Priority 3</b>	<b>Priority 1 or 3</b>	<b>Priority 2 or 4</b>
All Checked For Continuity Open Short To Ground Short To Voltage	Done Stop Testing = Yes Oxygen Sensor Heater Oxygen Sensor Response	<b>Fuel Control Monitor</b> Monitors Fuel Control System For: Fuel System Lean Fuel System Rich Requires 3 Consecutive <i>Fuel System Good Trips</i> to Extinguish the MIL
Inputs Checked For Rationality	Catalytic Converter Efficiency Except EWMA up to 6 tests per trip and a one trip fault (SBEC) and a two-trip fault on JTEC	
Outputs Checked For Functionality	EGR System Evaporative Emission System (Purge and Leak) Non-LDP or LDP	<b>Misfire Monitor</b> Monitors for Engine Misfire At: 4 X 1000 RPM Counter (4000 Revs) (Type B) **200 X 3 (600) RPM Counter (Type A)
Requires 3 Consecutive <i>Global Good Trips</i> to Extinguish the MIL*	Requires 3 Consecutive <i>Global Good Trips</i> to Extinguish the MIL*	Requires 3 Consecutive <i>Global Good Trips</i> To Extinguish the MIL
<b>*40 Warm Up Cycles</b> are required to erase DTCs after the MIL has been extinguished.		<b>**Type A misfire</b> is a one trip failure on pre-1999, 2 Trip failure on 1999 and later.. The MIL will illuminate at the first or second failure, based on MY.



### OBDII MONITOR RUN PROCESS NGC VEHICLES

The following procedure has been established to assist Chrysler Dealer Technicians in the field with enabling and running OBD II Monitors. The order listed in the following procedure is intended to allow the technician to effectively complete each monitor and to set the CARB Readiness Status in the least time possible.

**\*\*NOTE\*\***

- C. Once the monitor run process has begun, do not turn off the ignition. By turning the ignition key off, monitor enabling conditions will be lost. NVLD Monitor runs after key off.
- D. By performing a Battery Disconnect, or Selecting Erase DTCs, the CARB Readiness and all additional OBD II information will be cleared.

Monitor Preliminary Checks:

- 4. Plug a DRBIII® into the vehicle's DLC.
  - 5. Turn the ignition, KEY ON - ENGINE OFF. Watch for MIL lamp illumination during the bulb check. MIL lamp must have illuminated, if not, repair MIL lamp.
  - 6. On the DRBIII® Select #1 DRBIII® Standalone.
  - 7. Select #1 1998-2003 Diagnostics
  - 8. Select #1 Engine
  - 9. Select #2 DTCs and Related Functions
  - 10. Select #1 Read DTCs
    - \* Verify that No Emissions Related DTCs are Present.
    - \* If an Emissions DTC is Present, the OBD II Monitors may not run and the CARB Readiness will not update.
    - \*The Emissions related DTC, will need to be repaired, then cleared. By clearing DTCs, the OBD Monitors will need to be run and completed to set the CARB Readiness Status.
  - 11. Return to Engine Select Function Menu and Select #9, OBD II Monitors.
  - 12. Select #3 CARB Readiness Status.
- Do all the CARB Readiness Status Locations read **YES**?

\***YES**, then all monitors have been completed and this vehicle is ready to be I/M or Emission Tested.

\***NO**, then the following procedure needs to be followed to run/complete all available monitors.

**\*\*NOTE\*\***

- A. Only the monitors, which are **not** YES in the CARB Readiness Status, need to be completed.
- B. Specific criteria need to be met for each monitor. Each monitor has a Pre-Test screen to assist in running the monitor.  
For additional information, refer to the Chrysler Corporation Technical Training Workbook titled On Board Diagnostics: OBDII/EOBD, part number

81-699-01050.

- C. The most efficient order to run the monitors has been outlined below, including suggestions to aid the process.

#### 1. Natural Vacuum Leak Detection with Purge Monitor

This monitor requires a cool down cycle, usually an overnight soak for at least 8 hours without the engine running. The ambient temperature must decrease overnight - parking the vehicle outside is advised. To run this test the fuel level must be between 15-85% full. For the monitor run conditions select the EVAP MON PRE-TEST in the DRBIII®, OBD II Monitors Menu. The Purge monitor will run if the small leak test reports a pass.

Criteria for NVLD monitor

- 1) Engine off time greater than one hour
- 2) Fuel Level between 15% and 85%
- 3) Start Up ECT and IAT within 10° C (18° F).
- 4) Vehicle started and run until Purge Monitor reports a result.

Note: If the vehicle does not report a result and the conditions where correct. It may take up to two weeks to fail the small leak monitor. DO NOT use this test to attempt to determine a fault. Use the appropriate service information procedure for finding a small leak. If there are no faults and the conditions are correct this test will run and report a pass. Note the Small leak test can find leaks less than 10 thousands of an inch. If a small leak is present it takes approximately one week of normal driving to report a failure.

#### 2. Catalyst / O2 Monitor

With NGC, Catalyst and O2 Monitor information are acquired and processed at the same time. Most vehicles will need to be driven at highway speed (< 50 mph) for a few minutes. Some trucks run the monitor at idle in drive. If the vehicle is equipped with a manual transmission, using 4th gear may assist in meeting the monitor running criteria. For the monitor run conditions, select the BANK 1 CAT MON PRE-TEST in the DRBIII®, OBD II Monitors Menu.

#### 3. EGR Monitor

The EGR monitor now runs in a closed throttle decel or at idle on a warm vehicle. However, it is necessary to maintain the TPS, Map and RPM ranges to allow the monitor to complete itself. For the monitor run conditions, select the EGR PRE-TEST in the DRBIII®, OBD II Monitors Menu.

#### 4. O2 Sensor Heater Monitor

This monitor is now continuously running once the heaters are energized. Pass information will be processed at power down. For the monitor run

conditions, select the O2S HEATER MON PRE-TEST in the DRBIII®, OBD II Monitors Menu.

### ECM (CM848) OPERATING MODES (DIESEL)

As input signals to the Engine Control Module (ECM) change, the ECM adjusts its response to output devices. There are several different modes of operation that determine how the ECM responds to the various input signals.

### IGNITION SWITCH ON (ENGINE OFF) MODE

When the ignition switch is in the “on” position, the following actions occur:

1. When the PCM and ECM receive an ignition sense input, they power up. Battery voltage is supplied through the battery voltage input.
2. The wait-to start, water-in-fuel, check engine, check gauges, and transmission temperature

(auto trans only) lamps are turned on by the PCM, ECM, or BCM for at least 2 seconds as a bulb test. This is done by direct wire or through the Bus to the smart cluster.

3. The ECM monitors the intake air temperature signal. If the intake air temperature is below a predetermined temperature, the ECM will start the air intake preheat cycle. The ECM will energize the intake heaters by grounding the air intake relays. The ECM will turn the wait-to-start lamp on until the preheat cycle is over. If the ECM receives a crank signal before the preheat (Fig 1.) cycle is over, the preheat cycle will be aborted.
4. The ECM will request the water-in-fuel lamp on if a signal is received from the water-in-fuel sensor.

INTAKE AIR TEMPERATURE	PREHEAT		
	HEATERS	DURATION	DUTY CYCLE
< -40F	Both	30 Sec	Continuous
-40 F to -15 F	Both	30 Sec	Continuous
-15 F to 0 F	Both	30 Sec	Continuous
0 F to 15 F	Both	15 Sec	Continuous
15 F to 30 F	Both	10 Sec	Continuous
30 F to 66 F	Both	10 Sec	Continuous
> 66 F	Both	0 Sec (off)	Continuous

**NOTE:** If the water-in-fuel lamp remains illuminated after the 2-second bulb check, the vehicle should not be started until the fuel filter has been drained.

### ENGINE START-UP MODE

When the ignition key is held in the “start” position, the following occurs:

1. The ECM receives the crank signal input from the camshaft position sensor.
2. The air intake heaters are not energized during cranking.
3. The ECM monitors engine speed and when the engine speed is above 650 rpm, the ECM determines that the engine is running.

4. If the ECM receives a crank signal before the preheat (Fig 2) cycle is over, the heaters will be disabled. However, the post-heat cycle will begin if the engine is in the run state or speed is above 1200 rpm.

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INTAKE AIR TEMP or BATTERY TEMP SENSOR	POSTHEAT		
	HEATERS	DURATION	DUTY CYCLE
< - 40 F	Both	20 Sec	Continuous
	One	10 Sec	Continuous
	One	120 Sec	25 / 75
- 40 F to -15 F	Both	20 Sec	Continuous
	One	10 Sec	Continuous
	One	120 Sec	25 / 75
-15 F to 0 F	Both	20 Sec	Continuous
	One	10 Sec	Continuous
	One	120 Sec	25 / 75
0 F to 15 F RPM < Threshold	Both	10 Sec	Continuous
	One	130 Sec	25 / 75
0 F to 15 F RPM > Threshold	Both	10 Sec	Continuous
	One	90 Sec	Continuous
	One	40 Sec	50 / 50
15 F to 30 F RPM < Threshold	Both	10 Sec	Continuous
	One	130 Sec	25 / 75
15 F to 30 F RPM > Threshold	Both	10 Sec	Continuous
	One	90 Sec	Continuous
	One	40 Sec	50 / 50
30 F to 66 F RPM < Threshold	Both	10 Sec	Continuous
	One	130 Sec	25 / 75
30 F to 66 F RPM > Threshold	Both	10 Sec	Continuous
	One	90 Sec	Continuous
	One	40 Sec	50 / 50
> 66 F	Off		

### ENGINE WARM-UP MODE

1. The ECM may start the air intake heater post-heat cycle depending on intake air temperature. If manifold air temperature was 66°F or less when the ignition was turned on, the cycle is started.
2. If the transmission temperature sensor shows it is below 59°F, the automatic transmission will not be allowed to enter overdrive.
3. If the transmission temperature sensor shows it is below 69°F, the transmission's torque converter clutch will not be allowed to engage.
4. The ECM will request the water-in-fuel lamp on if a signal is received from the water-in-fuel sensor.

### CRUISE OR IDLE MODE

During the cruising speed, the following inputs are received by the ECM:

1. The ECM monitors intake manifold air temperature through the intake air temperature sensor.
2. The intake air heater post-heat cycle will be complete, if it is not already over.
3. The vehicle speed, and throttle position sensors are used by the PCM to control the transmission overdrive and torque converter clutch operation.
4. If the transmission temperature sensor shows it is below 59°F or above 275°F, the automatic transmission will not be allowed to enter overdrive. If the transmission is in overdrive when the transmission temperature is above 275°F,

the transmission will downshift and not upshift again until the transmission temperature drops to 240°F.

5. The water-in-fuel sensor signal is used by the ECM to request the water-in-fuel lamp on, if water is sensed in the fuel.

### ACCELERATION MODE

When there is an abrupt demand for increased engine output and vehicle acceleration, the following occurs:

1. The vehicle speed, and throttle position signals are used to control transmission overdrive and torque converter clutch operation.
2. If the transmission temperature sensor shows it is below 59°F, the torque converter clutch will not be allowed to engage.
3. If the transmission temperature sensor shows it is below 59°F or above 275°F, the automatic transmission will not be allowed to enter overdrive. If the transmission is in overdrive when the transmission temperature is above 275°F, the transmission will downshift and not upshift again until the transmission temperature drops to 240°F.
4. If the speed control system resume/accelerate function is being used, the ECM (Diesel applications with manual transmission use the CM848 ECM to conduct speed control system) will only allow the vehicle to accelerate at a predetermined rate. If a speed control has been set and the resume/accelerate button is momentarily pushed in, the ECM will increase vehicle speed by two miles per hour.
5. The ECM will disable the speed control when:
  - the brakes are applied
  - excessive engine speed
  - the clutch is disengaged (manual transmission)
  - the gear selector is shifted to neutral (automatic transmission)
  - the speed control off switch is activated

### DECELERATION MODE

During deceleration, the following inputs are received by the ECM:

1. The vehicle speed, crank position, and throttle position signals are used to control transmission overdrive and torque converter clutch operation.
2. The torque converter clutch will disengage, if the brakes are applied.
3. If the transmission temperature sensor shows it is below 59°F or above 275°F, the automatic transmission will not be allowed to enter overdrive. If the transmission is in overdrive when the transmission temperature is above 275°F, the transmission will downshift and not upshift again until the transmission temperature drops to 240°F.

4. The ECM will disable the speed control when:
  - the brakes are applied
  - excessive engine speed
  - the clutch is disengaged (manual transmission)
  - the gear selector is shifted to neutral (automatic transmission)
  - the speed control off switch is activated

### IGNITION SWITCH OFF MODE

When the ignition switch is turned to the "off" position, the PCM and ECM still stores in memory trouble codes and the throttle position sensor value from the previous key-on.

### NON-MONITORED CIRCUITS (DIESEL)

The ECM does not directly monitor the following circuits, systems, and conditions even though they could have malfunctions that result in driveability problems. A diagnostic code may not be displayed for the following conditions. However, problems with these systems may cause a diagnostic code to be displayed for other systems.

**Engine Timing** - The ECM can detect incorrectly indexed timing gears; however, cannot detect improper valve adjustment.

**Fuel Inlet Restriction** - On a CARB certified vehicle, the ECM can detect a clogged fuel pump inlet filter, clogged in-tank filter, or a pinched supply line. On an EPA certified vehicle, the ECM cannot detect a clogged fuel pump inlet filter, clogged in-tank filter, or a pinched supply line.

**Fuel Injectors** - On a CARB certified vehicle, the ECM can detect if a fuel injector is clogged, or if the pintle is sticking. On an EPA certified vehicle, the ECM cannot detect if a fuel injector is clogged, or if the pintle is sticking.

**Fuel Requirements** - Poor quality or air in fuel can cause problems such as hard starting, no starting, stalling, and stumble.

**PCM Grounds** - The ECM cannot detect a poor system ground. However, a diagnostic trouble code may be stored as a result of this condition.

**Air Cleaner Air Flow** - The ECM cannot detect a clogged or restricted air cleaner inlet or filter element, however, this condition may lead to a low power/hard start type of complaint.

**Exhaust System** - The ECM cannot detect a plugged, restricted, or leaking exhaust system, however, this condition may lead to a low power/hard start type of complaint.



### Fuel System - General Information

**WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS . FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.**

The fuel system is a Robert Bosch High Pressure Common Rail (HPCR) electronically controlled fuel system. The HPCR system consists of five main components: Electronic Fuel Lift Pump, Fuel Pump Gear Pump, High Pressure Pump (CP3), Fuel Rail, and Injectors. The High Pressure Pump (CP3) supplies high-pressure fuel to the fuel rail independent of engine speed. This high-pressure fuel is then accumulated in the Fuel Rail. High-pressure fuel is constantly supplied to the Injectors by the Fuel Rail. The Electronic Control Module (ECM) controls the fueling and timing of the engine by actuating the Injectors.

Fuel enters the system from the Electronic Fuel Lift Pump, which is attached to the fuel filter assembly. Fuel is forced through the fuel filter element and then enters the Fuel Pump Gear Pump, which is attached to the rear of the High Pressure Pump (CP3). The Fuel Pump Gear Pump is a low-pressure pump and produces pressures ranging from 80 to 180 psi (5.5 to 12.4 bar).

Then the fuel enters the High Pressure Pump (CP3). The low-pressure fuel is then supplied to the Fuel Control Actuator (FCA). The Fuel Control Actuator is an electronically controlled solenoid valve. The ECM controls the amount of fuel that enters the high pressure pumping chambers by opening and closing the Fuel Control Actuator based on a demanded fuel pressure. The Pressure Sensor on the Fuel Rail provides the actual fuel pressure. When the Actuator is opened, the maximum amount of fuel is being supplied to the High Pressure Pump. Any fuel that does not enter the High Pressure Pump is directed to the Cascade Overflow Valve. The Cascade Overflow Valve regulates how much excess fuel is used for lubrication for the pump and how much is returned to the tank.

The fuel that enters the High Pressure Pump is pressurized between 4350-23,200 psi (300-1600

bar) by three radial pumping chambers. The pressurized fuel is then supplied to the Fuel Rail.

### 3.2.3 TRANSMISSION CONTROL

The 45RFE/545RFE electronic transmission has a fully adaptive control system. The system performs its functions based on continuous real-time sensor feedback information. The control system automatically adapts to changes in engine performance and friction element variations to provide consistent shift quality. The control system ensures that clutch operation during upshifting and downshifting is more responsive without increased harshness.

The Powertrain Control Module (PCM) continuously checks for electrical problems, mechanical problems, and some hydraulic problems. When a problem is sensed, the PCM stores a diagnostic trouble code (DTC). Some of these codes cause the transmission to go into "limp-in" or "default" mode. The 45RFE/545RFE has three default modes:

**(I) Immediate shutdown** - The PCM de-energizes the transmission control relay. This causes the transmission system to immediately default to third gear if shift lever is in the "D" position, or 2nd gear if it is in the "2" or "L" positions. Park, Neutral, and Reverse are still available.

**(O) Orderly Shutdown** - If the PCM recognizes a problem that does not require an immediate shutdown, the transmission will maintain the current gear and the transmission control relay will remain energized until de-energizing it will not overspeed the engine. When the vehicle speed reaches a reasonable level the PCM de-energizes the transmission control relay. This causes the transmission system to immediately default to third gear if shift lever is in the "D" position, or 2nd gear if it is in the "2" or "L" positions. Park, Neutral, and Reverse are still available.

**(L) Logical Shutdown with Recovery** - The PCM does not de-energize the Transmission Control Relay. Instead, the transmission will utilize 1st and 3rd gears while in "D", and will use 2nd while in "2" or "L". All transmission operation in this mode will be at a preset line pressure (open loop). The transmission will resume normal operation (recover) if the detected problem goes away. Three recoveries are permitted in a given key, after the fourth occurrence the operation described above will be maintained.

Once the DRBIII® is in the "EATX" portion of the diagnostic program, it constantly monitors the



PCM to see if the system is in limp-in mode. If the transmission is in limp-in mode, the DRBIII® will flash the red LED.

### 3.2.3.1 TRANSMISSION OPERATION AND SHIFT SCHEDULING AT VARIOUS OIL TEMPERATURES

The transmission covered in this manual has unique shift schedules depending on the temperature of the transmission oil. The shift schedule is modified to extend the life of the transmission while operating under extreme conditions.

The oil temperature is measured with a Temperature Sensor on the 45RFE/545RFE transmission. The Temperature Sensor is an integral component of the Transmission Range Sensor (TRS). If the Temperature Sensor is faulty, the transmission will default to a "calculated" oil temperature. Oil temperature will then be calculated using engine coolant temperature, battery/ambient temperature, and engine off time from the Body Control Module (BCM). These inputs are received from the communication bus periodically and are used to initialize the oil temperature at start up. Once the engine is started, the PCM updates the transmission oil temperature based on torque converter slip speed, vehicle speed, gear, and engine coolant temperature to determine an estimated oil temperature during vehicle operation. Vehicles using "calculated oil temperature" track oil temperature reasonably accurately during normal operation. However, if a transmission is overfilled, a transmission oil cooler becomes restricted, or if a customer drives aggressively in low gear, the calculated oil temperature will be inaccurate. Consequently the shift schedule selected may be inappropriate for the current conditions.

### 3.2.3.2 LINE PRESSURE CONTROL

Proper control of the transmission line pressure is essential for proper operation. The 45RFE/545RFE normally uses closed loop line pressure control, where actual line pressure (reported by the line pressure sensor) is continuously monitored. The PCM determines the desired (target) line pressure which is required, and adjusts the Pressure Control Solenoid (PCS) until the actual line pressure matches the desired line pressure value. In the event of a line pressure sensor failure DTC P0932(CA), the PCM changes to an open loop control at an essentially constant line pressure.

Proper diagnosis of line pressure systems is facilitated by the use of a special tool (T-fitting - Miller #8259) which allows the use of a mechanical pressure gauge to compare the line pressure sensor reading on the DRBIII® to the gauge pressure.

Technicians should compare the mechanical gauge reading with the "actual" and "desired" line pressure reading on the DRBIII®. All three readings should closely match in pressure. Because the mechanical and actual line pressure may not match the desired at low engine speeds (due to low pump output RPM), line pressure should always be checked at 1500 - 2000 RPM.

#### Typical Line Pressure problems include:

- ▶ Mechanical and "actual" readings both less than desired
  - If the mechanical and "actual" readings do not increase significantly as engine speed is raised above 2000 RPM, the pressure control solenoid is usually at fault. The pressure control solenoid is usually accompanied by DTCs P0867(C8) and P0868(C9). The PCS is located in the Transmission Solenoid/TRS assembly.
  - If the mechanical and "actual" readings vary with engine speed (above 2000 RPM), the fault is often a sticking main regulator valve. This valve is located in the transmission pump assembly.
- ▶ "Actual" reading on the DRBIII® differs from the Mechanical Pressure reading (higher or lower) by more than 69kPa (10 PSI). This is sometimes accompanied by a DTC P0869(CB). The fault is usually in the Line Pressure Sensor or the Line Pressure Sensor Wiring.
- ▶ All three readings match, but the "actual" reading exhibits momentary intermittent pressure increases to 1724 kPa (250 PSI). The line Pressure Sensor is usually the problem. This will cause erratic shift quality (particularly a harsh 3-1 coast down shift), repair by replacing the Line Pressure Sensor.

### 3.2.3.3 DRIVE LEARN PROCEDURE

#### **Procedure To Learn A Smooth 1st Neutral To Drive Shift:**

Perform this procedure only if the complaint is for a delayed or harsh shift the first time the transmission is put into gear after the vehicle is allowed to set with the engine not running for at least 10 minutes. Use the following steps to have the PCM learn the 1st N-D UD CVI.

**NOTE: The transmission oil temperature must be between 80 - 110°F (27 - 43°C).**

1. Start the engine only when the engine and ignition have been off for at least ten (10) minutes.
2. With the vehicle at a stop and the service brake applied, record the 1st N-D UD CVI while performing a Neutral to Drive shift. The 1st N-D

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UD CVI account for air entrapment in the UD clutch that may occur after the engine has been off for a period of time.

3. Repeat steps 1 and 2 until the recorded 1st N-D UD CVI value stabilizes.

**NOTE:** It is important that this procedure be performed when the transmission temperature is between 80 - 110°F (27 - 43°C). If this procedure takes too long to complete fully for the allowed transmission oil temperature, the vehicle may be returned to the customer with an explanation that the shift will improve daily during normal vehicle usage. The PCM also learns at higher oil temperatures, but these values (line pressure correction values) are not available for viewing on the DRBIII®.

### **Procedure To Learn A Smooth Neutral To Drive Garage Shift:**

Perform this procedure if the complaint is for a delayed or harsh shift when the transmission is put into gear after the vehicle has had its first shift. Use the following steps to have the PCM learn the NORM N-D UD CVI.

**NOTE:** The transmission oil temperature must be between 80 - 110°F (27 - 43°C) to learn the UD CVI. Additional learning occurs at temperatures as low as 0°F and as high as 200°F. This procedure may be performed at any temperature that experiences poor shift quality. Although the UD CVI may not change, shift quality should improve.

1. Start the vehicle engine and shift to drive.
2. Move the vehicle forward to a speed of at least 16 km/h (10 MPH) and come to a stop. This ensures no air is present in the UD hydraulic circuit.
3. Perform repeated N-D shifts at a stop while pausing in Neutral for at least 2-3 seconds and monitor NORM N-D UD CVI volume until the value stabilizes. The value will change during the N-D shift. This is normal since the UD value is different for the N-D shift than the normal value shown which is used for 4-3 coastdown and kickdowns. Perform repeated shifts in this temperature range until the NORM N-D UD CVI value stabilizes and the N-D shifts become smooth.
4. This procedure may be performed at any temperature that experiences poor N-D shift quality. Although the UD CVI may not change, shift quality should improve.

### **Procedure To Learn The 1st 2-3 Shift After A Restart Or Shift To Reverse:**

Use the following steps to have the PCM learn the 1st 2-3 shift OD CVI.

**NOTE:** The transmission oil temperature must be above 80°F (27°C).

1. With the vehicle engine running, select reverse gear for over 2 seconds.
2. Shift the transmission to Drive and accelerate the vehicle from a stop at a steady 15 degree throttle opening and perform a 2-3 shift while noting the OD CVI. During the shift, a different value may appear on the screen, which is the 1st 2-3 OD CVI.
3. Repeat steps 1 and 2 until the 1st 2-3 upshift becomes smooth and the 1st 2-3 OD CVI stabilizes.

### **Procedure To Learn A Smooth 2-3 And 3-4 Upshift:**

Use the following steps to have the PCM learn the OD and 4C CVI's.

**NOTE:** The transmission oil temperature must be above 110°F (43°C).

1. Accelerate the vehicle from a stop at a steady 15 degree throttle opening and perform multiple 1-2, 2-3, and 3-4 upshifts. The 2nd 2-3 shift following a restart or shift to reverse will be shown during the shift as a value between the 1st 2-3 OD CVI and the normal OD CVI. Updates to the normal OD CVI will occur after the 2nd shift into 3rd gear, following a restart or shift to reverse.
2. Repeat step 1 until the 2-3 and 3-4 shifts become smooth and the OD and 4C CVI become stable.

### **Procedure To Learn A Smooth 4-3 Coastdown And Part Throttle 4-3 Kickdown:**

Use the following steps to have the PCM learn the UD shift volume.

**NOTE:** The transmission oil temperature must be above 110°F (43°C).

1. At a vehicle speed between 64-97 km/h (40-60 MPH), perform repeated 4-3 kickdown shifts.
2. Repeat step 1 until the UD volume becomes somewhat stable and the shift becomes smooth.

### **Procedure To Learn A Smooth 1-2 Upshift and 3-2 Kickdown:**

Use the following steps to have the PCM learn the 2C shift volume.

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

1. With a vehicle speed below 48 km/h (30 MPH) and the transmission in 3rd gear, perform multiple 3-2 kickdowns.
2. Repeat step 1 until the 3-2 kickdowns become smooth and the 2C CVI becomes stable.

**Procedure To Learn A Smooth Manual 2-1 Pulldown Shift As Well As A Neutral To Reverse Shift:**

Use the following steps to have the PCM learn the LR volume.

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

1. With the vehicle speed around 40-48 km/h (25-30 MPH) in Manual 2nd, perform manual pull-downs to Low or 1st gear at closed throttle.
2. Repeat step 1 until the LR CVI become stable and the manual 2-1 becomes smooth.

**Procedure To Learn A Smooth Neutral To Reverse Shift:**

Perform the following shifts.

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

1. With the vehicle at a stop, perform Neutral to Reverse shifts until the shift is smooth. An unlearned Neutral to Reverse shift may be harsh or exhibit a double bump.

If any of the shifts are still not smooth after the clutch volume stabilizes, an internal transmission problem may be present.

**Procedure To Learn A Smooth 4-5 Upshift for 545RFE:**

Use the following steps to have the PCM learn the ALT 2C CVI.

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

1. Accelerate the vehicle through 88 km/h (55mph) at a steady 10-15 degree throttle opening and perform multiple 4-5 upshifts.
2. Repeat step 1 until the 4-5 shift become smooth and the ALT 2C CVI become stable. Note: There is a separate ALT 2C CVI volume used and learned for 4-5 shifts. It is independent of the 2C CVI learned on 3-2 kickdowns.

### 3.2.4 TRANSMISSION CONTROL (48RE)

The Cummins Controller 848 (ECM) controls the 4 speed automatic transmissions utilizing electronic governor pressure control, eliminating the need for a separate transmission controller.

Transmission control is achieved through regulation of governor pressure using a Governor Pressure Solenoid valve. Valve position is controlled by pulse width modulation. Torque converter clutch and overdrive solenoids are also controlled by the ECM, as are the transmission relay and dashboard overdrive off lamp. ECM inputs affecting transmission operation include the throttle position sensor, output shaft speed sensor, vehicle speed, engine speed sensor (CKP), brake switch, ignition, overdrive on/off switch, torque converter clutch solenoid, transmission temperature sensor, and governor pressure sensor.

The ECM continuously checks for internal transmission problems, electrical problems, and some hydraulic problems. When a problem is sensed, the ECM stores a diagnostic trouble code. Any of these codes cause the transmission to go into "default" mode. When the ECM detects a problem, the transmission will default to third gear. When this happens, the only transmission functions are:

- PARK and NEUTRAL
- REVERSE
- THIRD GEAR
- MANUAL SHIFTING of FIRST, SECOND and THIRD GEAR

No upshifts or downshifts are allowed. The position of the manual valve alone allows the ranges that are available. Although engine performance is seriously degraded while in this mode, it allows the owner to drive the vehicle in for service. The transmission can be shifted manually by quickly downshifting into 1st to achieve 1st gear, then shifting to 2nd, then to third. However, default mode will not allow 4th gear or any EMCC operation.

Once the DRBIII® is in the transmission portion of the diagnostic program, it constantly monitors the ECM, updating the screens with switch, sensor, and input/output states, as well as displaying diagnostic trouble codes and default status.

#### Transmission Identification

The transmission part/identification numbers and codes are stamped on the left side of the case just above the oil pan gasket surface. The first letter/number group is the assembly part number. The next number group is the transmission serial number. Refer to this information when ordering replacement parts.

#### Governor Pressure Solenoid Valve

The solenoid valve generates the governor pressure needed for upshifts and downshifts. It is an electro-hydraulic device and is located in the governor body on the valve body transfer plate. The inlet side of the solenoid valve is exposed to normal transmission line pressure while in forward gears.



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The outlet side of the valve leads to the valve body governor circuit. The solenoid valve regulates line pressure to produce governor pressure. The average current supplied to the solenoid valve controls governor pressure. One amp current produces zero psi governor pressure. Zero amps set the maximum governor pressure. Current is regulated by modulation of the pulse width of a 512 Hz driver frequency. The transmission control relay supplies electrical power to the solenoid valve. Operating voltage is 12 volts (DC) and is provided through the relay's fused B+ contact. The solenoid is polarity sensitive. The ECM energizes the solenoid by grounding it through the power ground terminal on the ECM.

### Governor Pressure Sensor

The governor pressure sensor measures output pressure of the governor pressure solenoid valve.

The sensor output signal provides the necessary feedback to the ECM. This feedback is needed to accurately control pressure. The unit is an absolute pressure device and the output is calibrated to be 0.35 to 0.65 volts at 14.7 psi (normal barometric pressure). Since this is an absolute pressure device, 0 psi calibration is required often to compensate for changing atmospheric pressure or altitude. This voltage measured at 0 psi is referred to as zero pressure offset.

### Governor Shift Schedules

The electronic governor has several governor curves possible as opposed to a conventional governor, which has a single governor curve with two stages. These transmissions are mechanically and hydraulically the same as the ones they replace.

As with all-hydraulic transmissions, the vehicle shift speeds are determined by balancing a hydraulic pressure signal proportional to transmission output speed (called governor pressure) against a pressure signal determined by throttle position (called throttle pressure). The four curves are used during the following operating conditions.

**Low Transmission Fluid Temperature** - When the transmission fluid is cold at or below 30°F, the conventional governor can delay shifts, resulting in higher than normal shift speeds and harsh shifts. The electronically controlled low temperature governor pressure curve is higher than normal to make the transmission shift at normal speeds and sooner. The ECM uses a temperature sensor in the transmission oil sump to determine when low temperature governor pressure is needed.

**Transfer Case Low-Range Operation** - On four-wheel drive vehicles operating in low range, the engine can accelerate to its peak more rapidly than in Normal range, resulting in delayed shifts

and undesirable engine "flare." The low range governor pressure curve is also higher than normal to initiate upshifts sooner. The ECM compares the electronic vehicle speed signal to the transmission output shaft speed signal to determine when the transfer case is in low range.

**Wide-Open Throttle Operation** - In wide-open throttle (WOT) mode, adaptive memory in the ECM assures that up-shifts occur at the preprogrammed optimum speed. WOT operation is determined from the throttle position sensor, which is also a part of the emission control system. The initial setting for the WOT upshift is below the optimum engine speed. As WOT shifts are repeated, the ECM learns the time required to complete the shifts by comparing the engine speed when the shifts occur to the optimum speed. After each shift, the ECM adjusts the shift point until the optimum speed is reached. The ECM also considers vehicle loading, grade and engine performance changes due to high altitude in determining when to make WOT shifts. It does this by measuring vehicle and engine acceleration and then factoring in the shift time.

**Normal Operation** - Normal operation is refined through the increased computing power of the ECM and through access to data on engine operating conditions provided by the ECM. This facilitated the development of a load adaptive shift strategy - the ability to alter the shift schedule in response to vehicle load conditions. One manifestation of this capability is grade "hunting" prevention - the ability of the transmission logic to delay an upshift on a grade if the engine does not have sufficient power to maintain speed in the higher gear. The 3-2 downshift and the potential for hunting between gears occurs with a heavily loaded vehicle or on steep grades. When hunting occurs, it is very objectionable because shifts are frequent and accompanied by large changes in noise and acceleration.

### Governor Operation

The electronic governor control system replaces the old centrifugal governor pressure control and is located on the valve body. The control system uses a governor pressure solenoid that can vary pressure, a pressure sensor, and the output shaft speed sensor. The electronic governor control system regulates pressure to control shifts in the first three gears. Output shaft speed and throttle position is used to determine target pressure. Actual governor pressure is read from the sensor and the difference between the target pressure and actual pressure is used to determine duty cycle correction. The duty cycle is the amount of time the governor pressure solenoid needs to be off to meet the target pressure. Output shaft speed, throttle position, controller calculations, and shift lever position, all determine

different governor pressure curves. Governor pressures can be different at the same output shaft speed. The desired governor pressure is determined by many things; including the acceleration of the vehicle. There is no need for concern if the same output shaft speed has different requested pressures. There is a need for concern if the target pressure and actual pressure are not within three PSI for five seconds or more. If this occurs the control system could result in erratic shifting. The only time the governor control system stays at zero is when the gear selector is in park, neutral, reverse or drive with the vehicle at a stop. When the transmission is in park, neutral, or reverse no line pressure is supplied to the governor pressure solenoid, making governor pressure zero.

#### **Transmission Temperature sensor**

Transmission fluid temperature readings are supplied to the ECM by the trans temp sensor. The temp sensor is located in the governor pressure sensor connector. The temperature readings are used to control engagement of the overdrive clutch, the converter clutch, and governor pressure. Normal resistance value for the thermistor at room temperature is approximately 1000 ohms. The engine control module prevents engagement of the converter clutch and overdrive clutch, when fluid temperature is below approximately 30°F. If fluid temperature exceeds 260°F, the ECM will cause a 4-3 downshift and engage the converter clutch. Engagement is according to the third gear converter clutch engagement schedule.

The overdrive OFF lamp in the instrument panel, also illuminates when the shift back to third occurs. The transmission will not allow fourth gear operation until fluid temperature decreases to approximately 230°F.

#### **Transmission Output Shaft Speed Sensor**

The output shaft speed sensor is located in the overdrive housing. The sensor is positioned over the park gear and monitors transmission output shaft rotating speed. Speed sensor signals are triggered by the park gear lugs as they rotate past the sensor pickup face. One revolution of the output shaft produces 23 pulses. Input signals from the sensor are sent to the ECM for processing.

#### **Torque Converter Electronics**

The torque converter contains a converter clutch mechanism. The converter clutch is an electronically controlled mechanism. It is engaged in fourth gear, and in third gear only when the overdrive control switch is in the OFF position, and also, in third gear over temp mode. The torque converter is not a serviceable component. It should be replaced as an assembly when: diagnosis indicates a mal-

function has occurred, or when a major malfunction allows debris to enter the converter.

### **3.2.5 O2 SENSOR (NGC)**

The O2 system will with ignition on and engine off have a normalized O2 voltage of around 5 volts as displayed on the DRBIII® or measured with a high impedance voltmeter. As the O2 sensor starts generating a signal the voltage will move towards 2.5 volts. The voltage will typically vary between 2.5 volts and 3.5 volts on a normal running engine. The goal voltage is also typically between 2.5 and 3.5 volts. This implies that the 0-volt through 1-volt range that you are used to is still valid, only it is shifted up by a 2.5 volt offset. This 2.5 volt supply is being delivered through the sensor return line. After replacing any O2 Sensor the PCM RAM Memory must be cleared. The reason is that the NGC learns the characteristics of the O2 heater element and these values need to be reinitialized after installing a new O2 sensor. It takes a long time and many cold starts for the NGC to re-learn the new sensor. The RAM Memory can be cleared by depowering the module via a momentary battery disconnect, fuse pulling, or disconnecting the Black connector (C-1) of the NGC.

### **3.2.6 OTHER CONTROLS**

#### **Charging System (NGC)**

The charging system is turned on when the engine is started. The Generator Field is controlled by the PCM using a 12-volt high side driver and a body ground. The PCM determines the Generator output voltage by an input from the Battery Temperature Sensor. The PCM applies a longer duty cycle on time to the Generator Field Control circuit when more system voltage is needed. When a lower system voltage is needed, the PCM shortens the duty cycle on time of the high side driver.

#### **Vehicle Speed Control (w/o ETC)**

The PCM controls vehicle speed by operation of the speed control servo vacuum and vent solenoids. Energizing the vacuum solenoid applies vacuum to the servo to increase throttle position. Operation of the vent solenoid slowly releases the vacuum allowing throttle position to decrease. A special dump solenoid allows immediate release of throttle position caused by braking, cruise control turn off, shifting into neutral, excessive RPM (tires spinning) or ignition key off.

#### **Vehicle Speed Control (ETC)**

The PCM controls vehicle speed by controlling the throttle opening to achieve the selected vehicle speed under all driving conditions. Cruise control



## GENERAL INFORMATION

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switches used on NGC vehicles have two inputs per switch. No servo or solenoids are used with this system.

### IMPORTANT

Be sure that the PCM has the latest software update. Reprogram as indicated by any applicable Technical Service Bulletin. After LDP repairs are completed, verify the repair by running the DRBIII® Leak Detection Pump (LDP) Monitor Test as described in Technical Service Bulletin 18-12-99.

### NATURAL VACUUM LEAK DETECTION (NVLD)

The Natural Vacuum Leak Detection (NVLD) system is the next generation evaporative leak detection system that will first be used on vehicles equipped with the Powertrain Control Module (PCM) or Next Generation Controller (NGC) starting in 2002 M.Y. This new system replaces the leak detection pump as the method of evaporative system leak detection. The current CARB requirement is to detect a leak equivalent to a 0.020" (0.5 mm) hole. This system has the capability to detect holes of this size very dependably.

The basic leak detection theory employed with NVLD is the "Gas Law". This is to say that the pressure in a sealed vessel will change if the temperature of the gas in the vessel changes. The vessel will only see this effect if it is indeed sealed. Even small leaks will allow the pressure in the vessel to come to equilibrium with the ambient pressure. In addition to the detection of very small leaks, this system has the capability of detecting medium as well as large evaporative system leaks.

#### The NVLD utilizes the Gas Law principles

A vent valve seals the canister vent during engine off conditions. If the vapor system has a leak of less than the failure threshold, the evaporative system will be pulled into a vacuum, either due to the cool down from operating temperature or diurnal ambient temperature cycling. The diurnal effect is considered one of the primary contributors to the leak determination by this diagnostic.

When the vacuum in the system exceeds about 1" H<sub>2</sub>O (0.25 KPA), a vacuum switch closes. The switch closure sends a signal to the PCM. The PCM, via appropriate logic strategies (described below), utilizes the switch signal, or lack thereof, to make a determination of whether a leak is present.

#### The NVLD Device and how it functions

The NVLD Assembly is designed with a normally open vacuum switch, a normally closed solenoid, and a seal, which is actuated by both the solenoid and a diaphragm. The NVLD is located on the atmospheric vent side of the canister. The NVLD Assembly is mounted on top of the canister outlet for the DN.

The normally open vacuum switch will close with about 1" H<sub>2</sub>O (0.25 KPA) vacuum in the evaporative system. The diaphragm actuates the switch. This is above the opening point of the fuel inlet check valve in the fill tube so cap off leaks can be detected. Submerged fill systems must have recirculation lines that do not have the in-line normally closed check valve that protects the system from failed nozzle liquid ingestion, in order to detect cap off conditions.

The normally closed valve in the NVLD is intended to maintain the seal on the evaporative system during the engine off condition. If vacuum in the evaporative system exceeds 3" to 6" H<sub>2</sub>O (0.75 to 1.5 KPA), the valve will be pulled off the seat, opening the seal. This will protect the system from excessive vacuum as well as allowing sufficient purge flow in the event that the solenoid was to become inoperative. The solenoid actuates the valve to unseal the canister vent while the engine is running. It also will be used to close the vent during the medium and large leak tests and during the purge flow check. This solenoid requires initial 1.5 amps of current to pull the valve open but after 100 ms. will be duty cycled down to an average of about 150 mA for the remainder of the drive cycle.

Another feature in the NVLD Assembly is a diaphragm that will open the seal with pressure in the evaporative system. The seal will be opened at about 0.5" H<sub>2</sub>O (0.12 KPA) pressure to permit the venting of vapors during refueling. An added benefit to this is that it will also allow the tank to "breathe" during increasing temperatures, thus limiting the pressure in the tank to this low level. This is beneficial because the induced vacuum during a subsequent declining temperature will achieve the switch closed (pass threshold) sooner than if the tank had to decay from a built up pressure.

The NVLD Assembly itself has 3 wires: Switch sense, solenoid driver and ground. It also includes a resistor to protect the switch from a short to battery or a short to ground. The PCM utilizes a high-side driver to energize and duty-cycle the solenoid.

#### The PCM's Role in NVLD Diagnosis:

The integral part of the diagnostic system that makes engine-off leak detection possible is a special circuit in the PCM controller. After the vehicle is turned off, a special part of the controller stays alive and monitors for an NVLD switch closure. This circuit within the PCM is very specific in its function and consumes very little power. If a switch closure is detected, it will log the event and time from key-off, and then power down. This information will be processed at the next key cycle.

**NVLD Leak Detection***Small Leak Test (Passive)*

If, after a specified delay after key off (perhaps 5 minutes), the switch closes or is closed, the test will be pass, indicating that there is no leak. The PCM records the switch closure. The NVLD circuit in the PCM will shut down for the remainder of that particular engine off (soak) period. When the engine is started, the switch closure is recorded as a "Pass," and the timers that are recording accumulated time are reset.

This diagnostic test can take at least a week to mature a leak fault. A week has been chosen for this because the vehicle will have been exposed to the largest possible drive scenarios before a decision is made (most vehicles should see both daily work and weekend driving cycles). This also satisfies CARB's stated goal of getting 3 MIL illuminations within a month for 0.020" (0.5 mm) leak detection diagnostic.

The diagnostics will log engine run time and engine off time to determine when a week has elapsed. There is a limit on the total amount of run time that is applied to the one-week timer. There is also a limit on the total soak time that will be allowed to apply to the one-week timer. There will be a limit on the amount of accrued run time during one specific drive that can be applied to the one-week timer.

The enabling criteria to run this monitor are:

- Fuel level less than 85%
  - Ambient temperature greater than 40°F (4.4°C)
- Rationality Tests*

1. The rationality check of the switch, solenoid and seal will be performed as follows:

- At key-on, the NVLD solenoid will be energized to vent any vacuum that may be trapped in the evaporative system from the previous soak. This should result in an open switch condition.
- The solenoid will be de-energized (to seal the system) at the point where purge begins. The system / NVLD component rationality passes for that drive cycle if the switch closes after purge begins.
- The solenoid is then re-energized for the remainder of the drive cycle.
- If the switch events are not seen in a certain period of time, the rationality check will have failed (2 trip rule).

2. Purge Flow:

The above rationality check is considered sufficient to confirm purge solenoid function and conformance with the purge flow test requirement. The Purge Flow Monitor is passed based on switch activity when purge is turned on or based on a rich fuel control shift when purge is turned on.

*Medium and Large Leak Test (Intrusive)*

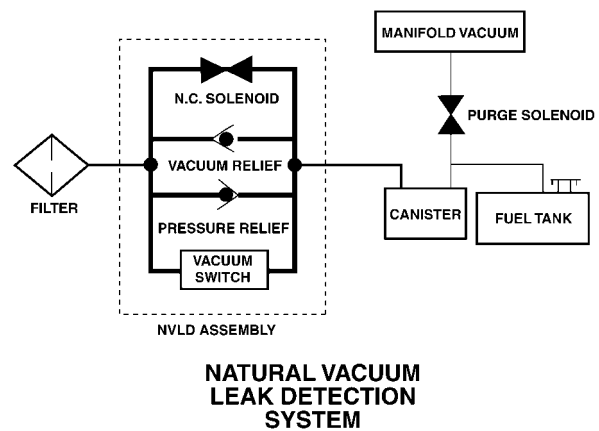
**NOTE: This intrusive test will only be run if the Small Leak (passive) test fails, or is inconclusive (the switch does not close)**

Enabling Conditions:

- 40°F to 90°F
- Engine temperature at startup within 10°F of the ambient temperature
- Fuel level less than 85%

The intrusive Medium and Large leak are conducted as follows:

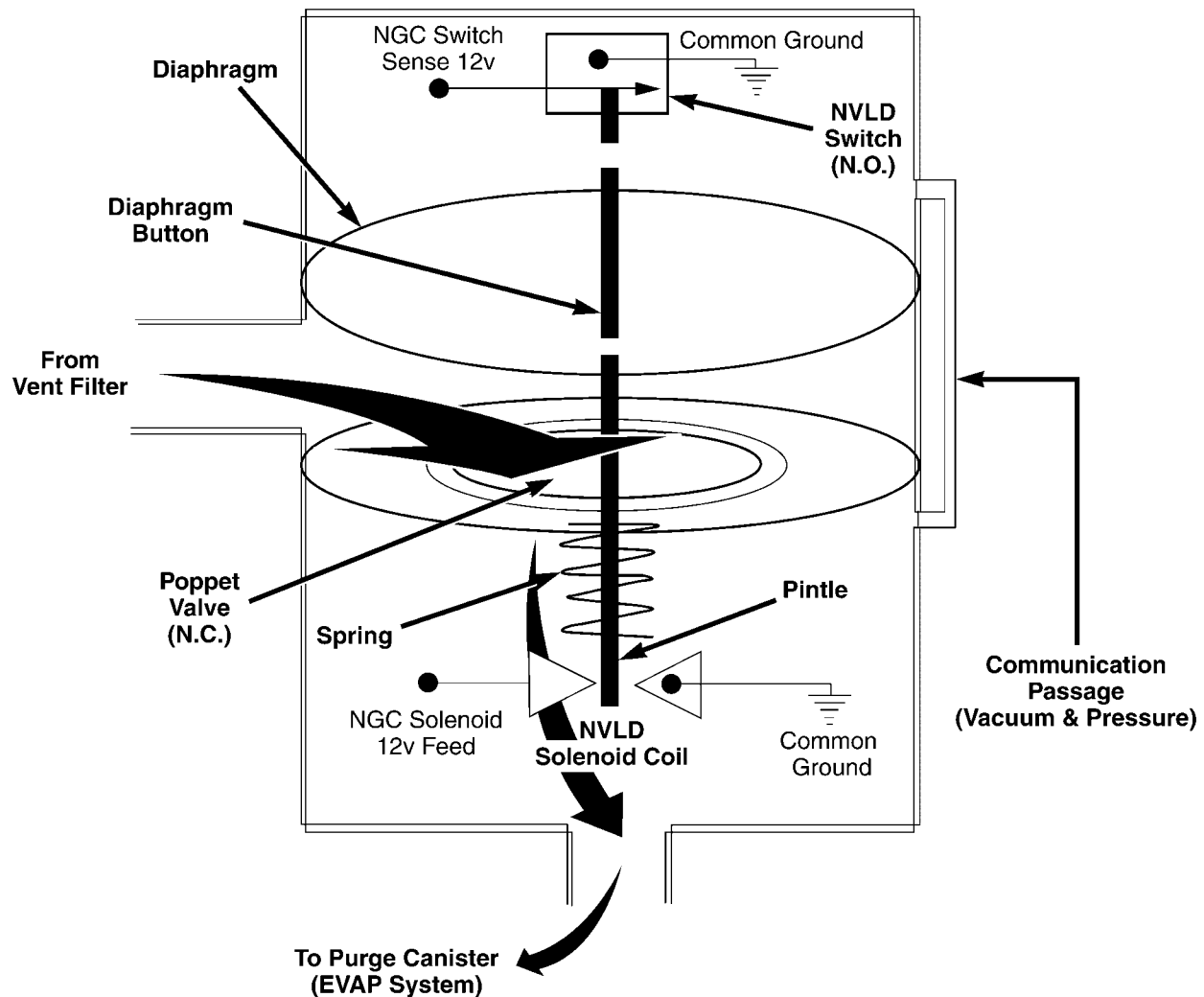
- De-energize the NVLD solenoid to seal the canister vent.
- Activate purge shortly after closed loop. Pull the tank vacuum past the vacuum switch point (1" H<sub>2</sub>O vacuum) of the NVLD for a specific time while tracking the standard purge flow rate.
- Turn purge off and determine how long it takes to decay the tank vacuum and reopen the switch. Determine the leak size from the time it took to reopen the switch. Note: Fuel level is an important determining factor.
- If the switch does not close, a more aggressive purge flow will be applied to determine if it is a very large leak, missing fuel cap, problem with the NVLD device, purge flow problem, etc...



80dceb8e

**TEST EQUIPMENT**

The Evaporative Emission Leak Detector (EELD) Miller Special Tool 8404 is capable of visually detecting leaks in the evaporative system and will take the place of the ultrasonic leak detector 6917A. The EELD utilizes shop air and a smoke generator to visually detect leaks down to 0.020 or smaller. The food grade oil used to make the smoke includes an UV trace dye that will leave telltale signs of the leak under a black light. This is helpful when components have to be removed to determine the exact leak location. For detailed test instructions, follow the operators manual packaged with the EELD.



**NVLD Switch Closure happens at 1" H<sub>2</sub>O (Water) Vacuum (+/-12% when new). Vacuum draws the Diaphragm up closing the Switch.**

- Pressure Relief:** The Poppet Valve is spring loaded closed (up). It opens at 1" H<sub>2</sub>O Pressure. Pressure from the Purge Canister (EVAP System) enters the top of the diaphragm chamber via an internal communication passage. Pressure then pushes the Diaphragm down unseating the Poppet Valve allow the EVAP pressure to exit to the Vent Filter.
- Vacuum Relief:** The Poppet Valve is spring loaded closed (up). The Poppet Valve begins to open at 3"-4" H<sub>2</sub>O Vacuum, and is completely open at 6" H<sub>2</sub>O (flows 70 Liters per Minute). Vacuum acts on the bottom of the Poppet Valve & draws it down to open the Purge Canister (EVAP System) to the Vent Filter.

**NVLD Solenoid has a Resistance of 8 Ohms (+/-0.5 Ohm) at 68 Degrees F. When Energized, it pulls the Pintle down thus opening the Poppet Valve and connects the Purge Canister with the Vent Filter (Atmosphere).**

### 3.2.7 NON-MONITORED CIRCUITS

The PCM does not monitor the following circuits, systems, and conditions even though they could have malfunctions that result in driveability problems. A diagnostic code may not be displayed for the following conditions. However, problems with these systems may cause a diagnostic code to be displayed for other systems. For example, a fuel pressure problem will not register a diagnostic code directly, but could cause a rich or lean condition. This could cause an oxygen sensor, fuel system, or misfire monitor trouble code to be stored in the PCM.

**Engine Timing** - The PCM cannot detect an incorrectly indexed timing chain, camshaft sprocket, or crankshaft sprocket. The PCM also cannot detect an incorrectly indexed distributor or Cam sensor.(\*)

**Fuel Pressure** - Fuel pressure is controlled by the fuel pressure regulator. The PCM cannot detect a clogged fuel pump inlet filter, clogged in-line filter, or a pinched fuel supply.(\*)

**Fuel Injectors** - The PCM cannot detect a clogged fuel injector, a sticking pintle, or that an incorrect injector is installed.(\*)

**Fuel Requirements** - Poor quality gasoline can cause problems such as hard starting, stalling, and stumble. Use of methanol-gasoline blends may result in starting and driveability problems. (See individual symptoms and their definitions in Section 6.0 (Glossary of Terms).

**PCM Grounds** - The PCM cannot detect a poor system ground.

However, a diagnostic trouble code may be stored in the PCM as a result of this condition.

**Throttle Body Air Flow** - The PCM cannot detect a clogged or restricted air cleaner inlet or filter element.(\*)

**Exhaust System** - The PCM cannot detect a plugged, restricted, or leaking exhaust system.(\*)

**Cylinder Compression** - The PCM cannot detect uneven, low, or high engine cylinder compression.(\*)

**Excessive Oil Consumption** - Although the PCM monitors the exhaust oxygen content through the oxygen sensor when the system is in a closed loop, it cannot determine excessive oil consumption.

**NOTE:** Any of these conditions could result in a rich or lean condition causing an oxygen sensor trouble code to be stored in the PCM, or the vehicle may exhibit one or more of the driveability symptoms listed in the Table of Contents.

### 3.3 DIAGNOSTIC TROUBLE CODES

Diagnostic trouble codes (DTCs) are codes stored by the Powertrain Control Module (PCM) that help us diagnose Powertrain, Transmission problems. The Electronic Transfer Case Diagnostic trouble codes (DTCs) are stored in the Transfer Case Control Module. They are viewed using the DRBIII® scan tool. Some engine driveability problems can be misinterpreted as a transmission problem. Ensure that the engine is running properly and that no engine DTCs are present that could cause a transmission complaint.

If there is a communication bus problem, trouble codes will not be accessible until the problem is fixed. The DRBIII® will display an appropriate message. The following is a possible list of causes for a bus problem:

- open or short to ground/battery in PCI bus circuit.
- internal failure of any module or component on the bus

Each diagnostic trouble code is diagnosed by following a specific testing sequence. The diagnostic test procedures contain step-by-step instructions for determining the cause of a transmission diagnostic trouble code. Possible sources of the code are checked and eliminated one by one. It is not necessary to perform all of the tests in this book to diagnose an individual code. These tests are based on the problem being present at the time that the test is run.

If the Engine or Transmission records a DTC that will adversely affect vehicle emissions, it will request (via the communication bus) that the PCM illuminate the Malfunction Indicator Lamp (MIL). Although these DTCs will be stored in the PCM immediately as a 1 trip failure, it may take up to five minutes of accumulated trouble confirmation to set the DTC and illuminate the MIL. Three consecutive successful OBDII/EURO III trips or clearing the DTCs with a diagnostic tool (DRBIII® or equivalent) is required to extinguish the MIL. When the Transmission requests that the PCM illuminate the MIL, the PCM sets a DTC P0700 (\$89) to alert the technician that there are DTCs in the Transmission. The PCM DTC (\$89) must also be erased in the PCM in order to extinguish the MIL.



### 3.3.1 HARD CODE

#### Powertrain

A diagnostic trouble code that comes back within one cycle of the ignition key is a “hard” code. This means that the problem is present when the PCM checks that circuit or function. Most procedures in this manual verify if the trouble code is a hard code at the beginning of each test. When it is not a hard code, an “intermittent” test must be performed.

Codes that are for OBDII monitors will not set with just the ignition key on. Comparing these to non-emission codes, they will seem like an intermittent. These codes require a set of parameters to be performed (The DRBIII® pre-test screens will help with this for MONITOR codes), this is called a “TRIP”. All OBDII DTCs will be set after two or in some cases one trip failures, and the MIL will be turned on. These codes require three successful, no failures, TRIPS to extinguish the MIL, followed by 40 warm-up cycles to erase the code. For further explanation of TRIPS, Pre-test screens, Warm-up cycles, and the use of the DRBIII®, refer to the On Board Diagnostic training booklet #81-699-97094.

#### Transmission

Any Diagnostic Trouble Code (DTC) that is set whenever the system or component is monitored is a HARD code. This means that the problem is there every time the PCM checks that system or component. Some codes will set immediately at start up and others will require a road test under specific conditions. It must be determined if a code is repeatable (Hard) or intermittent before attempting transmission diagnosis.

### 3.3.2 ONE TRIP FAILURE

A One Trip Failure, when read from the PCM, is a hard OBDII/EURO III code that has not matured to the full 5 minutes. This DTC can take up to five minutes of problem identification before illuminating the MIL

### 3.3.3 INTERMITTENT CODE

A diagnostic trouble code that is not present every time the PCM checks the circuit is an “intermittent” code. Most intermittent codes are caused by wiring or connector problems. Intermittent conditions that come and go like this are the most difficult to diagnose; they must be looked for under specific conditions that cause them. The following procedures may assist you in identifying a possible intermittent problem:

- Visually inspect related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.

- Visually inspect the related harnesses. Look for chafed, pierced, or partially broken wire.
- Refer to any S.T.A.R. Hotline Newsletters or technical service bulletins that may apply.
- Use the DRBIII® data recorder or co-pilot.

Some Transmission intermittent DTCs are caused by wiring or connector problems. However intermittent Speed ratio codes are usually caused by intermittent hydraulic seal leakage in the clutch and/or accumulator circuits. Intermittent speed ratio codes can be set by intermittent speed sensor circuitry or by line noise being induced onto one or both of the speed sensor signal circuits. Problems that come and go like this are the most difficult to diagnose, they must be looked for under the specific conditions that cause them.

### 3.3.4 STARTS SINCE SET COUNTER

#### Powertrain

This reset counter counts the number of times the vehicle has been started since codes were last set or erased. This counter will count up to 255 start counts. The number of starts helps determine when the trouble code actually happened. This is recorded by the PCM and can be viewed on the DRBIII® as STARTS since set. When there are no trouble codes stored in memory, the DRBIII® will display “NO TROUBLE CODES FOUND” and the reset counter will show “STARTS since set = XXX.” OBDII vehicles will also display a DTC Specific or Global “Good Trip” counter which will indicate the number of “Good Trips” since the DTC was set. After 3 consecutive “Good Trips,” the MIL is extinguished and the good trip counter is replaced by a “Warm Up Cycle” counter. 40 Warm-Up Cycles will erase the DTC and Freeze Frame information.

#### RFE TRANSMISSION

The Starts Since Set counter counts the number of times the vehicle has started since the most recent DTC was set. The counter will count up to 255 starts. Note that this counter only applies to the last code set.

When there are no diagnostic trouble codes stored in memory, the DRBIII® will display “NO DTC’s PRESENT” and the reset counter will show “STARTS SINCE CLEAR” = XXX.

The number of starts helps determine if the diagnostic trouble code is hard or intermittent.

- If the number of starts is less than 3, the code is usually a hard code.
- If the number of starts is greater than 3, it is considered an intermittent code. This means that the engine has been started most of the time without the code recurring.



### 3.3.5 TROUBLE CODE ERASURE

A Diagnostic trouble code will be cleared from PCM memory if it has not reset for 40 warm-up cycles.

A warm-up cycle is defined as “sufficient vehicle operation such that the coolant temperature has risen by at least 22°C (40°F) from engine starting and reaches a minimum temperature of 71°C (160°F).

The Malfunction Indicator Lamp (MIL) will turn off after 3 good trips or when the DTC's are cleared from the PCM

### 3.3.6 RFE QUICK LEARN

The Quick Learn function customizes adaptive parameters of the PCM to the transmission Characteristics of a vehicle. This gives the customer improved “as received” shift quality compared to the initial parameters stored in the PCM.

Notes about Quick Learn Features

The nature of the Quick Learn function requires that certain features must be taken into consideration.

- > Quick Learn should generally not be used as a repair procedure unless directed by a repair or diagnostic procedure. If the transmission system is exhibiting a problem that you think is caused by an invalid CVI, you should try to relearn the value by performing the appropriate driving maneuver. In most cases, if a Quick Learn makes a vehicle shift better, the vehicle will return with the same problem.
- > Before performing Quick Learn, it is imperative that the vehicle be shifted into OD with the engine running and the oil level set to the correct level. This step will purge air from the clutch circuits to prevent erroneous clutch volume values which could cause poor initial shift quality. Cycle the transmission through all gears 2-3 times immediately before performing Quick Learn. For best results, Quick Learn should be run with the transmission sump temperature > 90°F.
- > If an unused PCM is installed on a vehicle with a HOT engine, Quick Learn will cause the PCM to report a cold calculated oil temperature. This requires monitoring the calculated oil temperature using the DRBIII®. If the temperature is below 16°C (60°F), the transmission must be run at idle or driven in gear until it goes above 16°C (60°F). If the temperature is above 93°C (200°F), the transmission must cool to below 93°C (200°F).
- > First gear is engaged in overdrive after Quick Learn is completed. Place the vehicle in park after performing Quick Learn.  
The Quick Learn function should be performed:

- Upon installation of a new service PCM
- After replacement or rebuild of internal transmission components or the torque converter
- If one or more of the clutch volumes indexes (CVI's) contain skewed readings because of abnormal conditions.

The Quick Learn procedure is performed with the DRBIII® by selecting “Transmission” system then “Miscellaneous” functions, then “Quick Learn”. Follow the procedure instructions displayed on the DRBIII®.

To perform the Quick Learn procedure, the following conditions must be met.

**NOTE: The oil temperature must be between 16°C (60°F) and 93°C (200°F). Above 32°C (90°F) for best results.**

**Cycle the transmission through all gears 2-3 times immediately before performing Quick Learn.**

- It is imperative that the vehicle oil level set to the correct level. Shift the transmission into OD with the engine running, this step will purge the air in the clutch circuits to prevent erroneous clutch volume values, which could cause poor initial shift quality.
- Shift the transmission to neutral.
- The brakes must be applied.
- The engine must be idling.
- The throttle angle (TP sensor) must be less than 3 degrees.
- The shift lever position must stay in neutral, after shifting to neutral the engine idle speed will ramp up to 1600rpm and the DRBIII® will prompt the operator to shift to OD. Do not shift to OD until the engine idle speed stabilizes at 1600rpm.
- The shift lever must stay in OD after the “Shift to Overdrive” prompt until the DRBIII® indicates the procedure is complete.

**NOTE: The above conditions must be maintained during the procedure to keep the procedure from being aborted.**

**NOTE: After the Quick Learn Procedure is complete, the vehicle should be drive learned per the Drive Learn Procedure**

### 3.3.7 RFE CLUTCH VOLUMES

The LR clutch volume is updated when doing a **manual** downshift into 1st gear with vehicle speed above 40 km/h (25 MPH) and throttle angle below 5°. The transmission temperature must be above 43°C (110°F).

## GENERAL INFORMATION

The clutch volume should be between 45 and 134.

**Note: you must manually move the shift lever into the low position.**

The 2C clutch volume is updated when doing a 3-2 shift with throttle angle between 10° and 54°. The transmission temperature must be above 43°C (110°F). The clutch volume should be between 25 and 85

The ALT 2C clutch volume is updated when doing a 4th-4 prime shift with throttle angle between 10° and 54°. The transmission temperature must be above 43°C (110°F). The clutch volume should be between 25 and 85

The OD clutch volume is updated when doing a 2-3 shift with throttle angle between 10° and 54°. The transmission temperature must be above 43°C (110°F). The clutch volume should be between 30 and 100.

The 4C clutch volume is updated when doing a 3-4 shift with throttle angle between 10° and 54°. The transmission temperature must be above 43°C (110°F). The clutch volume should be between 30 and 85.

The UD clutch volume is updated when doing a 4-3 shift with throttle angle between 10° and 54°. The transmission temperature must be above 43°C (110°F). The clutch volume should be between 30 and 100.

### 3.3.8 NO START INFORMATION (POWERTRAIN)

#### IMPORTANT NOTE:

If the Powertrain Control Module has been programmed, a DTC will set in the ABS and Air Bag modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting.

#### FOR ABS AND AIR BAG SYSTEMS:

1. Enter correct VIN and Mileage in PCM.
2. Erase codes in ABS and Air Bag modules.

#### FOR SKIM THEFT ALARM:

1. Connect the DRBIII® to the data link connector.
2. Go to Theft Alarm, SKIM, Misc. and place the SKIM in *secured access* mode, by using the appropriate PIN code for this vehicle.
3. Select Update the Secret Key data, data will be transferred from the SKIM to the PCM (This is required to allow the vehicle to start with the new PCM).
4. If three attempts are made to enter *secured access* mode using the incorrect PIN, *secured access* mode will be locked out for one hour. To exit this lock out mode, leave the ignition key in

the Run/Start position for one hour. Ensure all accessories are turned off. Also monitor the battery state and connect a battery charger if necessary.

After reading (System Description and Functional Operation), you should have a better understanding of the theory and operation of the on-board diagnostics, and how this relates to the diagnosis of a vehicle that may have a driveability-related symptom or complaint.

### 3.4 USING THE DRBIII®

Refer to the DRBIII® user's guide for instructions and assistance with reading trouble codes, erasing trouble codes, and other DRBIII® functions.

### 3.5 DRBIII® ERROR MESSAGES AND BLANK SCREEN

Under normal operation, the DRBIII® will display one of only two error messages:

- User-Requested WARM Boot by pressing MORE and NO at the same time.

ver: 2.29  
date: 1 oct 93  
file: key\_itf.cc  
date: Jan 12 1994  
line: 544  
err: 0x1User-Requested WARM Boot

Press MORE to switch between this display  
and the application screen.  
Press F4 when done noting information.  
or  
User Requested COLD Boot by pressing  
MORE YES at the same time.

ver: 2.29  
date: 1 oct 99  
file: key HND1.CC  
date: Mar 8 2000  
line: 1297  
err: 0x1  
User-Requested COLD Boot

Press MORE to switch between this display  
and the application screen.  
Press F4 when done noting information.

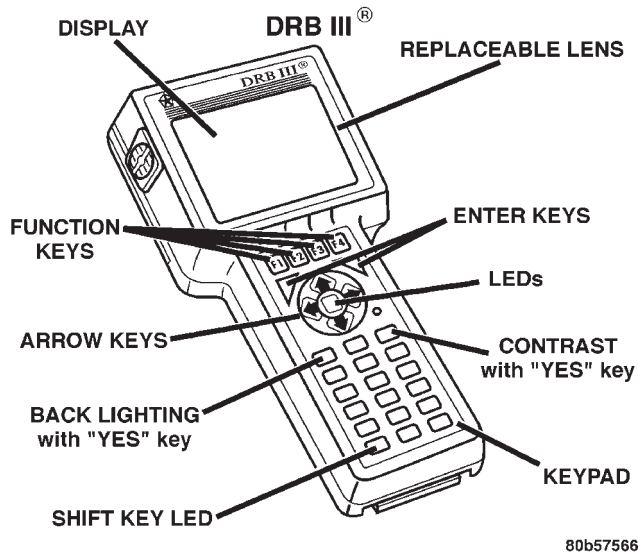
#### 3.5.1 DRBIII® DOES NOT POWER UP

If the LED's do not light or no sound is emitted at start up, check for loose cable connections or a bad cable. Check the vehicle battery voltage (data link connector cavity 16). Check for proper ground connection at DLC cavity. A minimum of 11 volts is required to adequately power the DRBIII®.

If all connections are proper between the DRBIII® and the vehicle or other devices, and the vehicle battery is fully charged, an inoperative DRBIII® may be the result of a faulty cable or vehicle wiring. For a blank screen, refer to the appropriate body diagnostics manual.

### 3.5.2 DISPLAY IS NOT VISIBLE

Low temperatures will affect the visibility of the display. Adjust the contrast to compensate for this condition.



### 3.5.3 SOME DISPLAY ITEMS READ " \_ "

This is caused by scrolling the DRBIII® display a single line up or down. The line which was scrolled onto the screen might read " \_ ". Use the page down or page up function to display the information.

### 3.6 EATX DTC EVENT DATA

EATX DTC EVENT DATA can be used as a diagnostic aid when experiencing Electronic Transmissions with intermittent problems. When a Diagnostic Trouble Code (DTC) is set, the vehicles EATX inputs are stored in the controller memory and are retrievable with the DRBIII®. This information can be helpful when a DTC can not be duplicated.

The EATX DTC EVENT DATA is located in the DRBIII®, under the Transmission system menu, in the sub-screen Miscellaneous. It is a good practice to document the EATX DTC EVENT DATA before beginning any diagnostic or service procedure.

A thorough understanding of how the transmission works is beneficial in order to interpret the data correctly. These skills are necessary in order to avoid an incorrect diagnosis.

A MASTERTECH video and reference book was produced in January 2002 that explains many of the features of the EATX DTC EVENT DATA with

several examples on how to interpret the information and suggested training material to help understand all the specifics.

EATX DTC EVENT DATA can only be erased by:

1. Disconnecting the battery.
2. Performing a DRBIII® QUICK LEARN procedure.
3. Reprogramming the EATX/NGC controller.

Erasing Transmission DTCs does **not** clear the EATX DTC EVENT DATA

### 3.7 TRANSMISSION SIMULATOR (MILLER TOOL # 8333) AND ELECTRONIC TRANSMISSION ADAPTER KIT (MILLER TOOL #8333-1A)

**NOTE: Remove the starter Relay when using the transmission simulator**

**\*Failure to remove the Starter Relay can cause a PCM - No Response condition.**

**\*The removal of the Starter Relay will also prevent the engine from starting in gear.**

**\*The Transmission Simulator will not accurately diagnose intermittent faults**

The transmission simulator, simply put, is an electronic device that simulates the electronic functions of any EATX or NGC controlled transmission. The Simulators basic function is to aid the technician in determining if an internal transmission problem exists or if the problem resides in the vehicle wiring or control module. It is only useful for electrical problems. It will not aid in the diagnosis of a failed mechanical component, but it can tell you that the control module and wiring are working properly and that the problem is internal to the transmission.

The ignition switch should be in the lock position before attempting to install the simulator. Follow all instructions included with the simulator. If the feedback from the simulator is in doubt, you can verify it's operation by installing it on a known good vehicle. A "known good vehicle" would be defined as a vehicle that does not set any DTC's and drives and shifts as expected. One important point to remember is that the Simulator receives it's power from the Trans Relay Output circuit. If the transmission system is in Limp-in (Relay open), the simulator will not operate. This is not really an indication of a problem, but an additional symptom. If the simulator does not power up ("P" led lit), this is an indication that the problem is still present with the simulator hooked up. This indicates that the problem is in the wiring or control module and not the transmission.

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Miller Tool # 8333-1A consists of the adapter cables and overlay necessary to adapt the simulator to TE/AE/LE/RLE transmissions.

### 4.0 DISCLAIMERS, SAFETY, WARNINGS

#### 4.1 DISCLAIMERS

All information, illustrations, and specifications contained in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

#### 4.2 SAFETY

##### 4.2.1 TECHNICIAN SAFETY INFORMATION

**WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS . FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.**

**WARNING: ENGINES PRODUCE CARBON MONOXIDE THAT IS ODORLESS, CAUSES SLOWER REACTION TIME, AND CAN LEAD TO SERIOUS INJURY. WHEN THE ENGINE IS OPERATING, KEEP SERVICE AREAS WELL VENTILATED OR ATTACH THE VEHICLE EXHAUST SYSTEM TO THE SHOP EXHAUST REMOVAL SYSTEM.**

Set the parking brake and block the wheels before testing or repairing the vehicle. It is especially important to block the wheels on front-wheel drive vehicles; the parking brake does not hold the drive wheels.

When servicing a vehicle, always wear eye protection, and remove any metal jewelry such as watchbands or bracelets that might make an inadvertent electrical contact.

When diagnosing a powertrain system problem, it is important to follow approved procedures where applicable. These procedures can be found in the service manual procedures. Following these procedures is very important to the safety of individuals performing diagnostic tests.

##### 4.2.2 VEHICLE PREPARATION FOR TESTING

Make sure the vehicle being tested has a fully charged battery. If it does not, false diagnostic DTC's or error messages may occur. It is extremely important that accurate shift lever position data is available to the PCM. The accuracy of any DTC found in memory is doubtful unless the Shift Lever Test, performed on the DRBIII® Scan Tool, passes without failure.

##### 4.2.3 SERVICING SUB-ASSEMBLIES

Some components of the powertrain system are intended to be serviced in assembly only. Attempting to remove or repair certain system sub-components may result in personal injury and/or improper system operation. Only those components with approved repair and installation procedures in the service manual should be serviced.

##### 4.2.4 DRBIII® SAFETY INFORMATION

**WARNING: EXCEEDING THE LIMITS OF THE DRBIII® MULTIMETER IS DANGEROUS. IT CAN EXPOSE YOU TO SERIOUS INJURY. CAREFULLY READ AND UNDERSTAND THE CAUTIONS AND THE SPECIFICATION LIMITS.**

Follow the vehicle manufacturer's service specifications at all times.

- Do not use the DRBIII® if it has been damaged.
- Do not use the test leads if the insulation is damaged or if metal is exposed.
- To avoid electrical shock, do not touch the test leads, tips, or the circuit being tested.
- Choose the proper range and function for the measurement. Do not try voltage or current measurements that may exceed the rated capacity.
- Do not exceed the limits shown in the table below:

Function	Input Limit
Volts	0 - 500 peak volts AC 0 - 500 volts DC
Ohms (resistance)*	0 - 1.12 megohms
Frequency Measured Frequency Generated	0 - 10 kHz



Function	Input Limit
Temperature	- 50 - 600°C - 58 - 1100°F

\* Ohms cannot be measured if voltage is present.

Ohms can be measured only in a non-powered circuit.

- Voltage between any terminal and ground must not exceed 500v DC or 500v peak AC.
- Use caution when measuring voltage above 25v DC or 25v AC.
- A 10A fuse or circuit breaker must protect the circuit being tested.
- Use the low current shunt to measure circuits up to 10A. Use the high current clamp to measure circuits exceeding 10A.
- When testing for the presence of voltage or current, make sure the meter is functioning correctly. Take a reading of a known voltage or current before accepting a zero reading.
- When measuring current, connect the meter in series with the load.
- Disconnect the live test lead before disconnecting the common test lead.
- When using the meter function, keep the DRBIII® away from spark plug or coil wires to avoid measuring error from outside interference.

## 4.3 WARNINGS AND CAUTIONS

### 4.3.1 ROAD TEST WARNINGS

Some complaints will require a test drive as part of the repair verification procedure. The purpose of the test drive is to try to duplicate the diagnostic code or symptom condition.

**CAUTION: Before road testing a vehicle, be sure that all components are reassembled. During the test drive, do not try to read the DRBIII® screen while in motion. Do not hang the DRBIII® from the rear view mirror or operate it yourself. Have an assistant available to operate the DRBIII®**

### 4.3.1 VEHICLE DAMAGE WARNINGS

Before disconnecting any control module, make sure the ignition is "lock" position. Failure to do so could damage the module.

When testing voltage or continuity at any control module, use the Miller tool #8815 (not the wire end or terminal) in the connector. Do not probe a wire

through the insulation: this will damage the wire and eventually cause the wire to fail because of corrosion.

Be careful when performing electrical tests so as to prevent accidental shorting of terminals. Such mistakes can damage fuses or components. Also, a second DTC could be set, making diagnosis of the original problem more difficult.

When replacing a blown fuse, it is important to use only a fuse having the correct amperage rating. The use of a fuse with a rating other than indicated may result in a dangerous electrical system overload. If a properly rated fuse continues to blow, it indicates a problem in the circuit that must be corrected.

### 4.3.2 ROAD TESTING A COMPLAINT VEHICLE (TRANSMISSION)

Some complaints will require a test drive as part of the repair verification procedure. The purpose of the test drive is to try to duplicate the diagnostic DTC or symptom condition.

**CAUTION: Before road testing a vehicle, be sure that all components are reassembled. During the test drive, do not try to read the DRBIII® screen while in motion. Do not hang the DRBIII® from the rear view mirror or operate it yourself. Have an assistant available to operate the DRBIII®**

Road testing is an essential step in the diagnostic process that must not be overlooked. Along with the diagnostic information obtained from the DRBIII® Scan Tool and the original customer concern, the road test helps verify the problem was current and any repairs performed, fixed the vehicle correctly. Always operate and observe the vehicle under actual driving conditions.

Just as important as the road test is, there are preliminary inspections that should be performed prior to the road test. Always check the fluid level and condition before taking the vehicle on a road test. Determine if the incorrect fluid is being used, improper fluid will result in erratic transmission operation.

Some of the conditions of incorrect fluid level are as follows:

- Delayed engagement
- Poor shifting or erratic shifting
- Excessive noise
- Overheating

The next step is to verify that the shifter is correctly adjusted. If the shifter is incorrectly adjusted, a number of complaints can result.

The PCM monitors the Shift Lever Position (SLP) Sensor continuously. If the shifter is incorrectly



## GENERAL INFORMATION

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adjusted, the PCM will sense a shift lever position that is not correct for the gear chosen by the driver. This may cause a DTC to be set.

The following complaints may also be the result of an incorrectly adjusted or worn linkage:

- Delayed clutch engagement
- Erratic shifts
- Vehicle will drive in neutral
- Engine will not crank in park or neutral
- Shifter will be able to be moved without the key in the ignition
- Not able to remove the ignition key in park
- Parking pawl will not engage properly

The shift linkage should also be adjusted when replacing the Transmission, repairing the valve body, or when repairing any component between the shift lever and the Transmission.

Some questions to ask yourself when performing the road test are as follows:

- Is the complaint or concern what you think the problem is, based on the drivers description of the problem?
- Is the Transmission operating normally, or is there a real problem?
- When does the problem occur?
- Is the problem only in one gear range?
- What temperature does the problem occur?
- Does the vehicle have to sit over night for the problem to occur?
- Does the transmission go into Limp-in mode?

### 4.3.3 RFE ELECTRONIC PINION FACTOR WARNINGS (IF APPLICABLE)

The pinion factor must be set when replacing the PCM. Note: The pinion factor is a fixed number and cannot be changed or updated in some vehicle applications. If the pinion factor is not set or incorrectly set, any speed related functions will not operate correctly i.e. speedometer, speed control, rolling door locks, other control modules will be affected that depend on speed information.

### 4.4.4 BULLETINS AND RECALLS

Always perform all Safety Recalls and Technical Service Bulletins that are applicable to the problem. Under the provisions of the warranty.

## 5.0 REQUIRED TOOLS AND EQUIPMENT

DRBIII® (diagnostic read-out box) scan tool - must use the latest release level.

Diagnostic Pinout Box #8815  
Evaporative Emissions Leak Detector #8404  
Terminal Removal tool #3638  
Fuel filler adapter #8382  
Fuel pressure adapter (C-6631) or #6539  
Fuel pressure kit (C-4799-B) or #5069  
Fuel pressure kit #8978  
Fuel release hose (C-4799-1)  
Jumper wires  
Line pressure adapter (Miller # 8259)  
Ohmmeter  
Oscilloscope  
Pressure gauge 0-2068 kPa (0-300 PSI)  
Transmission simulator #8833  
Vacuum gauge  
Voltmeter  
12 volt test light minimum 25 ohms resistance with probe #6801  
Fuel pressure gauge #6828 - Diesel  
Fuel test fitting #9011 - Diesel  
Fuel test fitting #9012 - Diesel  
Fuel test fitting #9013 - Diesel  
Fuel test fitting #9014 - Diesel  
Fuel test fitting #9015 - Diesel  
Fuel injector harness tester #9008 - Diesel  
Air induction test tool #9022

**CAUTION: A 12 volt test light should not be used for the following circuits, damage to the powertrain controller will occur.**

- 5-volt Supply
- J1850 PCI Bus
- CCD Bus
- PCI Bus
- CKP Sensor Signal
- CMP Sensor Signal
- Vehicle Speed Sensor Signal
- O2 Sensor Signal

## 6.0 ACRONYMS

<b>A/C</b>	Air Conditioning
<b>ABS</b>	Anti-lock Brake System
<b>ASD Relay</b>	Auto Shutdown Relay
<b>APPS</b>	Accelerator Pedal Position Sensor
<b>Baro</b>	Barometric Pressure
<b>BCM</b>	Body Control Module
<b>BTS</b>	Battery Temperature Sensor
<b>CAA</b>	Clean Air Act

<b>CAB</b>	Controller Antilock Brakes	<b>FEMCC</b>	Fully Electronically Modulated Converter Clutch
<b>CARB</b>	California Air Resources Board	<b>FTP</b>	Federal Test Procedure
<b>CCD BUS</b>	Chrysler Collision Detection Bus	<b>FSS</b>	Fan Speed signal
<b>CKP Sensor</b>	Crankshaft Position Sensor	<b>HC</b>	Hydrocarbons
<b>CKT</b>	Circuit	<b>HO2S</b>	Heated Oxygen Sensor
<b>CMP</b>	Sensor Camshaft Position Sensor	<b>Generator</b>	Previously called “alternator”
<b>CM840</b>	Cummins Engine controller	<b>IAC Motor</b>	Idle Air Control Motor
<b>CO</b>	Carbon Monoxide	<b>IAT Sensor</b>	Intake Air Temperature Sensor
<b>CVI</b>	Clutch Volume Index	<b>IOD</b>	Ignition off draw
<b>DCP Solenoid</b>	Duty-Cycle Purge Solenoid	<b>IRT</b>	Intelligent Recovery Timer
<b>DLC</b>	Data Link Connector	<b>ISS</b>	Input Speed Sensor
<b>DRBIII®</b>	Diagnostic Readout Box - 3rd Generation	<b>I/M</b>	Inspection and Maintenance Testing
<b>DTC</b>	Diagnostic Trouble Code	<b>JTEC</b>	Jeep/Truck Engine Controller
<b>DVOM</b>	Digital Volt Ohm Meter	<b>LDP</b>	Leak Detection Pump
<b>EATX</b>	Electronic Automatic Transmission Controller n	<b>LED</b>	Light Emitting Diode
<b>EC</b>	European Community	<b>LPS</b>	Line Pressure Sensor
<b>ECT Sensor</b>	Engine Coolant Temperature Sensor	<b>LR</b>	Low/reverse Clutch
<b>EEPROM</b>	Electrically Erasable Programmable Read Only Memory	<b>LSIACV</b>	Linear Solenoid Idle Air Control Valve
<b>EGR Valve</b>	Exhaust Gas Recirculation Valve	<b>MAF</b>	Mass Air flow
<b>EMCC</b>	Electronically Modulated Converter Clutch	<b>MAP Sensor</b>	Manifold Absolute Pressure Sensor
<b>EMI</b>	Electro-Magnetic Interference	<b>MDS2®</b>	Mopar Diagnostic System 2nd Generation
<b>EOBD</b>	European OBD (based upon Euro Stage III)	<b>MIL</b>	Malfunction Indicator Lamp
<b>EPA</b>	Environmental Protection Agency	<b>MS</b>	Multi Select
<b>EPP</b>	Engine Position Pulse	<b>MTV</b>	Manifold Tuning Valve
<b>ETC</b>	Electronic Throttle Control	<b>NGC</b>	Next Generation Controller
<b>EU</b>	European Union	<b>NTC</b>	Negative Temperature Coefficient
<b>EVAP</b>	Evaporative Emission System	<b>NVLD</b>	Natural Vacuum Leak Detection
<b>EVR</b>	Electronic Voltage Regulator	<b>O2 Sensor</b>	Oxygen Sensor
<b>EWMA</b>	Exponentially Weighted Moving Average	<b>O2S</b>	Oxygen Sensor
		<b>OBD I</b>	On Board Diagnostics 1st Generation
		<b>OBD II</b>	On-Board Diagnostics 2nd Generation

## GENERAL INFORMATION

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<b>OD</b>	Overdrive Clutch	<b>SCW</b>	Similar Conditions Window
<b>ORVR</b>	On-Board Refueling Vapor Recovery	<b>SKIM</b>	Sentry Key Immobilizer Module
<b>OSS</b>	Output Speed Sensor	<b>SRV</b>	Short Runner Valve
<b>PCI BUS</b>	Programmable Communications Interface BUS (J1850)	<b>SSV</b>	Solenoid Switch Valve
<b>PCM</b>	Powertrain Control Module	<b>SW</b>	Switch
<b>PCS</b>	Pressure Control Solenoid	<b>TCC</b>	Torque Converter Clutch
<b>PCV</b>	Positive Crankcase Ventilation	<b>TCCM</b>	Transfer Case Control Module
<b>PDC</b>	Power Distribution Center	<b>TDC</b>	Top Dead Center
<b>PEMCC</b>	Partial Electronically Modulated Converter Clutch	<b>TP</b>	Throttle Position Sensor
<b>PEP</b>	Peripheral Expansion Port	<b>TRD</b>	Torque Reduction
<b>P/N</b>	Park/Neutral	<b>TRS</b>	Transmission Range Sensor
<b>PPS</b>	Proportional Purge Solenoid	<b>TTS</b>	Transmission Temperature Sensor
<b>PS</b>	Power Steering	<b>UD</b>	Underdrive Clutch
<b>PSP</b>	Power Steering Pressure (Switch)	<b>VSS</b>	Vehicle Speed Signal
<b>PTC</b>	Positive Temperature Coefficient	<b>WOT</b>	Wide Open Throttle
<b>PWM</b>	Pulse-Width Modulation	<b>2C</b>	2nd Clutch
<b>RAM</b>	Random Access Memory	<b>4C</b>	4th Clutch
<b>REV</b>	Reverse Clutch		
<b>RFI</b>	Radio Frequency Interference		
<b>RKE</b>	Remote Keyless Entry		
<b>RPM</b>	Revolutions Per Minute		
<b>SAE</b>	Society of Automotive Engineers		
<b>SBEC</b>	Single Board Engine Controller		

### 6.2 DEFINITIONS

OBDII/EURO III Trip - A vehicle start and drive cycle such that all once per trip diagnostic monitors have run.

Key Start - A vehicle start and run cycle of at least 20 seconds.

Warm-up Cycle - A vehicle start and run cycle such that the engine coolant must rise to at least 71°C (160°F) and must rise by at least 22°C (40°F) from initial start up. To count as a warm-up cycle, no DTCs may occur during the cycle.

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## 7.0

# DIAGNOSTIC INFORMATION AND PROCEDURES

## Symptom:

**\*NO RESPONSE FROM ECM (PCI BUS) - DIESEL ONLY**

POSSIBLE CAUSES
ECM PCI NO RESPONSE
PCI BUS CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition on.</p> <p><b>NOTE: As soon as one or more module communicates with the DRB, answer the question.</b></p> <p>With the DRBIII®, enter Anti-Lock Brakes.</p> <p>With the DRBIII®, enter Body then Electro/Mechanical Cluster (MIC).</p> <p>With the DRBIII®, enter Passive Restraints then Airbag.</p> <p>Were you able to establish communications with any of the modules?</p> <p>Yes → Go To 2</p> <p>No → Refer to symptom PCI Bus Communication Failure in the Communications category.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**\*NO RESPONSE FROM ECM (PCI BUS) - DIESEL ONLY — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII® read ECM Diagnostic Trouble Codes. This is to ensure power and grounds to the ECM are operational.</p> <p><b>NOTE: If the DRBIII® will not read ECM DTC's, follow the NO RESPONSE TO ECM (SCI only) symptom path.</b></p> <p><b>NOTE: If the vehicle will not start and the DRBIII® displays a no response message, refer to the appropriate symptom in the powertrain diagnostic procedures.</b></p> <p>Turn the ignition off.</p> <p>Disconnect the ECM harness connectors.</p> <p>Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes.</p> <p>Connect the scope input cable to the channel one connector on the DRBIII®. Attach the red and black leads and the cable to probe adapter to the scope input cable.</p> <p>With the DRBIII® select Pep Module Tools.</p> <p>Select lab scope.</p> <p>Select Live Data.</p> <p>Select 12 volt square wave.</p> <p>Press F2 for Scope.</p> <p>Press F2 and use the down arrow to set voltage range to 20 volts. Set Probe to x10.</p> <p>Press F2 again when complete.</p> <p>Connect the Black lead to the ECM ground. Connect the Red lead to the PCI Bus circuit in the ECM connector.</p> <p>Turn the ignition on.</p> <p>Observe the voltage display on the DRBIII® Lab Scope.</p> <p>Does the voltage pulse from 0 to approximately 7.5 volts?</p> <p>Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Repair the PCI Bus circuit for an open. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

**\*NO RESPONSE FROM ECM (SCI ONLY) - DIESEL ONLY**

POSSIBLE CAUSES
INSPECT WIRING HARNESS AND CONNECTORS CHECK ECM POWERS AND GROUNDS SCI CIRCUIT(S) SHORTED TO GROUND SCI CIRCUIT(S) SHORTED TO VOLTAGE SCI CIRCUIT(S) OPEN SCI CIRCUIT(S) SHORTED TOGETHER ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Perform the symptom Checking ECM Power and Ground Circuits in the Driveability category. Did the vehicle pass this test?  Yes → Go To 2 No → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the DRB from the DLC. Measure the resistance between ground and the SCI Transmit circuit. Measure the resistance between ground and the SCI Receive circuit. Is the resistance below 10.0 ohms for both measurements?  Yes → Repair the SCI circuit(s) for a short to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All
3	Turn the ignition off. Disconnect the DRB from the DLC. Disconnect the ECM harness connectors. Turn the ignition on. Measure the voltage of the SCI Transmit circuit at the DLC. Measure the voltage of the SCI Receive circuit at the DLC. Is the voltage above 1.0 volt for either measurement?  Yes → Repair the SCI circuit(s) for a short to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 4	All

**\*NO RESPONSE FROM ECM (SCI ONLY) - DIESEL ONLY — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Disconnect the DRB from the DLC.            Measure the resistance of the SCI Transmit circuit between the ECM harness connector and the DLC.            Measure the resistance of the SCI Receive circuit between the ECM harness connector and the DLC.            Is the resistance below 10.0 ohms for each measurement?</p> <p>Yes → Go To 5</p> <p>No → Repair the SCI circuit(s) for an open.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Disconnect the DRB from the DLC.            Measure the resistance between the SCI Transmit and SCI Receive circuits at the DLC.            Is the resistance below 10.0 ohms?</p> <p>Yes → Repair the SCI circuit(s) for a short together.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.            Using the Service Information inspect the SCI Transmit and SCI Receive circuits between the DLC and ECM.            Check the wiring and connectors for damage, corrosion or other problems that may cause circuit interruption.            Are there any problems evident?</p> <p>Yes → Repair as wiring/ connectors necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the Engine Control Module in accordance with the Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

**\*NO RESPONSE FROM PCM (PCI BUS) - NGC**

### POSSIBLE CAUSES

PCM PCI NO RESPONSE  
POWERTRAIN CONTROL MODULE  
PCI BUS CIRCUIT OPEN

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition on.</p> <p><b>NOTE: As soon as one or more module communicates with the DRB, answer the question.</b></p> <p>With the DRB, enter Body then Electro/Mechanical Cluster (MIC).</p> <p>With the DRB, enter Passive Restraints then Airbag.</p> <p>Were you able to establish communications with any of the modules?</p> <p>Yes → Go To 2</p> <p>No → Refer to symptom PCI Bus Communication Failure in the Communications category.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
2	<p>With the DRB read the Powertrain DTC's. This is to ensure power and grounds to the PCM are operational.</p> <p><b>NOTE: If the DRB will not read PCM DTC's, follow the NO RESPONSE TO PCM (PCM SCI only) symptom path.</b></p> <p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes.</p> <p>Connect the scope input cable to the channel one connector on the DRB. Attach the red and black leads and the cable to probe adapter to the scope input cable.</p> <p>With the DRBIII® select Pep Module Tools.</p> <p>Select lab scope.</p> <p>Select Live Data.</p> <p>Select 12 volt square wave.</p> <p>Press F2 for Scope.</p> <p>Press F2 and use the down arrow to set voltage range to 20 volts. Press F2 again when complete.</p> <p>Connect the Black lead to the chassis ground. Connect the Red lead to the PCI Bus circuit in the appropriate terminal of special tool #8815.</p> <p>Turn the ignition on.</p> <p>Observe the voltage display on the DRB Lab Scope.</p> <p>Does the voltage pulse from 0 to approximately 7.5 volts?</p> <p>Yes → Replace and program the Powertrain Control Module in accordance with the Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Repair the PCI Bus circuit for an open.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**Symptom:**

**\*NO RESPONSE FROM PCM (PCM SCI ONLY) - NGC**

POSSIBLE CAUSES
CHECK PCM POWERS AND GROUNDS
PCM SCI TRANSMIT CIRCUIT SHORTED TO VOLTAGE
PCM SCI RECEIVE CIRCUIT SHORTED TO VOLTAGE
PCM SCI CIRCUITS SHORTED TOGETHER
PCM SCI TRANSMIT CIRCUIT SHORTED TO GROUND
PCM SCI RECEIVE CIRCUIT SHORTED TO GROUND
PCM SCI RECEIVE CIRCUIT OPEN
PCM SCI TRANSMIT CIRCUIT OPEN
POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>Perform the symptom Checking PCM Power and Ground Circuits in the Driveability category.</p> <p><b>NOTE: With the DRBIII® in the generic scan tool mode, attempt to communicate with the PCM.</b></p> <p><b>NOTE: If the DRBIII® can communicate with the PCM in the generic scan tool mode, it may not be necessary to perform this step.</b></p> <p>Did the vehicle pass this test?</p> <p>Yes → Go To 2</p> <p>No → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
2	<p>Turn the ignition off.</p> <p>Disconnect the DRBIII® from the DLC.</p> <p>Disconnect the PCM harness connectors.</p> <p>Turn the ignition on.</p> <p>Measure the voltage of the PCM SCI Transmit circuit at the Data Link harness connector (cav 7).</p> <p>Is the voltage above 1.0 volt?</p> <p>Yes → Repair the PCM SCI Transmit circuit for a short to voltage. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.</p> <p>Disconnect the DRBIII® from the DLC.</p> <p>Disconnect the PCM harness connectors.</p> <p>Turn the ignition on.</p> <p>Measure the voltage of the PCM SCI Receive circuit at the Data Link harness connector (cav 12).</p> <p>Is the voltage above 1.0 volt?</p> <p>Yes → Repair the PCM SCI Receive circuit for a short to voltage. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 4</p>	All



## \*NO RESPONSE FROM PCM (PCM SCI ONLY) - NGC — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the DRBIII® from the DLC.            Disconnect the PCM harness connectors.            Measure the resistance between the PCM SCI Transmit circuit and the PCM SCI Receive circuit at the Data Link harness connector (cavs 7 and 12).            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the PCM SCI Transmit and the PCM SCI Receive circuits.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect the DRBIII® from the DLC.            Measure the resistance between ground and the PCM SCI Transmit circuit at the Data Link harness connector (cav 7).            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the PCM SCI Transmit circuit for a short to ground.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.            Disconnect the PCM harness connector.            Disconnect the DRBIII® from the DLC.            Measure the resistance between ground and the PCM SCI Receive circuit in the Data Link harness connector (cav 12).            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the PCM SCI Receive circuit for a short to ground.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off.            Disconnect the PCM harness connector.            Disconnect the DRBIII® from the DLC.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the PCM SCI Receive circuit from the Data Link harness connector (cav 12) to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the PCM SCI Receive circuit for an open.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**\*NO RESPONSE FROM PCM (PCM SCI ONLY) - NGC — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off.            Disconnect the PCM harness connector.            Disconnect the DRBIII® from the DLC.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the PCM SCI Transmit circuit from the Data Link harness connector (cav 7) to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the PCM SCI Transmit circuit for an open.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
9	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module in accordance with the Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

## Symptom:

### \*NO RESPONSE FROM SENTRY KEY IMMOBILIZER MODULE

POSSIBLE CAUSES
ATTEMPT TO COMMUNICATE WITH THE MIC GROUND CIRCUIT OPEN FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN FUSED B(+) CIRCUIT OPEN OPEN PCI BUS CIRCUIT SENTRY KEY IMMOBILIZER MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, attempt to communicate with the Instrument Cluster. Was the DRB able to I/D or communicate with the MIC?  Yes → Go To 2  No → Refer to the symptom list for problems related to no communication with the MIC. Perform SKIS VERIFICATION.	All
2	Turn the ignition off. Disconnect the SKIM harness connector. Using a 12-volt test light connected to 12-volts, probe the ground circuit. Is the test light illuminated?  Yes → Go To 3  No → Repair the ground circuit for an open. Perform SKIS VERIFICATION.	All
3	Turn the ignition off. Disconnect the SKIM harness connector. Turn the ignition on. Using a 12-volt test light connected to ground, probe the Fused Ignition Switch Output circuit. Is the test light illuminated?  Yes → Go To 4  No → Repair the Fused Ignition Switch Output circuit for an open. Perform SKIS VERIFICATION.	All
4	Turn the ignition off. Disconnect the SKIM harness connector. Using a 12-volt test light connected to ground, probe the Fused B(+) circuit. Is the test light illuminated?  Yes → Go To 5  No → Repair the Fused B+ circuit for an open. Perform SKIS VERIFICATION.	All

**\*NO RESPONSE FROM SENTRY KEY IMMOBILIZER MODULE — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>Note: Ensure there is PCI Bus communication with other modules on the vehicle before proceeding. If not, refer to the symptom list from the menu and repair as necessary.</b></p> <p>Disconnect the SKIM harness connector.</p> <p>Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes.</p> <p>Connect the scope input cable to the channel one connector on the DRB. Attach the red and black leads and the cable to probe adapter to the scope input cable.</p> <p>With the DRBIII® select Pep Module Tools.</p> <p>Select lab scope.</p> <p>Select Live Data.</p> <p>Select 12 volt square wave.</p> <p>Press F2 for Scope.</p> <p>Press F2 and use the down arrow to set voltage range to 20 volts. Press F2 again when complete.</p> <p>Connect the Black lead to the chassis ground. Connect the Red lead to the PCI Bus circuit in the SKIM connector.</p> <p>Turn the ignition on.</p> <p>Observe the voltage display on the DRB Lab Scope.</p> <p>Does the voltage pulse from 0 to approximately 7.5 volts?</p> <p>Yes → Go To 6</p> <p>No → Repair the PCI Bus circuit for an open.</p> <p>Perform SKIS VERIFICATION.</p>	All
6	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information.</p> <p>Perform SKIS VERIFICATION.</p>	All

## Symptom:

### \*NO RESPONSE FROM TRANSFER CASE CONTROL MODULE

POSSIBLE CAUSES
NO RESPONSE FROM TRANSFER CASE CONTROL MODULE
FUSED B(+) CIRCUIT OPEN
GROUND CIRCUIT OPEN
OPEN PCI BUS CIRCUIT
TRANSFER CASE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition on.</p> <p><b>NOTE: As soon as one or more module communicates with the DRBIII®, answer the question.</b></p> <p>With the DRBIII®, attempt to communicate with the Airbag Control Module.</p> <p>With the DRBIII®, attempt to communicate with the Front Control Module.</p> <p>Was the DRBIII® able to I/D or establish communications with either of the modules?</p> <p>Yes → Go To 2</p> <p>No → Refer to the Communications category and perform the symptom PCI Bus Communication Failure.</p> <p>Perform TRANSFER CASE VERIFICATION TEST.</p>	All
2	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the TCCM harness connectors.</p> <p>Using a 12-volt test light connected to ground, check the Fused B(+) circuit in the TCCM harness connector.</p> <p><b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b></p> <p>Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the Fused B(+) circuit for an open. If the fuse is open make sure to check for a short to ground. Refer to the wiring diagrams located in the Service Information.</p> <p>Perform TRANSFER CASE VERIFICATION TEST.</p>	All
3	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the TCCM harness connectors.</p> <p>Using a 12-volt test light connected to 12-volts, check each ground circuit in the TCCM harness connectors.</p> <p><b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b></p> <p>Does the test light illuminate brightly for each Ground circuit?</p> <p>Yes → Go To 4</p> <p>No → Repair the Ground circuit for an open. Refer to the wiring diagrams located in the Service Information.</p> <p>Perform TRANSFER CASE VERIFICATION TEST.</p>	All



**\*NO RESPONSE FROM TRANSFER CASE CONTROL MODULE —**  
**Continued**

TEST	ACTION	APPLICABILITY
4	<p><b>Note: Ensure there is PCI Bus communication with other modules on the vehicle before proceeding. If not, refer to the symptom list from the menu and repair as necessary.</b></p> <p>Turn the ignition off to the lock position.            Disconnect the TCCM harness connector.            Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes.            Connect the scope input cable to the channel one connector on the DRB. Attach the red and black leads and the cable to probe adapter to the scope input cable.            With the DRBIII® select Pep Module Tools.            Select lab scope.            Select Live Data.            Select 12 volt square wave.            Press F2 for Scope.            Press F2 and use the down arrow to set voltage range to 20 volts. Set Probe to x10.            Press F2 again when complete.            Connect the Black lead to the chassis ground. Connect the Red lead to the PCI Bus circuit in the TCCM connector.            Turn the ignition on.            Observe the voltage display on the DRBIII® Lab Scope.            Does the voltage pulse from 0 to approximately 7.5 volts?</p> <p>Yes → Go To 5</p> <p>No → Repair the PCI Bus circuit for an open.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Transfer Case Control Module in accordance with the service information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All

## Symptom:

### \*NO RESPONSE FROM TRANSMISSION CONTROL MODULE

POSSIBLE CAUSES
NO RESPONSE FROM TRANSMISSION CONTROL MODULE
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
FUSED B(+) CIRCUIT OPEN
GROUND CIRCUIT(S) OPEN
PCI BUS CIRCUIT OPEN
POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition on.</p> <p><b>Note: As soon as one or more module communicates with the DRB, answer the question.</b></p> <p>With the DRB, attempt to communicate with the Instrument Cluster.</p> <p>With the DRB, attempt to communicate with the Airbag Control Module.</p> <p>Was the DRB able to I/D or establish communications with both of the modules?</p> <p>Yes → Go To 2</p> <p>No → Refer to the Communications category and perform the appropriate symptom.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
2	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Turn the ignition on.</p> <p>Using a 12-volt test light connected to ground, probe both Fused Ignition Switch Output circuits (cavs 11 and 12) in the appropriate terminal of special tool #8815.</p> <p><b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b></p> <p>Is the test light illuminated for both circuits?</p> <p>Yes → Go To 3</p> <p>No → Repair the Fused Ignition Switch Output circuit for an open. Refer to the wiring diagrams located in the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**\*NO RESPONSE FROM TRANSMISSION CONTROL MODULE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Using a 12-volt test light connected to ground, probe the Fused B(+) circuit in the appropriate terminal of special tool #8815. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Is the test light illuminated?</p> <p>Yes → Go To 4</p> <p>No → Repair the Fused B(+) circuit for an open. Refer to the wiring diagrams located in the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Using a 12-volt test light connected to 12-volts, probe each ground circuit in the appropriate terminal of special tool #8815. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Is the light illuminated at all ground circuits?</p> <p>Yes → Go To 5</p> <p>No → Repair the Ground circuit(s) for an open. Check the main ground connection to engine block and/or chassis. Refer to the wiring diagrams located in the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

## \*NO RESPONSE FROM TRANSMISSION CONTROL MODULE — Continued

TEST	ACTION	APPLICABILITY
5	<p><b>Note: Ensure there is PCI Bus communication with other modules on the vehicle before proceeding. If not, refer to the symptom list from the menu and repair as necessary.</b></p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes.</p> <p>Connect the scope input cable to the channel one connector on the DRB. Attach the red and black leads and the cable to probe adapter to the scope input cable.</p> <p>With the DRBIII® select Pep Module Tools.</p> <p>Select lab scope.</p> <p>Select Live Data.</p> <p>Select 12 volt square wave.</p> <p>Press F2 for Scope.</p> <p>Press F2 and use the down arrow to set voltage range to 20 volts. Set Probe to x10.</p> <p>Press F2 again when complete.</p> <p>Connect the Black lead to the chassis ground. Connect the Red lead to the PCI Bus circuit in the appropriate terminal of special tool #8815.</p> <p>Turn the ignition on.</p> <p>Observe the voltage display on the DRB Lab Scope.</p> <p>Does the voltage pulse from 0 to approximately 7.5 volts?</p> <p>Yes → Go To 6</p> <p>No → Repair the PCI Bus circuit for an open.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module in accordance with the service information. WITH THE DRBIII® PERFORM QUICK LEARN.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:**
**\*PCI BUS COMMUNICATION FAILURE**
**POSSIBLE CAUSES**

WIRING HARNESS INTERMITTENT  
 OPEN PCI BUS CIRCUIT AT THE DATA LINK CONNECTOR (DLC)  
 PCI BUS CIRCUIT SHORTED TO VOLTAGE  
 MODULE SHORT TO VOLTAGE  
 PCI BUS CIRCUIT SHORTED TO GROUND  
 MODULE SHORT TO GROUND

TEST	ACTION	APPLICABILITY
1	<p><b>Note: Determine which modules this vehicle is equipped with before beginning.</b></p> <p><b>Note: When attempting to communicate with any of the modules on this vehicle, the DRB will display 1 of 2 different communication errors: a NO RESPONSE message or a BUS +/- SIGNALS OPEN message.</b></p> <p>Turn the ignition on.</p> <p>Using the DRB, attempt to communicate with the following control modules:</p> <p>Airbag Control Module</p> <p>Front Control Module</p> <p>Instrument Cluster</p> <p>Was the DRBIII® able to communicate with one or more Module(s)?</p> <p>Yes → Go To 2</p> <p>No → Go To 3</p>	All
2	<p>Turn the ignition off.</p> <p><b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b></p> <p><b>Note: Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b></p> <p><b>Note: If the DRB can not communicate with a single module, refer to the category list for the related symptom.</b></p> <p>Were any problems found?</p> <p>Yes → Repair wiring harness/connectors as necessary. Perform BODY VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All



## \*PCI BUS COMMUNICATION FAILURE — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM/ECM harness connector. Note: If equipped with NGC follow the caution below.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Disconnect the DRB from the Data Link Connector (DLC).            Disconnect the negative battery cable.            Measure the resistance of the PCI Bus circuit between the Data Link Connector (DLC) and the PCM/ECM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the PCI Bus circuit for an open.            Perform BODY VERIFICATION TEST - VER 1.</p>	All
4	<p><b>NOTE: Reconnect the PCM/ECM harness connector and the negative battery cable.</b>            Turn the ignition on.            Measure the voltage of the PCI Bus circuit at the Data Link Connector (DLC).            Is the voltage above 7.0 volts?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>Turn the ignition off.            Using a voltmeter, connect one end to the PCI Bus circuit at the DLC, and the other end to ground.  <b>Note: When performing the next step turn the ignition off (wait one minute) before disconnecting any module. When the module is disconnected turn the ignition on to check for a short to voltage.</b>            Turn the ignition on.            While monitoring the voltmeter, disconnect each module the vehicle is equipped with one at a time.            Is the voltage steadily above 7.0 volts with all the modules disconnected?</p> <p>Yes → Repair the PCI Bus circuit for a short to voltage.            Perform BODY VERIFICATION TEST - VER 1.</p> <p>No → Replace the module that when disconnected the short to voltage was eliminated.            Perform BODY VERIFICATION TEST - VER 1.</p>	All

**\*PCI BUS COMMUNICATION FAILURE — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.            Disconnect the negative battery cable.            Using a ohmmeter, connect one end to the PCI Bus circuit at the DLC, and the other end to ground.            While monitoring the ohmmeter, disconnect each module the vehicle is equipped with one at a time.  <b>NOTE: Total bus resistance to ground thru all of the modules is typically between 350 to 1000 ohms. The more modules on the bus, the lower the total bus resistance will be.</b>            Is the resistance below 150.0 ohms with all the modules disconnected?</p> <p>Yes → Repair the PCI Bus circuit for a short to ground.            Perform BODY VERIFICATION TEST - VER 1.</p> <p>No → Replace the module that when disconnected the short to ground was eliminated.            Perform BODY VERIFICATION TEST - VER 1.</p>	All

## Symptom: INTERMITTENT CONDITION

POSSIBLE CAUSES
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.</b></p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Refer to any Technical Service Bulletins (TSBs) that may apply.</p> <p>Review the DRBIII® Freeze Frame information. If possible, try to duplicate the conditions under which the DTC set.</p> <p>With the engine running at normal operating temperature, monitor the DRBIII® parameters related to the DTC while wiggling the wire harness. Look for parameter values to change and/or a DTC to set.</p> <p>Visually inspect the related wire harness. Look for any chafed, pierced, pinched, partially broken wires and broken, bent, pushed out, or corroded terminals.</p> <p>Inspect and clean all ECM, engine, and chassis grounds that related to the DTC set.</p> <p>If numerous trouble codes were set, use a wire schematic to help you find any common ground or supply circuits</p> <p>For any Relay DTCs, actuate the Relay with the DRBIII® and wiggle the related wire harness to try to interrupt the actuation.</p> <p>A data recording, and/or lab scope should be used to help diagnose intermittent conditions.</p> <p>Use the DRBIII® to perform a System Test if one applies to failing component.</p> <p>Were any problems found during the above inspections?</p> <p>Yes → Repair as necessary Perform POWERTRAIN VERIFICATION TEST VER - 5 (DIESEL).</p> <p>No → Test Complete.</p>	All

**Symptom:****P0016-ENGINE SPEED SIGNAL MISMATCH****When Monitored and Set Condition:****P0016-ENGINE SPEED SIGNAL MISMATCH**

When Monitored: While Engine is running.

Set Condition: When the engine speed detected by the Engine Position Sensor (cam) and the Engine Speed Sensor (crank) differ by a specified RPM amount.

**POSSIBLE CAUSES**

DAMAGE TO THE ESS OR EPS

MECHANICAL MISALIGNMENT OF THE ESS OR EPS

MECHANICAL MISALIGNMENT OF THE CAMSHAFT AND CRANKSHAFT GEARS

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Visually inspect the condition of the tone wheel, ESS, and EPS for damage. Are any of the components damaged?</p> <p>Yes → Repair or replace any damaged component. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Verify the speed indicator ring is properly positioned relative to the locating pin in the front face of the crankshaft. Is the speed indicator ring properly installed?</p> <p>Yes → Go To 3</p> <p>No → Repair the speed ring indicator ring installation. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Check the mechanical alignment of the camshaft gear to the crankshaft gear. Refer to service manual for assistance. Are the gear teeth in proper alignment?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Repair the gear alignment. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P0071-INLET AIR TEMP SENSOR RATIONALITY**

## When Monitored and Set Condition:

### **P0071-INLET AIR TEMP SENSOR RATIONALITY**

When Monitored: While the engine is running.

Set Condition: The ECM does not read a change in value from the sensor over time.

## POSSIBLE CAUSES

INLET AIR TEMPERATURE SENSOR  
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Remove the temperature sensor and reconnect the wiring to the sensor. With the DRBIII® in Sensors, Monitor the inlet Air Temperature. While heating the sensor with an external heat source (DO NOT USE OPEN FLAME). Does the reading from the sensor increase at least 5 degrees F. on the DRBIII®?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the inlet air temperature sensor Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**Symptom:****P0072-INLET AIR TEMP SENSOR VOLTAGE TOO LOW****When Monitored and Set Condition:****P0072-INLET AIR TEMP SENSOR VOLTAGE TOO LOW**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM falls below a calibrated threshold for a certain period of time.

**POSSIBLE CAUSES**

SENSOR OUT OF SPEC  
 INTERMITTENT CONDITION  
 HARNESS SHORTED  
 (Y501) 5-VOLT SUPPLY OPEN  
 HARNESS SHORTED (ECM SIDE)  
 INTERMITTENT CONDITION  
 ECM  
 ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Inlet Air Temp sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the temperature sensor. Is the resistance between 300 and 90k ohms?  Yes → Go To 2  No → Replace the sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Reconnect the Inlet Air Temp Sensor harness connector. Turn the ignition on. With the DRBIII®, erase DTCs. With the DRBIII®, read DTCs. Did the DTC return?  Yes → Go To 3  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## P0072-INLET AIR TEMP SENSOR VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the inlet Air Temp sensor harness connector.  Disconnect the ECM harness connector.  Check connectors - Clean/repair as necessary.  Measure the resistance between the engine ground and the (K69) temperature sensor signal circuit at the sensor connector.  Is the resistance more than 100 k ohms?</p> <p>Yes → Go To 4</p> <p>No → Replace or Repair the shorted harness.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Measure the resistance between the (K69) signal circuit and all other circuits at the ECM harness connector.  Is the resistance more than 100 k ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair or replace the ECM harness shorted.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Reconnect the ECM harness connector.  Turn the ignition on.  Measure the voltage between the (Y501) supply circuit and the (Y502) return circuit in the Air Temp sensor harness connector.  Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Go To 6</p> <p>No → Go To 7</p>	All
6	<p>Reconnect the Air Temp sensor harness connector.  Reconnect the ECM harness connector.  With the DRBIII®, erase DTCs.  While monitoring with DRBIII®, disconnect the Air Temp sensor harness connector.  Did the DTC P0073 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Disconnect the ECM harness connectors.  Measure the voltage at the (Y501) 5-volt supply circuit at the ECM harness connector.  Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Fix or repair the (Y501) 5-volt supply circuit open.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0073-INLET AIR TEMP SENSOR VOLTAGE TOO HIGH****When Monitored and Set Condition:****P0073-INLET AIR TEMP SENSOR VOLTAGE TOO HIGH**

When Monitored: With ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM is above a calibrated threshold for a certain period of time.

**POSSIBLE CAUSES**

DTC RETURNS  
 INLET AIR TEMPERATURE SENSOR  
 (K69) SIGNAL CIRCUIT OPEN  
 (Y502) RETURN CIRCUIT OPEN  
 (K69) SIGNAL CIRCUIT SHORTED  
 INTERMITTENT CONDITION  
 ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, erase DTCs. With the DRBIII®, read DTCs. With the DRBIII®, record all Freeze frame data. Did the DTC return?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Turn the ignition off. Disconnect the Inlet Air Temp sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the Inlet Air temp sensor Is the resistance between 300 and 90k ohms?  Yes → Go To 3  No → Replace the Inlet air temperature sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## P0073-INLET AIR TEMP SENSOR VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Disconnect the ECM harness connector.  Check connectors - Clean/repair as necessary.  Reconnect the Inlet Air Temp sensor harness connector.  Measure the resistance between the (K69) inlet air temperature sensor signal circuit and (Y502) return circuit at the ECM connector.  Is the resistance between 300 and 90k ohms?</p> <p>Yes → Go To 6  No → Go To 4</p>	All
4	<p>Disconnect the inlet Air Temp sensor harness connector.  Measure the resistance of the (K69) inlet air temperature sensor signal circuit between the sensor harness connector and the ECM harness connector.  Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5  No → Repair or replace the harness.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance of the sensor (Y502) return circuit between the sensor harness connector and the ECM harness connector.  Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 6  No → Repair or replace the harness.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Check for a short circuit from the (K69) signal circuit to all other circuits at the ECM harness connector.  Is the resistance more than 100 k ohms?</p> <p>Yes → Go To 7  No → Repair or replace the harness for a short to ground in the signal circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Reconnect the ECM harness connector.  Turn the ignition on.  With the DRBIII®, erase DTCs.  While monitoring with DRBIII®, use a jumper wire and connect the sensor (K69) signal circuit to the sensor (Y502) return circuit at the sensor connector.  Did the DTC P0072 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0088-FUEL RAIL PRESSURE SIGNAL IS ABOVE MAX LIMIT****When Monitored and Set Condition:****P0088-FUEL RAIL PRESSURE SIGNAL IS ABOVE MAX LIMIT**

When Monitored: Engine running.

Set Condition: Fuel pressure is above a calibrated value for a calibrated amount of time.

**POSSIBLE CAUSES**

FUEL CONTROL ACTUATOR (FCA)

FUEL PRESSURE SENSOR

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: This DTC will only clear by turning the ignition off. It is necessary to operate the engine for at least five seconds to verify the DTC will clear.</b></p> <p>Check for a mechanically stuck Fuel Control Actuator by turning the key switch on and off and listening for a click at the FCA. Do you hear a click from the actuator when the key is cycled off?</p> <p>Yes → Go To 2</p> <p>No → Check the electrical connector of the Fuel Control Actuator, if the connection is tight, replace the fuel control actuator. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
2	<p>Using the DRBIII®, monitor the fuel pressure while operating the engine at several different RPM settings. Did the fuel pressure reading on the DRBIII® change?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p> <p>No → Replace the Fuel Pressure Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All

## Symptom:

### **P0106-INLET AIR PRESSURE SENSOR RATIONALITY**

#### **When Monitored and Set Condition:**

#### **P0106-INLET AIR PRESSURE SENSOR RATIONALITY**

When Monitored: When the ignition is on.

Set Condition: The Inlet air pressure is above a calibrated threshold.

#### **POSSIBLE CAUSES**

INLET AIR PRESSURE SENSOR

INTERMITTENT CONDITION

TROUBLESHOOT OTHER DTC'S FIRST

TEST	ACTION	APPLICABILITY
1	<p>Using the DRBIII®, check for additional DTC's. Do you have any other air pressure related DTC's?</p> <p>Yes → Troubleshoot other DTC's First. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Using the DRBIII®, monitor the Inlet air pressure sensor values. Do the readings on the DRBIII® fluctuate slightly?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the Inlet Air Temperature/ Pressure sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**Symptom:****P0107-INLET AIR PRESSURE SENSOR VOLTAGE TOO LOW****When Monitored and Set Condition:****P0107-INLET AIR PRESSURE SENSOR VOLTAGE TOO LOW**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM falls below a calibrated threshold for a certain period of time.

**POSSIBLE CAUSES**

OTHER DTC'S PRESENT

INLET AIR PRESSURE SENSOR

INLET AIR SENSOR (K69) SIGNAL CIRCUIT SHORTED TO THE (Y502) RETURN CIRCUIT

INLET AIR PRESSURE SENSOR (Y501) SUPPLY CIRCUIT SHORTED TO THE RETURN CIRCUIT

(K69) SIGNAL CIRCUIT OPEN

(Y501) 5-VOLT SUPPLY CIRCUIT OPEN

(K69) SIGNAL CIRCUIT SHORTED TO GROUND

(Y501) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs. Do you have multiple DTC's?  Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Disconnect the Inlet Air Pressure sensor harness connector. Check connectors - Clean/repair as necessary. Measure the voltage between the (Y501) 5-volt supply circuit and (Y502) return circuit of the sensor harness connector. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 3 No → Go To 5	All

## P0107-INLET AIR PRESSURE SENSOR VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	<p>While monitoring DRBIII®, use a jumper wire to connect the (Y501) 5-volt supply circuit with the (K69) signal circuit at the sensor harness connector. Does the DRBIII® show a pressure sensor out of range high DTC?</p> <p>Yes → Replace the Inlet Air Temperature/Pressure sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the ECM harness connector. Check connectors - Clean/repair as necessary. Measure the resistance between the (K69) signal circuit and (Y502) return circuit in the Inlet Air pressure sensor harness connector. Is the resistance greater than 100K Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair or replace wiring harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance between the (Y501) 5-volt supply circuit and (Y502) return circuit in the Inlet Air Pressure sensor harness connector. Is the resistance greater than 100K Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the short or replace the harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance between the (K69) signal circuit in the Inlet Air Pressure sensor harness connector and the (K69) signal circuit in the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair or replace the open wiring harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the resistance between the (Y501) 5-volt supply circuit in the Inlet Air Pressure sensor harness connector with the (Y501) 5-volt supply circuit in the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair or replace the Engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P0107-INLET AIR PRESSURE SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Measure the resistance between the (K69) signal circuit in the inlet Air Pressure sensor connector and battery negative. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the (K69) signal circuit shorted to ground or replace the wire harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
9	<p>Measure the resistance between the (Y501) 5-volt supply Circuit in the Inlet Air Pressure sensor harness connector and battery negative. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the (Y501) 5-volt supply circuit shorted to ground or replace the wire harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Install the ECM harness connector. Turn the ignition on. While monitoring DRBIII®, use a jumper wire to connect the (Y501) 5-volt supply circuit with the (K69) signal circuit at the sensor harness connector. Does the DRBIII® show a pressure sensor out of range high DTC?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P0108-INLET AIR Pressure Sensor Voltage Too high**

## When Monitored and Set Condition:

### **P0108-INLET AIR Pressure Sensor Voltage Too high**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM is above a calibrated threshold for a certain period of time.

## POSSIBLE CAUSES

OTHER DTC'S PRESENT

INLET AIR PRESSURE SENSOR

INLET AIR PRESSURE SENSOR (K69) SIGNAL CIRCUIT SHORTED TO VOLTAGE

INLET AIR SENSOR (Y501) 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

(K69) SIGNAL CIRCUIT SORTED TO (Y501) 5-VOLT SUPPLY

(Y502) RETURN CIRCUIT OPEN

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs. Do you have multiple DTC's?</p> <p>Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Disconnect the Inlet Air Pressure sensor harness connector. Measure the voltage between the (Y501) 5-volt supply circuit and (Y502) return circuit of the Inlet Air Pressure sensor harness connector. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Go To 3</p> <p>No → Go To 4</p>	All
3	<p>While monitoring DRBIII®, use a jumper wire to connect the (Y502) Return circuit to the (K69) signal circuit at the Inlet Air Pressure sensor harness connector. Does the DRBIII® show a P0107 Inlet Air Pressure Sensor Low DTC.</p> <p>Yes → Replace the Inlet Air Temperature/Pressure sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All

**P0108-INLET AIR Pressure Sensor Voltage Too high — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Disconnect the ECM harness connectors.</p> <p><b>NOTE: Check connectors - Clean/repair as necessary.</b></p> <p>Measure the voltage between the (K69) signal circuit of the Inlet Air Pressure sensor connector and battery negative.</p> <p>Is the voltage less than 1 volt?</p> <p>Yes → Go To 5</p> <p>No → Repair or replace short to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the voltage between the (Y501) 5-volt supply circuit of the sensor connector and battery negative.</p> <p>Is the voltage less than 1 volt?</p> <p>Yes → Go To 6</p> <p>No → Repair the short to voltage or replace the harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Turn the ignition off.</p> <p>Measure the resistance between the (K69) signal circuit and the (Y501) 5-volt supply circuit of the Inlet Air Pressure sensor harness connector.</p> <p>Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair or replace the shorted wiring harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Disconnect the ECM harness connector.</p> <p>Check connectors - Clean/repair as necessary.</p> <p>Measure the resistance between the (Y502) return circuit in the Inlet Air Pressure sensor harness connector with the (Y502) return circuit in the ECM harness connector.</p> <p>Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair or replace the Engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Install the ECM harness connector.</p> <p>Turn the ignition on.</p> <p>While monitoring DRBIII®, use a jumper wire to connect the (Y501) 5-volt supply circuit with the (K69) signal circuit at the Inlet Air Pressure sensor harness connector.</p> <p>Did DTC P0107 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P0111-INTAKE AIR TEMPERATURE (IAT) SENSOR RATIONALITY**

## When Monitored and Set Condition:

### **P0111-INTAKE AIR TEMPERATURE (IAT) SENSOR RATIONALITY**

When Monitored: While the engine is running.

Set Condition: The ECM does not read a change in value from the sensor over time.

## POSSIBLE CAUSES

FAILED IAT SENSOR

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Remove the temperature sensor and reconnect the wiring to the sensor. Monitor DRBIII®, while heating the sensor with an external heat source (DO NOT USE OPEN FLAME).</p> <p>Does the reading from the sensor increase at least 5 degrees F. on the DRB?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the Intake air temp sensor/MAP sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**Symptom:****P0112-INTAKE AIR TEMPERATURE (IAT) SENSOR VOLTAGE TOO LOW****When Monitored and Set Condition:****P0112-INTAKE AIR TEMPERATURE (IAT) SENSOR VOLTAGE TOO LOW**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM falls below a calibrated threshold for a certain period of time.

**POSSIBLE CAUSES**

INTAKE AIR TEMP SENSOR OUT OF SPEC

INTERMITTENT CONDITION

(K21) SENSOR SIGNAL CIRCUIT SHORTED TO GROUND CIRCUIT

WIRING HARNESS SHORTED

(K72E) 5-VOLT SUPPLY CIRCUIT OPEN

ECM

ECM

TEST	ACTION	APPLICABILITY
1	Disconnect the Intake Air Temperature sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the Intake Air Temp sensor. Is the resistance between 300 and 90k ohms?  Yes → Go To 2  No → Replace the Intake Air temperature sensor/MAP sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Reconnect the circuit. Turn the ignition on. With the DRBIII®, erase DTCs. With the DRBIII®, read DTCs. Did the DTC reappear?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All

## P0112-INTAKE AIR TEMPERATURE (IAT) SENSOR VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the ECM harness connector. Check connectors - Clean/repair as necessary. Measure the resistance between the engine ground and the temperature sensor (K21) signal circuit at the sensor harness connector. Is the resistance more than 100 k ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair or replace the engine wiring harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Measure the resistance between the (K21) signal circuit and all other circuits at the ECM harness connector. Is the resistance more than 100 k ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair or replace the shorted wiring harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Reconnect the ECM harness connector connected. Turn the ignition on. Measure the voltage between the (K72E) 5-volt supply circuit and the (K55) return circuit the sensor harness connector. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Go To 7</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off. Disconnect the ECM harness connector. Measure the voltage at the (K72E) 5-volt supply circuit of the sensor harness connector. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Repair the open (K72E) 5-volt supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 7</p>	All
7	<p>Reconnect the ECM harness connector. Reconnect the intake air temp sensor harness connector. Turn the ignition on. While monitoring with DRBIII®, disconnect the temperature sensor Did the DTC P0113 set?</p> <p>Yes → Clear DTC's, repair complete. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0113-INTAKE AIR TEMPERATURE (IAT) SENSOR VOLTAGE TOO HIGH****When Monitored and Set Condition:****P0113-INTAKE AIR TEMPERATURE (IAT) SENSOR VOLTAGE TOO HIGH**

When Monitored: With ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM is above a calibrated threshold for a certain period of time.

**POSSIBLE CAUSES**

FAILED SENSOR  
 INTERMITTENT CONDITION  
 (K21) SENSOR SIGNAL CIRCUIT OPEN  
 (K55) RETURN CIRCUIT OPEN  
 SHORT IN HARNESS  
 ECM  
 ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the IAT sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the IAT sensor. Is the resistance between 300 and 90k ohms?  Yes → Go To 2  No → Replace the Intake Air Temperature Sensor/map sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Reconnect the IAT harness connector. Turn the ignition on. With the DRBIII®, erase DTCs. With the DRBIII®, read DTCs. Is P0113 still set?  Yes → Go To 3  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

# **P0113-INTAKE AIR TEMPERATURE (IAT) SENSOR VOLTAGE TOO HIGH**

— Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the ECM harness connector(s).  Measure the resistance between the temperature sensor (K21) signal and (K55) return circuit at the ECM harness connector with the sensor connected  Is the resistance between 300 and 90k ohms?</p> <p>Yes → Go To 6  No → Go To 4</p>	All
4	<p>Measure the resistance of the sensor (K21) signal circuit between the sensor harness connector and the ECM harness connector.  Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5  No → Repair the open Sensor (K21) signal circuit or the harness.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance of the sensor (K55) Return circuit between the sensor harness connector and the ECM harness connector.  Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 6  No → Repair the open (K55) return circuit or the harness.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Check for a short circuit from (K21) signal circuit to all other circuits at the ECM harness connector.  Is the resistance more than 100 k ohms?</p> <p>Yes → Go To 7  No → Repair the short in the wiring harness or replace the harness.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Reconnect the ECM harness connectors.  Turn the ignition on.  With the DRBIII®, erase DTCs.  While monitoring with DRBIII®, use a jumper wire and connect the sensor (K21) signal circuit to the sensor (K55) return circuit at the sensor harness connector.  Did the DTC P0112 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0116-ENGINE COOLANT TEMPERATURE (ECT) SENSOR RATIONALITY****When Monitored and Set Condition:****P0116-ENGINE COOLANT TEMPERATURE (ECT) SENSOR RATIONALITY**

When Monitored: While the engine is running.

Set Condition: The ECM does not read a change in value from the sensor over time.

**POSSIBLE CAUSES**

LOW COOLANT LEVEL  
 COOLANT TEMPERATURE SENSOR  
 THERMOSTAT  
 INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>With the engine cold, verify the level of coolant in the radiator.            Is the radiator full of coolant?</p> <p>Yes → Go To 2</p> <p>No → Fill the radiator with coolant- refer to the owners manual for assistance.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
2	<p>Remove the temperature sensor and reconnect the wiring to the sensor.            Turn the ignition on.            Monitor DRBIII®, while heating the sensor with an external heat source (DO NOT USE OPEN FLAME).            Does the reading from the sensor increase at least 5 degrees F. on the DRBIII®?</p> <p>Yes → Go To 3</p> <p>No → Replace the coolant temp sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>NOTE: refer to the no trouble code test "Thermostat Test" to ensure the thermostat is operating properly.            Is the thermostat operating properly?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the Thermostat.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P0117-ENGINE COOLANT TEMPERATURE (ECT) SENSOR VOLTAGE TOO LOW**

## When Monitored and Set Condition:

### **P0117-ENGINE COOLANT TEMPERATURE (ECT) SENSOR VOLTAGE TOO LOW**

When Monitored: With ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM falls below a calibrated threshold for a certain period of time.

### POSSIBLE CAUSES

COOLANT TEMPERATURE SENSOR

INTERMITTENT CONDITION

(K2) SENSOR SIGNAL CIRCUIT SHORTED TO GROUND OR (K104) RETURN CIRCUIT

WIRING HARNESS SHORTED

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Coolant Temp sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the Temp sensor. Is the resistance between 300 and 90k ohms?  Yes → Go To 2  No → Replace the Coolant Temperature sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Reconnect the coolant temp sensor connected. Turn the ignition on. With the DRBIII®, erase DTCs. With the DRBIII®, read DTCs. Did the DTC reset?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All



## P0117-ENGINE COOLANT TEMPERATURE (ECT) SENSOR VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the ECM harness connector.            Check connectors - Clean/repair as necessary.            Measure the resistance between the engine ground and the (K2) temperature sensor signal circuit at the sensor harness connector.            Is the resistance more than 100 k ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair or replace the short harness.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Measure the resistance between the (K2) signal circuit and all other circuits at the ECM harness connector.            Is the resistance more than 100k ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair or replace shorted wiring harness            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Reconnect the ECM harness connectors.            Turn the ignition on.            With the DRBIII®, erase DTCs.            While monitoring the DRBIII®, Disconnect the temperature sensor harness connector.            Did the DTC P0118 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P0118-ENGINE COOLANT TEMPERATURE (ECT) SENSOR VOLTAGE TOO HIGH**

## When Monitored and Set Condition:

### **P0118-ENGINE COOLANT TEMPERATURE (ECT) SENSOR VOLTAGE TOO HIGH**

When Monitored: With ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM is above a calibrated threshold for a certain period of time.

### POSSIBLE CAUSES

COOLANT TEMPERATURE SENSOR  
INTERMITTENT CONDITION  
(K2) SIGNAL CIRCUIT OPEN  
(K104) SENSOR RETURN CIRCUIT OPEN  
(K2) SIGNAL CIRCUIT SHORTED  
ECM

TEST	ACTION	APPLICABILITY
1	Disconnect the coolant temperature sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the coolant temperature sensor. Is the resistance between 300 and 90k ohms?  Yes → Go To 2  No → Replace the coolant temperature sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Reconnect the disconnected coolant temp sensor harness connector. With the DRBIII®, erase DTCs. With the DRBIII®, read DTCs. Did the DTC return?  Yes → Go To 3  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## P0118-ENGINE COOLANT TEMPERATURE (ECT) SENSOR VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the ECM harness connector.            Check connectors - Clean/repair as necessary.            Measure the resistance between the (K2) temperature sensor signal and (K104) return circuit at the ECM harness connector with the coolant temp sensor harness connected.            Is the resistance between 300 and 90k ohms?</p> <p>Yes → Go To 6            No → Go To 4</p>	All
4	<p>Disconnect the coolant temperature sensor harness connector.            Measure the resistance of the (K2) coolant temperature sensor signal circuit between the coolant temperature sensor connector and the ECM connector.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5            No → Repair or replace the open (K2) signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance of the (K104) coolant temperature sensor return circuit between the coolant temperature sensor connector and the ECM connector.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 6            No → Repair or replace the open (K104) sensor return circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of (K2) signal circuit to all other circuits at the ECM harness connector.            Is the resistance more than 100k ohms?</p> <p>Yes → Go To 7            No → Repair or replace the (K2) coolant temperature sensor signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Reconnect the ECM harness connectors.            Turn the ignition on.            With the DRBIII®, erase DTCs.            While monitoring with DRBIII®, use a jumper wire and connect the sensor (K2) signal circuit to the (K104) sensor return circuit at the sensor connector.            Did the DTC P0117 set?</p> <p>Yes → Test Complete.            No → Replace the ECM.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### P0128-THERMOSTAT RATIONALITY

#### When Monitored and Set Condition:

#### P0128-THERMOSTAT RATIONALITY

When Monitored: While the engine is running.

Set Condition: The coolant temperature does not rise by a calibrated amount over a calibrated amount of time.

#### POSSIBLE CAUSES

COOLING FAN

COOLANT TEMPERATURE SENSOR

THERMOSTAT

TEST	ACTION	APPLICABILITY
1	<p>NOTE: refer to the no trouble code test "Fan Operation Test" to ensure the fan is operating properly.</p> <p>Is the cooling fan operating properly?</p> <p>Yes → Go To 2</p> <p>No → Repair the cooling fan. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
2	<p>Operate the engine for 10 minutes while monitoring the coolant temperature with the DRBIII®.</p> <p>Did the coolant temperature change over time while the engine was running?</p> <p>Yes → Go To 3</p> <p>No → Replace the coolant temperature sensor. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
3	<p>NOTE: refer to the no trouble code test "Thermostat Test" to ensure the thermostat is operating properly.</p> <p>is the thermostat operating properly?</p> <p>Yes → Test Complete.</p> <p>No → Replace the thermostat. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All

**Symptom:****P0148-HIGH PRESSURE COMMON RAIL (HPCR) CHECKSUM****When Monitored and Set Condition:****P0148-HIGH PRESSURE COMMON RAIL (HPCR) CHECKSUM**

When Monitored: While the engine is running.

Set Condition: A deviation between the fuel pressure set point and the actual fuel pressure.

**POSSIBLE CAUSES**

OTHERS DTC'S PRESENT  
 FUEL LEAKS  
 FUEL CONTROL ACTUATOR  
 FUEL PRESSURE SENSOR  
 CASCADE OVERFLOW VALVE  
 CHECK VALVE DAMAGED OR BLOCKED  
 FUEL RETURN LINES OBSTRUCTION, DAMAGE, OR DEBRIS.  
 LIFT PUMP FLOW  
 AIR IN FUEL SYSTEM  
 LEAKING FUEL INJECTORS OR HIGH PRESSURE CONNECTORS  
 PRESSURE LIMITING VALVE  
 HIGH PRESSURE FUEL PUMP  
 INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Are any other DTC's present?</p> <p>Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Ensure that the fuel level is above 15% using the DRBIII®. Visually inspect the low and high pressure side of the fuel system for fuel leaks or damaged components. Do you have any fuel leaks or damaged components?</p> <p>Yes → Repair the fuel leak. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 3</p>	All

## P0148-HIGH PRESSURE COMMON RAIL (HPCR) CHECKSUM — Continued

TEST	ACTION	APPLICABILITY
3	<p>Check for a mechanically stuck Fuel Control Actuator (FCA). Using the DRBIII®, actuate the fuel control actuator. NOTE: The fuel control actuator will only click when cycled off.</p> <p>Do you hear a click from the actuator when you cycle the actuator off with the DRBIII®?</p> <p>Yes → Go To 4</p> <p>No → Replace the fuel control actuator. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Using the DRBIII®, monitor the fuel pressure reading from the fuel rail pressure sensor at idle and at 2000 RPM</p> <p>Is the fuel rail pressure reading higher at 2000 RPM than at idle?</p> <p>Yes → Go To 5</p> <p>No → Replace the fuel pressure sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Using the DRBIII® compare the fuel rail pressure set point with the actual fuel rail pressure.</p> <p>Is the actual fuel rail pressure higher than the fuel rail pressure set point?</p> <p>Yes → Go To 6</p> <p>No → Go To 9</p>	All
6	<p>Perform the no trouble code test "**fuel pump return flow test" .</p> <p>Did the fuel injection pump pass the test?</p> <p>Yes → Go To 7</p> <p>No → Replace the Fuel pump. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Check the fuel drain line check valve in the rear of the cylinder head for signs of damage, blockage, or debris.</p> <p>Is the check valve damaged or blocked?</p> <p>Yes → Repair the cause of the damaged or blocked check valve or replace the valve. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 8</p>	All
8	<p>Check the fuel return lines for signs of obstruction, damage, or debris.</p> <p>Are the fuel drain lines damaged or blocked?</p> <p>Yes → Repair cause of high fuel drain line restriction. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 9</p>	All



**P0148-HIGH PRESSURE COMMON RAIL (HPCR) CHECKSUM — Continued**

TEST	ACTION	APPLICABILITY
9	Perform the no trouble code "Lift Pump flow and inlet restriction test". Did the Lift pump pass the test?  Yes → Go To 10  No → Replace the Lift Pump. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
10	Perform the no trouble code test "Fuel system vacuum test". Is there air in the fuel system?  Yes → Go To 11  No → Repair cause of air in fuel system. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
11	Perform the no trouble code test " Pressure Limiting Valve on the Fuel Rail for internal leaks". Did the pressure limiting valve pass the test procedure?  Yes → Go To 12  No → Replace the Pressure Limiting Valve. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
12	Perform the no trouble test "*Injector return flow test". Are any Injectors leaking or high pressure connectors leaking?  Yes → Replace or repair the leaking fuel injectors or high pressure connectors. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 13	All
13	Perform the no trouble code test "HIGH PRESSURE FUEL PUMP PERFORMANCE TEST" Did the fuel pump pass the high pressure fuel pump performance test?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Replace the High pressure fuel pump. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## Symptom:

### **P0169-WATER IN FUEL (WIF) LIGHT ON TOO LONG**

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## When Monitored and Set Condition:

### **P0169-WATER IN FUEL (WIF) LIGHT ON TOO LONG**

When Monitored: While the engine is running.

Set Condition: Water in fuel light was on for a calibrated amount of time.

## POSSIBLE CAUSES

OTHER DTC'S PRESENT

WATER IN FUEL

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Is P2269 displayed?</p> <p>Yes → Repair P2269 DTC first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Drain water in fuel.</p>	All

**Symptom:****P0192-FUEL PRESSURE SENSOR VOLTAGE TOO LOW****When Monitored and Set Condition:****P0192-FUEL PRESSURE SENSOR VOLTAGE TOO LOW**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM falls below a calibrated threshold for a certain period of time.

**POSSIBLE CAUSES**

OTHER DTC'S

FUEL PRESSURE SENSOR

(K72E) 5-VOLT SUPPLY CIRCUIT SHORTED TO (G910) RETURN CIRCUIT

(K102) SIGNAL CIRCUIT SHORTED TO (G910) RETURN CIRCUIT

(K102) SIGNAL CIRCUIT OPEN

(K72E) 5-VOLT SUPPLY CIRCUIT OPEN

(K102) SIGNAL CIRCUIT SHORTED TO GROUND

(K72E) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs. Do you have multiple DTC's?  Yes → Repair other DTC's first.  No → Go To 2	All
2	Turn the ignition off. Disconnect the Fuel Pressure sensor harness connector. Check connectors - Clean/repair as necessary. Measure the voltage between the (K72E) 5-volt supply and (G910) return circuits of the Fuel pressure sensor harness connector. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 3  No → Go To 4	All

## P0192-FUEL PRESSURE SENSOR VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	<p>Reconnect the disconnected Fuel Pressure Sensor harness connector. Ignition on, engine not running. While monitoring DRBIII®, disconnect the Fuel Pressure sensor harness connector. Does the DTC P0193 set?</p> <p>Yes → Replace the Fuel Pressure Sensor.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Pressure sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance between the (K72E) 5-volt supply circuit and (G910) return circuit in the sensor harness connector. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the shorted circuits.</p>	All
5	<p>Measure the resistance between the (K102) signal circuit and (G910) return circuit in the sensor connector. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the shorted circuits.</p>	All
6	<p>Measure the resistance between the signal (K102) circuit in the sensor harness connector with the (K102) signal circuit in the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open (K102) signal circuit.</p>	All
7	<p>Measure the resistance between the supply (K72E) circuit in the sensor harness connector with the (K72E) 5-volt supply circuit in the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open (K72E) 5-volt supply circuit.</p>	All
8	<p>Measure the resistance between the (K102) signal circuit in the sensor harness connector and battery negative. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair (K102) signal circuit shorted to ground.</p>	All
9	<p>Measure the resistance between the (K72E) 5-volt supply circuit in the sensor harness connector and battery negative. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair (K72E) 5-volt Supply circuit shorted to ground.</p>	All

**P0192-FUEL PRESSURE SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
10	Reconnect the disconnected Fuel pressure sensor harness connector and ECM harness connectors. While monitoring DRBIII®, disconnect the Fuel Pressure sensor connector. Does the DTC P0193 set?  Yes → Test Complete.  No → Replace the ECM.	All

## Symptom:

### **P0193-FUEL PRESSURE SENSOR VOLTAGE TOO HIGH**

#### When Monitored and Set Condition:

#### **P0193-FUEL PRESSURE SENSOR VOLTAGE TOO HIGH**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM is above a calibrated threshold for a certain period of time.

#### POSSIBLE CAUSES

OTHER DTC'S

FUEL PRESSURE SENSOR

(K102) SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K72E) 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

(K102) SIGNAL CIRCUIT SHORTED TO (K72E) 5-VOLT SUPPLY CIRCUIT

(G910) RETURN CIRCUIT OPEN

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs. Do you have multiple DTC's?  Yes → Refer to multiple fault troubleshooting tree.  No → Go To 2	All
2	Turn the ignition off. Disconnect the Fuel Pressure sensor harness connector. Check connectors - Clean/repair as necessary. Measure the voltage between the (K72E) 5-volt supply and (G910) return circuits of the Fuel pressure sensor harness connector. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 3  No → Go To 4	All
3	Ignition on, engine not running. While monitoring DRBIII®, connect a jumper wire between the (K102) signal circuit and the (G910) return circuit of the Fuel Pressure sensor connector. Does the DTC P0192 set?  Yes → Replace the Fuel Pressure Sensor.  No → Go To 4	All



**P0193-FUEL PRESSURE SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the Fuel Pressure sensor harness connector. Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Turn the ignition on. Measure the voltage between the (K102) signal circuit of the sensor harness connector and battery negative. Is the voltage less than 1 volt?  Yes → Go To 5 No → Repair the (K102) signal circuit shorted to voltage.	All
5	Measure the voltage between the (K72E) 5-volt supply circuit of the sensor harness connector and battery negative. Is the voltage less than 1 volt?  Yes → Go To 6 No → Repair the (K72E) 5-volt supply circuit shorted to voltage.	All
6	Turn the ignition off. Measure the resistance between the (K102) signal circuit and (K72E) 5-volt supply circuit in the sensor connector. Is the resistance greater than 10 K Ohms?  Yes → Go To 7 No → Repair the shorted circuits.	All
7	Measure the resistance between the (G910) return circuit in the sensor harness connector with the (G910) return circuit in the ECM harness connector. Is the resistance less than 10 Ohms?  Yes → Go To 8 No → Repair the open (G910) return circuit.	All
8	Reconnect the disconnected ECM harness connectors. While monitoring DRBIII®, connect a jumper wire between the (K102) signal circuit of the sensor connector and the (G910) return circuit of the sensor connector. Does the DTC P0192 set?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). No → Replace the ECM.	All

### Symptom List:

**P0201-INJECTOR #1 CONTROL CIRCUIT**  
**P0202-INJECTOR #2 CONTROL CIRCUIT**  
**P0203-INJECTOR #3 CONTROL CIRCUIT**  
**P0204-INJECTOR #4 CONTROL CIRCUIT**  
**P0205-INJECTOR #5 CONTROL CIRCUIT**  
**P0206-INJECTOR #6 CONTROL CIRCUIT**

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**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0201-INJECTOR #1 CONTROL CIRCUIT**.

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### When Monitored and Set Condition:

**P0201-INJECTOR #1 CONTROL CIRCUIT**

When Monitored: While the engine is running.

Set Condition: When the injector current falls below a calibrated threshold.

**P0202-INJECTOR #2 CONTROL CIRCUIT**

When Monitored: While the engine is running.

Set Condition: When the injector current falls below a calibrated threshold.

**P0203-INJECTOR #3 CONTROL CIRCUIT**

When Monitored: While the engine is running.

Set Condition: When the injector current falls below a calibrated threshold.

**P0204-INJECTOR #4 CONTROL CIRCUIT**

When Monitored: While the engine is running.

Set Condition: When the injector current falls below a calibrated threshold.

**P0205-INJECTOR #5 CONTROL CIRCUIT**

When Monitored: While the engine is running.

Set Condition: When the injector current falls below a calibrated threshold.

**P0206-INJECTOR #6 CONTROL CIRCUIT**

When Monitored: While the engine is running.

Set Condition: When the injector current falls below a calibrated threshold.

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### POSSIBLE CAUSES

PASS TROUGH CONNECTORS OPEN

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**P0201-INJECTOR #1 CONTROL CIRCUIT — Continued**

POSSIBLE CAUSES	
FUEL INJECTOR	
INJECTOR HARNESS OPEN	
HIGH SIDE DRIVER HARNESS OPEN	
LOW SIDE DRIVER HARNESS OPEN	
ECM	

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Are all 6 of the injector DTC's (P0201 - P0206) present?</p> <p>Yes → Go To 2</p> <p>No → Go To 3</p>	All
2	<p>Inspect wiring harness for signs of multiple open circuits between the ECM and the injector pass through connectors. Inspect the wiring harness between the pass through connectors to the injectors. Are there open circuits in the wiring harness?</p> <p>Yes → Repair or replace the open connectors or wiring.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off. Disconnect the pigtail nuts from the suspect injector. Using an Ohmmeter, measure the resistance between the solenoid posts of the injector. <b>NOTE: Be sure to zero the ohm meter prior to checking the injector circuit.</b> Is the resistance less than 1 ohm and greater than 0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Replace the fuel injector.</p>	All
4	<p>Connect the pigtail nuts for the suspect injector. Disconnect the injector harness connector for the suspect injector. Measure the resistance of the injector harness circuit between the high side driver circuit and the low side driver circuit for the suspect injector at the injector harness connector. <b>NOTE: Be sure to zero the ohm meter prior to checking the injector circuit.</b> Is the resistance less than 1 ohm and greater than 0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Replace or repair the injector harness.</p>	All
5	<p>Disconnect the ECM harness connectors. Disconnect the Injector harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the Bank 1 high side driver circuit between the ECM connector and the injector harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 6</p> <p>No → Replace or repair the open engine harness.</p>	All

## P0201-INJECTOR #1 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
6	<p>Measure the resistance of the Bank 1 low side driver circuit between the ECM connector and the injector harness connector.</p> <p>Is the resistance less than 10 Ohms?</p> <p>Yes → Test Complete.</p> <p>No → Replace or repair the open engine harness.</p>	All

**Symptom:****P0217-DECREASED ENGINE PERFORMANCE DUE TO ENGINE OVERHEAT CONDITION****POSSIBLE CAUSES**

ECT SENSOR  
 OTHER DTC'S  
 MECHANICAL FAILURE

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read DTCs. Are other Cooling system DTC's present? Yes → Trouble shoot the other DTC's first No → Go To 2	All
2	Allow the engine to reach normal operating temperature. Use a temperature probe and measure the engine temperature near the ECT Sensor. With the DRBIII®, read the Engine Temperature. Compare the temperature probe reading with the DRBIII® reading. Are the readings within 10°F of each other? Yes → Repair the cause of mechanical failure No → Replace the coolant temp sensor.	All

## Symptom:

### **P0219-CRANKSHAFT POSITION SENSOR OVER SPEED SIGNAL**

## When Monitored and Set Condition:

### **P0219-CRANKSHAFT POSITION SENSOR OVER SPEED SIGNAL**

When Monitored: While the engine is running.

Set Condition: The ECM detects engine speed is above a calibrated threshold.

## POSSIBLE CAUSES

OTHER DTC'S

MECHANICAL OVERSPEED OF ENGINE

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read and record the freeze frame data. With the DRBIII®, read the Engine DTC's. Is there other Crankshaft position sensor DTC's set?  Yes → Refer to symptom list for problems related to the other Crankshaft position sensor DTC's.  No → Go To 2	All
2	Visually inspect the engine for signs of mechanical overspeed. Such as, bent push rod, broken rocker arms, bent valves, etc. Did you notice any overspeed damage?  Yes → Repair or replace any damaged components.  No → Test Complete.	All



**Symptom:****P0234-TURBO BOOST LIMIT EXCEEDED****When Monitored and Set Condition:****P0234-TURBO BOOST LIMIT EXCEEDED**

When Monitored: While running.

Set Condition: The intake air pressure is above a calibrated value for a calibrated amount of time.

**POSSIBLE CAUSES**

OTHER DTC'S

WASTEGATE STUCK

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read the Engine DTC's. Do you have additional Boost Pressure related faults?  Yes → Repair other boost related DTC's first.  No → Go To 2	All
2	Turn the ignition on. With the DRBIII®, go to the Freeze Frame screen record all data. With the DRBIII®, read DTCs. Operate the vehicle in the Freeze Frame parameters. Did the DTC P-0234 return?  Yes → Replace the Wastegate.  No → Test Complete.	All

## Symptom:

### P0236-MAP SENSOR TOO HIGH TOO LONG

## When Monitored and Set Condition:

### P0236-MAP SENSOR TOO HIGH TOO LONG

When Monitored: Ignition on.

Set Condition: The intake air pressure is above a calibrated value past a calibrated amount of time.

## POSSIBLE CAUSES

OTHER CODES

INTERMITTENT CONDITION

MAP SENSOR

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition on. With the DRBIII®, read the Engine DTC's. Are there any other MAP Sensor related DTC's.</p> <p>Yes → Repair other MAP Sensor DTC's. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Start the engine. With the DRBIII®, read the MAP Sensor voltage. Is the pressure reading of the MAP sensor less than 35.85 in Hg?</p> <p>Yes → Go To 3</p> <p>No → Replace the MAP Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Operate the engine under normal driving conditions (no load) for at least 30 seconds. Monitor the MAP sensor reading with the DRBIII®. Did the pressure reading from the MAP sensor go above 22.5 in Hg for more than 2.5 seconds?</p> <p>Yes → Replace the Map sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0237-MAP SENSOR VOLTAGE TOO LOW****When Monitored and Set Condition:****P0237-MAP SENSOR VOLTAGE TOO LOW**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM falls below a calibrated threshold for a certain period of time.

**POSSIBLE CAUSES**

OTHER DTC'S

(K68) SIGNAL CIRCUIT SHORTED TO (Y502) SENSOR RETURN CIRCUIT

(Y501) 5-VOLT SUPPLY CIRCUIT SHORTED TO (Y502) SENSOR RETURN CIRCUIT

MAP SENSOR

(K68) SIGNAL CIRCUIT OPEN

(Y501) 5-VOLT SUPPLY CIRCUIT OPEN

MAP SENSOR (K68) SIGNAL CIRCUIT SHORT TO GROUND

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read the Engine DTC's. Is there a 5-volt Supply DTC set?  Yes → Refer to symptom list for problems related to the 5-volt Supply DTC. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Turn the ignition off. Disconnect the Map sensor harness connector. Check connectors - Clean/repair as necessary. Turn the ignition on. Measure the voltage between the (Y501) 5-volt supply circuit and sensor (Y502) return circuit of the Map sensor harness connector. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 3 No → Go To 4	All

## P0237-MAP SENSOR VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	<p>While monitoring the DRBIII®, jumper the (Y501) 5-volt supply circuit to the (K68) signal circuit in the Map sensor harness connector. Did the P0238-MAP SENSOR VOLTAGE TOO HIGH, DTC set?</p> <p>Yes → Replace the MAP sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the ECM harness 60 pin connector. Check connectors - Clean/repair as necessary. Measure the resistance between the (K68) signal circuit and (Y502) sensor return circuit in the MAP sensor harness connector. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Repair (K68) signal circuit shorted to (Y502) sensor return circuit or replace harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (Y501) 5-volt supply circuit and (Y502) sensor return circuit in the MAP sensor harness connector. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Repair (Y501) 5-volt supply circuit shorted to (Y502) sensor return circuit or replace harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between the signal (K68) circuit in the Map sensor harness connector with the (K68) signal circuit in the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the resistance between the (Y501) 5-volt supply circuit in the Map sensor harness connector with the (Y501) 5-volt supply circuit in the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P0237-MAP SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
8	Measure the resistance between the MAP Sensor Signal (K68) circuit and the Battery negative terminal. Is the resistance above 100k ohms?  Yes → Go To 9  No → Repair the MAP Sensor (K68) Signal circuit for a short to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
9	Measure the resistance between the (Y501) 5-volt supply circuit in the sensor harness connector and battery negative. Is the resistance above 100k ohms?  Yes → Go To 10  No → Test Complete.	All
10	While monitoring the DRBIII®, jumper the (Y501) 5-volt supply circuit to the (K68) signal circuit in the map sensor harness connector. Did the P0238-MAP SENSOR VOLTAGE TOO HIGH, DTC set?  Yes → Test Complete.  No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## Symptom:

### P0238-MAP SENSOR VOLTAGE TOO HIGH

#### When Monitored and Set Condition:

#### P0238-MAP SENSOR VOLTAGE TOO HIGH

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM is above a calibrated threshold for a certain period of time.

#### POSSIBLE CAUSES

OTHER DTC'S

(K9) SIGNAL CIRCUIT SHORTED TO BATTERY

(K72E) 5-VOLT SUPPLY CIRCUIT SHORTED TO BATTERY

MAP SENSOR

(K9) SIGNAL CIRCUIT SHORT TO SUPPLY

(K72E) 5-VOLT SUPPLY CIRCUIT SHORT TO BATTERY

INTERMITTENT

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read the Engine DTC's. Is there a 5-volt Supply DTC set?  Yes → Refer to symptom list for problems related to the 5-volt Supply DTC. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Turn the ignition off. Disconnect the Map sensor harness connector. Check connectors - Clean/repair as necessary. Turn the ignition on. Measure the voltage between the (K72E) 5-volt supply circuit and (K55) sensor return circuit of the Map sensor harness connector. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 3 No → Go To 4	All

**P0238-MAP SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>While monitoring DRBIII®, use a jumper wire to connect the (K55) return circuit with the (K9) signal circuit at the sensor connector. Did the P0237-MAP SENSOR VOLTAGE TOO LOW, DTC set?</p> <p>Yes → Go To 4</p> <p>No → Replace the MAP sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the voltage between the (K9) signal circuit at the MAP sensor harness connector and Battery Negative. Is the voltage less than 1 volt?</p> <p>Yes → Repair (K9) signal circuit shorted to Battery or replace harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Measure the voltage between the (K72E) 5-volt supply circuit at the MAP sensor harness connector and Battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Repair (K72E) 5-volt supply circuit shorted to Battery or replace harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off. Disconnect the ECM harness connectors. Measure the resistance between the (K9) signal circuit of the sensor harness connector and the (K72E) 5-volt supply circuit of the sensor harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the resistance between the (K55) sensor return circuit in the Map sensor harness connector with the (K55) sensor return circuit in the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



## P0238-MAP SENSOR VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
8	<p>Reconnect the ECM harness connector.  Turn the ignition on.  While monitoring DRBIII®, connect a jumper wire between the (K9) signal circuit of the sensor harness connector and the (K55) return circuit of the sensor harness connector.  Does the DRBIII® show P0237-Map Sensor Voltage Too Low DTC?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0251-CP3 PUMP REGULATOR CONTROL****When Monitored and Set Condition:****P0251-CP3 PUMP REGULATOR CONTROL**

When Monitored: When the ignition is on.

Set Condition: The ECM detects a discrepancy between the PWM supplied to the Electronic Fuel Control Actuator and the PWM returned from the Electronic Fuel Control Actuator.

**POSSIBLE CAUSES**

INTERMITTENT CONDITION

FUEL CONTROL ACTUATOR

(K31) RETURN CIRCUIT OPEN FROM FCA TO ECM

(K65) 5-VOLT SUPPLY CIRCUIT OPEN FROM FCA TO ECM

(K65) 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

ECM

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record all freeze frame data and erase DTC's.            With the DRBIII®, read DTCs.            Is the DTC P0251 set?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p>	All
2	<p>Disconnect the fuel control actuator (FCA).            Check connectors - Clean/repair as necessary.            Measure the resistance between the (K65) 5-volt supply circuit and (K31) return circuit of the FCA.            Is the resistance between 2.8 and 4.0 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the fuel control actuator (FCA).</p>	All
3	<p>Disconnect the ECM harness connector.            Check connectors - Clean/repair as necessary.            Measure the resistance of the (K31) return circuit between the FCA and the ECM connector.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair or replace the engine wiring harness.</p>	All

## P0251-CP3 PUMP REGULATOR CONTROL — Continued

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance of the (K65) 5-volt supply circuit between the FCA and the ECM connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair or replace the engine wiring harness.</p>	All
5	<p>Turn the ignition off. Measure the voltage between the (K65) 5-volt supply circuit in the electronic fuel control actuator connector and battery negative. Is the voltage greater than 1 volts?</p> <p>Yes → Repair the (K65) 5-volt supply (K65) circuit shorted to voltage.</p> <p>No → Go To 6</p>	All
6	<p>Reconnect the ECM harness connectors. Ignition on, engine not running. With the DRBIII®, erase DTCs. Monitor with the DRBIII® while connecting a jumper wire between the (K65) 5-volt supply and (K31) return circuits in the FCA connector. Did the DTC return?</p> <p>Yes → Replace the ECM.</p> <p>No → Test Complete.</p>	All

**Symptom List:**

**P0300-MULTIPLE CYLINDER MISFIRE**

**P0301-CYLINDER # 1 MISFIRE**

**P0302-CYLINDER # 2 MISFIRE**

**P0303-CYLINDER # 3 MISFIRE**

**P0304-CYLINDER # 4 MISFIRE**

**P0305-CYLINDER # 5 MISFIRE**

**P0306-CYLINDER # 6 MISFIRE**

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**Test Note: All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P0300-MULTIPLE CYLINDER  
MISFIRE.**

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**When Monitored and Set Condition:**

**P0300-MULTIPLE CYLINDER MISFIRE**

When Monitored: While the engine is idling.

Set Condition: Misfire detected on multiple cylinders.

**P0301-CYLINDER # 1 MISFIRE**

When Monitored: While the engine is idling at operating temperature.

Set Condition: Misfire detected on this cylinder.

**P0302-CYLINDER # 2 MISFIRE**

When Monitored: While the engine is idling at operating temperature.

Set Condition: Misfire detected on this cylinder.

**P0304-CYLINDER # 4 MISFIRE**

When Monitored: While the engine is idling at operating temperature.

Set Condition: Misfire detected on this cylinder.

**P0305-CYLINDER # 5 MISFIRE**

When Monitored: While the engine is idling at operating temperature.

Set Condition: Misfire detected on this cylinder.

**P0306-CYLINDER # 6 MISFIRE**

When Monitored: While the engine is idling at operating temperature.

Set Condition: Misfire detected on this cylinder.

## P0300-MULTIPLE CYLINDER MISFIRE — Continued

POSSIBLE CAUSES
<p>LOW FUEL</p> <p>OTHER DTC'S</p> <p>DAMAGED FUEL LINES</p> <p>VALVE TRAIN</p> <p>OBSTRUCTED FUEL INJECTOR SUPPLY LINES</p> <p>DAMAGED OR OBSTRUCTED HIGH PRESSURE CONNECTORS</p> <p>EXTERNAL DAMAGED FUEL INJECTORS</p> <p>INTERNAL DAMAGED FUEL INJECTOR</p> <p>NO COMPRESSION</p> <p>EXCESSIVE ENGINE LEAK DOWN</p>

TEST	ACTION	APPLICABILITY
1	<p>Using the DRBIII®, verify that the fuel level is above 15%. Is the fuel level above 15%?</p> <p>Yes → Go To 2</p> <p>No → Add fuel go to step 2. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
2	<p>Read the Freeze frame data. Is the DTC equal to the freeze frame DTC?</p> <p>Yes → Go To 3</p> <p>No → Repair any other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Visually inspect the injector supply lines for damage. Do you have any kinked or bent fuel lines?</p> <p>Yes → Repair or replace damaged fuel lines. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Visually inspect the valve train and check the valve lash on the suspect cylinders. Is the valve train functional and the lash within the specifications listed in the service manual?</p> <p>Yes → Go To 5</p> <p>No → Adjust the lash or fix or repair any damaged component(s). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P0300-MULTIPLE CYLINDER MISFIRE — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Remove the fuel injector supply lines for the suspect cylinders.  Inspect both ends of the fuel injector supply lines for damage.  Using shop air pressure, blow out the fuel injector supply lines to verify that they are not obstructed.  Are the fuel lines free of debris or damage?</p> <p>Yes → Go To 6</p> <p>No → Replace the damaged or obstructed fuel injector supply lines.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Remove the high pressure connectors for the suspect cylinders.  Inspect both ends of the high pressure connectors for signs of damage.  Using shop air pressure, blow out the high pressure connectors to verify that they are not obstructed.  Are the high pressure connectors free of debris or damage?</p> <p>Yes → Go To 7</p> <p>No → Replace the damaged or obstructed high pressure connectors.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Remove the suspect fuel injectors.  Are the fuel injectors damaged?</p> <p>Yes → Replace the external damaged fuel injectors &amp; high pressure connectors.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 8</p>	All
8	<p>With the DRBIII®, erase DTCs.  Switch the misfiring injectors &amp; high pressure connectors with injectors &amp; high pressure connectors from cylinders that are firing properly.  Operate the vehicle.  Did the misfire DTC follow the suspect injectors &amp; high pressure connectors?</p> <p>Yes → Replace the internal damaged fuel injector and high pressure connector.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 9</p>	All
9	<p>Perform engine compression test  Did the suspect cylinders pass the compression test?</p> <p>Yes → Go To 10</p> <p>No → Repair the internal damage to the engine.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P0300-MULTIPLE CYLINDER MISFIRE — Continued

TEST	ACTION	APPLICABILITY
10	Perform engine leak down test Did the suspect cylinders pass the leak down test?  Yes → Test Complete.  No → Repair the internal damage to the engine. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All



**Symptom:****P0335-CRANKSHAFT POSITION (CKP) LOST****When Monitored and Set Condition:****P0335-CRANKSHAFT POSITION (CKP) LOST**

When Monitored: While the engine is running.

Set Condition: The ECM no longer detects a signal from the Crankshaft Position Sensor.

**POSSIBLE CAUSES**

OTHER DTC'S

P0337 PRESENT

CKP SENSOR

VISUAL DAMAGE

(G17) SIGNAL CIRCUIT OPEN

(K6) 5-VOLT SUPPLY CIRCUIT OPEN

(K167) RETURN CIRCUIT OPEN

(G17) SIGNAL CIRCUIT SHORTED TO (K167) RETURN CIRCUIT

(K6) 5-VOLT SUPPLY CIRCUIT SHORTED TO (K167) RETURN CIRCUIT

(G17) SIGNAL CIRCUIT SHORTED TO (K6) 5-VOLT SUPPLY CIRCUIT

(G17) SIGNAL CIRCUIT SHORTED TO GROUND

(K6) 5-VOLT SUPPLY CIRCUIT SHORTED TO BATTERY NEGATIVE

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read DTCs. Is DTC P2146 and/or P2149 present?  Yes → Repair other DTC's. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	With the DRBIII®, read DTCs. Is P0337 present?  Yes → Repair P0337 first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All

## P0335-CRANKSHAFT POSITION (CKP) LOST — Continued

TEST	ACTION	APPLICABILITY
3	<p>Visually inspect the sensor, engine belt, sensor connector, and the ECM connector. Is there any damage?</p> <p>Yes → Repair or replace the sensor, engine belt, harness, or the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Disconnect the CKP sensor harness connector.</p> <p><b>NOTE: Check connectors - Clean/repair as necessary.</b></p> <p>Measure the resistance between the (K6) 5-volt supply circuit and the (G17) signal circuit of the sensor harness connector.</p> <p>Is the resistance between 900 and 1100 ohms?</p> <p>Yes → Go To 5</p> <p>No → Replace the CKP sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Disconnect the ECM harness connectors.</p> <p>Disconnect the CKP sensor harness connector.</p> <p>Check connectors - Clean/repair as necessary.</p> <p>Measure the resistance of the (G17) signal circuit between the ECM harness connector and the CKP sensor harness connector.</p> <p>Is the resistance less than 10 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open (G17) signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of the (K6) 5-volt supply circuit between the ECM harness connector and the CKP sensor harness connector.</p> <p>Is the resistance less than 10 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open (K6) 5-volt supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the resistance of the (K167) return circuit between the ECM harness connector and the CKP sensor harness connector.</p> <p>Is the resistance less than 10 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open (K167) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Measure the resistance between the (G17) signal circuit and the (K167) return circuit in the sensor connector.</p> <p>Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P0335-CRANKSHAFT POSITION (CKP) LOST — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Measure the resistance between the (K6) 5-volt supply circuit and the (K167) return circuit in the sensor connector. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Measure the resistance between the (G17) signal circuit and ground. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
11	<p>Measure the resistance between the (K6) 5-volt supply circuit and ground. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
12	<p>Measure the resistance between the (G17) signal circuit and the (K6) 5-volt supply circuit in the sensor connector. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 13</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
13	<p>Reconnect the ECM harness connectors. Ignition on, engine not running. With the DRBIII®, erase DTCs. Connect a jumper wire between the sensor supply circuit and the sensor return circuit in the sensor harness connector. Did DTC P0337 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### P0336-CRANKSHAFT POSITION (CKP) SENSOR SIGNAL

## When Monitored and Set Condition:

### P0336-CRANKSHAFT POSITION (CKP) SENSOR SIGNAL

When Monitored: With the key on.

Set Condition: The voltage detected at the Crankshaft position sensor is below a calibrated value.

## POSSIBLE CAUSES

CKP SENSOR

(G17) SIGNAL CIRCUIT OPEN

(K6) 5-VOLT SUPPLY CIRCUIT OPEN

(K167) RETURN CIRCUIT OPEN

(G17) SIGNAL CIRCUIT SHORTED TO (K167) RETURN CIRCUIT

(K6) 5-VOLT SUPPLY CIRCUIT SHORTED TO (K167) RETURN CIRCUIT

(G17) SIGNAL CIRCUIT SHORTED TO (K6) 5-VOLT SUPPLY CIRCUIT

(G17) SIGNAL CIRCUIT SHORTED TO GROUND

(K6) 5-VOLT SUPPLY CIRCUIT SHORTED TO BATTERY NEGATIVE

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	<p>Disconnect the CKP sensor harness connector.</p> <p><b>NOTE: Check connectors - Clean/repair as necessary.</b></p> <p>Measure the resistance between the (K6) 5-volt supply circuit and the (G17) signal circuit of the sensor harness connector.</p> <p>Is the resistance between 900 and 1100 ohms?</p> <p>Yes → Go To 2</p> <p>No → Replace the CKP sensor.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
2	<p>Disconnect the ECM harness connectors.</p> <p>Disconnect the CKP sensor harness connector.</p> <p>Check connectors - Clean/repair as necessary.</p> <p>Measure the resistance of the (G17) signal circuit between the ECM harness connector and the CKP sensor harness connector.</p> <p>Is the resistance less than 10 ohms?</p> <p>Yes → Go To 3</p> <p>No → Repair the open (G17) signal circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P0336-CRANKSHAFT POSITION (CKP) SENSOR SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Measure the resistance of the (K6) 5-volt supply circuit between the ECM harness connector and the CKP sensor harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open (K6) 5-volt supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Measure the resistance of the (K167) return circuit between the ECM harness connector and the CKP sensor harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open (K167) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance between the (G17) signal circuit and the (K167) return circuit in the sensor connector. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance between the (K6) 5-volt supply circuit and the (K167) return circuit in the sensor connector. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the resistance between the (G17) signal circuit and ground. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Measure the resistance between the (K6) 5-volt supply circuit and ground. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P0336-CRANKSHAFT POSITION (CKP) SENSOR SIGNAL — Continued

TEST	ACTION	APPLICABILITY
9	<p>Measure the resistance between the (G17) signal circuit and the (K6) 5-volt supply circuit in the sensor connector. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the short circuit or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Reconnect the ECM harness connectors. Ignition on, engine not running. With the DRBIII®, erase DTCs. Connect a jumper wire between the sensor supply circuit and the sensor return circuit in the sensor harness connector. Did DTC P0337 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0337-CRANKSHAFT POSITION (CKP) SENSOR VOLTAGE TOO LOW****When Monitored and Set Condition:****P0337-CRANKSHAFT POSITION (CKP) SENSOR VOLTAGE TOO LOW**

When Monitored: With the key on.

Set Condition: Voltage detected at the CKP is below a calibrated value for a calibrated amount of time.

**POSSIBLE CAUSES**

CKP SENSOR

(K6) 5-VOLT SUPPLY CIRCUIT SHORTED TO (K167) RETURN CIRCUIT

(K6) 5-VOLT SUPPLY CIRCUIT SHORTED BATTERY NEGATIVE

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	Disconnect the CKP sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance between the (K6) 5-volt supply circuit and the (G17) signal circuit of the sensor harness connector. Is the resistance between 900 and 1100 ohms?  Yes → Go To 2 No → Replace the CKP sensor.	All
2	Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the (K6) 5-volt supply circuit and the (K167) return circuit in the sensor connector. Is the resistance greater than 100k Ohms?  Yes → Go To 3 No → Repair the short circuit or replace the engine harness.	All
3	Measure the resistance between the (K6) 5-volt supply circuit and battery negative. Is the resistance greater than 100k Ohms?  Yes → Go To 4 No → Repair the short circuit or replace the engine harness.	All



## **P0337-CRANKSHAFT POSITION (CKP) SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
4	Reconnect the ECM harness connectors. Ignition on, engine not running. Connect a jumper wire between the sensor (K6) 5-volt supply circuit in the sensor harness connector 12-volts. Did DTC P0337 set?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  No → Replace the ECM.	All

**Symptom:****P0338-CRANKSHAFT POSITION (CKP) SENSOR VOLTAGE TOO HIGH****When Monitored and Set Condition:****P0338-CRANKSHAFT POSITION (CKP) SENSOR VOLTAGE TOO HIGH**

When Monitored: With the key on.

Set Condition: Voltage detected at the CKP is above a calibrated value for a calibrated amount of time.

**POSSIBLE CAUSES**

(K6) 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the ECM harness connector(s). Disconnect the CKP sensor harness connector. Check connectors - Clean/repair as necessary. Measure voltage between the (K6) 5-volt supply circuit in the sensor harness connector and battery negative. Is the voltage greater than 1 volt?  Yes → Repair or replace the shorted wiring harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Reconnect the ECM harness connectors. Ignition on, engine not running. Connect a jumper wire between the sensor (K6) 5-volt supply circuit and the sensor (K167) return in the sensor harness connector. Did DTC P0337 set?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## Symptom:

### P0340-CAMSHAFT POSITION (CMP) LOST

#### When Monitored and Set Condition:

#### P0340-CAMSHAFT POSITION (CMP) LOST

When Monitored: While the engine is running.

Set Condition: The ECM no longer detects a signal from the Engine Position Sensor.

#### POSSIBLE CAUSES

INJECTOR DTC'S PRESENT  
 OTHER DTC'S  
 CAMSHAFT SENSOR  
 (K72E) 5-VOLT SUPPLY CIRCUIT OPEN  
 (K55) RETURN CIRCUIT OPEN  
 (K53) SIGNAL CIRCUIT SHORTED TO GROUND  
 (K53) SIGNAL CIRCUIT SHORTED TO SUPPLY (K72E) CIRCUIT  
 (K53) SIGNAL CIRCUIT SHORTED TO (K55) RETURN CIRCUIT  
 (K53) SIGNAL CIRCUIT SHORT TO VOLTAGE  
 ECM  
 INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read DTCs. Do you have a DTC for P2146 or P2149?  Yes → Repair injector DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).  No → Go To 2	All
2	With the DRBIII®, read DTCs. Is any other DTC's present?  Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).  No → Go To 3	All

**P0340-CAMSHAFT POSITION (CMP) LOST — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the cam sensor harness connector.            Check connectors - Clean/repair as necessary.            Measure the resistance between the (K72E) 5-volt supply circuit and the (K53) signal circuit of the sensor.            Is the resistance between 900 and 1100 ohms?</p> <p>Yes → Go To 4</p> <p>No → Replace the camshaft sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
4	<p>Disconnect the ECM harness connectors.            Check connectors - Clean/repair as necessary.            Measure the resistance of the (K72E) 5-volt supply circuit between the ECM harness connector and the cam sensor harness connector.            Is the resistance less than 10 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open (K72E) 5-volt supply circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
5	<p>Measure the resistance of the (K55) return circuit between the ECM harness connector and the cam sensor harness connector.            Is the resistance less than 10 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open (K55) return circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
6	<p>Measure the resistance between the (K53) signal circuit in the sensor harness connector and battery negative.            Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair (K53) signal circuit shorted to ground.            Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
7	<p>Measure the resistance between the (K53) signal circuit and the (K72E) 5-volt supply circuit in the sensor harness connector.            Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair (K53) signal circuit shorted to the (K72E) 5-volt supply circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All

## P0340-CAMSHAFT POSITION (CMP) LOST — Continued

TEST	ACTION	APPLICABILITY
8	<p>Measure the resistance between the (K53) signal circuit and the (K55) return circuit in the sensor harness connector. Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair (K53) signal circuit shorted to the (K55) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
9	<p>Measure the voltage between the (K53) signal circuit in the sensor harness connector and battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Go To 10</p> <p>No → Repair (K53) signal circuit shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
10	<p>Reconnect the ECM harness connectors. Measure the voltage between the (K53) signal circuit in the sensor harness connector and battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All

**Symptom:****P0341-CAMSHAFT POSITION (CMP) SENSOR SIGNAL****When Monitored and Set Condition:****P0341-CAMSHAFT POSITION (CMP) SENSOR SIGNAL**

When Monitored: While the engine is running.

Set Condition: The ECM no longer detects a signal from the Engine Position Sensor.

**POSSIBLE CAUSES**

INJECTOR DTC'S PRESENT

OTHER DTC'S

CAMSHAFT SENSOR

(K53) SIGNAL CIRCUIT OPEN

(K72E) 5-VOLT SUPPLY CIRCUIT OPEN

(K55) RETURN CIRCUIT OPEN

(K53) SIGNAL CIRCUIT SHORTED TO GROUND

(K53) SIGNAL CIRCUIT SHORTED TO (K72E) 5-VOLT SUPPLY CIRCUIT

(K53) SIGNAL CIRCUIT SHORTED TO (K55) RETURN CIRCUIT

(K53) SIGNAL CIRCUIT SHORT TO VOLTAGE

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read DTCs. Do you have a DTC for P2146 or P2149?  Yes → Repair injector DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).  No → Go To 2	All
2	With the DRBIII®, read DTCs. Is any other DTC's present?  Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).  No → Go To 3	All

## P0341-CAMSHAFT POSITION (CMP) SENSOR SIGNAL — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the cam sensor harness connector.  Check connectors - Clean/repair as necessary.  Measure the resistance between the (K72E) 5-volt supply circuit and the (K53) signal circuit of the sensor.  Is the resistance between 900 and 1100 ohms?</p> <p>Yes → Go To 4</p> <p>No → Replace the camshaft sensor.  Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
4	<p>Disconnect the ECM harness connectors.  Measure the resistance of the (K53) signal circuit between the ECM harness connector and the sensor harness connector.  Is the resistance less than 10 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open (K53) signal circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
5	<p>Measure the resistance of the (K72E) 5-volt supply circuit between the ECM harness connector and the sensor harness connector.  Is the resistance less than 10 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open (K72E) 5-volt supply circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
6	<p>Measure the resistance of the (K55) return circuit between the ECM harness connector and the sensor harness connector.  Is the resistance less than 10 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open (K55) return circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
7	<p>Measure the resistance between the (K53) signal circuit in the sensor harness connector and battery negative.  Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair (K53) signal circuit shorted to ground.  Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All



**P0341-CAMSHAFT POSITION (CMP) SENSOR SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Measure the resistance between the (K53) signal circuit and the (K72E) 5-volt supply circuit in the sensor harness connector. Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair (K53) signal circuit shorted to the (K72E) 5-volt supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
9	<p>Measure the resistance between the (K53) signal circuit and the (K55) return circuit in the sensor harness connector. Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair (K53) signal circuit shorted to the (K55) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
10	<p>Measure the voltage between the (K53) signal circuit in the sensor harness connector and battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Go To 11</p> <p>No → Repair (K53) signal circuit shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All
11	<p>Reconnect the ECM harness connectors. Measure the voltage between the (K53) signal circuit in the sensor harness connector and battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Test Complete.</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All

## Symptom:

### P0381-WAIT TO START LAMP INOPERATIVE

#### When Monitored and Set Condition:

#### P0381-WAIT TO START LAMP INOPERATIVE

When Monitored: Ignition on .

Set Condition: The cluster sends a signal to the ECM that it has detected a failed wait to start lamp.

#### POSSIBLE CAUSES

WAIT-TO-START LAMP STAYS ON ALL THE TIME  
 WAIT-TO-START LAMP DRIVER CIRCUIT SHORTED TO GROUND  
 WAIT-TO-START LAMP DRIVER CIRCUIT OPEN FROM ECM TO CLUSTER.  
 FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN  
 WAIT-TO-START LIGHT BULB  
 ECM DRIVER CIRCUIT OPEN  
 WIRING/CONNECTOR PROBLEM  
 ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. While watching the wait-to-start lamp, turn the ignition key on. Did the wait-to-start lamp light?  Yes → Go To 2 No → Go To 4	All
2	Turn the ignition off. While watching the wait-to-start lamp, turn the ignition key on. Does the wait-to-start lamp stay on all the time?  Yes → Go To 3 No → Wait-to-start Lamp operating normally. Test passed. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

**P0381-WAIT TO START LAMP INOPERATIVE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the ECM harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> While watching the wait-to-start lamp, turn the ignition key on. Did the Wait-to-start lamp light?</p> <p>Yes → Repair Diesel Wait-to-start Lamp driver circuit for a short to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Test Complete.</p>	All
4	<p>Turn the ignition off. Disconnect the ECM harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Connect a jumper between the ECM Wait-to-start Lamp driver and a good ground. Did the Wait-to-lamp illuminate?</p> <p>Yes → Go To 5</p> <p>No → Repair the open Wait-to-start lamp driver circuit open from ECM to cluster. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Turn the ignition off. Remove the cluster. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Turn the ignition on. Using a 12-Volt test Light, check the Fused Ignition Switch Run/Start circuit. Is the light illuminated and bright?</p> <p>Yes → Go To 6</p> <p>No → Repair the open fused Ignition Switch Output circuit Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Remove and inspect the Wait-to-Start Bulb. Is the Bulb Ok?</p> <p>Yes → Go To 7</p> <p>No → Replace the Wait-to-Start Bulb. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the Wait-to-start driver circuit at the ECM harness connector. Is the voltage above 10.0 volts?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 8</p>	All

## P0381-WAIT TO START LAMP INOPERATIVE — Continued

TEST	ACTION	APPLICABILITY
8	<p>Using a schematic as a guide, inspect the related wiring and connectors for problems. Check the Fuses. Were any problems found?</p> <p>Yes → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>Test Complete Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0461-Fuel Level Unit No Change Over Time****When Monitored and Set Condition:****P0461-Fuel Level Unit No Change Over Time**

When Monitored: While the engine is running.

Set Condition: Fuel level does not change by a calibrated amount over a calibrated amount of time.

**POSSIBLE CAUSES**

EXTERNAL DAMAGE TO FUEL TANK  
 FUEL LEVEL SENSOR  
 FUEL LEVEL SENSOR  
 INSIDE OF FUEL TANK OBSTRUCTED DAMAGED  
 INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Visually inspect the fuel tank for external damage. Is the fuel tank damaged from the outside?  Yes → Fix or replace the fuel tank. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Disconnect the wiring harness from the fuel level sensor. Check connectors - Clean/repair as necessary. Remove the fuel level sensor from the fuel tank. Does the fuel level float move freely?  Yes → Go To 3  No → Replace the fuel level sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
3	Measure the resistance between the sensor (G8) signal circuit and (K4) return circuit while moving the sensor float arm. Does the resistance level change as you move the sensor arm?  Yes → Go To 4  No → Replace the fuel level sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## P0461-Fuel Level Unit No Change Over Time — Continued

TEST	ACTION	APPLICABILITY
4	<p>Visually inspect the inside of the fuel tank for obstructions. Is the inside of the fuel tank damaged or obstructing the fuel level sensor?</p> <p>Yes → Test Complete.</p> <p>No → Replace the fuel tank. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0462-LOW VOLTAGE DETECTED AT THE FUEL LEVEL SENSOR****When Monitored and Set Condition:****P0462-LOW VOLTAGE DETECTED AT THE FUEL LEVEL SENSOR**

When Monitored: Ignition on and battery voltage above 10.4 volts.

Set Condition: The signal voltage from the sensor falls below a calibrated value for a calibrated amount of time.

**POSSIBLE CAUSES**

FUEL LEVEL SENSOR

(G8) SIGNAL CIRCUIT OPEN

(G8) SIGNAL CIRCUIT SHORTED TO VOLTAGE

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Fuel Level Sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the sensor across the (G8) signal circuit and (K4) return circuit. Is the resistance less than 10 ohms? Yes → Go To 2 No → Replace the fuel level sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance of the (G8) signal circuit between the ECM harness connector and the sensor harness connector. Is the resistance less than 10 ohms? Yes → Go To 3 No → Repair the open (G8) signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
3	Measure the voltage between the (G8) signal circuit and battery negative. Is the voltage greater than 1 volt? Yes → Repair the (G8) signal circuit shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL). No → Go To 4	All



## **P0462-LOW VOLTAGE DETECTED AT THE FUEL LEVEL SENSOR — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Reconnect the ECM harness connector.</p> <p>While monitoring with the DRBIII®, connect a jumper wire between the (G8) signal circuit in the sensor harness connector and battery negative.</p> <p>Did the DTC P0463 set?</p> <p>Yes → Test Complete.</p> <p>No → Replace the ECM.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0463-HIGH VOLTAGE DETECTED AT THE FUEL LEVEL SENSOR****When Monitored and Set Condition:****P0463-HIGH VOLTAGE DETECTED AT THE FUEL LEVEL SENSOR**

When Monitored: Ignition on and battery voltage above 10.4 volts.

Set Condition: The signal voltage from the sensor goes above a calibrated value for a calibrated amount of time.

**POSSIBLE CAUSES**

FUEL LEVEL SENSOR

(G8) SIGNAL CIRCUIT SHORTED TO GROUND

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	Disconnect the ECM harness connectors. Disconnect the Fuel level sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the Fuel level sensor across the (G8) signal circuit and return (K4) circuit. Is the resistance less than 10 ohms?  Yes → Go To 2  No → Replace the Fuel level sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Measure the resistance between the (G8) signal circuit in the sensor harness connector and battery negative. Is the resistance less than 10 Ohms?  Yes → Repair the (G8) signal circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All
3	Reconnect the ECM harness connector. While monitoring with the DRBIII®, disconnect the Fuel level sensor harness connector. Did the DTC P0462 set?  Yes → Test Complete.  No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## Symptom:

### P0477-LOW VOLTAGE ON THE ENGINE BRAKE DRIVER

## When Monitored and Set Condition:

### P0477-LOW VOLTAGE ON THE ENGINE BRAKE DRIVER

When Monitored: When the ignition is on .

Set Condition: When the signal from the engine brake driver output does not match the signal from the engine brake driver feedback.

## POSSIBLE CAUSES

WIRING HARNESS

ENGINE BRAKE DRIVER RELAY

FUSED B+ OPEN

ENGINE BRAKE DRIVER SIGNAL CIRCUIT OPEN

INTERMITTENT CONDITION

ENGINE BRAKE DRIVER SIGNAL CIRCUIT SHORTED TO BATTERY NEGATIVE

ECM

TEST	ACTION	APPLICABILITY
1	Turn the engine off (ignition on). With the DRBIII®, actuate the exhaust brake relay. Can you hear the Relay clicking?  Yes → Go To 2 No → Go To 3	All
2	With the DRBIII®, actuate the exhaust brake relay. While the relay is clicking, wiggle the wiring harness and connectors throughout the circuit. Does this interrupt the clicking?  Yes → Repair or replace the wiring harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All
3	Remove the Engine Brake Driver Relay. Check connectors - Clean/repair as necessary. Measure the resistance between terminals 86 and 85 of the engine brake relay. Is the resistance less than 100 Ohms?  Yes → Go To 4 No → Replace the Engine Brake Driver Relay. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

**P0477-LOW VOLTAGE ON THE ENGINE BRAKE DRIVER — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Ignition on, engine not running. Measure the voltage of the Fused B+ Supply circuit at the Engine Brake Relay. Is the voltage within 10% of battery voltage?</p> <p>Yes → Go To 5</p> <p>No → Repair the open B+ circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Turn the ignition off. Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance of the Engine Brake Driver signal circuit between the Relay harness connector and the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open Engine Brake driver circuit open from relay to ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of the Engine Brake Driver signal circuit between the Relay connector and battery negative. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair Engine brake driver shorted to Battery negative. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Reconnect the ECM harness connectors. Using the DRBIII®, actuate the Engine Brake Driver Relay. While monitoring with the DRBIII®, use a jumper wire to connect 12 volts to the relay signal circuit with the relay disconnected. Did the DTC P0478?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P0478-HIGH VOLTAGE ON THE ENGINE BRAKE DRIVER**

## When Monitored and Set Condition:

### **P0478-HIGH VOLTAGE ON THE ENGINE BRAKE DRIVER**

When Monitored: When the ignition is on.

Set Condition: When the signal from the engine brake driver output does not match the signal from the engine brake driver feedback.

### POSSIBLE CAUSES

RELAY LOOSE  
ENGINE BRAKE DRIVER CONTROL CIRCUIT SHORTED TO VOLTAGE  
ENGINE BRAKE RELAY  
INTERMITTENT CONDITION  
ECM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the Engine Brake Driver Relay. Can you hear the Relay clicking?  Yes → Go To 2 No → Go To 3	All
2	While the relay is clicking, wiggle the wiring harness and connectors. Does this interrupt the clicking?  Yes → Repair the loose connection. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All
3	Turn the ignition off. Remove the Engine Brake Driver Relay. Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the voltage of the Engine Brake Driver Control Circuit between the relay terminal and battery negative. Is the voltage less than 1 volt?  Yes → Go To 4 No → Repair Engine Brake Driver Control Circuit shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

**P0478-HIGH VOLTAGE ON THE ENGINE BRAKE DRIVER — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between terminals 85 and 86 of the engine brake relay. Is the resistance less than 10 ohms?</p> <p>Yes → Replace the engine brake relay. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Reconnect the ECM harness connectors. Reinstall the Engine Brake relay. Ignition on, engine not running. While monitoring with the DRBIII®, remove the Engine Brake Driver Relay. Did P0477 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom: P0480-FAN CLUTCH

### When Monitored and Set Condition:

#### P0480-FAN CLUTCH

When Monitored: When the ignition is on.

Set Condition: The PWM signal to the fan clutch does not match the PWM signal from the fan clutch.

#### POSSIBLE CAUSES

FAN CLUTCH

WIRE HARNESS DAMAGED

OPEN FAN CLUTCH (Y1) DRIVER CIRCUIT

(Y1) DRIVER CIRCUIT SHORTED TO (K4) RETURN CIRCUIT

(Y1) DRIVER CIRCUIT SHORTED TO BATTERY NEGATIVE

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	Disconnect the fan clutch harness connector. Check connectors - Clean/repair as necessary. Measure the resistance between the fan clutch (Y1) driver circuit and the fan speed (K4) sensor return circuit on the fan clutch assembly. Is the resistance less than 10 Ohms?  Yes → Replace the fan clutch. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Disconnect the Fan Clutch harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the fan clutch (Y1) driver circuit and the fan clutch battery supply circuit on the fan clutch assembly. Is the resistance less than 6 Ohms or greater than 10 Ohms?  Yes → Replace the fan clutch. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All



**P0480-FAN CLUTCH — Continued**

TEST	ACTION	APPLICABILITY
3	Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance of the fan clutch (Y1) driver circuit between the ECM harness connector and the fan clutch harness connector. Is the resistance less than 10 Ohms?  Yes → Go To 4  No → Repair the open fan clutch (Y1) river circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
4	Measure the resistance between the fan clutch (Y1) driver circuit and the fan speed sensor (K4) return circuit at the sensor harness connector. Is the resistance greater than 100K Ohms?  Yes → Go To 5  No → Repair the (Y1) Driver circuit shorted to (K4) Return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
5	Measure the resistance between the fan clutch (Y1) driver circuit and the battery negative. Is the resistance greater than 100k Ohms?  Yes → Go To 6  No → Repair the (Y1) Driver circuit shorted to battery negative. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
6	Reconnect the ECM harness connectors. Measure the resistance of the fan clutch (Y1) driver circuit between the fan clutch connector and battery negative. Is the resistance greater than 100k Ohms?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## Symptom: P0483-FAN SPEED

### When Monitored and Set Condition:

#### P0483-FAN SPEED

When Monitored: While the engine is running.

Set Condition: The actual fan speed is less than 75 RPM or more than 4000 RPM.

### POSSIBLE CAUSES

#### OTHER DTC'S

(Y5) SIGNAL CIRCUIT SHORT TO 5-VOLT SUPPLY (Y3) CIRCUIT

(Y5) SIGNAL CIRCUIT OPEN FROM ECM TO FAN CLUTCH ASSEMBLY

(Y3) SUPPLY CKT OPEN FROM ECM HARNESS CONNECTOR TO FAN CLUTCH HARNESS CONNECTOR

#### INTERMITTENT CONDITION

(Y5) SIGNAL CIRCUIT SHORTED TO RETURN IN THE HARNESS

(Y5) SIGNAL CIRCUIT SHORTED TO VOLTAGE

(Y5) SIGNAL CIRCUIT IN ECM SHORTED TO GROUND INSIDE ECM

(Y5) SIGNAL CIRCUIT SHORTED TO VOLTAGE IN THE ECM

(Y3) 5-VOLT SUPPLY CIRCUIT IN ECM

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Is DTC P0480 present?</p> <p>Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Disconnect the Fan clutch connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the (Y5) signal circuit in the fan clutch assembly and the battery (Y3) 5-volt supply circuit in the fan clutch assembly. Is the resistance less than 10 Ohms?</p> <p>Yes → Replace the Fan clutch assembly. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 3</p>	All

**P0483-FAN SPEED — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance of the (Y5) signal circuit between the ECM harness connector and the fan clutch assembly harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open (Y5) circuit from the ECM harness connector to the Fan clutch harness connector. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Measure the resistance of the (Y3) 5-volt supply circuit between the ECM harness connector and the fan clutch assembly harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open (Y5) circuit from ECM harness connector to Fan clutch connector. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance between the (Y5) signal circuit in the fan clutch assembly harness connector and the return circuit in the fan clutch assembly harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Repair the shorted (Y5) circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Measure the voltage between the (Y5) signal circuit in the fan clutch assembly harness connector and battery negative. Is the voltage greater than 1 volt?</p> <p>Yes → Repair the (Y5) signal circuit shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 7</p>	All
7	<p>Reconnect the ECM harness connectors. Measure the resistance between the (Y5) signal circuit in the fan clutch assembly harness connector and battery negative. Is the resistance less than 10 Ohms?</p> <p>Yes → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 8</p>	All

## P0483-FAN SPEED — Continued

TEST	ACTION	APPLICABILITY
8	<p>Reconnect the fan harness connector.  Turn the ignition on.  While back probing the fan connector measure the voltage between the fan speed (Y5) signal circuit in the fan clutch assembly harness connector and battery negative while manually rotating the fan blade.  Did voltage go from less than 0.7 volts to 4.7 to 5.7 volts?</p> <p>Yes → Repair the Fan Speed (Y5) Signal circuit in the engine harness.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition on.  Measure the voltage between the (Y3) 5-volt supply circuit in the fan clutch assembly harness connector and battery negative.  Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0500-NO VEHICLE SPEED SENSOR SIGNAL****When Monitored and Set Condition:****P0500-NO VEHICLE SPEED SENSOR SIGNAL**

When Monitored: While the engine is running.

Set Condition: The ECM indicates signals of motion; however, the VSS does not.

**POSSIBLE CAUSES**

VEHICLE SPEED (G7) SIGNAL CIRCUIT SHORTED TO VOLTAGE

VEHICLE SPEED (G7) SIGNAL CIRCUIT OPEN BETWEEN CAB AND ECM

VEHICLE SPEED (G7) SIGNAL CIRCUIT SHORTED TO GROUND

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the ABS/RWAL Module harness connector. Ignition on, engine not running. Measure the voltage of the Vehicle Speed (G7) signal circuit in the ABS/RWAL or ECM harness connector. Is the voltage above 4.9 volts?  Yes → Repair the short to voltage in the Vehicle Speed (G7) Signal circuit between the CAB and ECM. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).  No → Go To 2	All
2	Turn the ignition off. Measure the resistance of the Vehicle Speed (G7) signal circuit between the ECM harness connector and the ABS/RWAL harness connector. Is the resistance above 5.0 ohms?  Yes → Repair the open in the Vehicle Speed (G7) signal circuit between the CAB and ECM. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).  No → Go To 3	All
3	Measure the resistance between ground and the Vehicle Speed (G7) signal circuit at the ECM harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the Vehicle Speed (G7) signal circuit between the CAB and ECM. Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).  No → Go To 4	All

## P0500-NO VEHICLE SPEED SENSOR SIGNAL — Continued

TEST	ACTION	APPLICABILITY
4	<p><b>NOTE: Before continuing, check the ECM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the ECM per Service Information.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL).</p>	All

**Symptom:****P0514-BAT TEMPERATURE SENSOR RATIONALITY****When Monitored and Set Condition:****P0514-BAT TEMPERATURE SENSOR RATIONALITY**

When Monitored: While the engine is running.

Set Condition: The ECM does not read a change in value from the sensor over time.

**POSSIBLE CAUSES**

BATTERY TEMP SENSOR  
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Remove the temperature sensor and reconnect the wiring harness connector to the sensor. Monitor DRBIII®, while heating the sensor with an external heat source (DO NOT USE OPEN FLAME). Does the reading from the sensor increase at least 5 degrees F. on the DRBIII®?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Replace the battery temperature sensor. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All

## Symptom:

### P0516-LOW VOLTAGE AT THE BAT TEMP SENSOR

#### When Monitored and Set Condition:

#### P0516-LOW VOLTAGE AT THE BAT TEMP SENSOR

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM falls below a calibrated threshold for a certain period of time.

#### POSSIBLE CAUSES

BATTERY TEMP SENSOR

(K118) SIGNAL CIRCUIT SHORTED TO GROUND

(K118) SIGNAL CIRCUIT SHORTED

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Battery temp sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the Battery temp sensor. Is the resistance between 300 and 90k ohms?  Yes → Go To 2  No → Replace the battery temp sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance between the engine ground and the temperature sensor (K118) signal circuit at the sensor connector. Is the resistance more than 100 k ohms?  Yes → Go To 3  No → Repair the Battery temp sensor (K118)signal circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
3	Measure the resistance between the Battery temp sensor (K118) signal circuit and all other circuits in the ECM harness connector of the engine harness. Is the resistance more than 100k ohms?  Yes → Go To 4  No → Repair the (K118) signal circuit shorted to another circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All



**P0516-LOW VOLTAGE AT THE BAT TEMP SENSOR — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Reconnect the disconnected Battery temp sensor harness connector. While monitoring with DRBIII®, disconnect the temperature sensor harness connector. Did P0517 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### P0517-HIGH VOLTAGE AT THE BAT TEMP SENSOR

#### When Monitored and Set Condition:

#### P0517-HIGH VOLTAGE AT THE BAT TEMP SENSOR

When Monitored: With ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM is above a calibrated threshold for a certain period of time.

#### POSSIBLE CAUSES

BATTERY TEMP SENSOR  
(K118) SIGNAL CIRCUIT OPEN  
(K4) RETURN CIRCUIT OPEN  
(K118) SIGNAL CIRCUIT SHORTED  
ECM  
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Disconnect the Battery temp sensor harness connector. Check connectors - Clean/repair as necessary. Measure the resistance of the Battery temp sensor Is the resistance between 300 and 90k ohms?  Yes → Go To 2 No → Replace the Battery temp sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Reconnect the disconnected Battery temp sensor harness connector. Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance between the temperature sensor (K118) signal and (K4) return circuits at the ECM harness connector. Is the resistance between 300 and 90k ohms?  Yes → Go To 5 No → Go To 3	All
3	Disconnect the Battery temp sensor harness connector. Measure the resistance of the sensor (K118) signal circuit between the sensor harness connector and the ECM harness connector. Is the resistance less than 10 Ohms?  Yes → Go To 4 No → Repair the open (K118) signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

**P0517-HIGH VOLTAGE AT THE BAT TEMP SENSOR — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance of the sensor (K4) return circuit between the sensor harness connector and the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open (K4) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Check for a short circuit from (K118) signal circuit to all other circuits at the ECM harness connector. Is the resistance more than 100k ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the shorted (K118) signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Reconnect the ECM harness connectors. While monitoring with DRBIII®, use a jumper wire and connect the sensor (K118) signal circuit to the sensor (K4) return circuit at the sensor harness connector. Did P0516 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### P0521-OIL PRESSURE SWITCH RATIONALITY

#### When Monitored and Set Condition:

#### P0521-OIL PRESSURE SWITCH RATIONALITY

When Monitored: While the key is on.

Set Condition: Oil pressure is detected with engine RPM = 0 for 30 seconds.

#### POSSIBLE CAUSES

OIL PRESSURE SWITCH  
(G60) SIGNAL CIRCUIT OPEN  
INTERMITTENT CONDITION  
ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Oil pressure switch harness connector. Check connectors - Clean/repair as necessary. Measure the resistance between the oil pressure switch terminal and ground. Is the resistance less than 10 ohms?  Yes → Go To 2 No → Replace the oil pressure switch. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance of the oil pressure switch (G60) signal circuit between the oil pressure switch harness connector and the ECM harness connector. Is the resistance less than 10 ohms?  Yes → Go To 3 No → Repair the open Oil pressure (G60) signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

**P0521-OIL PRESSURE SWITCH RATIONALITY — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Reconnect the ECM harness connectors. Turn the ignition on. Measure the voltage between the oil pressure (G60) signal circuit at the oil pressure switch harness connector and ground. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P0524-OIL PRESSURE TOO LOW**

## When Monitored and Set Condition:

### **P0524-OIL PRESSURE TOO LOW**

When Monitored: While the engine is running.

Set Condition: The oil pressure detected by the ECM is less than a calibrated value.

## POSSIBLE CAUSES

LOW OIL LEVEL

(G60) SIGNAL CIRCUIT SHORT TO GROUND

OIL PRESSURE SWITCH

INTERNAL ENGINE DAMAGE

TEST	ACTION	APPLICABILITY
1	<p>Check the engine oil level. Is the engine oil in the safe operating range?</p> <p>Yes → Go To 2</p> <p>No → Repair any condition that may cause the oil level to be above or below the safe operating range.</p>	All
2	<p>With the DRBIII®, erase DTCs. Turn the ignition off. Disconnect the oil pressure switch harness connector. Turn the ignition on for 1 minute. Did DTC P0521 set?</p> <p>Yes → Go To 3</p> <p>No → Repair the (G60) signal circuit shorted to ground.</p>	All
3	<p>Measure the engine oil pressure with a mechanical gauge. Is the oil pressure within the acceptable operating range?</p> <p>Yes → Replace the oil pressure switch.</p> <p>No → Repair internal engine damage.</p>	All

**Symptom:****P0532-A/C SENDING UNIT VOLTS TOO LOW****When Monitored and Set Condition:****P0532-A/C SENDING UNIT VOLTS TOO LOW**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM falls below a calibrated threshold for a certain period of time.

**POSSIBLE CAUSES**

OTHER DTC'S

A/C PRESSURE SENSOR

(C18) SIGNAL CIRCUIT SHORTED TO (K55) RETURN CIRCUIT

(K72E) 5-VOLT SUPPLY CIRCUIT SHORTED TO (K55) RETURN CIRCUIT

(C18) SIGNAL CIRCUIT OPEN FROM ECM HARNESS CONNECTOR TO A/C HARNESS CONNECTOR

(K72E) 5-VOLT SUPPLY CIRCUIT OPEN FROM ECM HARNESS TO A/C HARNESS CONNECTORS

(C18) SIGNAL CIRCUIT SHORTED TO GROUND

(K72E) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTCs. Are other DTC's present?  Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Disconnect the A/C pressure sending unit harness connector. Check connectors - Clean/repair as necessary. Measure the voltage between the (K72E) 5-volt supply and (K55) return circuits of the sensor harness connector. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 3 No → Go To 4	All

## P0532-A/C SENDING UNIT VOLTS TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	<p>While monitoring DRBIII®, use a jumper wire to connect the (K72E) 5-volt supply circuit to the (C18) signal circuit at the sensor harness connector.</p> <p>Did P0533 set?</p> <p>Yes → Replace the A/C pressure sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the ECM harness connectors.</p> <p>Measure the resistance between the (C18) signal circuit and (K55) return circuit in the sensor harness connector.</p> <p>Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the (C18) signal circuit shorted to the (K55) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance between the (K72E) 5-volt supply circuit and (K55) return circuit in the sensor harness connector.</p> <p>Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the (K72E) 5-volt supply circuit shorted to the (K55) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of the (C18) signal circuit between the sensor harness connector and the ECM harness connector.</p> <p>Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open (C18) signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the resistance of the (K72E) 5-volt supply circuit between the sensor harness connector and the ECM harness connector.</p> <p>Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open (K72E) 5-volt supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Measure the resistance between the (C18) signal circuit in the sensor harness connector and battery negative.</p> <p>Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the (C18) signal circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**P0532-A/C SENDING UNIT VOLTS TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
9	Measure the resistance between the (K72E) 5-volt supply circuit in the sensor harness connector and battery negative. Is the resistance greater than 100k Ohms?  Yes → Go To 10  No → Repair the (K72E) 5-volt supply circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
10	Reconnect the ECM harness connectors. Turn the ignition on. While monitoring DRBIII®, use a jumper wire to connect the (K72E) 5-volt supply circuit with the (C18) signal circuit at the sensor harness connector. Did DTC P0533 set?  Yes → Test Complete.  No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## Symptom:

### P0533-A/C SENDING UNIT VOLTS TOO HIGH

#### When Monitored and Set Condition:

#### P0533-A/C SENDING UNIT VOLTS TOO HIGH

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The circuit voltage to the ECM is above a calibrated threshold for a certain period of time.

#### POSSIBLE CAUSES

OTHER DTC'S

A/C PRESSURE SENSOR

(C18) SIGNAL CIRCUIT SHORTED TO BATTERY POSITIVE

(K72E) 5-VOLT SUPPLY CIRCUIT SHORTED TO BATTERY POSITIVE

(K55) RETURN CIRCUIT OPEN FROM ECM HARNESS CONNECTOR TO A/C HARNESS CONNECTOR

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read DTCs. Are other DTC's present?  Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Disconnect the A/C pressure sending unit harness connector. Check connectors - Clean/repair as necessary. Measure the voltage between the (K72E) 5-volt supply circuit and (K55) return circuit of the sensor harness connector. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 3  No → Go To 4	All
3	While monitoring DRBIII®, use a jumper wire to connect the (K55) return circuit to the (C18) signal circuit at the sensor harness connector. Did P0532 set?  Yes → Replace the A/C pressure sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 4	All

**P0533-A/C SENDING UNIT VOLTS TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Check connectors - Clean/repair as necessary.            Measure the voltage between the (K72E) 5-volt supply circuit at the harness connector and battery negative.            Is the voltage less than 1 volt?</p> <p>Yes → Go To 5</p> <p>No → Repair the (K72E) 5-volt supply circuit shorted to the battery negative.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the voltage between the (C18) signal circuit at the harness connector and battery negative.            Is the voltage less than 1 volt?</p> <p>Yes → Go To 6</p> <p>No → Repair the (C18) signal circuit shorted to the battery negative.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of the (K55) return circuit between the sensor harness connector and the ECM harness connector.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open (K55) return circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Reconnect the ECM harness connectors.            Turn the ignition on.            While monitoring DRBIII®, use a jumper wire to connect the (K55) return circuit with the (C18) signal circuit at the sensor harness connector.            Did DTC P0532 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom List:

**P0541-LOW VOLTAGE ON THE #1 INTAKE AIR HEATER RELAY**  
**P2607-LOW VOLTAGE AT THE #2 INTAKE AIR HEATER RELAY**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0541-LOW VOLTAGE ON THE #1 INTAKE AIR HEATER RELAY**.

## When Monitored and Set Condition:

### **P0541-LOW VOLTAGE ON THE #1 INTAKE AIR HEATER RELAY**

When Monitored: When the ignition is on.

Set Condition: When the signal from the #1 intake air heater output does not match the signal from the #1 intake air heater feedback.

### **P2607-LOW VOLTAGE AT THE #2 INTAKE AIR HEATER RELAY**

When Monitored: When the ignition is on.

Set Condition: When the signal from the #2 intake air heater output does not match the signal from the #2 intake air heater feedback.

## POSSIBLE CAUSES

LOOSE CONNECTION  
INTAKE AIR HEATER RELAY  
SIGNAL CIRCUIT OPEN FROM RELAY TO ECM  
SIGNAL CIRCUIT SHORTED TO BATTERY NEGATIVE  
ECM  
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the #1 Intake Air Heater. Can you hear the Relay clicking?  Yes → Go To 2 No → Go To 3	All
2	While the relay is clicking , wiggle the wiring harness and connectors. Does this interrupt the clicking?  Yes → Repair the poor connection. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL). No → Go To 3	All

## P0541-LOW VOLTAGE ON THE #1 INTAKE AIR HEATER RELAY — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Remove the Intake Air Heater #1 Relay.  Check connectors - Clean/repair as necessary.  Measure the resistance between the signal and return posts of the intake air heater relay.  Is the resistance between 15 and 25 Ohms?</p> <p>Yes → Go To 4</p> <p>No → Replace the Intake Air Heater #1 relay.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Disconnect the ECM harness connectors.  Check connectors - Clean/repair as necessary.  Measure the resistance of the intake air heater relay signal circuit between the ECM connector and the intake air heater relay connector.  Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open signal circuit from PDC to ECM harness connector.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the voltage between the signal circuit of the intake air heater relay and battery negative.  Is the voltage greater than 1 volts?</p> <p>Yes → Repair the signal circuit shorted to Battery negative.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Reconnect the ECM harness connectors.  Disconnect the intake air heater relay signal wire and use a jumper to connect it to battery negative.  Turn the ignition on.  With the DRBIII®, read DTCs.  Did DTC P0542 set or P2608?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom List:

**P0542-HIGH VOLTAGE ON THE #1 INTAKE AIR HEATER RELAY**

**P2608-HIGH VOLTAGE AT THE #2 INTAKE AIR HEATER RELAY**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0542-HIGH VOLTAGE ON THE #1 INTAKE AIR HEATER RELAY**.

## When Monitored and Set Condition:

### **P0542-HIGH VOLTAGE ON THE #1 INTAKE AIR HEATER RELAY**

When Monitored: When the ignition is on.

Set Condition: When the signal from the #1 Intake Air Heater output does not match the signal from the #1 Intake Air Heater feedback.

### **P2608-HIGH VOLTAGE AT THE #2 INTAKE AIR HEATER RELAY**

When Monitored: When the ignition is on.

Set Condition: When the signal from the #2 Intake Air Heater output does not match the signal from the #2 Intake Air Heater feedback.

## POSSIBLE CAUSES

LOOSE CONNECTION  
INTAKE AIR HEATER RELAY  
SIGNAL CIRCUIT SHORTED TO BATTERY NEGATIVE  
ECM  
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the Intake Air Heater relay. Can you hear the Relay clicking?  Yes → Go To 2 No → Go To 3	All
2	While the relay is clicking , wiggle the wiring harness and connectors. Does this interrupt the clicking?  Yes → Repair the poor connection. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All

## P0542-HIGH VOLTAGE ON THE #1 INTAKE AIR HEATER RELAY — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Remove the Intake Air Heater Relay.  Check connectors - Clean/repair as necessary.  Measure the resistance between the signal and return posts of the intake air heater relay.  Is the resistance between 15 and 25 Ohms?</p> <p>Yes → Go To 4</p> <p>No → Replace the Intake Air Heater relay.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Disconnect the ECM harness connector(s).  <b>NOTE: Check connectors - Clean/repair as necessary.</b>  Measure the resistance between the signal circuit of the intake air heater relay and battery negative.  Is the resistance greater than 100 K ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair signal circuit shorted to battery negative.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Reconnect the ECM harness connectors.  Turn the ignition on.  Disconnect the intake air heater relay signal wire.  Did DTC P0542 or 2608 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom: P0562-BATTERY VOLTAGE LOW

### When Monitored and Set Condition:

#### P0562-BATTERY VOLTAGE LOW

When Monitored: With the key on or the engine running.

Set Condition: The battery voltage detected by the ECM is less than a calibrated value.

POSSIBLE CAUSES
<p>P0622 PRESENT</p> <p>P2502 PRESENT</p> <p>P2503 PRESENT</p> <p>BATTERY TERMINAL CONNECTIONS</p> <p>ACCESSORY WIRING</p> <p>BATTERY</p> <p>HIGH RESISTANCE IN WIRE HARNESS</p> <p>ECM</p> <p>INTERMITTENT CONDITION</p>

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Is P0622 set?</p> <p>Yes → Repair P0622 first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>With the DRBIII®, read DTCs. Is P2502 set?</p> <p>Yes → Repair P2502 first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, read DTCs. Is P2503 set?</p> <p>Yes → Repair P2503 first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All



**P0562-BATTERY VOLTAGE LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Visually inspect the positive and negative connections at the batteries and inspect the battery negative connections at the engine block. Are the connections free of corrosion and are they tight?</p> <p>Yes → Go To 5</p> <p>No → Repair the poor connections. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Check for add-on or accessory wiring at positive (+) terminal of the battery Are there any damaged wires at the battery?</p> <p>Yes → Repair accessory wiring. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Perform battery load test using the Midtronics Micro 420 battery system tester. Did the battery(s) pass the test?</p> <p>Yes → Go To 7</p> <p>No → Replace the weak battery or batteries. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the battery terminals. Measure the resistance from the positive and negative battery posts to the appropriate circuits in the ECM harness connector Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the high resistance in the wire harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Reconnect the battery terminals. Measure and record the voltage between battery positive pins of the ECM connector and the battery negative circuits of the ECM harness connector. Reconnect the ECM harness connectors. Use the DRBIII® to measure and record battery voltage. Are the readings within 3 volts of each other?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom: P0563-BATTERY VOLTAGE HIGH

### When Monitored and Set Condition:

#### P0563-BATTERY VOLTAGE HIGH

When Monitored: With the key on or the engine running.

Set Condition: The battery voltage detected by the ECM is greater than a calibrated value.

### POSSIBLE CAUSES

P0622 PRESENT  
P2502 PRESENT  
P2504 PRESENT  
BATTERIES IMPROPERLY INSTALLED  
ECM  
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read DTCs. Is P0622 set?  Yes → Repair P0622 first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	With the DRBIII®, read DTCs. Is P2502 set?  Yes → Repair P2502 first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All
3	With the DRBIII®, read DTCs. Is P2504 set?  Yes → Repair P2504 first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 4	All

**P0563-BATTERY VOLTAGE HIGH — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Disconnect the ECM harness connectors.  Measure the battery voltage between the positive circuits and ground of the ECM harness connector.  Is the voltage less than 19 volts?</p> <p>Yes → Go To 5</p> <p>No → Install the battery system correctly.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Reconnect the battery terminals.  Measure and record the voltage between battery positive pins of the ECM connector and the battery negative circuits of the ECM harness connector.  Reconnect the ECM harness connectors.  Use the DRBIII® to measure and record battery voltage.  Are the readings within 3 volts of each other?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

### Symptom:

**P0572-LOW VOLTAGE DETECTED AT THE BRAKE SWITCH**

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### When Monitored and Set Condition:

**P0572-LOW VOLTAGE DETECTED AT THE BRAKE SWITCH**

When Monitored: While the ignition is on.

Set Condition:

POSSIBLE CAUSES
BRAKE SWITCH INPUT SHORTED TO GROUND

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### Repair Instructions:

**BRAKE SWITCH INPUT SHORTED TO GROUND**

Repair Brake switch circuit shorted to ground.

**Symptom:****P0573-HIGH VOLTAGE DETECTED AT THE BRAKE SWITCH**

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**When Monitored and Set Condition:****P0573-HIGH VOLTAGE DETECTED AT THE BRAKE SWITCH**

When Monitored: While the ignition is on.

Set Condition:

POSSIBLE CAUSES
BRAKE SWITCH SHORTED TO VOLTAGE

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**Repair Instructions:****BRAKE SWITCH SHORTED TO VOLTAGE**

Repair Brake switch shorted to voltage.

## Symptom:

### **P0580-LOW VOLTAGE DETECTED AT THE SPEED CONTROL SWITCH**

## When Monitored and Set Condition:

### **P0580-LOW VOLTAGE DETECTED AT THE SPEED CONTROL SWITCH**

When Monitored: While the ignition is on

Set Condition: Speed control MUX switch below 1.0 volts for 5 seconds.

### POSSIBLE CAUSES

S/C WIRING HARNESS OBSERVABLE PROBLEM  
 S/C SWITCH (ON/OFF)  
 CLOCKSPEED SHORTED TO GROUND  
 S/C SWITCH (RESUME/ACCEL)  
 S/C SWITCH SIGNAL CIRCUIT SHORTED TO GROUND  
 S/C SIGNAL CIRCUIT SHORTED TO SENSOR GROUND  
 ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read the S/C Switch volts status in the ECM. Is the S/C Switch voltage below 1.0 volt?  Yes → Go To 3 No → Go To 2	All
2	Turn the ignition off. Using the Schematics as a guide, inspect the Wiring and Connectors. Were any problems found?  Yes → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).  No → Go To 3	All
3	Turn the ignition off. Disconnect the S/C ON/OFF Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Turn the ignition on. With the DRBIII® in Sensors, read the S/C Switch volts in the ECM. Did the S/C Switch volts change to 5.0 volts?  Yes → Replace the S/C ON/OFF Switch. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).  No → Go To 4	All

## P0580-LOW VOLTAGE DETECTED AT THE SPEED CONTROL SWITCH — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the S/C RESUME/ACCEL Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            With the DRBIII® in Sensors, read the S/C Switch volts in the ECM.            Did the S/C Switch volts go above 4.0 volts?</p> <p>Yes → Replace the Resume/Accel Switch.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.            Disconnect the clockspring 6-way harness connector (instrument panel wiring side).            Turn the ignition on.            With the DRBIII® in Sensors, read the S/C Switch volts in the ECM.            Did the S/C Switch volts change to 5.0 volts?</p> <p>Yes → Replace the Clockspring.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.            Disconnect the S/C ON/OFF Switch harness connector.            Disconnect the ECM harness connectors.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between the S/C Switch Signal circuit and ground (B-) at S/C ON/OFF Switch harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair S/C Switch Signal Circuit for a short to ground.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 7</p>	All
7	<p>Measure the resistance between the S/C Signal Circuit and the Sensor Ground Circuit at the ON/OFF switch harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair S/C Signal Circuit shorted to Sensor Ground.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All

## Symptom:

### **P0581-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL SWITCH**

## When Monitored and Set Condition:

### **P0581-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL SWITCH**

When Monitored: Key on or Engine running.

Set Condition: Speed Control MUX switch above 11.5 volts for 5 seconds.

POSSIBLE CAUSES
<p>S/C WIRING HARNESS OBSERVABLE PROBLEM</p> <p>CLOCKSPRING SIGNAL/GROUND CIRCUIT OPEN</p> <p>SPEED CONTROL ON/OFF SWITCH</p> <p>S/C SWITCH SIGNAL CKT SHORTED TO VOLTAGE</p> <p>S/C SWITCH SIGNAL CIRCUIT OPEN ECM TO CLOCK SPRING</p> <p>S/C SWITCH SIGNAL CIRCUIT OPEN CLOCKSPRING TO S/C SWITCH</p> <p>S/C SWITCH GROUND CIRCUIT OPEN CLOCKSPRING TO S/C SWITCH</p> <p>S/C SWITCH GROUND CIRCUIT OPEN ECM TO CLOCKSPRING</p> <p>ECM</p>

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition on.</p> <p>With the DRBIII® in Inputs/Outputs, read the Speed Control inputs state in ECM. While monitoring the DRBIII®, push the Speed Control On/Off Switch several times, then leave it on.</p> <p>Did the DRBIII® show Speed Control Switch off and on?</p> <p>Yes → Go To 2</p> <p>No → Test Complete.</p>	All
2	<p>Turn the ignition off.</p> <p>Using the Schematics as a guide, inspect the Wiring and Connectors.</p> <p>Were any problems found?</p> <p>Yes → Repair as necessary.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 3</p>	All



**P0581-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL SWITCH**

— Continued

TEST	ACTION	APPLICABILITY
3	<p>Disconnect the upper and lower 6-way clockspring harness connectors.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the sensor ground circuit between the upper and lower 6-way clockspring harness connectors.            Measure the resistance of the speed control switch signal circuit between the upper and lower 6-way clockspring harness connectors.            Was the resistance above 5.0 ohms for either circuit?</p> <p>Yes → Replace the clockspring.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Disconnect the Speed Control On/Off Switch 2-way harness connector only.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance across the S/C On/Off Switch.            Is the resistance between 20.3K and 20.7K ohms?</p> <p>Yes → Go To 5</p> <p>No → Replace the On/Off Switch.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All
5	<p>Turn the ignition on.            Measure the voltage of the S/C Switch Signal Circuit at the On/Off Switch 2-way connector.            Is the voltage above 6.0 volts?</p> <p>Yes → Repair the Speed Control Switch Signal Circuit for a short to voltage.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.            Disconnect the ECM harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the S/C Switch Signal Circuit between the ECM connector and the Clockspring Connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair open Speed Control Switch Signal Circuit ECM to Clockspring.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All
7	<p>Measure the resistance of the S/C Switch Signal Circuit from the clockspring harness connector to the On/Off switch harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open Speed Control Switch Signal Circuit Clockspring to S/C switch.            Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All

## P0581-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL SWITCH

— Continued

TEST	ACTION	APPLICABILITY
8	<p>Measure the resistance of the S/C Switch Sensor Ground Circuit between the On/Off Switch 2-way harness connector to the clockspring harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair open ground circuit from clockspring to S/C switch. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All
9	<p>Measure the resistance of the S/C Switch Sensor Ground Circuit between the ECM harness connector to the clockspring harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Repair open ground circuit from ECM to clockspring. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All

**Symptom:****P0583-LOW VOLTAGE DETECTED AT THE SPEED CONTROL VACUUM DRIVER****When Monitored and Set Condition:****P0583-LOW VOLTAGE DETECTED AT THE SPEED CONTROL VACUUM DRIVER**

When Monitored: With engine running and Speed control engaged.

Set Condition: This code will set if the voltage detected on the Speed Control Vacuum circuit at the ECM is different than the expected voltage for 3 seconds.

**POSSIBLE CAUSES**

P0595 OR P0596 PRESENT

(V36) SPEED CONTROL VACUUM CIRCUIT OPEN

(V36) SPEED CONTROL VACUUM CIRCUIT SHORT TO GROUND

ECM

(V36) SHORTED TO OTHER CIRCUITS IN HARNESS

INTERMITTENT CONDITION

CRUISE CONTROL SERVO

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: To clear this DTC it is necessary to drive the vehicle while using the cruise control.</b></p> <p>With the DRBIII®, read DTCs. Is the P0595 or P0596 set?</p> <p>Yes → Repair the other DTC's first.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off. Disconnect the Speed Control Servo harness connector <b>NOTE: Check connectors - Clean/repair as necessary.</b> Turn the ignition on. With the DRBIII®, actuate the Speed control vacuum relay. Using a 12-volt test light connected to B+, check the Speed Control Vacuum solenoid Output circuit in the Speed Control Servo harness connector. NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery. Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Test Complete.</p> <p>No → Go To 3</p>	All

**P0583-LOW VOLTAGE DETECTED AT THE SPEED CONTROL VACUUM DRIVER — Continued**

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECM harness connector(s). <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the Speed Control Vacuum circuit between the Cruise Control assembly harness connector and the ECM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 4  No → Repair the open (V36) Speed control vacuum circuit.	All
4	Turn the ignition off. Measure the resistance between ground and the Cruise Control Vacuum circuit in the ECM harness connector. Is the resistance greater than 100k ohms?  Yes → Go To 5  No → Repair the (V36) Speed Control Vacuum circuit for a short to ground.	All
5	Measure the resistance between the Speed Control Vacuum circuit in the ECM harness connector and all other circuits in the ECM harness connectors. Is the resistance less than 10 ohms?  Yes → Go To 6  No → Repair the shorted (V36) speed control vacuum solenoid circuit.	All
6	Reconnect the ECM harness connectors. Ignition on, engine not running. With the DRBIII®, actuate the Speed Control Vacuum Solenoid. Using a 12-volt test light connected to battery positive, check the Speed Control Vacuum Solenoid Output circuit in the Speed Control Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly?  Yes → Go To 7  No → Replace and program the ECM in accordance with the Service Information.	All
7	Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Where any problems found?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  No → Replace the Cruise control servo.	All

**Symptom:****P0584-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL VACUUM DRIVER****When Monitored and Set Condition:****P0584-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL VACUUM DRIVER**

When Monitored: While the engine is running and the Speed control engaged.

Set Condition: The Speed Control Vacuum commanded state is on and the feedback state is off.

**POSSIBLE CAUSES**

SPEED CONTROL SERVO ASSEMBLY

(V36) SPEED CONTROL VACUUM CIRCUIT SHORTED TO VOLTAGE

(V36) SPEED CONTROL VACUUM CIRCUIT SHORTED TO OTHER CIRCUITS

ECM

CRUISE CONTROL SERVO

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Speed control servo harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, actuate the Speed Control Vacuum Solenoid. Using a 12-volt test light connected to battery positive, check the Speed Control Vacuum Solenoid Output circuit in the Speed Control Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly?  Yes → Replace the speed control servo assembly. No → Go To 2	All
2	Turn the ignition off. Disconnect the ECM harness connector(s). <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the voltage of the Speed Control Vacuum circuit between the Speed Control Assembly harness connector and the ECM harness connector. Is the voltage above 1.0 volts?  Yes → Go To 3 No → Repair the (V36) Speed control vacuum circuit shorted to voltage.	All

**P0584-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL VACUUM DRIVER — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Measure the resistance between the Speed Control Vacuum circuit and all other pins in the ECM connectors. Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (V36) Speed Control vacuum circuit shorted to other circuit.</p> <p>No → Go To 4</p>	All
4	<p>Reconnect the ECM harness connectors. Ignition on, engine not running. With the DRBIII®, actuate the Speed Control Vacuum Solenoid. Using a 12-volt test light connected to battery positive, check the Speed Control Vacuum Solenoid Output circuit in the Speed Control Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Go To 5</p> <p>No → Replace and program the ECM in accordance with the Service Information.</p>	All
5	<p>Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Where any problems found?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>No → Replace the Cruise control servo.</p>	All

**Symptom:**

**P0587-LOW VOLTAGE DETECTED AT THE SPEED CONTROL VENT DRIVER**

**When Monitored and Set Condition:**

**P0587-LOW VOLTAGE DETECTED AT THE SPEED CONTROL VENT DRIVER**

When Monitored: While driving and the Speed control is set.

Set Condition: This code will set if the voltage detected on the Speed Control Vent circuit at the ECM is different than the expected voltage for 3 seconds.

**POSSIBLE CAUSES**

P0595 OR P0596 PRESENT

SPEED CONTROL SERVO ASSEMBLY

(V35) SPEED CONTROL VENT CIRCUIT OPEN

(V35) SPEED CONTROL VENT CIRCUIT SHORTED TO GROUND

(V35) SPEED CONTROL VENT CIRCUIT SHORTED TO OTHER CIRCUITS

ECM

INTERMITTENT CONDITION

SPEED CONTROL SERVO

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: To clear this DTC it is necessary to drive the vehicle while using the cruise control.</b>            With the DRBIII®, read DTCs.            Is the P0595 or P0596 set?</p> <p>Yes → Repair the other DTC's first.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off.            Disconnect the Speed control servo harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            With the DRBIII®, actuate the Speed Control Vent Solenoid.            Using a 12-volt test light connected to battery positive, check the Speed Control Vent Solenoid Output circuit in the Speed Control Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Replace the speed control servo assembly.</p> <p>No → Go To 3</p>	All

**P0587-LOW VOLTAGE DETECTED AT THE SPEED CONTROL VENT DRIVER — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the ECM harness connector(s).  <b>NOTE: Check connectors - Clean/repair as necessary.</b>  Measure the resistance of the Speed Control vent circuit between the Cruise Control Assembly harness connector and the ECM harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the (V35) Speed Control vent circuit for an open.</p>	All
4	<p>Measure the resistance between ground and the Speed Control vent circuit in the ECM harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the (V35) Speed Control vent circuit for a short to ground.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the Speed Control Vacuum circuit and all other circuits in the ECM connectors.  Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (V35) Speed Control vent circuit shorted to other circuit.</p> <p>No → Go To 6</p>	All
6	<p>Reconnect the ECM harness connectors.  Ignition on, engine not running.  With the DRBIII®, actuate the Speed Control Vent Solenoid.  Using a 12-volt test light connected to battery positive, check the Speed Control Vent Solenoid Output circuit in the Speed Control Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>  Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Go To 7</p> <p>No → Replace and program the ECM in accordance with the Service Information.</p>	All
7	<p>Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Where any problems found?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>No → Replace the Speed control servo.</p>	All



**Symptom:****P0588-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL VENT DRIVER****When Monitored and Set Condition:****P0588-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL VENT DRIVER**

When Monitored: While the engine is running and the Speed control is set.

Set Condition: The Speed control vent commanded state is on and the feedback state is off.

**POSSIBLE CAUSES**

SPEED CONTROL SERVO ASSEMBLY

(V35) SPEED CONTROL VENT SHORTED TO VOLTAGE

(V35) SPEED CONTROL VENT CIRCUIT SHORTED TO OTHER CIRCUITS

ECM

INTERMITTENT CONDITION

SPEED CONTROL SERVO

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Speed control servo harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, actuate the Speed Control Vacuum Solenoid. Using a 12-volt test light connected to battery positive, check the Speed Control Vacuum Solenoid Output circuit in the Speed Control Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly? Yes → Replace the speed control servo assembly. No → Go To 2	All
2	Turn the ignition off. Disconnect the ECM harness connector(s). <b>NOTE: Check connectors - Clean/repair as necessary.</b> Turn the ignition on. Measure the voltage of the Speed Control vent circuit between the Cruise Control Assembly harness connector and engine ground. Is the voltage above 1 volt? Yes → Repair the Speed Control vent circuit for a short to voltage. No → Go To 3	All

**P0588-HIGH VOLTAGE DETECTED AT THE SPEED CONTROL VENT DRIVER — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Measure the resistance between the Speed Control Vacuum circuit and all other circuits in the ECM connectors.            Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (V35) Speed Control vent circuit shorted to other circuit.</p> <p>No → Go To 4</p>	All
4	<p>Reconnect the ECM harness connectors.            Ignition on, engine not running.            With the DRBIII®, actuate the Speed Control Vent Solenoid.            Using a 12-volt test light connected to battery positive, check the Speed Control Vent Solenoid Output circuit in the Speed Control Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Go To 5</p> <p>No → Replace and program the ECM in accordance with the Service Information.</p>	All
5	<p>Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Where any problems found?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>No → Replace the Cruise control servo.</p>	All

**Symptom:****P0595-LOW VOLTAGE DETECTED AT THE S/C BRAKE SWITCH OUTPUT****When Monitored and Set Condition:****P0595-LOW VOLTAGE DETECTED AT THE S/C BRAKE SWITCH OUTPUT**

When Monitored: While the key is on.

Set Condition: The voltage detected on the Cruise Control Servo is above a calibrated value for a calibrated amount on time.

**POSSIBLE CAUSES**

SPEED CONTROL SERVO

(V32) S/C 12-VOLT SOURCE CIRCUIT OPEN

GROUND CIRCUIT OPEN

(V32) S/C 12-VOLT SOURCE SHORTED TO VOLTAGE

(V32) S/C 12-VOLT SOURCE SHORTED TO OTHER CIRCUITS

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Speed Control Servo harness connector <b>NOTE: Check connectors - Clean/repair as necessary.</b> Turn the ignition on. With the DRBIII®, actuate the S/C 12 volt source. Using a 12-volt test light connected to ground, check the S/C 12-volt source circuit in the Speed Control Servo harness connector. <b>NOTE: The test light must illuminate brightly.</b> Compare the brightness to that of a direct connection to the battery. Does the test light cycle on and off and illuminate brightly?  Yes → Go To 2 No → Go To 3	All
2	Turn the ignition off. Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the ground circuit between the Speed control servo connector and battery negative. Is the resistance less than 10 ohms?  Yes → Replace the Speed control servo. No → Repair the open ground circuit at the Cruise control servo harness connector.	All

## P0595-LOW VOLTAGE DETECTED AT THE S/C BRAKE SWITCH OUTPUT

— Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the S/C 12-volt source circuit between the ECM harness connector and the Speed Control servo assembly harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open (V32) 12-volt source circuit.</p>	All
4	<p>Measure the voltage between the S/C 12-volt source circuit in the Speed Control servo assembly harness connector and battery negative. Is the voltage greater than 1 volt?</p> <p>Yes → Repair the (V32) S/C 12-volt source circuit shorted to voltage.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the S/C 12-volt source circuit in the ECM harness connector and all other circuits in the ECM harness connectors. Is the resistance less than 10 Ohms?</p> <p>Yes → Repair the (V32) S/C 12-volt source circuit shorted to other circuit.</p> <p>No → Go To 6</p>	All
6	<p>Reconnect the ECM harness connectors. Ignition on, engine not running. With the DRBIII®, actuate the S/C 12-volt source. Using a 12-volt test light connected to ground, check the S/C brake switch output circuit in the Speed Control servo harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>No → Replace and program the ECM in accordance with the Service Information.</p>	All

**Symptom:****P0596-HIGH VOLTAGE DETECTED AT THE S/C BRAKE SWITCH OUTPUT****When Monitored and Set Condition:****P0596-HIGH VOLTAGE DETECTED AT THE S/C BRAKE SWITCH OUTPUT**

When Monitored: While the key is on.

Set Condition: The voltage detected on the Speed Control Servo is below a calibrated value for a calibrated amount on time.

**POSSIBLE CAUSES**

SPEED CONTROL SERVO ASSEMBLY

(V32) S/C 12-VOLT SOURCE SHORTED TO OTHER CIRCUITS

(V32) S/C BRAKE SWITCH OUTPUT SHORTED TO GROUND

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Speed control servo harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, actuate the S/C 12-volt source. Using a 12-volt test light connected to battery ground, check the S/C brake switch Output circuit in the Speed Control servo harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly? Yes → Replace the speed control servo assembly. No → Go To 2	All
2	Turn the ignition off. Disconnect the ECM harness connector(s). <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the S/C brake switch output circuit between the Speed Control assembly connector and battery negative. Is the resistance greater than 100k Ohms? Yes → Go To 3 No → Repair the (V32) S/C brake switch output shorted to ground.	All
3	Measure the resistance between the S/C 12-volt source circuit in the ECM harness connector and all other circuits in the ECM harness connectors. Is the resistance less than 100k Ohms? Yes → Go To 4 No → Repair the (V32) S/C 12-volt source circuit shorted to other circuit.	All

## P0596-HIGH VOLTAGE DETECTED AT THE S/C BRAKE SWITCH OUTPUT — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.  Reconnect the ECM harness connectors.  Ignition on, engine not running.  With the DRBIII®, actuate the S/C 12-volt source.  Using a 12-volt test light connected to battery ground, check the S/C brake switch Output circuit in the Speed Control servo harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>  Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Test Complete.</p> <p>No → Replace and program the ECM in accordance with the Service Information.</p>	All

**Symptom:**  
**P0602-CHECKSUM ERROR**

**When Monitored and Set Condition:**

**P0602-CHECKSUM ERROR**

When Monitored: While the ignition is on.

Set Condition: A deviation between the ECM memory and a stored calibration.

**POSSIBLE CAUSES**

FLASH ECM  
 ECM

TEST	ACTION	APPLICABILITY
1	Using the DRBIII®, reflash the ECM with the proper calibration for the particular truck. Is the flash successful?  Yes → Repair complete. No → Go To 2	All
2	With the DRBIII®, read DTCs. Did P0602 set after the reflash?  Yes → Replace the ECM. No → Test Complete.	All

## Symptom:

### **P0604-ECM SOFTWARE ERROR**

## When Monitored and Set Condition:

### **P0604-ECM SOFTWARE ERROR**

When Monitored: While the key is on.

Set Condition: Internal ECM software error.

## POSSIBLE CAUSES

REFLASH ECM  
ECM

TEST	ACTION	APPLICABILITY
1	Using the DRBIII®, reflash the module with latest calibration Was the flash successful?  Yes → Go To 2 No → Replace the ECM.	All
2	Run the engine for one minute and shut off. With the DRBIII®, read DTCs. Did P0604 set?  Yes → Replace the ECM. No → Test Complete.	All



**Symptom:****P0606-ECM HARDWARE ERROR****When Monitored and Set Condition:****P0606-ECM HARDWARE ERROR**

When Monitored: With the key on or engine running.

Set Condition: ECM had detected internal failures.

**POSSIBLE CAUSES**

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. <b>NOTE: This DTC is caused by an internal Engine Control Module failure. Repairs are not possible to the ECM.</b> With the DRBIII®, erase DTCs. Is the DTC still set?  Yes → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Test Complete.	All

## Symptom:

### **P0607-ECM INTERNAL FAILURE**

## When Monitored and Set Condition:

### **P0607-ECM INTERNAL FAILURE**

When Monitored: With the key on or engine running.

Set Condition: ECM had detected internal failures.

## POSSIBLE CAUSES

ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. <b>NOTE: This DTC is caused by an internal Engine Control Module failure. Repairs are not possible to the ECM.</b> Is the DTC P0606 set?  Yes → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Test Complete.	All

**Symptom:****P0622-GENERATOR FIELD NOT SWITCHING PROPERLY****When Monitored and Set Condition:****P0622-GENERATOR FIELD NOT SWITCHING PROPERLY**

When Monitored: When the ignition is on.

Set Condition: The feedback signal does not match the commanded signal for the voltage regulator.

**POSSIBLE CAUSES**

GENERATOR  
 OPEN DRIVER CIRCUIT  
 GEN SOURCE SHORTED TO BATTERY NEGATIVE  
 (K20) FIELD DRIVER CIRCUIT SHORTED TO VOLTAGE  
 GEN SOURCE OPEN  
 ECM

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Generator field harness connector. Check connectors - Clean/repair as necessary. Measure the resistance between the generator field terminals. Is the resistance between .5 and 15 Ohms?  Yes → Go To 2 No → Replace the Generator.	All
2	Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance of the generator driver wire between the generator harness connector and the ECM harness connector. Is the resistance less than 10 ohms.  Yes → Go To 3 No → Repair the open driver circuit.	All
3	Measure the resistance of the generator source circuit between the generator harness connector and battery negative. Is the resistance less than 10 ohms.  Yes → Repair the Gen source shorted to Battery negative. No → Go To 4	All

## P0622-GENERATOR FIELD NOT SWITCHING PROPERLY — Continued

TEST	ACTION	APPLICABILITY
4	Measure the voltage between the (K20) generator field driver circuit in the generator harness connector and battery negative. Is the voltage greater than 1 volt?  Yes → Repair the (K20) Generator field driver circuit shorted to voltage. No → Go To 5	All
5	Measure voltage of the Gen source circuit at the generator harness connector. Is voltage within one volt of battery voltage?  Yes → Replace the ECM. No → Repair the open or high resistance of Gen source circuit.	All

**Symptom:****P0628-LOW VOLTAGE DETECTED AT THE FUEL LIFT PUMP****When Monitored and Set Condition:****P0628-LOW VOLTAGE DETECTED AT THE FUEL LIFT PUMP**

When Monitored: While the key is on.

Set Condition: The voltage detected on the Fuel Lift Pump is above a calibrated value for a calibrated amount on time.

**POSSIBLE CAUSES**

LOOSE CONNECTION  
GROUND CIRCUIT OPEN  
LIFT PUMP SHORTED TO VOLTAGE  
LIFT PUMP  
ECM

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, in system test actuate the lift pump. Does the lift pump run?</p> <p>Yes → Go To 2</p> <p>No → Go To 3</p>	All
2	<p>Lift pump actuation still running. While the lift pump is running, wiggle the wiring harness and connectors throughout the circuit. Does this interrupt the pump operation?</p> <p>Yes → Repair the loose connection. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 3</p>	All
3	<p>Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the lift pump (K62) supply circuit between the ECM harness connector and the lift pump harness connector. Is the resistance less than 1 Ohms?</p> <p>Yes → Go To 4</p> <p>No → Test Complete.</p>	All

## P0628-LOW VOLTAGE DETECTED AT THE FUEL LIFT PUMP — Continued

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance of the ground circuit between the lift pump connector and battery negative. Is the resistance less than 1 Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the voltage between the supply and ground circuits of the lift pump connector. Is the voltage greater than 1 volt?</p> <p>Yes → Repair the lift pump circuits shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Reconnect the ECM harness connectors. Connect a jumper wire between the (K62) supply circuit and ground circuit of the lift pump harness connector. Turn the ignition on. With the DRBIII®, read DTCs. Did DTC P0628 set?</p> <p>Yes → Replace the lift pump. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0629-HIGH VOLTAGE DETECTED AT THE FUEL LIFT PUMP****When Monitored and Set Condition:****P0629-HIGH VOLTAGE DETECTED AT THE FUEL LIFT PUMP**

When Monitored: While the key is on.

Set Condition: The commanded signal to the lift pump does not match the feedback signal from the lift pump.

**POSSIBLE CAUSES**

LOOSE CONNECTION

(K62) SUPPLY CIRCUIT SHORTED TO VOLTAGE

(K62) SUPPLY CIRCUIT SHORTED

LIFT PUMP

ECM

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, in system test actuate the lift pump. Does the lift pump run?</p> <p>Yes → Go To 2</p> <p>No → Go To 5</p>	All
2	<p>Lift pump actuation still running. While the lift pump is running, wiggle the wiring harness and connectors throughout the circuit. Does this interrupt the pump operation?</p> <p>Yes → Repair the loose connection.</p> <p>No → Go To 3</p>	All
3	<p>Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the lift pump (K62) supply circuit of the lift pump connector and battery negative. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the (K62) supply circuit shorted to voltage.</p>	All
4	<p>Measure the resistance between the lift pump (K62) supply circuit and all other circuits in the ECM harness connectors. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the (K62) supply circuit shorted to another circuit.</p>	All

## P0629-HIGH VOLTAGE DETECTED AT THE FUEL LIFT PUMP — Continued

TEST	ACTION	APPLICABILITY
5	Reconnect the disconnected Lift pump harness connector. Reconnect the ECM harness connectors. Turn the ignition on. With the DRBIII®, read DTCs while disconnecting the lift pump. Did P0628 set?  Yes → Replace the lift pump. No → Replace the ECM	All



**Symptom:****P0630-VIN NOT ENTERED ERROR****When Monitored and Set Condition:****P0630-VIN NOT ENTERED ERROR**

When Monitored: While the key is on.

Set Condition: The VIN was not calibrated into the ECM.

**POSSIBLE CAUSES**

VIN NOT CALIBRATED INTO ECM

TEST	ACTION	APPLICABILITY
1	Using the DRBIII®, recalibrate the ECM with the proper VIN. Did the DTC P0630 reset?  Yes → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Test Complete.	All

## Symptom:

### **P0633-SKIM SECRET KEY NOT ENTERED**

## When Monitored and Set Condition:

### **P0633-SKIM SECRET KEY NOT ENTERED**

When Monitored: While the key is on.

Set Condition: The SKIM secret key was not calibrated into the ECM.

## POSSIBLE CAUSES

IMPROPER IGNITION KEY IS BEING USED

SKIM DTC'S

SKIM NOT CALIBRATED PROPERLY

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read SKIM DTCs. Are any SKIM DTC's present?</p> <p>Yes → Repair all SKIM DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Verify that the proper ignition key is in the ignition lock on the steering column. Are the proper keys being used?</p> <p>Yes → Go To 3</p> <p>No → Use the proper key for the vehicle. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Using the DRBIII®, recalibrate the ECM with the proper SKIM secret key. With the DRBIII®, erase DTCs. Cycle the ignition switch from on to off to on. With the DRBIII®, read DTCs. Did the DTC reset?</p> <p>Yes → Test Complete.</p> <p>No → Verify information is correct and replace ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0642-LOW VOLTAGE AT THE #2 SENSOR SUPPLY CIRCUIT****When Monitored and Set Condition:****P0642-LOW VOLTAGE AT THE #2 SENSOR SUPPLY CIRCUIT**

When Monitored: With the key on.

Set Condition: Voltage detected on the #2 sensor supply circuit is below a calibrated value.

**POSSIBLE CAUSES**

FAN CLUTCH ASSEMBLY

(F856) 5-VOLT SHORTED TO GROUND

(F856) 5-VOLT SUPPLY SHORTED TO ANOTHER CIRCUIT

FAN DTC

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	Disconnect the Fan clutch harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> With the DRBIII®, read DTCs. Did P0483 set?  Yes → Replace the Fan clutch assembly. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Turn the ignition off. Disconnect the ECM harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the (F856) #2 5-volt supply (fan speed sensor power) circuit in the sensor harness connector and battery negative. Is the resistance greater than 100k Ohms?  Yes → Go To 3  No → Repair the #2 (F856) 5-volt supply shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## P0642-LOW VOLTAGE AT THE #2 SENSOR SUPPLY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	<p>Measure the resistance between the sensor (F856) #2 5-volt supply (fan speed sensor power) circuit in the ECM harness connector to all other circuits in the ECM harness connectors</p> <p>Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the 5-volt supply shorted to another circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Reconnect the ECM harness connectors. Reconnect the disconnected Fan harness connector. Turn the ignition on. With the DRBIII®, read DTCs. Is DTC P0483 set?</p> <p>Yes → Repair the Fan DTC. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off. Disconnect the Fan harness connector. Turn the ignition on. Measure the voltage between the sensor (F856) #2 5-volt supply (fan speed sensor power) circuit at the fan clutch harness connector and the fan speed sensor ground. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0643-HIGH VOLTAGE AT THE #2 SENSOR SUPPLY CIRCUIT****When Monitored and Set Condition:****P0643-HIGH VOLTAGE AT THE #2 SENSOR SUPPLY CIRCUIT**

When Monitored: With the key on.

Set Condition: Voltage detected on the #2 sensor supply circuit was above a calibrated value.

**POSSIBLE CAUSES**

FAN CLUTCH ASSEMBLY

(F856) 5-VOLT SHORTED TO VOLTAGE

INTERMITTENT CONDITION

ECM

TEST	ACTION	APPLICABILITY
1	Disconnect the Fan clutch harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> With the DRBIII®, read DTCs. Did P0483 set?  Yes → Replace the Fan clutch assembly. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 2	All
2	Disconnect the ECM harness connectors. Disconnect the Fan harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the voltage between the fan speed sensor (F856) 5-volt supply circuit and battery negative. Is the voltage greater than 1 volt?  Yes → Repair the (F856) 5-volt supply shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All

## P0643-HIGH VOLTAGE AT THE #2 SENSOR SUPPLY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Reconnect the ECM harness connectors.  Turn the ignition on.  Measure the voltage between the (F856) 5-volt supply circuit in the sensor harness connector and battery negative.  Is the voltage greater than 6 volts?</p> <p>Yes → Replace the ECM.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0646-LOW VOLTAGE DETECTED AT THE A/C CLUTCH RELAY****When Monitored and Set Condition:****P0646-LOW VOLTAGE DETECTED AT THE A/C CLUTCH RELAY**

When Monitored: When the ignition is on.

Set Condition: When the signal from the A/C Clutch output does not match the signal from the A/C Clutch feedback.

**POSSIBLE CAUSES**

A/C CLUTCH RELAY  
 LOOSE CONNECTION  
 FUSED BATTERY SUPPLY  
 (C13) A/C SIGNAL CIRCUIT OPEN  
 (C13) A/C SIGNAL CIRCUIT SHORTED TO GROUND  
 INTERMITTENT CONDITION  
 ECM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the A/C clutch relay. Can you hear the Relay clicking?  Yes → Go To 2 No → Go To 3	All
2	Actuation still running. While the relay is clicking, wiggle the wiring harness and connectors throughout the circuit. Does this interrupt the clicking?  Yes → Repair the loose connection. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All
3	Remove the A/C Clutch Relay from the PDC. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between terminals 85 and 86 of the A/C Clutch Relay. Is the resistance less than 100 Ohms?  Yes → Go To 4 No → Replace the A/C clutch relay. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## P0646-LOW VOLTAGE DETECTED AT THE A/C CLUTCH RELAY — Continued

TEST	ACTION	APPLICABILITY
4	<p>Ignition on, engine not running. Measure the voltage on the Fused Battery Supply circuit in the PDC. Is the voltage within 1 volt of battery voltage?</p> <p>Yes → Go To 5</p> <p>No → Repair the open Fused battery supply. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Turn the ignition off. Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the (C13) A/C Clutch signal circuit between the PDC and the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open (C13) A/C signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of the (C13) A/C Clutch signal circuit between the PDC and battery negative. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the (C13) A/C signal circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Reconnect the ECM harness connectors. Using the DRBIII®, actuate the A/C Clutch Relay While monitoring with the DRBIII®, use a jumper wire to connect 12 volts to the relay signal cavity (85) in the PDC with the relay disconnected. Did DTC P0647 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**Symptom:****P0647-HIGH VOLTAGE DETECTED AT THE A/C CLUTCH RELAY****When Monitored and Set Condition:****P0647-HIGH VOLTAGE DETECTED AT THE A/C CLUTCH RELAY**

When Monitored: When the ignition is on.

Set Condition: When the signal from the A/C Clutch output does not match the signal from the A/C Clutch feedback.

**POSSIBLE CAUSES**

LOOSE CONNECTION  
FUSED BATTERY SUPPLY  
A/C CLUTCH RELAY  
INTERMITTENT CONDITION  
ECM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the A/C clutch relay. Can you hear the Relay clicking?  Yes → Go To 2 No → Go To 3	All
2	Actuation still running. While the relay is clicking, wiggle the wiring harness and connectors throughout the circuit. Does this interrupt the clicking?  Yes → Repair the loose connection. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All
3	Ignition on, engine not running. Measure the voltage on the Fused Battery Supply circuit in the PDC. Is the voltage within 1 volt of battery voltage?  Yes → Go To 4  No → Repair the open Fused battery supply. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## P0647-HIGH VOLTAGE DETECTED AT THE A/C CLUTCH RELAY — Continued

TEST	ACTION	APPLICABILITY
4	<p>Remove the A/C Clutch Relay from the PDC.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between terminals 85 and 86 of the A/C Clutch Relay.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5</p> <p>No → Replace the A/C clutch relay.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Reconnect the ECM harness connectors.            Reinstall the A/C clutch relay.            With the DRBIII®, actuate the A/C clutch relay.            Turn the ignition on.            While monitoring with the DRBIII®, disconnect the A/C Clutch Relay from the PDC.            Did DTC P0646 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the ECM.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0652-LOW VOLTAGE AT THE #1 SENSOR SUPPLY CIRCUIT****When Monitored and Set Condition:****P0652-LOW VOLTAGE AT THE #1 SENSOR SUPPLY CIRCUIT**

When Monitored: With the key on.

Set Condition: Voltage detected on the sensor supply is below a calibrated value.

**POSSIBLE CAUSES**

ECM

(F855) #1 5-VOLT SUPPLY SHORTED TO GROUND

(F855) #1 5-VOLT SUPPLY SHORTED

FUEL RAIL PRESSURE

A/C PRESSURE SENSOR

MAP SENSOR

CAMSHAFT POSITION SENSOR

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the ECM 60 pin harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Turn the ignition on. Measure the voltage between the Sensor (F855) #1 5-volt Supply and the Sensor (K916) #1 Return pin at the ECM. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 2  No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Disconnect the Pressure sensors harness connectors and the engine position sensor. Measure the resistance between the (F855) #1 sensor supply circuits at the ECM harness connector and battery negative. Is the resistance greater than 100K Ohms?  Yes → Go To 3  No → Repair the harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## P0652-LOW VOLTAGE AT THE #1 SENSOR SUPPLY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	<p>Reconnect the ECM harness connector. While monitoring with the DRBIII®, disconnect the fuel rail pressure sensor. Is DTC P0652 set?</p> <p>Yes → Go To 4</p> <p>No → Replace the Fuel rail pressure sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>While monitoring with the DRBIII®, disconnect the A/C pressure sensor. Is DTC P0652 set?</p> <p>Yes → Go To 5</p> <p>No → Replace the A/C pressure sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>While monitoring with the DRBIII®, disconnect the map sensor. Is DTC P0652 set?</p> <p>Yes → Go To 6</p> <p>No → Replace the MAP sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>While monitoring with the DRBIII®, disconnect the Camshaft position sensor. Is DTC P0652 set?</p> <p>Yes → Go To 7</p> <p>No → Replace the Camshaft position sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the resistance between the (F855) #1 sensor supply circuit of the ECM harness connector and all other circuits in both ECM harness connectors. Is the resistance greater than 100K Ohms?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Repair the shorted circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P0653-HIGH VOLTAGE AT THE #1 SENSOR SUPPLY CIRCUIT****When Monitored and Set Condition:****P0653-HIGH VOLTAGE AT THE #1 SENSOR SUPPLY CIRCUIT**

When Monitored: While the engine is running.

Set Condition: Voltage detected on the sensor supply is above a calibrated value.

**POSSIBLE CAUSES**

ECM

(F855) 5-VOLT SUPPLY SHORTED TO VOLTAGE

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the ECM 60 pin harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Turn the ignition on. Measure the voltage between the Sensor (F855) #1 5-volt Supply and the Sensor #1 Return pin at the ECM. Is the voltage between 4.5 and 5.5 volts?  Yes → Go To 2  No → Replace and program the ECM in accordance with the Service Information.	All
2	Disconnect the sensor connectors for each pressure sensor, and the engine position sensor. Disconnect the ECM 50 way harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the voltage between the supply circuit at each pressure sensor harness connector and battery negative. Measure voltage between the (F855) 5-volt supply circuit at the engine position sensor harness connector and battery negative. Is the voltage less than 1 volt?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  No → Repair the (F855) 5-volt supply shorted to voltage.	All

## Symptom:

### **P0698-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO LOW**

## When Monitored and Set Condition:

### **P0698-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO LOW**

When Monitored: With engine running.

Set Condition: Low voltage detected at the APPS signal circuit.

## POSSIBLE CAUSES

(K851) APPS 5-VOLT SUPPLY OPEN

APPS HIGH RESISTANCE

(K851) 5-VOLT SUPPLY CIRCUIT SHORTED TO (K922) RETURN CIRCUIT

(K851) 5-VOLT SUPPLY CIRCUIT SHORTED TO BATTERY NEGATIVE

(K851) 5-VOLT SUPPLY CIRCUIT SHORTED TO THE (K922) RETURN CIRCUIT

ECM

INTERMITTENT CONDITION

(K852) 5-VOLT SUPPLY CIRCUIT SHORTED TO BATTERY NEGATIVE

(K852) 5-VOLT SUPPLY CIRCUIT SHORTED TO OTHER CIRCUITS

INTERNAL ECM

APPS

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>The diesel engine uses two types of throttle position sensors, depending on transmission configuration.</p> <p>Is the throttle position sensor is located on the engine?</p> <p>Yes → Go To 2</p> <p>No → Go To 9</p>	All
2	<p>Turn the ignition off.</p> <p>Disconnect the APPS harness connector.</p> <p><b>NOTE: Check connectors - Clean/repair as necessary.</b></p> <p>Ignition on, engine not running.</p> <p>Measure the voltage between the (K851) 5-volt supply circuit at the sensor connector and battery negative.</p> <p>Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Go To 3</p> <p>No → Go To 4</p>	All

## P0698-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	<p>Connect a jumper wire between the (K851) 5-volt supply circuit in the APPS harness connector and battery voltage. With the DRBIII®, read DTCs. Did P0699 set?</p> <p>Yes → Replace the Accelerator pedal position sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Measure the resistance between the APPS (K851) 5-volt supply circuit and (K922) return circuit of the sensor connector (APPS side) with the accelerator depressed and released. Is the resistance between 2000 and 3000 Ohms, depressed as well as released?</p> <p>Yes → Go To 5</p> <p>No → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Disconnect the ECM harness connectors. Check connectors - Clean/repair as necessary. Measure the resistance between the (K851) 5-volt supply circuit and the (K922) return circuit in the sensor harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Repair the (K851) 5-volt supply circuit shorted to the (K922) Return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between the (K851) 5-volt supply circuit in the sensor harness connector and battery negative. Is the resistance less than 10 Ohms?</p> <p>Yes → Repair the (K851) 5-volt supply circuit shorted to battery negative. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 7</p>	All
7	<p>Measure the resistance between the (K851) 5-volt supply circuit and the sensor (K922) return circuit in the sensor harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Repair the (K851) 5-volt supply circuit shorted to the (K922) Return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 8</p>	All

**P0698-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Reconnect the ECM harness connector.            Connect a jumper wire between the (K851) 5-volt supply circuit in the sensor harness connector and battery voltage.            With the DRBIII®, read DTCs.            Did the DTC for P0699 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
9	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Disconnect the APPS harness connector.            Check connectors - Clean/repair as necessary.            Measure the resistance of the APPS 1 (K852) 5-volt supply circuit between the sensor harness connector and battery negative            Is the resistance greater than 100 k ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the (K852) 5-volt supply circuit shorted to battery negative.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Measure the resistance between the (K852) APPS 1 5-volt supply circuit at the ECM harness connector and all other circuits in the ECM connector.            Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair the APPS #1 (K852) 5-volt supply circuit shorted to other circuits.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
11	<p>Reconnect the ECM harness connectors.            While monitoring with the DRBIII®, connect a jumper wire between the (K23) APPS 1 signal circuit at the sensor harness connector and the (K852) APPS 1 supply circuit at the sensor harness connector.  <b>NOTE: With the APPS disconnected it is normal to have a APPS 1 and APPS 2 low voltage DTC set.</b>            Did a APPS 1 voltage too high DTC set?</p> <p>Yes → Go To 12</p> <p>No → Replace and program the ECM in accordance with the Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**P0698-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
12	<p>Reconnect the APPS harness connector.</p> <p>Ignition on, engine not running.</p> <p>Monitor the APPS 1 and APPS 2 voltage with the DRBIII® while depressing the throttle pedal.</p> <p>Is the voltage transition shown on the DRBIII® smooth while depressing the throttle and is the volta</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the APPS.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P0699-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO HIGH**

## When Monitored and Set Condition:

### **P0699-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO HIGH**

When Monitored: While engine is running.

Set Condition: High voltage detected at the APPS supply circuit.

## POSSIBLE CAUSES

(K851) 5-VOLT SUPPLY OPEN

(K851) 5-VOLT SUPPLY SHORT TO VOLTAGE

ECM

INTERMITTENT CONDITION

(K852) 5-VOLT SUPPLY OPEN

(K852) 5-VOLT SUPPLY SHORT TO VOLTAGE

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>The diesel engine uses two types of throttle position sensors, depending on transmission configuration and build. Is the throttle position sensor is located on the engine?</p> <p>Yes → Go To 2</p> <p>No → Go To 5</p>	All
2	<p>Turn the ignition off. Disconnect the APPS harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. Measure the voltage between the (K851) 5-volt supply circuit at the sensor connector and battery negative. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 3</p>	All

## P0699-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the ECM harness connector(s).  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage between the (K851) 5-volt supply circuit in the sensor harness connector and battery negative.            Is the voltage less than 1 volt?</p> <p>Yes → Go To 4</p> <p>No → Repair or replace the wiring harness.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Turn the ignition off.            Reconnect the ECM harness connector(s).            Ignition on, engine not running.            Measure the voltage between the (K851) 5-volt supply circuit at the sensor harness connector and battery negative.            Is the voltage greater than 6 volts?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Turn the ignition off.            Disconnect the APPS harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage between the (K852) APPS #1 5-volt supply circuit at the sensor connector and battery negative.            Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Replace the APPS.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.            Disconnect the ECM harness connector(s).  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage between the (K852) APPS #1 5-volt supply circuit in the sensor harness connector and battery negative.            Is the voltage less than 1 volt?</p> <p>Yes → Go To 7</p> <p>No → Repair or replace the wiring harness.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P0699-ACCELERATOR PEDAL POSITION SENSOR (APPS) SUPPLY VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off. Reconnect the ECM harness connector(s). Ignition on, engine not running. Measure the voltage between the (K852) APPS #1 5-volt supply circuit at the sensor harness connector and battery negative. Is the voltage greater than 6 volts?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P1652-J1850 SHORT TO GROUND****When Monitored and Set Condition:****P1652-J1850 SHORT TO GROUND**

When Monitored: While the ignition is on.

Set Condition: The ECM detects a short to ground on the J1850.

**POSSIBLE CAUSES**

ECM

(D25) J1850 SHORTED

COMMUNICATION

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the (D25) J1850 circuit in the ECM harness connector and battery negative. Is the resistance less than 10 Ohms?  Yes → Go To 2 No → Replace the ECM.	All
2	Measure the resistance between the (D25) J1850 circuit and all other circuits in both ECM connectors. Is the resistance greater than 100k ohms?  Yes → Refer to the Body Diagnostic book Communications section. No → Repair (D25) J1850 shorted to another circuit.	All

## Symptom:

**P2121-APP VOLTS DO NOT AGREE WITH IDLE VALIDATION SIGNAL**

## When Monitored and Set Condition:

**P2121-APP VOLTS DO NOT AGREE WITH IDLE VALIDATION SIGNAL**

When Monitored: While the engine is running.

Set Condition: IVS indicates idle while APPS signal voltage indicates not at idle condition or IVS indicates not at idle while APPS signal voltage indicates idle condition.

## POSSIBLE CAUSES

OTHER APPS DTC'S

APPS

(K851) 5-VOLT SUPPLY SHORTED TO VOLTAGE

(K22) SIGNAL CIRCUIT SHORTED TO (K556) NOT IDLE CIRCUIT

ECM

(K851) 5-VOLT SUPPLY CIRCUIT IN ECM

INTERMITTENT CONDITION

APPS

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Using the DRBIII®, check for any other APPS DTC's. Are any other APPS DTC's present?</p> <p>Yes → Repair other APPS DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>The diesel engine uses two types of throttle position sensors, depending on transmission configuration. Is the throttle position sensor is located on the engine?</p> <p>Yes → Go To 3</p> <p>No → Go To 8</p>	All

## P2121-APP VOLTS DO NOT AGREE WITH IDLE VALIDATION SIGNAL — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the APPS harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the (K22) signal circuit at the sensor and the (K556) not idle circuit at the sensor. Is the resistance less than 10 ohms?</p> <p>Yes → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the voltage between the (K851) 5-volt supply circuit of the sensor harness connector and battery negative. Is the voltage greater than 1 volt?</p> <p>Yes → Repair or replace the (K851) 5-volt supply circuit shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (K22) signal circuit of the sensor harness connector and (K556) not idle Circuit of the sensor harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (K22) Signal circuit shorted to the (K556) not idle circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Reconnect the ECM harness connectors. Measure the resistance between the (K22) signal circuit of the sensor harness connector and (K556) not idle circuit of the sensor harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 7</p>	All

## **P2121-APP VOLTS DO NOT AGREE WITH IDLE VALIDATION SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition on.            Measure the voltage of the (K851) 5-volt supply circuit at the sensor harness connector and battery negative.            Is the voltage greater than 5.5 volts?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Monitor the APPS 1 and APPS 2 voltage with the DRBIII® while depressing the throttle pedal.            Is the voltage transition shown on the DRBIII® smooth while depressing the throttle and is the volta</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the APPS.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**Symptom:****P2122-LOW VOLTAGE AT THE APP SENSOR****When Monitored and Set Condition:****P2122-LOW VOLTAGE AT THE APP SENSOR**

When Monitored: While the key is on and during engine operation.

Set Condition: The APPS circuit voltage at the ECM goes below 0.13 volt for more than 2 seconds.

**POSSIBLE CAUSES**

APPS

APPS

APPS

APPS

(K851) 5-VOLT SUPPLY CIRCUIT OPEN

(K22) SIGNAL CIRCUIT OPEN FROM ECM TO APPS

(K22) SIGNAL CIRCUIT SHORTED TO (K922) RETURN CIRCUIT

(K22) SIGNAL CIRCUIT SHORTED TO GROUND

(K22) SIGNAL CIRCUIT SHORTED TO (K914) SENSOR RETURN

(K851) 5-VOLT SUPPLY CIRCUIT SHORTED TO (K922) RETURN CIRCUIT

(K851) 5-VOLT SUPPLY CIRCUIT SHORTED TO (K914) SENSOR RETURN

(K851) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

(K22) SIGNAL CIRCUIT SHORTED TO (K565) IDLE CIRCUIT

(K22) SIGNAL CIRCUIT SHORTED TO (K556) NOT IDLE CIRCUIT

ECM

INTERMITTENT CONDITION

(K23) APPS NO. 1 SIGNAL CIRCUIT OPEN

(K852) APPS NO. 1 5-VOLT SUPPLY OPEN

(K23) APPS NO. 1 SIGNAL CIRCUIT SHORTED TO GROUND

(K23) APPS NO. 1 SIGNAL CIRCUIT SHORTED TO OTHER CIRCUITS

(K852) APPS NO. 1 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

(K852) APPS NO. 1 5-VOLT SUPPLY CIRCUIT SHORTED TO OTHER CIRCUITS

ECM

APPS

INTERMITTENT CONDITION

## P2122-LOW VOLTAGE AT THE APP SENSOR — Continued

TEST	ACTION	APPLICABILITY
1	<p>The diesel engine uses two types of throttle position sensors, depending on transmission configuration.</p> <p>Is the throttle position sensor is located on the engine?</p> <p>Yes → Go To 2</p> <p>No → Go To 17</p>	All
2	<p>Turn the ignition off.</p> <p>Disconnect the APPS harness connector.</p> <p><b>NOTE: Check connectors - Clean/repair as necessary.</b></p> <p>Measure the resistance between the (K22) signal circuit of the sensor to the (K851) 5-volt supply circuit of the sensor.</p> <p>Is the resistance between 1500 - 3000 Ohms with the accelerator pedal released?</p> <p>Yes → Go To 3</p> <p>No → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Measure the resistance between the (K22) signal circuit of the sensor to the (K851) 5-volt supply circuit of the sensor.</p> <p><b>NOTE: Released resistance must be at least 1000 Ohms greater than depressed resistance.</b></p> <p>Is the resistance between 200 - 1500 Ohms with the accelerator pedal depressed?</p> <p>Yes → Go To 4</p> <p>No → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Measure the resistance between the (K851) 5-volt supply circuit of the sensor and the (K922) return circuit of the sensor.</p> <p>Is the resistance between 2000 and 3000 Ohms, depressed as well as released?</p> <p>Yes → Go To 5</p> <p>No → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Connect a jumper wire between the (K22) signal circuit in the sensor harness connector and the (K851) 5-volt supply circuit in the sensor harness connector.</p> <p>With the DRBIII®, read DTCs.</p> <p>Did P2123 set?</p> <p>Yes → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All

**P2122-LOW VOLTAGE AT THE APP SENSOR — Continued**

TEST	ACTION	APPLICABILITY
6	Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the (K851) 5-volt supply circuit between the APPS harness connector and the ECM harness connector. Is the resistance less than 10 ohms?  Yes → Go To 7  No → Repair the open (K851) 5-volt supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
7	Measure the resistance of the (K22) signal circuit between the APPS harness connector and the ECM harness connector. Is the resistance less than 10 ohms?  Yes → Go To 8  No → Repair the open (K22) signal circuit from ECM to APPS harness connector. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
8	Measure the resistance between the (K22) signal circuit in the sensor harness connector and the (K922) return circuit in the sensor harness connector. Is the resistance less than 10 ohms?  Yes → Repair the (K22) signal circuit shorted to the (K922) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 9	All
9	Measure the resistance between the (K22) signal circuit in the sensor harness connector and battery negative. Is the resistance less than 10 ohms?  Yes → Repair the (K22) signal circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 10	All
10	Measure the resistance between the (K22) signal circuit in the sensor harness connector and the (K914) sensor return circuit of the ECM harness connector. Is the resistance less than 10 ohms?  Yes → Repair the (K22) signal circuit shorted to the (K914) sensor return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 11	All

## P2122-LOW VOLTAGE AT THE APP SENSOR — Continued

TEST	ACTION	APPLICABILITY
11	<p>Measure the resistance between the (K851) 5-volt supply circuit in the sensor harness connector and the (K922) return circuit in the sensor harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (K851) 5-volt supply circuit shorted to the (K922) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 12</p>	All
12	<p>Measure the resistance between the (K851) 5-volt supply circuit in the sensor harness connector and battery negative. Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (K851) 5-volt supply circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 13</p>	All
13	<p>Measure the resistance between the (K851) 5-volt supply circuit in the sensor harness connector and the (K914) sensor return circuit of the ECM harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (K851) 5-volt supply circuit shorted to the (K914) sensor return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 14</p>	All
14	<p>Measure the resistance between the (K22) signal circuit in the sensor harness connector and the (K565) idle switch circuit in the sensor harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (K22) signal circuit shorted to the (K565) idle circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 15</p>	All
15	<p>Measure the resistance between the (K22) signal circuit in the sensor harness connector and the (K556) not idle switch circuit in the sensor harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Repair the (K22) signal circuit shorted to the (K556) not idle circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 16</p>	All

**P2122-LOW VOLTAGE AT THE APP SENSOR — Continued**

TEST	ACTION	APPLICABILITY
16	<p>Reconnect the ECM harness connectors.            Ignition on, engine not running.            Connect a jumper wire between the (K22) signal circuit in the sensor harness connector and the (K851) 5-volt supply circuit in the sensor harness connector.            Did DTC P2123 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
17	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Disconnect the APPS harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the (K23) APPS No. 1 signal circuit between the APPS sensor harness connector and the ECM harness connector.            Is the resistance less than 10 ohms?</p> <p>Yes → Go To 18</p> <p>No → Repair the (K23) APPS No. 1 signal circuit open.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
18	<p>Measure the resistance of the (K852) APPS No. 1 5-volt supply circuit between the APPS sensor harness connector and the ECM harness connector.            Is the resistance less than 10 ohms?</p> <p>Yes → Go To 19</p> <p>No → Repair the (K852) APPS No. 1 5-volt supply open.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
19	<p>Measure the resistance between the (K23) APPS No. 1 signal circuit at the sensor harness connector and battery negative.            Is the resistance greater than 100 k ohms?</p> <p>Yes → Go To 20</p> <p>No → Repair the (K23) APPS No. 1 signal circuit shorted to ground.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
20	<p>Measure the resistance between the (K23) APPS No. 1 signal circuit at the sensor harness connector and all other circuits in the ECM harness connector.            Is the resistance greater than 100 k ohms?</p> <p>Yes → Go To 21</p> <p>No → Repair the (K23) APPS No. 1 signal circuit shorted to other circuits.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P2122-LOW VOLTAGE AT THE APPS SENSOR — Continued

TEST	ACTION	APPLICABILITY
21	<p>Measure the resistance between the (K852) APPS No. 1 5-volt supply circuit at the sensor harness connector and battery negative. Is the resistance greater than 100 k ohms?</p> <p>Yes → Go To 22</p> <p>No → Repair the (K852) APPS No. 1 5-volt supply circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
22	<p>Measure the resistance between the (K852) APPS No. 1 5-volt supply circuit at the sensor harness connector and all other circuits in the ECM harness connector. Is the resistance greater than 100 k ohms?</p> <p>Yes → Go To 23</p> <p>No → Repair the (K852) APPS No. 1 5-volt supply circuit shorted to other circuits. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
23	<p>Reconnect the ECM harness connectors. Turn the ignition on. While monitoring with the DRBIII®, connect a jumper wire between the (K23) APPS No. 1 signal circuit at the sensor harness connector and the (K852) APPS No. 1 5-volt supply circuit at the sensor harness connector. <b>NOTE: With the sensor disconnected it is normal to have a APPS 1 and APPS 2 low voltage DTC set.</b> Did DTC P2123 set?</p> <p>Yes → Go To 24</p> <p>No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
24	<p>Reconnect the APPS harness connector. Monitor the APPS 1 and APPS 2 voltage with the DRBIII® while depressing the throttle pedal. Is the voltage transition shown on the DRBIII® smooth while depressing the throttle and is the volta</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P2123-HIGH VOLTAGE AT THE APP SENSOR****When Monitored and Set Condition:****P2123-HIGH VOLTAGE AT THE APP SENSOR**

When Monitored: While the key is on and during engine operation.

Set Condition: The APPS signal circuit voltage at the ECM goes above 4.24 volts for more than 2 seconds.

**POSSIBLE CAUSES**

APPS

APPS

APPS

(K922) RETURN CIRCUIT OPEN

(K22) SIGNAL CIRCUIT SHORTED TO (K851) 5-VOLT SUPPLY

(K22) SIGNAL CIRCUIT SHORTED TO VOLTAGE

ECM

INTERMITTENT CONDITION

(K167) APPS NO. 1 RETURN CIRCUIT OPEN

(K23) APPS NO. 1 SIGNAL CIRCUIT SHORTED TO (K852) APPS NO. 1 5-VOLT SUPPLY

(K23) APPS SIGNAL CIRCUIT SHORTED TO ANOTHER CIRCUIT

ECM

APPS

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>The diesel engine uses two types of throttle position sensors, depending on transmission configuration.</p> <p>Is the throttle position sensor is located on the engine?</p> <p>Yes → Go To 2</p> <p>No → Go To 9</p>	All

## P2123-HIGH VOLTAGE AT THE APP SENSOR — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off. Disconnect the APPS harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the (K22) signal circuit of the sensor to the (K851) 5-volt supply circuit of the sensor. Is the resistance between 1500 - 3000 Ohms with the accelerator pedal released?</p> <p>Yes → Go To 3</p> <p>No → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Measure the resistance between the (K22) signal circuit of the sensor to the (K851) 5-volt supply circuit of the sensor. <b>NOTE: Released resistance must be at least 1000 Ohms greater than depressed resistance.</b> Is the resistance between 200 - 1500 Ohms with the accelerator pedal depressed?</p> <p>Yes → Go To 4</p> <p>No → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Reconnect the APPS harness connector. Ignition on, engine not running. Using the DRBIII®, monitor the DTC while disconnecting the APPS harness connector Did P2122 set?</p> <p>Yes → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the APPS harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the APPS (K922) return circuit between the sensor harness connector and the ECM harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open (K922) return circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance between the (K22) signal circuit in the sensor harness connector and the (K851) 5-volt supply circuit in the sensor harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Repair the (K22) signal circuit shorted to (K851) 5-volt supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 7</p>	All



**P2123-HIGH VOLTAGE AT THE APP SENSOR — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Measure the voltage between the (K22) signal circuit in the sensor harness connector and battery negative. Is the voltage greater than 1 volt?</p> <p>Yes → Repair the (K22) signal circuit shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 8</p>	All
8	<p>Reconnect the ECM harness connectors. Reconnect the disconnected APPS harness connector. Monitor the DRBIII® while disconnecting the APPS harness connector. Did P2122 set?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
9	<p>Turn the ignition off. Disconnect the APPS harness connector. Disconnect the ECM harness connectors. Measure the resistance on the (K167) APPS No. 1 return circuit between the sensor harness connector and the ECM harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the (K167) APPS No. 1 return circuit open. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Measure the resistance between the (K23) APPS No. 1 signal circuit in the sensor harness connector and the (K852) APPS No. 1 5-volt supply circuit in the sensor harness connector. Is the resistance greater than 100 K ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair the (K23) APPS No. 1 signal circuit shorted to the (K852) 5-volt supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
11	<p>Measure the resistance between the APPS No. 1 signal circuit at the ECM harness connector and all other circuits in the ECM harness connector. Is the resistance greater than 100 k ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the (K23) APPS No. 1 signal circuit shorted to another circuit in the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P2123-HIGH VOLTAGE AT THE APP SENSOR — Continued

TEST	ACTION	APPLICABILITY
12	<p>Reconnect the ECM harness connectors.  Reconnect the APPS harness connector.  While monitoring with the DRBIII®, disconnect the sensor connector.  Did a APPS No. 1 and APPS No. 2 voltage too low DTC set?</p> <p>Yes → Go To 13</p> <p>No → Replace and program the ECM in accordance with the Service Information.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
13	<p>Reconnect the APPS harness connector.  Monitor the APPS No. 1 and APPS No. 2 voltage with the DRBIII® while depressing the throttle pedal.  Is the voltage transition shown on the DRBIII® smooth while depressing the throttle and is the volta</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the APPS.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****P2127-LOW VOLTAGE AT THE THROTTLE VALIDATION SWITCH****When Monitored and Set Condition:****P2127-LOW VOLTAGE AT THE THROTTLE VALIDATION SWITCH**

**When Monitored:** Key on. **NOTE:** This DTC will remain active until the accelerator pedal is cycled. Be sure to cycle the accelerator pedal after completing any repairs to this circuit and prior to checking DTC status with the DRBIII®

**Set Condition:** Both Idle and Not Idle switches are in the same state simultaneously for a calibrated amount of time.

**POSSIBLE CAUSES**

APPS IDLE SWITCH  
 APPS NOT IDLE SWITCH  
 IDLE SWITCH CIRCUIT OPEN  
 NOT IDLE SWITCH CIRCUIT OPEN  
 APPS RETURN CIRCUIT OPEN  
 IDLE SWITCH CIRCUIT SHORTED TO VOLTAGE  
 NOT IDLE SWITCH CIRCUIT SHORTED TO VOLTAGE  
 ECM  
 APPS 2 SIGNAL CIRCUIT OPEN  
 INTERMITTENT CONDITION  
 5-VOLT SUPPLY CIRCUIT OPEN  
 APPS 2 SIGNAL CIRCUIT SHORTED TO GROUND  
 APPS 2 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND  
 APPS 2 SIGNAL CIRCUIT SHORTED  
 APPS 2 5-VOLT SUPPLY CIRCUIT SHORTED  
 APPS  
 ECM  
 INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>The diesel engine uses two types of throttle position sensors, depending on transmission configuration.            Is the throttle position sensor is located on the engine?</p> <p>Yes → Go To 2</p> <p>No → Go To 10</p>	All

## P2127-LOW VOLTAGE AT THE THROTTLE VALIDATION SWITCH — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.            Disconnect the APPS harness connector.            Turn the ignition on.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Measure the voltage between the idle switch circuit of the APPS harness connector and sensor #1 return circuit.            Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Replace the APPS.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 3</p>	All
3	<p>Measure the voltage between the not idle switch circuit of the APPS harness connector and sensor #1 return circuit.            Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Replace the APPS.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.            Disconnect the ECM harness connector(s).  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the idle switch circuit between the APPS harness connector and the ECM harness connector.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open idle switch circuit from the ECM harness connector to the APPS harness connector.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance of the not idle switch circuit between the APPS harness connector and the ECM harness connector.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open not idle switch circuit from the ECM harness connector to the APPS harness connector.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of the APPS #1 return circuit between the APPS harness connector and the ECM harness connector.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open APPS return circuit from the ECM harness connector to the APPS harness connector.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P2127-LOW VOLTAGE AT THE THROTTLE VALIDATION SWITCH — Continued

TEST	ACTION	APPLICABILITY
7	<p>Measure the voltage between the idle switch circuit of the APPS connector and battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Go To 8</p> <p>No → Repair the shorted to voltage idle switch circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Measure the voltage between the not idle switch circuit of the APPS connector and battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Go To 9</p> <p>No → Repair the shorted to voltage not idle switch circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
9	<p>Reconnect the ECM harness connector. Measure the voltage between the idle switch circuit of the APPS connector and APPS return circuit. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the APPS harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the APPS 2 signal circuit between the APPS harness connector and the ECM harness connector Is the resistance less than 10 ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
11	<p>Measure the resistance of the APPS 2 5-volt supply circuit between the APPS harness connector and the ECM harness connector. Is the resistance less than 10 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the open 5-volt supply circuit or replace the wiring harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P2127-LOW VOLTAGE AT THE THROTTLE VALIDATION SWITCH — Continued**

TEST	ACTION	APPLICABILITY
12	<p>Measure the resistance of the APPS 2 signal circuit between the APPS harness connector and battery negative. Is the resistance less than 100 ohms?</p> <p>Yes → Go To 13</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
13	<p>Measure the resistance of the APPS 2 5-volt supply circuit between the APPS harness connector and battery negative. Is the resistance less than 100 ohms?</p> <p>Yes → Go To 14</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
14	<p>Measure the resistance of the APPS 2 signal circuit between the APPS harness connector and all other circuits in the ECM harness connector. Is the resistance less than 100 ohms?</p> <p>Yes → Go To 15</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
15	<p>Measure the resistance of the APPS 2 5-volt supply circuit between the APPS harness connector and all other circuits in the ECM harness connector. Is the resistance less than 100 ohms?</p> <p>Yes → Go To 16</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
16	<p>Reconnect the ECM harness connectors. Ignition on, engine not running. While monitoring with the DRBIII®, connect a jumper wire between the APPS 2 signal circuit at the sensor harness connector and the APPS 2 5-volt supply circuit at the sensor harness connector. <b>NOTE: With the sensor disconnected it is normal to have a APPS 1 and APPS 2 low voltage DTC set.</b> Did a APPS 2 voltage too high DTC set?</p> <p>Yes → Go To 17</p> <p>No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P2127-LOW VOLTAGE AT THE THROTTLE VALIDATION SWITCH — Continued

TEST	ACTION	APPLICABILITY
17	<p>Turn the ignition off.  Reconnect the APPS harness connector.  Ignition on, engine not running.  Monitor the APPS 1 and APPS 2 voltage with the DRBIII® while depressing the throttle pedal.  Is the voltage transition shown on the DRBIII® smooth while depressing the throttle and is the volta</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace the APPS.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P2128-HIGH VOLTAGE AT THE THROTTLE VALIDATION SWITCH**

## When Monitored and Set Condition:

### **P2128-HIGH VOLTAGE AT THE THROTTLE VALIDATION SWITCH**

When Monitored: Key on.

Set Condition: Both Idle and Not Idle switches are in the same state simultaneously for a calibrated amount of time.

## POSSIBLE CAUSES

(K565) IDLE SWITCH CIRCUIT SHORTED TO (K922) RETURN CIRCUIT  
 (K556) NOT IDLE SWITCH CIRCUIT SHORTED TO (K922) RETURN CIRCUIT  
 (K565) IDLE SWITCH CIRCUIT SHORTED TO GROUND  
 (K556) NOT IDLE SWITCH CIRCUIT SHORTED TO GROUND  
 (K565) IDLE SWITCH SHORTED TO (K556) NOT IDLE SWITCH  
 (K565) IDLE SWITCH SHORTED TO (K556) NOT IDLE SWITCH INSIDE ECM  
 ECM  
 INTERMITTENT CONDITION  
 (K29) APPS NO.2 SIGNAL CIRCUIT SHORTED TO (K854) APPS NO.2 5-VOLT SUPPLY CIRCUIT  
 (K29) APPS NO. 2 SIGNAL CIRCUIT SHORTED TO OTHER CIRCUITS IN THE ECM HARNESS  
 ECM  
 APPS  
 INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>The diesel engine uses two types of throttle position sensors, depending on transmission configuration.            Is the throttle position sensor is located on the engine?</p> <p>Yes → Go To 2</p> <p>No → Go To 9</p>	All



## P2128-HIGH VOLTAGE AT THE THROTTLE VALIDATION SWITCH — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off. Disconnect the APPS harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. Measure the voltage between the (K565) idle switch circuit of the APPS harness connector and (K922) return circuit. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 3</p>	All
3	<p>Measure the voltage between the (K556) not idle switch circuit of the APPS harness connector and (K922) return circuit. Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the (K565) idle switch circuit of the APPS harness connector and battery negative. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the (K565) Idle switch circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance between the (K556) not idle switch circuit of the APPS harness connector and battery negative. Is the resistance greater than 100 K Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the (K556) not Idle switch circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance between the (K65) idle switch circuit of the APPS harness connector and the (K556) not idle switch circuit of the APPS harness connector. Is the resistance less than 10 Ohms?</p> <p>Yes → Repair the (K565) idle switch circuit shorted to the not (K556) not idle switch circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 7</p>	All

**P2128-HIGH VOLTAGE AT THE THROTTLE VALIDATION SWITCH — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Reconnect the ECM harness connectors.                      Measure the resistance between the (K565) idle switch circuit of the APPS harness connector and the (K556) not idle switch circuit of the APPS harness connector.                      Is the resistance less than 10 Ohms?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information.                      Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 8</p>	All
8	<p>Ignition on, engine not running.                      Measure the voltage between the (K565) idle switch circuit of the APPS harness connector and battery negative.                      Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).                      Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information.                      Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
9	<p>Turn the ignition off.                      Disconnect the ECM harness connectors.                      Disconnect the APPS harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>                      Measure the resistance between the (K29) APPS No. 2 signal circuit in the sensor harness connector and the (K854) APPS No. 2 5-volt supply circuit in the sensor harness connector.                      Is the resistance greater than 100 K ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the (K29) APPS No. 2 signal circuit shorted to (K854) APPS No. 2 5-volt supply circuit.                      Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Measure the resistance between the APPS No. 2 signal circuit at the ECM harness connector and all other circuit in the ECM harness connector.                      Is the resistance greater than 100 K ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair the (K29) APPS No. 2 Signal circuit shorted to other circuits in the ECM harness connector.                      Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P2128-HIGH VOLTAGE AT THE THROTTLE VALIDATION SWITCH — Continued

TEST	ACTION	APPLICABILITY
11	Reconnect the ECM harness connector. Reconnect the APPS harness connector. Ignition on, engine not running. While monitoring the DRBIII®, disconnect the APPS harness connector. Did DTC P2122 and P2127 set?  Yes → Go To 12  No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
12	Reconnect the APPS harness connector. Monitor the APPS No. 1 and APPS No. 2 voltage with the DRBIII® while depressing the throttle pedal. Is the voltage transition shown on the DRBIII® smooth while depressing the throttle and is the volta  Yes → Test Complete.  No → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## Symptom:

### **P2146-BANK 1 (CYLINDERS 1-3) SHORTED HIGH OR LOW**

## When Monitored and Set Condition:

### **P2146-BANK 1 (CYLINDERS 1-3) SHORTED HIGH OR LOW**

When Monitored: While the engine is running.

Set Condition: A circuit failure detected at cylinders 1,2, or 3 or any combination of cylinders 1,2, or 3.

## POSSIBLE CAUSES

OTHER DTC'S

HIGH SIDE DRIVER CIRCUIT OPEN

LOW SIDE DRIVER CIRCUIT OPEN

HIGH SIDE DRIVER SHORTED TO LOW SIDE DRIVER

HIGH SIDE DRIVERS SHORTED LOW

LOW SIDE DRIVER CIRCUIT SHORTED OTHER LOW SIDE DRIVER CIRCUIT

LOW SIDE DRIVERS SHORTED LOW

HIGH SIDE DRIVER SHORTED TO VOLTAGE

LOW SIDE DRIVER SHORTED TO VOLTAGE

LOW SIDE DRIVER CIRCUIT SHORTED IN INJECTOR HARNESS

INJECTOR

INJECTOR HARNESS

INTERMITTENT CONDITION

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Do you have any combination of DTC's P0201, P0202, or P0203?</p> <p>Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All

**P2146-BANK 1 (CYLINDERS 1-3) SHORTED HIGH OR LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Disconnect the Injector 1-3 harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the injector high side driver circuit between the Bank 1 high side driver circuit in the ECM harness connector and the high side driver circuit in the injector harness connectors for cylinders 1-3.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 3</p> <p>No → Repair the open high side driver circuit from ECM harness connector to the Injector harness connector.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Measure the resistance of the #1,#2, and #3 injector low side driver circuits between the ECM harness connector and the injector harness connectors.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open low side driver circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Measure the resistance between the Bank 1 high side driver circuit at the ECM harness connector and the low side driver circuit for injectors 1-3 at the ECM harness connector.            Is the resistance more than 100k Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the High side circuit shorted to the low side circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance of the injector harness connector high side driver circuits to battery negative for injectors 1-3.            Is the resistance more than 100k Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the High side driver shorted low in the harness.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of the injector harness connector Low side driver circuits to battery negative for injectors 1-3.            Is the resistance more than 100k Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the Low side driver shorted low in the harness.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P2146-BANK 1 (CYLINDERS 1-3) SHORTED HIGH OR LOW — Continued

TEST	ACTION	APPLICABILITY
7	<p>Measure the voltage between the high side driver circuit in the engine harness and battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Go To 8</p> <p>No → Repair the high side driver shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Measure the voltage between the low side driver circuit in the engine harness and battery negative for cylinders 1-3. Is the voltage less than 1 volt?</p> <p>Yes → Go To 9</p> <p>No → Repair the low side driver shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
9	<p>Measure the resistance of each of the Bank 1 low side driver circuit to all other Bank 1 low side driver circuits at the ECM harness connector. Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair Low side driver circuit shorted to other Low side driver circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Reconnect the disconnected injector harness connector. Measure the resistance of each of the Bank 1 low side driver circuit to all other Bank 1 low side driver circuit at the ECM harness connector. Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 11</p> <p>No → Replace the injector harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
11	<p>Measure the resistance of each injector from the through head connector. <b>NOTE: Be sure to zero the ohm meter prior to checking the injector circuit.</b> Is the resistance greater than .8 ohm?</p> <p>Yes → Go To 12</p> <p>No → Go To 14</p>	All
12	<p>Disconnect the pigtail nuts from injectors 1-3. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the solenoid posts of each injector. <b>NOTE: Be sure to zero the ohm meter prior to checking the injector circuit.</b> Is the resistance less than 1 ohm and greater than 0 ohms?</p> <p>Yes → Go To 13</p> <p>No → Replace the fuel injector or injectors. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P2146-BANK 1 (CYLINDERS 1-3) SHORTED HIGH OR LOW — Continued**

TEST	ACTION	APPLICABILITY
13	<p>Measure resistance of each circuit in the injector harness from pigtail side to injector harness connector. Is resistance above 1 ohm?</p> <p>Yes → Replace the injector harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
14	<p>Reconnect the all injector pig tails harness connector. Reconnect the ECM harness connector. Reconnect the Injector harness connector. Start the engine. With the DRBIII®, read DTCs. Did the DTC return?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P2149-BANK 2 (CYLINDERS 4-6) SHORTED HIGH OR LOW**

## When Monitored and Set Condition:

### **P2149-BANK 2 (CYLINDERS 4-6) SHORTED HIGH OR LOW**

When Monitored: While the engine is running.

Set Condition: A misfire detected at cylinders 4,5, or 6 or any combination of cylinders 4,5, or 6.

## POSSIBLE CAUSES

OTHER DTC'S

HIGH SIDE DRIVER CIRCUIT OPEN

LOW SIDE DRIVER CIRCUIT OPEN

HIGH SIDE DRIVER SHORTED TO LOW SIDE DRIVER

HIGH SIDE DRIVERS SHORTED LOW

LOW SIDE DRIVER CIRCUIT SHORTED OTHER LOW SIDE DRIVER CIRCUIT

LOW SIDE DRIVERS SHORTED LOW

HIGH SIDE DRIVER SHORTED TO VOLTAGE

LOW SIDE DRIVER SHORTED TO VOLTAGE

LOW SIDE DRIVER CIRCUIT SHORTED IN INJECTOR HARNESS

INJECTOR

INJECTOR HARNESS

INTERMITTENT CONDITION

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Do you have any combination of DTC's P0201, P0202, or P0203?</p> <p>Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All



**P2149-BANK 2 (CYLINDERS 4-6) SHORTED HIGH OR LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Disconnect the Injector 4-6 harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the injector high side driver circuit between the Bank 2 high side driver circuit in the ECM harness connector and the high side driver circuit in the injector harness connectors for cylinders 4-6.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 3</p> <p>No → Repair the open high side driver circuit from ECM harness connector to the Injector harness connector.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Measure the resistance of the #4, #5, and #6 injector low side driver circuits between the ECM harness connector and the injector harness connectors.            Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open low side driver circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
4	<p>Measure the resistance between the Bank 2 high side driver circuit at the ECM harness connector and the low side driver circuit for injectors 4-6 at the ECM harness connector.            Is the resistance more than 100k Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the High side circuit shorted to the low side circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance of the injector harness connector high side driver circuits to battery negative for injectors 4-6.            Is the resistance more than 100k Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the High side driver shorted low in the harness.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance of the injector harness connector Low side driver circuits to battery negative for injectors 4-6.            Is the resistance more than 100k Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the Low side driver shorted low in the harness.            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## P2149-BANK 2 (CYLINDERS 4-6) SHORTED HIGH OR LOW — Continued

TEST	ACTION	APPLICABILITY
7	<p>Measure the voltage between the high side driver circuit in the engine harness and battery negative. Is the voltage less than 1 volt?</p> <p>Yes → Go To 8</p> <p>No → Repair the high side driver shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Measure the voltage between the low side driver circuit in the engine harness and battery negative for cylinders 4-6. Is the voltage less than 1 volt?</p> <p>Yes → Go To 9</p> <p>No → Repair the low side driver shorted to voltage. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
9	<p>Measure the resistance of each of the Bank 2 low side driver circuit to all other Bank 1 low side driver circuits at the ECM harness connector. Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair Low side driver circuit shorted to other Low side driver circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
10	<p>Reconnect the disconnected injector harness connector. Measure the resistance of each of the Bank 2 low side driver circuit to all other Bank 2 low side driver circuit at the ECM harness connector. Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 11</p> <p>No → Replace the injector harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
11	<p>Measure the resistance of each injector from the through head connector. <b>NOTE: Be sure to zero the ohm meter prior to checking the injector circuit.</b> Is the resistance greater than .8 ohm?</p> <p>Yes → Go To 12</p> <p>No → Go To 14</p>	All
12	<p>Disconnect the pigtail nuts from injectors 4-6. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the solenoid posts of each injector. <b>NOTE: Be sure to zero the ohm meter prior to checking the injector circuit.</b> Is the resistance less than 1 ohm and greater than 0 ohms?</p> <p>Yes → Go To 13</p> <p>No → Replace the fuel injector or injectors. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**P2149-BANK 2 (CYLINDERS 4-6) SHORTED HIGH OR LOW — Continued**

TEST	ACTION	APPLICABILITY
13	<p>Measure resistance of each circuit in the injector harness from pigtail side to injector harness connector. Is resistance above 1 ohm?</p> <p>Yes → Replace the injector harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
14	<p>Reconnect the all injector pig tails harness connector. Reconnect the ECM harness connector. Reconnect the Injector harness connector. Start the engine. With the DRBIII®, read DTCs. Did the DTC return?</p> <p>Yes → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Test Complete.</p>	All

## Symptom:

### **P2266-WATER IN FUEL (WIF) SENSOR VOLTAGE TOO LOW**

## When Monitored and Set Condition:

### **P2266-WATER IN FUEL (WIF) SENSOR VOLTAGE TOO LOW**

When Monitored: Ignition on.

Set Condition: Low voltage detected at the WIF signal circuit at the ECM.

## POSSIBLE CAUSES

WATER IN FUEL SENSOR

(G123) WATER IN FUEL SENSOR SIGNAL CIRCUIT SHORTED TO (K914) RETURN CIRCUIT

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Water in fuel sensor harness connector. Ignition on, engine not running. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the voltage between the signal circuit and return circuit of the WIF sensor harness connector. Is the voltage between 4.5 and 5.5 volts?  Yes → Replace the Water in fuel sensor. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Test Complete.	All

**Symptom:****P2269-WATER IN FUEL (WIF)****POSSIBLE CAUSES**

OTHER DTC'S PRESENT

WATER IN FUEL

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Do you have any additional water in fuel DTC's?</p> <p>Yes → Repair other Water in fuel sensor DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Using the service publications as a guide, drain the water in fuel separator. Did the DTC become inactive after draining the water in fuel separator?</p> <p>Yes → Clear DTC, repair complete. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 3</p>	All
3	<p>Disconnect the WIF sensor harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Using the DRBIII®, monitor for DTC's while connecting a jumper wire between the (G123) signal circuit of the water in fuel sensor and battery voltage. Did the water in fuel light go out?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom: P2502-CHARGING SYSTEM ERROR

### When Monitored and Set Condition:

#### P2502-CHARGING SYSTEM ERROR

When Monitored: While the engine is running.

Set Condition: The ECM cycles the voltage regulator in the generator while monitoring for a change in output voltage. If the voltage does not drop when the regulator is off, the fault is set.

#### POSSIBLE CAUSES

DIRTY OR LOOSE CONNECTIONS  
HIGH RESISTANCE IN THE B+ CIRCUIT  
HIGH RESISTANCE IN THE B+ CROSS OVER CABLE  
HIGH RESISTANCE IN THE GROUND CIRCUIT  
GENERATOR  
ECM  
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Visually inspect the positive and negative connections at the battery. Visually inspect the battery negative connections at the engine block. Are the connections free of corrosion and are they tight?</p> <p>Yes → Go To 2</p> <p>No → Clean and/or tighten the connections. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All
2	<p>Measure the voltage between the B+ post of the generator and the B+ post of the battery while the engine is running. Is the voltage above .4 volts?</p> <p>Yes → Repair the high resistance in the B+ circuit from battery to the generator. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 3</p>	All

**P2502-CHARGING SYSTEM ERROR — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Measure the voltage between the B+ post of the generator and the B+ post of the right side battery to the left side battery while the engine is running. Is the voltage above .4 volts?</p> <p>Yes → Repair the high resistance in the B+ cross over cable from right side battery to left side battery. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 4</p>	All
4	<p>Measure the voltage between the generator case and the B- post of the battery. Is the voltage above .1 volts?</p> <p>Yes → Repair the high resistance in the ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Disconnect the Generator field harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the generator field terminals. Is the resistance between .5 and 15 Ohms?</p> <p>Yes → Go To 6</p> <p>No → Replace the generator. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All
6	<p>Turn the ignition off. Reconnect the Generator field harness connector. Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. Measure and record the voltage between battery positive circuits of the ECM harness connector and the battery negative circuits of the ECM harness connector. Turn the ignition off. Reconnect the ECM harness connectors. Start the engine. Use the DRBIII® to measure and record battery voltage. Compare the voltage reading from the voltmeter with that of the DRBIII®. Are the readings within 3 volts of each other?</p> <p>Yes → Test Complete.</p> <p>No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL).</p>	All

## Symptom:

### P2503-CHARGING SYSTEM OUTPUT LOW

#### When Monitored and Set Condition:

#### P2503-CHARGING SYSTEM OUTPUT LOW

When Monitored: While the engine is running.

Set Condition: The battery voltage exceeds target voltage by more than a calibrated value.

#### POSSIBLE CAUSES

OTHER DTC'S PRESENT

GENERATOR

FIELD DRIVER CIRCUIT SHORTED TO GROUND

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Is DTC P2502 set?</p> <p>Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Disconnect the Generator field harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the generator field terminals at the generator. Is the resistance between .5 and 15 Ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the generator. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Disconnect the ECM harness connectors. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the generator field driver circuit between the generator and battery negative. Is the resistance greater than 100 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the generator field driver circuit shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**P2503-CHARGING SYSTEM OUTPUT LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure and record the voltage between battery positive circuit of the ECM harness connector and the battery negative circuits of the ECM harness connector. Reconnect the ECM connectors. Use the DRBIII® to measure and record battery voltage. Compare the voltage reading from the voltmeter with that of the DRBIII®. Are the readings within 3 volts of each other?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P2504-CHARGING SYSTEM OUTPUT HIGH**

#### When Monitored and Set Condition:

#### **P2504-CHARGING SYSTEM OUTPUT HIGH**

When Monitored: While the engine is running.

Set Condition: Battery voltage is less than 11.5 volts for more than 8 seconds. Battery voltage must exceed 12 volts for more than 5 seconds for fault to become inactive.

#### POSSIBLE CAUSES

OTHER DTC'S PRESENT

DIRTY OR LOOSE CONNECTIONS

ADD-ON OR ACCESSORY WIRES AT BATTERY TERMINAL

HIGH RESISTANCE IN THE B+ CIRCUIT

HIGH RESISTANCE IN THE B+ CROSS OVER CABLE

HIGH RESISTANCE IN THE GROUND CIRCUIT

GENERATOR

ECM

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Is DTC P2502 set?</p> <p>Yes → Repair other DTC's first. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 2</p>	All
2	<p>Visually inspect the positive and negative connections at the battery. Visually inspect the battery negative connections at the engine block. Are the connections free of corrosion and are they tight?</p> <p>Yes → Go To 3</p> <p>No → Clean and/or tighten the connections. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
3	<p>Check for add-on or accessory wiring at positive (+) terminal of the battery. Are there any damaged wires at the battery?</p> <p>Yes → Remove defective or miss wired add-on or accessory wiring from battery. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 4</p>	All

**P2504-CHARGING SYSTEM OUTPUT HIGH — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the voltage between the B+ post of the generator and the B+ post of the battery while the engine is running. Is the voltage above .4 volts?</p> <p>Yes → Repair the high resistance in the B+ circuit from battery to the generator. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 5</p>	All
5	<p>Measure the voltage between the B+ post of the generator and the B+ post of the right side battery to the left side battery while the engine is running. Is the voltage above .4 volts?</p> <p>Yes → Repair the high resistance in the B+ cross over cable from right side battery to left side battery. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 6</p>	All
6	<p>Measure the voltage between the generator case and the B- post of the battery. Is the voltage above .1 volts?</p> <p>Yes → Repair the high resistance in the ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Go To 7</p>	All
7	<p>Disconnect the Generator field harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the generator field terminals at the generator. Is the resistance between .5 and 15 Ohms?</p> <p>Yes → Go To 8</p> <p>No → Replace the generator. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
8	<p>Measure and record the voltage between battery positive circuit of the ECM harness connector and the battery negative circuits of the ECM harness connector. Reconnect the ECM connectors. Use the DRBIII® to measure and record battery voltage. Compare the voltage reading from the voltmeter with that of the DRBIII®. Are the readings within 3 volts of each other?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Replace and program the ECM in accordance with the Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P2509-POWERDOWN DATA LOST ERROR**

#### When Monitored and Set Condition:

#### **P2509-POWERDOWN DATA LOST ERROR**

When Monitored: Continuous - key on or key off.

Set Condition: Loss of voltage detected at the ECM for a calibrated amount of time.

#### **POSSIBLE CAUSES**

POOR CONNECTIONS AT THE BATTERIES  
 LOW BATTERY VOLTAGE  
 OPEN FUSED B+ TO ECM  
 OPEN GROUND CIRCUIT  
 BATTERY + SHORTED TO OTHER CIRCUITS  
 RETURN CIRCUIT SHORTED  
 BATTERY + SHORTED TO GROUND  
 INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Visually inspect the wiring at the battery for damaged wires, or corrosion. Are the connections tight and free of corrosion?  Yes → Go To 2 No → Repair the poor connections at the batteries. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Measure the voltage between the positive and negative posts of the batteries. Is the battery voltages both above 12 volts?  Yes → Go To 3 No → Recharge or replace the battery (s). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
3	Turn the ignition off. Disconnect the ECM harness connectors. Turn the ignition on. Measure the resistance between the positive battery post and the ECM supply circuits. Is the resistance less than 10 Ohms?  Yes → Go To 4 No → Repair the open fused B+ circuit to ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

**P2509-POWERDOWN DATA LOST ERROR — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the negative battery post and the ECM ground wire. Is the resistance less than 10 Ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
5	<p>Measure the resistance between the ECM supply circuits and all other circuits in the ECM harness connector, except other supply circuits. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the battery circuit short to other circuits in engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
6	<p>Measure the resistance between the ECM return circuits and all other circuits in the ECM harness connector, except other return circuits. Is the resistance greater than 100k Ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair or replace the engine harness. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All
7	<p>Measure the resistance between the ECM B+ supply circuit and ground. Is the resistance greater than 100k Ohms?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p> <p>No → Repair Battery + shorted to ground. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### **P2609-NO VOLTAGE DROP SEEN FROM INTAKE AIR HEATERS**

## When Monitored and Set Condition:

### **P2609-NO VOLTAGE DROP SEEN FROM INTAKE AIR HEATERS**

When Monitored: First 15 seconds of engine operation.

Set Condition: The ECM does not detect a voltage drop on the intake air heater circuit.

## POSSIBLE CAUSES

INTAKE AIR HEATER OPEN

INTAKE AIR HEATER GROUND OPEN

OPEN BATTERY CABLE FROM INTAKE AIR HEATER RELAY

BATTERY CABLE OPEN

#1 INTAKE AIR HEATER RELAY

#2 INTAKE AIR HEATER RELAY

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Measure the resistance between the intake air heater supply and ground terminal on each intake air heater. Is the resistance less than 10 Ohms?  Yes → Go To 2  No → Replace the open Intake Air Heater.	All
2	Measure the resistance of the intake air heater ground circuit between the intake air heater terminal and the intake manifold cover ground connection. Is the resistance less than 10 Ohms?  Yes → Go To 3  No → Repair the open Intake Air heater ground.	All
3	Measure the resistance of the battery cable between the intake air heater and the intake air heater relay for both intake air heaters. Is the resistance less than 10 Ohms?  Yes → Go To 4  No → Repair The open or high resistance battery cable from the intake heater relay to heater.	All
4	Measure the resistance of the battery cable between the battery and the intake air heater relay for both relays. Is the resistance less than 10 Ohms?  Yes → Go To 5  No → Replace the battery cable from the battery to the Intake Air Heater Relay.	All

# **P2609-NO VOLTAGE DROP SEEN FROM INTAKE AIR HEATERS — Continued**

TEST	ACTION	APPLICABILITY
5	Disconnect the #1 intake air heater relay signal wire. Connect a jumper wire from the signal terminal of the #1 intake air heater relay to battery positive. Did the relay click when 12 volts was applied?  Yes → Go To 6 No → Replace #1 Intake Air Heater Relay.	All
6	Disconnect the #2 intake air heater relay signal wire. Connect a jumper wire from the signal terminal of the #2 intake air heater relay to battery positive. Did the relay click when 12 volts was applied?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). No → Replace #2 Intake Air Heater Relay.	All

## Symptom:

### \*CHECKING PRESSURE LIMITING VALVE ON THE FUEL RAIL FOR INTERNAL LEAKS

#### POSSIBLE CAUSES

#### PRESSURE LIMITING VALVE DIAGNOSTICS

TEST	ACTION	APPLICABILITY
1	<p>Using the DRBIII®, measure the rail pressure and determine if the rail pressure is excessive (above 185,000 kpa/26,831 psi), if it is, troubleshoot for excessive rail pressure first.</p> <p>Remove the banjo bolt from the pressure-limiting valve on the fuel rail.</p> <p>Install fuel system test fitting (9013) into the pressure-limiting valve.</p> <p>Attach one end of a fuel hose to the fuel fitting and put the other end of the fuel hose into a container.</p> <p>Perform the tests listed below to determine if the pressure-limiting valve is leaking.</p> <p>a. Operate the engine at idle and watch for fuel flow into the fuel container.</p> <p>b. Operate the engine at idle and actuate the fuel pressure override test with the DRBIII®. Watch for fuel flow into the fuel container.</p> <p>If fuel flows into the fuel container, replace the pressure-limiting valve. If fuel does not leak from the pressure-limiting valve, the test is complete.</p> <p>NOTE: do not drive the vehicle with any portion of this test kit installed.</p> <p>view repair</p> <p>Yes → Repair complete Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**Symptom:****\*CHECKING THE ACCELERATOR PEDAL SENSOR CALIBRATION**

POSSIBLE CAUSES		
MIS-WIRED APPS VOLTAGE NOT CHANGING DURING SWEEP THROTTLE PEDAL NOT MOVING FREELY APPS		
TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Remove the APPS cover. Inspect both APPS connector and ECM for proper wiring. Are both connectors wired correctly?  Yes → Go To 2  No → Repair mis-wired APPS connector at APPS or ECM. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All
2	Ignition on, engine not running. Remove APPS cover. With the DRBIII® in Sensors, read the APPS voltage while sweeping the APPS from the lower to the upper stops. Does voltage vary between less than 1.0 volt (closed) and more than 3.0 volts (open)?  Yes → Test complete. No trouble found. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Go To 3	All
3	Ignition on, engine not running. Remove APPS cover. Look for proper Throttle operation. Does the Throttle Pedal move freely between the upper and lower stops?  Yes → Replace the APPS. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).  No → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).	All

## Symptom:

### \*CHECKING THE ECM POWER AND GROUNDS

POSSIBLE CAUSES
ECM GROUND CIRCUIT(S) OPEN
FUSED B+ CIRCUIT OPEN
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the ECM harness connectors. Using a 12-volt test light connected to 12-volts, check each of the ECM ground circuits in ECM harness connector. Did the test light illuminate for each cavity?  Yes → Go To 2 No → Repair the ECM Ground circuit(s) for an open.	All
2	Turn the ignition off. Disconnect the ECM harness connectors. Turn the ignition on. Using a 12-volt test light connected to ground, check the Fused Ignition Switch Output circuit in ECM harness connector. Is the test light on?  Yes → Go To 3 No → Repair the Fused Ignition Switch Output circuit for an open.	All
3	Turn the ignition off. Disconnect the ECM harness connectors. Using a 12-volt test light connected to ground, check each Fused B+ circuit in the ECM harness connector. Does the test light illuminate brightly for each circuit?  Yes → Test Complete. No → Repair the Fused B+ Output circuit for an open.	All

**Symptom:****\*CHECKING THE PCM POWER AND GROUNDS****POSSIBLE CAUSES**

FUSED B+ CIRCUIT OPEN

FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN

PCM GROUND CIRCUIT(S) OPEN

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the PCM harness connectors. Using a 12-volt test light connected to 12-volts, check both ECM ground circuits in ECM harness connector. Did the test light illuminate for each cavity?  Yes → Go To 2 No → Repair the PCM Ground circuit(s) for an open.	All
2	Turn the ignition off. Disconnect the PCM harness connectors. Turn the ignition on. Using a 12-volt test light connected to ground, check the Fused Ignition Switch Output circuit in PCM harness connector. Is the test light on?  Yes → Go To 3 No → Repair the Fused Ignition Switch Output circuit for an open.	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Using a 12-volt test light connected to ground, check each Fused B+ circuit in the PCM harness connector. Does the test light illuminate brightly for each circuit?  Yes → Test Complete. No → Repair the Fused B+ Output circuit for an open.	All

## Symptom:

**\*ENGINE DIFFICULT TO START OR WILL NOT START (EXHAUST SMOKE)**

### POSSIBLE CAUSES

#### POSSIBLE CAUSES

TEST	ACTION	APPLICABILITY
1	<p>This is a list of possible causes:</p> <p>Check for any TSBs for ECM calibration updates that may apply.</p> <p>Fuel level low.</p> <p>Battery voltage low.</p> <p>Fuel filter plugged.</p> <p>Poor quality or improper grade of fuel.</p> <p>Fuel tank venting.</p> <p>Low fuel pressure.</p> <p>Air in fuel system</p> <p>Fuel Lift Pump malfunctioning.</p> <p>Fuel Inlet restriction.</p> <p>Fuel line kinked or restricted.</p> <p>Fuel return passage or fuel return line kinked or restricted.</p> <p>Injectors are incorrect.</p> <p>Injector shim thickness is incorrect.</p> <p>Injector malfunction.</p> <p>Fuel connector leaking fuel.</p> <p>Crankshaft position sensor (CKP) or Camshaft position sensor (CMP) and/or circuit malfunction.</p> <p>Moisture in harness connectors or corroded terminals.</p> <p>Internal engine damage.</p> <p>Air intake restriction.</p> <p>Exhaust restriction.</p> <p>Fuel inlet temperature high.</p> <p>Overhead adjustments.</p> <p>Ignition switch output voltage low and/or open.</p> <p>Starting accessories for cold weather such as engine block heaters, fuel heaters if equipped.</p> <p>Engine cranking speed is low.</p> <p>Electrical noise.</p> <p>Fuel control actuator circuit</p> <p>Speed indicator ring</p> <p>Pressure limiting valve</p> <p>Injector circuit</p> <p>Air inlet restriction</p> <p>External fuel leaks</p> <p>View repair</p> <p>Repair</p> <p>Repair as necessary. Refer to Service Information for the related symptom(s).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:**

**\*ENGINE DIFFICULT TO START OR WILL NOT START (NO EX-HAUST SMOKE WHILE CRANKING)**

POSSIBLE CAUSES
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POSSIBLE CAUSES
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TEST	ACTION	APPLICABILITY
1	<p>This is a list of possible causes:            Check for any TSBs for ECM calibration updates that may apply.            Fuel level low.            Poor quality or improper grade of fuel.            Fuel filter plugged.            Fuel tank venting.            Low fuel pressure.            Air in fuel system            Fuel Lift Pump malfunctioning.            Fuel Inlet restriction.            Fuel injection pump supply voltage open or low voltage.            Fuel inlet line kinked or restricted.            Fuel return passage or fuel return line kinked or restricted.            Injectors are incorrect.            Injector shim thickness is incorrect.            Injector malfunction.            Fuel connector leaking fuel.            Crankshaft position sensor (CKP) or Camshaft position sensor (CMP) and/or circuit malfunction.            Moisture in harness connectors or corroded terminals.            Skim issues.            Battery voltage low.            Ignition switch supply voltage low or open.            Battery voltage to ECM is low or open.            Electrical noise.            Fuel injection pump.            Engine Control Module.            Internal engine damage.            View repair.</p> <p>Repair</p> <p>Repair as necessary. Refer to Service Information for the related symptom(s).            Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### \*ENGINE SPEED SURGES IN PTO OR CRUISE CONTROL

POSSIBLE CAUSES		
POSSIBLE CAUSES		
TEST	ACTION	APPLICABILITY
1	<p>This is a list of possible causes:  Check for any TSBs for ECM calibration updates that may apply.  Fuel filter plugged.  Fuel Inlet restriction.  Fuel line kinked or restricted.  Fuel return passage or fuel return line kinked or restricted.  Accelerator pedal is restricted or out of calibration.  Vehicle Speed sensor (VSS) and/or circuit malfunction.  Transmission gear shift.  Check vehicle brakes for dragging, transmission malfunction, cooling fan operation cycle time and engine driven devices.  Moisture in harness connectors or corroded terminals.  ECM control, PTO speed governor.  Engine overload.  Air Inlet restriction  View repair</p> <p>Repair</p> <p>Repair as necessary. Refer to Service Information for the related symptom(s).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****\*ENGINE SPEED SURGES LOW OR HIGH IDLE****POSSIBLE CAUSES****POSSIBLE CAUSES**

TEST	ACTION	APPLICABILITY
1	<p>This is a list of possible causes:  Check for any TSBs for ECM calibration updates that may apply.  Fuel level low.  Fuel filter plugged.  Poor quality or improper grade of fuel.  Fuel tank venting.  Low fuel pressure.  Air in fuel system  Fuel Lift Pump malfunctioning.  Fuel Inlet restriction.  Fuel line kinked or restricted.  Fuel return passage or fuel return line kinked or restricted.  Injectors are incorrect.  Injector shim thickness is incorrect.  Injector malfunction.  Fuel connector leaking fuel.  High pressure Fuel pump.  Accelerator pedal is restricted or out of calibration.  Vibration damper is damaged.  Crankshaft position sensor (CKP) or Camshaft position sensor (CMP) and/or circuit malfunction.  Vehicle Speed sensor (VSS) and/or circuit malfunction.  Incorrect Transmission Clutch operation.  Check vehicle brakes for dragging, transmission malfunction, cooling fan operation cycle time and engine driven devices.  Check for proper turbocharger, turbo charger wheel clearance is out of specifications, waste gate for correct operation.  Bus communication problems.  Moisture in harness connectors or corroded terminals.  Internal engine damage.  Electronic noise.  Idling with excessive load.  Clutch is malfunctioning or incorrect.  Speed indicator ring  Injector circuit  View repair.</p> <p>Repair</p> <p>Repair as necessary. Refer to Service Information for the related symptom(s).  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

**\*ENGINE SPEED SURGES UNDER LOAD OR IN OPERATING RANGE**

### POSSIBLE CAUSES

#### POSSIBLE CAUSES

TEST	ACTION	APPLICABILITY
1	<p>This is a list of possible causes:</p> <p>Check for any TSBs for ECM calibration updates that may apply.</p> <p>Fuel level low.</p> <p>Fuel filter plugged.</p> <p>Poor quality or improper grade of fuel.</p> <p>Fuel tank venting.</p> <p>Low fuel pressure.</p> <p>Air in fuel system</p> <p>Fuel Lift Pump malfunctioning.</p> <p>Fuel Inlet restriction.</p> <p>Fuel line kinked or restricted.</p> <p>Fuel return passage or fuel return line kinked or restricted.</p> <p>Injectors are incorrect.</p> <p>Injector shim thickness is incorrect.</p> <p>Injector malfunction.</p> <p>Fuel connector leaking fuel.</p> <p>Accelerator pedal is restricted or out of calibration.</p> <p>Crankshaft position sensor (CKP) or Camshaft position sensor (CMP) and/or circuit malfunction.</p> <p>Vehicle Speed sensor (VSS) and/or circuit malfunction.</p> <p>Incorrect Transmission Clutch operation.</p> <p>Check vehicle brakes for dragging, transmission malfunction, cooling fan operation cycle time and engine driven devices.</p> <p>Check for proper turbocharger, turbo charger wheel clearance is out of specifications, waste gate for correct operation.</p> <p>Bus communication problems.</p> <p>Moisture in harness connectors or corroded terminals.</p> <p>Internal engine damage.</p> <p>Fuel control actuator</p> <p>Speed indicator ring</p> <p>Pressure Limiting valve</p> <p>Air inlet restriction</p> <p>External fuel leaks</p> <p>Injector circuit</p> <p>High pressure fuel pump</p> <p>View repair</p> <p>Repair</p> <p>Repair as necessary. Refer to Service Information for the related symptom(s).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All



**Symptom:****\*FUEL HEATER THERMOSTAT TEST****POSSIBLE CAUSES****FUEL HEATER THERMOSTAT TEST**

TEST	ACTION	APPLICABILITY
1	<p>To check the operating resistance levels on the thermostat and fuel heater perform the following:</p> <p>Unplug the wiring harness from the thermostat.</p> <p>Check the resistance across the two pins of the thermostat with an Ohm meter.</p> <p>The ambient temperature must be below the "Circuit close temperature; 1° +/- 3° C" to perform this check.</p> <p>If necessary, induce this ambient temperature by placing ice packs on the thermostat to produce an "effective ambient temperature" below the circuit close temperature.</p> <p>The resistance across the two pins should be within the range of 0.3 Ohms to 0.45 Ohms for a properly operating thermostat and heater.</p> <p>If the resistance from step 2 is out of range, remove the thermostat and check the resistance across the terminal connections of the heater (the heater can be checked at room temperatures).</p> <p>The resistance across the terminal pins of the heater should be within the same range of step 2.</p> <p>Replace the heater if resistance is not within the proper operation range.</p> <p>Replace the heater if resistance is not within the proper operation range. Re-install the thermostat with a new o-ring.</p> <p>If the heater resistance is within the proper operating.</p> <p>Circuit close temperature; 1° +/- 3° C</p> <p>Circuit open temperature; 18° +/- 4° C</p> <p>Fuel Heater Thermostat 0.3 - 0.45 Ohms at less than 1 degree C</p> <p>Fuel Heater 0.3 - 0.45 Ohms at room temperature</p> <p>View Repair</p> <p>Repair</p> <p>Test complete</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### \*FUEL LIFT PUMP FLOW AND INLET RESTRICTION TEST

#### POSSIBLE CAUSES

\*FUEL LIFT PUMP FLOW AND INLET RESTRICTION TEST

TEST	ACTION	APPLICABILITY
1	<p>Disconnect the wiring harness from the fuel lift pump.            Connect a voltmeter between the supply and return circuits of the wiring harness connector            Use the DRBIII® to actuate the fuel lift pump.            If the voltage is greater than 11.5 volts, continue the test. If not, troubleshoot the vehicle for low battery voltage.            Reconnect the lift pump connector.            Inspect the fuel line between the fuel filter housing and the high pressure fuel pump for signs of damage. Replace as necessary.            Disconnect the vehicle fuel supply line from the fuel transfer pump hose at the frame rail connection.            Fuel Pressure Adapter 6631 between the vehicle fuel supply line and the fuel transfer pump hose at the fuel rail connection.            Install the pressure transducer or the pressure/vacuum gauge to the brass T fitting on the Fuel Pressure Adapter 6631.            Install the DRBIII® to the pressure transducer (only if pressure transducer is used in place of the pressure/vacuum gauge)            Remove the fuel pump supply banjo fitting from the fuel injection pump.            Install test fitting 9014 in place of the fuel pump supply banjo fitting in the fuel pump.            Connect one end of a section of fuel hose to the test fitting. Put the other end of the fuel hose into a 1000 ml graduated cylinder.            Use the DRBIII® to actuate the lift pump for 10 seconds.            0 Refer to the Fuel Lift Pump Flow and Inlet Restriction Chart for fuel lift pump flow vs. flow restriction in section 10 charts and graph.  <b>NOTE: It is best to conduct this test several times to ensure the test hose is free of air. This will provide the most accurate fuel flow measurement.</b>            test complete</p> <p>view repair            Test Complete.</p>	All

**Symptom:****\*FUEL PUMP RETURN FLOW TEST****POSSIBLE CAUSES****EXCESSIVE INJECTOR RETURN FLOW**

TEST	ACTION	APPLICABILITY
1	<p>Using the DRBIII®, idle the engine and measure the rail pressure and determine if the rail pressure is excessive (above 185,00 kpa/26,831 psi), if it is, troubleshoot for excessive rail pressure first.</p> <p>Remove the banjo bolt from the pressure-limiting valve on the fuel rail.</p> <p>Install fuel system test fitting #9012 into the pressure-limiting valve.</p> <p>Attach one end of a fuel hose to the fuel fitting and put the other end of the fuel hose into a container</p> <p>Perform the tests listed below to determine if the pressure-limiting valve is leaking.</p> <p>a. Operate the engine at idle and watch for fuel flow into the fuel container.</p> <p>b. Operate the engine at idle and actuate the fuel pressure override test with the DRBIII®. Watch for fuel flow into the fuel container.</p> <p>If fuel flows into the fuel container, replace the pressure-limiting valve. If fuel does not leak from the pressure-limiting valve, the test is complete.</p> <p>NOTE: do not drive the vehicle with any portion of this test kit installed</p> <p>Operate the engine until the engine is at operating temperature.</p> <p>Remove the banjo connector from the fuel drain tube at the rear of the fuel filter housing</p> <p>Install fuel system test fitting #9012 in place of the banjo connector.</p> <p>Install a piece of fuel line onto the test fitting and put the open end into the graduated cylinder .</p> <p>Start the engine and let it idle for one minute.</p> <p>Measure the amount of fuel in the graduated cylinder.</p> <p>If the flow is less than 1000-ml/minute at idle, the test has successfully passed.</p> <p>If the flow is greater than 1000 ml/minute at idle, replace the fuel injection pump.</p> <p>Retest to confirm repair.</p> <p>View Repair</p> <p>Repair</p> <p>Test Complete</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

## Symptom:

### \*HIGH PRESSURE FUEL PUMP PERFORMANCE TEST

#### POSSIBLE CAUSES

\*HIGH PRESSURE FUEL PUMP PERFORMANCE TEST

TEST	ACTION	APPLICABILITY
1	<p>Monitor rail pressure with DRBIII® while cranking the engine  Compare the fuel pressure set point with the actual fuel pressure reading.  If the engine is not generating fuel pressure, use the DRBIII® to check for fuel pressure sensor fault codes.  If no fuel pressure sensor faults are present, verify that the engine has adequate fuel delivery using the fuel lift pump flow test.  Monitor rail pressure with DRBIII® while cranking the engine.  If the engine is not generating fuel pressure, check the torque on the fuel pump drive gear. Torque - 105 Nm.  Retest to confirm fix.  Test complete</p> <p>Repair</p> <p>Test complete.  Perform POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL).</p>	All

**Symptom:****\*INJECTOR RETURN FLOW TEST****POSSIBLE CAUSES**

\*INJECTOR RETURN FLOW TEST

TEST	ACTION	APPLICABILITY
1	<p>Operate the engine until the engine is at operating temperature.</p> <p>Remove the banjo connector from the fuel drain tube at the rear of the fuel filter housing.</p> <p>Install fuel system test fitting (9012) in place of the banjo connector.</p> <p>Remove the vehicle fuel return line from the engine fuel drain tube.</p> <p>Install a piece of fuel line onto the test fitting and into a fuel container or into the fuel tank.</p> <p>Install one end of a test hose onto the fuel drain tube. Place the other end of the test hose into a graduated cylinder.</p> <p>Start the engine and let it idle for one minute.</p> <p>Measure the amount of fuel in the graduated cylinder.</p> <p>If the flow is less than 180-ml/minute, the test has successfully passed.</p> <p>If the flow is greater than 180 ml/minute, shut off the engine and remove all of the fuel injector supply lines. Retorque all of the high-pressure connector nuts. Install all of the fuel injector supply lines.</p> <p>Start the engine and idle for one minute. Measure the amount of fuel in the graduated cylinder.</p> <p>If the flow is less than 180ml/minute, the condition has been fixed.</p> <p>If the flow is greater than 180 ml/minute after step 12, shut off the engine and remove the #1 fuel injector supply line. Retorque the high-pressure connector nut. Cap the #1 fuel port on the fuel rail and the #1 high pressure connector. Start the eng</p> <p>Measure the amount of fuel in the graduated cylinder.</p> <p>If the amount of fuel is less than 180 ml/minute, shut off the engine and remove the #1 high pressure connector and the #1 fuel injector. Inspect for damage, repair/replace as necessary.</p> <p>If the amount of fuel is not less than 180-ml/minute, repeat steps 14-16 for cylinders 2-6.</p> <p>Install all high-pressure connectors, fuel injectors, and fuel injector supply lines.</p> <p>Repeat steps 1-8 to confirm repair.</p> <p>SPECIFICATION: Less than 180 ml/minute total fuel return flow</p> <p>Repair</p> <p>Test Complete.</p>	All

## Symptom:

### \*INTAKE AIR SYSTEM PRESSURE TEST

#### POSSIBLE CAUSES

#### CHARGE AIR COOLER PRESSURE TEST

TEST	ACTION	APPLICABILITY
1	<p>Loosen air inlet tube clamp at the turbocharger.</p> <p>Remove the air filter housing and the inlet tube from the vehicle as an assembly.</p> <p>Install the CAC Pressure Tester into the inner diameter of the turbocharger, securing it in place with the supplied three-fingered band clamp, tighten tool clamp to 8n.m (72 in lbs).</p> <p>NOTE: NEVER ATTEMPT TO START OR RUN THE VEHICLE AT ANY TIME DURING THIS TEST, ENGINE DAMAGE MAY OCCUR.</p> <p>Fasten the safety chain around a solid surface behind the turbocharger. Warning: Never run CAC Pressure test without the safety chain securely fastened.</p> <p>Before attaching shop air to the pressure regulator verify that the regulator is at its lowest pressure setting (0 psi).</p> <p>Attach an air supply to the regulator and slowly increase the pressure until the pressure gauge reads 20 psi.</p> <p><b>WARNING: Never apply more than 20 PSI.</b></p> <p>Using a solution of soap and water spray the Turbocharger, Turbocharger wastegate, Charge Air Cooler Heat Exchange and CAC Hoses while watching for leaks.</p> <p>Before any attempt to repair the CAC system is made, its necessary to completely discharge the system. This can be accomplished by turning the regulator knob counter-clockwise.</p> <p>Allow for adequate time to pass before removing the CAC Pressure tester from the turbo charger inlet.</p> <p>Position the Air Filter Housing over the three mounting studs located on the inside front fender well and press down firmly to lock housing into place.</p> <p>Install Air Inlet Tube over the Turbocharger inlet and torque the band clamp to 35 in.lbs.</p> <p>View Repair</p> <p>Repair</p> <p>Test complete.</p>	All

**Symptom:**  
**INTERMITTENT CONDITION**

**POSSIBLE CAUSES**

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.</b></p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Refer to any Technical Service Bulletins (TSBs) that may apply.</p> <p>Review the DRBIII® Freeze Frame information. If possible, try to duplicate the conditions under which the DTC set.</p> <p>With the engine running at normal operating temperature, monitor the DRBIII® parameters related to the DTC while wiggling the wire harness. Look for parameter values to change and/or a DTC to set.</p> <p>Visually inspect the related wire harness. Look for any chafed, pierced, pinched, partially broken wires and broken, bent, pushed out, or corroded terminals.</p> <p>Inspect and clean all PCM, engine, and chassis grounds that related to the DTC set.</p> <p>If numerous trouble codes were set, use a wire schematic to help you find any common ground or supply circuits</p> <p>For any Relay DTCs, actuate the Relay with the DRBIII® and wiggle the related wire harness to try to interrupt the actuation.</p> <p>For intermittent Evaporative Emission trouble codes perform a visual and physical inspection of the related parts including hoses and the Fuel Filler cap.</p> <p>For intermittent Misfire DTCs check for restrictions in the Intake and Exhaust system, improper installation of Sensors, vacuum leaks, and binding components driven by the accessory drive belt.</p> <p>A co-pilot, data recording, and/or lab scope should be used to help diagnose intermittent conditions.</p> <p>Use the DRBIII® to perform a System Test if one applies to failing component.</p> <p>Were any problems found during the above inspections?</p> <p>Yes → Repair as necessary  Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

### Symptom List:

**P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW**  
**P0032-O2 SENSOR 1/1 HEATER CIRCUIT HIGH**  
**P0037-O2 SENSOR 1/2 HEATER CIRCUIT LOW**  
**P0038-O2 SENSOR 1/2 HEATER CIRCUIT HIGH**  
**P0051-O2 SENSOR 2/1 HEATER CIRCUIT LOW**  
**P0052-O2 SENSOR 2/1 HEATER CIRCUIT HIGH**

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**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW**.

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### When Monitored and Set Condition:

#### **P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is on.

Set Condition: Desired state does not match Actual state.

#### **P0032-O2 SENSOR 1/1 HEATER CIRCUIT HIGH**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is off.

Set Condition: Desired state does not equal Actual state.

#### **P0037-O2 SENSOR 1/2 HEATER CIRCUIT LOW**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is on.

Set Condition: Desired state does not equal Actual state.

#### **P0038-O2 SENSOR 1/2 HEATER CIRCUIT HIGH**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is off.

Set Condition: Desired state does not equal Actual state.

#### **P0051-O2 SENSOR 2/1 HEATER CIRCUIT LOW**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is on.

Set Condition: Desired state does not equal Actual state.

#### **P0052-O2 SENSOR 2/1 HEATER CIRCUIT HIGH**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is off.

Set Condition: Desired state does not equal Actual state.



**P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW — Continued****POSSIBLE CAUSES**

O2 HEATER TEST  
 O2 SENSOR HEATER ELEMENT  
 (A141) FUSED ASD RELAY OUTPUT CIRCUIT  
 HEATER CONTROL CIRCUIT OPEN  
 HEATER CONTROL CIRCUIT SHORTED TO GROUND  
 PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.  <b>NOTE: If P0136 is set with the P0031 or P0051, inspect the related fuse and repair as necessary.</b>            With the DRBIII®, actuate the O2 Heater test.            Monitor the O2 Heater Voltage for 5 minutes.            Did the voltage drop down close to zero during the Heater test?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 2</p> <p><b>NOTE: Stop the actuation before continuing.</b></p>	All
2	<p>Turn the ignition off.            Disconnect the O2 Sensor harness connector.            Measure the resistance of the O2 Heater element at the O2 Sensor connector (component side).  <b>NOTE: O2 Heater Element resistance values should be measured at 70°F (21.1°C). The resistance value will vary with different temperature values.</b>            Is the resistance of the O2 Sensor Heater Element between 2.0 and 30.0 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the O2 Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>Ignition on, engine not running.            With the DRBIII®, actuate the O2 Heater Test.            Using a 12-volt test light connected to ground, probe the (A141) Fused ASD Relay Output circuit at the O2 Sensor harness connector.            Did the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the open or short to ground in the (A141) Fused ASD Relay Output circuit. Inspect the related fuse and repair as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Stop the actuation before continuing.</b></p>	All

## P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn the Ignition off.            Disconnect the PCM harness connectors.            Measure the resistance of the O2 Heater Control circuit (PWM) from the O2 Sensor to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the O2 Heater Control (PWM) circuit or the O2 Heater Relay Control circuit depending on the O2 Sensor being tested.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the O2 Heater Control (PWM) circuit.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the Heater Control (PWM) circuit or the Heater Relay Control circuit depending on the O2 Sensor being tested.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0071-AMBIENT/BATTERY TEMP SENSOR PERFORMANCE****When Monitored and Set Condition:****P0071-AMBIENT/BATTERY TEMP SENSOR PERFORMANCE**

**When Monitored:** With the ignition on and no Battery Temperature Sensor Open or Short Faults present.

**Set Condition:** After 5 warm cycles have occurred (coolant increases at least 22°C (40°F) to a minimum of 71°C (160°F) and the odometer mileage has increased 196.6 miles and the Battery Temperature has changed less than 4°C (7.2°F) change in temperature. One trip fault.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(K118) BATTERY TEMP SIGNAL CIRCUIT SHORTED TO VOLTAGE

BATTERY TEMPERATURE SENSOR

RESISTANCE IN THE (K118) BATTERY TEMP SENSOR SIGNAL CIRCUIT

RESISTANCE IN THE (K4) SENSOR GROUND CIRCUIT

(K118) BATTERY TEMP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the Battery Temp Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (K118) Battery Temp Signal circuit at the Sensor connector. Is the voltage above 5.2 volts?  Yes → Repair the short to voltage on the (K118) Batt Temp Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All

**P0071-AMBIENT/BATTERY TEMP SENSOR PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII®, read the Battery Temp Sensor voltage with the Batt Temp Sensor still disconnected. Is the voltage above 4.6 volts?</p> <p>Yes → Go To 4</p> <p>No → Go To 7</p>	All
4	<p>Connect a jumper wire between the (K118) Battery Temp Signal circuit and the (K4) Sensor ground circuit at the Sensor harness connector. With the DRBIII®, read the Battery Temp Sensor voltage. Is the voltage below 1.0 volt?</p> <p>Yes → Replace the Battery Temperature Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
5	<p>Turn the ignition off. Connect the Battery Temp Sensor harness connector. <b>NOTE: Ensure the voltmeter leads meet the terminals in the connector and that there is good terminal to wire connection.</b> <b>NOTE: Ensure the voltmeter leads are connected for positive polarity</b> Backprobe the (K118) Battery Temp Sensor Signal circuit at the Sensor harness connector and the PCM harness connector with both voltmeter leads. Start the engine. Allow the engine to idle. Is the voltage below 0.10 of a volt?</p> <p>Yes → Go To 6</p> <p>No → Repair the excessive resistance in the (K118) Battery Temp Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Turn the ignition off. <b>NOTE: Ensure the voltmeter leads meet the terminals in the connector and that there is good terminal to wire connection.</b> <b>NOTE: Ensure the voltmeter leads are connected for positive polarity</b> Backprobe the (K4) Sensor ground circuit at the Battery Temperature Sensor harness connector and the PCM harness connector using both volt meter leads. Start the engine. Allow the engine to idle. Is the voltage below 0.10 of a volt?</p> <p>Yes → Go To 8</p> <p>No → Repair the excessive resistance in the (K4) Sensor ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0071-AMBIENT/BATTERY TEMP SENSOR PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off.            Disconnect the Battery Temp Sensor harness connector.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (K118) Battery Temp Signal circuit.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K118) Battery Temp Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P0107-MAP SENSOR VOLTAGE TOO LOW**

## When Monitored and Set Condition:

### **P0107-MAP SENSOR VOLTAGE TOO LOW**

**When Monitored:** With the engine RPM above 416 but less than 1500, the TPS voltage less than 1.13 volts, and battery voltage greater than 10.4 volts.

**Set Condition:** The MAP Sensor signal voltage is below 0.1 of a volt for 2.0 seconds with the engine running.

### **POSSIBLE CAUSES**

MAP SENSOR VOLTAGE BELOW 0.1 OF A VOLT

(K7) 5-VOLT SUPPLY CIRCUIT OPEN

(K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

MAP SENSOR

(K1) MAP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

(K1) MAP SENSOR SIGNAL CIRCUIT SHORTED TO (K4) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Start the engine.            With the DRBIII®, read the MAP Sensor voltage.            Is the voltage below 0.1 of a volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the MAP Sensor harness connector.            Ignition on, engine not running.            Measure the voltage on the (K7) 5-volt Supply circuit at the MAP Sensor harness connector.            Is the voltage between 4.5 to 5.2 volts?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All

**P0107-MAP SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII®, monitor the MAP Sensor voltage with the Sensor still disconnected. Is the voltage above 1.2 volts?</p> <p>Yes → Replace the MAP Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K1) MAP Sensor Signal circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K1) MAP Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (K1) MAP Sensor Signal circuit and the (K4) Sensor ground circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K4) Sensor ground circuit and the (K1) MAP Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
6	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance in the (K7) 5-volt Supply circuit from the MAP Sensor harness connector to the PCM harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Measure the resistance between ground and the (K7) 5-volt Supply circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P0108-MAP SENSOR VOLTAGE TOO HIGH

#### When Monitored and Set Condition:

#### P0108-MAP SENSOR VOLTAGE TOO HIGH

**When Monitored:** With the engine RPM above 400, the TPS voltage less than 1.13 volts, and battery voltage greater than 10.4 volts

**Set Condition:** The MAP Sensor signal voltage is greater than 4.88 volts at start or with the engine running for 2.2 seconds.

#### POSSIBLE CAUSES

MAP SENSOR VOLTAGE ABOVE 4.8 VOLTS

MAP SENSOR

(K1) MAP SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K1) MAP SENSOR SIGNAL CIRCUIT OPEN

(K1) MAP SENSOR SIGNAL CIRCUIT SHORTED TO (K7) 5-VOLT SUPPLY CIRCUIT

(K4) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Start the engine.            With the DRBIII®, read the MAP Sensor voltage.            Is the voltage above 4.8 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the MAP Sensor harness connector.            Connect a jumper wire between the (K1) MAP Sensor Signal circuit and the (K4) Sensor ground circuit.            Ignition on, engine not running.            With the DRBIII®, monitor the MAP Sensor voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the MAP Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All



**P0108-MAP SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the (K1) MAP Sensor Signal circuit at the MAP Sensor harness connector.            Is the voltage above 5.3 volts?</p> <p>Yes → Repair the short to voltage in the (K1) MAP Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.            Measure the resistance of the (K1) MAP Sensor Signal circuit from the MAP Sensor harness connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K1) MAP Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between the (K1) MAP Sensor Signal circuit and the (K7) 5-volt Supply circuit at the MAP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K7) 5-volt Supply circuit and the (K1) MAP Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance of the (K4) Sensor ground circuit from the PCM harness connector to the MAP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K4) Sensor ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P0111-INTAKE AIR TEMP PERFORMANCE

#### When Monitored and Set Condition:

#### P0111-INTAKE AIR TEMP PERFORMANCE

**When Monitored:** With the ignition on and no Intake Air Temperature Sensor open/shorted faults present.

**Set Condition:** After 5 warm cycles have occurred (coolant increases at least 22°C (40°F) to a minimum of 71°C (160°F) and the odometer mileage has increased 196.6 miles and the Intake Air Temperature has had less than 5°C (9°F) change in temperature.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

IAT SENSOR

RESISTANCE IN THE (K21) IAT SENSOR SIGNAL CIRCUIT

RESISTANCE IN THE (K4) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the Intake Air Temperature Sensor harness connector. Ignition on, engine not running. With the DRBIII®, read the IAT Sensor voltage. Is the voltage above 4.6 volts?  Yes → Go To 3  No → Go To 5	All

**P0111-INTAKE AIR TEMP PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Connect a jumper wire across the IAT Sensor harness connector.            Ignition on, engine not running.            With the DRBIII®, read the IAT Sensor voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the Intake Air Temperature Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p> <p><b>NOTE: Remove the jumper wire and connect the Sensor harness connector before continuing.</b></p>	All
4	<p>Turn the ignition off.  <b>NOTE: Ensure the voltmeter leads meet the terminals in the connector and that there is good terminal to wire connection.</b>  <b>NOTE: Ensure the voltmeter leads are connected for positive polarity.</b>            Backprobe the (K21) IAT Sensor Signal circuit at the IAT Sensor harness connector and PCM harness connector with the voltmeter leads.            Start the engine.            Allow the engine to idle.            Is the voltage below 0.10 of a volt?</p> <p>Yes → Go To 6</p> <p>No → Repair the excessive resistance in the (K21) IAT Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Turn the ignition off.  <b>NOTE: Ensure the voltmeter leads meet the terminals in the connector and that there is good terminal to wire connection.</b>  <b>NOTE: Ensure the voltmeter leads are connected for positive polarity.</b>            Backprobe the (K4) Sensor ground circuit at the IAT Sensor harness connector and PCM harness connector with both leads of a voltmeter.            Start the engine.            Allow the engine to idle.            Is the voltage below 0.10 of a volt?</p> <p>Yes → Go To 6</p> <p>No → Repair the excessive resistance in the (K4) Sensor ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Turn the ignition off before continuing.</b></p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P0112-INTAKE AIR TEMP SENSOR VOLTAGE TOO LOW**

## When Monitored and Set Condition:

### **P0112-INTAKE AIR TEMP SENSOR VOLTAGE TOO LOW**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The Intake Air Temperature (IAT) Sensor circuit voltage at the PCM goes below 0.8 of a volt.

### **POSSIBLE CAUSES**

IAT SENSOR VOLTAGE BELOW 1.0 VOLT

IAT SENSOR

(K21) IAT SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

(K21) IAT SENSOR SIGNAL SHORTED TO (K4) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII®, read the IAT Sensor voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the Intake Air Temp Sensor harness connector.            Ignition on, engine not running.            With the DRBIII®, read IAT Sensor voltage.            Is the voltage above 1.0 volt?</p> <p>Yes → Replace the IAT Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (K21) IAT Sensor Signal circuit at the IAT Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K21) IAT Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All

**P0112-INTAKE AIR TEMP SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the (K21) IAT Sensor Signal circuit and the (K4) Sensor ground circuit at the IAT Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K4) Sensor ground circuit and the (K21) IAT Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P0113-INTAKE AIR TEMP SENSOR VOLTAGE TOO HIGH**

## When Monitored and Set Condition:

### **P0113-INTAKE AIR TEMP SENSOR VOLTAGE TOO HIGH**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The Intake Air Temperature (IAT) Sensor circuit voltage at the PCM goes above 4.9 volts.

## POSSIBLE CAUSES

IAT SENSOR VOLTAGE ABOVE 4.8 VOLTS

IAT SENSOR

(K21) IAT SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K21) IAT SENSOR SIGNAL CIRCUIT OPEN

(K4) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII®, read the IAT Sensor voltage.            Is the voltage above 4.8 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the Intake Air Temp Sensor harness connector.            Connect a jumper wire between the (K21) IAT Sensor Signal circuit and the (K4) Sensor ground circuit at the Sensor harness connector.            Ignition on, engine not running.            With the DRBIII®, read the IAT Sensor voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the IAT Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

**P0113-INTAKE AIR TEMP SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage on the (K21) IAT Sensor Signal circuit. Is the voltage above 5.3 volts?  Yes → Repair the short to voltage in the (K21) IAT Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All
4	Turn the ignition off. Measure the resistance of the (K21) IAT Sensor Signal circuit from the IAT Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 5  No → Repair the open in the (K21) IAT Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
5	Measure the resistance of the (K4) Sensor ground circuit from the IAT Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 6  No → Repair the open in the (K4) Sensor ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
6	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

## Symptom:

### **P0117-ENGINE COOLANT TEMP SENSOR VOLTAGE TOO LOW**

## When Monitored and Set Condition:

### **P0117-ENGINE COOLANT TEMP SENSOR VOLTAGE TOO LOW**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The Engine Coolant Temperature (ECT) Signal circuit voltage at the PCM goes below 0.8 of a volt for more than 3 seconds.

### POSSIBLE CAUSES

ECT VOLTAGE BELOW 1.0 VOLT

ECT SENSOR

(K2) ECT SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

(K2) ECT SENSOR SIGNAL CIRCUIT SHORTED TO (K4) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII®, read the ECT Sensor voltage.            Is the ECT Sensor voltage below 1.0 volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the Engine Coolant Temp Sensor harness connector.            Ignition on, engine not running.            With the DRBIII®, read ECT voltage.            Is the voltage above 1.0 volt?</p> <p>Yes → Replace the ECT Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (K2) ECT Sensor Signal circuit at the ECT Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K2) ECT Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All



# **P0117-ENGINE COOLANT TEMP SENSOR VOLTAGE TOO LOW —** **Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the (K2) ECT Sensor Signal circuit and the (K4) Sensor ground circuit at the ECT Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to the (K4) Sensor ground circuit in the (K2) ECT Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P0118-ENGINE COOLANT TEMP SENSOR VOLTAGE TOO HIGH**

## When Monitored and Set Condition:

### **P0118-ENGINE COOLANT TEMP SENSOR VOLTAGE TOO HIGH**

When Monitored: With the ignition on and battery voltage greater than 10.4 volts.

Set Condition: The Engine Coolant Temperature (ECT) Sensor circuit voltage at the PCM goes above 4.94 volts for more than 3 seconds.

## POSSIBLE CAUSES

ECT VOLTAGE ABOVE 4.9 VOLTS

ECT SENSOR

(K2) ECT SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K2) ECT SENSOR SIGNAL CIRCUIT OPEN

(K4) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII®, read the ECT Sensor voltage.            Is the voltage above 4.9 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the Engine Coolant Temp Sensor harness connector.            Ignition on, engine not running.            Connect a jumper wire between the (K2) ECT Sensor Signal circuit and the (K4) Sensor ground circuit in the ECT harness connector.            With the DRBIII®, read the ECT Sensor voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the ECT Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

# **P0118-ENGINE COOLANT TEMP SENSOR VOLTAGE TOO HIGH —** **Continued**

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage on the (K2) ECT Sensor Signal circuit at the ECT Sensor harness connector. Is the voltage above 5.3 volts?  Yes → Repair the short to voltage in the (K2) ECT Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All
4	Turn the ignition off. Measure the resistance of the (K2) ECT Sensor Signal circuit from the ECT Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 5  No → Repair the open in the (K2) ECT Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
5	Measure the resistance of the (K4) Sensor ground circuit from the ECT Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 6  No → Repair the open in the (K4) Sensor ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
6	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

### Symptom:

#### **P0121-TP SENSOR VOLTAGE DOES NOT AGREE WITH MAP**

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### When Monitored and Set Condition:

#### **P0121-TP SENSOR VOLTAGE DOES NOT AGREE WITH MAP**

**When Monitored:** With the engine running and no MAP Sensor or TP Sensor DTC's set. Engine speed must be greater than 1600 RPM.

**Set Condition:** The PCM performs two separate tests. When the manifold vacuum is high, the TP Sensor should be low. When the manifold vacuum is low, the TP Sensor signal should be high. If the proper TP Sensor voltage is not detected when the two conditions are met, a DTC will be set after 4 seconds.

#### **POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

RESISTANCE IN THE (K7) 5-VOLT SUPPLY CIRCUIT

(K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

MAP SENSOR

RESISTANCE IN THE (K1) MAP SENSOR SIGNAL CIRCUIT

RESISTANCE BETWEEN GROUND AND THE (K1) MAP SENSOR SIGNAL CIRCUIT

RESISTANCE IN THE (K4) SENSOR GROUND CIRCUIT

TP SENSOR OPERATION

RESISTANCE IN THE TP SENSOR (K7) 5-VOLT SUPPLY

TP SENSOR (K7) 5-VOLT SUPPLY SHORTED TO GROUND

THROTTLE POSITION SENSOR

RESISTANCE IN THE (K22) TP SENSOR NO.1 SIGNAL CIRCUIT

RESISTANCE BETWEEN GROUND AND THE (K22) TP SENSOR NO.1 SIGNAL CIRCUIT

RESISTANCE IN (K4) SENSOR GROUND CIRCUIT

PCM

**P0121-TP SENSOR VOLTAGE DOES NOT AGREE WITH MAP — Continued**

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.</p> <p><b>NOTE: Diagnose any TP Sensor or MAP component DTCs before continuing.</b></p> <p><b>NOTE: If the P0500 - No Vehicle Speed Signal is set along with this DTC, refer to the P0500 diagnostics before continuing.</b></p> <p><b>NOTE: The throttle plate and linkage should be free of binding and carbon build up.</b></p> <p><b>NOTE: Ensure the throttle plate is at the idle position.</b></p> <p>Ignition on, engine not running.</p> <p><b>NOTE: Repair any vacuum leaks that are present before continuing.</b></p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Inspect the throttle body for carbon build up, other restrictions, and a bent throttle plate using a straight edge.</p> <p>If the throttle plate does not close entirely it may be bent and needs to be replaced.</p> <p>Start the engine.</p> <p>With the DRBIII®, monitor the MAP Sensor voltage.</p> <p>Snap the throttle.</p> <p>Does the DRBIII® display MAP voltage from below 2.0 volts at idle to above 3.5 volts at WOT?</p> <p>Yes → Go To 3</p> <p>No → Go To 10</p>	All
3	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, monitor the TP Sensor voltage while slowly pressing the accelerator pedal from the idle position to the wide open throttle position.</p> <p>Does voltage start at approximately 0.8 of a volt and go above 3.5 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the TP Sensor harness connector.</p> <p>Disconnect the PCM harness connectors.</p> <p>Measure the resistance of the (K7) 5-volt Supply circuit from the TP Sensor harness connector to the PCM harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the excessive resistance in the (K7) 5-volt Supply circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0121-TP SENSOR VOLTAGE DOES NOT AGREE WITH MAP — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Measure the resistance between ground and the (K7) 5-volt Supply circuit at the TP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Connect the PCM harness connectors. With the DRBIII®, monitor the TP Sensor voltage. Ignition on, engine not running. Connect a jumper wire between the (K22) TP Sensor No.1 Signal circuit and the (K4) Sensor ground circuit. Does the DRBIII® display TP Sensor voltage from approximately 4.9 volts to below 0.5 of a volt?</p> <p>Yes → Replace the Throttle Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
7	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance of the (K22) TP Sensor No.1 Signal circuit from the TP Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the excessive resistance in the (K22) TP Sensor No.1 Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p>Measure the resistance between ground and the (K22) TP Sensor No.1 Signal circuit at the TP Sensor harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the short to ground in the (K22) TP Sensor No.1 Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
9	<p>Measure the resistance of the (K4) Sensor ground circuit from the TP Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 16</p> <p>No → Repair the excessive resistance in the (K4) Sensor ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0121-TP SENSOR VOLTAGE DOES NOT AGREE WITH MAP — Continued**

TEST	ACTION	APPLICABILITY
10	Turn the ignition off. Disconnect the MAP Sensor harness connector. Disconnect the PCM harness connectors. Measure the resistance of the (K7) 5-volt Supply circuit from the MAP Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 11  No → Repair the excessive resistance in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
11	Measure the resistance between ground and the (K7) 5-volt Supply circuit at the MAP Sensor harness connector. Is the resistance above 100k ohms?  Yes → Go To 12  No → Repair the short to ground in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
12	Connect the PCM harness connectors. Ignition on, engine not running. With the DRBIII®, monitor the MAP Sensor voltage. Connect a jumper wire between the (K1) MAP Sensor Signal circuit and the (K4) Sensor ground circuit . Cycle the ignition switch from off to on. Does the DRBIII® display MAP voltage from approximately 4.9 volts to below 0.5 of a volt?  Yes → Replace the MAP Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 13  <b>NOTE: Remove the jumper wire before continuing.</b>	All
13	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance of the (K1) MAP Sensor Signal circuit from the MAP Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 14  No → Repair the excessive resistance in the (K1) MAP Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
14	Measure the resistance between ground and the (K1) MAP Sensor Signal circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Go To 15  No → Repair the short to ground in the (K1) MAP Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

## P0121-TP SENSOR VOLTAGE DOES NOT AGREE WITH MAP — Continued

TEST	ACTION	APPLICABILITY
15	<p>Measure the resistance of the (K4) Sensor ground circuit from the MAP Sensor harness connector to the PCM harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 16</p> <p>No → Repair the excessive resistance in the (K4) Sensor ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
16	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P0122-THROTTLE POSITION SENSOR #1 VOLTAGE TOO LOW****When Monitored and Set Condition:****P0122-THROTTLE POSITION SENSOR #1 VOLTAGE TOO LOW**

When Monitored: With the ignition on and battery voltage above 10.4 volts.

Set Condition: Throttle Position Sensor voltage at the PCM is lower than 0.1 of a volt for 1.3 seconds.

**POSSIBLE CAUSES**

TP SENSOR SWEEP

INTERMITTENT CONDITION

(K7) 5-VOLT SUPPLY CIRCUIT OPEN

(K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

TP SENSOR

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO (K4) SENSOR GROUND CIRCUIT

TCM INTERNALLY SHORTED TP SENSOR SIGNAL CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Check for any related TSBs. With the DRBIII®, read the Throttle Position Sensor voltage. Is the voltage below 0.2 of a volt?  Yes → Go To 2 No → Go To 10	All
2	Turn the ignition off. Disconnect the TP Sensor harness connector. Ignition on, engine not running. Measure the voltage of the (K7) 5-volt Supply circuit at the TP Sensor harness connector. Is the voltage between 4.5 to 5.2 volts?  Yes → Go To 3 No → Go To 7	All

**P0122-THROTTLE POSITION SENSOR #1 VOLTAGE TOO LOW —**  
**Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running.                      With the DRBIII®, monitor the TP Sensor voltage.                      Is the voltage above 4.5 volts?</p> <p>Yes → Replace the Throttle Position Sensor.                      Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.                      Disconnect the PCM harness connectors.                      Measure the resistance between ground and the (K22) TP Sensor No.1 Signal circuit at the TP Sensor harness connector.                      Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K22) TP Sensor No.1 Signal circuit.                      Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (K22) TP Sensor No.1 Signal circuit and the (K4) Sensor ground circuit at the TP Sensor harness connector.                      Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K4) Sensor ground and the (K22) TP Sensor No.1 Signal circuit.                      Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: If the vehicle is not equipped with a TCM, answer No to this test and continue.</b>                      Connect the PCM harness connectors.                      Disconnect the TCM harness connector.                      Ignition on, engine not running.                      With the DRBIII®, monitor the TP Sensor voltage.                      Is the voltage above 4.5 volts?</p> <p>Yes → Replace and program the Transmission Control Module per Service Information.                      Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
7	<p>Turn the ignition off.                      Disconnect the PCM harness connectors.                      Measure the resistance of the (K7) 5-volt Supply circuit from the TP Sensor harness connector to the PCM harness connector.                      Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (K7) 5-volt Supply circuit.                      Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

# **P0122-THROTTLE POSITION SENSOR #1 VOLTAGE TOO LOW —** **Continued**

TEST	ACTION	APPLICABILITY
8	<p>Measure the resistance between ground and the (K7) 5-volt Supply circuit at the TP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
10	<p>Ignition on, engine not running. With the DRBIII®, monitor the Throttle Position Sensor voltage. Slowly open the throttle from the idle position to the wide open throttle position. Does voltage start at approximately 0.8 of a volt and go above 3.5 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the Throttle Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P0123-THROTTLE POSITON SENSOR #1 VOLTAGE TOO HIGH

## When Monitored and Set Condition:

### P0123-THROTTLE POSITON SENSOR #1 VOLTAGE TOO HIGH

When Monitored: With the ignition on and battery voltage above 10.4 volts.

Set Condition: Throttle Position Sensor signal voltage at the PCM goes above 4.5 volts for 3.2 seconds.

## POSSIBLE CAUSES

TP SENSOR SWEEP

INTERMITTENT CONDITION

TP SENSOR

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT OPEN

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO (K7) 5-VOLT SUPPLY CIRCUIT

(K4) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Check for any related TSBs.  <b>NOTE: Ensure the throttle is fully closed and free from binding or carbon build up.</b>            Start the engine.            With the DRBIII®, read the Throttle Position Sensor voltage.            Is the voltage above 4.5 volts?</p> <p>Yes → Go To 2            No → Go To 8</p>	All
2	<p>Turn the ignition off.            Disconnect the Throttle Position Sensor harness connector.            Connect a jumper wire between the (K22) TP Sensor No.1 Signal circuit and the (K4) Sensor ground circuit.            Ignition on, engine not running.            With the DRBIII®, monitor the TP Sensor voltage.            Is the voltage below 0.5 of a volt?</p> <p>Yes → Replace the Throttle Position Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.            No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

# **P0123-THROTTLE POSITON SENSOR #1 VOLTAGE TOO HIGH —** **Continued**

TEST	ACTION	APPLICABILITY
3	<p>Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the (K22) TP Sensor No.1 Signal circuit at the TP Sensor harness connector.  <b>NOTE: If the voltage reading is below 5.3 volts answer NO to this test and continue.</b>            If the voltage is above 5.3 volts, disconnect the Clockspring harness connectors per Service Information.            If the TP Sensor voltage drops to 5.0 volts with the Clockspring harness disconnected, replace the Clockspring.            Is the voltage still above 5.3 volts with the Clock Spring harness disconnected?</p> <p>Yes → Repair the short to voltage in the (K22) TP Sensor No.1 Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p> <p><b>NOTE: Turn the ignition off and connect the Clockspring harness connectors per Service Information before continuing.</b></p>	All
4	<p>Measure the resistance of the (K22) TP Sensor No.1 Signal circuit from the TP Sensor harness connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K22) TP Sensor No.1 Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between the (K22) TP Sensor No.1 Signal circuit and the (K7) 5-volt Supply circuit at the TP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K7) 5-volt Supply circuit and the (K22) TP Sensor No.1 Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance of the (K4) Sensor ground circuit from the TP Sensor harness connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K4) Sensor ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## **P0123-THROTTLE POSITON SENSOR #1 VOLTAGE TOO HIGH —** Continued

TEST	ACTION	APPLICABILITY
8	<p>Ignition on, engine not running.            With the DRBIII®, monitor the Throttle Position Sensor voltage.            Slowly open the throttle from the idle position to the wide open throttle position.            Does voltage start at approximately 0.8 of a volt and go above 3.5 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the Throttle Position Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0125-CLOSED LOOP TEMP NOT REACHED****When Monitored and Set Condition:****P0125-CLOSED LOOP TEMP NOT REACHED**

**When Monitored:** With battery voltage greater than 10.4 volts, after engine is started, for ten minutes.

**Set Condition:** The engine temperature does not go above 18 deg. F after the engine has been running for 10 minutes. Two trips are required to set this DTC.

**POSSIBLE CAUSES**

ECT SENSOR

GOOD TRIP EQUAL TO ZERO

LOW COOLANT LEVEL

THERMOSTAT OPERATION

TEST	ACTION	APPLICABILITY
1	Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
2	<b>NOTE: If a ECT Sensor DTC set along with this code, diagnose the ECT Sensor DTC first.</b> <b>NOTE: Inspect the ECT terminals and related PCM terminals. Ensure the terminals are free from corrosion and damage.</b> <b>NOTE: The best way to diagnose this DTC is to allow the vehicle to sit overnight outside in order to have a totally cold soaked engine.</b> <b>Note: Extremely cold outside ambient temperatures may have caused this DTC to set.</b> <b>WARNING: Never open the cooling system when the engine is hot. The system is under pressure. Extreme burns or scalding may result. Allow the engine to cool before opening the cooling system.</b> Check the coolant system to make sure that the coolant is in good condition and at the proper level. Is the coolant level and condition OK?  Yes → Go To 3  No → Inspect the vehicle for a coolant leak and add the necessary amount of coolant. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0125-CLOSED LOOP TEMP NOT REACHED — Continued**

TEST	ACTION	APPLICABILITY
3	<p><b>Note: This test works best if performed on a cold engine (cold soak)</b>            Ignition on, engine not running.            With the DRBIII®, read the Eng Coolant Tmp Deg value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.  <b>Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b>            Start the Engine.            During engine warm-up monitor the Eng Coolant Tmp Deg value. The temp deg value change should be a smooth transition from start up to normal operating temp 82°C (180°F) . Also monitor the actual coolant temperature with a thermometer.  <b>NOTE: As the engine warms up to operating temperature, the actual coolant temperature (thermometer reading) and the Eng Coolant Tmp Deg in the DRBIII® values should stay relatively close to each other.</b>            Using the appropriate service information, determine the proper opening temperature of the thermostat.            Did the thermostat open at the proper temperature?</p> <p>Yes → Go To 4</p> <p>No → Replace the thermostat.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p><b>Note: For this test to be valid, the thermostat must be operating correctly.</b>  <b>Note: This test works best if performed on a cold engine (cold soak)</b>            Ignition on, engine not running.            With the DRBIII® in sensors, read the Eng Coolant Tmp Deg value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the surrounding temperature (ambient temperature).  <b>Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b>            Start the engine.            During engine warm-up, monitor the Eng Coolant Tmp Deg value. The temp deg value change should be a smooth transition from start up to normal operating temp 82°C (180°F). The value should reach at least 82°C (180°F).            Was the Eng Coolant Tmp Deg value increase a smooth transition and did it reach at least 180°F?</p> <p>Yes → Test Complete.</p> <p>No → Replace the Engine Coolant Temperature Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom List:****P0131-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO LOW****P0137-O2 SENSOR 1/2 CIRCUIT VOLTAGE TOO LOW****P0151-O2 SENSOR 2/1 CIRCUIT VOLTAGE TOO LOW****P0157-O2 SENSOR 2/2 CIRCUIT VOLTAGE TOO LOW**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
 The title for the tests will be **P0131-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO LOW**.

**When Monitored and Set Condition:****P0131-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO LOW**

When Monitored: At a cold start, engine coolant below 98°F, Ambient/Battery Sensor reading within 27°F, and Engine Coolant Temperature above 170°F on the previous key off.

Set Condition: The Oxygen Sensor signal voltage is below 0.156 of a volt for 28 seconds after starting engine.

**P0137-O2 SENSOR 1/2 CIRCUIT VOLTAGE TOO LOW**

When Monitored: At a cold start, engine coolant below 98°F, Ambient/Battery Sensor reading within 27°F, and Engine Coolant Temperature above 170°F on the previous key off.

Set Condition: The Oxygen Sensor signal voltage is below 0.156 of a volt for 28 seconds after starting engine.

**P0151-O2 SENSOR 2/1 CIRCUIT VOLTAGE TOO LOW**

When Monitored: At a cold start, engine coolant below 98°F, Ambient/Battery Sensor reading within 27°F, and Engine Coolant Temperature above 170°F on the previous key off.

Set Condition: The Oxygen Sensor signal voltage is below 0.156 of a volt for 28 seconds after starting engine.

**P0157-O2 SENSOR 2/2 CIRCUIT VOLTAGE TOO LOW**

When Monitored: At a cold start, engine coolant below 98°F, Ambient/Battery Sensor reading within 27°F, and Engine Coolant Temperature above 170°F on the previous key off.

Set Condition: The Oxygen Sensor signal voltage is below 0.156 of a volt for 28 seconds after starting engine.

**POSSIBLE CAUSES**

O2 SENSOR BELOW 0.16 OF A VOLT

O2 SENSOR OPERATION

O2 SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

O2 SENSOR SIGNAL CIRCUIT SHORTED TO (K4) SENSOR GROUND CIRCUIT

## P0131-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO LOW — Continued

POSSIBLE CAUSES	
O2 SENSOR SIGNAL SHORTED TO THE HEATER GROUND CIRCUIT	
PCM	

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Check for any related TSBs.            Start the engine.            Allow the engine to idle for 4 to 5 minutes.            With the DRBIII®, read the O2 Sensor voltage.            Is the voltage below 0.16 of a volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            Disconnect the O2 Sensor harness connector.            Start the engine.            With the DRBIII®, monitor the O2 Sensor voltage.            Is the O2 Sensor voltage above 0.16 of a volt?</p> <p>Yes → Replace the O2 Sensor            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the O2 Sensor Signal circuit at the O2 Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the O2 Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Measure the resistance between the O2 Sensor Signal circuit and the (K4) Sensor ground circuit at the O2 Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K4) Sensor ground circuit and the O2 Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All

**P0131-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: Two types of O2 Sensor Heater Ground circuits may be used on this vehicle. One type uses an engine ground and the other type uses the PCM as a ground through the Pulse Width Modulated circuit.</b></p> <p>* Measure the resistance between the PWM O2 Sensor Heater Control circuit and the O2 Sensor Signal circuit if it applies to the O2 Sensor being tested.</p> <p>OR</p> <p>* Measure the resistance between the O2 Sensor Signal circuit and the O2 Heater ground circuit if it applies to the O2 Sensor being tested.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the O2 Sensor Signal circuit and the Heater ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

### Symptom List:

**P0132-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO HIGH**

**P0138-O2 SENSOR 1/2 CIRCUIT VOLTAGE TOO HIGH**

**P0152-O2 SENSOR 2/1 CIRCUIT VOLTAGE TOO HIGH**

**P0158-O2 SENSOR 2/2 CIRCUIT VOLTAGE TOO HIGH**

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**Test Note: All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P0132-O2 SENSOR 1/1 CIRCUIT  
VOLTAGE TOO HIGH.**

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### When Monitored and Set Condition:

**P0132-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO HIGH**

When Monitored: With battery voltage greater than 10.4 volts, engine running for more than 4 minutes and coolant temperature above 180°F.

Set Condition: The oxygen sensor voltage is above 1.5 volts.

**P0138-O2 SENSOR 1/2 CIRCUIT VOLTAGE TOO HIGH**

When Monitored: With battery voltage greater than 10.4 volts, engine running for more than 4 minutes and coolant temperature above 180°F.

Set Condition: The oxygen sensor voltage is above 1.5 volts.

**P0152-O2 SENSOR 2/1 CIRCUIT VOLTAGE TOO HIGH**

When Monitored: With battery voltage greater than 10.4 volts, engine running for more than 4 minutes and coolant temperature above 180°F.

Set Condition: The oxygen sensor voltage is above 1.5 volts.

**P0158-O2 SENSOR 2/2 CIRCUIT VOLTAGE TOO HIGH**

When Monitored: With battery voltage greater than 10.4 volts, engine running for more than 4 minutes and coolant temperature above 180°F.

Set Condition: The oxygen sensor voltage is above 1.5 volts.

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### POSSIBLE CAUSES

O2 SENSOR ABOVE 1.5 VOLTS

O2 SENSOR OPERATION

O2 SENSOR SIGNAL SHORTED TO VOLTAGE

O2 SENSOR SIGNAL CIRCUIT OPEN

O2 SENSOR SIGNAL CIRCUIT SHORTED TO O2 HEATER SUPPLY CIRCUIT

(K4) SENSOR GROUND CIRCUIT OPEN

O2 SENSOR HEATER CONTROL CIRCUIT OPEN

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**P0132-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO HIGH — Continued****POSSIBLE CAUSES**

O2 SENSOR HEATER GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Start the engine. Allow the engine to idle for 4 to 5 minutes. With the DRBIII®, read the O2 Sensor voltage. Is the voltage above 1.5 volts?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
2	<b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b> Turn the ignition off. Disconnect the O2 Sensor harness connector. Start the engine. With the DRBIII®, monitor the O2 Sensor voltage. Is the O2 Sensor voltage below 1.5 volts?  Yes → Replace the O2 Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the O2 Sensor Signal circuit at the O2 Sensor harness connector. Does the test light illuminate brightly?  Yes → Repair the short to voltage in the O2 Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All
4	Turn the ignition off. Measure the resistance of the O2 Sensor Signal circuit from the O2 Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 5  No → Repair the open in the O2 Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0132-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: Two relays may be used on this vehicle for the different types of Heated O2 Sensors. One uses the ASD Relay which is only used with PWM O2 Sensor Heaters and the other uses the O2 Heater Relay.</b></p> <p>Verify which relay is used to supply power for the O2 Sensor Heater being tested. Measure the resistance between the O2 Sensor Signal circuit and the O2 Heater Supply circuit at the O2 Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the O2 Sensor Signal circuit and the (A141) ASD Relay Output or (A42) O2 Heater Relay Output circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance of the (K4) Sensor ground circuit from the O2 Sensor harness connector to the PCM harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K4) Sensor ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Connect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII® actuate the O2 Heater Test.</p> <p>Measure the voltage on the O2 Heater Supply circuit.</p> <p>Is the voltage above 11.0 volts?</p> <p>No → Repair the open in the Heater Supply circuit. The Heater Supply circuit can be and output from the ASD Relay or an O2 Heater Relay. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>Yes → Go To 8</p>	All
8	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>NOTE: The O2 Sensor Heater ground may be a Pulse Width Modulated circuit or a chassis ground depending on the type of O2 Sensor being tested.</b></p> <p>* Measure the resistance of the PWM O2 Sensor Heater Control circuit from the O2 Sensor harness connector to the PCM harness connector if it applies to the O2 Sensor being tested</p> <p>OR</p> <p>* Measure the resistance of the O2 Sensor Heater ground circuit from the O2 Sensor harness connector to the PCM harness connector if it applies to the O2 Sensor being tested.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the O2 Sensor ground (PWM) circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0132-O2 SENSOR 1/1 CIRCUIT VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

### Symptom List:

**P0133-O2 SENSOR 1/1 SLOW RESPONSE**

**P0139-O2 SENSOR 1/2 SLOW RESPONSE**

**P0153-O2 SENSOR 2/1 SLOW RESPONSE**

**P0159-O2 SENSOR 2/2 SLOW RESPONSE**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0133-O2 SENSOR 1/1 SLOW RESPONSE.**

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### When Monitored and Set Condition:

#### **P0133-O2 SENSOR 1/1 SLOW RESPONSE**

**When Monitored:** With ECT greater than 147°F, after reaching a vehicle speed of 10 mph, and the throttle remaining open (off idle) for 2 minutes, bring the vehicle to a stop and allow the engine to idle with the transmission in DRIVE.

**Set Condition:** The oxygen sensor signal voltage is switching from below 0.27 of a volt to above 0.62 of a volt and back fewer times than required.

#### **P0139-O2 SENSOR 1/2 SLOW RESPONSE**

**When Monitored:** Start engine. Allow engine to idle. For 1st part of test, if limits are exceeded, test passes. If not, 2nd part of test runs. amb/batt temp >44°F, Baro >22.13" H<sub>2</sub>O, battery >10.5 volts, MAP >11.79 & <18.15" H<sub>2</sub>O, RPM >1350 & <2200 and vss >50 and <65.

**Set Condition:** The oxygen sensor signal voltage is switching from below 0.39 of a volt to above 0.58 of a volt and back fewer times than required.

#### **P0153-O2 SENSOR 2/1 SLOW RESPONSE**

**When Monitored:** With ECT greater than 147°F, after reaching a vehicle speed of 10 mph, and the throttle remaining open (off idle) for 2 minutes, bring the vehicle to a stop and allow the engine to idle with the transmission in DRIVE.

**Set Condition:** The oxygen sensor signal voltage is switching from below 0.27 of a volt to above 0.62 of a volt and back fewer times than required.

#### **P0159-O2 SENSOR 2/2 SLOW RESPONSE**

**When Monitored:** Start engine. Allow engine to idle. For 1st part of test, if limits are exceeded, test passes. If not, 2nd part of test runs. amb/batt temp >44°F, Baro >22.13" H<sub>2</sub>O, battery >10.5 volts, MAP >11.79 & <18.15" H<sub>2</sub>O, RPM >1350 & <2200 and vss >50 and <65.

**Set Condition:** The oxygen sensor signal voltage is switching from below 0.39 of a volt to above 0.58 of a volt and back fewer times than required.



**P0133-O2 SENSOR 1/1 SLOW RESPONSE — Continued**

POSSIBLE CAUSES
<p>GOOD TRIP EQUAL TO ZERO</p> <p>EXHAUST LEAK</p> <p>RESISTANCE IN THE O2 SENSOR SIGNAL CIRCUIT</p> <p>RESISTANCE IN THE (K4) SENSOR GROUND CIRCUIT</p> <p>O2 SENSOR</p>

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.</p> <p><b>NOTE: Check for contaminants that may have damaged the O2 Sensor: contaminated fuel, unapproved silicone, oil and coolant.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Start the engine.</p> <p>Inspect the exhaust for leaks between the engine and the related O2 Sensor.</p> <p>Are there any exhaust leaks?</p> <p>Yes → Repair or replace the leaking exhaust parts as necessary.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.</p> <p>While backprobing, measure the voltage of the O2 Sensor Signal circuit between the O2 Sensor harness connector and PCM harness connector.</p> <p><b>NOTE: Ensure the voltmeter leads meet the terminals in the connector and that there is good terminal to wire connection and are connected for positive polarity.</b></p> <p>Start the engine.</p> <p>Allow the engine to idle.</p> <p>Is the voltage below 0.10 of a volt?</p> <p>Yes → Go To 4</p> <p>No → Repair the excessive resistance in the O2 Sensor Signal circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P0133-O2 SENSOR 1/1 SLOW RESPONSE — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.</p> <p>While backprobing, measure the voltage of the (K4) Sensor ground circuit between the O2 Sensor harness connector and PCM harness connector.</p> <p><b>NOTE: Ensure the voltmeter leads meet the terminals in the connector and that there is good terminal to wire connection.</b></p> <p><b>NOTE: Ensure the voltmeter leads are connected for positive polarity</b></p> <p>Start the engine.</p> <p>Allow the engine to idle.</p> <p>Is the voltage below 0.10 of a volt?</p> <p>Yes → Go To 5</p> <p>No → Repair the excessive resistance in the (K4) Sensor ground circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Turn the ignition off before continuing.</b></p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the O2 Sensor</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:****P0135-O2 SENSOR 1/1 HEATER FAILURE****P0141-O2 SENSOR 1/2 HEATER FAILURE****P0155-O2 SENSOR 2/1 HEATER FAILURE****P0161-O2 SENSOR 2/2 HEATER FAILURE**

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**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0135-O2 SENSOR 1/1 HEATER FAILURE**.

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**When Monitored and Set Condition:****P0135-O2 SENSOR 1/1 HEATER FAILURE**

When Monitored: With battery voltage greater than 9 volts, at a cold start, ECT less than 147°F, battery temperature sensor equal to or less than 27°F, and engine at idle for at least 12 seconds.

Set Condition: O2 sensor voltage greater than 3 volts for 30 to 90 seconds.

**P0141-O2 SENSOR 1/2 HEATER FAILURE**

When Monitored: With battery voltage greater than 10.5 volts, at a cold start, ECT less than 147°F, battery temperature sensor equal to or less than 27°F, and engine at idle for at least 12 seconds.

Set Condition: O2 sensor voltage greater than 3 volts for 60 to 240 seconds.

**P0155-O2 SENSOR 2/1 HEATER FAILURE**

When Monitored: With battery voltage greater than 9 volts, at a cold start, ECT less than 147°F, battery temperature sensor equal to or less than 27°F, and engine at idle for at least 12 seconds.

Set Condition: O2 sensor voltage greater than 3 volts for 60 to 240 seconds.

**P0161-O2 SENSOR 2/2 HEATER FAILURE**

When Monitored: With battery voltage greater than 10.5 volts, at a cold start, ECT less than 147°F, battery temperature sensor equal to or less than 27°F, and engine at idle for at least 12 seconds.

Set Condition: O2 sensor voltage greater than 3 volts for 60 to 240 seconds.

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**POSSIBLE CAUSES**

O2 SENSOR HEATER OPERATION

O2 HEATER ELEMENT

O2 HEATER SUPPLY CIRCUIT OPEN

HEATER CONTROL CIRCUIT OPEN

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## P0135-O2 SENSOR 1/1 HEATER FAILURE — Continued

POSSIBLE CAUSES
HEATER CONTROL CIRCUIT SHORTED TO GROUND HEATER GROUND CIRCUIT OPEN PCM

TEST	ACTION	APPLICABILITY
1	Check for any related TSBs. Turn the ignition off. <b>NOTE: Wait a minimum of 8 minutes to allow the O2 Sensor to cool down before continuing the test.</b> Ignition on, engine not running. With the DRBIII®, actuate the O2 Heater Test. With the DRBIII®, monitor O2 Sensor voltage for at least 2 minutes. Does the voltage stabilize between 0.1 and 0.3 of a volt during the Heater test?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 2	All
2	Turn the ignition off. <b>NOTE: Allow the O2 Sensor to cool to room temperature.</b> Disconnect the O2 Sensor harness connector. Measure the resistance across the O2 Sensor Heater element component side. <b>NOTE: O2 Heater Element resistance values should be measured at 70°F (21.1°C). The resistance value will vary with different temperature values.</b> Is the resistance of the O2 Sensor Heater Element between 2.0 and 30.0 ohms?  Yes → Go To 3  No → Replace the O2 Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
3	<b>NOTE: The O2 Heater Supply circuit may be a fused (A141) ASD Relay Output or an O2 Sensor (A42) Heater Relay Output, depending on the O2 Sensor being tested.</b> Ignition on, engine not running and the O2 Sensor still disconnected. With the DRBIII®, actuate the O2 Heater Test. Using a 12-volt test light connected to ground, probe the (A141) Fused ASD Relay Output or (A42) O2 Heater Relay Output circuit at the O2 Sensor harness connector.. Does the light illuminate brightly?  Yes → Go To 4  No → Repair the open in the (A141) Fused ASD Relay Output circuit or the (A42) O2 Heater Relay Output circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0135-O2 SENSOR 1/1 HEATER FAILURE — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Remove the O2 Heater Relay, if it applies to the O2 Sensor being tested.            * Measure the resistance of the O2 Heater Control circuit (PWM) from the O2 Sensor to the PCM harness connector if it applies to the O2 Sensor being tested.            OR            * Measure the resistance of the (K127) O2 Heater Relay Control circuit from the O2 Heater Relay to the PCM harness connector, if it applies to the O2 Sensor being tested.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the excessive resistance in the O2 Heater Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>NOTE: Before beginning this test, verify what type of Heated O2 Sensor is being tested, either the PWM Heated O2 Sensor or the Heater Relay controlled Heated O2 Sensor.</b>            * Measure the resistance between ground and the O2 Heater Control (PWM) circuit if it applies to the O2 Sensor being tested.            OR            * Measure the resistance between ground and the (K127) O2 Heater Relay Control circuit at the PCM harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the O2 Heater Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: If the O2 Sensor being tested does not use an O2 Heater Relay to supply voltage to the O2 Sensor Heater, answer YES to this test and continue.</b>            Using a 12-volt test light connected to 12-volts, probe the (Z192) or (Z193) O2 Heater Ground circuit.            Does the test light illuminate brightly?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the O2 Sensor Heater ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P0136-O2 SENSOR 1/2 HEATER CIRCUIT MALFUNCTION**

## When Monitored and Set Condition:

### **P0136-O2 SENSOR 1/2 HEATER CIRCUIT MALFUNCTION**

When Monitored: Ignition ON, with battery voltage greater than 10.4 volts.

Set Condition: The state of the PCM relay control circuit, between the PCM and relay coil, does not match the desired state.

### **POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

O2 SENSOR HEATER RELAY

(A141) FUSED ASD RELAY OUTPUT CIRCUIT

(K127) O2 HEATER RELAY CONTROL CIRCUIT OPEN

(K127) O2 HEATER RELAY CONTROL CIRCUIT SHORTED TO GROUND

O2 HEATER ELEMENT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.  <b>NOTE: If P0031 and P0051 are set along with P0136, inspect the related fuse and repair as necessary.</b>            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Remove the Heater Relay from the PDC.            Measurement is taken at the Heater Relay component.            Measure the resistance of the O2 Sensor Heater Relay Coil.            Is the resistance above 100 ohms?</p> <p>Yes → Replace the O2 Sensor Heater Relay.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P0136-O2 SENSOR 1/2 HEATER CIRCUIT MALFUNCTION — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running.            With the DRBIII®, actuate the ASD Relay.            Using a 12-volt test light connected to ground, probe the (A141) Fused ASD Relay Output circuit of the O2 Heater Relay in the PDC.            Does the test light illuminate brightly when the relay actuates?</p> <p>Yes → Go To 4</p> <p>No → Repair the open or short to ground in the (A141) ASD Relay Output circuit. Inspect the related fuse and repair as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance of the (K127) O2 Heater Relay Control circuit from the PDC (Heater Relay) connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K127) O2 Heater Relay Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (K127) O2 Heater Relay Control circuit at the PDC connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K127) O2 Sensor Heater Relay Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.  <b>NOTE: Allow the O2 Sensor to cool to room temperature.</b>            Disconnect the 1/2 and 2/2 O2 Sensor harness connectors.            Measure the resistance across each of the O2 Sensor Heater elements, component side.  <b>NOTE: O2 Heater Element resistance values should be measured at 70°F (21.1°C). The resistance value will vary with different temperature values.</b>            Is the resistance of the O2 Sensor Heater Elements between 2.0 and 30.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Replace the O2 Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are not possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

### Symptom List:

**P0171-1/1 FUEL SYSTEM LEAN**

**P0174-2/1 FUEL SYSTEM LEAN**

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**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0171-1/1 FUEL SYSTEM LEAN**.

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### When Monitored and Set Condition:

#### **P0171-1/1 FUEL SYSTEM LEAN**

When Monitored: With the engine running in closed loop mode, the ambient/battery temperature above 20° F and altitude below 8000 ft.

Set Condition: If the PCM multiplies short term compensation by long term adaptive and a certain percentage is exceeded for two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored.

#### **P0174-2/1 FUEL SYSTEM LEAN**

When Monitored: With the engine running in closed loop mode, the ambient/battery temperature above 20° F and altitude below 8000 ft.

Set Condition: If the PCM multiplies short term compensation by long term adaptive and a certain percentage is exceeded for two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored.

### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO  
FUEL PRESSURE OUT OF SPECS  
RESTRICTED FUEL SUPPLY LINE  
FUEL PUMP INLET STRAINER PLUGGED  
FUEL PUMP MODULE  
O2 SENSOR  
O2 SENSOR SIGNAL CIRCUIT SHORTED TO GROUND  
O2 SENSOR HEATER OPERATION  
TP SENSOR VOLTAGE GREATER THAN 0.92 OF A VOLT WITH THROTTLE CLOSED  
TP SENSOR SWEEP  
MAP SENSOR OPERATION  
ECT SENSOR OPERATION  
ENGINE MECHANICAL PROBLEM  
FUEL FILTER/PRESSURE REGULATOR  
INTERMITTENT CONDITION  
PCM



**P0171-1/1 FUEL SYSTEM LEAN — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Check for contaminants that may have damaged the O2 Sensor: contaminated fuel, unapproved silicone, oil and coolant.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p><b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Install a fuel pressure gauge.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.</p> <p><b>NOTE: Fuel pressure specification is 339 KPa +/- 34 KPa (49.2 psi +/- 5 psi).</b></p> <p>Turn the ignition off.</p> <p>Choose a conclusion that best matches your fuel pressure reading.</p> <p>Below Specification Go To 3</p> <p>Within Specification Go To 6</p> <p>Above Specification Replace the fuel filter/pressure regulator. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>CAUTION: Stop All Actuations.</b></p>	All
3	<p>Turn the ignition off.</p> <p><b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Raise vehicle on hoist, and disconnect the fuel pressure line at the fuel pump module.</p> <p>Install special 5/16 fuel line adapter tool #6539 or #6631 for 3/8 fuel line adapter, between the disconnected fuel line and the fuel pump module.</p> <p>Attach a fuel pressure test gauge to the T fitting on tool #6539 or #6631.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.</p> <p><b>NOTE: Fuel pressure specification is 339 KPa +/- 34 KPa (49.2 psi +/- 5 psi).</b></p> <p>Is the fuel pressure within specification?</p> <p>Yes → Repair or replace fuel supply line as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p> <p><b>Caution: Stop All Actuations.</b></p>	All

## P0171-1/1 FUEL SYSTEM LEAN — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.</p> <p><b>WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Remove the Fuel Pump Module and inspect the Fuel Inlet Strainer.</p> <p>Is the Fuel Inlet Strainer plugged?</p> <p>Yes → Replace the Fuel Pump Inlet Strainer. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Fuel Pump Module.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Turn the ignition off.</p> <p><b>NOTE: Wait a minimum of 10 minutes to allow the O2 Sensor and Exhaust System to cool down before continuing the test.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, monitor all of the O2 Sensor voltage readings.</p> <p>Is the voltage above 4.5 volts for all of the O2 Sensors?</p> <p>Yes → Go To 7</p> <p>No → Go To 13</p>	All
7	<p>Turn the ignition off.</p> <p><b>NOTE: Wait a minimum of 10 minutes to allow the O2 Sensor to cool down before continuing the test.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the O2 Heater Test.</p> <p>With the DRBIII®, monitor all O2 Sensor voltage readings for at least 2 minutes.</p> <p>Does the voltage stay above 4.5 volts for any of the O2 Sensors?</p> <p>Yes → Replace the O2 Sensor that had the voltage reading above 4.5 volts. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p>With the DRBIII®, read TP Sensor voltage.</p> <p><b>NOTE: The throttle must be against the stop.</b></p> <p>Is the voltage 0.92 of a volt or less with the Throttle closed?</p> <p>Yes → Go To 9</p> <p>No → Check for a binding throttle condition. If OK, replace the Throttle Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
9	<p>With the DRBIII®, read the TP Sensor voltage.</p> <p>While monitoring the DRBIII®, slowly open and close the throttle.</p> <p>Does the voltage increase and decrease smoothly?</p> <p>Yes → Go To 10</p> <p>No → Replace the Throttle Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0171-1/1 FUEL SYSTEM LEAN — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Turn the ignition off.            Connect a Vacuum Gauge to a Manifold Vacuum source.            Start the engine.            Allow the engine to idle.  <b>Note: If engine will not idle, maintain a constant RPM above idle.</b>            With the DRBIII® in Sensors, read the MAP Sensor vacuum value.            Is the DRBIII® reading within 1" of the Vacuum Gauge reading?</p> <p>Yes → Go To 11</p> <p>No → Replace the MAP Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Remove the vacuum gauge before continuing.</b></p>	All
11	<p><b>Note: For this test to be valid, the thermostat must be operating correctly.</b>  <b>Note: This test works best if performed on a cold engine (cold soak)</b>            Ignition on, engine not running.            With the DRBIII®, read the Engine Coolant Temperature Sensor value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.  <b>Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b>            Start the Engine.            During engine warm-up, monitor the Engine Coolant Temperature value. The temp value change should be a smooth transition from start up to normal operating temp 82°C (180°F). The value should reach at least 82°C (180°F).            Did the Engine Coolant Temperature increase smoothly and did it reach at least 82°C (180°F)?</p> <p>Yes → Go To 12</p> <p>No → Replace the Engine Coolant Temperature Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
12	<p>Check for any of the following conditions/mechanical problems.            AIR INDUCTION SYSTEM - must be free from leaks.            ENGINE VACUUM - must be at least 13 inches in neutral            ENGINE VALVE TIMING - must be within specifications            ENGINE COMPRESSION - must be within specifications            ENGINE EXHAUST SYSTEM - must be free of any restrictions or leaks.            ENGINE PCV SYSTEM - must flow freely            TORQUE CONVERTER STALL SPEED - must be within specifications            POWER BRAKE BOOSTER - no internal vacuum leaks            FUEL - must be free of contamination            FUEL INJECTOR - plugged or restricted injector; control wire not connected to correct injector            Are there any engine mechanical problems?</p> <p>Yes → Repair as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P0171-1/1 FUEL SYSTEM LEAN — Continued

TEST	ACTION	APPLICABILITY
13	<p><b>NOTE: Wait a minimum of 10 minutes to allow the O2 Sensor to cool down before continuing the test.</b></p> <p>Ignition on, engine not running.            Disconnect the harness connector(s) of the O2 Sensor(s) that had a voltage reading below 4.5 volts in the previous step.            With the DRBIII®, monitor the O2 Sensor voltage reading(s).            Is the voltage above 4.5 volts for any of the O2 Sensors?</p> <p>Yes → Replace the O2 Sensor that had the voltage reading above 4.5 volts.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 14</p>	All
14	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the O2 Sensor Signal circuit at the PCM harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the O2 Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 15</p>	All
15	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:****P0172-1/1 FUEL SYSTEM RICH****P0175-2/1 FUEL SYSTEM RICH**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0172-1/1 FUEL SYSTEM RICH**.

**When Monitored and Set Condition:****P0172-1/1 FUEL SYSTEM RICH**

**When Monitored:** With the engine running in closed loop mode, the ambient/battery temperature above 20° F and altitude below 8000 ft.

**Set Condition:** If the PCM multiplies short term compensation by long term adaptive and the result is below a certain value for two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored.

**P0175-2/1 FUEL SYSTEM RICH**

**When Monitored:** With the engine running in closed loop mode, the ambient/battery temperature above 20° F and altitude below 8000 ft.

**Set Condition:** If the PCM multiplies short term compensation by long term adaptive and the result is below a certain value for two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

INTERMITTENT CONDITION

O2 SENSOR

O2 SENSOR SIGNAL CIRCUIT OPEN

O2 SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

O2 SENSOR HEATER OPERATION

EVAP SYSTEM OPERATION

TP SENSOR VOLTAGE GREATER THAN 0.92 OF A VOLT WITH THROTTLE CLOSED

TP SENSOR SWEEP

FUEL FILTER/PRESSURE REGULATOR

MAP SENSOR OPERATION

ECT SENSOR OPERATION

ENGINE MECHANICAL PROBLEM

PCM

## P0172-1/1 FUEL SYSTEM RICH — Continued

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Check for contaminants that may have damaged the O2 Sensor: contaminated fuel, unapproved silicone, oil and coolant.</b>            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.  <b>NOTE: Any O2 Sensor, TPS, ECT, MAP, or EVAP DTCs must be repaired before continuing.</b>            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.  <b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b>            Install a fuel pressure gauge.            Ignition on, engine not running.            With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.  <b>NOTE: Fuel pressure specification is 339 KPa +/- 34 KPa (49.2 psi +/- 5 psi).</b>            Choose a conclusion that best matches your fuel pressure reading.</p> <p>Within Specification            Go To 3</p> <p>Above Specification            Replace the fuel filter/pressure regulator.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>Caution: Stop All Actuations.</b></p>	All
3	<p>Ignition on, engine not running.            With the DRBIII®, monitor all of the O2 Sensor voltage readings.            Is the voltage above 4.5 volts for all of the O2 Sensors?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	All
4	<p>Turn the ignition off.  <b>NOTE: Wait a minimum of 10 minutes to allow the O2 Sensor to cool down before continuing the test. Allow the O2 Sensor voltage to stabilize between 4 and 5 volts.</b>            Ignition on, engine not running.            With the DRBIII®, actuate the O2 Heater Test.            With the DRBIII®, monitor all of the O2 Sensor voltage values for at least 2 minutes.            Does the voltage stay above 4.5 volts on any of the O2 Sensors?</p> <p>Yes → Replace the O2 Sensor that had the voltage reading above 4.5 volts.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All

**P0172-1/1 FUEL SYSTEM RICH — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: The engine must be at operating temperature and in closed loop to perform this test.</b>            Start the engine.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            Allow the engine to reach normal operating temperature.            With the DRBIII® select System Tests, perform the Purge Vapors Test.            Observe the Short Term Adaptive value and press 3 to flow.  <b>NOTE: Short Term Adaptive value change.</b>            Did the Short Term Adaptive value change?</p> <p>Yes → Go To 6</p> <p>No → Refer to the Driveability category and perform the appropriate Diagnostic test.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Ignition on, engine not running.            With the DRBIII®, read TP Sensor voltage.  <b>NOTE: The throttle must be against the stop.</b>            Is the voltage 0.92 of a volt or less with the Throttle closed?</p> <p>Yes → Go To 7</p> <p>No → Check for a binding throttle condition. If OK, replace the Throttle Position Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>With the DRBIII®, read the TP Sensor voltage.            While monitoring the DRBIII®, slowly open and close the throttle.            Does the voltage increase and decrease smoothly?</p> <p>Yes → Go To 8</p> <p>No → Replace the Throttle Position Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p>Turn the ignition off.            Connect a Vacuum Gauge to a Manifold Vacuum source.            Start the engine.            Allow the engine to idle.  <b>Note: If engine will not idle, maintain a constant RPM above idle.</b>            With the DRBIII® in Sensors, read the MAP Sensor vacuum value.            Is the DRBIII® reading within 1" of the Vacuum Gauge reading?</p> <p>Yes → Go To 9</p> <p>No → Replace the MAP Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Remove the vacuum gauge before continuing.</b></p>	All

## P0172-1/1 FUEL SYSTEM RICH — Continued

TEST	ACTION	APPLICABILITY
9	<p><b>Note: For this test to be valid, the thermostat must be operating correctly.</b>  <b>Note: This test works best if performed on a cold engine (cold soak)</b>            Ignition on, engine not running.            With the DRBIII®, read the Engine Coolant Temperature Sensor value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.  <b>Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b>            Start the Engine.            During engine warm-up, monitor the Engine Coolant Temperature value. The temp value change should be a smooth transition from start up to normal operating temp 82°C (180°F). The value should reach at least 82°C (180°F).            Did the Engine Coolant Temperature value increase smoothly and reach at least 82°C?</p> <p>Yes → Go To 10</p> <p>No → Replace the Engine Coolant Temperature Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
10	<p>Check for any of the following conditions/mechanical problems.            AIR INDUCTION SYSTEM - must be free from restrictions.            ENGINE VACUUM - must be at least 13 inches in neutral            ENGINE VALVE TIMING - must be within specifications            ENGINE COMPRESSION - must be within specifications            ENGINE EXHAUST SYSTEM - must be free of any restrictions or leaks.            ENGINE PCV SYSTEM - must flow freely            TORQUE CONVERTER STALL SPEED - must be within specifications            POWER BRAKE BOOSTER - no internal vacuum leaks            FUEL - must be free of contamination            FUEL INJECTOR - plugged or restricted injector; control wire not connected to correct injector            Are there any engine mechanical problems?</p> <p>Yes → Repair as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
11	<p>Disconnect the sensor harness connector of the O2 Sensor(s) that had a voltage value greater than 4.5 volts in the previous step.            Ignition on, engine not running.            With the DRBIII®, monitor the O2 Sensor voltage reading(s).            Is the O2 Sensor voltage above 4.5 volts?</p> <p>Yes → Replace the O2 Sensor that had the voltage reading above 4.5 volts.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 12</p>	All



**P0172-1/1 FUEL SYSTEM RICH — Continued**

TEST	ACTION	APPLICABILITY
12	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance of the O2 Sensor Signal circuit from the PCM harness connector to the O2 Sensor harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 13  No → Repair the open in the O2 Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
13	Ignition on, engine not running. Leave the O2 Sensor and PCM harness connectors disconnected. Measure the voltage on the O2 Sensor Signal circuit at the O2 Sensor harness connector. Is the voltage above 5.2 volts?  Yes → Repair the short to voltage in the O2 Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 14  <b>NOTE: Turn the ignition off before continuing.</b>	All
14	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

### Symptom List:

**P0201-INJECTOR #1 CONTROL CIRCUIT**  
**P0202-INJECTOR #2 CONTROL CIRCUIT**  
**P0203-INJECTOR #3 CONTROL CIRCUIT**  
**P0204-INJECTOR #4 CONTROL CIRCUIT**  
**P0205-INJECTOR #5 CONTROL CIRCUIT**  
**P0206-INJECTOR #6 CONTROL CIRCUIT**  
**P0207-INJECTOR #7 CONTROL CIRCUIT**  
**P0208-INJECTOR #8 CONTROL CIRCUIT**  
**P0209-INJECTOR #9 CONTROL CIRCUIT**  
**P0210-INJECTOR #10 CONTROL CIRCUIT**

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**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be **P0201-INJECTOR #1 CONTROL CIRCUIT**.

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### When Monitored and Set Condition:

#### **P0201-INJECTOR #1 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

#### **P0202-INJECTOR #2 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

#### **P0203-INJECTOR #3 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

#### **P0204-INJECTOR #4 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

**P0201-INJECTOR #1 CONTROL CIRCUIT — Continued****P0205-INJECTOR #5 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

**P0206-INJECTOR #6 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

**P0207-INJECTOR #7 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

**P0208-INJECTOR #8 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

**P0209-INJECTOR #9 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

**P0210-INJECTOR #10 CONTROL CIRCUIT**

When Monitored: With battery voltage greater than 10.4 volts, the auto shutdown relay energized, injector pulse width less than 10ms, and engine speed less than 3000 rpm.

Set Condition: This trouble code takes .64 to 10.0 seconds to set when no inductive kick is sensed .18ms after injector turn off, and with no other injectors on.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(A142) ASD RELAY OUTPUT CIRCUIT

FUEL INJECTOR

FUEL INJECTOR CONTROL CIRCUIT OPEN

## P0201-INJECTOR #1 CONTROL CIRCUIT — Continued

POSSIBLE CAUSES
FUEL INJECTOR CONTROL CIRCUIT SHORTED TO GROUND PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.  <b>NOTE: Diagnose any Misfire DTCs before continuing. If a Misfire is detected for a particular cylinder, the PCM will shut down that Injectors Control circuit.</b>            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the Fuel Injector harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the ASD Relay.            Using a 12-volt test light connected to ground, probe the (A142) ASD Relay Output circuit at the Fuel Injector harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the open or short to ground in the (A142) ASD Relay Output circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>Using a 12-volt test light connected to 12-volts, backprobe the Fuel Injector Driver circuit.            With the DRBIII®, actuate the Fuel Injector.            What is the state of the test light while actuating the Fuel Injector?</p> <p>Brightly blinking or flickering.            Replace the Fuel Injector.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>ON constantly.            Go To 4</p> <p>OFF constantly.            Go To 5</p>	All
4	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the Fuel Injector Control circuit at the Fuel Injector harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the Fuel Injector Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All

**P0201-INJECTOR #1 CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance of the Fuel Injector Control circuit from the Fuel Injector harness connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the Fuel Injector Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P0300-MULTIPLE CYLINDER MIS-FIRE**

**P0301-CYLINDER #1 MISFIRE**

**P0302-CYLINDER #2 MISFIRE**

**P0303-CYLINDER #3 MISFIRE**

**P0304-CYLINDER #4 MISFIRE**

**P0305-CYLINDER #5 MISFIRE**

**P0306-CYLINDER #6 MISFIRE**

**P0307-CYLINDER #7 MISFIRE**

**P0308-CYLINDER #8 MISFIRE**

**P0309-CYLINDER #9 MISFIRE**

**P0310-CYLINDER #10 MISFIRE**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0300-MULTIPLE CYLINDER MIS-FIRE.**

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**When Monitored and Set Condition:**

**P0300-MULTIPLE CYLINDER MIS-FIRE**

**When Monitored:** Any time the engine is running, and the adaptive numerator has been successfully updated.

**Set Condition:** When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0301-CYLINDER #1 MISFIRE**

**When Monitored:** Any time the engine is running, and the adaptive numerator has been successfully updated.

**Set Condition:** When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0302-CYLINDER #2 MISFIRE**

**When Monitored:** Any time the engine is running, and the adaptive numerator has been successfully updated.

**Set Condition:** When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0303-CYLINDER #3 MISFIRE**

**When Monitored:** Any time the engine is running, and the adaptive numerator has been successfully updated.

**Set Condition:** When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0300-MULTIPLE CYLINDER MIS-FIRE — Continued**

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**P0304-CYLINDER #4 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0305-CYLINDER #5 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0306-CYLINDER #6 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0307-CYLINDER #7 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0308-CYLINDER #8 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0309-CYLINDER #9 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

**P0310-CYLINDER #10 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 1% misfire rate is measured during two trips, or with a 6% to 30% misfire rate during one trip.

## P0300-MULTIPLE CYLINDER MIS-FIRE — Continued

POSSIBLE CAUSES
<p>INTERMITTENT MISFIRE</p> <p>VISUAL INSPECTION</p> <p>IGNITION WIRE</p> <p>ASD RELAY OUPUT CIRCUIT</p> <p>ENGINE MECHANICAL PROBLEM</p> <p>IGNITION COIL</p> <p>COIL CONTROL CIRCUIT</p> <p>SPARK PLUG</p> <p>CHECKING FUEL PRESSURE</p> <p>FUEL PUMP INLET STRAINER PLUGGED</p> <p>RESTRICTED FUEL SUPPLY LINE</p> <p>FUEL PUMP MODULE</p> <p>CHECKING FUEL LEAK DOWN</p> <p>FUEL INJECTOR</p> <p>INJECTOR CONTROL CIRCUIT</p> <p>PCM</p>

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Check for any TSB's that apply to a Misfire condition. Review the vehicle repair history for any misfire condition repairs that have been performed.</b></p> <p>Read and record the FREEZE FRAME DATA. Select OBD II MONITORS. Read and record the MIS-FIRE SIMILAR CONDITIONS WINDOW DATA.</p> <p>With these screens, attempt to duplicate the condition(s) that has set this DTC. When the vehicle is operating in the SIMILAR CONDITIONS WINDOW, refer to the WHICH CYLINDER IS MISFIRING screen.</p> <p>Observe the WHICH CYLINDER IS MISFIRING screen for at least one minute.</p> <p>Is there a misfire present?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**P0300-MULTIPLE CYLINDER MIS-FIRE — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>NOTE: Anything that affects the speed of the crankshaft can cause a misfire DTC.</b></p> <p><b>NOTE: When a Misfire is detected for a particular cylinder, the PCM will shut down that cylinders Injector Control circuit.</b></p> <ul style="list-style-type: none"> <li>- Visually inspect the engine for any of the following conditions.</li> <li>- Worn serpentine belt</li> <li>- Binding Engine-Driven accessories: A/C Compressor, P/S Pump, Water pump.</li> <li>- Misalignment Water pump, P/S Pump and A/C Compressor pulleys</li> <li>- Corroded PCM power and ground circuits.</li> <li>- Improper CKP, CMP, MAP, and TP Sensor mounting</li> <li>- Poor connector/terminal to component connection. i.e., CKP sensor, Fuel Injector, Ign coil, etc.</li> <li>- Vacuum leaks</li> <li>- Restricted Air Induction system or Exhaust system.</li> </ul> <p>Were any of the above conditions present?</p> <p style="padding-left: 40px;">Yes → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p style="padding-left: 40px;">No → Go To 3</p>	All
3	<p>Turn the ignition off.</p> <p>Disconnect the Ignition Coil harness connector.</p> <p>Disconnect the Fuel Injector harness connector.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Relay.</p> <p>Using a 12-volt test light connected to ground, probe the (A142) ASD Relay Output circuit at the Ignition Coil harness connector and Fuel Injector harness connector.</p> <p>Does the test light illuminate brightly?</p> <p style="padding-left: 40px;">Yes → Go To 4</p> <p style="padding-left: 40px;">No → Repair the excessive resistance or short to ground in the (A142) ASD Relay Output circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Turn the ignition off.</p> <p>Connect the Ignition Coil harness connector.</p> <p>Disconnect the Ignition wire from the spark plug.</p> <p>Disconnect the Fuel Injector harness connector of the cylinder being tested.</p> <p><b>NOTE: Before continuing inspect the ignition wire for damage or carbon tracking. Replace as necessary.</b></p> <p>Install a spark tester on the ignition wire.</p> <p>While cranking the engine observe the spark coming from the spark tester.</p> <p><b>NOTE: A crisp blue spark that is able to jump the gap of the spark tester should be generated.</b></p> <p>Is good spark present?</p> <p style="padding-left: 40px;">Yes → Go To 5</p> <p style="padding-left: 40px;">No → Go To 14</p> <p><b>NOTE: Connect the Fuel Injector harness connector before continuing.</b></p>	All

## P0300-MULTIPLE CYLINDER MIS-FIRE — Continued

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.  Remove the Spark Plug.  Inspect the Spark Plug for the following conditions.</p> <ul style="list-style-type: none"> <li>- Cracks</li> <li>- Carbon Tracking</li> <li>- Foreign Material</li> <li>- Gap size out of specifications</li> <li>- Loose or broke electrode</li> </ul> <p><b>NOTE: Lightly tap the bottom of the spark plug on a solid surface. The electrode in the spark plug should not move.</b>  Were any of the above condition present?</p> <p style="padding-left: 40px;">Yes → Replace the Spark Plug.  Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p style="padding-left: 40px;">No → Go To 6</p>	All
6	<p><b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b>  Install a fuel pressure gauge to the fuel rail.  Start the engine and observe the fuel pressure reading.  <b>NOTE: Fuel pressure specification is 334 KPa +/- 34 KPa (49 psi +/- 5 psi).</b>  Choose a conclusion that best matches your fuel pressure reading.</p> <p style="padding-left: 40px;">Within Specification  Go To 7</p> <p style="padding-left: 40px;">Below Specification  Go To 12</p> <p style="padding-left: 40px;">Above Specification  Replace the fuel filter/pressure regulator.  Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing visually and physically inspect the fuel delivery system for external leaks or damage. Repair /replace as necessary.</b>  Turn the ignition off.  <b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b>  Install special tool #6539 (5/16") or #6631 (3/8") fuel line adapter.  Install the fuel pressure gauge.  Start the engine and allow the fuel system to reach maximum pressure.  Turn the ignition off.  <b>NOTE: Fuel specification is 334 KPa +/- 34 KPa (49 psi +/- 5 psi).</b>  Using special tool #C4390, Hose Clamp Pliers, pinch the rubber fuel line between the fuel pressure gauge and the engine.  Monitor the fuel pressure gauge for a minimum of 5 minutes.  <b>NOTE: The pressure should not fall below 241 KPa (35 psi)</b>  Does the fuel pressure gauge fall below the listed specification?</p> <p style="padding-left: 40px;">Yes → Replace the leaking Fuel Injector(s).  Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p style="padding-left: 40px;">No → Go To 8</p>	All

**P0300-MULTIPLE CYLINDER MIS-FIRE — Continued**

TEST	ACTION	APPLICABILITY
8	<p><b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p><b>CAUTION: After each Fuel Injector actuation, start the engine to clean the cylinder of fuel. Failure to do so could cause engine damage.</b></p> <p>Remove special tool #C4390.</p> <p>Start the engine and allow the fuel pressure to reach maximum pressure.</p> <p>Using the DRBIII®, actuate the Fuel Injector for the cylinder that indicated the misfire.</p> <p>Monitor the fuel pressure gauge.</p> <p>Does the fuel pressure gauge indicate a drop in fuel pressure?</p> <p>Yes → Go To 9</p> <p>No → Go To 10</p> <p><b>NOTE: Turn the ignition off, remove the Fuel Pressure gauge, and connect the fuel lines before continuing.</b></p>	All
9	<p>Check for any of the following conditions/mechanical problems.</p> <p>ENGINE VACUUM - must be at least 13 inches in neutral</p> <p>ENGINE VALVE TIMING - must be within specifications</p> <p>ENGINE COMPRESSION - must be within specifications</p> <p>ENGINE EXHAUST SYSTEM - must be free of any restrictions or leaks.</p> <p>ENGINE PCV SYSTEM - must flow freely</p> <p>TORQUE CONVERTER STALL SPEED - must be within specifications</p> <p>POWER BRAKE BOOSTER - no internal vacuum leaks</p> <p>FUEL - must be free of contamination</p> <p>CAM LOBES - must not be worn excessively</p> <p>CYLINDER LEAKAGE TEST - must be within specifications</p> <p>VALVE SPRINGS - cannot be weak or broken</p> <p>Are there any engine mechanical problems?</p> <p>Yes → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 17</p>	All
10	<p>Turn the ignition off.</p> <p>Disconnect the Fuel Injector harness connector.</p> <p>Ignition on, engine not running.</p> <p><b>NOTE: When a Misfire is detected for a particular cylinder, the PCM will shut down that cylinder's Injector Control circuit.</b></p> <p>With the DRBIII®, erase DTCs.</p> <p>Using a 12-volt test light connected to 12-volts, probe the Injector Control circuit.</p> <p>With the DRBIII®, actuate the Fuel Injector.</p> <p>Does the test light blink/flicker?</p> <p>Yes → Replace the Fuel Injector. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All

# P0300-MULTIPLE CYLINDER MIS-FIRE — Continued

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off. Disconnect the PCM harness connectors. Check the Injector Control circuit for an open, short to ground, and short to voltage. Was a problem found with the Injector Control circuit?</p> <p>Yes → Repair the excessive resistance or short in the Injector Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 17</p>	All
12	<p>Turn the ignition off. <b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b> Raise vehicle on hoist, and disconnect the fuel pressure line at the fuel pump module. Install special tool #6539 (5/16") #6631(3/8") fuel line adapter and the fuel pressure gauge between the fuel supply line and the fuel pump module. Ignition on, engine not running. With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge. <b>NOTE: Fuel pressure specification is 339 KPa +/- 34 KPa (49 psi +/- 5 psi).</b> Is the fuel pressure within specification?</p> <p>Yes → Repair or replace fuel supply line as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All
13	<p>Turn the ignition off. <b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b> Remove the Fuel Pump Module and inspect the Fuel Inlet Strainer. Is the Fuel Inlet Strainer plugged?</p> <p>Yes → Replace the Fuel Pump Inlet Strainer. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → NOTE: Before continuing, check the Fuel Pump Module harness connector terminals for corrosion, damage, or terminal push out. Ensure the ground circuit is operating properly. Repair as necessary. Replace the Fuel Pump Module. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
14	<p><b>NOTE: If the vehicle being tested does not have an ignition wire answer YES to this test and continue.</b> Turn the ignition off. Remove the ignition wire. Measure the resistance of the ignition wire. Is the resistance below 10K ohms?</p> <p>Yes → Go To 15</p> <p>No → Replace the Ignition Wire. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0300-MULTIPLE CYLINDER MIS-FIRE — Continued**

TEST	ACTION	APPLICABILITY
15	<p>Remove the Fuel Pump Relay or ASD Relay.            Using a 12-volt test light connected to 12-volts, probe the Ignition Coil Control circuit in the Ignition Coil harness connector.            Crank the engine for 5 second while observing the test light.  <b>NOTE: The primary resistance of the 8.0L Ignition coil is 0.53 to 0.65 of an ohm, the resistance of a 5.9L Ignition coil is 0.95 of an to 1.2 ohms, and the resistance of a 3.7L coil is 0.6 to 0.9 of an ohm at 77°F (25°C).</b>            Does the test light brightly blink/flicker?</p> <p>Yes → Replace the Ignition Coil.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 16</p>	All
16	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Check the Coil Control circuit for an open, short to ground, and short to voltage.            Was a problem found with the Coil Control circuit?</p> <p>Yes → Repair the Coil Control circuit for an open or shorted condition.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 17</p>	All
17	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P0320-NO CRANK REFERENCE SIGNAL AT PCM

## When Monitored and Set Condition:

### P0320-NO CRANK REFERENCE SIGNAL AT PCM

When Monitored: With the ignition on.

Set Condition: No signal from the Crankshaft Position Sensor is present during engine cranking, and at least 3 Camshaft Position Sensor signals have occurred.

## POSSIBLE CAUSES

CAM POSITION SENSOR SIGNAL  
 INTERMITTENT CRANK POSITION SIGNAL  
 (K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE  
 (K7) 5-VOLT SUPPLY CIRCUIT OPEN  
 (K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND  
 (K24) CKP SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE  
 (K24) CKP SENSOR SIGNAL CIRCUIT OPEN  
 (K24) CKP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND  
 (K24) CKP SENSOR SIGNAL SHORTED TO (K7) 5-VOLT SUPPLY CIRCUIT  
 (K4) SENSOR GROUND CIRCUIT OPEN  
 CRANKSHAFT POSITION SENSOR  
 PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. With the DRBIII®, erase DTCs. Start the engine. If the DTC does not set right away it may be necessary to test drive the vehicle. Does the DTC return?  Yes → Go To 2 No → Go To 14	All
2	Turn the ignition off. Disconnect the CKP Sensor harness connector. Ignition on, engine not running. Measure the voltage of the (K7) 5-volt Supply circuit at the CKP Sensor harness connector. Is the voltage between 4.8 and 5.2 volts?  Yes → Go To 3 No → Go To 10	All

**P0320-NO CRANK REFERENCE SIGNAL AT PCM — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Measure the voltage on the (K24) CKP Sensor Signal circuit at the CKP Sensor harness connector.</p> <p>Is the voltage between 4.5 and 5.0 volts?</p> <p>Yes → Go To 4</p> <p>No → Go To 6</p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Measure the resistance of the (K4) Sensor ground circuit from the CKP Sensor harness connector to the PCM harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K4) Sensor ground circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>NOTE: Inspect the slots on the flywheel for damage. If a problem is found repair as necessary.</b></p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Crankshaft Position Sensor.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage of the (K24) CKP Sensor Signal circuit at the CKP Sensor harness connector.</p> <p>Is the voltage above 5.3 volts?</p> <p>Yes → Repair the short to voltage in the (K24) CKP Sensor Signal circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off.</p> <p>Measure the resistance of the (K24) CKP Sensor Signal circuit from the CKP Sensor harness connector to the PCM harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (K24) CKP Sensor Signal circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p>Measure the resistance between ground and the (K24) CKP Sensor Signal circuit at the CKP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K24) CKP Sensor Signal circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All

## P0320-NO CRANK REFERENCE SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
9	<p>Measure the resistance between the (K24) CKP Sensor Signal circuit and the (K7) 5-volt Supply circuit at the CKP Sensor harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K7) 5-volt Supply circuit and the (K24) CKP Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All
10	<p>Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage of the (K7) 5-volt Supply circuit at the CKP Sensor harness connector. Is the voltage above 5.3 volts?</p> <p>Yes → Repair the short to voltage in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
11	<p>Turn the ignition off. Measure the resistance of the (K7) 5-volt Supply circuit from the CKP Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the open in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
12	<p>Measure the resistance between ground and the (K7) 5-volt Supply circuit at the CKP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All
13	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**P0320-NO CRANK REFERENCE SIGNAL AT PCM — Continued**

TEST	ACTION	APPLICABILITY
14	<p><b>NOTE: The following tests may help in identifying a possible intermittent condition with the Crank Sensor or its related wire harness.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII® as a Dual Channel Lab Scope and the Miller special tool #6801, backprobe the (K24) CKP Signal circuit in the Crank Sensor connector and the PCM harness connector.</p> <p>Wiggle the related wire harness and connections.</p> <p>Monitor the lab scope screen.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Lightly tap on the Crank Sensor and wiggle the CKP Sensor connector and the related wire harness.</p> <p>Observe the lab scope screen.</p> <p>Look for any erratic pulses generated by the CKP Sensor.</p> <p>Did the CKP Sensor generate any erratic pulses?</p> <p>Yes → Carefully inspect the wire harness and connections, repair as necessary, if ok, replace the Crank Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 15</p>	All
15	<p><b>NOTE: An intermittent failure with the Cam Position Sensor may cause the P0320 code to set.</b></p> <p>Turn the ignition off.</p> <p>With the DRBIII® as a Dual Channel Lab Scope and the Miller special tool #6801, backprobe the (K44) CMP Signal circuit in the CMP Sensor connector and the PCM harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Ignition on, engine not running.</p> <p>Wiggle the related wire harness and gently tap on the Cam Position Sensor.</p> <p>Monitor the lab scope screen.</p> <p>Start the engine.</p> <p>Lightly tap on the CMP Sensor and wiggle the related wire harness.</p> <p>Observe the lab scope screen, looking for any erratic pulses generated by the CMP Sensor.</p> <p>Did the CMP Sensor generate any erratic pulses?</p> <p>Yes → Carefully inspect the wire harness and connections, repair as necessary, if ok, replace the Cam Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

## Symptom List:

**P0325-KNOCK SENSOR #1 CIRCUIT**

**P0330-KNOCK SENSOR #2 CIRCUIT**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0325-KNOCK SENSOR #1 CIRCUIT**.

## When Monitored and Set Condition:

### **P0325-KNOCK SENSOR #1 CIRCUIT**

When Monitored: With the ignition on and the engine running.

Set Condition: Knock Sensor #1 signal below minimum acceptable threshold voltage at particular engine speeds or above 5.0 volts.

### **P0330-KNOCK SENSOR #2 CIRCUIT**

When Monitored: With the ignition on and the engine running.

Set Condition: Knock Sensor #2 signal below minimum acceptable threshold voltage at particular engine speeds or above 5.0 volts.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

(K73) OR (K74) KNOCK SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K73) OR (K74) KNOCK SENSOR SIGNAL CIRCUIT OPEN

(K73) OR (K74) KNOCK SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

(K73) OR (K74) KNOCK SENSOR SIGNAL CIRCUIT SHORTED TO THE (K4) SENSOR GROUND

(K4) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Record the Freeze Frame Information that set along with the DTC.</b> Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0325-KNOCK SENSOR #1 CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>NOTE: (K73) is the Knock Sensor No.1 Signal circuit and (K74) is the Knock Sensor No.2 Signal circuit.</b></p> <p>Turn the ignition off.            Disconnect the Knock Sensor harness connector.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the (K73) or (K74) Knock Sensor Signal circuit in the Knock Sensor harness connector.            Is the voltage above 2.0 volts?</p> <p>Yes → Repair the short to voltage in the (K73) or (K74) Knock Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.            Measure the resistance of the (K73) or (K74) Knock Sensor Signal circuit from the Knock Sensor harness connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (K73) or (K74) Knock Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the resistance between ground and the appropriate Knock Sensor Signal circuit.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K73) or (K74) Knock Sensor Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (K73) or (K74) Knock Sensor Signal circuit and the (K4) Sensor ground circuit in the Knock Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K73) or (K74) Knock Sensor Signal circuit and the (K4) Sensor ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance of the (K4) Sensor ground circuit from the Knock Sensor harness connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K4) Sensor ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P0325-KNOCK SENSOR #1 CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
7	<p>Connect the PCM harness connectors.            Replace the Knock Sensor.            Ignition on, engine not running.            With the DRBIII®, erase DTC.            Attempt to operate the vehicle within the operating range of the information in Freeze Frame.            With the DRBIII®, read DTC's.            Does the Knock Sensor DTC return?</p> <p>Yes → NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary. Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0340-NO CAM REFERENCE SIGNAL AT PCM****When Monitored and Set Condition:****P0340-NO CAM REFERENCE SIGNAL AT PCM**

When Monitored: Engine cranking/running.

Set Condition: At least 5 seconds have elapsed with Crankshaft Position Sensor signals present but no Camshaft Position Sensor signal.

**POSSIBLE CAUSES**

CHECKING INTERMITTENT CMP SIGNAL WITH LAB SCOPE

CRANK POSITION SENSOR SIGNAL

(K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

(K7) 5-VOLT SUPPLY CIRCUIT OPEN

(K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

(K44) CMP SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K44) CMP SENSOR SIGNAL CIRCUIT OPEN

(K44) CMP SENSOR SIGNAL CIRCUIT SHORTED GROUND

(K44) CMP SENSOR SIGNAL SHORTED TO (K7) 5-VOLT SUPPLY CIRCUIT

(K4) SENSOR GROUND CIRCUIT OPEN

CAMSHAFT POSITION SENSOR

PCM

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read DTCs and record the related Freeze Frame data. With the DRBIII®, erase DTCs. Start the engine. If the DTC does not set right away it may be necessary to take the vehicle on a test drive. Does the DTC return? Yes → Go To 2 No → Go To 14	All
2	Turn the ignition off. Disconnect the CMP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (K7) 5-volt Supply circuit at the CMP Sensor harness connector. Is the voltage between 4.8 and 5.2 volts? Yes → Go To 3 No → Go To 10	All

## P0340-NO CAM REFERENCE SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
3	<p>Measure the voltage on the (K44) CMP Sensor Signal circuit at the CMP Sensor harness connector.</p> <p>Is the voltage between 4.5 and 5.0 volts?</p> <p>Yes → Go To 4</p> <p>No → Go To 6</p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Measure the resistance of the (K4) Sensor ground circuit from the CMP Sensor harness connector to the PCM harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K4) Sensor ground circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>NOTE: Inspect the Camshaft sprocket for damage per the Service Information. If a problem is found repair as necessary.</b></p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Camshaft Position Sensor.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (K44) CMP Sensor Signal circuit at the CMP Sensor harness connector.</p> <p>Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K44) CMP Sensor Signal circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off.</p> <p>Measure the resistance of the (K44) CMP Sensor Signal circuit from the CMP Sensor harness connector to the PCM harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (K44) CMP Sensor Signal circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p>Measure the resistance between ground and the (K44) CMP Sensor Signal circuit at the CMP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K44) CMP Sensor Signal circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All

**P0340-NO CAM REFERENCE SIGNAL AT PCM — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Measure the resistance between the (K44) CMP Sensor Signal circuit and the (K7) 5-volt Supply circuit in the CMP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K7) 5-volt Supply circuit and the (K44) CMP Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All
10	<p>Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage on the (K7) 5-volt Supply circuit at the CMP Sensor harness connector. Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
11	<p>Turn the ignition off. Measure the resistance of the (K7) 5-volt Supply circuit from the CMP Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the open in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
12	<p>Measure the resistance between ground and the (K7) 5-volt Supply circuit at the CMP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All
13	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P0340-NO CAM REFERENCE SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
14	<p><b>NOTE: The following tests may help in identifying a possible intermittent condition with the Cam Sensor or its related wire harness.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII® as a Dual Channel Lab Scope and the Miller special tool #6801, backprobe the (K44) CMP Signal circuit in the Cam Sensor connector and the PCM harness connector.</p> <p>Wiggle the related wire harness and connections.</p> <p>Monitor the lab scope screen.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Lightly tap on the Cam Sensor and wiggle the CMP Sensor connector and wire harness.</p> <p>Observe the lab scope screen.</p> <p>Look for any erratic pulses generated by the CMP Sensor.</p> <p>Did the CMP Sensor generate any erratic pulses?</p> <p>Yes → Carefully inspect the wire harness and connections, repair as necessary, if ok, replace the Cam Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 15</p>	All
15	<p><b>NOTE: An intermittent Crank Position Sensor failure may cause the P0340 code to set.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII® as a Dual Channel Lab Scope and the Miller special tool #6801, backprobe the (K24) CKP Signal circuit in the Crank Sensor connector and the PCM harness connector.</p> <p>Wiggle the related wire harness and connections.</p> <p>Monitor the lab scope screen.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Lightly tap on the Crank Sensor and wiggle the CKP Sensor connector and wire harness.</p> <p>Observe the lab scope screen.</p> <p>Look for any erratic pulses generated by the CKP Sensor.</p> <p>Did the CKP Sensor generate any erratic pulses?</p> <p>Yes → Carefully inspect the wire harness and connections, repair as necessary, if ok, replace the Crank Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All



**Symptom List:**

**P0351-IGNITION COIL #1 PRIMARY CIRCUIT**  
**P0352-IGNITION COIL #2 PRIMARY CIRCUIT**  
**P0353-IGNITION COIL #3 PRIMARY CIRCUIT**  
**P0354-IGNITION COIL #4 PRIMARY CIRCUIT**  
**P0355-IGNITION COIL #5 PRIMARY CIRCUIT**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0351-IGNITION COIL #1 PRIMARY CIRCUIT.**

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**When Monitored and Set Condition:****P0351-IGNITION COIL #1 PRIMARY CIRCUIT**

When Monitored: With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

Set Condition: Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

**P0352-IGNITION COIL #2 PRIMARY CIRCUIT**

When Monitored: With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

Set Condition: Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

**P0353-IGNITION COIL #3 PRIMARY CIRCUIT**

When Monitored: With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

Set Condition: Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

**P0354-IGNITION COIL #4 PRIMARY CIRCUIT**

When Monitored: With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

Set Condition: Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

**P0351-IGNITION COIL #1 PRIMARY CIRCUIT — Continued**

**P0355-IGNITION COIL #5 PRIMARY CIRCUIT**

**When Monitored:** With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

**Set Condition:** Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO  
(A142) ASD RELAY OUTPUT CIRCUIT  
IGNITION COIL RESISTANCE  
IGNITION COIL  
IGNITION COIL CONTROL CIRCUIT OPEN  
IGNITION COIL CONTROL CIRCUIT SHORTED TO GROUND  
PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 8.0L V10 MPI or MAGNUM 5.9L SMPI V8
2	<p>Turn the ignition off. Disconnect the Ignition coil harness connector. Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the (A142) ASD Relay Output circuit at the coil harness connector. With the DRBIII®, actuate the ASD Relay. Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Inspect the related fuse. Repair the open/excessive resistance or short to ground in the (A142) ASD Relay Output circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>Stop All Actuations</b></p>	MAGNUM 8.0L V10 MPI or MAGNUM 5.9L SMPI V8

**P0351-IGNITION COIL #1 PRIMARY CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            The resistance of the 5.9L Primary Ignition coil is 0.95 of and ohm to 1.2 ohms.            The resistance of a 8.0L Primary Ignition coil is 0.53 to 0.65 of an ohm.            Measure the resistance of the primary Ignition coil.            Is the resistance within the appropriate specification?</p> <p>Yes → Go To 4</p> <p>No → Replace the Ignition coil.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 8.0L V10 MPI or MAG- NUM 5.9L SMPI V8
4	<p>Using a 12-volt test light connected to a 12-volt source, probe the Ignition Coil Driver circuit.            Crank the engine for 5 seconds while observing the test light.            What is the condition of the test light while cranking the engine?</p> <p>Brightly blinking.            Replace the Ignition Coil Rail.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>ON constantly.            Go To 5</p> <p>OFF constantly.            Go To 6</p>	MAGNUM 8.0L V10 MPI or MAG- NUM 5.9L SMPI V8
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between the Ignition Coil Control circuit and ground.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the Ignition Coil Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	MAGNUM 8.0L V10 MPI or MAG- NUM 5.9L SMPI V8
6	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance of the Ignition Coil Control circuit from the Ignition Coil connector to the PCM connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the Ignition Coil Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 8.0L V10 MPI or MAG- NUM 5.9L SMPI V8
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair            Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 8.0L V10 MPI or MAG- NUM 5.9L SMPI V8

### Symptom List:

**P0351-IGNITION COIL #1 PRIMARY CIRCUIT**  
**P0352-IGNITION COIL #2 PRIMARY CIRCUIT**  
**P0353-IGNITION COIL #3 PRIMARY CIRCUIT**  
**P0354-IGNITION COIL #4 PRIMARY CIRCUIT**  
**P0355-IGNITION COIL #5 PRIMARY CIRCUIT**  
**P0356-IGNITION COIL #6 PRIMARY CIRCUIT**

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**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0351-IGNITION COIL #1 PRIMARY CIRCUIT**.

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### When Monitored and Set Condition:

#### **P0351-IGNITION COIL #1 PRIMARY CIRCUIT**

**When Monitored:** With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

**Set Condition:** Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

#### **P0352-IGNITION COIL #2 PRIMARY CIRCUIT**

**When Monitored:** With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

**Set Condition:** Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

#### **P0353-IGNITION COIL #3 PRIMARY CIRCUIT**

**When Monitored:** With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

**Set Condition:** Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

#### **P0354-IGNITION COIL #4 PRIMARY CIRCUIT**

**When Monitored:** With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

**Set Condition:** Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

**P0351-IGNITION COIL #1 PRIMARY CIRCUIT — Continued****P0355-IGNITION COIL #5 PRIMARY CIRCUIT**

**When Monitored:** With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

**Set Condition:** Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

**P0356-IGNITION COIL #6 PRIMARY CIRCUIT**

**When Monitored:** With battery voltage greater than 8 volts during engine cranking or greater than 12 volts with engine running, engine rpm less than 2016, and none of the coils in dwell when checked.

**Set Condition:** Peak current is not achieved with battery based dwell plus 1.5 msec of diagnostic offset. It takes less than 3 seconds during cranking or up to 6 seconds while running to set.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(A142) ASD RELAY OUTPUT CIRCUIT OPEN

CAPACITOR(S) SHORTED TO GROUND

(A142) ASD RELAY OUTPUT CIRCUIT SHORTED TO GROUND

COIL ON PLUG RESISTANCE

COIL ON PLUG

COIL CONTROL CIRCUIT SHORTED TO GROUND

COIL CONTROL CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero for?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 3.7L V6

## P0351-IGNITION COIL #1 PRIMARY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.  Disconnect the coil on plug harness connector.  Ignition on, engine not running.  With the DRBIII®, actuate the ASD Relay.  Using a 12-volt test light connected to ground, probe the (A142) ASD Relay Output circuit at the Coil on plug harness connector.  Does the test light illuminate brightly?</p> <p>Yes → Go To 3  No → Go To 8</p> <p><b>Stop All Actuations</b></p>	MAGNUM 3.7L V6
3	<p>Turn the ignition off.  Disconnect the coil on plug harness connector.  <b>NOTE: The following resistance measurement should be taken at 70°-80° F.</b>  Measure the resistance of the Primary Ignition Coil.  3.7L Primary Ignition Coil resistance is 0.6 to 0.9 of an ohm at 77°F (25°C).  Is the resistance within the given specification for the Ignition Coil being tested?</p> <p>Yes → Go To 4  No → Replace the coil on plug.  Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 3.7L V6
4	<p>Using a 12-volt test light connected to a 12-volt source, probe the Ignition Coil Driver circuit.  Crank the engine for 5 seconds while observing the test light.  What is the condition of the test light while cranking the engine?</p> <p>Brightly blinking.  Replace the Coil on plug.  Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>ON constantly.  Go To 5</p> <p>OFF constantly.  Go To 6</p>	MAGNUM 3.7L V6
5	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Measure the resistance between the Coil Control circuit and known good ground.  Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the Coil Control circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	MAGNUM 3.7L V6
6	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Measure the resistance of the Coil Control circuit from the Coil on plug connector to the PCM connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7  No → Repair the open in the Coil Control circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 3.7L V6

**P0351-IGNITION COIL #1 PRIMARY CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, review repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 3.7L V6
8	<p>Turn the ignition off.            Remove the ASD Relay from the IPM.            Measure the resistance of the (A142) ASD Relay Output circuit between the ASD Relay connector and the Ignition Coil harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the (A142) ASD Relay Output circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 3.7L V6
9	<p>Install the ASD Relay.  <b>NOTE: Repeat the following test for both capacitors</b>  <b>NOTE: The Capacitors are attached to the side of each valve cover.</b>            Disconnect the Capacitor harness connector.            Install a good INJ/COIL fuse.            With the DRBIII®, actuate the ASD Relay.  <b>NOTE: If the above test results in an open fuse for both capacitor tests, the problem is a short to ground in the (A142) ASD Relay Output circuit. Repair the short to ground in the (A142) ASD Relay Output circuit and refer to VER-5</b>            Is the INJ/COIL fuse OK for both capacitor tests?</p> <p>Yes → Replace the Capacitor(s)            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Repair the short to ground in the (A142) ASD Relay Output circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 3.7L V6

### Symptom List:

**P0420-1/1 CATALYTIC CONVERTER EFFICIENCY**

**P0432-2/1 CATALYTIC CONVERTER EFFICIENCY**

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**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0420-1/1 CATALYTIC CONVERTER EFFICIENCY**.

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### When Monitored and Set Condition:

#### **P0420-1/1 CATALYTIC CONVERTER EFFICIENCY**

**When Monitored:** After engine warm up to 147° F, 180 seconds of open throttle operation, at a speed greater than 20 mph, with the engine at 1200-1700 rpm and MAP vacuum between 15.0 and 21.0 inches of mercury (Hg).

**Set Condition:** As catalyst efficiency deteriorates, the switch rate of the downstream O2 sensor approaches that of the upstream O2 sensor. If at any point during the test the switch ratio reaches a predetermined value a counter is incremented by one.

#### **P0432-2/1 CATALYTIC CONVERTER EFFICIENCY**

**When Monitored:** After engine warm up to 147° F, 180 seconds of open throttle operation, at a speed greater than 20 mph, with the engine at 1200-1700 rpm and MAP vacuum between 15.0 and 21.0 inches of mercury (Hg).

**Set Condition:** As catalyst efficiency deteriorates, the switch rate of the downstream O2 sensor approaches that of the upstream O2 sensor. If at any point during the test the switch ratio reaches a predetermined value a counter is incremented by one.

### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

VISUALLY INSPECT CATALYTIC CONVERTER

EXHAUST LEAK

ENGINE MECHANICAL PROBLEM

UPSTREAM O2 SENSOR OLDER THAN DOWNSTREAM O2 SENSOR

CATALYTIC CONVERTER



**P0420-1/1 CATALYTIC CONVERTER EFFICIENCY — Continued**

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Inspect the Catalytic Converter for the following damage.            Damaged Catalytic Converter, dent and holes.            Severe discoloration caused by overheating the Catalytic Converter.            Catalytic Converter broken internally.            Leaking Catalytic Converter.            Were any problems found?</p> <p>Yes → Replace the Catalytic Converter. Repair the condition that may have caused the failure.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Start Engine and let idle.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            Check for exhaust leaks between the engine and the appropriate downstream O2 Sensor.            Is there any exhaust leaks?</p> <p>Yes → Repair or replace leaking exhaust parts as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p><b>Check the exhaust for excessive smoke from internal oil or coolant leaks.</b>            Is there an oil or coolant consumption condition present?</p> <p>Yes → Repair engine mechanical condition as necessary and replace Catalytic Converter.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.  <b>NOTE: A new Downstream O2 Sensor along with an aging Upstream O2 Sensor may cause this trouble code to set.</b>            Review vehicle repair history.            Has the Downstream O2 Sensor been replaced without replacing the Upstream O2 Sensor?</p> <p>Yes → Replace the appropriate Upstream Oxygen Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Catalytic Converter.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P0441-EVAP PURGE FLOW MONITOR**

#### When Monitored and Set Condition:

#### **P0441-EVAP PURGE FLOW MONITOR**

**When Monitored:** With engine temperature greater than 170° F, fuel control in closed loop, engine idling for 2 minutes, no low fuel, MAP less than 15.7 inches mercury and barometric altitude less than 8,000 feet.

**Set Condition:** After having passed the Leak Detection Pump (LDP) test, no air flow through the evaporative system is detected by the EVAP monitor.

#### **POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

INTERMITTENT CONDITION

VISUAL INSPECTION

EVAP PURGE HOSE (SOLENOID TO CANISTER)

EVAP PURGE HOSE (CANISTER TO FUEL TANK)

EVAP PURGE SOLENOID VACUUM SUPPLY

EVAP PURGE SOLENOID (LEAKS/STUCK OPEN)

EVAP PURGE SOLENOID

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Visually inspect the Evap canister. Look for any physical damage or any signs of fuel that has entered the canister. Any signs of fuel may indicate a bad rollover valve. Were any problems found?</p> <p>Yes → Repair or Replace as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P0441-EVAP PURGE FLOW MONITOR — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Visually inspect the Evap purge hose that goes from the Purge Solenoid to the Evap Canister. Look for any physical damage such as a pinched, plugged, ripped or dry rotted hose.</p> <p>Were any problems found?</p> <p>Yes → Repair or replace hose as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Visually inspect the Evap Purge hose that goes between the Evap canister and the fuel tank. Look for any physical damage such as a pinched, plugged, ripped or dry rotted hose.</p> <p>Were any problems found?</p> <p>Yes → Repair or replace hose as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Carefully inspect the Evap Purge Solenoid vacuum supply hose for proper routing. Also check for a pinched or plugged hose from the throttle body to the Purge Solenoid. Inspect the vacuum nipple at the throttle body for any damage or plugging. Make sure vacuum fitting at the purge solenoid is not over installed, pushed in too far.</p> <p>Is the vacuum supply hose and throttle body vacuum nipple free from defects?</p> <p>Yes → Go To 6</p> <p>No → Repair the vacuum supply hose/tube as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>Note: After disconnecting the Evap Purge Solenoid vacuum connections, inspect the lines and solenoid for any signs of contamination from the EVAP Canister. This may indicate a faulty fuel tank vent. Replace purge solenoid if contamination is found</b></p> <p>Disconnect the vacuum hoses at the EVAP Purge Solenoid.</p> <p>Using a hand vacuum pump, apply 10 inches of vacuum to the Evap Purge Solenoid vacuum source port. (component side)</p> <p>Does the Evap Purge Solenoid hold vacuum?</p> <p>Yes → Go To 7</p> <p>No → Replace the Evap Purge Solenoid and the Evap Canister and clean out Evap lines as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Using a hand vacuum pump, apply 10 inches of vacuum to the Evap Purge Solenoid vacuum source port. (component side)</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the EVAP Purge Solenoid and observe the vacuum gauge.</p> <p>Does the vacuum drop when the solenoid is actuated?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the Evap Purge Solenoid. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P0442-EVAP LEAK MONITOR MEDIUM (0.040) LEAK DETECTED**

**P0455-EVAP LEAK MONITOR LARGE LEAK DETECTED**

**P0456-EVAP LEAK MONITOR SMALL (0.020) LEAK DETECTED**

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**Test Note: All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P0442-EVAP LEAK MONITOR  
MEDIUM (0.040) LEAK DETECTED.**

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**When Monitored and Set Condition:**

**P0442-EVAP LEAK MONITOR MEDIUM (0.040) LEAK DETECTED**

When Monitored: Immediately after a cold start, with battery/ambient temperature between 40° F and 90° F and coolant temperature within 10° F of battery/ambient.

Set Condition: If there is a leak larger than 0.040" and smaller than 0.080" in the evaporative system.

**P0455-EVAP LEAK MONITOR LARGE LEAK DETECTED**

When Monitored: Immediately after a cold start, with battery/ambient temperature between 40° F and 90° F and coolant temperature within 10° F of battery/ambient.

Set Condition: There is a leak larger than 0.080" in the evaporative system.

**P0456-EVAP LEAK MONITOR SMALL (0.020) LEAK DETECTED**

When Monitored: Immediately after a cold start, with battery/ambient temperature between 40° F and 90° F and coolant temperature within 10° F of battery/ambient.

Set Condition: There is a leak larger than 0.020" and smaller than 0.040" in the evaporative system.

<b>POSSIBLE CAUSES</b>
GOOD TRIP EQUAL TO ZERO
INTERMITTENT CONDITION
VERIFY EVAPORATIVE EMISSION SYSTEM LEAK
EVAPORATIVE EMISSION LEAK DETECTION
EVAP PURGE SOLENOID

**P0442-EVAP LEAK MONITOR MEDIUM (0.040) LEAK DETECTED — Continued**

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.</p> <p><b>Note: A loose gas cap could have caused this DTC to set. Make sure gas cap is tight and in good condition. Ensure the gas cap meets OEM specifications.</b></p> <p>Verify with customer that the gas cap has not been tightened since the MIL illuminated.</p> <p><b>NOTE: Engine vacuum at must be present at the LDP vacuum port.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

## P0442-EVAP LEAK MONITOR MEDIUM (0.040) LEAK DETECTED — Continued

TEST	ACTION	APPLICABILITY
2	<p>To continue testing you will need Miller Tool #8404 Evaporative Emission Leak Detector (EELD).</p> <p><b>WARNING: Keep lit cigarettes, sparks, flames, and other ignition sources away from the test area to prevent the ignition of explosive gases. Keep the test area well ventilated.</b></p> <p><b>NOTE: The fuel tank should have between 20% and 80% of fuel tank capacity to properly test the Evap system.</b></p> <p>Disconnect the vacuum supply hose at the Leak Detection Pump.</p> <p>Connect and apply a continuous vacuum supply (i.e. 20"Hg) to the Leak Detection Pump. A vacuum pump such as an A/C recovery unit works well.</p> <p>Using the DRBIII®, select Engine/System Tests and actuate the Leak Detect Pump Test (Option 3/Hold PSI).</p> <p><b>NOTE: The above energizes the LDP solenoid and allows the constant vacuum source to apply vacuum to the LDP pump diaphragm. This lifts the diaphragm up and seals the atmospheric canister vent valve at the bottom of the Leak Detection Pump.</b></p> <p>Connect the red power lead of Miller Tool #8404 to the battery positive terminal and the black ground lead to battery negative terminal.</p> <p><b>NOTE: See Charts and Graph support material EELD Calibration Setup for an example.</b></p> <p>Connect shop air to the #8404 EELD.</p> <p>Set the smoke/air control switch to AIR.</p> <p>Insert the tester's AIR supply tip (clear hose) into the appropriate calibration orifice on the tester's control panel (based on DTC leak size).</p> <p>Press the remote smoke/air start button.</p> <p>Position the red flag on the air flow meter so it is aligned with the indicator ball.</p> <p>When the calibration is complete, release the remote button. The EELD is now calibrated the flow meter in liters per minute to the size leak indicated by the DTC set in the PCM.</p> <p>Install the service port adapter #8404-14 on the vehicle's service port (if equipped) or install the #8404-ADP service adapter in the LDP filter line.</p> <p>Connect the Air supply hose from the EELD to the service port or the #8404-ADP.</p> <p>Press the remote button to activate AIR flow.</p> <p><b>NOTE: Larger volume fuel tanks, and/or those with less fuel, may require 4 to 5 minutes to fill.</b></p> <p>Compare the flow meter indicator ball reading to the red flag.</p> <p>ABOVE the red flag indicates a leak present.</p> <p>BELOW the red flag indicates a sealed system.</p> <p>Is the indicator ball above the red flag?</p> <p>Yes → Go To 3</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

# **P0442-EVAP LEAK MONITOR MEDIUM (0.040) LEAK DETECTED — Continued**

TEST	ACTION	APPLICABILITY
3	<p><b>NOTE: A thorough visual inspection of the Evap system hoses, tubes, and connections may save time in your diagnosis. Look for any physical damage or signs of wetness at connections. The strong smell of fuel vapors may aid diagnosis also.</b></p> <p>To continue testing, you will need Miller Tool #8404 Evaporative Emissions Leak Detector (EELD).</p> <p>Remove the Air supply hose from the service port if equipped or #8404-ADP.</p> <p>Connect the SMOKE supply tip (black hose) to the service port if equipped or #8404-ADP.</p> <p>Set the smoke/air control switch to SMOKE.</p> <p><b>NOTE: The flow meter indicator ball will not move at this point.</b></p> <p>Press the remote smoke/air start button.</p> <p><b>NOTE: Ensure that smoke has filled the EVAP system by continuing to press the remote smoke/air start button, remove the vehicle fuel cap, and wait for the smoke to exit. Once smoke is indicated reinstall the fuel cap.</b></p> <p><b>NOTE: For optimal performance, introduce smoke into the system for an additional 60 seconds; continue introducing smoke at 15 second intervals, as necessary.</b></p> <p>While still holding the remote smoke/air start button, use the white light (#8404-CLL) to follow the EVAP system path, and look for the source of the leak indicated by exiting smoke.</p> <p>If a leak is concealed from view (i.e., top of fuel tank), release the remote smoke/air start button, and use the ultraviolet (UV) black light #8404-UVL and the yellow goggles 8404-20 to look for residual traces of dye that is left behind by the smoke. The exiting smoke deposits a residual fluid that is either bright green or bright yellow in color when viewed with a UV light.</p> <p>Was a leak found?</p> <p>Yes → Repair or replace the leaking component as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 4</p>	All
4	<p><b>NOTE: After disconnecting the Evap Purge Solenoid vacuum connections, inspect the lines and solenoid for any signs of contamination from the EVAP Canister. This may indicate a faulty rollover valve. Replace/repair as necessary.</b></p> <p>Turn the ignition off.</p> <p>Disconnect the vacuum hoses at the Evap Purge Solenoid.</p> <p>Using a hand vacuum pump, apply 10 inches of vacuum to the Evap Purge Solenoid vacuum source port on the component side.</p> <p><b>NOTE: Monitor the vacuum gauge for at least 15 seconds.</b></p> <p>Does the Evap Purge Solenoid hold vacuum?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Replace the EVAP Purge Solenoid. Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

## Symptom:

### P0443-EVAP PURGE SOLENOID CIRCUIT

#### When Monitored and Set Condition:

#### P0443-EVAP PURGE SOLENOID CIRCUIT

**When Monitored:** Continuously after the ignition is turned on and the battery voltage is above 10.4 volts.

**Set Condition:** Not powering down, not in limp-in and time since last solenoid activation is greater than 72 micro seconds. The PCM will set a trouble code if the actual state of the solenoid does not match the intended state on two consecutive key cycles.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

(Y134) FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN

EVAP PURGE SOLENOID

(K52) EVAP PURGE SOLENOID CONTROL CIRCUIT OPEN

(K52) EVAP PURGE SOLENOID CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the Evap Purge Solenoid connector. Measure the resistance between the terminals of the Evap Purge Solenoid. Is the resistance between 29.0 and 44.0 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the Evap Purge Solenoid. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**P0443-EVAP PURGE SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the (Y134) Fused Ignition Switch Output circuit. Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the excessive resistance or short to ground in the (Y134) Fused Ignition Switch Output circuit. Inspect related fuse and repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the (K52) Evap Purge Solenoid Control circuit from the PCM harness connector to the Evap Purge Solenoid harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K52) Evap Purge Solenoid Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (K52) Evap Purge Solenoid Control circuit. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K52) Evap Purge Solenoid Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom List:

**P0460-FUEL LEVEL SENDING UNIT NO CHANGE OVER MILES**

**P0461-FUEL LEVEL SENDING UNIT NO CHANGE OVER TIME**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0460-FUEL LEVEL SENDING UNIT NO CHANGE OVER MILES.**

## When Monitored and Set Condition:

### **P0460-FUEL LEVEL SENDING UNIT NO CHANGE OVER MILES**

When Monitored: Engine running and fuel level either below 15% or above 85% of capacity.

Set Condition: The PCM sees low fuel, less than 15%, for more than 120 miles or fuel level does not change by at least 4% for more than 250 miles.

### **P0461-FUEL LEVEL SENDING UNIT NO CHANGE OVER TIME**

When Monitored: Engine running and fuel level either below 15% or above 85% of capacity.

Set Condition: The PCM sees low fuel, less than 15%, for more than 120 miles or fuel level does not change by at least 4% for more than 250 miles.

## POSSIBLE CAUSES

PHYSICALLY DAMAGED/DEFORMED/OBSTRUCTED FUEL TANK

FUEL LEVEL SENSOR

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs. Turn the ignition off. <b>WARNING: The fuel system is under a constant pressure, even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b> Inspect the outside of the fuel tank for defects. Remove the fuel tank. Remove the fuel pump module from the fuel tank. Inspect the inside of the fuel tank for any obstructions or deformities. Is the fuel tank free from defects?</p> <p>Yes → Go To 2</p> <p>No → Repair or replace the fuel tank as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Fuel Level Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****P0462-FUEL LEVEL SENDING UNIT VOLTS TOO LOW****When Monitored and Set Condition:****P0462-FUEL LEVEL SENDING UNIT VOLTS TOO LOW**

When Monitored: Ignition on and battery voltage above 10.4 volts.

Set Condition: The Fuel Level Sensor signal voltage goes below 0.2 of a volt at the PCM for more than 5 seconds.

**POSSIBLE CAUSES**

FUEL LEVEL SENSOR VOLTAGE BELOW 0.2 OF A VOLT

FUEL LEVEL SENSOR

(G8) FUEL LEVEL SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

(G8) FUEL LEVEL SENSOR SIGNAL CIRCUIT SHORTED TO (K4) SENSOR GROUND CIRCUIT  
PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. With the DRBIII®, read the Fuel Level Sensor voltage. Is the Fuel Level Sensor voltage below 0.2 of a volt?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
2	Turn the ignition off. Disconnect the Fuel Pump Module harness connector. Ignition on, engine not running. With the DRBIII®, read the Fuel Level Sensor voltage. Did the Fuel Level Sensor voltage change from below 0.2 of a volt to above 4.0 volts?  Yes → Replace the Fuel Level Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 3	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (G8) Fuel Level Sensor Signal circuit. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (G8) Fuel Level Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 4	All

## P0462-FUEL LEVEL SENDING UNIT VOLTS TOO LOW — Continued

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the (G8) Fuel Level Sensor Signal circuit and the (K4) Sensor ground circuit. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K4) Sensor ground circuit and the (G8) Fuel Level Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****P0463-FUEL LEVEL SENDING UNIT VOLTS TOO HIGH****When Monitored and Set Condition:****P0463-FUEL LEVEL SENDING UNIT VOLTS TOO HIGH**

When Monitored: Ignition on and battery voltage above 10.4 volts.

Set Condition: The Fuel Level Sensor signal voltage at the PCM goes above 4.95 volts for more than 90 seconds.

**POSSIBLE CAUSES**

FUEL LEVEL SENSOR VOLTAGE ABOVE 4.9 VOLTS

FUEL LEVEL SENSOR

(G8) FUEL LEVEL SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

(G8) FUEL LEVEL SENSOR SIGNAL CIRCUIT OPEN

(K4) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Check for any related TSBs. With the DRBIII®, read the Fuel Level Sensor voltage. Is the Fuel Level Sensor voltage above 4.9 volts?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
2	Turn the ignition off. Disconnect the Fuel Pump Module electrical harness connector. Ignition on, engine not running. Connect a jumper wire between the (G8) Fuel Level Sensor Signal circuit and the (K4) Sensor ground circuit at the Fuel Pump Module harness connector. With the DRBIII®, read the Fuel Level Sensor voltage. Did the Fuel Level Sensor voltage change from above 4.8 volts to below 0.4 of a volt?  Yes → Replace the Fuel Level Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

## P0463-FUEL LEVEL SENDING UNIT VOLTS TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Ignition on, engine not running.  Measure the voltage on the (G8) Fuel Level Sensor Signal circuit in the Fuel Pump harness connector.  Is the voltage above 10.0 volts?</p> <p>Yes → Repair the short to voltage in the (G8) Fuel Level Sensor Signal circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  Measure the resistance of the (G8) Fuel Level Sensor Signal circuit from the PCM harness connector to the Fuel Pump Module harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (G8) Fuel Level Sensor Signal circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p>Measure the resistance of the (K4) Sensor ground circuit from the PCM harness connector to the Fuel Pump Module harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K4) Sensor ground circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair  Replace and program the Powertrain Control Module per Service Information.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:**  
**P0500-NO VEHICLE SPEED SIGNAL**

**When Monitored and Set Condition:**

**P0500-NO VEHICLE SPEED SIGNAL**

When Monitored: Engine Temperature greater than 104 deg F, MAP vacuum approximately 15" to 16" inches of mercury and Engine RPM between 1400 and 3000 rpm.

Set Condition: No Vehicle Speed Signal for more than 15 seconds on two consecutive trips.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(G7) VEHICLE SPEED SIGNAL CIRCUIT SHORTED TO VOLTAGE

(G7) VEHICLE SPEED SIGNAL CIRCUIT OPEN BETWEEN CAB AND PCM

(G7) VEHICLE SPEED SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. <b>NOTE: With the DRBIII® check for any related DTCs that may be present in the ABS/RWAL Module or TCM, diagnose any ABS/RWAL Module DTC's before continuing.</b> With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the PCM harness connectors. Disconnect the ABS/RWAL Module harness connector. Ignition on, engine not running. Measure the voltage of the (G7) Vehicle Speed Signal circuit in the CAB or PCM harness connector. Is the voltage above 4.9 volts?  Yes → Repair the short to voltage in the (G7) Vehicle Speed Signal circuit between the CAB and PCM. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All

## P0500-NO VEHICLE SPEED SIGNAL — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Measure the resistance of the (G7) Vehicle Speed Signal circuit between the PCM harness connector and the CAB harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the open in the (G7) Vehicle Speed Signal circuit between the CAB and PCM.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Measure the resistance between ground and the (G7) Vehicle Speed Signal circuit at the PCM harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (G7) Vehicle Speed Signal circuit between the CAB and PCM.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P0505-IDLE AIR CONTROL MOTOR CIRCUITS****When Monitored and Set Condition:****P0505-IDLE AIR CONTROL MOTOR CIRCUITS**

When Monitored: At power-up and battery voltage greater than 11.5 volts.

Set Condition: The PCM senses a short to ground or battery voltage on any of the four Idle Air Control (IAC) driver circuits for 100 msec while the IAC motor is active.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(K40) IAC #1 DRIVER CIRCUIT SHORTED TO #2, #3, OR #4

(K60) IAC #2 DRIVER CIRCUIT SHORTED TO #3 OR #4

(K39) IAC #3 DRIVER CIRCUIT SHORTED TO (K59) IAC #4 DRIVER CIRCUIT

IAC DRIVER CIRCUIT SHORTED TO VOLTAGE

IAC DRIVER CIRCUIT SHORTED TO GROUND

IAC MOTOR OPERATION

IAC MOTOR

TEST	ACTION	APPLICABILITY
1	Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the IAC Motor harness connector. Disconnect the PCM harness connectors. <b>Note: The following steps are checking for a short between the IAC Driver circuits.</b> Measure the resistance between the (K40) IAC #1 Driver circuit and #2, #3, #4 Driver circuits. Is the resistance below 100 ohms on any of the Drivers?  Yes → Repair the short between the IAC Driver circuits. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All

## P0505-IDLE AIR CONTROL MOTOR CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
3	<p><b>Note: The following steps are checking for a short between the IAC Driver circuits.</b>            Measure the resistance between the (K60) IAC #2 Driver circuit and #3, #4 Driver circuits.            Is the resistance below 100 ohms on any of the Drivers?</p> <p>Yes → Repair the shorted IAC Driver circuits.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p><b>Note: The following steps are checking for a short between the Driver Circuits.</b>            Measure the resistance between the (K39) IAC #3 Driver circuit and the (K59) #4 Driver circuit.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the IAC Driver circuits.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Remove the ASD Relay.            Using a jumper wire, jumper between the Fused B+ circuit and ASD Relay Output circuit in the PDC.            Ignition on, engine not running with the PCM and IAC harness connectors disconnected.            Measure the voltage on each of the IAC Driver circuits.            Is the voltage above 1.0 volt at any IAC Driver circuit?</p> <p>Yes → Repair the short to voltage on the appropriate IAC Driver circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p> <p><b>NOTE: Remove the jumper wire and install the ASD Relay before continuing.</b></p>	All
6	<p>Turn the ignition off.            Repeat each measurement for each IAC Driver circuit.            Measure the resistance between ground and each IAC Driver circuit.            Is the resistance below 100 ohms at any IAC Driver circuit?</p> <p>Yes → Repair the short to ground in the appropriate IAC Driver circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off.            Connect the PCM harness connectors.            Start and idle the engine.            Using a test light connected to ground, probe the (K40) IAC Driver #1 circuit for 10 seconds.            Repeat the above test for the remaining IAC Motor Driver circuits.            Does the test light turn on and off while probing each IAC Motor Driver circuits?</p> <p>Yes → Replace the Idle Air Control Motor.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0523-OIL PRESSURE CIRCUIT HIGH****When Monitored and Set Condition:****P0523-OIL PRESSURE CIRCUIT HIGH**

When Monitored: With the ignition on and battery voltage above 10.4 volts.

Set Condition: The oil pressure sensor signal at PCM goes above 4.9 volts. One Trip Fault.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

OIL PRESSURE SWITCH

(G60) OIL PRESSURE SIGNAL CIRCUIT SHORTED TO VOLTAGE

(G60) OIL PRESSURE SIGNAL CIRCUIT OPEN

(G60) OIL PRESSURE SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
2	Turn the ignition off. Disconnect the Oil Pressure Switch harness connector. Ignition on, engine not running. Connect a jumper wire to the (G60) Oil Pressure Signal circuit in the Switch harness connector. With the DRBIII® monitor the Oil Pressure Switch state. Touch the other end of the jumper wire to Ground several times. Did the Oil Pressure Switch state change from High to Low?  Yes → Replace the Oil Pressure Switch. Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

## P0523-OIL PRESSURE CIRCUIT HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Ignition on, engine not running.  Measure the voltage on the (G60) Oil Pressure Signal circuit at the Switch harness connector.  Is the voltage above 5.3 volts?</p> <p>Yes → Repair the short to voltage on the (G60) Oil Pressure Signal circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  Measure the resistance of the (G60) Oil Pressure Signal circuit from the Oil Pressure Switch harness connector to the PCM harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (G60) Oil Pressure Signal circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p>Measure the resistance between (G60) Oil Pressure Signal circuit and ground at the Switch connector.  Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (G60) Oil Pressure Signal circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****P0551-POWER STEERING SWITCH FAILURE****When Monitored and Set Condition:****P0551-POWER STEERING SWITCH FAILURE**

When Monitored: With the ignition key on and engine running.

Set Condition: With the vehicle above 40 mph for over 30 seconds, the power steering pressure switch remains open.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

POWER STEERING PRESSURE SWITCH

(S28) POWER STEERING SWITCH SIGNAL CIRCUIT OPEN

(S28) POWER STEERING PRESSURE SWITCH SIGNAL CIRCUIT SHORTED TO GROUND

(Z244) POWER STEERING PRESSURE SWITCH GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
2	Turn the ignition off. Disconnect the Power Steering Pressure Switch harness connector. Ignition on, engine not running. Connect a Jumper Wire to the (S28) Power Steering Pressure Switch Signal circuit at harness connector. Using the DRBIII®, monitor the Power Steering Pressure Switch. Touch the Jumper Wire to the (Z244) Ground circuit at the Power Steering Pressure Switch harness connector several times. Did the Power Steering Pressure Switch status change from Hi to Low?  Yes → Replace the Power Steering Pressure Switch. Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

## P0551-POWER STEERING SWITCH FAILURE — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure resistance of (S28) Power Steering Pressure Switch Signal circuit from PCM harness connector to Power Steering Pressure Switch harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (S28) Power Steering Switch Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
4	<p>Measure the resistance between ground and the (S28) Power Steering Pressure Switch Signal circuit at the P/S Switch harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (S28) Power Steering Pressure Switch Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 5</p>	All
5	<p>With a 12-volt test light connected to 12-volts, probe the (Z224) P/S Pressure Switch ground circuit.            Does the test light illuminate brightly?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (Z244) Power Steering Pressure Switch ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****P0601-PCM INTERNAL CONTROLLER FAILURE****POSSIBLE CAUSES**

POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<b>NOTE: This DTC indicates an internal PCM problem.</b> If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All

## Symptom:

### **P0622-GENERATOR FIELD NOT SWITCHING PROPERLY**

## When Monitored and Set Condition:

### **P0622-GENERATOR FIELD NOT SWITCHING PROPERLY**

When Monitored: With the ignition key on and the engine running.

Set Condition: When the PCM tries to regulate the generator field with no result during monitoring.

## POSSIBLE CAUSES

GENERATOR FIELD PERFORMANCE

(K125) GEN FIELD SOURCE CIRCUIT OPEN

(K20) GEN FIELD CONTROL CIRCUIT OPEN

(K20) GEN FIELD CONTROL CIRCUIT SHORTED TO GROUND

GENERATOR

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. Record all DTCs and the related Freeze Frame data. Check for any related TSBs. Using a 12-volt test light connected to ground, backprobe the (K20) Gen Field Control circuit at the back of the Generator. With the DRBIII®, actuate the Generator Field Driver. Does the test light blink?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 2</p>	All
2	<p>Ignition on, engine not running. Carefully inspect all connectors for corrosion or spread terminals before continuing. Backprobe the (K125) Generator Field Source circuit at back of Generator with a volt meter. With the DRBIII® actuate the Generator Field Driver. Is the voltage above 10.0 volts?</p> <p>Yes → Go To 3</p> <p>No → Repair the open in the (K125) Gen Field Source circuit. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All



**P0622-GENERATOR FIELD NOT SWITCHING PROPERLY — Continued**

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the PCM harness connectors. Disconnect the Generator Field harness connector. Measure the resistance of the (K20) Generator Field Control circuit from the Generator Field harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 4  No → Repair the open in the (K20) Gen Field Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 3.	All
4	Measure the resistance between ground and the (K20) Generator Field Control circuit in the PCM harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K20) Gen Field Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 3.  No → Go To 5	All
5	Measure resistance across the Generator Field Terminals at the Generator. Is the resistance between 0.5 of and ohm and 15 ohms?  Yes → Go To 6  No → Repair the Generator as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 3.	All
6	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 3.	All

## Symptom:

### P0645-A/C CLUTCH RELAY CIRCUIT

#### When Monitored and Set Condition:

#### P0645-A/C CLUTCH RELAY CIRCUIT

**When Monitored:** With the ignition key in the run position and battery voltage above 10.4 volts.

**Set Condition:** An open or shorted condition is detected in the A/C clutch relay control circuit.

#### POSSIBLE CAUSES

A/C CLUTCH RELAY OPERATION

A/C CLUTCH RELAY

INTERNAL FUSED IGNITION SWITCH OUTPUT CIRCUIT

(C13) A/C CLUTCH RELAY CONTROL CIRCUIT OPEN

(C13) A/C CLUTCH RELAY CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Check for any related TSBs.            With the DRBIII®, actuate the A/C Clutch Relay.            Is the A/C Clutch Relay clicking?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off.            Remove the A/C Clutch Relay from the IPM.            Measure the resistance between Coil Terminals of the A/C Clutch Relay.            Is the resistance between 50.0 and 90.0 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the A/C Clutch Relay.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**P0645-A/C CLUTCH RELAY CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running.            Measure the voltage on the Internal Fused Ignition Switch Output circuit for the A/C Clutch in the IPM.            Is the voltage above 10.0 volts?</p> <p>Yes → Go To 4</p> <p>No → Repair the open or short to ground in the Internal Fused Ignition Switch Output circuit. Inspect and replace fuses as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
4	<p>Turn the ignition off.            Measure the resistance of the (C13) A/C Clutch Relay Control circuit from the IPM to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (C13) A/C Clutch Relay Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p>Measure the resistance between ground and the (C13) A/C Clutch Relay Control circuit at the PCM harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (C13) A/C Clutch Relay Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### **P0700-TRANSMISSION CONTROL SYSTEM (MIL REQUEST)**

## When Monitored and Set Condition:

### **P0700-TRANSMISSION CONTROL SYSTEM (MIL REQUEST)**

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: An active DTC is stored in the TCM. One Trip Fault. Three good trips to turn off the MIL.

## POSSIBLE CAUSES

TCM DTC PRESENT SET IN PCM

TEST	ACTION	APPLICABILITY
1	<p>This DTC is an indicator that a Trans DTC has previously been set. A code may not currently be present in the TCM if a Trans repair was made. If after reading transmission DTC's there are no codes in the TCM, this code can be erased from the PCM.</p> <p>Trans DTC present?</p> <p>Continue</p> <p>A DTC was registered in the Transmission Control Module. With the DRB, go to the TCM and read codes. Refer to the appropriate symptom (Diagnostic Procedure).</p>	All

**Symptom List:**

**P1195-O2 SENSOR 1/1 SLOW DURING CATALYST MONITOR**  
**P1196-O2 SENSOR 2/1 SLOW DURING CATALYST MONITOR**

**Test Note: All symptoms listed above are diagnosed using the same tests.**  
**The title for the tests will be P1195-O2 SENSOR 1/1 SLOW DURING CATALYST MONITOR.**

**When Monitored and Set Condition:****P1195-O2 SENSOR 1/1 SLOW DURING CATALYST MONITOR**

**When Monitored:** With the engine running, coolant greater than 170°F, open throttle, steady to slightly increasing vehicle speed greater than 18 mph but less than 55 mph, with a light load on the engine, for a period no less than 5 minutes.

**Set Condition:** The oxygen sensor signal voltage is switching from below 0.39 of a volt to above 0.6 of a volt and back fewer times than required.

**P1196-O2 SENSOR 2/1 SLOW DURING CATALYST MONITOR**

**When Monitored:** With the engine running, coolant greater than 170°F, open throttle, steady to slightly increasing vehicle speed greater than 18 mph but less than 55 mph, with a light load on the engine, for a period no less than 5 minutes.

**Set Condition:** The oxygen sensor signal voltage is switching from below 0.39 of a volt to above 0.6 of a volt and back fewer times than required.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

EXHAUST LEAK

RESISTANCE IN THE O2 SENSOR SIGNAL CIRCUIT

RESISTANCE IN THE (K4) O2 SENSOR GROUND CIRCUIT

O2 SENSOR

TEST	ACTION	APPLICABILITY
1	Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

## P1195-O2 SENSOR 1/1 SLOW DURING CATALYST MONITOR — Continued

TEST	ACTION	APPLICABILITY
2	<p>Start the engine. Inspect the exhaust for leaks between the engine and the appropriate O2 Sensor. Are there any exhaust leaks?</p> <p>Yes → Repair or replace the leaking exhaust parts as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off. Backprobe the O2 Sensor Signal circuit at the O2 Sensor harness connector and PCM harness connector. <b>NOTE: Make sure the voltmeter leads are connected for positive polarity, meet the terminals in the connector, and that there is good terminal to wire connection.</b> <b>NOTE: Ensure the voltmeter leads are connected for positive polarity</b> Start the engine. Allow the engine to idle. Is the voltage below 0.10 of a volt?</p> <p>Yes → Go To 4</p> <p>No → Repair the excessive resistance on the O2 Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Turn the ignition off. Backprobe the (K4) Sensor ground circuit at the O2 Sensor harness connector and PCM harness connector. <b>NOTE: Make sure the voltmeter leads are connected for positive polarity, meet the terminals in the connector, and that there is good terminal to wire connection.</b> Start the engine. Allow the engine to idle. Is the voltage below 0.10 of a volt?</p> <p>Yes → Go To 5</p> <p>No → Repair the excessive resistance in the (K4) Sensor ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Turn the ignition off. If there are no possible causes remaining, view repair.</p> <p>Repair Replace the O2 Sensor Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P1281-ENGINE IS COLD TOO LONG****When Monitored and Set Condition:****P1281-ENGINE IS COLD TOO LONG**

When Monitored: The ignition key on, engine running.

Set Condition: The engine does not warm to 176 deg. F while driving for 20 minutes after start.

**POSSIBLE CAUSES**

ENGINE COOLANT TEMP SENSOR

ENGINE COLD TOO LONG

TEST	ACTION	APPLICABILITY
1	<p><b>Note: The best way to diagnose this DTC is to allow the vehicle to remain outside overnight in order to have a completely cold soaked engine.</b></p> <p><b>Note: Extremely cold outside ambient temperatures may cause this DTC to set.</b></p> <p>Verify that the coolant level is at the correct level per service information.</p> <p>Start the engine.</p> <p>With the DRBIII® in Sensors, read the ECT Sensor temperature value.</p> <p>Use a DVOM that has thermal sensing probe to monitor the Coolant temperature at the Thermostat housing.</p> <p>The thermostat housing area should be approximately 192-195°F (89-91°C) when the Thermostat begins to open.</p> <p>Is the DRBIII® reading cooler than the DVOM reading?</p> <p>Yes → Replace the ECT Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 2</p>	All
2	<p><b>Note: The best way to diagnose this DTC is to allow the vehicle to remain outside overnight in order to have a completely cold soaked engine.</b></p> <p>Start the engine.</p> <p>With the DRBIII®, set the engine RPM to 1500 and allow the engine to warm up for 10-15 minutes.</p> <p>With the DRBIII®, monitor the ENG COOLANT TMP DEG value during the warm up cycle. Make sure the transition of temperature change is smooth.</p> <p>Did the engine temperature reach a minimum of 80° C (176° F)?</p> <p>Yes → Test Complete.</p> <p>No → Refer to the Service Information for cooling system performance diagnosis. The most probable cause is a Thermostat problem. Also, refer to any related TSBs. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### P1282-FUEL PUMP/SYSTEM RELAY CONTROL CIRCUIT

#### When Monitored and Set Condition:

#### P1282-FUEL PUMP/SYSTEM RELAY CONTROL CIRCUIT

When Monitored: With the ignition on and battery voltage above 10.4 volts.

Set Condition: An open or shorted condition is detected in the Fuel Pump Relay Control circuit.

#### POSSIBLE CAUSES

FUEL PUMP RELAY OPERATION

FUEL PUMP RELAY

(Y135) FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN

(K31) FUEL PUMP RELAY CONTROL CIRCUIT OPEN

(K31) FUEL PUMP RELAY CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Check for any related TSBs. With the DRBIII®, actuate the Fuel Pump Relay. Is the Fuel Pump Relay clicking?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 2	All
2	Turn the ignition off. Remove the Fuel Pump Relay. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the coil terminals of the Fuel Pump Relay. Is the resistance between 50 and 90 ohms?  Yes → Go To 3  No → Replace the Fuel Pump Relay. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All



**P1282-FUEL PUMP/SYSTEM RELAY CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the (Y135) Fused Ignition Switch output circuit in the Fuel Pump Relay connector. Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the open or short to ground in the (Y135) Fused Ignition Switch Output circuit. Inspect the related fuse and repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance of the (K31) Fuel Pump Relay Control circuit from the Fuel Pump Relay connector to the PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K31) Fuel Pump Relay Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p>Measure the resistance between ground and the (K31) Fuel Pump Relay Control circuit at the IPM. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K31) Fuel Pump Relay Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### **P1294-TARGET IDLE NOT REACHED**

## When Monitored and Set Condition:

### **P1294-TARGET IDLE NOT REACHED**

**When Monitored:** With the engine idling and in drive, if automatic. There must not be a MAP sensor trouble code or a throttle position sensor trouble code.

**Set Condition:** Engine idle is not within 200 rpm above or 100 rpm below target idle for 14 seconds. Three separate failures are required to set a bad trip. Two bad trips are required to set the code.

### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

VACUUM LEAK

AIR INDUCTION SYSTEM

THROTTLE BODY AND THROTTLE LINKAGE

IAC DRIVER CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.  <b>NOTE: All MAP Sensor, IAC, and/or TPS codes present must be diagnosed first before proceeding.</b>            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>Inspect the Intake Manifold for vacuum leaks.            Inspect the Power Brake Booster for any vacuum leaks.            Inspect the PCV system for proper operation or any vacuum leaks.            Were any problems found?</p> <p>Yes → Repair vacuum leak as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 3</p>	All

**P1294-TARGET IDLE NOT REACHED — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Inspect the Air Induction System for the following problems.  Restrictions: Dirty Air Cleaner, Foreign material in the air intake tube, etc.  Leaks: Air Intake tube connection, Air Cleaner housing, etc.  Were any problems found?</p> <p>Yes → Repair or replace as necessary.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All
4	<p>Inspect the throttle body plate for carbon build up or other restrictions.  Inspect the throttle linkage for binding and smooth operation.  Ensure the throttle plate is resting on the stop at idle.  Remove IAC, inspect the pintle and its seating surface inside the throttle body.  Were any problems found?</p> <p>Yes → Clean and/or replace the throttle body as needed.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.  Disconnect IAC Motor harness connector.  Disconnect the PCM harness connectors.  Measure the resistance of each of the IAC Driver circuits from the IAC Motor harness connector to the PCM harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the appropriate IAC Driver circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### P1296-NO 5-VOLTS TO MAP SENSOR

## When Monitored and Set Condition:

### P1296-NO 5-VOLTS TO MAP SENSOR

When Monitored: During power-down and battery voltage greater than 10.4 volts.

Set Condition: The MAP sensor signal voltage goes below 2.35 volts with the key off for 5 seconds.

## POSSIBLE CAUSES

MAP SENSOR VOLTS BELOW 2.3 VOLTS

MAP SENSOR

(K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

SHORTED SENSOR

(K7) 5-VOLT SUPPLY CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If the P0107 - MAP Sensor Voltage Too Low is also set, diagnose it first before continuing with P1296 - No 5-volts To MAP Sensor.</b></p> <p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Check for any related TSBs.            With the DRBIII® in Sensors, read the MAP Sensor voltage.            Is the voltage below 2.35 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the MAP Sensor harness connector.            Ignition on, engine not running.            Measure the voltage on the (K7) 5-volt Supply circuit at the MAP Sensor harness connector.            Is the voltage above 4.5 volts?</p> <p>Yes → Go To 3</p> <p>No → Go To 4</p>	All

**P1296-NO 5-VOLTS TO MAP SENSOR — Continued**

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII® in Sensors, read the MAP Sensor voltage with the Sensor harness connector disconnected. Is the voltage above 4.5 volts?</p> <p>Yes → Replace the MAP Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
4	<p>Measure the voltage on the (K7) 5-volt Supply circuit in the MAP Sensor harness connector while disconnecting the remaining Sensors that share the (K7) 5-volt Supply circuit. Does the voltage return to approximately 5.0 volts with any Sensor disconnected?</p> <p>Yes → Replace the Sensor that pulled the (K7) 5-volt Supply circuit low. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance of the (K7) 5-volt Supply circuit from the MAP Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the excessive resistance in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Turn the ignition off. Disconnect the MAP Sensor harness connector. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K7) 5-volt Supply circuit in the MAP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P1297-NO CHANGE IN MAP FROM START TO RUN

#### When Monitored and Set Condition:

#### P1297-NO CHANGE IN MAP FROM START TO RUN

When Monitored: With engine RPM +/- 64 of target idle and the throttle blade at closed throttle.

Set Condition: Too small of a difference is seen between barometric pressure with ignition on (engine running) and manifold vacuum for 8.80 seconds.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

MAP SENSOR VACUUM PORT

MAP SENSOR VOLTAGE BELOW 3.19 VOLTS

(K7) 5-VOLT SUPPLY CIRCUIT OPEN

(K7) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

MAP SENSOR

(K1) MAP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

(K1) MAP SENSOR SIGNAL CIRCUIT SHORTED TO (K4) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.  <b>NOTE: If a MAP high or Low DTC set along with P1297, diagnose the High or Low DTC first before continuing.</b>            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Remove the MAP Sensor.            Inspect the vacuum port, check for restrictions or any foreign materials.            Were any restriction found?</p> <p>Yes → Repair as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P1297-NO CHANGE IN MAP FROM START TO RUN — Continued**

TEST	ACTION	APPLICABILITY
3	Install the MAP Sensor. Ignition on, engine not running. With the DRBIII®, read the MAP Sensor voltage. Is the voltage below 3.19 volts?  Yes → Go To 4  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
4	Turn the ignition off. Disconnect the MAP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (K7) 5-volt Supply circuit at the MAP Sensor harness connector. Is the voltage between 4.5 to 5.2 volts?  Yes → Go To 5  No → Go To 8	All
5	With the DRBIII®, monitor the MAP Sensor voltage with Sensor harness connector disconnected. Is the voltage above 1.2 volts?  Yes → Replace the MAP Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 6	All
6	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K1) MAP Sensor Signal circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K1) MAP Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 7	All
7	Measure the resistance between the (K1) MAP Sensor Signal circuit and the (K4) Sensor ground circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short between the (K4) Sensor ground and the (K1) MAP Sensor Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 10	All
8	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance of the (K7) 5-volt Supply circuit from the MAP Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 9  No → Repair the open in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All

**P1297-NO CHANGE IN MAP FROM START TO RUN — Continued**

TEST	ACTION	APPLICABILITY
9	Measure the resistance between ground and the (K7) 5-volt Supply circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K7) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 10	All
10	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All



**Symptom:****P1299-VACUUM LEAK FOUND****POSSIBLE CAUSES**

VACUUM LEAK

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.</p> <p><b>NOTE: This code is enabled on engines with plastic intake manifolds and is intended to shut down the engine if a large crack occurs.</b></p> <p><b>NOTE: A large vacuum leak is mostly the cause of this DTC.</b></p> <p>Inspect the Intake manifold for vacuum leaks.</p> <p>Inspect the Power Brake Booster for any vacuum leaks.</p> <p>Inspect the PCV system for proper operation or any vacuum leaks.</p> <p>Inspect the throttle body for carbon build up, other restrictions, and a bent throttle plate using a straight edge.</p> <p>If the throttle plate does not close entirely it may be bent and needs to be replaced.</p> <p>Improperly installed MAP Sensor.</p> <p>Were any vacuum leaks found?</p> <p>Yes → Repair vacuum leak as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P1388-AUTO SHUTDOWN RELAY CONTROL CIRCUIT

## When Monitored and Set Condition:

### P1388-AUTO SHUTDOWN RELAY CONTROL CIRCUIT

When Monitored: With ignition key on and battery voltage above 10.4 volts.

Set Condition: An open or shorted condition is detected in the ASD Relay control circuit.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

ASD RELAY

INTERNAL FUSED B+ OUTPUT CIRCUIT

(K51) ASD RELAY CONTROL CIRCUIT OPEN

(K51) ASD RELAY CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>Turn the ignition off.            Remove the ASD Relay from the IPM.            Measure the resistance between the coil terminals of the ASD Relay.            Is the resistance between 50 and 80 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the ASD Relay.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
3	<p>Using a 12-volt test light connected to ground, probe the Internal Fused B+ Output circuits in the ASD Relay connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the open or short to ground in the Internal Fused B+ Output circuit. Inspect the IPM for an internal open circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**P1388-AUTO SHUTDOWN RELAY CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
4	Disconnect the PCM harness connectors. Measure the resistance of the (K51) ASD Relay Control circuit from the ASD Relay cavity in the IPM to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 5  No → Repair the open in the (K51) ASD Relay Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
5	Measure the resistance between ground and the (K51) ASD Relay Control circuit. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K51) ASD Relay Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 6	All
6	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no more possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All

## Symptom:

### P1389-NO ASD RELAY OUTPUT VOLTAGE AT PCM

## When Monitored and Set Condition:

### P1389-NO ASD RELAY OUTPUT VOLTAGE AT PCM

**When Monitored:** With ignition key on, battery voltage above 10.4 volts, and engine RPM greater than 400.

**Set Condition:** No voltage sensed at the PCM when the ASD Relay is energized.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

ASD RELAY

INTERNAL FUSED B+ CIRCUIT

(A142) ASD RELAY OUTPUT CIRCUIT OPEN

(A142) ASD OUTPUT CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>Attempt to start the engine. Did the engine start?</p> <p>Yes → Go To 3</p> <p>No → Go To 4</p>	All
3	<p>Turn the ignition off. Remove the ASD Relay from the IPM. Disconnect the PCM harness connectors. Measure the resistance of the (A142) ASD Relay Output circuit from the ASD Relay cavity in the IPM to the PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (A142) ASD Relay Output circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**P1389-NO ASD RELAY OUTPUT VOLTAGE AT PCM — Continued**

TEST	ACTION	APPLICABILITY
4	Install a substitute relay for the ASD Relay. Attempt to start the vehicle. Did the engine start?  Yes → Replace the ASD Relay. Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 5	All
5	Turn the ignition off. Remove the ASD relay from the IPM. Using a 12-volt test light, probe the Fused B+ circuit at the ASD Relay connector in the IPM. Does the test light illuminate brightly?  Yes → Go To 6  No → Repair the open or short to ground in the Fused B+ circuit. The Fused B+ circuit is internal to the IPM. Inspect and replace fuses as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
6	Disconnect the PCM harness connectors. Measure the resistance of the (A142) ASD Relay Output circuit from the ASD Relay cavity in the IPM to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 7  No → Repair the open in the (A142) ASD Relay Output circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
7	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All

## Symptom:

### **P1391-INTERMITTENT LOSS OF CMP OR CKP**

## When Monitored and Set Condition:

### **P1391-INTERMITTENT LOSS OF CMP OR CKP**

When Monitored: Engine running or cranking.

Set Condition: When the failure counter reaches 20 for 2 consecutive trips.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

CHECKING INTERMITTENT CMP SIGNAL WITH LAB SCOPE

CMP WIRE HARNESS INSPECTION

TONE WHEEL/PULSE RING INSPECTION

CKP WIRE HARNESS INSPECTION

TONE WHEEL/PULSE RING INSPECTION

CHECKING INTERMITTENT CKP SIGNAL WITH LAB SCOPE

CAMSHAFT POSITION SENSOR

CRANKSHAFT POSITION SENSOR

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Start the engine and run until operating temp is reached. (Closed Loop)</p> <p>If the DTC does not return right away it may be necessary to test drive the vehicle to duplicate the DTC.</p> <p>Does the P1391 return?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P1391-INTERMITTENT LOSS OF CMP OR CKP — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.</p> <p>With the DRBIII® as a Dual Channel Lab Scope and Miller special tool #6801, backprobe the (K44) CMP Signal circuit in the CMP harness connector and PCM harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Observe the lab scope screen.</p> <p>Are there any irregular or missing signals?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All
3	<p>Turn the ignition off.</p> <p>Visually inspect the related wire harness. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Ensure the Crankshaft Position Sensor and the Camshaft Position Sensor are properly installed and the mounting bolt(s) are torqued to specification.</p> <p>Refer to any TSB that may apply.</p> <p>Were any of the above conditions present?</p> <p>Yes → Repair as necessary Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Remove the Camshaft Position Sensor.</p> <p>Inspect the Tone Wheel/Pulse Ring for damage, foreign material, or excessive movement.</p> <p>Were any problems found?</p> <p>Yes → Repair or replace the Tone Wheel/Pulse Ring as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Camshaft Position Sensor.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P1391-INTERMITTENT LOSS OF CMP OR CKP — Continued

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.</p> <p>With the DRBIII® as a Dual Channel Lab Scope and the Miller special tool #6801, backprobe the (K44) CMP Signal circuit in the PCM harness connector and in the CMP harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Carefully wiggle the related wire harness and gently tap on the CMP sensor.</p> <p>Observe the lab scope screen.</p> <p>Look for any differences in the two patterns generated by the CMP Sensor.</p> <p>If the Channel 1 and Channel 2 patterns are different, repair the wiring/connection concern</p> <p>Does the DRBIII® screen display any missing or irregular patterns?</p> <p>Yes → Inspect the wire harness and connectors. If no problem is found replace Cam Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off.</p> <p>With the DRBIII® as a Dual Channel Lab Scope and the Miller special tool #6801, backprobe the (K24) CKP Signal circuit in the CKP harness connector and PCM harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Observe the lab scope screen.</p> <p>Are there any irregular or missing signals?</p> <p>Yes → Go To 8</p> <p>No → Go To 11</p>	All
8	<p>Turn the ignition off.</p> <p>Visually inspect the related wire harness. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Ensure the Crankshaft Position Sensor and the Camshaft Position Sensor are properly installed and the mounting bolt(s) are torqued to specification.</p> <p>Refer to any TSB that may apply.</p> <p>Were any of the above conditions present?</p> <p>Yes → Repair as necessary Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p>Remove the Crankshaft Position Sensor.</p> <p>Inspect the Tone Wheel/Flex Plate slots for damage, foreign material, or excessive movement.</p> <p>Were any problems found?</p> <p>Yes → Repair or replace the Tone Wheel/Flex Plate as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 10</p>	All



**P1391-INTERMITTENT LOSS OF CMP OR CKP — Continued**

TEST	ACTION	APPLICABILITY
10	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Crankshaft Position Sensor.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
11	<p><b>NOTE: The conditions that set this DTC are not present at this time. The following test may help in identifying the intermittent condition.</b></p> <p>Turn the ignition off.</p> <p>With the DRBIII® as a Dual Channel Lab Scope and the Miller special tool #6801, backprobe the (K24) CKP Signal circuit in the PCM harness connector and CKP harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Carefully wiggle the related wire harness and gently tap on the CKP sensor.</p> <p>Compare the Channel 1 reading to the Channel 2 reading on the lab scope screen.</p> <p>Both of the readings should be the same.</p> <p>Were any of the above conditions present?</p> <p>Yes → Repair the wiring or connector concern.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

## Symptom:

### P1398-MIS-FIRE ADAPTIVE NUMERATOR AT LIMIT

## When Monitored and Set Condition:

### P1398-MIS-FIRE ADAPTIVE NUMERATOR AT LIMIT

**When Monitored:** Under closed throttle decel and Fuel Pulse Width equal to zero for 30 seconds.

**Set Condition:** One of the CKP sensor target windows has more than 2.86% variance from the reference window.

## POSSIBLE CAUSES

ADAPTIVE NUMERATOR RELEARN  
CMP SENSOR CONNECTOR/WIRING  
CKP SENSOR CONNECTOR/WIRING  
DAMAGED TONE WHEEL/FLEX PLATE (CRANKSHAFT)  
CRANKSHAFT POSITION SENSOR  
PCM

TEST	ACTION	APPLICABILITY
1	<p><b>Note: Check for any TSB's that may apply to this symptom.</b></p> <p>Read and record the Freeze Frame Data. Use this information to help you duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII® in the miscellaneous menu, choose Clear PCM (battery disconnect) to reset the PCM.</p> <p>With the DRBIII®, choose the Misfire Pretest screen.</p> <p>Road test the vehicle and re-learn the adaptive numerator.</p> <p>The adaptive numerator is learned when the Adaptive Numerator Done Learning line on the Misfire screen changes to Yes.</p> <p>Did the adaptive numerator re-learn?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 2</p>	All

**P1398-MIS-FIRE ADAPTIVE NUMERATOR AT LIMIT — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn ignition off.</p> <p><b>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b></p> <p><b>NOTE: Visually inspect the related wire harness. Look for any chafed, pierced, pinched, or partially broken wires.</b></p> <p><b>NOTE: Make sure the Camshaft Position Sensor is tight.</b></p> <p><b>Note: Refer to any technical service bulletins that may apply.</b></p> <p>Were any problems found?</p> <p>Yes → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p><b>Note: Visually inspect the Crankshaft Position Sensor and related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b></p> <p><b>NOTE: Visually inspect the related wire harness. Look for any chafed, pierced, pinched, or partially broken wires.</b></p> <p><b>NOTE: Verify the Crank Position Sensor is properly installed.</b></p> <p>Were any problems found?</p> <p>Yes → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Disconnect and remove the Crankshaft Position Sensor.</p> <p>Inspect the tone wheel/flexplate slots for damage, foreign material, or excessive movement.</p> <p>Is the tone wheel/flexplate free from defects?</p> <p>Yes → Go To 5</p> <p>No → Repair/replace tone wheel/flex plate as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>With the DRBIII® lab scope probe and the Miller special tool #6801, back probe the (K24) CKP Signal circuit in the PCM harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING..</b></p> <p>Start the engine and observe the lab scope screen for any erratic CKP Sensor pulses.</p> <p>Were any erratic Crank Position signals detected?</p> <p>Yes.</p> <p>Replace the Crankshaft Position Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No.</p> <p>Go To 6</p> <p><b>NOTE: Turn the ignition off before continuing.</b></p>	All

**P1398-MIS-FIRE ADAPTIVE NUMERATOR AT LIMIT — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P1486-EVAP LEAK MONITOR PINCHED HOSE FOUND****When Monitored and Set Condition:****P1486-EVAP LEAK MONITOR PINCHED HOSE FOUND**

**When Monitored:** Immediately after a cold start, with battery/ambient temperature between 40 deg. F and 90 deg. F and coolant temperature within 10 deg. F of battery/ambient.

**Set Condition:** LDP test must pass first. If the PCM suspects a pinched hose it will not set a fault until it runs the evap purge flow monitor. If the purge monitor does not pass then the pinched hose fault will be set.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

EVAP CANISTER OBSTRUCTED

OBSTRUCTION IN HOSE/TUBE BETWEEN EVAP CANISTER AND PURGE SOLENOID

LDP PRESSURE HOSE OBSTRUCTED

LEAK DETECTION PUMP

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
2	<p>Pressurize the EVAP System. On Miller Tool #8404, hold down the remote smoke/air start button and monitor the gauge.            When the flow meter gauge on the EELD reads 0 LPM, the EVAP system is completely pressurized.            Disconnect the LDP Pressure hose at the EVAP Canister. The LDP Pressure hose is the hose that connects the Evap Canister to the Leak Detection Pump.            Did the pressure drop when the hose was disconnected?</p> <p>Yes → Go To 3</p> <p>No → Replace the EVAP Canister.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

## P1486-EVAP LEAK MONITOR PINCHED HOSE FOUND — Continued

TEST	ACTION	APPLICABILITY
3	<p><b>NOTE: Connect all previously disconnected hose(s).</b>  Re-pressurize the EVAP System. On Miller Tool #8404, hold down the smoke/air start button and monitor the gauge.  When the flow meter gauge on the EELD reads 0 LPM, the EVAP system is completely pressurized.  Disconnect the EVAP hoses at the Purge Solenoid.  Did the pressure drop when the hose was disconnected?</p> <p>Yes → Go To 4</p> <p>No → Repair or replace hose/tube as necessary.  Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
4	<p>Disconnect and remove the LDP pressure hose. The LDP pressure hose is the hose that connects the EVAP Canister to the Leak Detection Pump.  Inspect the LDP pressure hose for any obstructions or physical damage.  Is the LDP pressure hose free from defects?</p> <p>Yes → Replace the Leak Detection Pump.  Perform POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Repair/replace hose as necessary.  Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

**Symptom:****P1491-COOLING FAN RELAY CONTROL CIRCUIT****POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

INTERNAL FUSED B+ CIRCUITS

(Y145) CONDENSER FAN RELAY CONTROL CIRCUIT OPEN

(Y145) CONDENSER FAN RELAY CONTROL CIRCUIT SHORTED TO GROUND

CONDENSER FAN RELAY

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>Turn the ignition off. Remove the Condenser Fan Relay from the IPM. Using a 12-volt test light connected to ground, probe the Internal Fused B+ circuits in the IPM. Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the open or short to ground in the Internal Fused B+ circuits. Inspect fuses and replace as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
3	<p>Disconnect the PCM harness connectors. Measure the resistance of the (Y145) Condenser Fan Relay Control circuit from the IPM to PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (Y145) Condenser Fan Relay Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
4	<p>Measure the resistance between ground and the (Y145) Condenser Fan Relay Control circuit. Is the resistance above 100 kohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the short to ground in the (Y145) Condenser Fan Relay Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**P1491-COOLING FAN RELAY CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Momentarily connect a jumper wire between the internal Fused B+ circuit and the (C23) Condenser Fan Relay Output circuit in the IPM connector.</p> <p>Did the Condenser Fan actuate?</p> <p>Yes → Go To 6</p> <p>No → Replace the Condenser Fan Relay.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All



**Symptom:****P1492-AMBIENT/BATTERY TEMPERATURE SENSOR VOLTAGE TOO HIGH****When Monitored and Set Condition:****P1492-AMBIENT/BATTERY TEMPERATURE SENSOR VOLTAGE TOO HIGH**

When Monitored: With the ignition key on.

Set Condition: The PCM senses the voltage from the Battery Temperature Sensor above 4.9 volts for 3 seconds.

**POSSIBLE CAUSES**

BATTERY TEMP SENSOR VOLTAGE ABOVE 4.8 VOLTS

BATTERY TEMPERATURE SENSOR

(K118) BATT TEMP SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K118) BATT TEMP SIGNAL CIRCUIT OPEN

(K4) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. Record all DTCs and the related Freeze Frame data. Check for any related TSBs. With the DRBIII®, monitor the Battery Temperature Sensor voltage. Is the voltage above 4.8 volts?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 3.	All
2	Turn the ignition off. Disconnect the Battery Temp Sensor harness connector. Ignition on, engine not running. With the DRBIII® in sensors, read the Batt Temp Sensor voltage value. Connect a jumper wire between the (K118) Batt Temp Signal circuit and the (K4) Sensor ground circuit at the Battery Temp Sensor connector. Did the Battery Temp Sensor voltage change from greater than 4.5 volts to less than 1.0 volt?  Yes → Replace the Battery Temperature Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 3.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

**P1492-AMBIENT/BATTERY TEMPERATURE SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage on the (K118) Battery Temp Signal circuit at the Sensor harness connector. Is the voltage above 5.2 volts?  Yes → Repair the short to voltage in the (K118) Batt Temp Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 3.  No → Go To 4	All
4	Turn the ignition off. Measure the resistance of the (K118) Battery Temp Signal circuit from the Battery Temp Sensor harness connector to the PCM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 5  No → Repair the open in the (K118) Batt Temp Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 3.	All
5	Measure the resistance in the (K4) Sensor ground circuit from the PCM harness connector to the Sensor connector. Is the resistance below 5.0 ohms?  Yes → Go To 6  No → Repair the open in the (K4) Sensor ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 3.	All
6	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 3.	All

**Symptom:****P1493-AMBIENT/BATTERY TEMPERATURE SENSOR VOLTAGE TOO LOW****When Monitored and Set Condition:****P1493-AMBIENT/BATTERY TEMPERATURE SENSOR VOLTAGE TOO LOW**

When Monitored: With the ignition on.

Set Condition: The PCM senses the voltage from the Battery Temperature Sensor below 0.5 of a volt for 3 seconds.

**POSSIBLE CAUSES**

BATTERY TEMP SENSOR VOLTS BELOW 0.5 OF A VOLT

BATTERY TEMPERATURE SENSOR

(K118) BATT TEMP SIGNAL CIRCUIT SHORTED TO GROUND

(K118) BATT TEMP SIGNAL CIRCUIT SHORTED TO THE (K4) SENSOR GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            Record all DTCs and the related Freeze Frame data.            With DRBIII®, monitor the Ambient/Battery Temperature Sensor voltage.            Is the voltage below 0.5 of a volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
2	<p>Ignition on, engine not running.            With the DRBIII® in sensors, read the Battery Temp Sensor voltage.            Disconnect the Battery Temp Sensor harness connector.            Did the Battery Temperature Sensor voltage change from below 1.0 volt to above 4.5 volts?</p> <p>Yes → Replace the Battery Temperature Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (K118) Battery Temp Signal circuit at the Battery Temp Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K118) Batt Temp Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 4</p>	All

**P1493-AMBIENT/BATTERY TEMPERATURE SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the (K118) Battery Temp Signal circuit and the (K4) Sensor ground circuit at the Battery Temp Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K4) Sensor ground circuit and the (K118) Batt Temp Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

**Symptom:****P1494-LEAK DETECTION PUMP SWITCH OR MECHANICAL FAULT****When Monitored and Set Condition:****P1494-LEAK DETECTION PUMP SWITCH OR MECHANICAL FAULT**

When Monitored: Immediately after a cold start, with battery/ambient temperature between 40 deg. F and 90 deg. F and coolant temperature within 10 deg. F of battery/ambient.

Set Condition: The state of the switch does not change when the solenoid is energized.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

LDP VACUUM SUPPLY

LEAK DETECTION PUMP

(K107) LDP SWITCH SENSE CIRCUIT OPEN

(K107) LDP SWITCH SENSE CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
2	<p>Turn the ignition off.            Disconnect the vacuum supply hose at the Leak Detection Pump.            Connect a vacuum gauge to the disconnected vacuum supply hose at the Leak Detection Pump.            Start the engine and read the vacuum gauge.            Does the vacuum gauge read at least 13" Hg?</p> <p>Yes → Go To 3</p> <p>No → Repair leak or obstruction in vacuum hose as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

# **P1494-LEAK DETECTION PUMP SWITCH OR MECHANICAL FAULT —** **Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Connect the vacuum supply hose at the LDP.            Disconnect the Leak Detection Pump electrical harness connector.            Start the engine.            With the DRBIII® in Inputs/Outputs, read the Leak Detect Pump Switch state.            Connect a jumper wire between 12-volts and the (K107) LDP Switch Signal circuit.            Did the Leak Detect Pump Sw state change when the jumper was connected?</p> <p>Yes → Replace the Leak Detection Pump.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 4</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
4	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance of the (K107) LDP Switch Sense circuit from the PCM harness connector to LDP harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K107) Leak Detection Pump Switch Sense circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
5	<p>Measure the resistance between ground and the (K107) LDP Switch Sense circuit.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K107) LDP Switch Sense circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

**Symptom:****P1495-LEAK DETECTION PUMP SOLENOID CIRCUIT****When Monitored and Set Condition:****P1495-LEAK DETECTION PUMP SOLENOID CIRCUIT**

**When Monitored:** Continuously when the ignition is on and battery voltage is greater than 10.4 volts.

**Set Condition:** The state of the solenoid circuit does not match the PCM's desired state.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(K125) GENERATOR SOURCE CIRCUIT OPEN

(K106) LEAK DETECTION PUMP SOLENOID CONTROL CIRCUIT OPEN

(K106) LDP SOLENOID CONTROL CIRCUIT SHORTED TO GROUND

LEAK DETECTION PUMP

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
2	<p>Turn the ignition off.            Disconnect the Leak Detection Pump electrical harness connector.            Start the engine.            With the DRBIII®, actuate the LDP Solenoid.            Using a 12-volt test light connected to ground, check the (K125) Generator Source circuit at the LDP connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the open in the (K125) Generator Source circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

## P1495-LEAK DETECTION PUMP SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Connect a 12-volt test light to a good 12-volt source.            Ignition on, engine not running.            With the DRBIII®, actuate the LDP Solenoid.            Probe the (K106) LDP Solenoid Control circuit with the test light while the Pump is actuating.            Does the test light blink?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Leak Detection Pump.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance of the (K106) LDP Solenoid Control circuit from the PCM harness connector to the LDP harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K106) Leak Detection Pump Solenoid Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
6	<p>Measure the resistance between ground and the (K106) LDP Solenoid Control circuit.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K106) LDP Solenoid Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 7</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 6.</p>	All



**Symptom:****P1594-CHARGING SYSTEM VOLTAGE TOO HIGH****When Monitored and Set Condition:****P1594-CHARGING SYSTEM VOLTAGE TOO HIGH**

When Monitored: With the ignition key on and the engine speed greater than 0 RPM.

Set Condition: When the PCM regulates the generator field and there are no detected field problems, but the voltage output does not decrease.

**POSSIBLE CAUSES**

CHARGING SYSTEM OPERATION

(K20) GENERATOR FIELD CONTROL CIRCUIT SHORTED TO GROUND

GENERATOR FIELD COIL SHORTED TO GROUND

BATTERY TEMPERATURE SENSOR

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Battery must be fully charged and be capable of passing a load test. Note: Generator Belt tension and condition must be checked before continuing.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and the related Freeze Frame data then clear the DTCs.</p> <p>With DRBIII®, actuate the Generator Field Driver.</p> <p>With a 12-volt test light connected to ground, backprobe the (K20) Gen Field Control circuit in the back of Generator Field harness connector.</p> <p>Does the test light illuminate brightly and flash?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
2	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Disconnect the Generator Field Harness connector.</p> <p>Carefully inspect the related connectors for corrosion or spread terminals before continuing.</p> <p>Measure the resistance between ground and the (K20) Generator Field Driver circuit at the Generator Field harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K20) Generator Field Control circuit.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 3</p>	All

## P1594-CHARGING SYSTEM VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Measure the resistance between ground and the Generator Field terminals on the Generator. Is the resistance below 100 ohms?</p> <p>Yes → Replace or repair the Generator Field Coil for a short to ground. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 4</p>	All
4	<p>Connect the PCM harness connectors and the Generator harness connector. Ignition on, engine not running. With the DRBIII® in Inputs/Outputs, read the Batt Temp Sensor value. Using a thermometer measure under hood temperature near Battery tray. Is the temperature within 10 deg of Battery temperature?</p> <p>Yes → Go To 5</p> <p>No → Replace the Battery Temperature Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

**Symptom List:****P1595-SPEED CONTROL SOLENOID CIRCUITS****P1683-SPD CTRL PWR RELAY; OR S/C 12V DRIVER CKT**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P1595-SPEED CONTROL SOLENOID CIRCUITS.

**When Monitored and Set Condition:****P1595-SPEED CONTROL SOLENOID CIRCUITS**

**When Monitored:** With the ignition key on, the speed control switched on, the SET switch pressed and the vehicle in drive gear moving above 35 MPH.

**Set Condition:** The powertrain control module actuates the vacuum and vent solenoids but they do not respond.

**P1683-SPD CTRL PWR RELAY; OR S/C 12V DRIVER CKT**

**When Monitored:** With the ignition key on and the speed control switched on.

**Set Condition:** The speed control power supply circuit is either open or shorted to ground.

**POSSIBLE CAUSES**

(Z10) GROUND CIRCUIT OPEN

INTERMITTENT CONDITION

SPEED CONTROL SERVO

(V30) S/C BRAKE SWITCH OUTPUT CIRCUIT OPEN

BRAKE LAMP SWITCH

(V32) S/C POWER SUPPLY CIRCUIT OPEN

S/C VACUUM SOLENOID

(V36) S/C VACUUM SOL CONTROL CIRCUIT OPEN

(V36) S/C VACUUM SOL CONTROL CIRCUIT SHORTED TO GROUND

S/C VENT SOLENOID

(V35) S/C VENT SOL CONTROL CIRCUIT OPEN

(V35) S/C VENT SOL CONTROL CIRCUIT SHORTED TO GROUND

PCM

**P1595-SPEED CONTROL SOLENOID CIRCUITS — Continued**

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.  <b>NOTE: In the below step you will need to actuate both S/C solenoids separately. Note the operation of the each solenoid when actuated.</b>            With the DRBIII®, actuate the Speed Control Vacuum Solenoid and note operation.            With the DRBIII®, actuate the Speed Control Vent Solenoid and note operation.            Choose the conclusion that best matches the solenoids operation.</p> <p>Vacuum Solenoid not operating            Go To 2</p> <p>Vent Solenoid not operating            Go To 5</p> <p>Both S/C Solenoids not operating            Go To 8</p> <p>Both S/C Solenoids operating            Go To 13</p>	All
2	<p>Turn the ignition off.            Disconnect the Speed Control Servo harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the Speed Control Vacuum Solenoid.            Using a 12-volt test light connected to 12-volts, probe the (V36) S/C Vacuum Sol Control circuit.            Does the test light illuminate brightly and flash?</p> <p>Yes → Replace the Speed Control Servo.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance of the (V36) S/C Vacuum Sol Control circuit between the PCM harness connector and Speed Control Servo harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (V36) S/C Vacuum Sol Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
4	<p>Measure the resistance between ground and the (V36) S/C Vacuum Sol Control circuit at the PCM harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V36) S/C Vacuum Sol Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 12</p>	All

**P1595-SPEED CONTROL SOLENOID CIRCUITS — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.            Disconnect the Speed Control Servo harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the S/C Vent Solenoid.            Using a 12-volt test light connected to 12-volts, probe the (V35) S/C Vent Sol Control circuit in the Speed Control Servo harness connector.            Does the test light illuminate brightly and flash?</p> <p>Yes → Replace the Speed Control Servo.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance of the (V35) S/C Vent Sol Control circuit between the PCM harness connector and S/C Servo harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (V35) S/C Vent Sol Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
7	<p>Measure the resistance between ground and the (V35) S/C Vent Sol Control circuit at the PCM harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V35) S/C Vent Sol Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 12</p>	All
8	<p>Turn the ignition off.            Disconnect the S/C Servo harness connector.            Ignition on, engine not running.            Turn the Cruise Control on.            Using a 12-volt test light connected to ground, probe the (V30) S/C Brake Switch Output circuit in the S/C Servo harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Replace the Speed Control Servo.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off.            Disconnect the Brake Lamp Switch harness connector.            Measure the resistance of the (V30) S/C Brake Switch Output circuit from the S/C Servo harness connector to the Brake Lamp Switch harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the open in the (V30) S/C Brake Switch Output circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

## P1595-SPEED CONTROL SOLENOID CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
10	<p>Ignition on, engine not running.  Turn the Cruise Control on, it may be necessary to hold the On button down while checking the following circuit.  Using a 12-volt test light connected to ground, probe the (V32) S/C Power Supply circuit in the Brake Lamp Switch harness connector.  Does the test light illuminate brightly?</p> <p>Yes → Replace the Brake Lamp Switch.  Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 11</p>	All
11	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Measure the resistance of the (V32) S/C Power Supply circuit between the PCM harness connector and the Brake Lamp Switch harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the open in the (V32) S/C Supply circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
12	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.  Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
13	<p>Turn the ignition off.  Disconnect the S/C Servo harness connector.  Using a 12-volt test light connected to 12-volts, probe the (Z10) Ground circuit in the S/C Servo harness connector.  Does the test light illuminate brightly?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Repair the open in the (Z10) Ground circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

**Symptom:****P1596-SPEED CONTROL SWITCH ALWAYS HIGH****When Monitored and Set Condition:****P1596-SPEED CONTROL SWITCH ALWAYS HIGH**

When Monitored: With the ignition key on.

Set Condition: An open circuit is detected in the speed control on/off switch circuit. The circuit must be above 4.8 volts for more than 2 minutes to set the DTC.

**POSSIBLE CAUSES**

SPEED CONTROL ON/OFF SWITCH OPERATION

S/C ON/OFF SWITCH

CLOCKSPRING

(V37) S/C SWITCH SIGNAL CIRCUIT SHORTED TO VOLTAGE

(V37) S/C SWITCH SIGNAL CIRCUIT OPEN BETWEEN PCM AND CLOCKSPRING

(K4) SENSOR GROUND CIRCUIT OPEN BETWEEN PCM AND CLOCKSPRING

(V37) S/C SWITCH SIGNAL CIRCUIT OPEN BETWEEN CLOCKSPRING AND S/C SWITCH

(K4) SENSOR GROUND CIRCUIT OPEN BETWEEN CLOCKSPRING AND S/C SWITCH

PCM

TEST	ACTION	APPLICABILITY
1	<p>Engine Running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII® in Sensors, read the Speed Control inputs state.            While monitoring the DRBIII®, push the Speed Control On/Off Switch several times, then leave it on.            Did the DRBIII® show Speed Control Switching off and on?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off.            Disconnect the S/C On/Off Switch 2-way harness connector only.            Measure the resistance across the S/C On/Off Switch.            Is the resistance between 20.3K and 20.7K ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the On/Off Switch.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

**P1596-SPEED CONTROL SWITCH ALWAYS HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Disconnect the upper and lower 6-way clockspring harness connector per Service Information.</p> <p>Measure the resistance of the (K4) Sensor ground circuit between the upper and lower 6-way clockspring harness connectors.</p> <p>Measure the resistance of the (V37) S/C Switch Signal circuit between the upper and lower 6-way clockspring harness connectors.</p> <p>Was the resistance above 5.0 ohms for either circuit?</p> <p>Yes → Replace the clockspring. Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	All
4	<p>Connect the Clockspring harness connectors per Service Information.</p> <p>Disconnect the Speed Control On/Off Switch 2-way harness connector only.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (V37) S/C Switch Signal circuit in the On/Off Switch 2-way connector.</p> <p>Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (V37) S/C Switch Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.</p> <p>Disconnect the upper and lower Clockspring harness connectors per Service Information.</p> <p>Disconnect the PCM harness connectors.</p> <p>Measure the resistance of the (V37) S/C Switch Signal circuit from the PCM harness connector to the lower Clockspring harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (V37) S/C Switch Signal circuit between the PCM and Clockspring. Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
6	<p>Measure the resistance of the (K4) Sensor ground circuit from the PCM harness connector to the lower Clockspring harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open (K4) Sensor ground circuit between the PCM and Clockspring. Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
7	<p>Measure the resistance of the (V37) S/C Switch Signal circuit from the upper Clockspring harness connector to the On/Off switch harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (V37) S/C Switch Signal circuit, Clockspring to S/C Switch. Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All



**P1596-SPEED CONTROL SWITCH ALWAYS HIGH — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Measure the resistance of the (K4) Sensor ground circuit from the On/Off Switch 2-way harness connector to the upper Clockspring harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the (K4) Sensor ground circuit between the Clockspring and S/C Switch. Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

## Symptom:

### P1597-SPEED CONTROL SWITCH ALWAYS LOW

#### When Monitored and Set Condition:

#### P1597-SPEED CONTROL SWITCH ALWAYS LOW

When Monitored: With the ignition key on and battery voltage above 10.4 volts.

Set Condition: When switch voltage is less than 0.39 of a volt for 2 minutes.

#### POSSIBLE CAUSES

S/C SWITCH VOLTAGE BELOW 1.0 VOLT

S/C ON/OFF SWITCH

S/C RESUME/ACCEL SWITCH

CLOCKSPRING

(V37) S/C SWITCH SIGNAL CIRCUIT SHORTED TO GROUND

(V37) S/C SWITCH SIGNAL CIRCUIT SHORTED TO (K4) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Check for any related TSBs.            With the DRBIII®, read the S/C Switch volts status.            Is the S/C Switch voltage below 1.0 volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
2	<p>Turn the ignition off.            Disconnect the S/C ON/OFF Switch harness connector.            Ignition on, engine not running.            With the DRBIII® in Sensors, read the S/C Switch volts.            Did the S/C Switch volts change to 5.0 volts?</p> <p>Yes → Replace the S/C ON/OFF Switch.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 3</p>	All

**P1597-SPEED CONTROL SWITCH ALWAYS LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the S/C RESUME/ACCEL Switch harness connector.            Ignition on, engine not running.            With the DRBIII® in Sensors, read the S/C Switch volts.            Did the S/C Switch volts go above 4.0 volts?</p> <p>Yes → Replace the Resume/Accel Switch.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.            Disconnect the lower clockspring 6-way harness connector per Service Information.            Ignition on, engine not running.            With the DRBIII® in Sensors, read the S/C Switch voltage.            Did the S/C Switch volts change to 5.0 volts?</p> <p>Yes → Replace the Clockspring.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.            Connect the Clockspring harness connector per Service Information.            Disconnect the PCM harness connectors.            Measure the resistance between a known good ground and the (V37) S/C Switch Signal circuit at S/C ON/OFF Switch harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V37) S/C Switch Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between the (V37) S/C Signal circuit and the (K4) Sensor ground circuit at the ON/OFF Switch harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K4) Sensor ground and the (V37) S/C Switch Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair            Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

**Symptom:**

**P1598-A/C PRESSURE SENSOR VOLTAGE TOO HIGH**

**When Monitored and Set Condition:**

**P1598-A/C PRESSURE SENSOR VOLTAGE TOO HIGH**

When Monitored: With the engine running and the A/C Relay energized.

Set Condition: The A/C Pressure Sensor Signal at the PCM goes above 4.92 volts.

**POSSIBLE CAUSES**

A/C PRESSURE SENSOR VOLTAGE ABOVE 4.9 VOLTS

A/C PRESSURE SENSOR

(C18) A/C PRESSURE SIGNAL CIRCUIT SHORTED TO VOLTAGE

(C18) A/C PRESSURE SIGNAL CIRCUIT OPEN

(C18) A/C PRESSURE SIGNAL CIRCUIT SHORTED TO (K6) 5-VOLT SUPPLY CIRCUIT

(K4) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the A/C refrigerant System is properly charged per the Service Information.</b></p> <p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Start the engine.            With the DRBIII®, read the A/C Pressure Sensor voltage.            Is the voltage above 4.9 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>Turn the ignition off.            Disconnect the A/C Pressure Sensor harness connector.            Connect a jumper wire between the (C18) A/C Pressure Signal circuit and the (K4) Sensor ground circuit in the Sensor harness connector.            With the DRBIII®, monitor the A/C Pressure Sensor voltage.            Ignition on, engine not running.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the A/C Pressure Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

**P1598-A/C PRESSURE SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the (C18) A/C Pressure Signal circuit in the A/C Pressure Sensor harness connector.            Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (C18) A/C Pressure Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.            Measure the resistance of the (C18) A/C Pressure Signal circuit between the A/C Pressure Sensor harness connector and the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (C18) A/C Pressure Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p>Measure the resistance between the (C18) A/C Pressure Signal circuit and the (K6) 5-volt Supply circuit in the A/C Pressure Sensor harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K6) 5-volt Supply circuit and the (C18) A/C Pressure Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance of the (K4) Sensor ground circuit from the A/C Pressure Sensor harness connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K4) Sensor ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### **P1599-A/C PRESSURE SENSOR VOLTAGE TOO LOW**

## When Monitored and Set Condition:

### **P1599-A/C PRESSURE SENSOR VOLTAGE TOO LOW**

When Monitored: With the engine running and the A/C Relay energized.

Set Condition: The A/C Pressure Sensor Signal voltage at the PCM goes below 0.58 volts for 2.6 seconds.

### **POSSIBLE CAUSES**

A/C PRESSURE SENSOR VOLTAGE BELOW 0.6 OF A VOLT

(K6) 5-VOLT SUPPLY CIRCUIT OPEN

(K6) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

A/C PRESSURE SENSOR

(C18) A/C PRESSURE SIGNAL CIRCUIT SHORTED TO GROUND

(C18) A/C PRESSURE SIGNAL CIRCUIT SHORTED TO (K4) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the A/C refrigerant System is properly charged per the Service Information.</b></p> <p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Check for any related TSBs.            Start the engine.            With the DRBIII®, read the A/C Pressure Sensor voltage.            Is the voltage below 0.60 of a volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>Turn the ignition off.            Disconnect the A/C Pressure Sensor harness connector.            Ignition on, engine not running.            Measure the voltage on the (K6) 5-volt Supply circuit in the A/C Pressure Sensor harness connector.            Is the voltage between 4.5 to 5.2 volts?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All

**P1599-A/C PRESSURE SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII®, monitor the A/C Pressure Sensor voltage with the Sensor disconnected. Is the voltage above 0.6 of a volt?</p> <p>Yes → Replace the A/C Pressure Sensor. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (C18) A/C Pressure Signal circuit in the A/C Pressure Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (C18) A/C Pressure Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (C18) A/C Pressure Signal circuit and the (K4) Sensor ground circuit in the A/C Pressure Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K4) Sensor ground and the (C18) A/C Pressure Signal circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 8</p>	All
6	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance of the (K6) 5-volt Supply circuit between the A/C Pressure Sensor harness connector and the PCM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K6) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
7	<p>Measure the resistance between the (K6) 5-volt Supply circuit and ground in the A/C Pressure Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K6) 5-volt Supply circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 8</p>	All
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### P1682-CHARGING SYSTEM VOLTAGE TOO LOW

## When Monitored and Set Condition:

### P1682-CHARGING SYSTEM VOLTAGE TOO LOW

**When Monitored:** With the ignition key on and the engine running over 1500 RPM after 25 seconds.

**Set Condition:** When the PCM regulates the generator field and there are no detected field problems, but the voltage output does not increase.

## POSSIBLE CAUSES

CHARGING VOLTAGE BELOW 15.1 VOLTS

BATTERY TEMPERATURE SENSOR

RESISTANCE IN THE BATTERY POSITIVE CIRCUIT

(K125) GENERATOR FIELD SOURCE CIRCUIT OPEN

RESISTANCE IN THE GENERATOR GROUND

(K125) GENERATOR FIELD SOURCE CIRCUIT SHORTED TO GROUND

(K20) GENERATOR FIELD CONTROL CIRCUIT OPEN

RESISTANCE IN THE GENERATOR FIELD COIL

PCM

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition off.</p> <p><b>NOTE: Battery must be fully charged and capable of passing a battery load test.</b></p> <p><b>Note: Generator Belt tension and condition must be checked before continuing.</b></p> <p><b>NOTE: Inspect the vehicle for any aftermarket accessories that may exceed the maximum Generator output.</b></p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Record all DTCs and the related Freeze Frame data.</p> <p>With the DRBIII®, read the target charging voltage.</p> <p>Is the target charging voltage above 15.1 volts?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 2</p>	All



**P1682-CHARGING SYSTEM VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.  <b>Note: Generator Belt tension and condition must be checked before continuing.</b>            Start the engine.            Allow the engine to reach normal operating temperature.            With the DRBIII® in sensors, read the Battery Temp Sensor value.            Using a Thermometer, measure under hood temperature.            Is the temperature within 10° F of Battery temperature?</p> <p>Yes → Go To 3</p> <p>No → Replace the Battery Temperature Sensor.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
3	<p>Ignition on, engine not running.            Measure the voltage between the Generator B+ Terminal and the Battery Positive Post.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>  <b>CAUTION: Ensure all wires are clear of the engine's moving parts.</b>            Start the engine.            Is the voltage above 0.4 of a volt?</p> <p>Yes → Repair the excessive resistance in the Battery Positive circuit between the Generator and Battery.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 4</p>	All
4	<p>Start the engine.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            Warm the engine to operating temperature.  <b>Caution: Ensure all wires are clear of the engine's moving parts.</b>            Measure the voltage between the Generator case and Battery Negative Post.            Is the voltage above 0.1 of a volt?</p> <p>Yes → Repair the excessive resistance in the Generator Ground circuit between the Generator Case and Battery Negative side.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 5</p>	All
5	<p>Ignition on, engine not running.            Carefully inspect all connectors for corrosion or spread terminals before continuing.            With the DRBIII® actuate the Generator Field Driver.            While backprobing, measure the voltage on the (K125) Generator Field Source circuit at back of Generator.            Is the voltage above 10.0 volts?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K125) Generator Field Source circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

## P1682-CHARGING SYSTEM VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect the Generator Field harness connector.            Measure the resistance between ground and the (K125) Generator Field Source circuit in the PCM harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K125) Generator Field Source circuit and replace the PCM.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 7</p>	All
7	<p>Measure the resistance of the (K20) Generator Field Driver circuit from the Generator harness connector to the PCM harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (K20) Generator Field Control circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
8	<p>Measure resistance across the Generator Field Terminals at the Generator.            Is the resistance above 15 ohms?</p> <p>Yes → Replace or repair the Generator as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

**Symptom:****P1685-WRONG OR INVALID KEY MSG RECEIVED FROM SKIM****When Monitored and Set Condition:****P1685-WRONG OR INVALID KEY MSG RECEIVED FROM SKIM**

When Monitored: With the ignition on.

Set Condition: The PCM does not receive a Valid Key message from the SKIM.

**POSSIBLE CAUSES**

NO COMMUNICATION WITH SKIM  
 SKIM TROUBLE CODES SET  
 NO VIN PROGRAMMED IN THE PCM  
 INCORRECT VIN IN PCM  
 INVALID SKIM KEY NOT PRESENT  
 PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the PCM DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2 No → Go To 7	All
2	With the DRBIII®, attempt to communicate with the SKIM. Can the DRBIII® communicate with the SKIM?  Yes → Go To 3 No → Refer to symptom BUS +/- SIGNAL OPEN FROM SKIM in the COMMUNICATION category. Perform SKIS VERIFICATION.	All
3	With the DRBIII®, check for SKIM DTCs. Are any DTCs present in the SKIM?  Yes → Refer to BODY information for the related symptom(s). Perform SKIS VERIFICATION.  No → Go To 4	All
4	With the DRBIII®, display the VIN that is programmed in the PCM. Has a VIN been programmed into the PCM?  Yes → Go To 5 No → Program the correct VIN into the PCM and retest. Perform SKIS VERIFICATION.	All

# **P1685-WRONG OR INVALID KEY MSG RECEIVED FROM SKIM —** **Continued**

TEST	ACTION	APPLICABILITY
5	<p>With the DRBIII®, display the VIN that is programmed in the PCM. Was the correct VIN programmed into the PCM?</p> <p>Yes → Go To 6</p> <p>No → Replace and program the Powertrain Control Module per Service Information. Perform SKIS VERIFICATION.</p>	All
6	<p>Turn the ignition off. Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information. Ignition on, engine not running. With the DRBIII®, erase all SKIM and PCM DTCs. Attempt to start and idle the engine. With the DRBIII®, read the PCM DTCs. Does the DRBIII® display this code?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information. Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All
7	<p><b>NOTE: You must obtain the SKIM pin number.</b> <b>NOTE: This DTC could have been set if the SKIM harness connector was disconnected, or if the SKIM was replaced recently.</b> <b>NOTE: All keys that the customer uses for this vehicle must be tested to verify they are operating properly.</b> Ignition on, engine not running. Verify the correct VIN is programmed into the PCM and SKIM. Turn the ignition off. With the next customer key turn the ignition key on and crank the engine to start. With the DRBIII®, read the PCM DTCs. Look for P1685 Does the DTC return?</p> <p>Yes → Replace the Ignition Key. Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p> <p><b>NOTE: If this DTC cannot be reset, it could have been an actual theft attempt.</b></p>	All

**Symptom:****P1686-NO SKIM BUS MESSAGE RECEIVED****When Monitored and Set Condition:****P1686-NO SKIM BUS MESSAGE RECEIVED**

When Monitored: With the ignition on.

Set Condition: The PCM does not receive a Bus message from the SKIM when expected.

**POSSIBLE CAUSES**

NO SKIM BUS MESSAGE

LOSS OF SKIM COMMUNICATION

PCI BUS CIRCUIT OPEN FROM PCM TO SKIM

SKIM/PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the PCM DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform SKIS VERIFICATION.	All
2	Ignition on, engine not running. With the DRBIII®, attempt to communicate with the SKIM. <b>NOTE: This test will indicate if the Bus is operational from the DLC to the SKIM.</b> Was the DRBIII® able to communicate with the SKIM?  Yes → Go To 3  No → Refer to symptom BUS +/- SIGNAL OPEN FROM SKIM in the COMMUNICATION category. Perform SKIS VERIFICATION.	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Disconnect the SKIM harness connector. Measure the resistance of the PCI Bus circuit between the PCM harness connector and the SKIM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 4  No → Repair the open in the PCI Bus circuit between the PCM and the SKIM. Perform SKIS VERIFICATION.	All

## P1686-NO SKIM BUS MESSAGE RECEIVED — Continued

TEST	ACTION	APPLICABILITY
4	<p>Replace the Sentry Key Immobilizer Module in accordance with the Service Information.</p> <p>Ignition on, engine not running.</p> <p>Display and erase all PCM and SKIM DTCs.</p> <p>Perform 5 ignition key cycles leaving the ignition key on for 90 seconds per cycle.</p> <p>With the DRB, display PCM DTCs.</p> <p>Does the DRB display the same DTC?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All

**Symptom:****P1687-NO CLUSTER BUS MESSAGE****When Monitored and Set Condition:****P1687-NO CLUSTER BUS MESSAGE**

When Monitored: With the ignition on.

Set Condition: The PCM has not received an expected Cluster Status Bus message from the instrument cluster within the last 20 seconds.

**POSSIBLE CAUSES**

NO CLUSTER BUS MESSAGE  
 COMMUNICATE WITH CLUSTER  
 INSTRUMENT CLUSTER OPERATION  
 PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, erase DTCs. Cycle the ignition key on and off several times. With the DRBIII®, read DTCs. Does the DTC reset?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 1.	All
2	Ignition on, engine not running. With the DRBIII®, attempt to communicate with the Instrument cluster. Can communication be established with the Instrument Cluster?  Yes → Go To 3  No → Refer to the Communication Category of the Body Diagnostic Manual and perform the appropriate symptom related to no communication with cluster. Perform POWERTRAIN VERIFICATION TEST VER - 1.	All
3	Start the engine Allow the engine to idle. Is the correct engine speed display in the instrument cluster (Tach)?  Yes → Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1.  No → Refer to the Instrument Category in the Body Diagnostic Manual and perform the appropriate symptom. Perform POWERTRAIN VERIFICATION TEST VER - 1.	All

## Symptom:

### P1696-PCM FAILURE EEPROM WRITE DENIED

#### POSSIBLE CAUSES

DRBIII® DISPLAYS WRITE FAILURE  
 DRBIII® DISPLAYS WRITE REFUSED 2ND TIME  
 DRBIII® DISPLAYS SRI MILEAGE INVALID  
 COMPARE SRI MILEAGE WITH ODOMETER

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, perform the SRI Memory Test. Does the DRBIII® display Write Failure?  Yes → Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1.  No → Go To 2	All
2	With the DRBIII®, perform the SRI Memory Test. Does the DRBIII® display Write Refused?  Yes → Go To 3 No → Go To 4	All
3	With the DRBIII®, perform the SRI Memory Test a second time. <b>NOTE: Retest the SRI Memory two more times.</b> Does the DRBIII® display Write Refused again?  Yes → Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 1.  No → Test Complete.	All
4	With the DRBIII®, perform the SRI Memory Test. Does the DRBIII® display SRI Mileage Invalid?  Yes → Update the mileage and retest the SRI Memory. Perform POWERTRAIN VERIFICATION TEST VER - 1.  No → Go To 5	All
5	Compare the SRI Mileage stored with the Instrument Panel Odometer. Is the mileage within the specified range displayed on the DRBIII®?  Yes → Test Complete.  No → Update the mileage and retest the SRI Memory. Perform POWERTRAIN VERIFICATION TEST VER - 1.	All



**Symptom:****P1698-NO BUS MESSAGE FROM TCM****POSSIBLE CAUSES**

NO BUS MESSAGE FROM TRANS INTERMITTENT

NO BUS MESSAGE FROM TRANS

PCM PCI BUS CIRCUIT OPEN

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII®, read DTCs.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p> <p><b>Note: This DTC could have been set when the TCM was disconnected for transmission Diagnostics.</b></p>	All
2	<p>Ignition on, engine not running.            Connect the DRBIII® and access Powertrain Control Module.  <b>Note: This test checks for other PCI BUS codes. That indicates diferent circuits in the BUS.</b>            With the DRBIII®, read DTCs.            Is a DTC also set for NO SKIM BUS MESSAGE and/or No MIC BUS MESSAGE?</p> <p>Yes → Go To 3</p> <p>No → Inspect the TCM Fused Ignition Switch circuits and ground circuits.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

## P1698-NO BUS MESSAGE FROM TCM — Continued

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII®, read DTCs. This is to ensure power and grounds to the PCM are operational.</p> <p><b>NOTE: If the DRBIII® will not read PCM DTC's, follow the "NO RESPONSE TO PCM (SCI only)" symptom path, if vehicle will start. For NO START Conditions follow symptom "NO RESPONSE" in Starting category .</b></p> <p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Connect the DRBIII® to the Data Link connector</p> <p>Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes.</p> <p>Connect the scope input cable to the channel one connector on the DRBIII®. Attach the red and black leads and the cable to probe adapter to the scope input cable.</p> <p>Select DRBIII® Standalone.</p> <p>Select lab scope.</p> <p>Select Live.</p> <p>Select 12 volt square wave.</p> <p>Press F2 for Scope.</p> <p>Press F2 and use the down arrow to set voltage range to 20 volts. Press F2 again when complete.</p> <p>Connect the Black lead to the PCM ground. Connect the Red lead to the PCM PCI Bus circuit</p> <p>Ignition on, engine not running.</p> <p>Observe the voltage displayed on the DRBIII® Lab Scope.</p> <p>What is the voltage displayed on the scope?</p> <p style="padding-left: 40px;">Pulse from 0 to approximately 7.5 volts Test Complete.</p> <p style="padding-left: 40px;">Steady 0 volts Repair the open PCI Bus circuit to PCM. Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**Symptom:****P1899- TRS PERFORMANCE****When Monitored and Set Condition:****P1899- TRS PERFORMANCE**

When Monitored: Continuously with the transmission in Park, Neutral, or Drive and NOT in Limp-in Mode.

Set Condition: This code will set if the PCM detects an incorrect Park/Neutral switch state for a given mode of vehicle operation.

**POSSIBLE CAUSES**

DRBIII® DISPLAYS P/N & D/R IN WRONG POSITION

(T24) P/N SENSE CIRCUIT OPEN

TRS (T24) P/N SENSE CIRCUIT SHORTED TO GROUND

TRS ASSEMBLY (P/N SWITCH)

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the PNP switch input state. While moving the gear selector through all gear positions Park to 1st and back to Park, watch the DRBIII® display. Did the DRBIII® display P/N and D/R in the correct gear positions?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 2	All
2	Turn the ignition off. Disconnect the PCM harness connector. Disconnect the TRS (P/N switch) harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance of the (T24) P/N Sense circuit between the PCM C1 harness connector and the TRS (P/N) switch harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 3  No → Repair the open in the (T24) P/N Sense circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.	All
3	Measure the resistance between ground and the (T24) P/N Sense circuit. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (T24) P/N Sense circuit. Perform POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All

## P1899- TRS PERFORMANCE — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Connect the TRS (P/N) harness connector.            Move the gear selector through all gear positions, from Park to 1st and back.            While moving the gear selector through the gear positions, measure the resistance between ground and the (T24) P/N Sense circuit in the PCM C1 harness connector.  <b>NOTE: The circuit is grounded in Park and Neutral and open in the other positions.</b>            Did the display change from above 100 kohms (open) to below 10.0 ohms (grounded)?</p> <p>Yes → Go To 5</p> <p>No → Replace the TRS Assembly (P/N Switch) per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****\*BRAKE SWITCH SENSE STATUS DOES NOT CHANGE ON DRBIII®****POSSIBLE CAUSES**

DRBIII® DOES NOT SHOW BRAKE SW PRESSED OR RELEASED

(A108) FUSED B+ CIRCUIT OPEN

(Z241) BRAKE LAMP SWITCH GROUND CIRCUIT OPEN

BRAKE LAMP SWITCH

(K29) BRAKE LAMP SWITCH SIGNAL CIRCUIT OPEN

(K29) BRAKE LAMP SWITCH SIGNAL CIRCUIT SHORT TO GROUND

(K29) BRAKE LAMP SWITCH SIGNAL LESS THAN 10.0 VOLTS

(V32) S/C POWER SUPPLY CIRCUIT BELOW 10 VOLTS AT BRAKE SWITCH CONN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.            Ignition on, engine not running.            With the DRBIII® in Inputs/Outputs, read the Brake Switch state.            While observing the DRBIII® display, press and release the brake pedal several times.            Does the DRBIII® display Brake Switch PRESSED and RELEASED?</p> <p>Yes → The Brake Lamp Switch is operating properly at this time.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off.            Disconnect the Brake Lamp Switch harness connector.            Using a 12-volt test light connected to ground, probe the (A108) Fused B+ circuit at the Brake Lamp Switch harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the open/high resistance in the (A108) Fused B+ circuit.            Check and replace fuses as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
3	<p>Using a 12-volt test light connect to 12-volts, probe the Brake Lamp Switch ground circuit.            Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (Z241) Brake Lamp Switch Ground circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

**\*BRAKE SWITCH SENSE STATUS DOES NOT CHANGE ON DRBIII® —**  
**Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance across the Brake Lamp Switch Signal terminal and the Ground terminal (measurement taken across the switch).            Apply and release the Brake Pedal while monitoring the ohmmeter.            Does the resistance change from below 5.0 ohms to open circuit?</p> <p>Yes → Go To 5</p> <p>No → Replace the Brake Lamp Switch.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
5	<p>Disconnect the PCM harness connectors.            Measure the resistance of the (K29) Brake Lamp Switch Signal circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K29) Brake Lamp Switch Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
6	<p>Disconnect the CAB harness connector.            Measure the resistance between ground and the (K29) Brake Lamp Switch Signal circuit.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K29) Brake Lamp Switch Signal circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p>	All
7	<p>Connect the PCM harness connectors.            Connect the CAB harness connector.            Connect the Brake Lamp Switch harness connector.            Brake pedal must be depressed in the next step.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, probe the (K29) Brake Lamp Switch Signal circuit at the Brake Lamp Switch harness connector.            Is the test light illuminated and bright?</p> <p>Yes → Go To 8</p> <p>No → Replace or adjust the brake switch.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
8	<p>Turn the ignition off.            Disconnect the Brake Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            With the DRBIII®, actuate the S/C Vacuum Solenoid.            Using a 12-volt test light, probe the (V32) S/C Power Supply circuit in the Brake Lamp Switch harness connector.            Did the test light illuminate brightly?</p> <p>Yes → Go To 9</p> <p>No → Repair the excessive resistance in the (V32) S/C Power Supply circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

**\*BRAKE SWITCH SENSE STATUS DOES NOT CHANGE ON DRBIII® —**  
**Continued**

TEST	ACTION	APPLICABILITY
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

## Symptom:

### \*CHECKING A/C SYSTEM OPERATION WITH NO DTCS

POSSIBLE CAUSES
DTC AND COMMUNICATION PRESENT A/C SELECT CIRCUIT OPEN A/C SELECT IN HVAC PCM A/C REQUEST CIRCUIT OPEN REFRIGERATION SYSTEM NOT PROPERLY CHARGED HIGH PRESS CUT-OFF SWITCH LOW PRESSURE SWITCH A/C CLUTCH COIL A/C COMPRESSOR CLUTCH GROUND CIRCUIT OPEN (C3) A/C CLUTCH RELAY OUTPUT CIRCUIT OPEN FUSED B+ CIRCUIT OPEN A/C CLUTCH RELAY

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.  Verify that communication with the HVAC and PCM is available over the BUS.  With the DRBIII®, check for DTCs in the PCM and HVAC module.  Are any A/C DTC's or communication failures present?</p> <p>Yes → Diagnose the related DTC(s) or BUS failure before continuing.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 2</p>	All
2	<p>Engine running.  With the DRBIII®, read the A/C Select status in the PCM.  Turn the A/C Switch on and off a few times.  Does the A/C Select state change?</p> <p>Yes → Go To 3</p> <p>No → Go To 12</p>	All
3	<p>Engine Running.  Turn the A/C system on and the fan on high.  With the DRBIII® in Inputs/Outputs, read the A/C request state.  Does the A/C request state change?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the A/C Request circuit.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All



**\*CHECKING A/C SYSTEM OPERATION WITH NO DTCS — Continued**

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Verify that the Refrigerant System is properly charged per Service Procedure. Is the Refrigerant System properly charged?  Yes → Go To 5  No → Properly charge the Refrigerant System per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
5	Verify the High Pressure Cut-Off Switch operation per Service Information. Is the High Pressure Cut-Off Switch OK?  Yes → Go To 6  No → Replace the High Pressure Cut-Off Switch. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
6	Verify the Low Pressure Switch operation per Service Information. Is the Low Pressure Switch OK?  Yes → Go To 7  No → Replace the Low Pressure Switch. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
7	Ignition on, engine not running. Disconnect the A/C Compressor Clutch harness connector. Connect a test light between the ground circuit and the A/C Clutch Relay Output circuit. With the DRBIII®, actuate the A/C Clutch Relay. Does the test light illuminate brightly on and off with the relay actuation?  Yes → Replace the A/C Clutch Coil. Perform POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 8	All
8	Turn the ignition off. Disconnect the A/C Clutch harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between ground and the A/C Compressor Clutch ground circuit in the A/C Clutch harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 9  No → Repair the open in the A/C Compressor Clutch ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
9	Remove the A/C Clutch Relay. Measure the resistance of the (C3) A/C Clutch Relay Output circuit between the IPM and the A/C Clutch Coil. Is the resistance below 5.0 ohms?  Yes → Go To 10  No → Repair the open in the (C3) A/C Clutch Relay Output circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All

## \*CHECKING A/C SYSTEM OPERATION WITH NO DTCS — Continued

TEST	ACTION	APPLICABILITY
10	<p>Measure the voltage of the Fused B+ circuit at the A/C Clutch Relay connector. Is the voltage above 11.0 volts?</p> <p>Yes → Go To 11</p> <p>No → Repair the open in the Fused B+ circuit. The open may be in the IMP. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
11	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the A/C Clutch Relay. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
12	<p>Ignition on, engine not running. With the DRBIII® in the HVAC, under the Monitors screen, read the A/C Select Switch state. While monitoring the DRBIII® screen, turn the A/C switch on and off a few times. Does the A/C Select State change on the HVAC Monitors screen.</p> <p>Yes → Check for any related TSBs. Replace and program the PCM in accordance with the Service Information as long as no BUS problems exist. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Replace the A/C-Heater Control module. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****\*CHECKING CHARGING SYSTEM OPERATION WITH NO DTCS**

POSSIBLE CAUSES
GENERATOR BELT CONDITION DTC RESET WIRE HARNESS INSPECTION RESISTANCE IN THE BATTERY POSITIVE CIRCUIT (K125) GENERATOR FIELD SOURCE CIRCUIT OPEN GENERATOR FIELD COIL HIGH RESISTANCE (K20) GEN FIELD CONTROL CIRCUIT OPEN RESISTANCE IN THE GENERATOR GROUND PCM

TEST	ACTION	APPLICABILITY
1	Check for any related TSBs. <b>NOTE: Verify that the Battery is able to pass a load test before continuing.</b> Ignition on, engine not running. With the DRBIII®, read the Battery voltage and record the results. Measure Battery voltage between the Battery Positive and Negative Terminals and record the results. Compare the two voltage readings. Is the voltage difference less than one volt?  Yes → Go To 2 No → Go To 8	All
2	Ignition on, engine not running. Measure the voltage between the Generator B+ Terminal and the Battery+ Post. <b>Caution: Ensure all wires are clear of the engine's moving parts.</b> Start the engine. Is the voltage above 0.4 of a volt?  Yes → Repair the excessive resistance in the Battery Positive circuit between the Generator and Battery . Perform POWERTRAIN VERIFICATION TEST VER - 3.  No → Go To 3	All
3	Ignition on, engine not running. Record all DTCs and freeze frame data, now erase Codes. Carefully inspect all connectors for corrosion or spread terminals before continuing. With the DRBIII® actuate the Generator Field Driver. Measure the voltage of the (K125) Generator Field Source circuit by backprobing the back of Generator Field harness connector. Is the voltage above 10.0 volts?  Yes → Go To 4  No → Repair the (K125) Generator Field Source circuit for an open or short to ground. Perform POWERTRAIN VERIFICATION TEST VER - 3.	All

## \*CHECKING CHARGING SYSTEM OPERATION WITH NO DTCS — Continued

TEST	ACTION	APPLICABILITY
4	<p>Start the engine. Warm the engine to operating temperature. <b>Caution: Ensure all wires are clear of the engine's moving parts.</b> Measure the voltage between the Generator case and Battery Negative Post. Is the voltage above 0.1 of a volt?</p> <p>Yes → Repair the excessive resistance in the Generator Ground circuit between the Generator Case and Battery Ground side. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off. Disconnect the Generator Field harness connector at back of the Generator. Measure resistance across the Generator Field Terminals at the Generator. Is the resistance above 15 ohms?</p> <p>Yes → Replace or repair the Generator as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 6</p>	All
6	<p>Disconnect the PCM harness connectors. Measure the resistance of the (K20) Generator Field Driver circuit between the PCM harness connector and the Generator harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K20) Gen Field Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> <b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> If there are no possible causes remaining, view repair.</p> <p>Repair Replace and program the Powertrain Control Module per Service Information. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
8	<p>Turn the ignition off. <b>NOTE: Battery condition must be verified prior to this test.</b> Inspect the Generator Belt tension and condition. Is the Generator Belt OK?</p> <p>Yes → Go To 9</p> <p>No → Repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
9	<p>Start the engine. Turn on all accessories. Raise engine speed to 2000 RPM for 30 seconds then return to idle. With the DRBIII®, read DTCs. Are there any "Charging System" Trouble Codes?</p> <p>Yes → Refer to Symptom list for the related Charging DTCs. Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 10</p>	All

**\*CHECKING CHARGING SYSTEM OPERATION WITH NO DTCS —**  
**Continued**

TEST	ACTION	APPLICABILITY
10	<p>Ignition on, engine not running.            With the DRBIII®, actuate the Generator Field Driver.            Using a 12-volt test light, backprobe the Generator Field Driver Terminal at the back of the Generator.  <b>Note: The test light should blink On and Off every 1.4 seconds.</b>            While monitoring the 12-volt test light, wiggle the Field Terminals back to the PCM and ASD Relay.            Was there any interruption in the normal cycle of the test light?</p> <p>Yes → Repair the wire or connector where the wiggling interrupted the voltage cycle.            Perform POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Test Complete.</p>	All

## Symptom:

### \*CHECKING CONDENSER FAN OPERATION

POSSIBLE CAUSES
INTERNAL FUSED B+ CIRCUITS
CONDENSER FAN RELAY
(Y145) CONDENSER FAN RELAY CONTROL CIRCUIT SHORTED TO GROUND
(Y145) CONDENSER FAN RELAY CONTROL CIRCUIT OPEN
(Z212) CONDENSER FAN GROUND CIRCUIT OPEN
CONDENSER FAN MOTOR

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the Condenser Fan Relay. Does the Condenser Fan Motor cycle on and off?  Yes → Test Complete. No → Go To 2	All
2	Turn the ignition off. Remove the Condenser Fan Relay. Using a 12-volt test light connected to ground, probe the Fused B+ circuit in the Condenser Fan Relay connector. Did the light illuminate brightly?  Yes → Go To 3 No → Repair the open or short to ground in the Internal Fused B+ circuits. Inspect the related fuse and repair as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All
3	Install a known good Relay. With the DRBIII®, actuate the Condenser Fan Relay. Does the Fan actuate?  Yes → Replace the Condenser Fan Relay. Perform POWERTRAIN VERIFICATION TEST VER - 2. No → Go To 4	All
4	Turn the ignition off. . Disconnect the PCM harness connectors. Measure the resistance of the (Y145) Condenser Fan Relay Control circuit from the Condenser Fan Relay to the PCM harness connectors. Is the resistance below 5.0 ohms?  Yes → Go To 5 No → Repair the short to ground in the (Y145) Condenser Fan Relay Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.	All

**\*CHECKING CONDENSER FAN OPERATION — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Measure the resistance of the (Y145) Condenser Fan Relay Output circuit between the Condenser Fan Motor harness connector and the Condenser Fan Relay connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (Y145) Condenser Fan Relay Control circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
6	<p>Disconnect the Condenser Fan Motor harness connector. Measure the resistance between ground and the (Z212) Condenser Fan Motor ground circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (Z212) Condenser Fan ground circuit. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
7	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Condenser Fan Motor. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### \*CHECKING THE PCM POWER AND GROUNDS

POSSIBLE CAUSES
(A14) PCM FUSED B+ CIRCUIT
(Y135) PCM FUSED IGNITION SWITCH OUTPUT CIRCUIT
(Z81) (Z82) PCM GROUND CIRCUITS

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Using a 12-volt test light connected to ground, probe the (A14) PCM Fused B+ circuit in the PCM harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 2</p> <p>No → Repair the open in the (A14) Fused B+ circuit. Inspect the related fuse and repair as necessary.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
2	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, probe the (Y135) PCM Fused Ignition Switch Output circuit in the PCM harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the open in the (Y135) Fused Ignition Switch Output circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
3	<p>Turn the ignition off.            Using a 12-volt test light connected to battery voltage, probe the (Z81) (Z82) PCM ground circuits in the PCM harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Test Complete.</p> <p>No → Repair the open in the PCM ground circuits.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All



**Symptom:**  
**INTERMITTENT CONDITION**

**POSSIBLE CAUSES**

**INTERMITTENT CONDITION**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.</b></p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Refer to any Technical Service Bulletins (TSBs) that may apply.</p> <p>Review the DRB Freeze Frame information. If possible, try to duplicate the conditions under which the DTC set.</p> <p>With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wire harness. Look for parameter values to change and/or a DTC to set.</p> <p>Turn the ignition off.</p> <p>Visually inspect the related wire harness. Disconnect all the related harness connectors. Look for any chafed, pierced, pinched, partially broken wires and broken, bent, pushed out, or corroded terminals.</p> <p>Perform a voltage drop test on the related circuits between the suspected faulty component and the PCM.</p> <p><b>CAUTION: NEVER PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Inspect and clean all PCM, engine, and chassis grounds that are related to the most current DTC.</p> <p>If numerous trouble codes were set, use a wire schematic and look for any common ground or supply circuits</p> <p>For any Relay DTCs, actuate the Relay with the DRBIII® and wiggle the related wire harness to try to interrupt the actuation.</p> <p>For intermittent Evaporative Emission trouble codes perform a visual and physical inspection of the related parts including hoses and the Fuel Filler cap.</p> <p>For intermittent Misfire DTC's check for restrictions in the Intake and Exhaust system, proper installation of Sensors, vacuum leaks, and binding components that are run by the accessory drive belt.</p> <p>Use the DRBIII® to perform a System Test if one applies to failing component.</p> <p>A co-pilot, data recorder, and/or lab scope should be used to help diagnose intermittent conditions.</p> <p>Were any problems found during the above inspections?</p> <p>Yes → Perform the necessary repairs.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

## Symptom:

### **P0016-CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT**

#### **When Monitored and Set Condition:**

#### **P0016-CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT**

When Monitored: Engine cranking and Engine running

Set Condition: Powertrain Control Module detects an error when the camshaft position is out of phase with the crankshaft position. One Trip Fault. Three good trips to turn off the MIL.

#### **POSSIBLE CAUSES**

INTERMITTENT CONDITION

CHECKING INTERMITTENT CMP SIGNAL WITH LAB

CMP WIRE HARNESS INSPECTION

TONE WHEEL/PULSE RING INSPECTION

CKP WIRE HARNESS INSPECTION

TONE WHEEL/PULSE RING INSPECTION

INTERMITTENT CKP SIGNAL

CAMSHAFT POSITION SENSOR

CRANKSHAFT POSITION SENSOR

TEST	ACTION	APPLICABILITY
1	<p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII®, erase DTCs.            Start the engine and run until operating temp is reached. (Closed Loop)            If the DTC does not reset it may be necessary to test drive the vehicle.            Does the P0016 return?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0016-CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K44) CMP Signal circuit at the CMP harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Observe the lab scope screen.</p> <p>Are there any irregular or missing signals?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All
3	<p>Turn the ignition off.</p> <p>Visually inspect the related wire harness. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Ensure the Crankshaft Position Sensor and the Camshaft Position Sensor are properly installed and the mounting bolt(s) tight.</p> <p>Refer to any TSBs that may apply.</p> <p>Were any of the above conditions present?</p> <p>Yes → Repair as necessary Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Remove the Camshaft Position Sensor.</p> <p>Inspect the Tone Wheel/Pulse Ring for damage, foreign material, or excessive movement.</p> <p>Were any problems found?</p> <p>Yes → Repair or replace the Tone Wheel/Pulse Ring as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Camshaft Position Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0016-CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off. Remove the lab scope probe. <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b> Ignition on, engine not running. With the DRBIII®, erase DTCs. Start the engine. Gently tap on the Cam Position Sensor and wiggle the Sensor. Ignition on, engine not running. Inspect the Sensor harness connector, PCM harness connector, Sensor connector, and PCM connector for loose, bent, corroded, or pushed out pins/terminals. Inspect the related wire harness and the splices in the CMP circuits. Does the P0016 return?</p> <p>Yes → Repair the wiring/connector concerns as needed or replace the Camshaft Position Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off. With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K24) CKP Signal circuit at the CKP harness connector. <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b> Start the engine. Observe the lab scope screen. Are there any irregular or missing signals?</p> <p>Yes → Go To 8</p> <p>No → Go To 11</p>	All
8	<p>Turn the ignition off. Visually inspect the related wire harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Ensure the Crankshaft Position Sensor and the Camshaft Position Sensor are properly installed and the mounting bolt(s) tight. Refer to any TSBs that may apply. Were any of the above conditions present?</p> <p>Yes → Repair as necessary Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p>Remove the Crankshaft Position Sensor. Inspect the Tone Wheel/Flex Plate slots for damage, foreign material, or excessive movement. Were any problems found?</p> <p>Yes → Repair or replace the Tone Wheel/Flex Plate as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 10</p>	All

**P0016-CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT — Continued**

TEST	ACTION	APPLICABILITY
10	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Crankshaft Position Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
11	<p><b>NOTE: The conditions that set this DTC are not present at this time. The following test may help in identifying the intermittent condition.</b></p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Gently tap on the Crank Position Sensor and wiggle the CKP Sensor.</p> <p>Turn the ignition off.</p> <p>Inspect the Sensor harness connector, PCM harness connector, Sensor connector, and PCM connector for loose, bent, corroded, or pushed out pins/terminals.</p> <p>Inspect the related wire harness and the splices in the CKP circuits.</p> <p>Were any problems found?</p> <p>Yes → Repair the wiring/connector concerns as needed or replace the Crankshaft Position Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

**Symptom List:**

**P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW**

**P0037-O2 SENSOR 1/2 HEATER CIRCUIT LOW**

**P0051-O2 SENSOR 2/1 HEATER CIRCUIT LOW**

**P0057-O2 SENSOR 2/2 HEATER CIRCUIT LOW**

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**Test Note: All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P0031-O2 SENSOR 1/1 HEATER  
CIRCUIT LOW.**

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**When Monitored and Set Condition:**

**P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is on.

Set Condition: Desired state does not match Actual state. One Trip Fault. Three good trips to turn off the MIL.

**P0037-O2 SENSOR 1/2 HEATER CIRCUIT LOW**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is on.

Set Condition: Desired state does not equal Actual state. One Trip Fault. Three good trips to turn off the MIL.

**P0051-O2 SENSOR 2/1 HEATER CIRCUIT LOW**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is on.

Set Condition: Desired state does not equal Actual state. One Trip Fault. Three good trips to turn off the MIL.

**P0057-O2 SENSOR 2/2 HEATER CIRCUIT LOW**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is on.

Set Condition: Desired state does not equal Actual state. One Trip Fault. Three good trips to turn off the MIL.

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**POSSIBLE CAUSES**

O2 SENSOR HEATER OPERATION

O2 HEATER ELEMENT

O2 HEATER CONTROL CIRCUIT

O2 HEATER CONTROL SHORTED TO GROUND

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**P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW — Continued**

<b>POSSIBLE CAUSES</b>		
PCM		

<b>TEST</b>	<b>ACTION</b>	<b>APPLICABILITY</b>
1	Turn the ignition off. <b>NOTE: Wait a minimum of 8 minutes to allow the O2 Sensor to cool down before continuing the test. Allow the O2 Sensor voltage to stabilize at 5.0 volts.</b> Ignition on, engine not running. With the DRBIII®, actuate the O2 Heater Test. With the DRBIII®, monitor O2 Sensor voltage for at least 2 minutes. Does the O2 Sensor voltage stay above 4.5 volts?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. <b>NOTE: Allow the O2 Sensor to cool down to room temperature.</b> Disconnect the O2 Sensor harness connector. Measure the resistance across the O2 Sensor Heater element component side. <b>NOTE: O2 Heater Element resistance values should be measured at 70°F (21.1°C). The resistance value will vary with different temperature values.</b> Is the O2 Sensor Heater Element resistance between 2.0 and 30.0 ohms?  Yes → Go To 3  No → Replace the O2 Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
3	Ignition on, engine not running. With the DRBIII®, actuate the O2 Heater Test with the O2 Sensor harness connector still disconnected. Using a 12-volt test light connected to ground, probe the O2 Heater Control circuit in the O2 Sensor harness connector. Does the test light illuminate brightly and flash on and off?  Yes → Replace the O2 Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All
4	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the O2 Heater Control circuit in the O2 Sensor harness connector. Is the resistance below 5.0 ohms?  Yes → Repair the short to ground in the O2 Sensor Heater Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 5	All

**P0031-O2 SENSOR 1/1 HEATER CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom List:****P0032-O2 SENSOR 1/1 HEATER CIRCUIT HIGH****P0038-O2 SENSOR 1/2 HEATER CIRCUIT HIGH****P0052-O2 SENSOR 2/1 HEATER CIRCUIT HIGH****P0058-O2 SENSOR 2/2 HEATER CIRCUIT HIGH**

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**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be **P0032-O2 SENSOR 1/1 HEATER CIRCUIT HIGH**.

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**When Monitored and Set Condition:****P0032-O2 SENSOR 1/1 HEATER CIRCUIT HIGH**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is off.

Set Condition: Desired state does not equal Actual state. One Trip Fault. Three good trips to turn off the MIL.

**P0038-O2 SENSOR 1/2 HEATER CIRCUIT HIGH**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is off.

Set Condition: Desired state does not equal Actual state. One Trip Fault. Three good trips to turn off the MIL.

**P0052-O2 SENSOR 2/1 HEATER CIRCUIT HIGH**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is off.

Set Condition: Desired state does not equal Actual state. One Trip Fault. Three good trips to turn off the MIL.

**P0058-O2 SENSOR 2/2 HEATER CIRCUIT HIGH**

When Monitored: Battery voltage above 10.6 volts, ASD is powered up, and O2 heater is off.

Set Condition: Desired state does not equal Actual state. One Trip Fault. Three good trips to turn off the MIL.

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**POSSIBLE CAUSES**

O2 SENSOR HEATER OPERATION

O2 HEATER ELEMENT

O2 HEATER GROUND CIRCUIT OPEN

O2 SENSOR

**P0032-O2 SENSOR 1/1 HEATER CIRCUIT HIGH — Continued**

POSSIBLE CAUSES	
O2 HEATER CONTROL SHORTED TO VOLTAGE	
O2 HEATER CONTROL CIRCUIT OPEN	
PCM	

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition off.</p> <p><b>NOTE: Wait a minimum of 8 minutes to allow the O2 Sensor to cool down before continuing the test. Allow the O2 Sensor voltage to stabilize at 5.0 volts.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the O2 Heater Test.</p> <p>With the DRBIII®, monitor O2 Sensor voltage for at least 2 minutes.</p> <p>Does the O2 Sensor voltage stay above 4.5 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.</p> <p><b>NOTE: Allow the O2 Sensor to cool down to room temperature.</b></p> <p>Disconnect the O2 Sensor harness connector.</p> <p>Measure the resistance across the O2 Sensor Heater element component side.</p> <p><b>NOTE: O2 Heater Element resistance values should be measured at 70°F (21.1°C). The resistance value will vary with different temperature values.</b></p> <p>Is the O2 Sensor Heater Element resistance between 2.0 and 30.0 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the O2 Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the O2 Heater Test with the Sensor harness connector still disconnected.</p> <p>Using a 12-volt test light connected to ground, probe the O2 Heater Control circuit in the O2 Sensor harness connector.</p> <p>Does the test light illuminate brightly and flash on and off?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>Turn the ignition off.</p> <p>Measure the resistance between engine ground and the O2 Heater ground circuit in the O2 Sensor harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Replace the O2 Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Repair the open in the O2 Heater ground circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0032-O2 SENSOR 1/1 HEATER CIRCUIT HIGH — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the O2 Heater Control circuit at the O2 Sensor harness connector.            Does the voltmeter indicate any voltage present?</p> <p>Yes → Repair the short to voltage in the O2 Heater Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the O2 Heater Control circuit from the O2 Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the O2 Heater Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P0068-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED**

**P2074-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0068-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED.**

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**When Monitored and Set Condition:**

**P0068-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED**

When Monitored: During all drive modes.

Set Condition: If vacuum drops below 1.5"Hg with engine RPM greater than 2000 RPM and closed throttle. One Trip Fault. Three good trips to turn off the MIL.

**P2074-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED**

When Monitored: During all drive modes.

Set Condition: If vacuum drops below 1.5"Hg with engine RPM greater than 2000 RPM and closed throttle. One Trip Fault. Three good trips to turn off the MIL.

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**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

VACUUM LEAK

RESISTANCE IN (F856) 5-VOLT SUPPLY CIRCUIT

(F856) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

MAP SENSOR

RESISTANCE IN THE (K1) MAP SIGNAL CIRCUIT

K1) MAP SIGNAL CIRCUIT SHORTED TO GROUND

RESISTANCE IN THE (K900) SENSOR GROUND CIRCUIT

TP SENSOR OPERATION

RESISTANCE IN THE (F855) 5-VOLT SUPPLY CIRCUIT

(F855) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

TP SENSOR

RESISTANCE IN THE (K22) TP SENSOR NO.1 SIGNAL CIRCUIT

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

RESISTANCE IN THE (K900) SENSOR GROUND CIRCUIT

PCM

## P0068-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED — Continued

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Diagnose any TP Sensor or MAP Sensor component DTCs before continuing.</b></p> <p><b>NOTE: If the P0501 - No Vehicle Speed Signal is set long with this DTC, refer to the P0501 diagnostics before continuing.</b></p> <p><b>NOTE: The throttle plate and linkage should be free from binding and carbon build up.</b></p> <p><b>NOTE: Ensure the throttle plate is at the idle position.</b></p> <p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
2	<p><b>NOTE: This code is enabled on engines with a plastic intake manifold and is intended to shut down the engine if a large crack occurs.</b></p> <p><b>NOTE: A large vacuum leak is most likely the cause of this DTC.</b></p> <p>Inspect the Intake Manifold for leaks and cracks.            Inspect the Power Brake Booster for any vacuum leaks.            Inspect the PCV system for proper operation or any vacuum leaks.            Inspect the throttle plate to see if it is bent and will close entirely, if it is bent it may need to be replaced.            Inspect the MAP Sensor for proper installation.            Verify the engine is free from any mechanical failures.            Were any vacuum leaks found?</p> <p>Yes → Repair the vacuum leak as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
3	<p>Start the engine.            With the DRBIII®, monitor the MAP Sensor voltage.            Snap the throttle.            Does the MAP Sensor voltage vary from below 2.0 volts at idle to above 3.5 volts at WOT.</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
4	<p>Ignition on, engine not running.            With the DRBIII®, monitor the TP Sensor voltage while slowly depressing the throttle pedal from closed to wide open throttle.            Does voltage start approximately at 0.8 of a volt and go above 3.5 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P0068-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.            Disconnect the TP Sensor harness connector.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (F855) 5-volt Supply circuit from the TP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the excessive resistance in the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
6	<p>Measure the resistance between ground and (F855) 5-volt Supply circuit at the TP Sensor harness connector.            Is the resistance above 100k ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the short to ground in the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
7	<p>Connect the PCM harness connectors.            Ignition on, engine not running.            With the DRBIII®, monitor the TP Sensor voltage.            Connect a jumper wire between the (K22) TP Sensor No.1 Signal circuit and the (K900) Sensor ground circuit in the Sensor harness connector.            Does the TP Sensor voltage change from approximately 4.9 volts to below 0.5 of a volt?</p> <p>Yes → Replace the Throttle Position Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
8	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K22) TP Sensor No.1 Signal circuit from the TP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the excessive resistance in the (K22) TP Sensor No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

# **P0068-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Measure the resistance between ground and the (K22) TP Sensor No.1 Signal circuit in the TP Sensor harness connector. Is the resistance above 100k ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the short to ground in the (K22) TP Sensor No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
10	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the TP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 17</p> <p>No → Repair the excessive resistance in the (K900) Sensor ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
11	<p>Turn the ignition off. Disconnect the MAP Sensor harness connector. Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (F856) 5-volt Supply circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the excessive resistance in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
12	<p>Measure the resistance between ground and the (F856) 5-volt Supply circuit at the MAP Sensor harness connector. Is the resistance above 100k ohms?</p> <p>Yes → Go To 13</p> <p>No → Repair the short to ground in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P0068-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED — Continued**

TEST	ACTION	APPLICABILITY
13	<p>Turn the ignition off.            Connect the PCM harness connectors.            Ignition on, engine not running.            With the DRBIII®, monitor the MAP Sensor voltage.            Connect a jumper wire between the (K1) MAP Signal circuit and the (K900) Sensor ground circuit.            Cycle the ignition switch from off to on.            Does the DRBIII® display MAP voltage from approximately 4.9 volts to below 0.5 of a volt?</p> <p>Yes → Replace the MAP Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 14</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
14	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K1) MAP Signal circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 15</p> <p>No → Repair the excessive resistance in the (K1) MAP Signal circuit            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
15	<p>Measure the resistance between ground and the (K1) MAP Signal circuit at the MAP Sensor harness connector.            Is the resistance above 100k ohms?</p> <p>Yes → Go To 16</p> <p>No → Repair the short to ground in the (K1) MAP Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
16	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 17</p> <p>No → Repair the excessive resistance in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6



**P0068-MAP SENSOR/TP SENSOR CORRELATION - VACUUM LEAK DETECTED — Continued**

TEST	ACTION	APPLICABILITY
17	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

## Symptom:

### P0071-AMBIENT TEMPERATURE SENSOR PERFORMANCE

#### When Monitored and Set Condition:

#### P0071-AMBIENT TEMPERATURE SENSOR PERFORMANCE

**When Monitored:** Engine off time is greater than 480 minutes and Ambient Temperature is greater than 4 deg C (39 deg F).

**Set Condition:** After a calibrated amount of cool down time, the PCM compares the ECT Sensor, IAT Sensor and the Ambient Air Temperature Sensor values. If the Ambient Air Temperature Sensor value is not within -10 deg C (18 deg F) of the other two temperature sensor's. Two Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

(G31) AAT SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

AAT SENSOR

(G31) AAT SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

(G31) AAT SIGNAL CIRCUIT SHORTED TO GROUND

(G31) AAT SIGNAL CIRCUIT SHORTED TO (K900) SENSOR GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p><b>NOTE: Visually inspect both the component and the PCM connectors. Look for damage, partially broken wires and backed out or corroded terminals</b> Turn the ignition off Disconnect the PCM harness connectors. Disconnect the Ambient Air Temp Sensor harness connector. Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the (G31) AAT Signal circuit in the Ambient Temp Sensor harness connector. Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (G31) AAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P0071-AMBIENT TEMPERATURE SENSOR PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Connect the PCM harness connectors.            Ignition on, engine not running.            With the DRBIII®, read the Ambient Air Temperature Sensor voltage.            Is the voltage above 4.6 volts?</p> <p>Yes → Go To 4            No → Go To 7</p>	All
4	<p>Connect a jumper wire across the (G31) AAT Signal circuit and the (K4) Sensor ground circuit terminals of the Sensor harness connector.            With the DRBIII®, read the AAT Sensor voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the Ambient Temperature Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.            No → Go To 5</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (G31) AAT Signal circuit from the AAT Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6            No → Repair the open in the (G31) AAT Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the AAT Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9            No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (G31) AAT Signal circuit in the AAT Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (G31) AAT Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.            No → Go To 8</p>	All

**P0071-AMBIENT TEMPERATURE SENSOR PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Measure the resistance between the (G31) AAT Signal circuit and the (K900) Sensor ground circuit in the AAT Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground circuit and the (G31) AAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0072-AMBIENT TEMPERATURE SENSOR CIRCUIT LOW****When Monitored and Set Condition:****P0072-AMBIENT TEMPERATURE SENSOR CIRCUIT LOW**

When Monitored: The ignition key on.

Set Condition: Ambient Temperature Sensor is less than .0392 of a volt at the PCM for 4.8 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

AAT SENSOR VOLTAGE BELOW 0.3 OF A VOLT

AAT SENSOR

(G31) AAT SIGNAL CIRCUIT SHORTED TO GROUND

(G31) ATT SIGNAL CIRCUIT SHORTED TO THE (K900) SENSOR GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the Ambient Air Temperature Sensor voltage. Is the voltage below 0.3 of a volt?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the Ambient Air Temperature Sensor harness connector. Ignition on, engine not running. With the DRBIII®, read AAT Sensor voltage. Is the voltage above 4.6 volts?  Yes → Replace the Ambient Temperature Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (G31) AAT Signal circuit in the AAT Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (G31) AAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All

**P0072-AMBIENT TEMPERATURE SENSOR CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the (G31) AAT Signal circuit and the (K900) Sensor ground circuit at the AAT Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground circuit and the (G31) AAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0073-AMBIENT TEMPERATURE SENSOR CIRCUIT HIGH****When Monitored and Set Condition:****P0073-AMBIENT TEMPERATURE SENSOR CIRCUIT HIGH**

When Monitored: The ignition key on.

Set Condition: The Ambient Temperature Sensor voltage is greater than 4.9 volts at the PCM for 4.8 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

AAT SENSOR VOLTAGE ABOVE 4.8 VOLTS

AAT SENSOR

(G31) AAT SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(G31) AAT SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read the Ambient Air Temperature Sensor voltage. Is the voltage above 4.8 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the Ambient Air Temperature Sensor harness connector. Connect a jumper wire between the (G31) AAT Signal circuit and the (K900) Sensor ground circuit at the AAT Sensor harness connector. Ignition on, engine not running. With the DRBIII®, read Ambient Air Temperature Sensor voltage. Is the voltage below 1.0 volt?</p> <p>Yes → Replace the Ambient Temperature Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

**P0073-AMBIENT TEMPERATURE SENSOR CIRCUIT HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, probe the (G31) AAT Signal circuit in the AAT Sensor harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (G31) AAT Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (G31) AAT Signal circuit from the AAT Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (G31) AAT Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the AAT Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P0107-MAP SENSOR CIRCUIT LOW****When Monitored and Set Condition:****P0107-MAP SENSOR CIRCUIT LOW**

When Monitored: Ignition on. Battery voltage greater than 10.4 volts.

Set Condition: The MAP sensor signal voltage is below 0.08 of a volt for 3.0 seconds. One Trip Fault. Three good trips to turn off the MIL, (5.7L ETC light will flash.)

**POSSIBLE CAUSES**

MAP SENSOR VOLTAGE BELOW 0.1 OF A VOLT

(F856) 5-VOLT SUPPLY CIRCUIT OPEN

(F856) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

MAP SENSOR

(K1) MAP SIGNAL CIRCUIT SHORTED TO GROUND

(K1) MAP SIGNAL CIRCUIT SHORTED TO THE (K900) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. With the DRBIII®, read the MAP Sensor voltage. Is the voltage below 0.1 of a volt?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the MAP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (F856) 5-volt Supply circuit in the MAP Sensor harness connector. Is the voltage between 4.5 to 5.2 volts?  Yes → Go To 3  No → Go To 6	All
3	With the DRBIII®, monitor the MAP Sensor voltage with the Sensor harness connector disconnected. Is the voltage above 4.5 volts?  Yes → Replace the MAP Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All

**P0107-MAP SENSOR CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K1) MAP Signal circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K1) MAP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 5	All
5	Measure the resistance between the (K1) MAP Signal circuit and the (K900) Sensor ground circuit in the MAP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short between the (K900) Sensor ground and the (K1) MAP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 8	All
6	Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F856) 5-volt Supply circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?  Yes → Go To 7  No → Repair the open in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
7	Measure the resistance between ground and the (F856) 5-volt Supply circuit in the MAP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 8	All
8	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**Symptom:**  
**P0108-MAP SENSOR CIRCUIT HIGH**

**When Monitored and Set Condition:**

**P0108-MAP SENSOR CIRCUIT HIGH**

When Monitored: Ignition on. Battery voltage greater than 10.4 volts

Set Condition: The MAP sensor signal voltage is greater than 4.93 volts for 3 seconds.  
 One trip fault. Three good trips to turn off the MIL. (5.7L ETC light will flash).

**POSSIBLE CAUSES**

MAP SENSOR VOLTAGE ABOVE 4.92 VOLTS

MAP SENSOR

(K1) MAP SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K1) MAP SIGNAL CIRCUIT OPEN

(K1) MAP SIGNAL CIRCUIT SHORTED TO THE (F856) 5-VOLT SUPPLY CIRCUIT

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Start the engine.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII®, read the MAP Sensor voltage.            Is the voltage above 4.92 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the MAP Sensor harness connector.            Connect a jumper wire between the (K1) MAP Signal circuit and the (K900) Sensor ground circuit in the harness connector.            Ignition on, engine not running.            With the DRBIII®, monitor the MAP Sensor voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the MAP Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

**P0108-MAP SENSOR CIRCUIT HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, probe the (K1) MAP Signal circuit in the MAP Sensor harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (K1) MAP Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K1) MAP Signal circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K1) MAP Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between the (K1) MAP Signal circuit and the (F856) 5-volt Supply circuit in the MAP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (F856) 5-volt Supply circuit and the (K1) MAP Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0111-INTAKE AIR TEMPERATURE SENSOR PERFORMANCE****When Monitored and Set Condition:****P0111-INTAKE AIR TEMPERATURE SENSOR PERFORMANCE**

**When Monitored:** The engine off time is greater than 480 minutes. Ambient Temperature if greater than 4 deg C (38 deg F).

**Set Condition:** After a calibrated amount of cool down time the PCM compares the ECT Sensor, IAT Sensor, and the Ambient Air Temp Sensor values. The IAT Sensor value is not within -10 deg C (18 deg F) of the other two temperature sensors. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(K21) IAT SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

IAT SENSOR

(K21) IAT SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

(K21) IAT SIGNAL CIRCUIT SHORTED TO GROUND

(K21) IAT SIGNAL CIRCUIT SHORTED TO THE (K900) SENSOR GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the IAT Sensor harness connector. Disconnect the PCM harness connectors. <b>NOTE: Visually inspect both the component and the PCM connectors. Look for damaged, partially broken wires, and backed out or corroded terminals.</b> Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the (K21) IAT Signal circuit in the IAT Sensor harness connector. Does the test light illuminate brightly?  Yes → Repair the short to voltage in the (K21) IAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All

## P0111-INTAKE AIR TEMPERATURE SENSOR PERFORMANCE — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Connect the PCM harness connectors. Ignition on, engine not running. With the DRBIII®, read the IAT voltage. Is the voltage above 4.6 volts?  Yes → Go To 4 No → Go To 7	All
4	Connect a jumper wire between the (K21) IAT Signal circuit and (K900) Sensor ground circuit in the IAT Sensor harness connector. With the DRBIII®, read the IAT voltage. Is the voltage below 1.0 volt?  Yes → Replace the IAT Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 5  <b>NOTE: Remove the jumper wire before continuing.</b>	All
5	Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K21) IAT Signal circuit from the IAT Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?  Yes → Go To 6  No → Repair the open in the (K21) IAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
6	<b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K900) Sensor ground circuit from the IAT Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?  Yes → Go To 9  No → Repair the open in the (K900) Sensor ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
7	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K21) IAT Signal circuit in the IAT Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K21) IAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 8	All

## P0111-INTAKE AIR TEMPERATURE SENSOR PERFORMANCE — Continued

TEST	ACTION	APPLICABILITY
8	<p>Measure the resistance between the (K900) Sensor ground circuit and the (K21) IAT Signal circuit at the IAT Sensor harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground circuit and the (K21) IAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:**

**P0112-INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW**

**When Monitored and Set Condition:**

**P0112-INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW**

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: The Intake Air Temperature (IAT) sensor circuit voltage at the PCM goes below 0.078 of a volt for more than 2.8 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

IAT SENSOR VOLTAGE BELOW 0.078 OF A VOLT

IAT SENSOR

(K21) IAT SIGNAL CIRCUIT SHORTED TO GROUND

(K21) IAT SIGNAL CIRCUIT SHORTED TO THE (K900) SENSOR GROUND CIRCUIT  
PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the IAT voltage. Is the voltage below 0.078 of a volt?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the IAT harness connector. Ignition on, engine not running. With the DRBIII®, read IAT voltage. Is the voltage above 1.0 volt?  Yes → Replace the IAT Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K21) IAT Signal circuit at the IAT Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K21) IAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All



**P0112-INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the (K21) IAT Signal circuit and the (K900) Sensor ground circuit in the IAT Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground and the (K21) IAT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:**

**P0113-INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH**

**When Monitored and Set Condition:**

**P0113-INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH**

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: The Intake Air Temperature (IAT) sensor circuit voltage at the PCM goes above 4.98 volts for more than 2.8 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

IAT SENSOR VOLTAGE ABOVE 4.98 VOLTS

IAT SENSOR

(K21) IAT SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K21) IAT SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read the IAT voltage. Is the voltage above 4.98 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the IAT harness connector. Connect a jumper wire between the (K21) IAT Signal circuit and the (K900) Sensor ground circuit in the IAT harness connector. Ignition on, engine not running. With the DRBIII®, read IAT voltage. Is the voltage below 1.0 volt?</p> <p>Yes → Replace the IAT Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

**P0113-INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, probe the (K21) IAT Signal circuit in the IAT Sensor harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (K21) IAT Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K21) IAT Signal circuit from the IAT Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K21) IAT Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the IAT Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0116-ENGINE COOLANT TEMPERATURE CIRCUIT PERFORMANCE****When Monitored and Set Condition:****P0116-ENGINE COOLANT TEMPERATURE CIRCUIT PERFORMANCE**

**When Monitored:** Engine off time is greater than 480 minutes. Ambient temperature is greater than 4 deg C (38 deg F).

**Set Condition:** After a calibrated amount of cool down time the PCM compares the ECT Sensor, IAT Sensor, and the Ambient Air Temp Sensor values. If the IAT Sensor value is not within 10 deg C (18 deg F) of the other two temperature sensors. Two Trip Fault. Three good trips to turn off the MIL. (5.7L ETC lamp will illuminate with the MIL.)

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(K2) ECT SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

ECT SENSOR

(K2) ECT SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

(K2) ECT SIGNAL CIRCUIT SHORTED TO GROUND

(K2) ECT SIGNAL CIRCUIT SHORTED TO THE (K900) SENSOR GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

## P0116-ENGINE COOLANT TEMPERATURE CIRCUIT PERFORMANCE — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect the ECT Sensor harness connector.  <b>NOTE: Visually inspect both the component and the PCM connectors. Look for damaged, partially broken wires, and backed out or corroded terminals.</b>            Ignition on, engine not running.            Using a 12-volt test light connected to ground, probe the (K2) ECT Signal circuit in the ECT Sensor harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (K2) ECT Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.            Connect the PCM harness connectors.            Ignition on, engine not running.            With the DRBIII®, read the ECT voltage.            Is the voltage above 4.6 volts?</p> <p>Yes → Go To 4</p> <p>No → Go To 7</p>	All
4	<p>Connect a jumper wire between the (K2) ECT Signal circuit and the (K900) Sensor ground circuit in the ECT Sensor harness connector.            With the DRBIII®, read the ECT voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the ECT Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K2) ECT Signal circuit from the ECT Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K2) ECT Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P0116-ENGINE COOLANT TEMPERATURE CIRCUIT PERFORMANCE — Continued

TEST	ACTION	APPLICABILITY
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the ECT Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the (K900) Sensor ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K2) ECT Signal circuit in the ECT Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p>Measure the resistance between the (K2) ECT Signal circuit and the (K900) Sensor ground circuit at the ECT Sensor harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground and the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0117-ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW****When Monitored and Set Condition:****P0117-ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW**

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: The Engine Coolant Temperature (ECT) sensor circuit voltage at the PCM is less than 0.078 of a volt for more than 2.8 seconds. One Trip Fault. Three good trips to turn off the MIL. (5.7L ETC lamp will illuminate with the MIL.)

**POSSIBLE CAUSES**

ECT SENSOR VOLTAGE BELOW 0.078 OF A VOLT

ECT SENSOR

(K2) ECT SIGNAL CIRCUIT SHORTED TO GROUND

(K2) ECT SIGNAL CIRCUIT SHORTED TO THE (K900) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the ECT voltage. Is the voltage below 0.078 of volt?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the ECT harness connector. Ignition on, engine not running. With the DRBIII®, read ECT voltage. Is the voltage above 1.0 volt?  Yes → Replace the ECT Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K2) ECT Signal circuit in the ECT Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All

**P0117-ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
4	Measure the resistance between the (K2) ECT Signal circuit and the (K900) Sensor ground circuit in the ECT Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short between the (K900) Sensor ground and the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 5	All
5	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All



**Symptom:****P0118-ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH****When Monitored and Set Condition:****P0118-ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH**

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: The Engine Coolant Temperature (ECT) sensor circuit voltage at the PCM is greater than 4.98 volts for more than 2.8 seconds. One Trip Fault. Three good trips to turn off the MIL. (5.7L ETC lamp will illuminate with the MIL.)

**POSSIBLE CAUSES**

ECT SENSOR VOLTAGE ABOVE 4.98 VOLTS

ECT SENSOR

(K2) ECT SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K2) ECT SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the ECT voltage. Is the voltage above 4.98 volts?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the ECT harness connector. Connect a jumper wire between the (K2) ECT Signal circuit and the (K900) Sensor ground circuit in the ECT harness connector. Ignition on, engine not running. With the DRBIII®, read ECT voltage. Is the voltage below 1.0 volt?  Yes → Replace the ECT Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

## P0118-ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the (K2) ECT Signal circuit in the ECT Sensor harness connector. Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K2) ECT Signal circuit from the ECT Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K900) Sensor ground circuit from the ECT Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K900) Sensor ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P0121-THROTTLE POSITION SENSOR NO.1 PERFORMANCE (5.7L)**  
**P0221-THROTTLE POSITION SENSOR NO.2 PERFORMANCE**  
**P2135-THROTTLE POSITION SENSOR NO.1 AND NO.2 VOLTAGE CORRELATION**

**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be **P0121-THROTTLE POSITION SENSOR NO.1 PERFORMANCE (5.7L)**.

**When Monitored and Set Condition:****P0121-THROTTLE POSITION SENSOR NO.1 PERFORMANCE (5.7L)**

When Monitored: Ignition on and No MAP Sensor DTCs set.

Set Condition: TP Sensor signals do not correlate to the MAP Sensor signal. One Trip Fault. 5.7L ETC light will illuminate. P2135 should set with this code also.

**P0221-THROTTLE POSITION SENSOR NO.2 PERFORMANCE**

When Monitored: Ignition on with no MAP Sensor DTCs set.

Set Condition: TP Sensor signals do not correlate to the MAP Sensor signal. One Trip Fault. ETC light will illuminate. P2135 should set with this code also.

**P2135-THROTTLE POSITION SENSOR NO.1 AND NO.2 VOLTAGE CORRELATION**

When Monitored: With the ignition on and no other DTCs present for TP Sensor No.1 or No.2.

Set Condition: PCM recognizes TP Sensors No.1 and No.2 are not coherent. One trip fault. ETC light is illuminated.

**POSSIBLE CAUSES**

TP SENSOR SWEEP  
 INTERMITTENT CONDITION  
 TP SENSOR SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE  
 THROTTLE POSITION SENSOR  
 RESISTANCE IN THE (K22) OR (K122) TP SIGNAL CIRCUIT  
 (K22) OR (K122) TP SIGNAL CIRCUIT SHORTED TO GROUND  
 RESISTANCE IN (F855) 5-VOLT SUPPLY CIRCUIT  
 RESISTANCE TO GROUND IN THE (F855) 5-VOLT SUPPLY CIRCUIT  
 RESISTANCE IN THE (K922) SENSOR RETURN CIRCUIT  
 (K22) TPS NO.1 SIGNAL CIRCUIT SHORTED TO (K122) TPS NO.2 SIGNAL CIRCUIT

## P0121-THROTTLE POSITION SENSOR NO.1 PERFORMANCE (5.7L) — Continued

POSSIBLE CAUSES	
PCM	

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Diagnose any other TP Sensor DTC(s) before continuing.</b>  <b>NOTE: The throttle plate and linkage should be free from binding and carbon build up.</b>  <b>NOTE: Ensure the throttle plate is at the idle position.</b>            Ignition on, engine not running.  <b>NOTE: Inspect the engine for vacuum leaks.</b>            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2            No → Go To 11</p>	MAGNUM 5.7L SMPI V8
2	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect the Throttle Body harness connector.            Ignition on, engine not running.            Measure the voltage on the (K22) TP No.1 Signal and the (K122) TP No.2 Signal circuits in the Throttle Body harness connector.            Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K22) TP No.1 or (K122) TP No.2 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	MAGNUM 5.7L SMPI V8
3	<p>Turn the ignition off.            Connect the PCM harness connectors.            Ignition on, engine not running.            With the DRBIII®, monitor the TP Sensor No.1 or No.2 voltage.            Connect a jumper wire between the (K922) Sensor Return circuit and the (K22) TP Sensor No.1 Signal circuit.            TP Sensor No.1 voltage should change from approximately 4.5 volts to 0.5 of a volt?            For TP Sensor No.2, connect a jumper wire between (F855) 5-volt supply circuit and the (K122) TP Sensor No.2 signal circuit.            TP Sensor No.2 voltage should change from approximately 0 volts to 5.0 volts?            Is the voltage reading within the listed specifications?</p> <p>Yes → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	MAGNUM 5.7L SMPI V8

## P0121-THROTTLE POSITION SENSOR NO.1 PERFORMANCE (5.7L) — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K22) TP Sensor No.1 Signal circuit or (K122) TP Sensor No.2 Signal circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the excessive resistance in the (K22) or (K122) TP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
5	<p>Measure the resistance between ground and the (K22) TP Sensor No.1 Signal circuit or (K122) TP Sensor No.2 Signal circuit at the appropriate terminals of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the short to ground in the (K22) or (K122) TP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F855) 5-volt Supply circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the excessive resistance in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
7	<p>Measure the resistance between ground and the (F855) 5-volt Supply circuit between the appropriate terminals of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	MAGNUM 5.7L SMPI V8

## P0121-THROTTLE POSITION SENSOR NO.1 PERFORMANCE (5.7L) — Continued

TEST	ACTION	APPLICABILITY
8	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K922) Sensor Return circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the excessive resistance in the (K922) Sensor Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
9	<p>Measure the resistance between the (K22) TP Sensor No.1 Signal circuit and the (K122) TP Sensor No.2 Signal circuit between the appropriate terminals of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K122) TP Sensor No.2 Signal circuit and the (K22) TP Sensor No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 10</p>	MAGNUM 5.7L SMPI V8
10	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, review repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
11	<p>Ignition on, engine not running. With the DRBIII®, perform the Throttle Follower Test and monitor the TP Sensor No.1 or No.2 voltage. Slowly press the throttle pedal down. The voltage for TP Sensor No.1 should start at approximately 0.3 of a volt and increase to above 4.7 volts. The voltage for TP Sensor No.2 should start at approximately 4.7 volts and decrease to approximately 0.6 of a volt. Is the voltage within the range of the listed specification for the appropriate Sensor?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**Symptom:****P0122-THROTTLE POSITION SENSOR NO.1 LOW (3.7L, 4.7L)****When Monitored and Set Condition:****P0122-THROTTLE POSITION SENSOR NO.1 LOW (3.7L, 4.7L)**

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: Throttle Position Sensor voltage at the PCM is less than 0.0978 of a volt for 1.3 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

THROTTLE POSITION SENSOR SWEEP

INTERMITTENT CONDITION

(F855) 5-VOLT SUPPLY CIRCUIT OPEN

(F855) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

THROTTLE POSITION SENSOR

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO THE (K900) SENSOR GROUND CIRCUIT  
PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the TP Sensor voltage. Is the voltage below 0.2 of a volt?  Yes → Go To 2 No → Go To 9	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
2	Turn the ignition off. Disconnect the TP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (F855) 5-volt Supply circuit in the TP Sensor harness connector. Is the voltage between 4.5 to 5.2 volts?  Yes → Go To 3 No → Go To 6	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
3	With the DRBIII®, monitor the TP Sensor voltage with the Sensor harness connector disconnected. Is the voltage above 4.5 volts?  Yes → Replace the Throttle Position Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5. No → Go To 4	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P0122-THROTTLE POSITION SENSOR NO.1 LOW (3.7L, 4.7L) — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (K22) TP Sensor No.1 Signal circuit at the TP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K22) TP Sensor No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
5	<p>Measure the resistance between the (K22) TP Sensor No.1 Signal circuit and the (K900) Sensor ground circuit in the TP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground and the (K22) TP Sensor No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
6	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (F855) 5-volt Supply circuit from the TP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
7	<p>Measure the resistance between ground and the (F855) 5-volt Supply circuit in the TP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6



**P0122-THROTTLE POSITION SENSOR NO.1 LOW (3.7L, 4.7L) — Continued**

TEST	ACTION	APPLICABILITY
9	<p>With the DRBIII®, monitor the Throttle Position Sensor voltage. Slowly open the throttle from the idle position to the wide open throttle position. Does voltage start at approximately 0.8 of a volt and go above 3.5 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the Throttle Position Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**Symptom:**

**P0122-THROTTLE POSITION SENSOR NO.1 LOW (5.7L)**

**When Monitored and Set Condition:**

**P0122-THROTTLE POSITION SENSOR NO.1 LOW (5.7L)**

When Monitored: With the ignition on with no other TP Sensor #1 failures. Battery voltage greater than 10.4 volts.

Set Condition: Throttle Position Sensor No.1 voltage below 0.0978 of a volt for 1.3 seconds. One Trip Fault. 5.7L ETC light will illuminate.

**POSSIBLE CAUSES**

TP SENSOR NO.1 SWEEP

INTERMITTENT CONDITION

(F855) 5-VOLT SUPPLY CIRCUIT OPEN

(F855) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

TP SENSOR

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO (K922) SENSOR RETURN CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p><b>NOTE: If P0642 or P0643 are set along with P0123, diagnose the 5-volt supply DTCs before continuing.</b></p> <p>With the DRBIII®, read the DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Go To 10</p>	MAGNUM 5.7L SMPI V8
2	<p>Was the P0222-TP SENSOR NO.2 VOLTAGE LOW DTC set along with the P0122?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	MAGNUM 5.7L SMPI V8
3	<p>Turn the ignition off.</p> <p>Disconnect the Throttle Body harness connector.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (F855) 5-volt Supply circuit in the Throttle Body harness connector.</p> <p>Is the voltage between 4.8 and 5.2 volts?</p> <p>Yes → Go To 6</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8

**P0122-THROTTLE POSITION SENSOR NO.1 LOW (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F855) 5-volt Supply circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
5	<p>Measure the resistance of the (F855) 5-volt Supply circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	MAGNUM 5.7L SMPI V8
6	<p>With the DRBIII®, monitor the TP Sensor No.1 voltage with the harness connector still disconnected. Is the voltage above 4.5 volts?</p> <p>Yes → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	MAGNUM 5.7L SMPI V8
7	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance between ground and the (K22) TP Sensor No.1 Signal circuit at the appropriate terminal of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K22) TP Sensor No.1 Signal. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	MAGNUM 5.7L SMPI V8
8	<p>Measure the resistance between the (K22) TP Sensor No.1 Signal circuit and the (K922) Sensor Return circuit between the appropriate terminals of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K922) Sensor Return circuit and the (K22) TP Sensor No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	MAGNUM 5.7L SMPI V8

**P0122-THROTTLE POSITION SENSOR NO.1 LOW (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
10	<p>With the DRBIII®, perform the Throttle Follower Test.            Monitor the TP Sensor No.1 voltage while slowly pressing the Throttle pedal down.            Is there a smooth voltage change from low to high?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**Symptom:****P0123-THROTTLE POSITION SENSOR NO.1 HIGH (3.7L, 4.7L)****When Monitored and Set Condition:****P0123-THROTTLE POSITION SENSOR NO.1 HIGH (3.7L, 4.7L)**

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: Throttle Position Sensor voltage at the PCM is greater than 4.4721 volts for 1.3 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

THROTTLE POSITION SENSOR SWEEP

INTERMITTENT CONDITION

THROTTLE POSITION SENSOR

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT OPEN

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO THE (F855) 5-VOLT SUPPLY CIRCUIT

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the throttle is fully closed and free from binding or carbon build up.</b></p> <p>Start the engine.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>With the DRBIII®, read the TP Sensor voltage.</p> <p>Is the voltage above 4.5 volts?</p> <p>Yes → Go To 2</p> <p>No → Go To 8</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
2	<p>Turn the ignition off.</p> <p>Disconnect the TP Sensor harness connector.</p> <p>Connect a jumper wire between the (K22) TP Sensor No.1 Signal circuit and the (K900) Sensor ground circuit in the Sensor harness connector.</p> <p>With the DRBIII®, monitor the TP Sensor voltage.</p> <p>Ignition on, engine not running.</p> <p>Is the voltage below 0.5 of a volt?</p> <p>Yes → Replace the Throttle Position Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P0123-THROTTLE POSITION SENSOR NO.1 HIGH (3.7L, 4.7L) — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the (K22) TP Sensor No.1 Signal circuit in the TP Sensor harness connector.            Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K22) TP Sensor No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K22) TP Sensor No.1 Signal circuit from the TP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K22) TP Sensor No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
5	<p>Measure the resistance between the (K22) TP Sensor No.1 Signal circuit and the (F855) 5-volt Supply circuit in the TP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (F855) 5-volt Supply circuit and the (K22) TP Sensor No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the TP Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P0123-THROTTLE POSITION SENSOR NO.1 HIGH (3.7L, 4.7L) — Continued**

TEST	ACTION	APPLICABILITY
8	<p>With the DRBIII®, monitor the Throttle Position Sensor voltage. Slowly open the throttle from the idle position to the wide open throttle position. Does voltage start at approximately 0.8 of a volt and go above 3.5 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the Throttle Position Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

## Symptom:

### **P0123-THROTTLE POSITION SENSOR NO.1 HIGH (5.7L)**

## When Monitored and Set Condition:

### **P0123-THROTTLE POSITION SENSOR NO.1 HIGH (5.7L)**

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: Throttle Position Sensor No.1 voltage is greater than 4.472 volts for 1.3 seconds. One Trip Fault. 5.7L ETC light will illuminate.

## POSSIBLE CAUSES

TP SENSOR NO.1 SWEEP

INTERMITTENT CONDITION

TP SENSOR

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT OPEN

(K22) TP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO (F855) 5-VOLT SUPPLY CIRCUIT

(K922) SENSOR RETURN CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If P2101 is also set with P0123, make sure the throttle blade moves freely and does not hang up near WOT by performing the Pedal Follower test with the scan tool.</b></p> <p><b>NOTE: If P0642 or P0643 are set along with P0123, diagnose the 5-volt supply DTCs before continuing.</b></p> <p>Start the engine.</p> <p>With the DRBIII®, read the TP Sensor voltage.</p> <p>Is the voltage above 4.47 volts?</p> <p>Yes → Go To 2</p> <p>No → Go To 8</p>	MAGNUM 5.7L SMPI V8



**P0123-THROTTLE POSITION SENSOR NO.1 HIGH (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.            Disconnect the Throttle Body Assembly harness connector.            Ignition on, engine not running.            Connect a jumper wire between the (K22) TP Sensor No.1 Signal circuit and the (K922) TP Sensor Return circuit in the Throttle Body harness connector.            With the DRBIII®, monitor the TP Sensor No.1 voltage.            Is the voltage below 0.5 volt?</p> <p>Yes → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	MAGNUM 5.7L SMPI V8
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Using a 12-volt test light connected to ground, probe the (K22) TP Sensor No.1 Signal circuit at the appropriate terminal of special tool #8815.            Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (K22) TP Sensor No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K22) TP Sensor No.1 Signal circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K22) TP Sensor No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
5	<p>Measure the resistance between the (K22) TP Sensor No.1 Signal circuit and the (F855) 5-volt Supply circuit between the appropriate terminals of special tool #8815.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K22) TP Sensor No.1 Signal circuit and the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	MAGNUM 5.7L SMPI V8

**P0123-THROTTLE POSITION SENSOR NO.1 HIGH (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K922) Sensor Return circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K922) Sensor Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
8	<p>With the DRBIII®, perform the Throttle Follower Test. Monitor the TP Sensor No.1 voltage while slowly pressing the Throttle pedal down. Is there a smooth voltage change from low to high?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**Symptom:****P0125-INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL****When Monitored and Set Condition:****P0125-INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL**

When Monitored: With battery voltage greater than 10.4 volts and after engine is started.

Set Condition: The engine temperature does not go above -10°C (15°F). Failure time depends on start-up coolant temperature and ambient temperature. (i.e. 2 minutes for a start temp of -10°C (15°F) or up to 10 minutes for a vehicle with a start-up temp of -28°C (5°F). Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

LOW COOLANT LEVEL  
THERMOSTAT OPERATION  
ECT SENSOR

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If a Engine Coolant Temperature (ECT) DTC is set along with this code, diagnose the ECT DTC first.</b></p> <p><b>NOTE: Inspect the ECT terminals and related PCM terminals. Ensure the terminals are free from corrosion and damage.</b></p> <p><b>NOTE: The best way to diagnose this DTC is to allow the vehicle to sit overnight outside in order to have a totally cold soaked engine.</b></p> <p><b>NOTE: Extremely cold outside ambient temperatures may have caused this DTC to set.</b></p> <p><b>WARNING: Never open the cooling system when the engine is hot. The system is under pressure. Extreme burns or scalding may result. Allow the engine to cool before opening the cooling system.</b></p> <p>Inspect the coolant system for proper level and condition. Is the coolant level and condition OK?</p> <p>Yes → Go To 2</p> <p>No → Inspect the vehicle for a coolant leak and add the necessary amount of coolant. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0125-INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>NOTE: This test works best if performed on a cold engine (cold soak)</b>            Ignition on, engine not running.            With the DRBIII®, read the Eng Coolant Tmp Deg value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.  <b>NOTE: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b>            Start the Engine.            During engine warm-up monitor the Eng Coolant Tmp Deg value. The temp deg value change should be a smooth transition from start up to normal operating temp 82°C (180°F) . Also monitor the actual coolant temperature with a thermometer.  <b>NOTE: As the engine warms up to operating temperature, the actual coolant temperature (thermometer reading) and the Eng Coolant Tmp Deg in the DRB values should stay relatively close to each other.</b>            Using the appropriate service information, determine the proper opening temperature of the thermostat.            Did the thermostat open at the proper temperature?</p> <p>Yes → Go To 3</p> <p>No → Replace the thermostat.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>Ignition on, engine not running.            With the DRBIII®, read the Eng Coolant Tmp Deg value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.  <b>NOTE: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b>            Start the Engine.            During engine warm-up monitor the Eng Coolant Tmp Deg value. The temp deg value change should be a smooth transition from start up to normal operating temp 82°C (180°F). Also monitor the actual coolant temperature with a thermometer.  <b>NOTE: As the engine warms up to operating temperature, the actual coolant temperature (thermometer reading) and the Eng Coolant Tmp Deg in the DRB values should stay relatively close to each other.</b>            Is the thermometer reading relatively close to the DRBIII® ECT reading?</p> <p>Yes → Test Complete.</p> <p>No → Replace the Engine Coolant Temperature Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0128-THERMOSTAT RATIONALITY****When Monitored and Set Condition:****P0128-THERMOSTAT RATIONALITY**

When Monitored: Engine running.

Set Condition: The PCM predicts a coolant temperature value that it will compare to the actual coolant temperature. A significant difference results in an error. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

LOW COOLANT LEVEL

THERMOSTAT OPERATION

SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

TEMPERATURE SENSOR

SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

SIGNAL CIRCUIT SHORTED TO GROUND

SIGNAL CIRCUIT SHORTED TO (K900) SENSOR GROUND

OTHER POSSIBLE CAUSES

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If any ECT, AAT, CMP or CKP sensor DTCs have set along with P0128, diagnose them before continuing.</b></p> <p><b>NOTE: Ensure that Pinion Factor has been programmed correctly into the PCM.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0128-THERMOSTAT RATIONALITY — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>NOTE: If a Engine Coolant Temperature (ECT) DTC is set along with this code, diagnose the ECT DTC first.</b></p> <p><b>NOTE: Inspect the ECT terminals and related PCM terminals. Ensure the terminals are free from corrosion and damage.</b></p> <p><b>NOTE: The best way to diagnose this DTC is to allow the vehicle to sit overnight outside in order to have a totally cold soaked engine.</b></p> <p><b>Note: Extremely cold outside ambient temperatures may have caused this DTC to set.</b></p> <p><b>WARNING: Never open the cooling system when the engine is hot. The system is under pressure. Extreme burns or scalding may result. Allow the engine to cool before opening the cooling system.</b></p> <p>Check the coolant system to make sure that the coolant is in good condition and at the proper level.</p> <p>Is the coolant level and condition OK?</p> <p>Yes → Go To 3</p> <p>No → Inspect the vehicle for a coolant leak and add the necessary amount of coolant.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p><b>NOTE: This test works best if performed on a cold engine (cold soak).</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read the ECT Deg value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.</p> <p><b>Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b></p> <p>Start the Engine.</p> <p>During engine warm-up, monitor the ECT Deg value. The temp deg value change should be a smooth transition from start up to normal operating temp 82°C (180°F). Also monitor the actual coolant temperature with a thermometer.</p> <p><b>NOTE: As the engine warms up to operating temperature, the actual coolant temperature (thermometer reading) and the ECT Deg in the DRB sensor should stay relatively close to each other.</b></p> <p>Using the appropriate service information, determine the proper opening temperature of the thermostat.</p> <p>Did the thermostat open at the proper temperature?</p> <p>Yes → Go To 4</p> <p>No → Replace the thermostat.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, read and record the AAT Sensor Temperature value.</p> <p>Using the DRB Temperature Probe #CH7050, measure the ambient air temperature near the AAT sensor.</p> <p>Is the AAT Sensor value with -15°C (5°F) of the temperature probe reading?</p> <p>Yes → Go To 5</p> <p>No → Go To 7</p>	All

**P0128-THERMOSTAT RATIONALITY — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>WARNING: MAKE SURE THE ENGINE COOLING SYSTEM IS COOL BEFORE REMOVING THE PRESSURE CAP OR ANY HOSE. SEVERE PERSONAL INJURY MAY RESULT FROM ESCAPING HOT COOLANT. THE COOLING SYSTEM IS PRESSURIZED WHEN HOT.</b></p> <p>With the DRBIII®, read and record the ECT Sensor Temperature value. Using the DRB Temperature Probe #CH7050, measure the engine coolant temperature. Is the ECT Sensor value with -15°C (5°F) of the temperature probe reading?</p> <p>Yes → Go To 6</p> <p>No → Go To 7</p>	All
6	<p>Inspect the Temperature sensors for any physical damage. Inspect the engine coolant. Ensure the coolant is at the proper level. Refer to the Service Information COOLING. Ensure the Temperature sensors are properly installed. Ensure the CMP and CKP sensors are installed properly. Check the connectors for any signs of damage.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Refer to any Technical Service Bulletins (TSBs) that may apply. With the engine running at normal operating temperature, monitor the Temperature sensor parameters while wiggling the wire harness. Look for parameter values to change. Visually inspect the related wire harness. Look for any chafed, pierced, pinched, partially broken wires and broken, bent, pushed out, or corroded terminals.</p> <p><b>CAUTION: NEVER PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Inspect and clean all PCM, engine, and chassis grounds. Were any problems found during the above inspections?</p> <p>Yes → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All
7	<p><b>NOTE: Visually inspect both the component and the PCM connectors. Look for damage, partially broken wires and backed out or corroded terminals</b></p> <p>Turn the ignition off. Disconnect the applicable Temperature Sensor harness connector. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage of the Signal circuit in the appropriate Temperature Sensor harness connector. Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to battery voltage in the Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All

**P0128-THERMOSTAT RATIONALITY — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off.            Connect the PCM harness connectors.            Connect a jumper wire across the Temperature Sensor harness connector.            Ignition on, engine not running.            With the DRBIII®, read the Temperature Sensor voltage.            Does the voltage start at 5.0 volts and drop below 1.0 volt?</p> <p>Yes → Replace the appropriate Temperature Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p> <p><b>NOTE: Disconnect the jumper wire before continuing.</b></p>	All
9	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Sensor Signal circuit from the Temperature Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the open in the Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
10	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the appropriate Temperature Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
11	<p>Measure the resistance between ground and the Sensor Signal circuit at the Temperature Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 12</p>	All
12	<p>Measure the resistance between the Signal circuit and the (K900) Sensor ground circuit in the Temperature Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground circuit and the Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All



**P0128-THERMOSTAT RATIONALITY — Continued**

TEST	ACTION	APPLICABILITY
13	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P0129-BAROMETRIC PRESSURE OUT-OF-RANGE**

#### When Monitored and Set Condition:

#### **P0129-BAROMETRIC PRESSURE OUT-OF-RANGE**

**When Monitored:** With the ignition key on. No Cam or Crank signal within 75 ms. Engine speed less than 250 RPM.

**Set Condition:** The PCM senses the voltage from the MAP sensor to be less than 2.2 volts but above 0.04 of a volt for 300 milliseconds. One Trip Fault. Three good trips to turn off the MIL. (5.7L ETC lamp will flash)

#### **POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(F856) 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

(F856) 5-VOLT SUPPLY CIRCUIT OPEN

(F856) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

MAP SENSOR

(K1) MAP SIGNAL CIRCUIT OPEN

(K1) MAP SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the MAP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (F856) 5-volt Supply circuit in the MAP Sensor harness connector. Is the voltage between 4.5 to 5.2 volts?  Yes → Go To 3  No → Go To 6	All

**P0129-BAROMETRIC PRESSURE OUT-OF-RANGE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII®, monitor the MAP Sensor voltage with the Sensor harness connector disconnected. Is the voltage above 4.8 volts?</p> <p>Yes → Replace the MAP Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K1) MAP Signal circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K1) MAP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (K1) MAP Signal circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K1) MAP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
6	<p>Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage on the (F856) 5-volt Supply circuit in the MAP Sensor harness connector. Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F856) 5-volt Supply circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0129-BAROMETRIC PRESSURE OUT-OF-RANGE — Continued**

TEST	ACTION	APPLICABILITY
8	Measure the resistance between ground and the (F856) 5-volt Supply circuit at the MAP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 9	All
9	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**Symptom List:**

**P0131-O2 SENSOR 1/1 CIRCUIT LOW VOLTAGE**  
**P0137-O2 SENSOR 1/2 CIRCUIT LOW VOLTAGE**  
**P0151-O2 SENSOR 2/1 CIRCUIT LOW VOLTAGE**  
**P0157-O2 SENSOR 2/2 CIRCUIT LOW VOLTAGE**

**Test Note: All symptoms listed above are diagnosed using the same tests.**  
**The title for the tests will be P0131-O2 SENSOR 1/1 CIRCUIT LOW VOLTAGE.**

**When Monitored and Set Condition:****P0131-O2 SENSOR 1/1 CIRCUIT LOW VOLTAGE**

When Monitored: Engine running for less than 30 seconds and the O2 Sensor Heater Temperature is less than 251°C (484°F) with battery voltage greater 10.99 volts.

Set Condition: The oxygen sensor signal voltage is below 2.5196 volts for 6 seconds after starting engine. One Trip Fault. Three good trips to turn off the MIL.

**P0137-O2 SENSOR 1/2 CIRCUIT LOW VOLTAGE**

When Monitored: Engine running for less than 30 seconds and the O2 Sensor Heater Temperature is less than 251°C (484°F) with battery voltage greater 10.99 volts.

Set Condition: The oxygen sensor signal voltage is below 2.5196 volts for 6 seconds after starting engine. One Trip Fault. Three good trips to turn off the MIL.

**P0151-O2 SENSOR 2/1 CIRCUIT LOW VOLTAGE**

When Monitored: Engine running for less than 30 seconds and the O2 Sensor Heater Temperature is less than 251°C (484°F) with battery voltage greater 10.99 volts.

Set Condition: The oxygen sensor signal voltage is below 2.5196 volts for 6 seconds after starting engine. One Trip Fault. Three good trips to turn off the MIL.

**P0157-O2 SENSOR 2/2 CIRCUIT LOW VOLTAGE**

When Monitored: Engine running for less than 30 seconds and the O2 Sensor Heater Temperature is less than 251°C (484°F) with battery voltage greater 10.99 volts.

Set Condition: The oxygen sensor signal voltage is below 2.5196 volts for 6 seconds after starting engine. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

O2 SENSOR BELOW 2.52 VOLTS

O2 SENSOR

O2 RETURN CIRCUIT SHORTED TO GROUND

O2 SIGNAL CIRCUIT SHORTED TO GROUND

# P0131-O2 SENSOR 1/1 CIRCUIT LOW VOLTAGE — Continued

POSSIBLE CAUSES
O2 SIGNAL CIRCUIT SHORTED TO SENSOR RETURN CIRCUIT
O2 SIGNAL SHORTED TO THE HEATER GROUND CIRCUIT
PCM

TEST	ACTION	APPLICABILITY
1	<p>Start the engine. Allow the engine to reach normal operating temperature. <b>NOTE: When diagnosing this DTC, diagnose the O2 Sensor that set the DTC.</b> With the DRBIII®, read the O2 Sensor voltage. Is the voltage below 2.52 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the O2 Sensor harness connector. Ignition on, engine not running. With the DRBIII®, monitor the O2 Sensor voltage. Is the O2 Sensor voltage above 4.8 volts?</p> <p>Yes → Go To 3</p> <p>No → Go To 5</p>	All
3	<p>Measure the voltage on the O2 Return circuit in the O2 Sensor harness connector. Is the voltage at 2.5 volts?</p> <p>Yes → Replace the O2 Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the O2 Return circuit in the O2 Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the O2 Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
5	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the O2 Signal circuit in the O2 Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the O2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All

**P0131-O2 SENSOR 1/1 CIRCUIT LOW VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Measure the resistance between the O2 Signal circuit and the O2 Return circuit in the O2 Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the O2 Return circuit and the O2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Measure the resistance between the O2 Signal circuit and the O2 Heater ground circuit in the O2 Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the O2 Heater ground circuit and the O2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P0132-O2 SENSOR 1/1 CIRCUIT HIGH VOLTAGE**

**P0138-O2 SENSOR 1/2 CIRCUIT HIGH VOLTAGE**

**P0152-O2 SENSOR 2/1 CIRCUIT HIGH VOLTAGE**

**P0158-O2 SENSOR 2/2 CIRCUIT HIGH VOLTAGE**

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**Test Note: All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P0132-O2 SENSOR 1/1 CIRCUIT  
HIGH VOLTAGE.**

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**When Monitored and Set Condition:**

**P0132-O2 SENSOR 1/1 CIRCUIT HIGH VOLTAGE**

When Monitored: O2 Sensor Heater Temperature is greater than 496°C (925°F) and battery voltage greater than 10.99 volts.

Set Condition: The Oxygen Sensor voltage is above 3.99 volts for 40 seconds. One Trip Fault. Three good trips to turn off the MIL.

**P0138-O2 SENSOR 1/2 CIRCUIT HIGH VOLTAGE**

When Monitored: O2 Sensor Heater Temperature is greater than 496°C (925°F) and battery voltage greater than 10.99 volts.

Set Condition: The Oxygen Sensor voltage is above 3.99 volts for 40 seconds. One Trip Fault. Three good trips to turn off the MIL.

**P0152-O2 SENSOR 2/1 CIRCUIT HIGH VOLTAGE**

When Monitored: O2 Sensor Heater Temperature is greater than 496°C (925°F) and battery voltage greater than 10.99 volts.

Set Condition: The Oxygen Sensor voltage is above 3.99 volts for 40 seconds. One Trip Fault. Three good trips to turn off the MIL.

**P0158-O2 SENSOR 2/2 CIRCUIT HIGH VOLTAGE**

When Monitored: O2 Sensor Heater Temperature is greater than 496°C (925°F) and battery voltage greater than 10.99 volts.

Set Condition: The Oxygen Sensor voltage is above 3.99 volts for 40 seconds. One Trip Fault. Three good trips to turn off the MIL.

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**POSSIBLE CAUSES**

O2 SENSOR VOLTAGE ABOVE 3.7 VOLTS

O2 SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

O2 SENSOR RETURN CIRCUIT SHORTED TO VOLTAGE

O2 SENSOR

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**P0132-O2 SENSOR 1/1 CIRCUIT HIGH VOLTAGE — Continued****POSSIBLE CAUSES**

O2 SENSOR SIGNAL CIRCUIT OPEN  
 O2 SENSOR RETURN CIRCUIT OPEN  
 PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If one of the O2 Sensors Signal or Return circuits are shorted to voltage, the DRBIII® will display all O2 Sensor voltage readings high.</b>  <b>NOTE: It is important to perform the diagnostics on the O2 Sensor that set the DTC.</b>  <b>NOTE: After the repairs have been made, verify proper O2 Sensor operation. If all the O2 Sensor voltage readings have not returned to normal, follow the diagnostic procedure for the remaining O2 Sensors.</b></p> <p>Start the engine.          Allow the engine to reach normal operating temperature.          With the DRBIII®, read the O2 Sensor voltage.          Is the voltage above 3.7 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION symptom in the Driveability category.          Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.          Disconnect the O2 Sensor harness connector  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>          Start the engine and allow the engine to idle.          Measure the voltage on the O2 Sensor Signal circuit in the O2 Sensor harness connector.  <b>NOTE: Measure the voltage in reference to ground, not the O2 Sensor Return circuit.</b>          Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the O2 Sensor Signal circuit.          Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.          Disconnect the PCM harness connectors.          Ignition on, engine not running.          Measure the voltage on the O2 Sensor Return circuit in the O2 Sensor harness connector.          Is there any voltage present?</p> <p>Yes → Repair the short to voltage in the O2 Sensor Return circuit.          Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All

**P0132-O2 SENSOR 1/1 CIRCUIT HIGH VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Connect the PCM harness connectors.            Connect a jumper wire between the O2 Sensor Signal circuit and the O2 Sensor Return circuit in the O2 Sensor harness connector.            Ignition on, engine not running.            With the DRBIII®, monitor the O2 Sensor voltage.            Is the voltage between 2.3 and 2.7 volts with the jumper wire in place?</p> <p>Yes → Replace the O2 Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
5	<p>Turn the ignition off.            Disconnect the PCM harness connector.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the O2 Sensor Signal circuit from the O2 Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open O2 Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Measure the resistance of the O2 Sensor Return circuit from the O2 Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open O2 Sensor Return circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P0133-O2 SENSOR 1/1 SLOW RESPONSE**  
**P0139-O2 SENSOR 1/2 SLOW RESPONSE**  
**P0153-O2 SENSOR 2/1 SLOW RESPONSE**  
**P0159-O2 SENSOR 2/2 SLOW RESPONSE**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0133-O2 SENSOR 1/1 SLOW RESPONSE.**

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**When Monitored and Set Condition:****P0133-O2 SENSOR 1/1 SLOW RESPONSE**

**When Monitored:** Vehicle is started and driven between 20 and 55 MPH with the Throttle open for a minimum of 120 seconds. Coolant greater than 70°C (158°F). Catalytic Converter Temp greater than 600°C (1112°F) and EVAP Purge is active.

**Set Condition:** The oxygen sensor signal voltage switches less than 16 times from lean to rich within 20 seconds during monitoring. Two Trip Fault. Three good trips to turn off the MIL.

**P0139-O2 SENSOR 1/2 SLOW RESPONSE**

**When Monitored:** Vehicle is started and driven between 20 and 55 MPH with the Throttle open for a minimum of 120 seconds. Coolant greater than 70°C (158°F). Catalytic Converter Temp greater than 600°C (1112°F) and EVAP Purge is active

**Set Condition:** The oxygen sensor signal voltage switches less than 16 times from lean to rich within 20 seconds during monitoring. Two Trip Fault. Three good trips to turn off the MIL.

**P0153-O2 SENSOR 2/1 SLOW RESPONSE**

**When Monitored:** Vehicle is started and driven between 20 and 55 MPH with the Throttle open for a minimum of 120 seconds. Coolant greater than 70°C (158°F). Catalytic Converter Temp greater than 600°C (1112°F) and EVAP Purge is active

**Set Condition:** The oxygen sensor signal voltage switches less than 16 times from lean to rich within 20 seconds during monitoring. Two Trip Fault. Three good trips to turn off the MIL.

**P0159-O2 SENSOR 2/2 SLOW RESPONSE**

**When Monitored:** Vehicle is started and driven between 20 and 55 MPH with the Throttle open for a minimum of 120 seconds. Coolant greater than 70°C (158°F). Catalytic Converter Temp greater than 600°C (1112°F) and EVAP Purge is active

**Set Condition:** The oxygen sensor signal voltage switches less than 16 times from lean to rich within 20 seconds during monitoring. Two Trip Fault. Three good trips to turn off the MIL.

# P0133-O2 SENSOR 1/1 SLOW RESPONSE — Continued

POSSIBLE CAUSES
<p>GOOD TRIP EQUAL TO ZERO</p> <p>EXHAUST LEAK</p> <p>O2 SIGNAL CIRCUIT</p> <p>O2 RETURN CIRCUIT</p> <p>O2 SENSOR</p>

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Check for contaminants that may have damaged the O2 Sensor: contaminated fuel, unapproved silicone, oil and coolant.</b></p> <p>Ignition on, engine not running.</p> <p><b>NOTE: After the repairs have been made, verify proper O2 Sensor operation. If all the O2 Sensor voltage readings have not returned to normal, follow the diagnostic procedure for the remaining O2 Sensors.</b></p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Start the engine.</p> <p>Inspect the exhaust system for leaks between the engine and the O2 Sensors.</p> <p>Are there any exhaust leaks?</p> <p>Yes → Repair or replace the leaking exhaust parts as necessary.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off</p> <p>Disconnect the O2 Sensor harness connector.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the O2 Signal circuit in the O2 Sensor harness connector.</p> <p>Is the voltage approximately 5.0 volts?</p> <p>Yes → Go To 4</p> <p>No → Check the O2 Signal circuit for a short to ground, open, or short to voltage. If OK, replace and program the Powertrain Control Module in per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the voltage on the O2 Return circuit in the O2 Sensor harness connector.</p> <p>Is the voltage at 2.5 volts?</p> <p>Yes → Check the O2 Return circuit for a short to ground, open, or short to voltage. If OK, replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All

**P0133-O2 SENSOR 1/1 SLOW RESPONSE — Continued**

TEST	ACTION	APPLICABILITY
5	If there are no possible causes remaining, view repair.  Repair Replace the O2 Sensor Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**Symptom List:**

**P0135-02 SENSOR 1/1 HEATER PERFORMANCE**  
**P0141-02 SENSOR 1/2 HEATER PERFORMANCE**  
**P0155-02 SENSOR 2/1 HEATER PERFORMANCE**  
**P0161-02 SENSOR 2/2 HEATER PERFORMANCE**

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**Test Note: All symptoms listed above are diagnosed using the same tests.**  
**The title for the tests will be P0135-02 SENSOR 1/1 HEATER PERFORMANCE.**

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**When Monitored and Set Condition:**

**P0135-02 SENSOR 1/1 HEATER PERFORMANCE**

When Monitored: Engine running and heater duty cycle greater than 0%. Battery voltage greater than 10.4 volts.

Set Condition: No sensor output is received when the PCM powers up the sensor heater for more than 50 seconds. Two trip fault. Three good trips to turn off the MIL.

**P0141-02 SENSOR 1/2 HEATER PERFORMANCE**

When Monitored: Engine running and heater duty cycle greater than 0%. Battery voltage greater than 11.0 volts.

Set Condition: No sensor output is received when the PCM powers up the sensor heater for more than 50 seconds. Two trip fault. Three good trips to turn off the MIL.

**P0155-02 SENSOR 2/1 HEATER PERFORMANCE**

When Monitored: Engine running and heater duty cycle greater than 0%. Battery voltage greater than 11.0 volts.

Set Condition: No sensor output is received when the PCM powers up the sensor heater for more than 50 seconds. Two trip fault. Three good trips to turn off the MIL.

**P0161-02 SENSOR 2/2 HEATER PERFORMANCE**

When Monitored: Engine running and heater duty cycle greater than 0%. Battery voltage greater than 11.0 volts.

Set Condition: No sensor output is received when the PCM powers up the sensor heater for more than 50 seconds. Two trip fault. Three good trips to turn off the MIL.

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**POSSIBLE CAUSES**

O2 SENSOR HEATER OPERATION
O2 HEATER ELEMENT
O2 HEATER CONTROL CIRCUIT OPEN
O2 HEATER GROUND CIRCUIT OPEN

**P0135-O2 SENSOR 1/1 HEATER PERFORMANCE — Continued**

<b>POSSIBLE CAUSES</b>		
PCM		

<b>TEST</b>	<b>ACTION</b>	<b>APPLICABILITY</b>
1	Turn the ignition off. <b>NOTE: Wait a minimum of 8 minutes to allow the O2 Sensor to cool down before continuing the test. Allow the O2 Sensor voltage to stabilize between 4.6 and 5.0 volts.</b> Ignition on, engine not running. With the DRBIII®, actuate the O2 Heater Test. With the DRBIII®, monitor O2 Sensor voltage for at least 2 minutes. Does the voltage stay above 4.5 volts?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. <b>NOTE: Allow the O2 sensor to cool down to room temperature.</b> Disconnect the O2 Sensor harness connector. Measure the resistance across the O2 Heater element component side. <b>NOTE: O2 Heater Element resistance values should be measured at 70°F (21.1°C). The resistance value will vary with different temperature values.</b> Is the resistance of the O2 Sensor Heater Element between 2.0 and 30.0 ohms?  Yes → Go To 3  No → Replace the O2 Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
3	Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the O2 Heater Control circuit from the O2 harness connector to the appropriate terminal of special tool #8815. Is the resistance below 0.5 of an ohm?  Yes → Go To 4  No → Repair the excessive resistance in the O2 Heater Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
4	Measure the resistance between ground and the O2 Heater ground circuit in the O2 Sensor harness connector. Is the resistance below 0.5 of an ohm?  Yes → Go To 5  No → Repair the excessive resistance in the O2 Heater ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0135-O2 SENSOR 1/1 HEATER PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom List:****P0171-FUEL SYSTEM 1/1 LEAN****P0174-FUEL SYSTEM 2/1 LEAN**

**Test Note: All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P0171-FUEL SYSTEM 1/1 LEAN.**

**When Monitored and Set Condition:****P0171-FUEL SYSTEM 1/1 LEAN**

**When Monitored:** With the engine running in closed loop mode, the ambient/battery temperature above 20 deg. F and altitude below 8500 ft.

**Set Condition:** If the PCM multiplies short term compensation by long term adaptive and a certain percentage is exceeded for two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored. Two Trip Fault. Three good trips to turn off the MIL.

**P0174-FUEL SYSTEM 2/1 LEAN**

**When Monitored:** With the engine running in closed loop mode, the ambient/battery temperature above 20 deg. F and altitude below 8500 ft.

**Set Condition:** If the PCM multiplies short term compensation by long term adaptive and a certain percentage is exceeded for two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO  
RESTRICTED FUEL SUPPLY LINE  
FUEL PUMP INLET STRAINER PLUGGED  
FUEL PUMP MODULE  
O2 SENSOR  
O2 SIGNAL CIRCUIT  
O2 RETURN CIRCUIT  
O2 SENSOR HEATER OPERATION  
MAP SENSOR OPERATION  
ECT SENSOR OPERATION  
ENGINE MECHANICAL PROBLEM  
FUEL FILTER/PRESSURE REGULATOR (HIGH)  
PCM

**P0171-FUEL SYSTEM 1/1 LEAN — Continued**

TEST	ACTION	APPLICABILITY
1	<p>Diagnose all other trouble codes before continuing.</p> <p><b>NOTE: Check for contaminants that may have damaged an O2 Sensor: contaminated fuel, unapproved silicone, oil and coolant.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p><b>WARNING: The fuel system is under constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Install a fuel pressure gauge to the fuel rail.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.</p> <p><b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b></p> <p>Turn the ignition off.</p> <p>Choose a conclusion that best matches your fuel pressure reading.</p> <p>Within Specification Go To 3</p> <p>Above Specification Replace the fuel filter/pressure regulator. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>Below Specification Go To 12</p> <p><b>CAUTION: Stop All Actuations.</b></p>	All
3	<p>Start the engine.</p> <p>Allow the engine to reach normal operating temperature.</p> <p><b>NOTE: If one of the O2 Sensor's Signal or Return circuit is shorted to ground the DRBIII® will display all O2 Sensor voltage readings low. The O2 Sensor that is shorted to ground will display a voltage reading near or at 0 volts.</b></p> <p><b>NOTE: If one of the O2 Sensor Signal or Return circuits are shorted to voltage, the DRBIII® will display all O2 Sensor voltage readings high.</b></p> <p><b>NOTE: After the repairs have been made, verify proper O2 Sensor operation. If all the O2 Sensor voltage readings have not returned to normal, follow the diagnostic procedure for the remaining O2 Sensors.</b></p> <p>With the DRBIII®, monitor all of the O2 Sensor voltage readings.</p> <p>Is the voltage switching between 2.5 and 3.4 volts for all the O2 Sensors?</p> <p>Yes → Go To 4</p> <p>No → Go To 8</p>	All

**P0171-FUEL SYSTEM 1/1 LEAN — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.</p> <p><b>NOTE: Wait a minimum of 10 minutes to allow the O2 Sensor to cool down before continuing the test. Allow the O2 Sensor voltage to stabilize at 5.0 volts.</b></p> <p><b>NOTE: Perform the following test on all O2 Sensors.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the O2 Heater Test.</p> <p>With the DRBIII®, monitor O2 Sensor voltage for at least 2 minutes.</p> <p>Does the voltage stay above 4.5 volts?</p> <p>Yes → Replace the O2 Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.</p> <p>Connect a Vacuum Gauge to a Manifold Vacuum source.</p> <p>Start the engine.</p> <p>Allow the engine to idle.</p> <p><b>NOTE: If engine will not idle, maintain a constant RPM above idle.</b></p> <p>With the DRBIII® in Sensors, read the MAP Sensor vacuum value.</p> <p>Is the DRBIII® reading within 1" of the Vacuum Gauge reading?</p> <p>Yes → Go To 6</p> <p>No → Replace the MAP Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: For this test to be valid, the thermostat must be operating correctly.</b></p> <p><b>NOTE: This test works best if performed on a cold engine (cold soak)</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read the Engine Coolant Temperature (ECT) Sensor value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.</p> <p><b>NOTE: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b></p> <p>Start the Engine.</p> <p>During engine warm-up, monitor the ECT Sensor value. The temperature value change should be a smooth transition from start up to normal operating temperature 82°C (180°F). The value should reach at least 82°C (180°F).</p> <p>Did the ECT value increase smoothly and did it reach at least 180°F (82°C)?</p> <p>Yes → Go To 7</p> <p>No → Replace the Engine Coolant Temperature Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

# P0171-FUEL SYSTEM 1/1 LEAN — Continued

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off.</p> <p>Check for any of the following conditions/mechanical problems.</p> <p>AIR INDUCTION SYSTEM - must be free from leaks.</p> <p>ENGINE VACUUM - must be at least 13 inches in neutral</p> <p>ENGINE VALVE TIMING - must be within specifications</p> <p>ENGINE COMPRESSION - must be within specifications</p> <p>ENGINE EXHAUST SYSTEM - must be free of any restrictions or leaks.</p> <p>ENGINE PCV SYSTEM - must flow freely</p> <p>TORQUE CONVERTER STALL SPEED - must be within specifications</p> <p>POWER BRAKE BOOSTER - no internal vacuum leaks</p> <p>FUEL - must be free of contamination</p> <p>FUEL INJECTOR - plugged or restricted injector; control wire not connected to correct injector</p> <p>Are there any engine mechanical problems?</p> <p>Yes → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
8	<p>Ignition on, engine not running.</p> <p><b>NOTE: Perform the following test on the O2 Sensors whose voltage was not switching properly in the previous step.</b></p> <p>Disconnect the O2 Sensor harness connector.</p> <p>With the DRBIII®, monitor the O2 Sensor voltage.</p> <p>O2 Sensor voltage should read 5.0 volts on the DRBIII® with the connector disconnected.</p> <p>Connect a jumper wire between the Signal circuit and the Return circuit in the O2 Sensor harness connector.</p> <p><b>NOTE: The voltage should drop from 5.0 volts to 2.5 volts with the jumper wire in place.</b></p> <p>Did the O2 Sensor voltage change from 5.0 volts to 2.5 volts?</p> <p>Yes → Replace the O2 Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
9	<p>Only have one O2 Sensor disconnect at a time.</p> <p>With the DRBIII®, monitor all the O2 Sensor voltage readings.</p> <p><b>NOTE: The DRBIII® will display all O2 Sensor voltage readings approximately 5.0 volts when only one O2 Sensor's Signal circuit is shorted to voltage.</b></p> <p><b>NOTE: The DRBIII® will display one O2 Sensor voltage close to zero and the others will read lower than normal when one O2 Sensor Signal circuit contains excessive resistance.</b></p> <p>Is the voltage above 4.8 volts?</p> <p>Yes → Go To 10</p> <p>No → Check all the O2 Signal circuits for a short to ground, open, or short to voltage. Inspect the O2 Sensor connector and the PCM harness connector. If OK, replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0171-FUEL SYSTEM 1/1 LEAN — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Disconnect each O2 Sensor harness connector.            Measure the voltage on the O2 Return circuits in the O2 Sensor harness connector.  <b>NOTE: The DRBIII® will display all O2 Sensor voltage readings approximately 5.0 volts when only one O2 Sensor's Return circuit is shorted to voltage.</b>  <b>NOTE: The DRBIII® will display one O2 Sensor voltage close to zero and the others will read lower than normal when one O2 Sensor Return circuit contains excessive resistance.</b>            Is the voltage at 2.5 volts?</p> <p>Yes → Go To 11</p> <p>No → Check all the O2 Return circuits for a short to ground, open, or short to voltage. Inspect the O2 Sensor connector and the PCM harness connector. If OK, replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
11	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
12	<p><b>WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b>            Raise vehicle on hoist, and disconnect the fuel pressure line at the fuel pump module. Install special 5/16 fuel line adapter tool #6539 between disconnected fuel line and the fuel pump module.            Attach a fuel pressure test gauge to the T fitting on tool #6539.            Ignition on, engine not running.            With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.  <b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b>            Is the fuel pressure within specification?</p> <p>Yes → Repair or replace fuel supply line as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p> <p><b>CAUTION: Stop All Actuators.</b></p>	All
13	<p>Turn the ignition off.  <b>WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b>            Remove the Fuel Pump Module and inspect the Fuel Inlet Strainer.            Is the Fuel Inlet Strainer plugged?</p> <p>Yes → Replace the Fuel Pump Inlet Strainer.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 14</p>	All

## P0171-FUEL SYSTEM 1/1 LEAN — Continued

TEST	ACTION	APPLICABILITY
14	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Fuel Pump Module.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:****P0172-FUEL SYSTEM 1/1 RICH****P0175-FUEL SYSTEM 2/1 RICH**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0172-FUEL SYSTEM 1/1 RICH**.

**When Monitored and Set Condition:****P0172-FUEL SYSTEM 1/1 RICH**

When Monitored: With the engine running in closed loop mode, the ambient/battery temperature above 20 deg. F and altitude below 8500 ft.

Set Condition: If the PCM multiplies short term compensation by long term adaptive and a purge fuel multiplier and the result is below a certain value for 30 seconds over two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored. Two Trip Fault. Three good trips to turn off the MIL.

**P0175-FUEL SYSTEM 2/1 RICH**

When Monitored: With the engine running in closed loop mode, the ambient/battery temperature above 20 deg. F and altitude below 8500 ft.

Set Condition: If the PCM multiplies short term compensation by long term adaptive and a purge fuel multiplier and the result is below a certain value for 30 seconds over two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

O2 SENSOR HEATER OPERATION

O2 SENSOR

EVAP PURGE SOLENOID OPERATION

O2 SIGNAL CIRCUIT

O2 RETURN CIRCUIT

MAP SENSOR

ECT SENSOR

ENGINE MECHANICAL PROBLEM

FUEL FILTER/PRESSURE REGULATOR (HIGH)

PCM

# P0172-FUEL SYSTEM 1/1 RICH — Continued

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Check for contaminants that may have damaged an O2 Sensor: contaminated fuel, unapproved silicone, oil and coolant.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p><b>WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Install a fuel pressure gauge to the fuel rail.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.</p> <p><b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b></p> <p>Turn the ignition off.</p> <p>Choose a conclusion that best matches your fuel pressure reading.</p> <p>Within Specification Go To 3</p> <p>Above Specification Replace the fuel filter/pressure regulator.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>CAUTION: Stop All Actuations.</b></p>	All
3	<p>Start the engine.</p> <p>Allow the engine to reach normal operating temperature.</p> <p><b>NOTE: If one of the O2 Sensors Signal or Return circuit is shorted to ground or voltage, all the other O2 Sensor voltage readings will be affected.</b></p> <p><b>NOTE: After the repairs have been made, verify proper O2 Sensor operation. If all the O2 Sensor voltage readings have not returned to normal, follow the diagnostic procedure for the remaining O2 Sensors.</b></p> <p>With the DRBIII®, monitor all of the O2 Sensor voltage readings.</p> <p>Is the voltage switching between 2.5 and 3.4 volts?</p> <p>Yes → Go To 4</p> <p>No → Go To 9</p>	All
4	<p>Turn the ignition off.</p> <p><b>NOTE: Wait a minimum of 10 minutes to allow the O2 Sensor to cool down before continuing the test. Allow the O2 Sensor voltage to stabilize at 5.0 volts.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, perform the O2 Heater Test for each of the O2 Sensors.</p> <p>With the DRBIII®, monitor all O2 Sensor voltage readings for at least 2 minutes.</p> <p>Does the voltage stay above 4.5 volts?</p> <p>Yes → Replace the O2 Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All



**P0172-FUEL SYSTEM 1/1 RICH — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.            Connect a Vacuum Gauge to a Manifold Vacuum source.            Start the engine.            Allow the engine to idle.  <b>NOTE: If engine will not idle, maintain a constant RPM above idle.</b>            With the DRBIII® in Sensors, read the MAP Sensor vacuum value.            Is the DRB reading within 1" of the Vacuum Gauge reading?</p> <p>Yes → Go To 6</p> <p>No → Replace the MAP Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Remove the vacuum gauge before continuing.</b></p>	All
6	<p><b>NOTE: For this test to be valid, the thermostat must be operating correctly.</b>  <b>NOTE: This test works best if performed on a cold engine (cold soak)</b>            Ignition on, engine not running.            With the DRBIII®, read the Engine Coolant Temperature Sensor value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.  <b>NOTE: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b>            Start the Engine.            During engine warm-up, monitor the Engine Coolant Temperature value. The temp value change should be a smooth transition from start up to normal operating temp 82°C (180°F). The value should reach at least 82°C (180°F).            Did the ECT value increase smoothly and reach at least 180°F (82°C)?</p> <p>Yes → Go To 7</p> <p>No → Replace the Engine Coolant Temperature Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Turn the ignition off.            Disconnect the hoses at the Evap Purge Solenoid.            Using a hand vacuum pump, apply 10 inches of vacuum to the Evap Purge Solenoid vacuum source port on the component side.            Did the Evap Purge Solenoid hold vacuum?</p> <p>Yes → Go To 8</p> <p>No → Replace the EVAP Purge Solenoid.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Connect the vacuum hoses before continuing.</b></p>	All

# P0172-FUEL SYSTEM 1/1 RICH — Continued

TEST	ACTION	APPLICABILITY
8	<p>Check for any of the following conditions/mechanical problems.</p> <p>AIR INDUCTION SYSTEM - must be free from restrictions.</p> <p>ENGINE VACUUM - must be at least 13 inches in neutral</p> <p>ENGINE VALVE TIMING - must be within specifications</p> <p>ENGINE COMPRESSION - must be within specifications</p> <p>ENGINE EXHAUST SYSTEM - must be free of any restrictions or leaks.</p> <p>ENGINE PCV SYSTEM - must flow freely</p> <p>TORQUE CONVERTER STALL SPEED - must be within specifications</p> <p>POWER BRAKE BOOSTER - no internal vacuum leaks</p> <p>FUEL - must be free of contamination</p> <p>FUEL INJECTOR - plugged or restricted injector; control wire not connected to correct injector</p> <p>Are there any engine mechanical problems?</p> <p>Yes → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 12</p>	All
9	<p>Ignition on, engine not running.</p> <p><b>NOTE: Perform the following test on the O2 Sensors whose voltage was not switching properly in the previous step.</b></p> <p>Disconnect the O2 Sensor harness connector.</p> <p>With the DRBIII®, monitor the O2 Sensor voltage.</p> <p>O2 Sensor voltage should read 5.0 volts on the DRBIII® with the connector disconnected.</p> <p>Connect a jumper wire between the O2 Signal circuit and the O2 Return circuit in the O2 Sensor harness connector.</p> <p><b>NOTE: The voltage should drop from 5.0 volts down to 2.5 volts with the jumper wire connected.</b></p> <p>Did the O2 Sensor voltage drop from 5 volts to 2.5 volts?</p> <p>Yes → Replace the O2 Sensor Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 10</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
10	<p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Measure the voltage on the O2 Signal circuit in the O2 Sensor harness connector.</p> <p>Is the voltage above 4.8 volts?</p> <p>Yes → Check the O2 Sensor Signal circuit for damage, short to ground, open, or short to voltage. Inspect the O2 Sensor connector and the PCM harness connector. If OK, replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All

**P0172-FUEL SYSTEM 1/1 RICH — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Engine still running.            Measure the voltage on the O2 Return circuit in the O2 Sensor harness connector.            Is the voltage at 2.5 volts?</p> <p>Yes → Go To 12</p> <p>No → Check the O2 Sensor Return circuit for damage, short to ground, open, or short to voltage. Inspect the O2 Sensor connector and the PCM harness connector. If OK, replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Turn the ignition off before continuing.</b></p>	All
12	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P0201-FUEL INJECTOR NO.1 CIRCUIT**  
**P0202-FUEL INJECTOR NO.2 CIRCUIT**  
**P0203-FUEL INJECTOR NO.3 CIRCUIT**  
**P0204-FUEL INJECTOR NO.4 CIRCUIT**  
**P0205-FUEL INJECTOR NO.5 CIRCUIT**  
**P0206-FUEL INJECTOR NO.6 CIRCUIT**  
**P0207-FUEL INJECTOR NO.7 CIRCUIT**  
**P0208-FUEL INJECTOR NO.8 CIRCUIT**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0201-FUEL INJECTOR NO.1 CIRCUIT.**

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**When Monitored and Set Condition:**

**P0201-FUEL INJECTOR NO.1 CIRCUIT**

When Monitored: With battery voltage greater than 10 volts. Auto Shutdown Relay energized. Engine speed less than 3000 rpm.

Set Condition: No inductive spike is detected after injector turn off. One Trip Fault. Three good trips to turn off the MIL.

**P0202-FUEL INJECTOR NO.2 CIRCUIT**

When Monitored: With battery voltage greater than 10 volts. Auto Shutdown Relay energized. Engine speed less than 3000 rpm.

Set Condition: No inductive spike is detected after injector turn off. One Trip Fault. Three good trips to turn off the MIL.

**P0203-FUEL INJECTOR NO.3 CIRCUIT**

When Monitored: With battery voltage greater than 10 volts. Auto Shutdown Relay energized. Engine speed less than 3000 rpm.

Set Condition: No inductive spike is detected after injector turn off. One Trip Fault. Three good trips to turn off the MIL.

**P0204-FUEL INJECTOR NO.4 CIRCUIT**

When Monitored: With battery voltage greater than 10 volts. Auto Shutdown Relay energized. Engine speed less than 3000 rpm.

Set Condition: No inductive spike is detected after injector turn off, and with no other injectors on. One Trip Fault. Three good trips to turn off the MIL.

**P0201-FUEL INJECTOR NO.1 CIRCUIT — Continued****P0205-FUEL INJECTOR NO.5 CIRCUIT**

When Monitored: With battery voltage greater than 10 volts. Auto Shutdown Relay energized. Engine speed less than 3000 rpm.

Set Condition: No inductive spike is detected after injector turn off. One Trip Fault. Three good trips to turn off the MIL.

**P0206-FUEL INJECTOR NO.6 CIRCUIT**

When Monitored: With battery voltage greater than 10 volts. Auto Shutdown Relay energized. Engine speed less than 3000 rpm.

Set Condition: No inductive spike is detected after injector turn off. One Trip Fault. Three good trips to turn off the MIL.

**P0207-FUEL INJECTOR NO.7 CIRCUIT**

When Monitored: With battery voltage greater than 10 volts. Auto Shutdown Relay energized. Engine speed less than 3000 rpm.

Set Condition: No inductive spike is detected after injector turn off. One Trip Fault. Three good trips to turn off the MIL.

**P0208-FUEL INJECTOR NO.8 CIRCUIT**

When Monitored: With battery voltage greater than 10 volts. Auto Shutdown Relay energized. Engine speed less than 3000 rpm.

Set Condition: No inductive spike is detected after injector turn off. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO  
(K342) ASD RELAY OUTPUT CIRCUIT  
FUEL INJECTOR  
INJECTOR CONTROL CIRCUIT OPEN  
INJECTOR CONTROL CIRCUIT SHORTED TO GROUND  
PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

# P0201-FUEL INJECTOR NO.1 CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.  Disconnect the Fuel Injector harness connector.  Ignition on, engine not running.  With the DRBIII®, actuate the ASD Relay.  Using a 12-volt test light connected to ground, backprobe the (K342) ASD Relay Output circuit at the Fuel Injector harness connector.  Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the excessive resistance or short to ground in the (K342) ASD Relay Output circuit. Inspect related fuses and repair as necessary.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>Using a 12-volt test light connected to 12-volts, backprobe the Injector Control circuit.  With the DRBIII®, actuate the Fuel Injector.  What is the state of the test light during the actuation?</p> <p>Brightly blinking.  Replace the Fuel Injector.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>ON constantly.  Go To 4</p> <p>OFF constantly.  Go To 5</p>	All
4	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Measure the resistance between ground and the Injector Control circuit at the Fuel Injector harness connector.  Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the Injector Control circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
5	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the Injector Control circuit from the Fuel Injector harness connector to the appropriate terminal of special tool #8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the Injector Control circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0201-FUEL INJECTOR NO.1 CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P0222-THROTTLE POSITION SENSOR NO.2 LOW**

#### When Monitored and Set Condition:

#### **P0222-THROTTLE POSITION SENSOR NO.2 LOW**

When Monitored: With the ignition on.

Set Condition: Throttle Position Sensor #2 Signal circuit voltage is less than 0.35 volt for more than 1.3 seconds. One Trip Fault. ETC light will illuminate.

#### POSSIBLE CAUSES

TP SENSOR NO.2 SWEEP

INTERMITTENT CONDITION

(F855) 5-VOLT SUPPLY CIRCUIT OPEN

(F855) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

TP SENSOR

(K122) TP SENSOR NO.2 SIGNAL CIRCUIT OPEN

(K122) TP SENSOR NO.2 SIGNAL CIRCUIT SHORTED TO GROUND

(K122) TP SENSOR NO.2 SIGNAL CIRCUIT SHORTED TO (K922) SENSOR RETURN CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.  <b>NOTE: If P0642 or P0643 are set along with P0123, diagnose the 5-volt supply DTCs before continuing.</b>            With the DRBIII®, read the TP Sensor No.2 voltage value.            Is voltage readings below 0.35 of a volt?</p> <p>Yes → Go To 2            No → Go To 10</p>	MAGNUM 5.7L SMPI V8
2	<p>Turn the ignition off.            Disconnect the Throttle Body harness connector.            Ignition on, engine not running.            Measure the voltage on the (F855) 5-volt Supply circuit in the Throttle Body harness connector.            Is the voltage between 4.8 and 5.2 volts?</p> <p>Yes → Go To 3            No → Go To 7</p>	MAGNUM 5.7L SMPI V8



**P0222-THROTTLE POSITION SENSOR NO.2 LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Connect a jumper wire between the (F855) 5-volt Supply circuit and the (K122) TP Sensor No.2 Signal circuit in the Throttle Body harness connector. With the DRBIII®, monitor the TP Sensor No.2 voltage. Is the voltage between 4.8 and 5.2 volts?</p> <p>Yes → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	MAGNUM 5.7L SMPI V8
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K122) TP Sensor No.2 Signal circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K122) TP Sensor No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
5	<p>Measure the resistance between ground and the (K122) TP Sensor No.2 Signal circuit between the appropriate terminals of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K122) TP Sensor No.2 Signal. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	MAGNUM 5.7L SMPI V8
6	<p>Measure the resistance between the (K122) TP Sensor No.2 Signal circuit and the (K922) Sensor Return circuit between the appropriate terminals of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K922) Sensor Return circuit and the (K122) TP Sensor No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	MAGNUM 5.7L SMPI V8

**P0222-THROTTLE POSITION SENSOR NO.2 LOW — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F855) 5-volt Supply circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
8	<p>Measure the resistance between ground and the (F855) 5-volt Supply circuit between the appropriate terminals of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	MAGNUM 5.7L SMPI V8
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
10	<p>Ignition on, engine not running. With the DRBIII®, perform the Throttle Follower Test. Monitor the TP Sensor No.2 voltage while slowly pressing the Throttle pedal down. Is there a smooth voltage change from high to low?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**Symptom:****P0223-THROTTLE POSITION SENSOR NO.2 HIGH****When Monitored and Set Condition:****P0223-THROTTLE POSITION SENSOR NO.2 HIGH**

When Monitored: With the ignition on.

Set Condition: Throttle Position Sensor #2 Signal circuit voltage is greater than 4.9 volts for 25 ms. One Trip Fault. 5.7L ETC light will illuminate.

**POSSIBLE CAUSES**

TP SENSOR NO.2 SWEEP

INTERMITTENT CONDITION

TP SENSOR

(K122) TP SENSOR NO.2 SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K122) TP SENSOR NO.2 SIGNAL CIRCUIT SHORTED TO (F855) 5-VOLT SUPPLY CIRCUIT

(K922) SENSOR RETURN CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs and record the related Freeze Frame data. Ignition on, engine not running. <b>NOTE: If P0642 or P0643 are set along with P0123, diagnose the 5-volt supply DTCs before continuing.</b> Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Go To 7</p>	MAGNUM 5.7L SMPI V8
2	<p>Turn the ignition off. Disconnect the Throttle Body Assembly harness connector. Ignition on, engine not running. With the DRBIII® monitor the TP Sensor No.2 voltage. Is the voltage below 0.5 volt?</p> <p>Yes → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	MAGNUM 5.7L SMPI V8

**P0223-THROTTLE POSITION SENSOR NO.2 HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Ignition on, engine not running. Measure the voltage on the (K122) TP Sensor No.2 Signal circuit in the appropriate terminal of special tool #8815. Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K122) TP Sensor No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance between the (K122) TP Sensor No.2 Signal circuit and the (F855) 5-volt Supply circuit between the appropriate terminals of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K122) TP Sensor No.2 Signal circuit and the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	MAGNUM 5.7L SMPI V8
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K922) Sensor Return circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K922) Sensor Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**P0223-THROTTLE POSITION SENSOR NO.2 HIGH — Continued**

TEST	ACTION	APPLICABILITY
7	<p>With the DRBIII®, perform the Throttle Follower Test. Monitor the TP Sensor No.2 voltage while slowly pressing the Throttle pedal down. Is there a smooth voltage change from high to low?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**Symptom List:**

**P0300-MULTIPLE CYLINDER MISFIRE**

**P0301-CYLINDER NO.1 MISFIRE**

**P0302-CYLINDER NO.2 MISFIRE**

**P0303-CYLINDER NO.3 MISFIRE**

**P0304-CYLINDER NO.4 MISFIRE**

**P0305-CYLINDER NO.5 MISFIRE**

**P0306-CYLINDER NO.6 MISFIRE**

**P0307-CYLINDER NO.7 MISFIRE**

**P0308-CYLINDER NO.8 MISFIRE**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0300-MULTIPLE CYLINDER MISFIRE.**

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**When Monitored and Set Condition:**

**P0300-MULTIPLE CYLINDER MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips. Above 3000 RPM 1 trip less than 3000 RPM 2 trip. Three good trips to turn off the MIL.

**P0301-CYLINDER NO.1 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip. Three good trips to clear the MIL.

**P0302-CYLINDER NO.2 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip. Three good trips to turn off the MIL.

**P0303-CYLINDER NO.3 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip. Three good trips to turn off the MIL.

**P0300-MULTIPLE CYLINDER MISFIRE — Continued****P0304-CYLINDER NO.4 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip. Three good trips to turn off the MIL.

**P0305-CYLINDER NO.5 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip. Three good trips to turn off the MIL.

**P0306-CYLINDER NO.6 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip. Three good trips to turn off the MIL.

**P0307-CYLINDER NO.7 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip. Three good trips to turn off the MIL.

**P0308-CYLINDER NO.8 MISFIRE**

When Monitored: Any time the engine is running, and the adaptive numerator has been successfully updated.

Set Condition: When more than a 2% (2.5% LEV) misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

INTERMITTENT MISFIRE  
VISUAL INSPECTION  
IGNITION WIRE  
ASD RELAY OUTPUT CIRCUIT  
ENGINE MECHANICAL PROBLEM

# **P0300-MULTIPLE CYLINDER MISFIRE — Continued**

POSSIBLE CAUSES
<p>IGNITION COIL</p> <p>COIL CONTROL CIRCUIT</p> <p>SPARK PLUG</p> <p>CHECKING FUEL PRESSURE</p> <p>FUEL PUMP INLET STRAINER PLUGGED</p> <p>RESTRICTED FUEL SUPPLY LINE</p> <p>FUEL PUMP MODULE</p> <p>CHECKING FUEL LEAK DOWN</p> <p>FUEL INJECTOR</p> <p>INJECTOR CONTROL CIRCUIT</p> <p>PCM</p>

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Check for any TSB's that apply to a Misfire condition. Review the vehicle repair history for any misfire condition repairs that have been performed.</b></p> <p>Read and record the FREEZE FRAME DATA. Select OBD II MONITORS. Read and record the MIS-FIRE SIMILAR CONDITIONS WINDOW DATA.</p> <p>With these screens, attempt to duplicate the condition(s) that has set this DTC. When the vehicle is operating in the SIMILAR CONDITIONS WINDOW, refer to the WHICH CYLINDER IS MISFIRING screen.</p> <p>Observe the WHICH CYLINDER IS MISFIRING screen for at least one minute. Is there a misfire present?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p><b>NOTE: Anything that affects the speed of the crankshaft can cause a misfire DTC.</b></p> <p><b>NOTE: When a Misfire is detected for a particular cylinder, the PCM will shut down that cylinders Injector Control circuit.</b></p> <ul style="list-style-type: none"> <li>- Visually inspect the engine for any of the following conditions.</li> <li>- Worn serpentine belt</li> <li>- Binding Engine-Driven accessories: A/C Compressor, P/S Pump, Water pump.</li> <li>- Misalignment Water pump, P/S Pump and A/C Compressor pulleys</li> <li>- Corroded PCM power and ground circuits.</li> <li>- Improper CKP, CMP, MAP, and TP Sensor mounting</li> <li>- Poor connector/terminal to component connection. i.e., CKP sensor, Fuel Injector, Ign coil, etc.</li> <li>- Vacuum leaks</li> <li>- Restricted Air Induction system or Exhaust system.</li> <li>- Internal engine component failures.</li> </ul> <p>Were any of the above conditions present?</p> <p>Yes → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All



**P0300-MULTIPLE CYLINDER MISFIRE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the Ignition Coil harness connector.            Disconnect the Fuel Injector harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the ASD Relay.            Using a 12-volt test light connected to ground, probe the (K342) ASD Relay Output circuit at the Ignition Coil harness connector and Fuel Injector harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the excessive resistance or short to ground in the (K342) ASD Relay Output circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Turn the ignition off.            Connect the Ignition Coil harness connector.            Remove the Ignition Coil.            Disconnect the Fuel Injector harness connector of the cylinder being tested.            Install a spark tester on the Ignition Coil.            While cranking the engine observe the spark coming from the spark tester.  <b>NOTE: A crisp blue spark that is able to jump the gap of the spark tester should be generated.</b>            Is good spark present?</p> <p>Yes → Go To 5</p> <p>No → Go To 14</p> <p><b>NOTE: Connect the Fuel Injector harness connector before continuing.</b></p>	All
5	<p>Turn the ignition off.            Remove the Spark Plug.            Inspect the Spark Plug for the following conditions.</p> <ul style="list-style-type: none"> <li>- Cracks</li> <li>- Carbon Tracking</li> <li>- Foreign Material</li> <li>- Gap size out of specifications</li> <li>- Loose or broke electrode</li> </ul> <p><b>NOTE: Lightly tap the bottom of the spark plug on a solid surface. The electrode in the spark plug should not move.</b>            Were any of the above condition present?</p> <p>Yes → Replace the Spark Plug.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All

**P0300-MULTIPLE CYLINDER MISFIRE — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Install a fuel pressure gauge to the fuel rail. Start the engine and observe the fuel pressure reading. <b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b> Choose a conclusion that best matches your fuel pressure reading.</p> <p>Within Specification Go To 7</p> <p>Below Specification Go To 12</p> <p>Above Specification Replace the fuel filter/pressure regulator. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing visually and physically inspect the fuel delivery system for external leaks or damage. Repair /replace as necessary.</b> Turn the ignition off.</p> <p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Install special tool #6539 (5/16") or #6631 (3/8") fuel line adapter. Install the fuel pressure gauge. Start the engine and allow the fuel system to reach maximum pressure. Turn the ignition off.</p> <p><b>NOTE: Fuel specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b> Using special tool #C4390, Hose Clamp Pliers, pinch the rubber fuel line between the fuel pressure gauge and the engine. Monitor the fuel pressure gauge for a minimum of 5 minutes. <b>NOTE: The pressure should not fall below 241 KPa (35 psi)</b> Does the gauge fall below the listed specification?</p> <p>Yes → Replace the leaking Fuel Injector(s). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p><b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p><b>CAUTION: After each Fuel Injector actuation, start the engine to clean the cylinder of fuel. Failure to do so could cause engine damage.</b></p> <p>Remove special tool #C4390. Start the engine and allow the fuel pressure to reach maximum pressure. Ignition on, engine not running. Using the DRBIII®, actuate the Fuel Injector for the cylinder that indicated the misfire. Monitor the fuel pressure gauge. Does the fuel pressure gauge indicate a drop in fuel pressure?</p> <p>Yes → Go To 9</p> <p>No → Go To 10</p> <p><b>NOTE: Turn the ignition off, remove the Fuel Pressure gauge, and connect the fuel lines before continuing.</b></p>	All

**P0300-MULTIPLE CYLINDER MISFIRE — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Check for any of the following conditions/mechanical problems.</p> <p>ENGINE VACUUM - must be at least 13 inches in neutral</p> <p>ENGINE VALVE TIMING - must be within specifications</p> <p>ENGINE COMPRESSION - must be within specifications</p> <p>ENGINE EXHAUST SYSTEM - must be free of any restrictions or leaks.</p> <p>ENGINE PCV SYSTEM - must flow freely</p> <p>TORQUE CONVERTER STALL SPEED - must be within specifications</p> <p>POWER BRAKE BOOSTER - no internal vacuum leaks</p> <p>FUEL - must be free of contamination</p> <p>CAM LOBES - must not be worn excessively</p> <p>CYLINDER LEAKAGE TEST - must be within specifications</p> <p>VALVE SPRINGS - cannot be weak or broken</p> <p>Are there any engine mechanical problems?</p> <p>Yes → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 17</p>	All
10	<p>Turn the ignition off.</p> <p>Disconnect the Fuel Injector harness connector.</p> <p>Ignition on, engine not running.</p> <p><b>NOTE: When a Misfire is detected for a particular cylinder, the PCM will shut down that cylinder's Injector Control circuit.</b></p> <p>With the DRBIII®, erase DTCs.</p> <p>Using a 12-volt test light connected to 12-volts, probe the Injector Control circuit.</p> <p>With the DRBIII®, actuate the Fuel Injector.</p> <p>Does the test light blink/flicker?</p> <p>Yes → Replace the Fuel Injector. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
11	<p>Turn the ignition off.</p> <p>Disconnect the Fuel Injector harness connector.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Check the Injector Control circuit for an open, short to ground, and short to voltage.</p> <p>Was a problem found with the Injector Control circuit?</p> <p>Yes → Repair the excessive resistance or short in the Injector Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 17</p>	All

**P0300-MULTIPLE CYLINDER MISFIRE — Continued**

TEST	ACTION	APPLICABILITY
12	<p>Turn the ignition off.</p> <p><b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Raise vehicle on hoist, and disconnect the fuel pressure line at the fuel pump module. Install special tool #6539 (5/16") #6631(3/8") fuel line adapter and the fuel pressure gauge between the fuel supply line and the fuel pump module.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.</p> <p><b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b></p> <p>Is the fuel pressure within specification?</p> <p>Yes → Repair or replace fuel supply line as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All
13	<p>Turn the ignition off.</p> <p><b>Warning: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Remove the Fuel Pump Module and inspect the Fuel Inlet Strainer.</p> <p>Is the Fuel Inlet Strainer plugged?</p> <p>Yes → Replace the Fuel Pump Inlet Strainer. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → NOTE: Before continuing, check the Fuel Pump Module harness connector terminals for corrosion, damage, or terminal push out. Ensure the ground circuit is operating properly. Repair as necessary. Replace the Fuel Pump Module. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
14	<p><b>NOTE: If the vehicle being tested does not have an ignition wire answer YES to this test and continue.</b></p> <p>Turn the ignition off.</p> <p>Remove the ignition wire.</p> <p>Measure the resistance of the ignition wire.</p> <p>Is the resistance below 10K ohms?</p> <p>Yes → Go To 15</p> <p>No → Replace the Ignition Wire. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
15	<p>Disconnect the Ignition Coil harness connector.</p> <p>Remove the Fuel Pump Relay or ASD Relay.</p> <p>Using a 12-volt test light connected to 12-volts, probe the Ignition Coil Control circuit.</p> <p>Crank the engine for 5 second while observing the test light.</p> <p><b>NOTE: The primary resistance of the 4.7L Ignition coil is 0.6 to 0.9 of an ohm and the resistance of a 5.7L Ignition coil is 0.558 to 0.682 of an ohm at 77°F (25°C).</b></p> <p>Does the test light brightly blink/flicker?</p> <p>Yes → Replace the Ignition Coil. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 16</p>	All

**P0300-MULTIPLE CYLINDER MISFIRE — Continued**

TEST	ACTION	APPLICABILITY
16	<p>Turn the ignition off.            Disconnect the Ignition Coil harness connector.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Check the Coil Control circuit for an open, short to ground, and short to voltage.            Was a problem found with the Coil Control circuit?</p> <p>Yes → Repair the Coil Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 17</p>	All
17	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom: P0315-NO CRANK SENSOR LEARNED

### When Monitored and Set Condition:

#### P0315-NO CRANK SENSOR LEARNED

**When Monitored:** Under closed throttle decel and A/C off. ECT above 75°C (167°F).  
Engine start time is greater than 50 seconds.

**Set Condition:** One of the CKP sensor target windows has more than 2.86% variance from the reference. One Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

INTERMITTENT CONDITION

TONE WHEEL/PULSE RING INSPECTION

CKP WIRE HARNESS INSPECTION

CRANKSHAFT POSITION SENSOR

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Check for any TSBs that may apply to this symptom.</b></p> <p>Ignition on, engine not running. With the DRBIII®, clear DTCs, PCM battery disconnect to reset the PCM. Start the engine. If the MIL has not yet illuminated, test drive the vehicle to try to get the code to reset. Does the code reset while cranking or during the test drive?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Visually inspect the CKP wire harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the CKP wire harness connectors. Look for broken, bent, pushed out, or corroded terminals. Ensure the Crankshaft Position Sensor is properly installed and the mounting bolt(s) tight. Were any of the above conditions present?</p> <p>Yes → Repair as necessary Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P0315-NO CRANK SENSOR LEARNED — Continued**

TEST	ACTION	APPLICABILITY
3	Remove the Crankshaft Position Sensor. Inspect the Tone Wheel/Flex Plate slots for damage, foreign material, or excessive movement. Were any problems found?  Yes → Repair or replace the Tone Wheel/Flex Plate as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All
4	If there are no possible causes remaining, view repair.  Repair Replace the Crankshaft Position Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**Symptom List:****P0325-KNOCK SENSOR NO.1 CIRCUIT****P0330-KNOCK SENSOR NO.2 CIRCUIT**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0325-KNOCK SENSOR NO.1 CIRCUIT**.

**When Monitored and Set Condition:****P0325-KNOCK SENSOR NO.1 CIRCUIT**

**When Monitored:** With the engine running >1312 RPM, coolant temp >65.25°C (149.45°F), MAF >250mg/tdc and no ECT, MAF or CAM Sensor DTCs.

**Set Condition:** The Knock Sensor error program internal to the PCM is on, the Knock Sensor voltage is <.49 volt, and the value of the Knock Sensor changes less than .06 volt for >11 seconds. One Trip Fault. Three good trips to turn off the MIL.

**P0330-KNOCK SENSOR NO.2 CIRCUIT**

**When Monitored:** With the engine running >1312 RPM, coolant temp >65.25°C (149.45°F), MAF >250mg/tdc and no ECT, MAF or CAM Sensor DTCs.

**Set Condition:** The Knock Sensor error program internal to the PCM is on, the Knock Sensor voltage is <.49 volt, and the value of the Knock Sensor changes less than .06 volt for >11 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

KNOCK SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE

KNOCK SENSOR SIGNAL CIRCUIT OPEN

KNOCK SENSOR RETURN CIRCUIT OPEN

KNOCK SENSOR SIGNAL CIRCUIT SHORTED TO KNOCK SENSOR RETURN CIRCUIT

KNOCK SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

KNOCK SENSOR

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All



**P0325-KNOCK SENSOR NO.1 CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.            Disconnect the Knock Sensor harness connector.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage of the Knock Sensor Signal circuit in the Knock Sensor harness connector.            Is the voltage above 2.0 volts?</p> <p>Yes → Repair the short to voltage in the (K42) or (K242) Knock Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K42) or (K242) Knock Sensor Signal circuit from the Knock Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (K42) or (K242) Knock Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K942) or (K924) Knock Sensor Return circuit from the Knock Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K942) or (K924) Knock Sensor Return circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between the Knock Sensor Signal circuit and the Knock Sensor Return circuit in the Knock Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the Knock Sensor Signal circuit and the Knock Sensor Return circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between ground and the (K42) or (K242) Knock Sensor Signal circuit in the Knock Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K42) or (K242) Knock Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All

**P0325-KNOCK SENSOR NO.1 CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Connect the PCM harness connectors. Replace the Knock Sensor. Ignition on, engine not running. With the DRBIII®, erase DTC. Attempt to operate the vehicle using the information noted in the Freeze Frame. With the DRBIII®, read DTCs. Does the DRBIII® display the DTC that was previously erased?</p> <p>Yes → NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary. Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0335-CRANKSHAFT POSITION SENSOR CIRCUIT****When Monitored and Set Condition:****P0335-CRANKSHAFT POSITION SENSOR CIRCUIT**

When Monitored: Engine cranking. Battery voltage greater than 10.4 volts.

Set Condition: No CKP signal is present during engine cranking, and at least 8 camshaft position sensor signals have occurred for more than 8 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

INTERMITTENT CKP SIGNAL

INTERMITTENT CMP SIGNAL

(F855) 5-VOLT SUPPLY CIRCUIT SHORTED TO BATTERY VOLTAGE

(F855) 5-VOLT SUPPLY CIRCUIT OPEN

(F855) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

(K24) CKP SIGNAL CIRCUIT OPEN

(K24) CKP SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K24) CKP SIGNAL CIRCUIT SHORTED GROUND

(K24) CKP SIGNAL CIRCUIT SHORTED TO (F855) 5-VOLT SUPPLY CIRCUIT

(K900) SENSOR GROUND CIRCUIT OPEN

CRANKSHAFT POSITION SENSOR

PCM

TEST	ACTION	APPLICABILITY
1	Crank the engine. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2 No → Go To 14	All
2	Turn the ignition off. Disconnect the CKP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (F855) 5-volt Supply circuit in the CKP Sensor harness connector. Is the voltage between 4.5 and 5.2 volts?  Yes → Go To 3 No → Go To 10	All

# P0335-CRANKSHAFT POSITION SENSOR CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	<p>Measure the voltage on the (K24) CKP Signal circuit in the CKP Sensor harness connector.</p> <p>Is the voltage between 4.5 and 5.0 volts?</p> <p>Yes → Go To 4</p> <p>No → Go To 7</p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the CKP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K900) Sensor ground circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between the (K24) CKP Signal circuit and the (F855) 5-volt Supply circuit at the CKP Sensor harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K24) CKP Signal circuit and the (F855) 5-volt Supply circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Inspect the slots on the flywheel for damage. If a problem is found repair as necessary.</b></p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Crankshaft Position Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (K24) CKP Signal circuit in the CKP Sensor harness connector.</p> <p>Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K24) CKP Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All

**P0335-CRANKSHAFT POSITION SENSOR CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K24) CKP Signal circuit from the CKP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the (K24) CKP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
9	<p>Measure the resistance between ground and the (K24) CKP Signal circuit in the CKP Sensor harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short to ground in the (K24) CKP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All
10	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Using a 12-volt test light connected to ground, probe the (F855) 5-volt Supply circuit in the CKP Sensor harness connector.</p> <p>Does the test light illuminate brightly?</p> <p>Yes → Repair the short to battery voltage in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
11	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (F855) 5-volt Supply circuit from the CKP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the open in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
12	<p>Measure the resistance between ground and the (F855) 5-volt Supply circuit in the CKP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All

**P0335-CRANKSHAFT POSITION SENSOR CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
13	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
14	<p>Turn the ignition off.            With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K44) CMP Signal circuit in the CMP harness connector.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            Ignition on, engine not running.            Wiggle the related wire harness and lightly tap on the Cam Position Sensor.            Observe the lab scope screen.            Look for any pulses generated by the CMP Sensor.            Allow the engine to idle.            Observe the lab scope screen.            Did the CMP Sensor generate any erratic pulses?</p> <p>Yes → Inspect the related wire harness and replace the Camshaft Position Sensor if no wiring problems were found.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 15</p>	All
15	<p>Turn the ignition off.            With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K24) CKP Signal circuit in the CKP harness connector.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            Ignition on, engine not running.            Wiggle the related wire harness and lightly tap on the Crank Position Sensor.            Observe the lab scope screen.            Look for any pulses generated by the CKP Sensor.            Allow the engine to idle.            Observe the lab scope screen.            Did the CKP Sensor generate any pulses?</p> <p>Yes → Inspect the related wire harness and replace the Crankshaft Position Sensor if no wiring problems were found.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0339-CRANKSHAFT POSITION SENSOR INTERMITTENT****When Monitored and Set Condition:****P0339-CRANKSHAFT POSITION SENSOR INTERMITTENT**

**When Monitored:** While cranking engine and engine running. Battery voltage greater than 10.4 volts.

**Set Condition:** When the CKP Sensor failure counter reaches 20. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

CKP WIRE HARNESS INSPECTION

(F855) 5-VOLT SUPPLY CIRCUIT OPEN OR SHORTED TO GROUND

TONE WHEEL/PULSE RING INSPECTION

CHECKING CMP SENSOR SIGNAL WITH THE DRBIII® LAB SCOPE

CRANKSHAFT POSITION SENSOR

(K24) CKP SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K24) CKP SIGNAL CIRCUIT OPEN

(K24) CKP SIGNAL CIRCUIT SHORTED TO GROUND

(K24) CKP SIGNAL CIRCUIT SHORTED TO (F855) 5-VOLT SUPPLY CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0339-CRANKSHAFT POSITION SENSOR INTERMITTENT — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.</p> <p>With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K24) CKP Signal circuit at the Sensor harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Ignition on, engine not running.</p> <p>Observe the lab scope screen.</p> <p>Start the engine.</p> <p>Observe the lab scope screen.</p> <p>Are there any irregular or missing signals?</p> <p>Yes → Go To 3</p> <p>No → Go To 8</p>	All
3	<p>Turn the ignition off.</p> <p>Visually inspect the related wire harness including the ground circuit. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Ensure the Crankshaft Position Sensor and the Camshaft Position Sensor are properly installed and the mounting bolt(s) are properly torqued.</p> <p>Refer to any TSBs that may apply.</p> <p>Were any of the above conditions present?</p> <p>Yes → Repair as necessary Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Disconnect the CKP Sensor connector.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (F855) 5-volt Supply circuit in the Sensor harness connector.</p> <p>Is the voltage between 4.5 and 5.2 volts?</p> <p>Yes → Go To 5</p> <p>No → Repair the open or short to ground in the (F855) 5-volt Supply circuit. Use Miller special tool #8815 when checking for an open circuit to prevent PCM harness connector terminal damage. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Turn the ignition off.</p> <p>Carefully disconnect the Negative Battery (Ground) cable.</p> <p>Remove the Crankshaft Position Sensor.</p> <p>Inspect the Tone Wheel/Flex Plate slots for damage, foreign material, or excessive movement.</p> <p>Were any problems found?</p> <p>Yes → Repair or replace the Tone Wheel/Flex Plate as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All



**P0339-CRANKSHAFT POSITION SENSOR INTERMITTENT — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Install the CKP Sensor and connect the battery cable.</p> <p><b>NOTE: An intermittent condition with the Cam Position Sensor can cause the P0339 to set.</b></p> <p>With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K44) CMP Signal circuit at the Sensor harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Ignition on, engine not running.</p> <p>Wiggle the related wire harness and lightly tap on the Cam Position Sensor.</p> <p>Observe the lab scope screen.</p> <p>Start the engine.</p> <p>Observe the lab scope screen.</p> <p>Are there any irregular or missing signals?</p> <p>Yes → Replace the Cam Position Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Crankshaft Position Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Disconnect the CKP Sensor harness connector.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (K24) CKP Signal circuit in the Sensor harness connector.</p> <p>Wiggle the related wire harness while taking this measurement.</p> <p>Does the voltage ever increase above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K24) CKP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance in the (K24) CKP Signal circuit from the CKP harness connector to the appropriate terminal of special tool #8815.</p> <p>Wiggle the wire harness while taking this measurement.</p> <p>Is the resistance below 1.0 ohm?</p> <p>Yes → Go To 10</p> <p>No → Repair the excessive resistance in the (K24) CKP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0339-CRANKSHAFT POSITION SENSOR INTERMITTENT — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Measure the resistance between ground and the (K24) CKP Signal circuit at the CKP Sensor harness connector. Wiggle the related wire harness while monitoring the resistance value. Does the resistance ever go below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K24) Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
11	<p>Measure the resistance between the (F855) 5-volt Supply circuit and the (K24) CKP Signal circuit at the CKP harness connector. Wiggle the related wire harness while taking this measurement. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (F855) 5-volt Supply circuit and the (K24) CKP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 12</p>	All
12	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, review repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0340-CAMSHAFT POSITION SENSOR CIRCUIT****When Monitored and Set Condition:****P0340-CAMSHAFT POSITION SENSOR CIRCUIT**

When Monitored: Engine cranking/running. Battery voltage greater than 10.4 volts.

Set Condition: At least 5 seconds or 2.5 engine revolutions have elapsed with crankshaft position sensor signals present but no camshaft position sensor signal. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

INTERMITTENT CKP SIGNAL

INTERMITTENT CMP SIGNAL

(F856) 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

(F856) 5-VOLT SUPPLY CIRCUIT OPEN

(F856) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

(K44) CMP SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K44) CMP SIGNAL CIRCUIT OPEN

(K44) CMP SIGNAL CIRCUIT SHORTED GROUND

(K44) CMP SIGNAL SHORTED TO (F856) 5-VOLT SUPPLY CIRCUIT

(K900) SENSOR GROUND CIRCUIT OPEN

CAMSHAFT POSITION SENSOR

PCM

TEST	ACTION	APPLICABILITY
1	Crank the engine. Ignition on, engine not running. With the DRBIII®, read the DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2 No → Go To 14	All
2	Turn the ignition off. Disconnect the CMP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (F856) 5-volt Supply circuit in the CMP Sensor harness connector. Is the voltage between 4.5 and 5.2 volts?  Yes → Go To 3 No → Go To 10	All

# P0340-CAMSHAFT POSITION SENSOR CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	<p>Measure the voltage on the (K44) CMP Signal circuit in the CMP Sensor harness connector.</p> <p>Is the voltage between 4.5 and 5.0 volts?</p> <p>Yes → Go To 4</p> <p>No → Go To 7</p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the CMP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K900) Sensor ground circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between the (K44) CMP Signal circuit and the (F856) 5-volt Supply circuit in the CMP Sensor harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K44) CMP Signal circuit and the (F856) 5-volt Supply circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Inspect the Camshaft sprocket for damage per the Service Information. If a problem is found repair as necessary.</b></p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Camshaft Position Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (K44) CMP Signal circuit in the CMP Sensor harness connector.</p> <p>Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K44) CMP Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All

**P0340-CAMSHAFT POSITION SENSOR CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K44) CMP Signal circuit from the CMP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the (K44) CMP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
9	<p>Measure the resistance between ground and the (K44) CMP Signal circuit in the CMP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K44) CMP Signal circuit Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All
10	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (F856) 5-volt Supply circuit in the CMP Sensor harness connector.</p> <p>Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
11	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (F856) 5-volt Supply circuit between the CMP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the open in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
12	<p>Measure the resistance between ground and the (F856) 5-volt Supply circuit in the CMP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 13</p>	All

**P0340-CAMSHAFT POSITION SENSOR CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
13	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
14	<p>Turn the ignition off.            With the DRBIII® lab scope probe and the Miller special tool #6801, back probe the (K24) CKP Signal circuit in the CKP harness connector.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            Ignition on, engine not running.            Wiggle the related wire harness and lightly tap the Crank Position Sensor.            Observe the lab scope screen.            Allow the engine to idle.            Observe the lab scope screen.            Did the CKP Sensor generate any erratic pulses?</p> <p>Yes → Replace the Crankshaft Position Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 15</p>	All
15	<p>Turn the ignition off.            With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K44) CMP Signal circuit in the CMP harness connector.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            Ignition on, engine not running.            Wiggle the related wire harness and lightly tap on the Cam Position Sensor.            Observe the lab scope screen.            Allow the engine to idle.            Observe the lab scope screen.            Did the CMP Sensor generate any erratic pulses?</p> <p>Yes → Replace the Camshaft Position Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0344-CAMSHAFT POSITION SENSOR INTERMITTENT****When Monitored and Set Condition:****P0344-CAMSHAFT POSITION SENSOR INTERMITTENT**

**When Monitored:** While cranking the engine and engine running. Battery voltage is greater than 10.4 volts.

**Set Condition:** When the failure counter reaches 20. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

CMP WIRE HARNESS INSPECTION

(F856) 5-VOLT SUPPLY CIRCUIT OPEN OR SHORTED TO GROUND

TONE WHEEL/PULSE RING INSPECTION

CHECKING CKP SENSOR SIGNAL WITH THE DRBIII® LAB SCOPE

CAMSHAFT POSITION SENSOR

(K44) CMP SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K44) CMP SIGNAL CIRCUIT OPEN

(K44) CMP SIGNAL CIRCUIT SHORTED TO GROUND

(K44) CMP SIGNAL CIRCUIT SHORTED TO (F856) 5-VOLT SUPPLY

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0344-CAMSHAFT POSITION SENSOR INTERMITTENT — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.</p> <p>With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K44) CMP Signal circuit in the CMP harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Ignition on, engine not running.</p> <p>Observe the lab scope screen.</p> <p>Start the engine.</p> <p>Observe the lab scope screen.</p> <p>Are there any irregular or missing signals?</p> <p>Yes → Go To 3</p> <p>No → Go To 8</p>	All
3	<p>Turn the ignition off.</p> <p>Visually inspect the related wire harness including the ground circuit. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Ensure the Crankshaft Position Sensor and the Camshaft Position Sensor are properly installed and the mounting bolt(s) are tight.</p> <p>Refer to any TSBs that may apply.</p> <p>Were any of the above conditions present?</p> <p>Yes → Repair as necessary Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Disconnect the CMP Sensor connector.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (F856) 5-volt Supply circuit in the CMP harness connector.</p> <p>Is the voltage between 4.5 and 5.2 volts?</p> <p>Yes → Go To 5</p> <p>No → Repair the open or short to ground in the (F856) 5-volt Supply circuit. Use Miller special tool #8815 when checking for an open circuit to prevent PCM harness connector terminal damage. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Turn the ignition off.</p> <p>Carefully disconnect the Battery Ground cable.</p> <p>Remove the Camshaft Position Sensor.</p> <p>Inspect the Tone Wheel/Pulse Ring for damage, foreign material, or excessive movement.</p> <p>Were any problems found?</p> <p>Yes → Repair or replace the Tone Wheel/Pulse Ring as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All



**P0344-CAMSHAFT POSITION SENSOR INTERMITTENT — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: An intermittent condition with the Crank Position Sensor can cause the P0344 to set.</b></p> <p>Install the CMP Sensor and connect the Battery cable.</p> <p>With the DRBIII® lab scope probe and the Miller special tool #6801, backprobe the (K24) CKP Signal circuit in the CKP harness connector.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Ignition on, engine not running.</p> <p>Wiggle the related wire harness and lightly tap on the Crank Position Sensor.</p> <p>Observe the lab scope screen.</p> <p>Start the engine.</p> <p>Observe the lab scope screen.</p> <p>Are there any irregular or missing signals?</p> <p>Yes → Replace the Crank Position Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Camshaft Position Sensor.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p>Turn the ignition off.</p> <p>Disconnect the CMP Sensor connector.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (K44) CMP Signal circuit.</p> <p>Wiggle the related wire harness while taking this measurement.</p> <p>Does the voltage ever increase above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K44) CMP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance in the (K44) CMP Signal circuit from the CMP harness connector to the appropriate terminal of special tool #8815.</p> <p>Wiggle the related wire harness while taking this measurement.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the excessive resistance in the (K44) CMP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0344-CAMSHAFT POSITION SENSOR INTERMITTENT — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Measure the resistance between ground and the (K44) CMP Signal circuit in the CMP Sensor harness connector. Wiggle the related wire harness while monitoring the resistance value. Does the resistance ever go below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K44) CMP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
11	<p>Measure the resistance between the (F856) 5-volt Supply circuit and the (K44) CMP Signal circuit in the CMP harness connector. Wiggle the related wire harness while taking this measurement. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (F856) 5-volt Supply circuit and the (K44) CMP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 12</p>	All
12	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, review repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0401-EGR SYSTEM PERFORMANCE****When Monitored and Set Condition:****P0401-EGR SYSTEM PERFORMANCE**

**When Monitored:** During engine decel, 26 to 4 MPH. Engine Coolant Temp greater than 70°C (158°F). Engine run time greater than 120 seconds.

**Set Condition:** The PCM monitors engine roughness. During decel, the EGR is opened and the PCM monitors engine then monitors engine roughness with the valve open. If an increase of engine roughness is not present, an error is detected. Two Trip Fault.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

EGR VALVE OPEN AT IDLE

EGR VALVE ASSEMBLY INSPECTION

(Z335) EGR SOLENOID GROUND CIRCUIT OPEN

EGR SOLENOID ASSEMBLY

(K35) EGR SOLENOID CONTROL CIRCUIT SHORTED TO GROUND

(K35) EGR SOLENOID CONTROL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K35) EGR SOLENOID CONTROL CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION symptom in the Driveability category. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	<b>NOTE: If the vehicle is running rough at idle (DRBIII® not actuating) follow the yes path to continue.</b> Turn all accessories off. Start the engine. Allow the engine to reach normal operating temperature. With the DRB, enter Engine System Test, then EGR System Test. Actuate the FLOW function in the EGR System Test. Did the engine run rough or stall?  Yes → Go To 3  No → Go To 6	All

**P0401-EGR SYSTEM PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the EGR Solenoid Assembly harness connector.            Start engine. Attempt to allow the engine to idle.            Does the engine run rough or stall?</p> <p>Yes → Inspect the EGR tube assembly. If OK, replace the EGR valve.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Ignition on, engine not running.            Measure the voltage on the (K35) EGR Solenoid Control circuit in the EGR Solenoid Connector.            Is the voltage above 1.0 volt?</p> <p>Yes → Repair the short to battery voltage in the (K35) EGR Solenoid Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Inspect the EGR Assembly for the following.            Gasket(s) for leaking            Damage and/or holes in the EGR tube(s)            Carbon build up on or near the EGR pintle and passage ways.            Obstruction in the EGR tubes            Were any problem found?</p> <p>Yes → Repair or replace the EGR Assembly as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 10</p>	All
6	<p>Ignition on, engine not running.            Turn all accessories off.            Disconnect the EGR Solenoid harness connector.            Using a 12-volt Test Light, jump across the EGR Solenoid harness connector.            With the DRB, actuate the EGR solenoid.            Does the 12-volt test light flash on and off?</p> <p>Yes → Inspect the tube(s) for obstructions and damage, repair as necessary. If OK, replace the EGR Solenoid Assembly.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off.            Disconnect the EGR Solenoid harness connector.            Using a 12-volt test light connected to battery voltage, probe (Z335) EGR Solenoid ground circuit in the EGR Solenoid harness connector.            Does the 12-volt test light illuminate brightly?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (Z335) EGR Solenoid ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0401-EGR SYSTEM PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Disconnect the PCM harness connector.  Measure the resistance between ground and the (K35) EGR Solenoid Control circuit in the EGR Solenoid harness connector.  Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K35) EGR Solenoid Control circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K35) EGR Solenoid Control circuit from the EGR Solenoid harness connector to the appropriate terminal of special tool # 8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the open in the (K35) EGR Solenoid Control circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
10	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom: P0403-EGR CONTROL CIRCUIT

### When Monitored and Set Condition:

#### P0403-EGR CONTROL CIRCUIT

When Monitored: Engine running. Battery voltage greater than 10.4 volts.

Set Condition: The EGR solenoid control circuit is not in the expected state when requested to operate by the PCM. One Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

EGR SOLENOID

(Z335) EGR SOLENOID GROUND CIRCUIT OPEN

(K35) EGR SOLENOID CONTROL CIRCUIT SHORTED TO VOLTAGE

(K35) EGR SOLENOID CONTROL CIRCUIT SHORTED TO GROUND

(K35) EGR SOLENOID CONTROL CIRCUIT SHORTED TO (K900) SENSOR GROUND CIRCUIT

(K35) EGR SOLENOID CONTROL CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the EGR Solenoid harness connector. Ignition on, engine not running. Turn off all accessories. Using a 12-volt test light connected to the (Z335) EGR Solenoid ground circuit, probe the (K35) EGR Solenoid Control circuit. With the DRBIII®, actuate the EGR solenoid. Does the 12-volt test light flash on and off?</p> <p>Yes → Replace the EGR Solenoid Assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P0403-EGR CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the PCM harness connectors. Using a 12-volt test light connected to the 12-volts, probe the (Z335) EGR Solenoid ground circuit at the EGR Solenoid harness connector. Does the test light illuminate brightly?  Yes → Go To 4  No → Repair the open in the (Z335) EGR Solenoid ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
4	Ignition on, engine not running. Measure the voltage on the (K35) EGR Solenoid Control circuit at the EGR Solenoid connector. Is the voltage above 1.0 volt?  Yes → Repair the short to voltage in the (K35) EGR Solenoid Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 5	All
5	Turn the ignition off. Measure the resistance between ground and the (K35) EGR Solenoid Control circuit at the EGR Solenoid harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K35) EGR Solenoid Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 6	All
6	Measure the resistance between the (K35) EGR Solenoid Control circuit and the (K900) Sensor ground circuit at the EGR Solenoid connector. Is the resistance below 5.0 ohms?  Yes → Repair the short between the (K900) Sensor ground circuit and the (K35) EGR Solenoid Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 7	All
7	<b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K35) EGR Solenoid Control circuit from the EGR Solenoid harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?  Yes → Go To 8  No → Repair the open in the (K35) EGR Solenoid Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0403-EGR CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P0404-EGR POSITION SENSOR PERFORMANCE****When Monitored and Set Condition:****P0404-EGR POSITION SENSOR PERFORMANCE**

When Monitored: Engine running.

Set Condition: The EGR flow or valve movement is not what is expected.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

EXCESSIVE RESISTANCE IN (F856) 5-VOLT SUPPLY

(K34) EGR SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

EGR ASSEMBLY

(K35) EGR SOLENOID CONTROL CIRCUIT

INTERMITTENT CONDITION

(K34) EGR SENSOR SIGNAL CIRCUIT OPEN

(K34) EGR SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

(K900) SENSOR GROUND CIRCUIT OPEN

EGR ASSEMBLY (GROUND)

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	<b>NOTE: Diagnose all other EGR DTC(s) first before continuing.</b> Start the engine. With the DRBIII®, read the EGR Position Sensor voltage. Choose a conclusion that best matches the EGR voltage reading.  Below 3.5 volts Go To 3  Between 3.5 volts to 4.3 volts Go To 5  Above 4.3 volts Go To 7	All

**P0404-EGR POSITION SENSOR PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the EGR Solenoid harness connector.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (F856) 5-volt Supply circuit from the EGR Solenoid harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the excessive resistance in the (F856) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the resistance between ground and the (K34) EGR Sensor Signal circuit at the EGR Solenoid harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short to ground in the (K34) EGR Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the EGR Assembly.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Ignition on, engine not running.            With the DRBIII®, actuate the EGR Solenoid.            Allow the EGR Solenoid to actuate for at least 15 seconds.            Feel the EGR Solenoid for operation.            Stop actuation.            Does EGR Solenoid operate while actuating and then turn off when actuation test is stopped?</p> <p>Yes → Go To 6</p> <p>No → Refer to the Driveability category and perform P0403 - EGR Control Circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0404-EGR POSITION SENSOR PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.</b></p> <p><b>NOTE: Closely inspect the EGR tube(s) for obstructions, damage and holes. Also, inspect the gasket(s) for leaks.</b></p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>With the engine running at normal operating temperature, monitor the DRBIII® parameters related to the DTC while wiggling the wire harness. Look for parameter values to change and/or a DTC to set.</p> <p>Review the DRBIII® Freeze Frame information. If possible, try to duplicate the conditions under which the DTC was set.</p> <p>Refer to any Technical Service Bulletins (TSB) that may apply.</p> <p>Visually inspect the related wire harness. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Were any of the above conditions present?</p> <p>Yes → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All
7	<p>Turn the ignition off.</p> <p>Disconnect the EGR Solenoid harness connector.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage of the (K34) EGR Sensor Signal circuit at the EGR Solenoid harness connector.</p> <p>Is the voltage above 4.30 volts?</p> <p>Yes → Go To 8</p> <p>No → Go To 9</p>	All
8	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the EGR Solenoid harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Replace the EGR Assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Repair the open in the (K900) Sensor ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0404-EGR POSITION SENSOR PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K34) EGR Sensor Signal circuit from the EGR Solenoid harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the open in the (K34) EGR Sensor Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
10	<p>Measure the resistance between ground and the (K34) EGR Sensor Signal circuit at the EGR Solenoid harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K34) EGR Sensor Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 11</p>	All
11	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0405-EGR POSITION SENSOR LOW****When Monitored and Set Condition:****P0405-EGR POSITION SENSOR LOW**

When Monitored: With the ignition on. Battery voltage above 10.4 volts.

Set Condition: EGR Position Sensor Signal is less than 0.1026 of a volt for more than 3.1875 seconds. One trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

EGR POSITION SENSOR SWEEP

INTERMITTENT CONDITION

(F856) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

(F856) 5-VOLT SUPPLY CIRCUIT OPEN

EGR POSITION SENSOR

(K34) EGR POSITION SENSOR SIGNAL CIRCUIT SHORTED TO GROUND

(K34) EGR POSITION SENSOR SIGNAL CIRCUIT SHORTED TO (K900) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the EGR Position Sensor voltage. Is the voltage below 0.2 of a volt?  Yes → Go To 2 No → Go To 9	All
2	Turn the ignition off. Disconnect the EGR Solenoid harness connector. Ignition on, engine not running. Measure the voltage of the (F856) 5-volt Supply circuit at the EGR Solenoid harness connector. Is the voltage between 4.5 to 5.2 volts?  Yes → Go To 3 No → Go To 6	All
3	With the DRBIII®, monitor the EGR Position Sensor voltage. Is the voltage above 4.5 volts?  Yes → Replace the EGR Solenoid Assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All

**P0405-EGR POSITION SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the PCM harness connector.            Measure the resistance between ground and the (K34) EGR Position Sensor Signal circuit at the EGR Position harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground circuit in the (K34) EGR Position Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (K34) EGR Position Sensor Signal circuit and (K900) Sensor ground circuit in the EGR Position harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground and the (K34) EGR Position Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
6	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (F856) 5-volt Supply circuit at the EGR Solenoid harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F856) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Disconnect the PCM harness connector.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (F856) 5-volt Supply circuit from the EGR Solenoid harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (F856) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0405-EGR POSITION SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
9	<p><b>NOTE: The engine will run rough and possibly stall in the following test. Feather the accelerator pedal to keep the engine from stalling.</b></p> <p>Start the engine. With the DRBIII®, enter Engine System Test and then EGR System Test. Push the 4=VARIABLE function. Monitor the EGR voltage while slowly pushing the up arrow. Is the voltage change smooth?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the EGR Solenoid Assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P0406-EGR POSITION SENSOR HIGH

## When Monitored and Set Condition:

### P0406-EGR POSITION SENSOR HIGH

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: EGR position sensor signal is greater than 4.89 for more than 3.1875 seconds. One trip Fault. Three good trips to clear the MIL.

## POSSIBLE CAUSES

EGR POSITION SENSOR SWEEP

INTERMITTENT CONDITION

(K34) EGR POSITION SENSOR SIGNAL CIRCUIT SHORTED TO (F856) 5-VOLT SUPPLY CIRCUIT

(K34) EGR POSITION SENSOR SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

EGR SOLENOID ASSEMBLY

(K34) EGR POSITION SENSOR SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Start the engine. With the DRBIII®, read the EGR Position Sensor voltage. Is the voltage above 4.5 volts?</p> <p>Yes → Go To 2</p> <p>No → Go To 8</p>	All
2	<p>Turn the ignition off. Disconnect the EGR Solenoid harness connector. Disconnect the PCM harness connectors. Measure the resistance between the (K34) EGR Position Sensor Signal circuit and the (F856) 5-volt Supply circuit at the EGR Solenoid harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K34) EGR Position Sensor Signal circuit and the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All



**P0406-EGR POSITION SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running.            Measure the voltage on the (K34) EGR Sensor Signal circuit at the EGR Solenoid harness connector.            Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to battery voltage in the (K34) EGR Position Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.            Connect the PCM harness connectors.            Connect a jumper wire between the (K34) EGR Position Sensor Signal circuit and the (K900) Sensor ground circuit.            With the DRBIII®, monitor the EGR Position Sensor voltage.            Ignition on, engine not running.            Is the voltage below 0.5 of a volt?</p> <p>Yes → Replace the EGR Solenoid Assembly.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K34) EGR Position Sensor Signal circuit from the EGR Solenoid harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K34) EGR Position Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the EGR Solenoid harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 30 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0406-EGR POSITION SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
8	<p><b>NOTE: The engine will run rough and possibly stall in the following test. Feather the accelerator pedal to keep the engine from stalling.</b></p> <p>Start the engine. With the DRBIII®, enter Engine System Test and then EGR System Test. Push the 4=VARIABLE function. Monitor the EGR voltage while slowly pushing the up arrow. Is the voltage change smooth?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the EGR Solenoid Assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:****P0420-CATALYST 1/1 EFFICIENCY****P0430-CATALYST 2/1 EFFICIENCY**

**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0420-CATALYST 1/1 EFFICIENCY.

**When Monitored and Set Condition:****P0420-CATALYST 1/1 EFFICIENCY**

**When Monitored:** After engine warm up to 70°C (158°F), 180 seconds of open throttle operation, at a speed greater than 18 mph and less than 55 mph, with the engine at 1200-1700 rpm and MAP vacuum between 15.0 and 21.0 inches of mercury (Hg).

**Set Condition:** As catalyst efficiency deteriorates, the switch rate of the downstream O2 sensor approaches that of the upstream O2 sensor. If at any point during the test the switch ratio reaches a predetermined value a counter is incremented by one. Three good trips to turn off the MIL.

**P0430-CATALYST 2/1 EFFICIENCY**

**When Monitored:** After engine warm up to 147 deg. F, 180 seconds of open throttle operation, at a speed greater than 20 mph, with the engine at 1200-1700 rpm and MAP vacuum between 15.0 and 21.0 inches of mercury (Hg).

**Set Condition:** As catalyst efficiency deteriorates, the switch rate of the downstream O2 sensor approaches that of the upstream O2 sensor. If at any point during the test the switch ratio reaches a predetermined value a counter is incremented by one. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

VISUALLY INSPECT CATALYTIC CONVERTER

EXHAUST LEAK

ENGINE MECHANICAL CONDITION

AGING O2 SENSOR

CATALYTIC CONVERTER

# P0420-CATALYST 1/1 EFFICIENCY — Continued

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: A new rear O2 Sensor along with an aging front O2 Sensor may cause the DTC to set. Review the repair history of the vehicle before continuing.</b></p> <p><b>NOTE: If a O2 Sensor DTC(s) set along with the Catalytic Converter Efficiency DTC diagnose the O2 Sensor DTC(s) before continuing.</b></p> <p><b>NOTE: Check for contaminants that may have damaged the O2 Sensor and Catalytic Converter: contaminated fuel, unapproved silicone, oil and coolant, repair necessary.</b></p> <p>Ignition on, engine not running.  With the DRBIII®, read DTCs and record the related Freeze Frame data.  Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Inspect the Catalytic Converter for the following damage.  Damage Catalytic Converter, dent and holes.  Severe discoloration caused by overheating the Catalytic Converter.  Catalytic Converter broke internally.  Leaking Catalytic Converter.  Were any problems found?</p> <p>Yes → Replace the Catalytic Converter. Repair the condition that may have caused the failure.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Start the engine.  Inspect the exhaust for leak between the engine and the O2 Sensor.  Inspect the exhaust for leaks between the engine and the appropriate rear O2 Sensor.  Are there any exhaust leaks?</p> <p>Yes → Repair or replace the leaking exhaust parts as necessary.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Check the exhaust for excessive smoke caused by an internal problem in the engine.  Is a engine mechanical condition present?</p> <p>Yes → Repair the engine mechanical condition as necessary.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>A new rear O2 Sensor along with an aging front O2 Sensor may cause the DTC to set.  Review the vehicles repair history.  Has the rear O2 Sensor been replace without replacing the front O2 Sensor?</p> <p>Yes → Replace the Front O2 Sensor as necessary.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>If there are no possible cause remaining, view repair.</p> <p>Repair  Replace the Catalytic Converter.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0440-GENERAL EVAP SYSTEM FAILURE****When Monitored and Set Condition:****P0440-GENERAL EVAP SYSTEM FAILURE**

**When Monitored:** Engine Running. Fuel Level greater than 12%. Ambient Temperature between 4°C and 32°C (39°F and 89°F)

**Set Condition:** The PCM does not see the NVLD switch close during the medium/large leak test. The PCM then will increase the vacuum supply to the EVAP system by increasing flow through the EVAP Purge valve. If the switch does not close with an increase in vacuum an error is detected. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO  
 VISUAL AND PHYSICAL INSPECTION  
 EVAP PURGE SOLENOID VACUUM SUPPLY INSPECTION  
 EVAP PURGE SOLENOID  
 NVLD SWITCH OPERATION  
 (Z910) GROUND CIRCUIT OPEN  
 NVLD ASSEMBLY  
 (K107) SIGNAL CIRCUIT OPEN  
 EVAPORATIVE EMISSION LEAK DETECTION  
 PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing.  <b>NOTE: If any of the following DTCs are set (P0443, P0452, P0453, P0498 or P0499) diagnose them first before continuing with P0440.</b>            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

**P0440-GENERAL EVAP SYSTEM FAILURE — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.            Perform a visual and physical inspection of the entire Evaporative Emission system.            Check for the following conditions:</p> <ul style="list-style-type: none"> <li>- Hoses disconnected or left off</li> <li>- Holes or cracks</li> <li>- Loose seal points</li> <li>- Evidence of damaged components</li> <li>- Incorrect routing of hoses and tubes</li> <li>- Fuel Cap left off or bad gasket seal</li> </ul> <p>Were any of the above conditions found?</p> <p>Yes → Repair as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 3</p>	All
3	<p>Carefully inspect the Evap Purge Solenoid vacuum supply hose for proper routing.            Check for a pinched or plugged hose from the throttle body to the Purge Solenoid.            Ensure the vacuum port at the throttle body is free from any blockage.            Were any problems found?</p> <p>Yes → Repair the vacuum supply, hose/tube as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 4</p>	All
4	<p>Disconnect the vacuum supply hoses from the EVAP Purge Solenoid.            Using a hand vacuum pump, apply 10 in Hg to the "CAN" side of the EVAP Purge Solenoid.            Ignition on, engine not running.            Observe the vacuum gauge.            With the DRBIII®, actuate the EVAP Purge Solenoid.            Does the vacuum drop when the solenoid is actuated?</p> <p>Yes → Go To 5</p> <p>No → Replace the Evap Purge Solenoid.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
5	<p>Connect the previously disconnected vacuum hose.            Start the engine.            Allow the engine to idle.            Using the DRBIII®, perform the NVLD FORCED MONITOR TEST.            Monitor the NVLD Switch state.  <b>NOTE: As the test runs, the NVLD Switch should go from an OPEN state to a CLOSED state and then return to OPEN when the test is complete.</b>            Did the NVLD Switch operate as described above?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 6</p>	All

**P0440-GENERAL EVAP SYSTEM FAILURE — Continued**

TEST	ACTION	APPLICABILITY
6	<p>To continue testing you will need Miller Tool #8404 Evaporative Emission Leak Detector (EELD).</p> <p><b>WARNING: Keep lit cigarettes, sparks, flames, and other ignition sources away from the test area to prevent the ignition of explosive gases. Keep the test area well ventilated.</b></p> <p><b>NOTE: The fuel tank should have between 20% and 80% of fuel tank capacity to properly test the Evap system.</b></p> <p>Connect the red power lead of EELD to the battery positive terminal and the black ground lead to battery negative terminal.</p> <p><b>NOTE: See Charts and Graph support material EELD Calibration Setup for an example.</b></p> <p>Block the vent hose of the EVAP Canister.</p> <p>Connect shop air to the EELD.</p> <p>Set the smoke/air control switch to AIR.</p> <p>Insert the tester's AIR supply tip (clear hose) into the .040 orifice on the tester's control panel.</p> <p>Press the remote smoke/air start button.</p> <p>Position the red flag on the air flow meter so it is aligned with the indicator ball.</p> <p>When the calibration is complete, release the remote button. The EELD flow meter is now calibrated in liters per minute.</p> <p>Install the service port adapter #8404-14 on the vehicle's service port (if equipped) or install the #8404-ADP into the filter line.</p> <p>Connect the Air supply hose from the EELD to the service port (if equipped) or to the #8404-ADP adapter.</p> <p>Press the remote button to activate AIR flow.</p> <p><b>NOTE: Larger volume fuel tanks, lower fuel levels or if the vehicle is equipped with a Flow Management Valve, this may indicate high flow and will require 4 to 5 minutes to fill.</b></p> <p>Compare the flow meter indicator ball reading to the red flag.</p> <p>ABOVE the red flag indicates a leak present.</p> <p>BELOW the red flag indicates a sealed system.</p> <p>Is the indicator ball above the red flag?</p> <p>Yes → Go To 7</p> <p>No → Go To 8</p>	All

**P0440-GENERAL EVAP SYSTEM FAILURE — Continued**

TEST	ACTION	APPLICABILITY
7	<p><b>NOTE: A thorough visual inspection of the Evap system hoses, tubes, and connections may save time in your diagnosis. Look for any physical damage or signs of wetness at connections. The strong smell of fuel vapors may aid diagnosis also.</b></p> <p>To continue testing, you will need Miller Tool #8404 Evaporative Emissions Leak Detector (EELD).</p> <p>Remove the Air supply hose from the service port or the #8404-ADP adapter. Connect the SMOKE supply tip (black hose) to the service port (if equipped) or to the #8404-ADP adapter.</p> <p>Set the smoke/air control switch to SMOKE.</p> <p><b>NOTE: The flow meter indicator ball will not move at this point.</b></p> <p>Press the remote smoke/air start button.</p> <p><b>NOTE: Ensure that smoke has filled the EVAP system by continuing to press the remote smoke/air start button, remove the vehicle fuel cap, and wait for the smoke to exit. Once smoke is indicated reinstall the fuel cap.</b></p> <p><b>NOTE: For optimal performance, introduce smoke into the system for an additional 60 seconds; continue introducing smoke at 15 second intervals, as necessary.</b></p> <p>While still holding the remote smoke/air start button, use the white light (#8404-CLL) to follow the EVAP system path, and look for the source of the leak indicated by exiting smoke.</p> <p>If a leak is concealed from view (i.e., top of fuel tank), release the remote smoke/air start button, and use the ultraviolet (UV) black light #8404-UVL and the yellow goggles 8404-20 to look for residual traces of dye that are left behind by the smoke. The exiting smoke deposits a residual fluid that is either bright green or bright yellow in color when viewed with a UV light.</p> <p><b>NOTE: Carefully inspect the vent side of the EVAP Canister. Due to the filtering system in the canister the smoke or dye may or may not be visible. Introducing smoke into the filtered side of the canister may assist in locating the leak.</b></p> <p>Was a leak found?</p> <p>Yes → Repair or replace the leaking component as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 11</p>	All
8	<p>Turn the ignition off.</p> <p>Disconnect the NVLD electrical harness connector.</p> <p>Check connectors - Clean/repair as necessary.</p> <p>Ignition on, engine not running.</p> <p>Connect a jumper wire between the (K107) NVLD Switch Signal circuit and the (Z910) Ground circuit in the NVLD electrical harness connector.</p> <p>Monitor the NVLD Switch state on the DRBIII®.</p> <p>Does the Switch change from OPEN to CLOSED.</p> <p>Yes → Replace the NVLD Assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 9</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All



**P0440-GENERAL EVAP SYSTEM FAILURE — Continued**

TEST	ACTION	APPLICABILITY
9	Turn the ignition off. Measure the resistance between the (Z910) Ground circuit and ground. Is the resistance below 5.0 ohms?  Yes → Go To 10  No → Repair the open in the (Z910) Ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.	All
10	Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K107) NVLD Switch Signal circuit from the NVLD electrical harness connector to the appropriate terminal of the special tool #8815. Is the resistance below 5.0 ohms?  Yes → Go To 11  No → Repair the open in the (K107) Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.	All
11	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.	All

## Symptom:

### P0441-EVAP PURGE SYSTEM PERFORMANCE

#### When Monitored and Set Condition:

#### P0441-EVAP PURGE SYSTEM PERFORMANCE

When Monitored: Cold start test. Engine Running. Small Leak Test Passed.

Set Condition: The PCM activates the EVAP Purge solenoid gradually increases to maximum flow. During flow, the PCM looks for the NVLD switch to close. If the PCM does not see the NVLD switch close at maximum flow an error is detected. Two Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

INTERMITTENT CONDITION

CHECKING EVAP PURGE SOLENOID FUNCTIONALITY

EVAP PURGE SOLENOID VACUUM SUPPLY

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing.</p> <p><b>NOTE: If any of the following DTCs are set (P0443, P0452, P0453, P0498 or P0499) diagnose them first before continuing with P0441.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p><b>NOTE: After disconnecting the Evap Purge vacuum connections, inspect the lines and solenoid for any signs of contamination or foreign materials.</b></p> <p>Using a hand vacuum pump, apply 10 in Hg to "CAN" side of the EVAP Purge Solenoid.</p> <p>Ignition on, engine not running.</p> <p>Observe the vacuum gauge.</p> <p>With the DRBIII®, actuate the EVAP Purge Solenoid .</p> <p>Does the vacuum drop when the solenoid is actuated?</p> <p>Yes → Go To 3</p> <p>No → Replace the Evap Purge Solenoid.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>NOTE: Remove the vacuum gauge before continuing.</b></p>	All

**P0441-EVAP PURGE SYSTEM PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Carefully inspect the Evap Purge Solenoid vacuum supply hose for proper routing. Check for a pinched or plugged hose from the throttle body to the Purge Solenoid. Inspect the vacuum port at the throttle body for any damage or plugging. Were any problems found?</p> <p>Yes → Repair the vacuum supply hose/tube as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

### Symptom List:

**P0442-EVAP SYSTEM MEDIUM LEAK**

**P0455-EVAP SYSTEM LARGE LEAK**

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**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be **P0442-EVAP SYSTEM MEDIUM LEAK**.

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### When Monitored and Set Condition:

#### **P0442-EVAP SYSTEM MEDIUM LEAK**

**When Monitored:** Engine Running. Cold start test. Fuel Level greater than 12%. Ambient Temperature between 4°C and 32°C (39°F and 89°F) Close Loop fuel system. Test runs when small leak test is maturing.

**Set Condition:** The PCM activates the EVAP Purge Solenoid to pull the EVAP system into a vacuum to close the NVLD switch. Once the NVLD switch is closed, the PCM turns the EVAP Purge solenoid off to seal the EVAP system. If the NVLD switch reopens before the calibrated amount of time for a Medium leak an error is detected. Two Trip Fault. Three good trips to turn off the MIL.

#### **P0455-EVAP SYSTEM LARGE LEAK**

**When Monitored:** Engine Running. Cold start test. Fuel Level greater than 12%. Ambient Temperature between 4°C and 32°C (39°F and 89°F) Close Loop fuel system. Test runs when small leak test is maturing.

**Set Condition:** The PCM activates the EVAP Purge Solenoid to pull the EVAP system into a vacuum to close the NVLD switch. Once the NVLD switch is closed, the PCM turns the EVAP Purge solenoid off to seal the EVAP system. If the NVLD switch reopens before the calibrated amount of time for a Large leak an error is detected. Two Trip Fault. Three good trips to turn off the MIL.

### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

VISUAL AND PHYSICAL INSPECTION

VERIFY EVAPORATIVE EMISSION SYSTEM LEAK

EVAPORATIVE EMISSION LEAK DETECTION

EVAP PURGE SOLENOID OPERATION

NVLD SWITCH OPERATION

**P0442-EVAP SYSTEM MEDIUM LEAK — Continued**

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing.</p> <p><b>NOTE: Since a hot vehicle can conceal a leak, it is best to perform this test at room temperature.</b></p> <p><b>NOTE: A loose gas cap could have caused this DTC to set. Make sure gas cap is tight and in good condition. Ensure the gas cap meets OEM specifications.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
2	<p>Perform a visual and physical inspection of the entire Evaporative Emission system.</p> <p>Check for the follow conditions:</p> <ul style="list-style-type: none"> <li>- Holes or cracks</li> <li>- Loose seal points</li> <li>- Evidence of damaged components</li> <li>- Incorrect routing of hoses and tubes</li> <li>- Fuel Cap gasket seal</li> </ul> <p>Were any of the above conditions found?</p> <p>Yes → Repair as necessary.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 3</p>	All

**P0442-EVAP SYSTEM MEDIUM LEAK — Continued**

TEST	ACTION	APPLICABILITY
3	<p>To continue testing you will need Miller Tool #8404A Evaporative Emission Leak Detector (EELD).</p> <p><b>WARNING: Keep lit cigarettes, sparks, flames, and other ignition sources away from the test area to prevent the ignition of explosive gases. Keep the test area well ventilated.</b></p> <p><b>NOTE: The fuel tank should have between 20% and 80% of fuel tank capacity to properly test the Evap system.</b></p> <p>Connect the red power lead of the EELD to the battery positive terminal and the black ground lead to battery negative terminal.</p> <p><b>NOTE: See Charts and Graph support material EELD Calibration Setup for an example.</b></p> <p>Block the vent hose of the canister if using the service port.</p> <p>Connect shop air to the EELD.</p> <p>Set the smoke/air control switch to AIR.</p> <p>Insert the tester's AIR supply tip (clear hose) into the appropriate calibration orifice on the tester's control panel (based on DTC leak size).</p> <p>Press the remote smoke/air start button.</p> <p>Position the red flag on the air flow meter so it is aligned with the indicator ball.</p> <p>When the calibration is complete, release the remote button. The EELD flow meter is now calibrated in liters per minute to the size leak indicated by the DTC set in the PCM.</p> <p>Install the service port adapter #8404-14 on the vehicle's service port and block the vent hose of the EVAP Canister (if equipped) or install the #8404-ADP service adaptor into the filter line.</p> <p>Connect the Air supply hose from the EELD to the service port (if equipped) or to the #8404-ADP adapter.</p> <p>Press the remote button to activate AIR flow.</p> <p><b>NOTE: Larger volume fuel tanks, lower fuel levels or if the vehicle is equipped with a Flow Management Valve may indicate high flow and will require 4 to 5 minutes to fill.</b></p> <p>Compare the flow meter indicator ball reading to the red flag.</p> <p>ABOVE the red flag indicates a leak present.</p> <p>BELOW the red flag indicates a sealed system.</p> <p>Is the indicator ball above the red flag?</p> <p>Yes → Go To 4</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

**P0442-EVAP SYSTEM MEDIUM LEAK — Continued**

TEST	ACTION	APPLICABILITY
4	<p><b>NOTE: A thorough visual inspection of the Evap system hoses, tubes, and connections may save time in your diagnosis. Look for any physical damage or signs of wetness at connections. The strong smell of fuel vapors may aid diagnosis also.</b></p> <p>To continue testing, you will need Miller Tool #8404A Evaporative Emissions Leak Detector (EELD).</p> <p>Remove the Air supply hose from the service port (if equipped) or from the #8404-ADP adapter.</p> <p>Connect the SMOKE supply tip (black hose) to the service port (if equipped) or to the #8404-ADP adapter.</p> <p>Set the smoke/air control switch to SMOKE.</p> <p><b>NOTE: The flow meter indicator ball will not move in the smoke mode.</b></p> <p>Press the remote smoke/air start button.</p> <p><b>NOTE: Ensure that smoke has filled the EVAP system by continuing to press the remote smoke/air start button, remove the vehicle fuel cap, and wait for the smoke to exit. Once smoke is indicated reinstall the fuel cap.</b></p> <p><b>NOTE: For optimal performance, introduce smoke into the system for an additional 60 seconds; continue introducing smoke at 15 second intervals, as necessary.</b></p> <p>While still holding the remote smoke/air start button, use the white light (#8404-CLL) to follow the EVAP system path, and look for the source of the leak indicated by exiting smoke.</p> <p>If a leak is concealed from view (i.e., top of fuel tank), release the remote smoke/air start button, and use the ultraviolet (UV) black light #8404-UVL and the yellow goggles 8404-20 to look for residual traces of dye that is left behind by the smoke. The exiting smoke deposits a residual fluid that is either bright green or bright yellow in color when viewed with a UV light.</p> <p><b>NOTE: Carefully inspect the vent side of the EVAP Canister. Due to the filtering system in the canister the smoke may not be as thick. Introducing smoke into the filtered side of the canister may assist in locating the leak.</b></p> <p>Was a leak found?</p> <p>Yes → Repair or replace the leaking component as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: After disconnecting the Evap Purge Solenoid vacuum connections, inspect the lines and solenoid for any signs of contamination from the EVAP Canister. This may indicate a faulty rollover valve. Replace/repair as necessary.</b></p> <p>Turn the ignition off.</p> <p>Disconnect the vacuum hoses at the Evap Purge Solenoid.</p> <p>Using a hand vacuum pump, apply 10 in Hg to the "CAN" of the EVAP Purge Solenoid.</p> <p><b>NOTE: Monitor the vacuum gauge for at least 15 seconds.</b></p> <p>Does the EVAP Purge Solenoid hold vacuum?</p> <p>Yes → Test Complete.</p> <p>No → Replace the Evap Purge Solenoid. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p>	All

**Symptom:**

**P0443-EVAP PURGE SOLENOID CIRCUIT**

**When Monitored and Set Condition:**

**P0443-EVAP PURGE SOLENOID CIRCUIT**

**When Monitored:** The ignition on or engine running. Battery voltage greater than 10.4 volts.

**Set Condition:** The PCM will set a trouble code if the actual state of the solenoid does not match the intended state for more than 3.175 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

EVAP PURGE SOLENOID

(K52) EVAP PURGE CONTROL CIRCUIT OPEN

(K52) EVAP PURGE SOL CONTROL CIRCUIT SHORTED TO GROUND

(K70) EVAP PURGE SOL RETURN CIRCUIT OPEN

(K70) EVAP PURGE SOL RETURN CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing.                      Ignition on, engine not running.                      With the DRBIII®, read DTCs and record the related Freeze Frame data.                      Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.                      Disconnect the EVAP Purge Solenoid harness connector.                      Ignition on, engine not running.                      Using a 12-volt test light, jump across the (K52) Evap Purge Sol Control circuit and (K70) Evap Purge Sol Signal circuit in the EVAP Purge Solenoid harness connector.                      With the DRBIII®, actuate the EVAP Purge Solenoid.                      Does the test light flash on and off?</p> <p>Yes → Replace the EVAP Purge Solenoid.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All



**P0443-EVAP PURGE SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K52) Evap Purge Sol Control circuit from the Evap Purge Solenoid harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (K52) EVAP Purge Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the resistance between ground and the (K52) Evap Purge Sol Control circuit at the Evap Purge Solenoid harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K52) EVAP Purge Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K70) Evap Purge Sol Return circuit from the EVAP Purge Solenoid harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K70) Evap Purge Sol Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Measure the resistance between ground and the (K70) Evap Purge Sol Return circuit at the Evap Purge Solenoid harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K70) Evap Purge Sol Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:**

**P0452-NVLD PRESSURE SWITCH STUCK CLOSED**

**When Monitored and Set Condition:**

**P0452-NVLD PRESSURE SWITCH STUCK CLOSED**

When Monitored: Immediately after the engine has been started.

Set Condition: The PCM activates the NVLD Solenoid. If PCM does not see NVLD switch open an error is detected. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

EVAP PURGE SOLENOID LEAKS/STUCK OPEN

(K52) EVAP PURGE SOL CONTROL CIRCUIT SHORTED TO GROUND

NVLD SWITCH OPERATION

NVLD ASSEMBLY

(K107) NVLD SWITCH SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing.                      Ignition on, engine not running.                      With the DRBIII®, read DTCs and record the related Freeze Frame data.                      Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.                      Disconnect the EVAP Purge Solenoid harness connector.                      Ignition on, engine not running.                      Using a 12-volt test light, jump across the Evap Purge Solenoid harness connector.                      With the DRBIII®, actuate the EVAP Purge Solenoid.                      Does the test light flash on and off?</p> <p>Yes → Go To 3</p> <p>No → Go To 7</p>	All

**P0452-NVLD PRESSURE SWITCH STUCK CLOSED — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Connect the Evap Purge Solenoid harness connector.            Disconnect the vacuum hoses at the Evap Purge Solenoid.  <b>NOTE: After disconnecting the Evap Purge Solenoid vacuum connections, inspect the lines and solenoid for any signs of contamination from the EVAP Canister. This may indicate a faulty rollover valve. Replace/repair as necessary.</b>            Using a hand vacuum pump, apply 10 in Hg to the "CAN" of the EVAP Purge Solenoid.  <b>NOTE: Monitor the vacuum gauge for at least 15 seconds.</b>            Does the EVAP Purge Solenoid hold vacuum?</p> <p>Yes → Go To 4</p> <p>No → Replace the Evap Purge Solenoid.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Ignition on, engine not running.            Using the DRBIII®, monitor the NVLD Switch State with the vacuum pump still installed and holding vacuum.            Does the DRBIII® display the NVLD state OPEN?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p> <p><b>NOTE: Remove the vacuum pump and connect the vacuum hose before continuing.</b></p>	All
5	<p>Disconnect the NVLD electrical connector.            Does the Switch change from CLOSED to OPEN?</p> <p>Yes → Replace the NVLD Assembly.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (K107) NVLD Switch Signal circuit in the NVLD Assembly harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K107) NVLD Switch Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
7	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (K52) Evap Purge Sol Control circuit at the EVAP Purge Solenoid harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K52) Evap Purge Sol Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All

**P0452-NVLD PRESSURE SWITCH STUCK CLOSED — Continued**

TEST	ACTION	APPLICABILITY
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0453-NVLD PRESSURE SWITCH STUCK OPEN****When Monitored and Set Condition:****P0453-NVLD PRESSURE SWITCH STUCK OPEN**

When Monitored: Engine running.

Set Condition: If the PCM does not see the NVLD switch close during test an error is detected. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

NVLD SWITCH OPERATION

NVLD ASSEMBLY

(K107) NVLD SWITCH SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K107) NVLD SWITCH SIGNAL CIRCUIT OPEN

(K107) NVLD SWITCH SIGNAL CIRCUIT SHORTED TO (K106) NVLD SOL CONTROL CIRCUIT

(Z910) GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing. Start the engine. Allow the engine to idle. Using the DRBIII®, perform the NVLD FORCED MONITOR TEST. Monitor the NVLD Switch state. <b>NOTE: As the test runs, the NVLD Switch should go from an OPEN state to a CLOSED state and then return to OPEN when the test is complete.</b> Did the NVLD Switch operate as described above?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off. Disconnect the NVLD electrical harness connector. Ignition on, engine not running. Monitor the NVLD Switch state on the DRBIII®. Connect a jumper wire between the (K107) NVLD Switch Signal circuit and the (Z910) ground circuit in the NVLD harness connector. Does the Switch change from OPEN to CLOSED?</p> <p>Yes → Replace the NVLD Assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

**P0453-NVLD PRESSURE SWITCH STUCK OPEN — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Ignition on, engine not running.  Measure the voltage on the (K107) NVLD Switch Signal circuit in the NVLD electrical harness connector.  Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K107) NVLD Switch Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the (K107) NVLD Switch Signal circuit from the NVLD electrical harness connector to the appropriate terminal of special tool # 8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K107) NVLD Switch Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between the (K107) NVLD Switch Signal circuit and the (K106) NVLD Sol Control circuit in the NVLD electrical harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K107) NVLD Switch Signal circuit and the (K106) NVLD Sol Control circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between the (Z910) Ground circuit and ground.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (Z910) Ground circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair  Replace and program the Powertrain Control Module per Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0456-EVAP SYSTEM SMALL LEAK****When Monitored and Set Condition:****P0456-EVAP SYSTEM SMALL LEAK**

**When Monitored:** Ignition off. Fuel Level less than 88%. Ambient Temperature between 4°C to 43°C (39°F to 109°F)

**Set Condition:** Due to temperature changes a vacuum is created in the fuel tank and EVAP system. With the EVAP system sealed, the PCM monitors the NVLD switch. If the NVLD switch does not close within a calibrated amount of time an error is detected. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

INTERMITTENT CONDITION

VISUAL AND PHYSICAL INSPECTION

EVAPORATIVE EMISSION LEAK DETECTION

EVAP PURGE SOLENOID LEAKS/STUCK OPEN

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing.</p> <p><b>NOTE: The difference in ambient temperature, outside temp VS shop temp, may conceal a leak, it is best to perform this test after the vehicle's temperature has stabilized in the work area.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p>	All
2	<p>Perform a visual and physical inspection of the entire Evaporative Emission system.</p> <p>Check for the following conditions:</p> <ul style="list-style-type: none"> <li>- Holes or cracks</li> <li>- Loose seal points</li> <li>- Evidence of damaged components</li> <li>- Incorrect routing of hoses and tubes</li> <li>- Fuel Cap gasket seal</li> </ul> <p>Were any of the above conditions found?</p> <p>Yes → Repair as necessary.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 3</p>	All

**P0456-EVAP SYSTEM SMALL LEAK — Continued**

TEST	ACTION	APPLICABILITY
3	<p><b>NOTE: A thorough visual inspection of the Evap system hoses, tubes, and connections may save time in your diagnosis. Look for any physical damage or signs of wetness at connections. The strong smell of fuel vapors may aid diagnosis also.</b></p> <p>Use the Miller Tool #8404A Evaporative Emissions Leak Detector (EELD).            Connect the SMOKE supply tip (black hose) to the service port (if equipped) or install the #8404-ADP service adaptor into the filter line.            Set the smoke/air control switch to SMOKE.  <b>NOTE: The flow meter indicator ball will not move at this point.</b>            Press the remote smoke/air start button.  <b>NOTE: Ensure that smoke has filled the EVAP system by continuing to press the remote smoke/air start button, remove the vehicle fuel cap, and wait for the smoke to exit. Once smoke is indicated reinstall the fuel cap.</b>  <b>NOTE: For optimal performance, introduce smoke into the system for an additional 60 seconds; continue introducing smoke at 15 second intervals, as necessary.</b>            While still holding the remote smoke/air start button, use the white light (#8404-CLL) to follow the EVAP system path, and look for the source of the leak indicated by exiting smoke.            If a leak is concealed from view (i.e., top of fuel tank), release the remote smoke/air start button, and use the ultraviolet (UV) black light #8404-UVL and the yellow goggles 8404-20 to look for residual traces of dye that are left behind by the smoke. The exiting smoke deposits a residual fluid that is either bright green or bright yellow in color when viewed with a UV light.  <b>NOTE: Carefully inspect the vent side of the EVAP Canister. Due to the filtering system in the canister the smoke or dye may or may not be visible. Introducing smoke into the filtered side of the canister may assist in locating the leak.</b>            Was a leak found?</p> <p>Yes → Repair or replace the leaking component as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Go To 4</p>	All
4	<p><b>NOTE: After disconnecting the Evap Purge Solenoid vacuum connections, inspect the lines and solenoid for any signs of contamination from the EVAP Canister. This may indicate a faulty rollover valve. Replace/repair as necessary.</b></p> <p>Turn the ignition off.            Disconnect the vacuum hoses at the Evap Purge Solenoid.            Using a hand vacuum pump, apply 10 in Hg to the "CAN" side of the EVAP Purge Solenoid.  <b>NOTE: Monitor the vacuum gauge for at least 15 seconds.</b>            Does the Evap Purge Solenoid hold vacuum?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p> <p>No → Replace the Evap Purge Solenoid.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 6.</p>	All



**Symptom:****P0461-FUEL LEVEL SENSOR NO.1 PERFORMANCE****When Monitored and Set Condition:****P0461-FUEL LEVEL SENSOR NO.1 PERFORMANCE**

When Monitored: TEST #1: With the ignition on, the fuel level is compared to the previous key down after a 20 second delay. TEST #2: The PCM monitors the fuel level at ignition on.

Set Condition: TEST #1: If the PCM does not see a difference in fuel level of greater than 0.1 volt the test will fail. TEST #2: If the PCM does not see a change in the fuel level of .1765 over a set amount of miles the test will fail. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

VISUALLY INSPECT FUEL TANK

(N4) FUEL LEVEL SIGNAL CIRCUIT OPEN

(N4) FUEL LEVEL SIGNAL CIRCUIT SHORTED TO GROUND

(K900) SENSOR GROUND CIRCUIT OPEN

INTERNAL INSPECTION OF THE FUEL TANK

FUEL LEVEL SENSOR

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Diagnose P0462 or P0463 first, if set along with P0461.</b>  <b>NOTE: Inspect the Fuel Pump Module harness connector for any corrosion or damage.</b>            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Visually inspect the Fuel Tank for damage that may restrict the Fuel Sending Unit float from moving.            Is the Fuel Tank OK?</p> <p>Yes → Go To 3</p> <p>No → Replace the Fuel Tank as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0461-FUEL LEVEL SENSOR NO.1 PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the Fuel Pump Module harness connector.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (N4) Fuel Level Signal circuit from the Fuel Pump Module harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (N4) Fuel Level Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the resistance between ground and the (N4) Fuel Level Signal circuit at the Fuel Pump Module harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (N4) Fuel Level Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the Fuel Pump Module harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before opening the fuel system the fuel pressure must be release. Relieve the fuel pressure in accordance with the service information.</b>            Remove the Fuel Tank per Service Information.            Remove the Fuel Pump Module.            Visually inspect the inside of the Fuel Tank for any obstructions or deformities.            Inspect the Fuel Pump Module Float arm for damage.            Were any problems found?</p> <p>Yes → Repair or replace as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Fuel Level Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0462-FUEL LEVEL SENSOR NO.1 LOW****When Monitored and Set Condition:****P0462-FUEL LEVEL SENSOR NO.1 LOW**

When Monitored: Ignition on. Battery voltage above 10.4 volts.

Set Condition: The fuel level sensor signal voltage goes below 0.1961 of a volt for more than 4.4 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

FUEL LEVEL SENSOR VOLTAGE BELOW 0.4 VOLT

FUEL LEVEL SENSOR

(N4) FUEL LEVEL SIGNAL CIRCUIT SHORTED TO GROUND

(N4) FUEL LEVEL SIGNAL CIRCUIT SHORTED TO (K900) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. With the DRBIII®, read the Fuel Level Sensor voltage. Is the Fuel Level Sensor voltage below 0.4 of a volt?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the Fuel Pump Module harness connector. Ignition on, engine not running. With the DRBIII®, read the Fuel Level Sensor voltage. Did the Fuel Level Sensor voltage change from below 0.4 of a volt to above 4.0 volts?  Yes → Replace the Fuel Level Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (N4) Fuel Level Signal circuit at the Fuel Level Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (N4) Fuel Level Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 4	All

**P0462-FUEL LEVEL SENSOR NO.1 LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the (N4) Fuel Level Signal circuit and the (K900) Sensor ground circuit at the Fuel Pump Module harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground and the (N4) Fuel Level Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0463-FUEL LEVEL SENSOR NO.1 HIGH****When Monitored and Set Condition:****P0463-FUEL LEVEL SENSOR NO.1 HIGH**

When Monitored: Ignition on. Battery voltage above 10.4 volts.

Set Condition: The fuel level sensor signal voltage at the PCM goes above 4.7059 volts for more than 4.4 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

FUEL LEVEL SENSOR VOLTAGE ABOVE 4.9 VOLTS

FUEL LEVEL SENSOR

(N4) FUEL LEVEL SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(N4) FUEL LEVEL SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the Fuel Level Sensor voltage. Is the Fuel Level Sensor voltage above 4.9 volts?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the Fuel Pump Module electrical harness connector. Ignition on, engine not running. Connect a jumper wire between the (N4) Fuel Level Signal circuit and the (K900) Sensor ground circuit at the Fuel Pump Module harness connector. With the DRBIII®, read the Fuel Level Sensor voltage. Did the Fuel Level Sensor voltage change from above 4.8 volts to below 0.4 of a volt?  Yes → Replace the Fuel Level Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

**P0463-FUEL LEVEL SENSOR NO.1 HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the (N4) Fuel Level Signal circuit in the Module harness connector.            Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (N4) Fuel Level Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (N4) Fuel Level Signal circuit from the Fuel Pump Module harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (N4) Fuel Level Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the Fuel Pump Module harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0480-COOLING FAN NO.1 CONTROL CIRCUIT****When Monitored and Set Condition:****P0480-COOLING FAN NO.1 CONTROL CIRCUIT**

**When Monitored:** With the ignition on. Battery voltage greater than 10.4 volts. Fuel Delivery mode is run.

**Set Condition:** The state of the Output does not agree with the control state for 2.7 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

CONDENSER FAN RELAY OPERATION

INTERNAL (A16) FUSED B+ CIRCUITS

CONDENSER FAN RELAY RESISTANCE

(K173) CONDENSER FAN RELAY CONTROL CIRCUIT OPEN

(K173) CONDENSER FAN RELAY CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the Condenser Fan Relay. Is the Condenser Fan Relay operating?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 2	All
2	Turn the ignition off. Remove the Condenser Fan Relay from the IPM. Using a 12-volt test light connected to ground, probe the (A16) Fused B+ circuits in the IPM. Is the voltage above 11.0 volts?  Yes → Go To 3  No → Repair the open or short to ground in the (A16) Fused B+ circuits. Inspect the related fuse and repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
3	Measure the resistance of the Condenser Fan Relay Coil. Is the resistance between 60 to 80 ohms?  Yes → Go To 4  No → Replace the Condenser Fan Relay. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0480-COOLING FAN NO.1 CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K173) Condenser Fan Relay Control circuit from the IPM to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K173) Condenser Fan Relay Control circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (K173) Condenser Fan Relay Control circuit at the IPM.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K173) Condenser Fan Relay Control circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P0498-NVLD CANISTER VENT VALVE SOLENOID CIRCUIT LOW****When Monitored and Set Condition:****P0498-NVLD CANISTER VENT VALVE SOLENOID CIRCUIT LOW**

When Monitored: Engine running.

Set Condition: The PCM detects a short in the NVLD Canister vent solenoid circuits for more than 5 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

NVLD SOLENOID

(K106) NVLD SOL CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing. Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the NVLD electrical harness connector. Measure the resistance of the NVLD Solenoid coil. Is the resistance between 7.5 to 8.5 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the NVLD Assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>Disconnect the PCM harness connectors. Measure the resistance between ground and the (K106) NVLD Sol Control circuit at the NVLD electrical harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K106) NVLD Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All

**P0498-NVLD CANISTER VENT VALVE SOLENOID CIRCUIT LOW —**  
**Continued**

TEST	ACTION	APPLICABILITY
4	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0499-NVLD CANISTER VENT VALVE SOLENOID CIRCUIT HIGH****When Monitored and Set Condition:****P0499-NVLD CANISTER VENT VALVE SOLENOID CIRCUIT HIGH**

When Monitored: Engine running.

Set Condition: The PCM detects an open in the NVLD Canister vent solenoid circuits for more than 9.375 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

NVLD SOLENOID

(K106) NVLD SOL CONTROL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K106) NVLD SOL CONTROL CIRCUIT OPEN

(Z910) GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs before continuing.            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the NVLD Assembly harness connector.            Measure the resistance of the NVLD Solenoid coil.            Is the resistance between 7.5 to 8.5 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the NVLD Assembly.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P0499-NVLD CANISTER VENT VALVE SOLENOID CIRCUIT HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Disconnect the PCM harness connectors. Take this measurement with the Ignition in the off (lock) position and in the Ignition on, engine off position. Measure the voltage on the (K106) NVLD Sol Control circuit in the NVLD Assembly harness connector. Is the voltage above 1.0 volt?</p> <p>Yes → Repair the short to voltage in the (K106) NVLD Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K106) NVLD Sol Control circuit from the NVLD Assembly harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K106) NVLD Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between the (Z910) Ground circuit and ground. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (Z910) Ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:****P0501-VEHICLE SPEED SIGNAL NO.1 PERFORMANCE****P0503-VEHICLE SPEED SIGNAL NO.1 ERRATIC**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P0501-VEHICLE SPEED SIGNAL NO.1 PERFORMANCE**.

**When Monitored and Set Condition:****P0501-VEHICLE SPEED SIGNAL NO.1 PERFORMANCE**

**When Monitored:** With the engine running, transmission not in park or neutral, brakes not applied, and engine rpm greater than 1500.

**Set Condition:** This code will set if no vehicle speed signal is received from the ABS/RWAL Module for more than 11 seconds for 2 consecutive trips. Two Trip Fault. Three good trips to turn off the MIL.

**P0503-VEHICLE SPEED SIGNAL NO.1 ERRATIC**

**When Monitored:** Ignition on and battery voltage greater than 10 volts. Transmission in Drive or reverse.

**Set Condition:** Vehicle speed signal is erratic during road load conditions. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(B22) VEHICLE SPEED NO.1 SIGNAL CIRCUIT SHORTED TO VOLTAGE

(B22) VEHICLE SPEED NO.1 SIGNAL CIRCUIT OPEN

(B22) VEHICLE SPEED NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. <b>NOTE: Check the ABS Module for active DTCs. Any VSS DTCs in the ABS Module must be properly diagnosed before continuing.</b> With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0501-VEHICLE SPEED SIGNAL NO.1 PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.                      Disconnect the CAB Module harness connector.                      Disconnect the PCM harness connectors.                      Ignition on, engine not running.                      Measure the voltage of the (B22) Vehicle Speed No.1 Signal circuit at the CAB Module harness connector.                      Is the voltage above 6.0 volts?</p> <p>Yes → Repair the short to voltage in the (B22) Vehicle Speed No.1 Signal circuit.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>                      Measure the resistance of the (B22) Vehicle Speed No.1 Signal circuit from the CAB Module harness connector to the appropriate terminal of special tool #8815.                      Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (B22) Vehicle Speed No.1 Signal circuit.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the resistance between ground and the (B22) Vehicle Speed No.1 Signal circuit in the CAB Module harness connector.                      Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (B22) Vehicle Speed No.1 Signal circuit.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>                      Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.                      If there is no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0506-IDLE SPEED PERFORMANCE LOWER THAN EXPECTED****When Monitored and Set Condition:****P0506-IDLE SPEED PERFORMANCE LOWER THAN EXPECTED**

**When Monitored:** With the engine running at idle, MAF <250 mg/tdc, air temp >-17.8°C (0°F) and <-7°C (19.4°F) enable after coolant temp >70°C (158°F) or air temp >-7°C (19.4°F), coolant temp >-7°C (19.4°F) <130°C (266°F), canister purge <100% duty cycle, and no VSS, MAF/MAP, ECT, TPS, ETC, CRK Sensor DTCs nor any fuel system or injector DTCs.

**Set Condition:** Engine speed is 100 RPM or more below idle speed for 7 seconds. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO  
AIR INDUCTION SYSTEM  
THROTTLE BODY OPERATION  
PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If any other DTCs are present, they must be diagnosed and repaired before continuing this test.</b></p> <p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Check for any related TSBs or control module updates before continuing. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Inspect the Air Induction System for the following problems. Restrictions: Dirty Air Cleaner, Foreign material trap in the air intake tube, etc. Leaks: Air Intake tube connection, Air Cleaner housing, etc. Were any problems found?</p> <p>Yes → Repair or replace as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

## P0506-IDLE SPEED PERFORMANCE LOWER THAN EXPECTED — Continued

TEST	ACTION	APPLICABILITY
3	<p>Inspect the throttle body for carbon build up, other restrictions, and a bent throttle plate using a straight edge.</p> <p>If the throttle plate does not close entirely it may be bent and needs to be replaced. Verify that the throttle cable between the Accelerator Pedal and APPS is not binding.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>While the vehicle is running, lightly tap on ETC Motor, with your hand, and listen for idle to raise.</p> <p>Were any problems found?</p> <p>Yes → Repair or replace as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P0507-IDLE SPEED PERFORMANCE HIGHER THAN EXPECTED****When Monitored and Set Condition:****P0507-IDLE SPEED PERFORMANCE HIGHER THAN EXPECTED**

**When Monitored:** With the engine running at idle, MAF <250 mg/tdc, air temp >-17.8°C (0°F) and <-7°C (19.4°F) enable after coolant temp >70°C (158°F) or air temp >-7°C (19.4°F), coolant temp >-7°C (19.4°F) <130°C (266°F), canister purge <100% duty cycle, and no VSS, MAF/MAP, ECT, TPS, ETC, CRK Sensor DTCs nor any fuel system or injector DTCs.

**Set Condition:** Engine speed is 200 RPM or more above idle speed for 7 seconds. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO  
 AIR INDUCTION SYSTEM  
 VACUUM LEAKS  
 THROTTLE BODY OPERATION  
 PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If any other DTCs are present, they must be diagnosed and repaired before continuing this test.</b></p> <p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Check for any related TSBs or control module updates before continuing.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Inspect the Air Induction System for the following problems.            Restrictions: Dirty Air Cleaner, Foreign material trap in the air intake tube, etc.            Leaks: Air Intake tube connection, Air Cleaner housing, etc.            Were any problems found?</p> <p>Yes → Repair or replace as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P0507-IDLE SPEED PERFORMANCE HIGHER THAN EXPECTED —**  
**Continued**

TEST	ACTION	APPLICABILITY
3	<p>Start the engine.            Inspect the vehicle for external vacuum leaks.            Inspect the engine for internal leaks.            Were any vacuum leaks found?</p> <p>Yes → Repair the vacuum leak as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Inspect the throttle body for carbon build up, other restrictions, and a bent throttle plate using a straight edge.            If the throttle plate does not close entirely it may be bent and needs to be replaced.            Verify that the throttle cable between the Accelerator Pedal and APPS is not binding.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>            While the vehicle is running, lightly tap on ETC Motor, with your hand, and listen for idle to raise.            Were any problems found?</p> <p>Yes → Repair or replace as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0508-IAC VALVE SIGNAL CIRCUIT LOW****When Monitored and Set Condition:****P0508-IAC VALVE SIGNAL CIRCUIT LOW**

**When Monitored:** Engine running. Battery voltage greater than 10.4 volts. ASD sense switch is ON. IAC motor operating.

**Set Condition:** The PCM senses a short to ground or battery voltage on the Linear Idle Air Control (LIAC) control circuit for more than 3.2 seconds while the IAC motor is active. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

IAC MOTOR OPERATION

IAC MOTOR

(K61) IAC CONTROL CIRCUIT SHORTED TO GROUND

(K961) IAC RETURN CIRCUIT OPEN

(K961) IAC RETURN CIRCUIT SHORTED TO GROUND

(K61) IAC CONTROL CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If the engine will not idle, maintain an engine speed between 800 and 1500 RPM.</b>            Start the engine.            Allow the engine to idle.            With the DRBIII®, read the IAC Current.            Is the IAC Current below 146 mA?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the IAC Motor harness connector.            Remove the IAC Motor.  <b>NOTE: Inspect the IAC air passages for restrictions and damage to the IAC valve.</b>            Measure the resistance across the IAC Motor pin terminals (component).            Is the resistance 9.7 +/- 1.0 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the IAC Motor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0508-IAC VALVE SIGNAL CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K961) IAC Return circuit from the IAC Motor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (K961) IAC Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the resistance between ground and the (K961) IAC Return circuit at the IAC Motor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K961) IAC Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K61) IAC Control circuit from the IAC Motor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K61) IAC Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Measure the resistance between ground and the (K61) IAC Control circuit at the IAC Motor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K61) IAC Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0509-IAC VALVE SIGNAL CIRCUIT HIGH****When Monitored and Set Condition:****P0509-IAC VALVE SIGNAL CIRCUIT HIGH**

**When Monitored:** Engine running. Battery voltage greater than 10.4 volts. ASD sense switch is ON. IAC motor operating.

**Set Condition:** The PCM senses a short to ground or battery voltage on the Linear Idle Air Control (LIAC) control circuit for more than 3.2 seconds while the IAC motor is active. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

IAC MOTOR OPERATION

IAC MOTOR

(K961) IAC RETURN CIRCUIT SHORTED TO VOLTAGE

(K61) IAC CONTROL CIRCUIT SHORTED TO VOLTAGE

(K61) IAC CONTROL CIRCUIT SHORTED TO (K961) IAC RETURN CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If the engine will not idle, maintain an engine speed between 800 and 1500 RPM.</b></p> <p>Start the engine.  Allow the engine to idle.  With the DRBIII®, read the IAC Current.  Is the IAC Current above 999 mA?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITON Symptom (Diagnostic Procedure).  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.  Disconnect the IAC Motor harness connector.  With the DRBIII®, monitor the IAC Current.  Ignition on, engine not running.  Does the DRBIII® display IAC Current at 0mA?</p> <p>Yes → Replace the IAC Motor.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

# P0509-IAC VALVE SIGNAL CIRCUIT HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Ignition on, engine not running.  Measure the voltage on the (K961) IAC Return circuit at the IAC Motor harness connector.  Is the voltage above 0.5 of a volt?</p> <p>Yes → Repair the short to voltage in the (K961) IAC Return circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  Measure the voltage on the (K61) IAC Control circuit at the IAC Motor harness connector.  Is the voltage above 0.5 of a volt?</p> <p>Yes → Repair the short to voltage in the (K61) IAC Control circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance across the (K961) IAC Return circuit and the (K61) IAC Control circuit at the IAC Motor harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K961) IAC Return circuit and the (K61) IAC Control circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair  Replace and program the Powertrain Control Module per Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:**  
**P0513-INVALID SKIM KEY**

**When Monitored and Set Condition:**

**P0513-INVALID SKIM KEY**

When Monitored: Ignition on.

Set Condition: The PCM detects an invalid SKIM key. One Trip Fault.

**POSSIBLE CAUSES**

INCORRECT VIN IN PCM  
 NO COMMUNICATION WITH SKIM  
 NO VIN PROGRAMMED IN THE PCM  
 SKIM TROUBLE CODES SET  
 IGNITION KEY  
 PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the PCM DTCs. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2 No → Go To 7	All
2	With the DRBIII®, attempt to communicate with the SKIM. Can the DRBIII® communicate with the SKIM?  Yes → Go To 3 No → Refer to symptom BUS +/- SIGNAL OPEN FROM SKIM in the COMMUNICATION category. Perform SKIS VERIFICATION.	All
3	With the DRBIII®, check for SKIM DTCs. Are any DTCs present in the SKIM?  Yes → Refer to BODY information for the related symptom(s). Perform SKIS VERIFICATION.  No → Go To 4	All
4	With the DRBIII®, display the VIN that is programmed in the PCM. Has a VIN been programmed into the PCM?  Yes → Go To 5 No → Program the correct VIN into the PCM and retest. Perform SKIS VERIFICATION.	All

**P0513-INVALID SKIM KEY — Continued**

TEST	ACTION	APPLICABILITY
5	<p>With the DRBIII®, display the VIN that is programmed in the PCM. Was the correct VIN programmed into the PCM?</p> <p>Yes → Go To 6</p> <p>No → Replace and program the Powertrain Control Module per Service Information. Perform SKIS VERIFICATION.</p>	All
6	<p>Turn the ignition off. Replace and program the Sentry Key Immobilizer Module per Service Information. Ignition on, engine not running. With the DRBIII®, erase all SKIM and PCM DTCs. Attempt to start and idle the engine. With the DRBIII®, read the PCM DTCs. Does the DRBIII® display this code?</p> <p>Yes → NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary. Replace and program the Powertrain Control Module per Service Information. Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All
7	<p><b>NOTE: You must obtain the SKIM pin number.</b> <b>NOTE: This DTC could have been set if the SKIM harness connector was disconnected, or if the SKIM was replaced recently.</b> <b>NOTE: All keys that the customer uses for this vehicle must be tested to verify they are operating properly.</b></p> <p>Ignition on, engine not running. Verify the correct VIN is programmed into the PCM and SKIM. Turn the ignition off. With the next customer key turn the ignition key on and crank the engine to start. With the DRBIII®, read the PCM DTCs. Look for P0513. Is the Good Trip Counter for DTC P0513 displayed and equal to 0?</p> <p>Yes → Replace the Ignition Key. Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p> <p><b>NOTE: If this DTC cannot be reset, it could have been an actual theft attempt.</b></p>	All



**Symptom:****P0516-BATTERY TEMPERATURE SENSOR LOW****When Monitored and Set Condition:****P0516-BATTERY TEMPERATURE SENSOR LOW**

When Monitored: Ignition on and battery voltage greater than 10.4 volts.

Set Condition: Battery temperature sensor voltage below 0.039 of a volt for 4.8 seconds.  
One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

BATTERY TEMP VOLTS BELOW 0.5 VOLT

BATTERY TEMPERATURE SENSOR

(K25) BATT TEMP SIGNAL CIRCUIT SHORTED TO GROUND

(K25) BATT TEMP SIGNAL CIRCUIT SHORTED TO (K900) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII® record all DTCs and the related Freeze Frame data. With DRBIII®, monitor Battery Temperature Sensor volts. Is the voltage below 0.5 of a volt?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
2	Ignition on, engine not running. With the DRBIII® in sensors, read the Battery Temp Sensor Voltage value. Disconnect the Battery Temperature Sensor harness connector. Did the Battery Temperature Voltage value change from below 1.0 volt to above 4.5 volts?  Yes → Replace the Battery Temperature Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 3	All
3	Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the (K25) Batt Temp Signal circuit at the Battery Temp Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K25) Batt Temp Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 4	All

**P0516-BATTERY TEMPERATURE SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Measure the resistance between the (K25) Batt Temp Signal circuit and the (K900) Sensor ground circuit at the Battery Temp Sensor harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground and the (K125) Batt Temp Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****P0517-BATTERY TEMPERATURE SENSOR HIGH****When Monitored and Set Condition:****P0517-BATTERY TEMPERATURE SENSOR HIGH**

When Monitored: Ignition on and battery voltage greater than 10.4 volts.

Set Condition: Battery temperature voltage above 4.94 volts for 4.8 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

BATTERY TEMP SENSOR VOLTAGE ABOVE 4.8 VOLTS

BATTERY TEMPERATURE SENSOR

(K25) BATT TEMP SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K25) BATT TEMP SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. Record all DTCs and the related Freeze Frame data. With the DRBIII®, monitor the Battery Temperature Sensor voltage. Is the voltage above 4.8 volts?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
2	Turn the ignition off. Disconnect the Battery Temperature Sensor harness connector. Ignition on, engine not running. With the DRBIII® in sensors, read the Battery Temp Voltage value. Connect a jumper wire between the (K25) Batt Temp Signal circuit and the (K900) Sensor ground circuit at the Battery Temp Sensor harness connector. Did the Battery Temp voltage value change from greater than 4.5 volts to less than 1.0 volt?  Yes → Replace the Battery Temperature Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

# P0517-BATTERY TEMPERATURE SENSOR HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Ignition on, engine not running.  Using a 12-volt test light connected to ground, probe the (K25) Batt Temp Signal circuit at the Battery Temp Sensor harness connector.  Does the test light illuminate?</p> <p>Yes → Repair the short to battery voltage in the (K25) Batt Temp Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the (K25) Batt Temp Signal circuit from the Battery Temp Sensor harness connector to the appropriate terminal of special tool #8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K25) Batt Temp Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance in the (K900) Sensor ground circuit from the Sensor connector to the appropriate terminal of special tool #8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K900) Sensor ground circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****P0522-OIL PRESSURE CIRCUIT LOW****When Monitored and Set Condition:****P0522-OIL PRESSURE CIRCUIT LOW**

When Monitored: With the ignition key on and battery voltage above 10.4 volts.

Set Condition: The oil pressure sensor voltage at PCM goes below 0.1 of a volt for 0.5 of a second. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

OIL PRESSURE SWITCH

(G6) OIL PRESSURE SIGNAL CIRCUIT OPEN

(G6) OIL PRESSURE SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(G6) OIL PRESSURE SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
2	Turn the ignition off. Disconnect the Oil Pressure Switch harness connector. Ignition on, engine not running. Connect a jumper wire to the (G60) Oil Pressure Signal circuit in the Sensor harness connector. With the DRBIII® monitor the Oil Pressure Switch state. Touch the other end of the jumper wire to a known good Ground several times. Did the Oil Pressure Switch state change from High to Low?  Yes → Replace the Oil Pressure Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

**P0522-OIL PRESSURE CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, probe the (G6) Oil Pressure Signal circuit at the Switch harness connector.            Does the test light illuminate?</p> <p>Yes → Repair the short to battery voltage on the (G6) Oil Pressure Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All
4	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (G6) Oil Pressure Signal circuit from the Oil Pressure Switch harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (G6) Oil Pressure Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p>Measure the resistance between a known good ground and the (G6) Oil Pressure Signal circuit at the Switch connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (G6) Oil Pressure Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****P0532-A/C PRESSURE SENSOR LOW****When Monitored and Set Condition:****P0532-A/C PRESSURE SENSOR LOW**

When Monitored: Ignition on and A/C is learned.

Set Condition: The A/C pressure sensor signal voltage at the PCM goes below 0.59 volts for 2.6 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

A/C PRESSURE SENSOR VOLTAGE BELOW 0.6 VOLTS

(F855) 5-VOLT SUPPLY CIRCUIT OPEN

(F855) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

A/C PRESSURE SENSOR

(C918) A/C PRESSURE SIGNAL CIRCUIT SHORTED TO GROUND

(C918) A/C PRESSURE SIGNAL CIRCUIT SHORTED TO (K900) SENSOR GROUND CIRCUIT  
PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the A/C refrigerant System is properly charged per the Service Information.</b></p> <p>Start the engine. With the DRBIII®, read the A/C Pressure Sensor voltage. Is the voltage below 0.6 of a volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (F855) 5-volt Supply circuit in the A/C Pressure Sensor harness connector. Is the voltage between 4.5 to 5.2 volts?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All
3	<p>With the DRBIII®, monitor the A/C Pressure Sensor voltage. Is the voltage above 0.6 of a volt?</p> <p>Yes → Replace the A/C Pressure Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All

**P0532-A/C PRESSURE SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (C918) A/C Pressure Signal circuit at the A/C Pressure Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (C918) A/C Pressure Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (C918) A/C Pressure Signal circuit and the (K900) Sensor ground circuit at the A/C Pressure Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K900) Sensor ground circuit and the (C918) A/C Pressure Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 8</p>	All
6	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (F855) 5-volt Supply circuit from the A/C Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
7	<p>Measure the resistance between ground and the (F855) 5-volt Supply circuit in the A/C Pressure Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 8</p>	All
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All



**Symptom:**  
**P0533-A/C PRESSURE SENSOR HIGH**

**When Monitored and Set Condition:**

**P0533-A/C PRESSURE SENSOR HIGH**

When Monitored: Ignition on and A/C is learned.

Set Condition: The A/C pressure sensor signal at the PCM goes above 4.92 volts for 2.6 seconds. One trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

A/C PRESSURE SENSOR VOLTAGE ABOVE 4.6 VOLTS

A/C PRESSURE SENSOR

(C918) A/C PRESSURE SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(C918) A/C PRESSURE SIGNAL CIRCUIT OPEN

(C918) A/C PRESSURE SIGNAL CIRCUIT SHORTED TO (F855) 5-VOLT SUPPLY

(K900) SENSOR GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the A/C refrigerant System is properly charged per Service Information.</b></p> <p>Start the engine.            With the DRBIII®, read the A/C Pressure Sensor voltage.            Is the voltage above 4.6 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
2	<p>Turn the ignition off.            Disconnect the A/C Pressure Sensor harness connector.            Connect a jumper wire between the (C918) A/C Pressure Signal circuit and the (K900) Sensor ground circuit at the Sensor harness connector.            Ignition on, engine not running.            With the DRBIII®, monitor the A/C Pressure Sensor voltage.            Is the voltage below 1.0 volt?</p> <p>Yes → Replace the A/C Pressure Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 3</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All

**P0533-A/C PRESSURE SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, probe the (C918) A/C Pressure Signal circuit at the A/C Pressure Sensor harness connector.            Does the test light illuminate?</p> <p>Yes → Repair the short to battery voltage in the (C918) A/C Pressure Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (C918) A/C Pressure Signal circuit from the A/C Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (C918) A/C Pressure Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p>Measure the resistance between the (C918) A/C Pressure Signal circuit and the (F855) 5-volt Supply circuit in the A/C Pressure Sensor harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (F855) 5-volt Supply circuit and the (C918) A/C Pressure Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 6</p>	All
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the A/C Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K900) Sensor ground circuit            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:****P0551-POWER STEERING SWITCH PERFORMANCE****When Monitored and Set Condition:****P0551-POWER STEERING SWITCH PERFORMANCE**

When Monitored: With the ignition key on and engine running.

Set Condition: With the vehicle above 40 mph for over 30 seconds, the power steering pressure switch remains open. Two Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

POWER STEERING PRESSURE SWITCH

(K66) P/S SWITCH SIGNAL CIRCUIT OPEN

(K66) P/S SWITCH SIGNAL CIRCUIT SHORTED TO GROUND

(Z988) GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
2	Turn the ignition off. Disconnect the Power Steering Pressure Switch harness connector. Ignition on, engine not running. Connect a jumper wire to the (K66) P/S Switch Signal circuit at harness connector. Using the DRBIII®, while monitoring the Power Steering Pressure Switch. Touch the other end of the jumper wire to the (Z988) Ground circuit at the Power Steering Pressure Switch harness connector several times. Did the Power Steering Pressure Switch status change from High to Low?  Yes → Replace the Power Steering Pressure Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 3  <b>NOTE: Remove the jumper wire before continuing.</b>	All

**P0551-POWER STEERING SWITCH PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure resistance of (K66) P/S Switch Signal circuit from the Power Steering Pressure Switch harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (K66) P/S Switch Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
4	<p>Measure the resistance between ground and the (K66) P/S Switch Signal circuit at the Switch connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K66) P/S Switch Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between Ground and the (Z988) Ground circuit at the Power Steering Pressure Switch connector. Is the resistance below 100 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (Z988) Ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**Symptom:**  
**P0562-BATTERY VOLTAGE LOW**

**When Monitored and Set Condition:**

**P0562-BATTERY VOLTAGE LOW**

When Monitored: The engine running. The engine speed greater than 1000 RPM.

Set Condition: Battery voltage is 1 volt less than desired voltage for more than 5.6 seconds One Trip Fault. ETC light is flashing. Three good trips to clear the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

RESISTANCE IN THE BATTERY POSITIVE CIRCUIT

RESISTANCE IN THE GENERATOR GROUND

GENERATOR OPERATION

(K20) GEN FIELD CONTROL CIRCUIT OPEN

(K20) GEN FIELD CONTROL CIRCUIT SHORTED TO GROUND

GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the Battery is in good condition. Using the Midtronics Battery Tester, test the Battery before continuing.</b></p> <p><b>NOTE: Inspect the vehicle for after market accessories that may exceed the Generator System output.</b></p> <p>Turn the ignition off.</p> <p><b>NOTE: Ensure the generator drive belt is in good operating condition.</b></p> <p><b>NOTE: Inspect the fuses in the IPM. If an open fuse is found, use the wire diagram/schematic as a guide, inspect the wiring and connectors for damage.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

**P0562-BATTERY VOLTAGE LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p><b>NOTE: Ensure all wires are clear of the engine's moving parts.</b></p> <p>Measure the voltage between the Generator B+ Terminal and the Battery+ Post. Start the engine. Is the voltage above 0.4 of a volt?</p> <p>Yes → Repair the excessive resistance in the Battery Positive circuit between the Generator and Battery. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 3</p>	All
3	<p>Ignition on, engine not running.</p> <p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine. Allow the engine to reach normal operating temperature.</p> <p><b>NOTE: Ensure all wires are clear of the engine's moving parts.</b></p> <p>Measure the voltage between the Generator case and Battery ground post. Is the voltage above 0.1 of a volt?</p> <p>Yes → Repair excessive resistance in the Generator Ground between the Generator Case and Battery ground side. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Disconnect the Generator Field harness connector. Using a 12-volt test light, jump it across the Generator Field harness connector. Ignition on, engine not running. With the DRBIII®, actuate the Gen Field Control circuit. Does the test light illuminate brightly and flash on and off?</p> <p>Yes → Replace the Generator. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off. Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K20) Gen Field Control circuit from the Generator harness connector to the appropriate terminal of the special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K20) Gen Field Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

**P0562-BATTERY VOLTAGE LOW — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Measure the resistance between ground and the (K20) Gen Field Control circuit in the Gen Field harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K20) Gen Field control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 7</p>	All
7	<p>Using a 12-volt test light connected to 12-volts, probe the Ground circuit in the Generator Field harness connector. Does the test light illuminate brightly?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the Ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

## Symptom: P0563-BATTERY VOLTAGE HIGH

### When Monitored and Set Condition:

#### P0563-BATTERY VOLTAGE HIGH

When Monitored: With the ignition on. Engine RPM greater than 1000 RPM. With no other charging system codes set.

Set Condition: Battery voltage is 1 volt greater than desired voltage. Battery voltage greater than 15.75 volts. One Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

GENERATOR OPERATION

(K20) GEN FIELD CONTROL CIRCUIT SHORTED TO VOLTAGE

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the Battery is in good condition. Using the Midtronics Battery Tester, test the Battery before continuing.</b></p> <p><b>NOTE: Inspect the vehicle for after market accessories that may exceed the Generator System output.</b></p> <p>Turn the ignition off.</p> <p><b>NOTE: Ensure the generator drive belt is in good operating condition.</b></p> <p><b>NOTE: Inspect the fuses in the IPM. If a fuse is open use the wire diagram/schematic as a guide, inspect the wiring and connectors for damage.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
2	<p>Turn the ignition off.</p> <p>Disconnect the Generator Field harness connector.</p> <p>Using a 12-volt test light, jump across the Generator Field harness connector.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the Generator Field Driver.</p> <p>Does the test light illuminate brightly and flash on and off?</p> <p>Yes → Replace the Generator.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 3</p>	All



**P0563-BATTERY VOLTAGE HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the (K20) Gen Field Control circuit at the Generator Field harness connector.            Is the voltage above 1.0 volt?</p> <p>Yes → Repair the short to voltage in the (K20) Gen Field Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 4</p> <p><b>NOTE: Turn the ignition off before continuing.</b></p>	All
4	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

**Symptom:**

**P0571-BRAKE SWITCH NO.1 PERFORMANCE (5.7L)**

**When Monitored and Set Condition:**

**P0571-BRAKE SWITCH NO.1 PERFORMANCE (5.7L)**

When Monitored: Ignition on.

Set Condition: If the output of Brake Switch #1 to the PCM looks like it is not applied, while Brake Switch #2 is applied the fault will mature in 60ms. One Trip Fault.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(B29) BRAKE SWITCH NO.1 SIGNAL SHORTED TO GROUND

(V32) BRAKE SWITCH NO.2 SIGNAL CIRCUIT OPEN

(V32) BRAKE SWITCH NO.2 SIGNAL SHORTED TO GROUND

GROUND CIRCUIT OPEN

BRAKE LAMP SWITCH OPERATION

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the Brake Switch is properly adjusted before continuing.</b>  <b>NOTE: Ensure the Brake Switch is properly wired, such as Brake Switch No.1 and Brake Switch No.2 are not switched at the harness connector.</b></p> <p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
2	<p>Turn the ignition off.            Disconnect the Brake Lamp Switch harness connector.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (B29) Brake Switch No.1 Signal circuit at the Brake Lamp Switch harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (B29) Brake Switch No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 3</p>	MAGNUM 5.7L SMPI V8

**P0571-BRAKE SWITCH NO.1 PERFORMANCE (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
3	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V32) Brake Switch No.2 Signal circuit from the Brake Lamp Switch harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (V32) Brake Switch No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
4	<p>Measure the resistance between ground and the (V32) Brake Switch No.2 Signal circuit at the Brake Lamp Switch harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V32) Brake Switch No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	MAGNUM 5.7L SMPI V8
5	<p>Measure the resistance between ground and the Ground circuit at the Brake Lamp Switch harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the Ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
6	<p>Measure the resistance between the Ground circuit terminal and the (B29) Brake Switch No.1 Signal terminal in the Brake Lamp Switch. Measure the resistance between the Fused Ignition Switch circuit terminal and the (V32) Brake Switch No.2 Signal terminal in the Brake Lamp Switch. Apply and release the brake pedal while monitoring the ohmmeter. Does the resistance change from below 5.0 ohms to an open circuit?</p> <p>Yes → Go To 7</p> <p>No → Replace the Brake Lamp Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**Symptom:**

**P0572-BRAKE SWITCH NO.1 CIRCUIT LOW**

**When Monitored and Set Condition:**

**P0572-BRAKE SWITCH NO.1 CIRCUIT LOW**

When Monitored: Ignition on.

Set Condition: When the PCM recognizes Brake Switch #1 is mechanically stuck in the low/on position. One Trip Fault. Three Global Good Trips to Clear.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

BRAKE LAMP SWITCH OPERATION

(B29) BRAKE SWITCH NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Verify battery voltage is greater than 10 volts.</b>                      With the DRBIII®, read DTCs and record the related Freeze Frame data.                      Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV
2	<p>Turn the ignition off.                      Remove the Brake Lamp Switch and disconnect the harness connector.                      Measure the resistance between the (Z429) Ground circuit terminal and the (B29) Brake Switch No.1 Signal terminal at the Brake Lamp Switch.                      Apply and release the brake pedal plunger while monitoring the ohmmeter.                      Does the resistance change from below 5.0 ohms to an open circuit?</p> <p>Yes → Go To 3</p> <p>No → Replace the Brake Lamp Switch.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV
3	<p>Turn the ignition off.                      Disconnect the PCM harness connectors.                      Measure the resistance between ground and the (B29) Brake Switch No.1 Signal circuit in the Brake Lamp Switch harness connector.                      Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (B29) Brake Switch No.1 Signal circuit.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV

**P0572-BRAKE SWITCH NO.1 CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV

## Symptom:

### **P0572-BRAKE SWITCH NO.1 CIRCUIT LOW (5.7L)**

## When Monitored and Set Condition:

### **P0572-BRAKE SWITCH NO.1 CIRCUIT LOW (5.7L)**

When Monitored: Ignition on.

Set Condition: When the PCM recognizes Brake Switch #1 is mechanically stuck in the low/on position. One Trip Fault. Three Global Good Trips to Clear.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

BRAKE LAMP SWITCH OPERATION

(B29) BRAKE SWITCH NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

(V32) BRAKE SWITCH NO.2 SIGNAL CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Verify battery voltage is greater than 10 volts.</b>  Record Freeze Frame Data that was set by the related DTC before continuing.  With the DRBIII®, read DTCs and record the related Freeze Frame data.  Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
2	<p>Turn the ignition off.  Remove the Brake Lamp Switch and disconnect the harness connector.  Measure the resistance between the Ground circuit terminal and the (B29) Brake Switch No.1 Signal terminal in the Brake Lamp Switch.  Measure the resistance between the Fused Ignition Switch circuit terminal and the (V32) Brake Switch No.2 Signal terminal in the Brake Lamp Switch.  Apply and release the brake pedal plunger while monitoring the ohmmeter.  Does the resistance change from below 5.0 ohms to an open circuit?</p> <p>Yes → Go To 3</p> <p>No → Replace the Brake Lamp Switch.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**P0572-BRAKE SWITCH NO.1 CIRCUIT LOW (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Measure the resistance between ground and the (B29) Brake Switch No.1 Signal circuit in the Brake Lamp Switch harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (B29) Brake Switch No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V32) Brake Switch No.2 Signal circuit from the Brake Lamp Switch harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (V32) Brake Switch No.2 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

## Symptom:

### P0573-BRAKE SWITCH NO.1 CIRCUIT HIGH

#### When Monitored and Set Condition:

#### P0573-BRAKE SWITCH NO.1 CIRCUIT HIGH

When Monitored: Ignition on.

Set Condition: When the PCM recognizes Brake Switch #1 is stuck in the high/off position. One Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO  
BRAKE LAMP SWITCH OPERATION  
(B29) BRAKE SWITCH NO.1 SIGNAL CIRCUIT OPEN  
(Z429) GROUND CIRCUIT OPEN  
PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	<p>MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV</p>
2	<p>Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Measure the resistance between the (Z429) Ground circuit terminal and the (B29) Brake Switch No.1 Signal circuit terminal in the Brake Lamp Switch. Apply and release the brake pedal while monitoring the ohmmeter. Does the resistance change from below 5.0 ohms to an open circuit?</p> <p>Yes → Go To 3</p> <p>No → Replace the Brake Lamp Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	<p>MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV</p>



**P0573-BRAKE SWITCH NO.1 CIRCUIT HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (B29) Brake Switch No.1 Signal circuit from the Brake Lamp Switch harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (B29) Brake Switch No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV
4	<p>Measure the resistance between the (Z429) Ground circuit and ground at the Brake Lamp Switch harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (Z429) Ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 3.7L V6 or ENG - 4.7L MAGNUM V8 or MAGNUM 4.7L V8 FFV

## Symptom:

### **P0573-BRAKE SWITCH NO.1 CIRCUIT HIGH (5.7L)**

## When Monitored and Set Condition:

### **P0573-BRAKE SWITCH NO.1 CIRCUIT HIGH (5.7L)**

When Monitored: Ignition on.

Set Condition: When the PCM recognizes Brake Switch #1 is stuck in the high/off position. One Trip Fault. Three good trips to turn off the MIL.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

BRAKE LAMP SWITCH OPERATION

(B29) BRAKE SWITCH NO.1 SIGNAL CIRCUIT OPEN

(V32) BRAKE SWITCH NO.2 SIGNAL CIRCUIT SHORTED TO GROUND

GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
2	<p>Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Measure the resistance between the Ground circuit terminal and the (B29) Brake Switch No.1 Signal circuit terminal in the Brake Lamp Switch. Apply and release the brake pedal while monitoring the ohmmeter. Does the resistance change from below 5.0 ohms to an open circuit?</p> <p>Yes → Go To 3</p> <p>No → Replace the Brake Lamp Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**P0573-BRAKE SWITCH NO.1 CIRCUIT HIGH (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (B29) Brake Switch No.1 Signal circuit from the Brake Lamp Switch harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (B29) Brake Switch No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
4	<p>Measure the resistance between ground and the (V32) Brake Switch #2 Signal circuit in the Brake Lamp Switch harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V32) Brake Switch No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	MAGNUM 5.7L SMPI V8
5	<p>Measure the resistance between the Ground circuit and ground at the Brake Lamp Switch harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the Ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**Symptom:**

**P0579-SPEED CONTROL SWITCH NO.1 PERFORMANCE (5.7L)**

**When Monitored and Set Condition:**

**P0579-SPEED CONTROL SWITCH NO.1 PERFORMANCE (5.7L)**

When Monitored: With the ignition key on.

Set Condition: Cruise switch voltage output is not out of range but it does not equal any of the values for any of the button positions.

**POSSIBLE CAUSES**

SPEED CONTROL SWITCH STATUS  
 SPEED CONTROL SWITCHES  
 (V37) S/C SWITCH NO.1 SIGNAL CIRCUIT SHORTED TO VOLTAGE  
 CLOCKS/SPRING  
 (V37) S/C SWITCH NO.1 SIGNAL CIRCUIT OPEN  
 (V937) SWITCH RETURN CIRCUIT OPEN  
 (V37) S/C SWITCH NO.1 SIGNAL CIRCUIT SHORTED TO GROUND  
 (V37) S/C SWITCH NO.1 SIGNAL CIRCUIT SHORTED TO (V937) SWITCH RETURN  
 PCM

TEST	ACTION	APPLICABILITY
1	<p>Start the engine.                      With the DRBIII®, monitor each which function for the Speed Control Switches.                      Press and release each Speed Control Button.</p> <ul style="list-style-type: none"> <li>- Resume/Accel</li> <li>- Cancel</li> <li>- Decel (Coast)</li> <li>- On/Off</li> <li>- Set</li> </ul> <p>Does each switch function change status when pressing and then depressing each switch?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 2</p>	MAGNUM 5.7L SMPI V8

# **P0579-SPEED CONTROL SWITCH NO.1 PERFORMANCE (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.</p> <p>Remove and disconnect the Speed Control Switches from the steering wheel per Service Information.</p> <p>Measure the resistance across each Speed Control Switch.</p> <p>Monitor the ohmmeter while pressing each function button on each switch.</p> <p>The following resistance specs are taken between terminals (V38) S/C Switch No.2 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position.</p> <p>On/Off - 8.87 kohms</p> <p>Set - 0.825 kohms</p> <p>Coast - 0.47 kohms</p> <p>Cancel - 3.92 kohms</p> <p>Resume/Accel - 1.87 kohms</p> <p>The following resistance specs are taken between terminals (V37) S/C Switch No.1 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position</p> <p>On/Off - 0.47 kohms</p> <p>Set - 5.49 kohms</p> <p>Coast - 2.94 kohms</p> <p>Cancel - 1.24 kohms</p> <p>Resume/Accel - 15.4 kohms</p> <p>Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 3</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
3	<p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (V37) S/C Switch No.1 Signal circuit at the Speed Control harness connector.</p> <p>Is the voltage above 5.0 volts?</p> <p>Yes → Repair the short to voltage in the (V37) S/C Switch No.1 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p>Turn the ignition off.</p> <p>Disconnect the upper and lower clockspring harness connectors per Service Information.</p> <p>Measure the resistance of the (V37) S/C Switch No.1 Signal circuit between the upper and lower clockspring harness connectors.</p> <p>Measure the resistance of the (V937) Switch Return circuit between the upper and lower clockspring harness connectors.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Replace the Clockspring per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p> <p><b>NOTE: Connect the Clockspring harness connectors per Service Information before continuing.</b></p>	MAGNUM 5.7L SMPI V8

# **P0579-SPEED CONTROL SWITCH NO.1 PERFORMANCE (5.7L) —** **Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V37) S/C Switch No.1 Signal circuit from the Speed Control harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms for both measurements?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (V37) S/C Switch No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
6	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V937) Switch Return circuit from the Speed Control harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms for both measurements?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (V937) Switch Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
7	<p>Measure the resistance between ground and the (V37) S/C Switch No.1 Signal circuit at the Speed Control harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V37) S/C Switch No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 8</p>	MAGNUM 5.7L SMPI V8
8	<p>Measure the resistance between the (V37) S/C Switch No.1 Signal circuit and the (V937) Switch Return circuit in the Speed Control harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (V37) S/C Switch No.1 Signal circuit and the (V937) Switch Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 9</p>	MAGNUM 5.7L SMPI V8
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**Symptom:****P0580-SPEED CONTROL SWITCH NO.1 LOW****When Monitored and Set Condition:****P0580-SPEED CONTROL SWITCH NO.1 LOW**

**When Monitored:** With the ignition key on. Battery voltage above 10.4 volts. Cruise is learned.

**Set Condition:** When Speed Control Switch No.1 voltage is less than 0.6078 of a volt for 18.4 seconds. One trip fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

SPEED CONTROL SWITCH VOLTAGE LOW  
 SPEED CONTROL ON/OFF SWITCH  
 SPEED CONTROL RESUME/ACCEL SWITCH  
 CLOCKSPRING  
 (V37) S/C SIGNAL CIRCUIT SHORTED TO GROUND  
 (V37) S/C SIGNAL CIRCUIT SHORTED TO (K900) SENSOR GROUND  
 PCM

TEST	ACTION	APPLICABILITY
1	<b>NOTE: Do not press any of the Speed Control Switch buttons.</b> Ignition on, engine not running. With the DRBIII®, read the Speed Control voltage. Is the Speed Control voltage below 1.0 volt?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
2	Ignition on, engine not running. With the DRBIII®, monitor the Speed Control Switch voltage. Disconnect the Speed Control On/Off Switch harness connector. Did the voltage change to above 4.7 volts?  Yes → Replace the Speed Control On/Off Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.  No → Go To 3	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
3	With the DRBIII®, monitor the Speed Control Switch voltage. Disconnect the Speed Control Resume/Accel Switch harness connector. Did the voltage change to above 4.7 volts?  Yes → Replace the Speed Control Resume/Accel Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.  No → Go To 4	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P0580-SPEED CONTROL SWITCH NO.1 LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.                      Disconnect the clockspring 6-way harness connector (instrument panel wiring side) per Service Information.                      Ignition on, engine not running.                      With the DRBIII® in Sensors, read the S/C Switch voltage.                      Did the S/C Switch volts change to 5.0 volts?</p> <p>Yes → Replace the Clockspring.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
5	<p>Turn the ignition off.                      Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>                      Measure the resistance between ground and the (V37) S/C Signal circuit at the Switch harness connector.                      Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V37) S/C Signal circuit.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 6</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
6	<p>Measure the resistance between the (K900) Sensor ground circuit and the (V37) S/C Signal circuit at the Speed Control Switch.                      Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (V37) S/C Signal circuit and the (K900) Sensor ground circuit.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
7	<p><b>NOTE: Before continuing, disconnect the PCM harness connector and check the related wiring terminals for corrosion, damage or terminal push out. Repair as necessary.</b>                      Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.                      If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6



**Symptom:****P0580-SPEED CONTROL SWITCH NO.1 LOW (5.7L)****When Monitored and Set Condition:****P0580-SPEED CONTROL SWITCH NO.1 LOW (5.7L)**

When Monitored: With the ignition key on.

Set Condition: Speed control switch input #1 is below the minimum acceptable voltage at the PCM. One trip fault.

**POSSIBLE CAUSES**

SPEED CONTROL SWITCH VOLTAGE LOW

SPEED CONTROL SWITCHES

SPEED CONTROL ON/OFF SWITCH

SPEED CONTROL RESUME/ACCEL SWITCH

CLOCKSPRING

(V37) S/C SWITCH NO.1 SIGNAL CIRCUIT SHORTED TO (V937) SWITCH RETURN

(V37) S/C SWITCH NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Do not press any of the Speed Control Switch buttons.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read the Speed Control voltage.</p> <p>Is the Speed Control voltage below 1.0 volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**P0580-SPEED CONTROL SWITCH NO.1 LOW (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.  Remove and disconnect the Speed Control Switches from the steering wheel per Service Information.  Measure the resistance across each Speed Control Switch.  Monitor the ohmmeter while pressing each function button on each switch.  The following resistance specs are taken between terminals (V38) S/C Switch #2 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position.  On/Off - 8.87 kohms  Set - 0.825 kohms  Coast - 0.47 kohms  Cancel - 3.92 kohms  Resume/Accel - 1.87 kohms  The following resistance specs are taken between terminals (V37) S/C Switch #1 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position  On/Off - 0.47 kohms  Set - 5.49 kohms  Coast - 2.94 kohms  Cancel - 1.24 kohms  Resume/Accel - 15.4 kohms  Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 3</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
3	<p>Connect the Resume/Accel Switch.  Ignition on, engine not running.  With the DRBIII®, monitor the Speed Control Switch voltage.  Disconnect the Speed Control On/Off Switch harness connector.  Did the voltage change to above 4.8 volts?</p> <p>Yes → Replace the Speed Control On/Off Switch.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p>With the DRBIII®, monitor the Speed Control Switch voltage.  Disconnect the Speed Control Resume/Accel Switch harness connector.  Did the voltage change to above 4.8 volts?</p> <p>Yes → Replace the Speed Control Resume/Accel Switch.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	MAGNUM 5.7L SMPI V8
5	<p>Turn the ignition off.  Disconnect the clockspring harness connector (instrument panel wiring side) per Service Information.  Ignition on, engine not running.  With the DRBIII® in Sensors, read the S/C Switch voltage.  Did the S/C Switch volts change to 5.0 volts?</p> <p>Yes → Replace the Clockspring.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 6</p>	MAGNUM 5.7L SMPI V8

**P0580-SPEED CONTROL SWITCH NO.1 LOW (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.            Connect the Clockspring harness connectors per Service Information.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between the (V937) Switch Return circuit and the (V37) S/C Switch No.1 Signal circuit at the Speed Control Switch.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (V37) S/C Switch No.1 Signal circuit and the (V937) Switch Return circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p>	MAGNUM 5.7L SMPI V8
7	<p>Measure the resistance between ground and the (V37) S/C Switch No.1 Signal circuit at the Switch harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V37) S/C Switch No.1 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 8</p>	MAGNUM 5.7L SMPI V8
8	<p><b>NOTE: Before continuing, disconnect the PCM harness connector and check the related wiring terminals for corrosion, damage or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

## Symptom:

### P0581-SPEED CONTROL SWITCH NO.1 HIGH

## When Monitored and Set Condition:

### P0581-SPEED CONTROL SWITCH NO.1 HIGH

**When Monitored:** With the ignition key on. Battery voltage above 10.4volts. Cruise is learned.

**Set Condition:** Speed Control Switch No.1 circuit voltage goes above 4.7843 volts for more than 18.4 seconds. One Trip Fault. Three good trips to turn off the MIL.

### POSSIBLE CAUSES

SPEED CONTROL SWITCH VOLTAGE HIGH

SPEED CONTROL SWITCHES

CLOCKSPRING

(V37) S/C SIGNAL CIRCUIT SHORTED TO VOLTAGE

(V37) S/C SWITCH SIGNAL CIRCUIT OPEN BETWEEN PCM AND CLOCKSPRING

(K900) SENSOR GROUND CIRCUIT OPEN BETWEEN PCM AND CLOCKSPRING

(K900) SENSOR GROUND CIRCUIT OPEN BETWEEN CLOCKSPRING AND S/C SWITCH

(V37) S/C SWITCH SIGNAL CIRCUIT OPEN BETWEEN CLOCKSPRING AND S/C SWITCH

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Do not press any of the Speed Control Switch buttons.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read the Speed Control voltage.</p> <p>Is the Speed Control voltage above 4.8 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P0581-SPEED CONTROL SWITCH NO.1 HIGH — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.  Remove the Speed Control Switches from the steering wheel.  Measure the resistance across each Speed Control Switch.  Monitor the ohmmeter while pressing each function button on each switch.  Resume/Accel - 15,400 ohms  Cancel - 909 +/- 9 ohms  Decel (Coast) - 2940 +/- 30 ohms  On/Off - 0 ohms  Set - 6650 +/- 66 ohms  Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 3</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
3	<p>Disconnect the upper and lower 6-way clockspring harness connector per Service Information.  Measure the resistance of the (K900) Sensor ground circuit between the upper and lower 6-way clockspring harness connectors.  Measure the resistance of the (V37) S/C Switch Signal circuit between the upper and lower 6-way clockspring harness connectors.  Was the resistance above 5.0 ohms for either circuit?</p> <p>Yes → Replace the clockspring.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
4	<p>Connect the Clockspring harness connectors per Service Information.  Disconnect the PCM harness connectors.  Ignition on, engine not running.  Measure the voltage on the (V37) S/C Signal circuit at the Speed Control harness connector.  Is the voltage above 5.3 volts?</p> <p>Yes → Repair the short to voltage in the (V37) S/C Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
5	<p>Turn the ignition off.  Disconnect the upper and lower Clockspring harness connectors per Service Information.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the (V37) S/C Switch Signal circuit from the lower Clockspring harness connector to the appropriate terminal of special tool #8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (V37) S/C Switch Signal circuit between the PCM and Clockspring.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P0581-SPEED CONTROL SWITCH NO.1 HIGH — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the lower Clockspring harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open (K900) Sensor ground circuit between the PCM and Clockspring. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
7	<p>Measure the resistance of the (V37) S/C Switch Signal circuit from the upper Clockspring harness connector to the On/Off switch harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (V37) S/C Switch Signal circuit, Clockspring to S/C Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
8	<p>Measure the resistance of the (K900) Sensor ground circuit from the On/Off Switch 2-way harness connector to the upper Clockspring harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the (K900) Sensor ground circuit between the Clockspring and S/C Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**Symptom:****P0581-SPEED CONTROL SWITCH NO.1 HIGH (5.7L)****When Monitored and Set Condition:****P0581-SPEED CONTROL SWITCH NO.1 HIGH (5.7L)**

When Monitored: With the ignition key on.

Set Condition: Speed control switch input above the maximum acceptable voltage at the PCM. One trip fault.

**POSSIBLE CAUSES**

SPEED CONTROL SWITCH VOLTAGE HIGH

SPEED CONTROL SWITCHES

CLOCKSPRING

(V37) S/C SWITCH NO.1 SIGNAL CIRCUIT SHORTED TO VOLTAGE

(V37) S/C SWITCH NO.1 SIGNAL CIRCUIT OPEN

(V937) SWITCH RETURN CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Do not press any of the Speed Control Switch buttons.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read the Speed Control voltage.</p> <p>Is the Speed Control voltage above 4.8 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**P0581-SPEED CONTROL SWITCH NO.1 HIGH (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.  Remove and disconnect the Speed Control Switches from the steering wheel.  Measure the resistance across each Speed Control Switch.  Monitor the ohmmeter while pressing each function button on each switch.  The following resistance specs are taken between terminals (V38) S/C Switch No.2 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position.  On/Off - 8.87 kohms  Set - 0.825 kohms  Coast - 0.47 kohms  Cancel - 3.92 kohms  Resume/Accel - 1.87 kohms  The following resistance specs are taken between terminals (V37) S/C Switch No.1 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position  On/Off - 0.47 kohms  Set - 5.49 kohms  Coast - 2.94 kohms  Cancel - 1.24 kohms  Resume/Accel - 15.4 kohms  Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 3</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
3	<p>Disconnect the upper and lower Clockspring harness connector per Service Information.  Measure the resistance of the (V937) Switch Return circuit between the upper and lower clockspring harness connectors.  Measure the resistance of the (V37) S/C Switch No.1 Signal circuit between the upper and lower clockspring harness connectors.  Was the resistance above 5.0 ohms for either circuit?</p> <p>Yes → Replace the clockspring.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p>Connect the Clockspring harness connectors per Service Information.  Disconnect the PCM harness connectors.  Ignition on, engine not running.  Measure the voltage on the (V37) S/C Switch No.1 Signal circuit at the Speed Control harness connector.  Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (V37) S/C Switch No.1 Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	MAGNUM 5.7L SMPI V8



**P0581-SPEED CONTROL SWITCH NO.1 HIGH (5.7L) — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b> Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V37) S/C Switch No.1 Signal circuit from the Speed Control harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (V37) S/C Switch No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
6	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V937) Switch Return circuit from the Speed Control harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (V937) Switch Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

## Symptom:

### P0582-SPEED CONTROL VACUUM SOLENOID CIRCUIT

#### When Monitored and Set Condition:

#### P0582-SPEED CONTROL VACUUM SOLENOID CIRCUIT

When Monitored: Ignition on Battery voltage greater than 10.4 volts. Cruise is learned and powered. Brake is not pressed.

Set Condition: An open or shorted condition detected in the Speed Control Vacuum Solenoid Control circuit for more than 0.325 of a second. One Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

SPEED CONTROL SOLENOID OPERATION

SPEED CONTROL VACUUM SOLENOID

(V36) S/C VACUUM SOL CONTROL CIRCUIT SHORTED TO GROUND

(V36) S/C VACUUM SOL CONTROL CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII®, actuate the Speed Control Vacuum Solenoid and note operation.            Does the Speed Control Vacuum Solenoid actuate properly?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off.            Disconnect the S/C Servo harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the S/C Vacuum Solenoid.            Using a 12-volt test light connected to ground, probe the (V36) S/C Vacuum control circuit.            Does the test light illuminate brightly and flash?</p> <p>Yes → Replace the Speed Control Servo.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 3</p>	All

**P0582-SPEED CONTROL VACUUM SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (V36) S/C Vacuum Control at the Speed Control Servo harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the excessive resistance in the (V36) S/C Vacuum Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
4	<p>Measure the resistance between ground and the (V36) S/C Vacuum Control circuit at the Speed Control Servo harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V36) S/C Vacuum Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

**Symptom:**

**P0585-SPEED CONTROL SWITCH NO.1 AND NO.2 CORRELATION**

**When Monitored and Set Condition:**

**P0585-SPEED CONTROL SWITCH NO.1 AND NO.2 CORRELATION**

When Monitored: Ignition on.

Set Condition: Cruise Switch inputs are not coherent with each other. Example: PCM is reading Switch #1 as Accel and Switch #2 as Coast at the same time. One trip fault.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO  
 SPEED CONTROL ON/OFF SWITCH  
 SPEED CONTROL RESUME/ACCEL SWITCH  
 S/C SWITCH SIGNAL CIRCUITS SHORTED TO VOLTAGE  
 SPEED CONTROL SWITCHES  
 CLOCKSPRING  
 RESISTANCE IN THE S/C SWITCH SIGNAL CIRCUITS  
 RESISTANCE IN THE (V937) SWITCH RETURN CIRCUIT  
 S/C SWITCH SIGNAL CIRCUITS SHORTED TO THE (V937) SWITCH RETURN CIRCUIT  
 (V37) S/C SWITCH #1 SIGNAL CIRCUIT SHORTED TO (V38) S/C SWITCH #2 SIGNAL CIRCUIT  
 S/C SWITCH SIGNAL CIRCUITS SHORTED TO GROUND  
 PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. <b>NOTE: This DTC may be the result of pressing two Speed Control Switch buttons simultaneously for more than 450 msec.</b> Ask the customer if it is possible that two buttons were pressed at the same time before this DTC set. If this is the case, no repair is necessary. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.	All
2	With the DRBIII®, monitor the Speed Control Switch voltage. Disconnect the Speed Control On/Off Switch harness connector. Did the voltage change to above 4.8 volts?  Yes → Replace the Speed Control On/Off Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.  No → Go To 3	All

# **P0585-SPEED CONTROL SWITCH NO.1 AND NO.2 CORRELATION — Continued**

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII®, monitor the Speed Control Switch voltage. Disconnect the Speed Control Resume/Accel Switch harness connector. Did the voltage change to above 4.8 volts?</p> <p>Yes → Replace the Speed Control Resume/Accel Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Remove and disconnect the Speed Control Switches from the steering wheel per Service Information. Measure the resistance across each Speed Control Switch. Monitor the ohmmeter while pressing each function button on each switch. The following resistance specs are taken between terminals (V38) S/C Switch No.2 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position. On/Off - 8.87 kohms Set - 0.825 kohms Coast - 0.47 kohms Cancel - 3.92 kohms Resume/Accel - 1.87 kohms The following resistance specs are taken between terminals (V37) S/C Switch No.1 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position On/Off - 0.47 kohms Set - 5.49 kohms Coast - 2.94 kohms Cancel - 1.24 kohms Resume/Accel - 15.4 kohms Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 5</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
5	<p>Disconnect the PCM harness connectors. Measure the voltage on the (V37) and (V38) S/C Switch Signal circuits at both Speed Control harness connectors. Is the voltage above 5.0 volts?</p> <p>Yes → Repair the short to voltage in the (V37) or (V38) S/C Switch Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 6</p>	All

# **P0585-SPEED CONTROL SWITCH NO.1 AND NO.2 CORRELATION — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.            Disconnect the upper and lower clockspring harness connectors per Service Information.            Measure the resistance of the (V37) and (V38) S/C Switch Signal circuits between the upper and lower clockspring harness connectors.            Measure the resistance of the (V937) Switch Return circuit between the upper and lower clockspring harness connectors.            Is the resistance above 5.0 ohms?</p> <p>Yes → Replace the Clockspring per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p> <p><b>NOTE: Connect the Clockspring harness connectors per Service Information before continuing.</b></p>	All
7	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V37) and (V38) S/C Switch Signal circuits from both Speed Control harness connectors to the appropriate terminals of special tool #8815.            Is the resistance below 5.0 ohms for both measurements?</p> <p>Yes → Go To 8</p> <p>No → Repair the excessive resistance in the (V37) or (V38) S/C Switch Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
8	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V937) Switch Return circuit from both Speed Control harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms for both measurements?</p> <p>Yes → Go To 9</p> <p>No → Repair the excessive resistance in the (V937) Switch Return circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
9	<p>Measure the resistance between the (V937) Switch Return circuit and both the (V37) and (V38) S/C Switch Signal circuits in the Speed Control harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (V937) Switch Return circuit and the (V37) or (V38) S/C Switch Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 10</p>	All

## P0585-SPEED CONTROL SWITCH NO.1 AND NO.2 CORRELATION — Continued

TEST	ACTION	APPLICABILITY
10	<p>Measure the resistance between the (V37) S/C Switch No.1 Signal circuit and the (V38) S/C Switch No.2 Signal circuit at both Speed Control harness connectors. Is the resistance below 100 ohms for each circuit?</p> <p>Yes → Repair the short between the (V38) S/C Switch No.2 Signal circuit and the (V37) S/C Switch No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 11</p>	All
11	<p>Measure the resistance between ground and the (V37) and (V38) S/C Switch Signal circuits at both Switch harness connectors. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V37) or (V38) S/C Switch Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 12</p>	All
12	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

## Symptom:

### P0586-SPEED CONTROL VENT SOLENOID CIRCUIT

#### When Monitored and Set Condition:

#### P0586-SPEED CONTROL VENT SOLENOID CIRCUIT

**When Monitored:** Engine running. Battery voltage is greater than 10.4 volts. Cruise is leaned and powered. Brake is not pressed.

**Set Condition:** The PCM detects an open or short to ground in the Speed Control Vent Control circuit for more than 0.325 of a second. One Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

SPEED CONTROL SOLENOID OPERATION

SPEED CONTROL VENT SOLENOID

(V35) S/C VENT SOL CONTROL CIRCUIT OPEN

(V35) S/C VENT SOL CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            With the DRBIII®, actuate the Speed Control Vent Solenoid and note operation.            Does the Speed Control Vent Solenoid actuate properly?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off.            Disconnect the Speed Control Servo harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the Speed Control Vent Solenoid.            Using a 12-volt test light connected to ground, probe the (V35) S/C Vent Solenoid Control circuit in the Speed Control Servo harness connector.            Does the test light illuminate brightly and flash?</p> <p>Yes → Replace the Speed Control Servo.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 3</p>	All



**P0586-SPEED CONTROL VENT SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (V35) S/C Vent Control circuit from the Speed Control Servo harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the excessive resistance in the (V35) S/C Vent Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
4	<p>Measure the resistance between ground and the (V35) S/C Vent solenoid Control circuit at the Speed Control Servo harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V35) S/C Vent Sol Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

## Symptom:

### P0591-SPEED CONTROL SWITCH NO.2 PERFORMANCE

#### When Monitored and Set Condition:

#### P0591-SPEED CONTROL SWITCH NO.2 PERFORMANCE

When Monitored: With the ignition key on.

Set Condition: Cruise switch voltage output is not out of range but it does not equal any of the values for any of the button positions.

#### POSSIBLE CAUSES

SPEED CONTROL SWITCH STATUS

SPEED CONTROL SWITCHES

CLOCKSPRING

(V38) S/C SWITCH NO.2 SIGNAL CIRCUIT OPEN

(V38) S/C SWITCH NO.2 SIGNAL CIRCUIT SHORTED TO VOLTAGE

(V937) SWITCH RETURN CIRCUIT OPEN

(V38) S/C SWITCH NO.2 SIGNAL CIRCUIT SHORTED TO GROUND

(V38) S/C SWITCH NO.2 SIGNAL CIRCUIT SHORTED TO (V937) SWITCH RETURN CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Start the engine. With the DRBIII®, monitor each which function for the Speed Control Switches. Press and release each Speed Control Button.</p> <ul style="list-style-type: none"> <li>- Resume/Accel</li> <li>- Cancel</li> <li>- Decel (Coast)</li> <li>- On/Off</li> <li>- Set</li> </ul> <p>Does each switch function change status when pressing and then depressing each switch?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 2</p>	MAGNUM 5.7L SMPI V8

**P0591-SPEED CONTROL SWITCH NO.2 PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.  Remove the Speed Control Switches from the steering wheel.  Measure the resistance across each Speed Control Switch.  Monitor the ohmmeter while pressing each function button on each switch.  The following resistance specs are taken between terminals (V38) S/C Switch No.2 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position.  On/Off - 8.87 kohms  Set - 0.825 kohms  Coast - 0.47 kohms  Cancel - 3.92 kohms  Resume/Accel - 1.87 kohms  The following resistance specs are taken between terminals (V37) S/C Switch No.1 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position  On/Off - 0.47 kohms  Set - 5.49 kohms  Coast - 2.94 kohms  Cancel - 1.24 kohms  Resume/Accel - 15.4 kohms  Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 3</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
3	<p>Disconnect the PCM harness connectors.  Ignition on, engine not running.  Measure the voltage of the (V38) S/C Switch No.2 Signal circuit at the S/C Switch harness connector.  Is the voltage above 5.0 volts?</p> <p>Yes → Repair the short to voltage in the (V38) S/C Switch No.2 Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p>Turn the ignition off.  Disconnect the upper and lower clockspring harness connectors per Service Information.  Measure the resistance of the (V38) S/C Switch No.2 Signal circuit between the upper and lower clockspring harness connectors.  Measure the resistance of the (V937) Switch Return circuit between the upper and lower clockspring harness connectors.  Is the resistance above 5.0 ohms?</p> <p>Yes → Replace the Clockspring per Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p> <p><b>NOTE: Connect the Clockspring harness connectors per Service Information before continuing.</b></p>	MAGNUM 5.7L SMPI V8

**P0591-SPEED CONTROL SWITCH NO.2 PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V38) S/C Switch No.2 Signal circuit from both Speed Control harness connectors to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms for both measurements?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (V38) S/C Switch No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
6	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V937) Switch Return circuit from the Speed Control harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms for both measurement?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (V937) Switch Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
7	<p>Measure the resistance between ground and the (V38) S/C Switch No.2 Signal circuit at the Speed Control harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V38) S/C Switch No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 8</p>	MAGNUM 5.7L SMPI V8
8	<p>Measure the resistance between the (V38) S/C Switch No.2 Signal circuit and the (V937) Switch Return circuit in the Speed Control harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (V38) S/C Switch No.2 Signal circuit and the (V937) Switch Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 9</p>	MAGNUM 5.7L SMPI V8
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**Symptom:****P0592-SPEED CONTROL SWITCH NO.2 LOW****When Monitored and Set Condition:****P0592-SPEED CONTROL SWITCH NO.2 LOW**

When Monitored: With the ignition key on.

Set Condition: Speed control switch input #2 is below the minimum acceptable voltage at the PCM. One trip fault.

**POSSIBLE CAUSES**

SPEED CONTROL SWITCH VOLTAGE LOW

SPEED CONTROL ON/OFF SWITCH

SPEED CONTROL RESUME/ACCEL SWITCH

CLOCKSPRING

(V38) S/C SWITCH NO.2 SIGNAL CIRCUIT SHORTED TO GROUND

(V38) S/C SWITCH NO.2 SIGNAL CIRCUIT SHORTED TO (V937) SWITCH RETURN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Do not press any of the Speed Control Switch buttons.</b>            Ignition on, engine not running.            With the DRBIII®, read the Speed Control voltage.            Is the Speed Control voltage below 1.0 volt?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
2	<p>With the DRBIII®, monitor the Speed Control Switch voltage.            Disconnect the Speed Control On/Off Switch harness connector.            Did the voltage change to above 4.7 volts?</p> <p>Yes → Replace the Speed Control On/Off Switch.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 3</p>	MAGNUM 5.7L SMPI V8
3	<p>With the DRBIII®, monitor the Speed Control Switch voltage.            Disconnect the Speed Control Resume/Accel Switch harness connector.            Did the voltage change to above 4.7 volts?</p> <p>Yes → Replace the Speed Control Resume/Accel Switch.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8

**P0592-SPEED CONTROL SWITCH NO.2 LOW — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.            Disconnect the clockspring harness connector (instrument panel wiring side) per Service Information.            Ignition on, engine not running.            With the DRBIII® in Sensors, read the S/C Switch voltage.            Did the S/C Switch volts change to 5.0 volts?</p> <p>Yes → Replace the Clockspring.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	MAGNUM 5.7L SMPI V8
5	<p>Turn the ignition off.            Connect the Clockspring harness connectors per Service Information.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the (V38) S/C Switch No.2 Signal circuit to the appropriate terminal of special tool #8815.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V38) S/C Switch No.2 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 6</p>	MAGNUM 5.7L SMPI V8
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between the (V937) Switch Return circuit and the (V38) S/C Switch No.2 Signal circuit at the Speed Control Switch.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (V38) S/C Switch No.2 Signal circuit and the (V937) Switch Return circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p>	MAGNUM 5.7L SMPI V8
7	<p><b>NOTE: Before continuing, disconnect the PCM harness connector and check the related wiring terminals for corrosion, damage or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair            Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**Symptom:****P0593-SPEED CONTROL SWITCH NO.2 HIGH****When Monitored and Set Condition:****P0593-SPEED CONTROL SWITCH NO.2 HIGH**

When Monitored: With the ignition key on.

Set Condition: Speed control switch #2 input above the maximum acceptable voltage at the PCM. One trip fault.

**POSSIBLE CAUSES**

SPEED CONTROL SWITCH VOLTAGE HIGH

SPEED CONTROL SWITCHES

CLOCKSPRING

(V38) S/C SIGNAL NO.2 CIRCUIT SHORTED TO VOLTAGE

(V38) S/C SWITCH NO.2 SIGNAL CIRCUIT OPEN BETWEEN PCM AND CLOCKSPRING

(V937) SENSOR GROUND CIRCUIT OPEN BETWEEN PCM AND CLOCKSPRING

(V38) S/C SWITCH NO.2 SIGNAL CIRCUIT OPEN BETWEEN CLOCKSPRING AND S/C SWITCH

(V937) SWITCH RETURN CIRCUIT OPEN BETWEEN CLOCKSPRING AND S/C SWITCH

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Do not press any of the Speed Control Switch buttons.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read the Speed Control voltage.</p> <p>Is the Speed Control voltage above 4.8 volts?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**P0593-SPEED CONTROL SWITCH NO.2 HIGH — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.            Disconnect and remove the Speed Control Switches from the steering wheel.            Measure the resistance across each Speed Control Switch.            Monitor the ohmmeter while pressing each function button on each switch.            The following resistance specs are taken between terminals (V38) S/C Switch No.2 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position.            On/Off - 8.87 kohms            Set - 0.825 kohms            Coast - 0.47 kohms            Cancel - 3.92 kohms            Resume/Accel - 1.87 kohms            The following resistance specs are taken between terminals (V37) S/C Switch No.1 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position            On/Off - 0.47 kohms            Set - 5.49 kohms            Coast - 2.94 kohms            Cancel - 1.24 kohms            Resume/Accel - 15.4 kohms            Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 3</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
3	<p>Disconnect the upper and lower Clockspring harness connector per Service Information.            Measure the resistance of the (V937) Switch Return circuit between the upper and lower clockspring harness connectors.            Measure the resistance of the (V38) S/C Switch No.2 Signal circuit between the upper and lower clockspring harness connectors.            Was the resistance above 5.0 ohms for either circuit?</p> <p>Yes → Replace the clockspring.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p>Connect the Clockspring harness connectors per Service Information.            Disconnect the PCM harness connectors.            Measure the voltage on the (V38) S/C Signal No.2 circuit at the Speed Control harness connector.            Ignition on, engine not running.            Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (V38) S/C Signal No.2 circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	MAGNUM 5.7L SMPI V8



**P0593-SPEED CONTROL SWITCH NO.2 HIGH — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off. Disconnect the upper and lower Clockspring harness connectors per Service Information.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V38) S/C Switch No.2 Signal circuit from the lower Clockspring harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (V38) S/C Switch No.2 Signal circuit between the PCM and Clockspring. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V937) Sensor ground circuit from the lower Clockspring harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (V937) Switch Return circuit between the PCM and Clockspring. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
7	<p>Measure the resistance of the (V38) S/C Switch No.2 Signal circuit from the upper Clockspring harness connector to the On/Off switch harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (V38) S/C Switch No.2 Signal circuit between the Clockspring and S/C Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
8	<p>Measure the resistance of the (V937) Sensor ground circuit from the On/Off Switch harness connector to the upper Clockspring harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the (V937) Switch Return circuit between the Clockspring and S/C Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**Symptom:**

**P0594-SPEED CONTROL SERVO POWER CIRCUIT**

**When Monitored and Set Condition:**

**P0594-SPEED CONTROL SERVO POWER CIRCUIT**

**When Monitored:** With the ignition key on. The speed control switched on. Brake is not pressed. Battery voltage above 10.4 volts.

**Set Condition:** The speed control power supply circuit is either open or shorted to ground for more than 2.6 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(V32) S/C SUPPLY CIRCUIT OPEN

(V32) S/C SUPPLY CIRCUIT SHORTED TO GROUND

BRAKE LAMP SWITCH

(V30) S/C BRAKE SWITCH OUTPUT

(V30) S/C BRAKE SWITCH OUTPUT CIRCUIT OPEN

(V30) S/C BRAKE SWITCH OUTPUT CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
2	<p>Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Using a 12-volt test light connected to ground, probe the (V32) S/C Supply circuit in the Switch harness connector while holding the Cruise Switch in the ON position. Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Go To 7</p>	All

**P0594-SPEED CONTROL SERVO POWER CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Disconnect and remove the Brake Lamp Switch.            Measure the resistance across the (V32) S/C Supply circuit terminal and the (V30) S/C Brake Switch Output circuit terminal at the Brake Lamp Switch.            Push the Plunger of the Switch in and let it out.            Does the resistance change from below 5.0 ohms to an open circuit?</p> <p>Yes → Go To 4</p> <p>No → Replace the Brake Lamp Switch.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
4	<p>Turn the ignition off.            Connect the Brake Lamp Switch harness connector and install the Switch.            Disconnect the Speed Control Servo harness connector.            Ignition on, engine not running.  <b>NOTE: It is necessary to PRESS and HOLD the Speed Control Switch in the ON position while checking for voltage.</b>            Using a 12-volt test light connected to ground, probe the (V30) S/C Brake Switch Output circuit in the Servo Harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Replace the S/C Servo.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.            Disconnect the Brake Lamp Switch harness connector.            Measure the resistance of the (V30) S/C Brake Switch Output circuit from the Brake Lamp Switch harness connector to the S/C Servo harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the excessive resistance in the (V30) S/C Brake Switch Output circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between ground and the (V30) S/C Brake Switch Output circuit at the Speed Control Servo harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V30) S/C Brake Switch Output circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 9</p>	All
7	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (V32) S/C Supply circuit from the Brake Lamp Switch harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the open in the (V32) S/C Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 8</p>	All

**P0594-SPEED CONTROL SERVO POWER CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	Measure the resistance between ground and the (V32) S/C Supply circuit in the Brake Switch harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (V32) S/C Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.  No → Go To 9	All
9	<b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.	All

**Symptom List:****P0600-SERIAL COMMUNICATION LINK****P0601-INTERNAL MEMORY CHECKSUM INVALID****P0606-ECM/PCM PROCESSOR**

**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be **P0600-SERIAL COMMUNICATION LINK**.

**When Monitored and Set Condition:****P0600-SERIAL COMMUNICATION LINK**

When Monitored: With the ignition on.

Set Condition: Internal Bus communication failure between processors. One Trip Fault. Three Global Good Trips to Clear.

**P0601-INTERNAL MEMORY CHECKSUM INVALID**

When Monitored: With the ignition on.

Set Condition: Internal checksum for software failed, does not match calculated value. One Trip Fault, Three Good Trips to clear.

**P0606-ECM/PCM PROCESSOR**

When Monitored: Engine running.

Set Condition: When the PCM recognizes an internal failure to communicate with the ECM or the CMP and CKP Sensor count periods are too short. One trip fault. ETC light is flashing.

**POSSIBLE CAUSES**

PCM INTERNAL OR SPI

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Diagnose any CMP or CKP Sensor faults before continuing. Check for intermittent loose CMP or CKP connections.</b></p> <p>The Powertrain Control Module is reporting internal errors, view repair to continue.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**Symptom List:**

**P060B-ETC MODULE PERFORMANCE**

**P060D-ETC APP SENSOR PERFORMANCE**

**P060E-ETC TPS PERFORMANCE**

**P060F-ETC ECT PERFORMANCE**

**P061A-ETC TORQUE PERFORMANCE**

**P061C-ETC RPM PERFORMANCE**

**P062C-ETC MPH PERFORMANCE**

**P2107-ELECTRONIC THROTTLE CONTROL MODULE PROCES-  
SOR**

**P2108-ELECTRONIC THROTTLE CONTROL MODULE PERFOR-  
MANCE**

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**Test Note: All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P060B-ETC MODULE PERFOR-  
MANCE.**

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**When Monitored and Set Condition:**

**P060B-ETC MODULE PERFORMANCE**

When Monitored: Engine running.

Set Condition: ETC lamp will flash

**P060D-ETC APP SENSOR PERFORMANCE**

When Monitored: Ignition on.

Set Condition: ETC lamp will flash

**P060E-ETC TPS PERFORMANCE**

When Monitored: Ignition on.

Set Condition: ETC lamp will flash

**P060F-ETC ECT PERFORMANCE**

When Monitored: Ignition on.

Set Condition: ETC lamp will flash

**P061A-ETC TORQUE PERFORMANCE**

When Monitored: Ignition on.

Set Condition: ETC lamp will flash

**P061C-ETC RPM PERFORMANCE**

When Monitored: Engine running.

Set Condition: ETC lamp will flash

**P060B-ETC MODULE PERFORMANCE — Continued****P062C-ETC MPH PERFORMANCE**

When Monitored: Ignition on.

Set Condition: ETC lamp will flash

**P2107-ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR**

When Monitored: Ignition on.

Set Condition: Internal PCM failure. Module will attempt to reset, so you will be able to hear the throttle relearning. If the condition is continuous, the vehicle may not be driveable. One trip fault. ETC light is flashing.

**P2108-ELECTRONIC THROTTLE CONTROL MODULE PERFORMANCE**

When Monitored: Ignition on.

Set Condition: Internal PCM failure. One trip fault. ETC light may be illuminated or flashing. Customer may experience extended crank condition with limited driving with a rough idle.

**POSSIBLE CAUSES**

REPROGRAM THE POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>Check for any related TSBs.</p> <p><b>NOTE: Inspect the Intake Manifold components for vacuum leaks, repair as necessary.</b></p> <p><b>NOTE: An intermittent loss of power to the PCM without performing an ETC Relearn procedure may cause this DTC to set.</b></p> <p>Verify the PCM is at the latest calibration (flash level).</p> <p>Flash the Powertrain Control Module per Service Information if any updates are available.</p> <p>Start the engine.</p> <p>Allow the engine to reach normal operating temperature.</p> <p>Operate the accelerator pedal. (do not exceed 3500 rpm)</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Does this DTC reset?</p> <p>Yes → Replace and reprogram the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

## Symptom:

### P0622-GENERATOR FIELD CONTROL CIRCUIT

#### When Monitored and Set Condition:

#### P0622-GENERATOR FIELD CONTROL CIRCUIT

When Monitored: With the ignition on. Engine running with RPM greater than 1000. ASD sense switch is ON.

Set Condition: Actual Generator Field Output State is not equal to the Desired State. One Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

GENERATOR OPERATION

(K20) GEN FIELD CONTROL CIRCUIT SHORTED TO VOLTAGE

(K20) GEN FIELD CONTROL CIRCUIT OPEN

(K20) GEN FIELD CONTROL CIRCUIT SHORTED TO GROUND

(Z346) GROUND CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
2	<p>Turn the ignition off. Disconnect the Generator Field harness connector. Using a 12-volt test light, jump it across the Generator Field harness connector. Ignition on, engine not running. With the DRBIII®, actuate the Generator Field Control circuit. Does the test light illuminate brightly and flash on and off?</p> <p>Yes → Replace the Generator. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 3</p>	All



**P0622-GENERATOR FIELD CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage on the (K20) Gen Field Control circuit in the Generator Field harness connector.            Is the voltage above 1.0 volt?</p> <p>Yes → Repair the short to voltage in the (K20) Gen Field Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K20) Gen Field Control circuit from the Generator Field harness connector to appropriate terminal of the special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K20) Gen Field Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
5	<p>Measure the resistance between ground and the (K20) Gen Field Control circuit in the Generator Field harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K20) Gen Field Control circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 6</p>	All
6	<p>Using a 12-volt test light connected to battery voltage, probe the (Z346) Ground circuit in the Gen Field harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (Z346) Ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

**Symptom:**

**P0627-FUEL PUMP RELAY CIRCUIT**

**When Monitored and Set Condition:**

**P0627-FUEL PUMP RELAY CIRCUIT**

When Monitored: With the ignition on. Battery voltage greater than 10.4 volts.

Set Condition: Actual Fuel Pump Relay state does not equal the Desired state for more than 2.7 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

FUEL PUMP RELAY OPERATION

FUEL PUMP RELAY

FUSED IGNITION SWITCH OUTPUT CIRCUIT

(K31) FUEL PUMP RELAY CONTROL CIRCUIT

(K31) FUEL PUMP RELAY CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, actuate the Fuel Pump Relay. Is the Fuel Pump Relay operating?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 2</p>	All
2	<p>Turn the ignition off. Remove the Fuel Pump Relay from the IPM. Measure the resistance of the Fuel Pump Relay Coil. Is the resistance between 70 to 90 ohms?</p> <p>Yes → Go To 3</p> <p>No → Replace the Fuel Pump Relay. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the Internal Fused Ignition Switch Output circuit. Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the open or short to ground in the Internal Fused Ignition Switch Output circuit. Inspect the related fuse and repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0627-FUEL PUMP RELAY CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K31) Fuel Pump Relay Control circuit from the IPM to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K31) Fuel Pump Relay Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (K31) Fuel Pump Relay Control circuit in the IPM. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K31) Fuel Pump Relay Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P0630-VIN NOT PROGRAMMED IN PCM

## When Monitored and Set Condition:

### P0630-VIN NOT PROGRAMMED IN PCM

When Monitored: Ignition on.

Set Condition: The VIN has not been programmed into the PCM. One Trip Fault. Three good trips to turn off the MIL.

## POSSIBLE CAUSES

PROGRAMMING VIN INTO PCM  
PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, erase DTCs.            Using the DRBIII®, program VIN into the PCM.            Start the engine.  <b>NOTE: If the engine will not start, crank the engine over for 15 seconds. Crank at least 2 times with the ignition switch returning to the off position each time.</b>            Allow the engine to reach normal operating temperature.            With the DRBIII®, read DTCs.            Does the DTC reset?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → The VIN has been successfully programmed into the PCM. Test is complete.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**Symptom:****P0632-ODOMETER NOT PROGRAMMED IN PCM****When Monitored and Set Condition:****P0632-ODOMETER NOT PROGRAMMED IN PCM**

When Monitored: Ignition on.

Set Condition: Odometer is not programed into the PCM. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

PROGRAMMING MILEAGE INTO PCM

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, erase DTCs.            Using the DRBIII®, program the mileage into the PCM.            Start the engine.            Allow the engine to reach normal operating temperature.            With the DRBIII®, read DTCs.            Does the DTC reset?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → The mileage has been successfully programmed into the PCM.            Test is complete.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

## Symptom:

### P0633-SKIM KEY NOT PROGRAMMED IN PCM

## When Monitored and Set Condition:

### P0633-SKIM KEY NOT PROGRAMMED IN PCM

When Monitored: Ignition on.

Set Condition: The SKIM Key information has not been programmed into the PCM. One Trip Fault. Three good trips to turn off the MIL.

## POSSIBLE CAUSES

PROGRAMMING SKIM KEY INTO PCM  
PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, erase DTCs. Using the DRBIII®, program the SKIM Key information into the PCM. Start the engine. <b>NOTE: If the engine will not start, crank the engine over for 15 seconds. Crank at least 2 times with the ignition switch returning to the off position each time.</b> Allow the engine to reach normal operating temperature. With the DRBIII®, read DTCs. Does the DTC reset?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → The SKIM KEY information has been successfully programmed into the PCM. Test is complete. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0642-PRIMARY 5-VOLT SUPPLY LOW****When Monitored and Set Condition:****P0642-PRIMARY 5-VOLT SUPPLY LOW**

When Monitored: Ignition on.

Set Condition: When the PCM recognizes the Primary 5-volt Supply circuit voltage is too low. One Trip Fault. ETC light is flashing.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(F855) PRIMARY 5-VOLT SUPPLY SHORTED TO GROUND

5-VOLT SENSOR

SENSOR SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.  <b>NOTE: Improperly installed aftermarket accessories can cause this DTC to set. Check for wiring added by customer.</b>            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect all the Sensors that share the (F855) Primary 5-volt Supply circuit.            Measure the resistance between ground and the (F855) Primary 5-volt Supply circuit at the CKP Sensor harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) Primary 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P0642-PRIMARY 5-VOLT SUPPLY LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Reconnect all the previously disconnected Sensors except for the CKP Sensor harness connector.  Ignition on, engine not running.  Measure the voltage on the (F855) Primary 5-volt Supply circuit in the CKP Sensor harness connector.  Is the voltage below 4.5 volts?</p> <p>Yes → Go To 4</p> <p>No → Replace the CKP Sensor.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the voltage on the (F855) Primary 5-volt Supply circuit at the CKP Sensor harness connector.  <b>CAUTION: You must Turn the Ignition OFF when disconnecting any of the Sensor harness connectors and Turn the Ignition On to check the voltage readings.</b>  While monitoring the voltage, disconnect each Sensor harness connector that shares the (F855) Primary 5-volt Supply circuit, one at a time.  Does the voltage increase above 4.5 volts when disconnecting any of the remaining Sensors?</p> <p>Yes → Replace the Sensor that causes the (F855) Primary 5-volt Supply circuit voltage to increase when disconnected.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p> <p><b>NOTE: Reconnect all the Sensors and clear all trouble codes before continuing.</b></p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P0643-PRIMARY 5-VOLT SUPPLY HIGH****When Monitored and Set Condition:****P0643-PRIMARY 5-VOLT SUPPLY HIGH**

When Monitored: Ignition on.

Set Condition: When the PCM recognizes the Primary 5-volt Supply circuit voltage is too high. One Trip Fault. ETC light is flashing.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(F855) PRIMARY 5-VOLT SUPPLY SHORTED TO VOLTAGE

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the PCM harness connectors. Disconnect all the Sensors that share the (F855) Primary 5-volt Supply circuit. <b>NOTE: Improperly installed aftermarket accessories can cause this DTC to set. Check for wiring added by customer.</b> Ignition on, engine not running. Measure the voltage on the (F855) Primary 5-volt Supply circuit at the CKP Sensor harness connector. Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (F855) Primary 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P0645-A/C CLUTCH RELAY CIRCUIT

#### When Monitored and Set Condition:

#### P0645-A/C CLUTCH RELAY CIRCUIT

**When Monitored:** With the ignition on. Battery voltage greater than 10 volts. A/C Switch on.

**Set Condition:** An open or shorted condition is detected in the A/C clutch relay control circuit for 2.7 seconds. One Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

A/C CLUTCH RELAY OPERATION

A/C CLUTCH RELAY RESISTANCE

INTERNAL FUSED IGNITION SWITCH OUTPUT CIRCUIT

(C13) A/C CLUTCH RELAY CONTROL CIRCUIT OPEN

(C13) A/C CLUTCH RELAY CONTROL CIRCUIT SHORT TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the A/C Clutch Relay. Is the A/C Clutch Relay operating?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 2	All
2	Turn the ignition off. Remove the A/C Clutch Relay from the IPM. Measure the resistance of the A/C Clutch Relay Coil. Is the resistance between 60 to 80 ohms?  Yes → Go To 3  No → Replace the A/C Clutch Relay. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
3	Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the Internal Fused Ignition Switch Output circuit in the IPM. Does the test light illuminate brightly?  Yes → Go To 4  No → Repair the open or short to ground in the Internal Fused Ignition Switch Output circuit. Check and replace any open fuses. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All

**P0645-A/C CLUTCH RELAY CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (C13) A/C Clutch Relay Control circuit from the IPM to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (C13) A/C Clutch Relay Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p>Measure the resistance between ground and the (C13) A/C Clutch Relay Control circuit in the IPM. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short to ground in the (C13) A/C Relay Clutch Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### P0652-AUXILIARY 5-VOLT SUPPLY LOW

#### When Monitored and Set Condition:

#### P0652-AUXILIARY 5-VOLT SUPPLY LOW

When Monitored: Ignition on.

Set Condition: When the PCM recognizes the Auxiliary 5-volt Supply circuit voltage is too low One Trip Fault. ETC light is flashing.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO  
(F856)AUXILIARY 5-VOLT SUPPLY SHORTED TO GROUND  
CAM POSITION SENSOR  
SENSOR SHORTED TO GROUND  
PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. <b>NOTE: Improperly installed aftermarket accessories can cause this DTC to set. Check for wiring added by customer.</b> Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the PCM harness connectors. Disconnect all the Sensors that share the (F856) Auxiliary 5-volt Supply circuit. Measure the resistance between ground and the (F856) Auxiliary 5-volt Supply circuit at the CMP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F856) Auxiliary 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P0652-AUXILIARY 5-VOLT SUPPLY LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Reconnect all the previously disconnected Sensors except for the CMP Sensor harness connector.  Ignition on, engine not running.  Measure the voltage on the (F856) Auxiliary 5-volt Supply circuit in the CMP Sensor harness connector.  Is the voltage below 4.5 volts?</p> <p>Yes → Go To 4</p> <p>No → Replace the Cam Position Sensor.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the voltage on the (F856) Auxiliary 5-volt Supply circuit at the CMP Sensor harness connector.  <b>CAUTION: You must Turn the Ignition OFF when disconnecting any of the Sensor harness connectors and Turn the Ignition On to check the voltage readings.</b>  While monitoring the voltage, disconnect each Sensor harness connector that shares the (F856) Auxiliary 5-volt Supply circuit, one at a time.  Does the voltage increase above 4.5 volts when disconnecting any of the Sensor harness connectors?</p> <p>Yes → Replace the Sensor that causes the (F856) Auxiliary 5-volt Supply circuit voltage to increase when disconnected.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P0653-AUXILIARY 5-VOLT SUPPLY HIGH

## When Monitored and Set Condition:

### P0653-AUXILIARY 5-VOLT SUPPLY HIGH

When Monitored: Ignition on.

Set Condition: When the PCM recognizes the Auxiliary 5-volt Supply circuit voltage is too high. One Trip Fault. ETC light is flashing.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

(F856) AUXILIARY 5-VOLT SUPPLY SHORTED TO VOLTAGE

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the PCM harness connectors. Disconnect all the Sensors that share the (F856) Auxiliary 5-volt Supply circuit. <b>NOTE: Improperly installed aftermarket accessories can cause this DTC to set. Check for wiring added by customer.</b> Ignition on, engine not running. Measure the voltage on the (F856) Auxiliary 5-volt Supply circuit at the CMP Sensor harness connector. Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (F856) Auxiliary 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P0685-ASD RELAY CONTROL CIRCUIT****When Monitored and Set Condition:****P0685-ASD RELAY CONTROL CIRCUIT**

When Monitored: With ignition on. Battery voltage above 10 volts.

Set Condition: ASD Relay Actual state does not equal the Desired state for 2.7 seconds.  
One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

ASD RELAY OPERATION

INTERNAL FUSED B+ CIRCUITS

ASD RELAY

(K51) ASD RELAY CONTROL CIRCUIT OPEN

(K51) ASD RELAY CONTROL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, actuate the ASD Relay. Is the ASD Relay operating?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 2	All
2	Turn the ignition off. Remove the ASD Relay from the IPM. Using a 12-volt test light connected to ground, probe the Internal Fused B+ circuits in the IPM. Does the test light illuminate brightly?  Yes → Go To 3  No → Repair the open or short to ground in the Internal Fused B+ circuits. Inspect and replace any open fuses. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
3	Measure the resistance of the ASD Relay Coil. Is the resistance between 60 to 80 ohms?  Yes → Go To 4  No → Replace the ASD Relay. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All

**P0685-ASD RELAY CONTROL CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K51) ASD Relay Control circuit from the IPM to the appropriate terminals of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K51) ASD Relay Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (K51) ASD Relay Control circuit in the IPM.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K51) ASD Relay Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P0688-ASD RELAY SENSE CIRCUIT LOW****When Monitored and Set Condition:****P0688-ASD RELAY SENSE CIRCUIT LOW**

When Monitored: With ignition key on. Battery voltage greater than 10 volts.

Set Condition: Actual ASD Sense level is not equal to the Desired Level for 3.075 seconds.  
One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

VERIFY ASD DTC

ASD RELAY

INTERNAL FUSED B+ CIRCUITS

(K342) ASD RELAY OUTPUT CIRCUIT OPEN (NO START)

(K342) ASD RELAY OUTPUT CIRCUIT OPEN (START)

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Diagnose P0685 - Auto Shutdown Relay Control Circuit first if set along with this DTC.</b>            With the DRBIII®, erase the DTC.            Attempt to start the engine. If the engine will not start, crank the engine for at least 15 seconds. It may be necessary to repeat several times.            Does the DTC reset?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Attempt to start the engine.            Does the engine start?</p> <p>Yes → Go To 3</p> <p>No → Go To 4</p>	All

**P0688-ASD RELAY SENSE CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.  Remove the ASD Relay from the IPM.  Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the (K342) ASD Relay Output circuit from the IPM to the appropriate terminals of special tool #8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K342) ASD Relay Output circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Turn the ignition off.  Install a substitute relay in place of the ASD Relay.  Ignition on, engine not running.  With the DRBIII®, erase DTCs.  Attempt to start the engine.  With the DRBIII®, read DTCs.  Does the DTC reset?</p> <p>Yes → Go To 5</p> <p>No → Replace the ASD Relay.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Turn the ignition off.  Using a 12-volt test light connected to ground, probe the Internal Fused B+ circuits in the IPM.  Does the test light illuminate brightly?</p> <p>Yes → Go To 6</p> <p>No → Repair the open or short to ground in the Internal Fused B+ circuits. Inspect the related fuse and repair as necessary.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the (K342) ASD Relay Output circuit from the IPM to the appropriate terminals of special tool #8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K342) ASD Relay Output circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P0688-ASD RELAY SENSE CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:**

**P0700-TRANSMISSION CONTROL SYSTEM (MIL REQUEST)**

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**When Monitored and Set Condition:**

**P0700-TRANSMISSION CONTROL SYSTEM (MIL REQUEST)**

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: An active DTC is stored in the TCM. One Trip Fault. Three good trips to turn off the MIL.

TEST	ACTION	APPLICABILITY
1	<p>This is an informational DTC letting you know that a DTC(s) is stored in the Transmission Control Module.</p> <p>Erase this DTC from the PCM after all Transmission DTC(s) have been repaired.</p> <p>Using the DRBIII®, read the Transmission Controller DTC and refer to the Transmission Category and perform the appropriate symptom.</p> <p>PCM Diagnostic Information complete.</p> <p>Continue</p> <p>Test Complete.</p>	All

**Symptom:****P0703-BRAKE SWITCH NO.2 PERFORMANCE****When Monitored and Set Condition:****P0703-BRAKE SWITCH NO.2 PERFORMANCE**

When Monitored: Ignition on.

Set Condition: When the PCM recognizes Brake Switch #2 voltage is not equal to the applied value at the PCM when Brake Switch #1 is applied. This could be a normal condition. If this condition is seen repeatedly by the PCM the fault is set. Cruise will not work.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

FUSED IGNITION SWITCH OUTPUT CIRCUIT

BRAKE LAMP SWITCH OPERATION

(V32) BRAKE SWITCH NO.2 SIGNAL CIRCUIT OPEN

(V32) BRAKE SWITCH NO.2 SIGNAL CIRCUIT SHORTED TO VOLTAGE

(V32) BRAKE SWITCH NO.2 SIGNAL SHORTED TO GROUND

(B29) BRAKE SWITCH NO.1 SIGNAL CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the Brake Switch is adjusted properly before continuing.</b>  <b>NOTE: Ensure the Brake Switch is properly wired, such as Brake Switch No.1 and Brake Switch No.2 are not switched at the harness connector.</b></p> <p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
2	<p>Turn the ignition off.            Disconnect the Brake Lamp Switch harness connector.            Using a 12-volt test light connected to ground, probe the Fused Ignition Switch Output circuit in the Brake Lamp Switch harness connector.            Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the open or short to ground in the Fused Ignition Switch Output circuit. Inspect the related fuse and repair as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

**P0703-BRAKE SWITCH NO.2 PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.</p> <p>Measure the resistance between the Fused Ignition Switch Output circuit terminal and the (V32) Brake Switch No.2 Signal terminal in the Brake Lamp Switch.</p> <p>Measure the resistance between the Ground circuit terminal and the (K29) Brake Switch No.1 Signal terminal in the Brake Lamp Switch.</p> <p>Apply and release the brake pedal while monitoring the ohmmeter.</p> <p>Does the resistance change from below 5.0 ohms to open circuit?</p> <p>Yes → Go To 4</p> <p>No → Replace the Brake Lamp Switch.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
4	<p>Disconnect the PCM harness connectors.</p> <p>Measure the voltage on the (V32) Brake Switch No.2 Signal circuit in the Brake Lamp Switch harness connector.</p> <p>Ignition on, engine not running.</p> <p>Is the voltage above 1.0 volt?</p> <p>Yes → Repair the short to voltage in the (V32) Brake Switch No.2 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V32) Brake Switch No.2 Signal circuit from the Brake Lamp Switch harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (V32) Brake Switch No.2 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All
6	<p>Measure the resistance between ground and the (V32) Brake Switch No.2 Signal circuit at the Brake Lamp Switch harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short to ground in the (V32) Brake Switch No.2 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p>	All
7	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (B29) Brake Switch No.1 Signal circuit from the Brake Lamp Switch harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (B29) Brake Switch No.1 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

**P0703-BRAKE SWITCH NO.2 PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All

## Symptom:

### P0850-PARK/NEUTRAL SWITCH PERFORMANCE

#### When Monitored and Set Condition:

#### P0850-PARK/NEUTRAL SWITCH PERFORMANCE

When Monitored: Continuously with the transmission in Park, Neutral, or Drive and NOT in Limp-in mode.

Set Condition: This code will set if the PCM detects an incorrect Park/Neutral switch state for a given mode of vehicle operation. One trip fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

DRB DISPLAYS P/N & D/R NOT IN CORRECT POSITION  
 TRS (T41) SENSE (P/N SENSE) CIRCUIT OPEN  
 TRS (T41) SENSE (P/N SENSE) CIRCUIT SHORTED TO GROUND  
 TRANSMISSION RANGE SENSOR  
 PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the Park/Neutral Position Switch input state. While moving the gear selector through all gear positions (Park to 1 and back to Park), monitor the DRB display. Did the DRB display show P/N and D/R in the correct gear positions?  Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 2	All
2	Turn the ignition off. Disconnect the PCM harness connectors. Disconnect the Transmission Range Sensor harness connector. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the TRS (T41) Sense (P/N Sense) circuit from the TRS harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?  Yes → Go To 3  No → Repair the open in the TRS (T41) Sense (P/N Sense) circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All



**P0850-PARK/NEUTRAL SWITCH PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Measure the resistance between ground and the TRS (T41) Sense (P/N Sense) circuit at the TRS harness connector. Is the resistance above 100k ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the short to ground in the TRS (T41) Sense (P/N Sense) circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
4	<p>Measure the resistance between ground and the (T41) TRS Sense (P/N Sense) circuit while moving the gear selector through each gear in the TRS connector. <b>NOTE: The circuit is grounded in Park and Neutral and open in the other positions.</b> Did the resistance change from above 100 kohms (open) to below 10.0 ohms (grounded)?</p> <p>Yes → Go To 5</p> <p>No → Replace the Transmission Range Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### P1115-GENERAL TEMPERATURE RATIONALITY

#### When Monitored and Set Condition:

#### P1115-GENERAL TEMPERATURE RATIONALITY

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: Ambient, Engine Coolant, and Intake Air Temp sensor inputs are compared under cold start conditions. After start up the temp readings are monitored. If two of the three readings agree and the third doesn't, a DTC is stored. Two Trip Fault. Three good trips to turn off the MIL.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

FAULTY TEMPERATURE SENSOR CIRCUIT

FAULTY SENSOR

EXCESSIVE RESISTANCE IN THE SENSOR SIGNAL CIRCUIT

EXCESSIVE RESISTANCE IN THE (K900) SENSOR GROUND CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p><b>NOTE: In cold weather, this DTC could be set by a high powered block heater and no repair would be required.</b></p> <p>With the DRBIII®, read the DTCs and record the related Freeze Frame data.</p> <p><b>NOTE: All ECT, Intake Air, and Ambient Air Temperature Sensor codes must be diagnosed and repaired before continuing.</b></p> <p>Is the Good Trip Counter displayed and equal to zero</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>With the DRBIII® in Sensors, read the ECT, Ambient/Battery Temp, and Intake Air Temp Sensor temp values.</p> <p>Start the engine.</p> <p>Allow the engine to reach normal operating temperature while monitoring the three Sensor temperature values.</p> <p>Is the temperature for each of the Sensors increasing properly?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P1115-GENERAL TEMPERATURE RATIONALITY — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running.            Disconnect the suspected faulty sensor.            Connect a jumper wire between the Sensor Signal circuit and the (K900) Sensor ground circuit.            With the DRBIII® in Sensors, read the voltage of the suspected Sensor.            Did the voltage reading start at 4.8 to 5.0 volts and decrease to 0 volts?</p> <p>Yes → Replace the faulty Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
4	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Sensor Signal circuit from the Sensor harness connector to the appropriate terminal of special tool # 8815.            Is the resistance above 5.0 ohms.</p> <p>Yes → Repair the excessive resistance in the Sensor Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (K900) Sensor ground circuit from the Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms.</p> <p>Yes → Repair the excessive resistance in the (K900) Sensor ground circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, review repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom List:

**P1501-VSS 1/2 CORRELATION - DRIVE WHEELS**

**P1502-VSS 1/2 CORRELATION - NON DRIVE WHEELS**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **P1501-VSS 1/2 CORRELATION - DRIVE WHEELS**.

## When Monitored and Set Condition:

### **P1501-VSS 1/2 CORRELATION - DRIVE WHEELS**

When Monitored: Ignition on and vehicle moving. Cruise is learned.

Set Condition: The PCM recognizes rear axle speed is greater than front axle speed.

### **P1502-VSS 1/2 CORRELATION - NON DRIVE WHEELS**

When Monitored: Ignition on and vehicle is moving. Brake must not be applied.

Set Condition: The PCM recognizes front axle speed is much greater than rear axle speed.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

VISUAL INSPECTION

VEHICLE SPEED SIGNAL CIRCUITS SHORTED TO VOLTAGE

EXCESSIVE RESISTANCE IN THE VEHICLE SPEED SIGNAL CIRCUITS

VEHICLE SPEED SIGNAL CIRCUITS SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p><b>NOTE: Check for active DTCs stored in the CAB Module. Any VSS DTCs in the CAB Module must be properly diagnosed before continuing.</b></p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P1501-VSS 1/2 CORRELATION - DRIVE WHEELS — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>NOTE: This code can set due to tire circumference differences and from the front or rear wheels being on a slippery surface while the opposite tires are not.</b></p> <p>This code may also set on a hard acceleration on loose gravel or during other off road driving conditions.</p> <p>Check tire pressure of all the tires.</p> <p>Check tire wear on all the tires.</p> <p>Ask the customer what the road and driving conditions were like when the fault set. Were any problems found?</p> <p>Yes → Repair as necessary. If the code set during a front OR rear wheel spin condition no repair is necessary.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.</p> <p>Disconnect the CAB Module harness connector.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage of the (B22) and (B222) Vehicle Speed Signal circuit at the CAB Module harness connector.</p> <p>Is the voltage above 6.0 volts?</p> <p>Yes → Repair the short to voltage in the (B22) or (B222) Vehicle Speed Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (B22) and (B222) Vehicle Speed Signal circuits from the CAB Module harness connector to the appropriate terminals of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the excessive resistance in the (B22) or (B222) Vehicle Speed Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (B22) and (B222) Vehicle Speed Signal circuits in the CAB module harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (B22) or (B222) Vehicle Speed Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All

**P1501-VSS 1/2 CORRELATION - DRIVE WHEELS — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there is no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P1572-BRAKE PEDAL STUCK ON****When Monitored and Set Condition:****P1572-BRAKE PEDAL STUCK ON**

When Monitored: Ignition on. In plant mode only.

Set Condition: PCM recognizes the Brake Pedal could not electrically indicate the applied (On) position with both switch inputs. One trip fault.

**POSSIBLE CAUSES**

BRAKE SWITCH ADJUSTMENT

CLEAR DTC

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. Make sure the Brake Switch is adjusted properly. Is the Brake Switch adjusted properly?  Yes → Clear the DTC and put the vehicle in the Field Mode. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.  No → Adjust the Brake Switch. If the DTC returns after properly adjusting the Brake Switch, clear the codes and put the vehicle in Field Mode. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.	All

## Symptom:

### P1573-BRAKE PEDAL STUCK OFF

## When Monitored and Set Condition:

### P1573-BRAKE PEDAL STUCK OFF

When Monitored: Ignition on, In plant mode passed the Applied test.

Set Condition: PCM recognizes the Brake Pedal could not electronically indicate the released (Off) position with both switches. If P1572 sets, P1573 will also set. One trip fault.

## POSSIBLE CAUSES

BRAKE SWITCH ADJUSTMENT

CLEAR DTC

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. Make sure the Brake Switch is adjusted properly. Is the Brake Switch adjusted properly?</p> <p>Yes → Clear the DTC and put the vehicle in the Field Mode. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Adjust the Brake Switch. If the DTC returns after properly adjusting the Brake Switch, clear the codes and put the vehicle in Field Mode. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	All



**Symptom:****P1593-SPEED CONTROL SWITCH NO.1 AND NO.2 STUCK (5.7L)****When Monitored and Set Condition:****P1593-SPEED CONTROL SWITCH NO.1 AND NO.2 STUCK (5.7L)**

When Monitored: Ignition on.

Set Condition: One of the S/C Switches is mechanically stuck in the On/Off, Resume/Accel, or Set position for too long. One trip fault.

**POSSIBLE CAUSES**

SPEED CONTROL SWITCH STATUS

SPEED CONTROL SWITCHES

(V37) OR (V38) S/C SWITCH SIGNAL CIRCUIT OPEN

(V37) OR (V38) S/C SWITCH SIGNAL CIRCUIT SHORTED TO VOLTAGE

(V937) SWITCH RETURN CIRCUIT OPEN

(V37) OR (V38) S/C SWITCH SIGNAL CIRCUIT SHORTED TO GROUND

(V37) OR (V38) S/C SWITCH SIGNAL CIRCUIT SHORTED TO (V937) SWITCH RETURN CIRCUIT  
PCM

TEST	ACTION	APPLICABILITY
1	<p>Start the engine. With the DRBIII®, monitor each which function for the Speed Control Switches. Press and release each Speed Control Button.</p> <ul style="list-style-type: none"> <li>- Resume/Accel</li> <li>- Cancel</li> <li>- Decel (Coast)</li> <li>- On/Off</li> <li>- Set</li> </ul> <p>Does each switch function change status when pressing and then depressing each switch?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 2</p>	MAGNUM 5.7L SMPI V8

# **P1593-SPEED CONTROL SWITCH NO.1 AND NO.2 STUCK (5.7L) —** **Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.  Remove the Speed Control Switches from the steering wheel.  Measure the resistance across each Speed Control Switch.  Monitor the ohmmeter while pressing each function button on each switch.  The following resistance specs are taken between terminals (V38) S/C Switch No.2 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position.  On/Off - 8.87 kohms  Set - 0.825 kohms  Coast - 0.47 kohms  Cancel - 3.92 kohms  Resume/Accel - 1.87 kohms  The following resistance specs are taken between terminals (V37) S/C Switch No.1 Signal and (V937) S/C Switch Return circuits of the Switch when holding the switch button in the following position  On/Off - 0.47 kohms  Set - 5.49 kohms  Coast - 2.94 kohms  Cancel - 1.24 kohms  Resume/Accel - 15.4 kohms  Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 3</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
3	<p>Turn the ignition off.  Disconnect the PCM harness connectors.  Ignition on, engine not running.  Measure the voltage of the (V37) and (V38) S/C Switch Signal circuits at the S/C Switch harness connector.  Is the voltage above 5.0 volts?</p> <p>Yes → Repair the short to voltage in the (v37) or (V38) S/C Switch Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	MAGNUM 5.7L SMPI V8
4	<p>Turn the ignition off.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the (V37) or (V38) S/C Switch Signal circuit from both Speed Control harness connectors to the appropriate terminals of special tool #8815.  Is the resistance below 5.0 ohms for both measurements?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (V37) or (V38) S/C Switch Signal circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

# **P1593-SPEED CONTROL SWITCH NO.1 AND NO.2 STUCK (5.7L) —** **Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V937) Switch Return circuit from the Speed Control harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms for both measurement?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (V937) Switch Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8
6	<p>Measure the resistance between ground and the (V37) or (V38) S/C Switch Signal circuit at the Speed Control harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V37) or (V38) S/C Switch Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p>	MAGNUM 5.7L SMPI V8
7	<p>Measure the resistance between the (V37) or (V38) S/C Switch Signal circuit and the (V937) Switch Return circuit in the Speed Control harness connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (V937) Switch Return circuit and the (V37) or (V38) S/C Switch Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 8</p>	MAGNUM 5.7L SMPI V8
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	MAGNUM 5.7L SMPI V8

**Symptom:**

**P1593-SPEED CONTROL SWITCH NO.1 STUCK (3.7L, 4.7L)**

**When Monitored and Set Condition:**

**P1593-SPEED CONTROL SWITCH NO.1 STUCK (3.7L, 4.7L)**

When Monitored: Ignition on.

Set Condition: S/C Switch No.1 is mechanically stuck in the On/Off, Resume/Accel, or Set position for too long. One trip fault.

**POSSIBLE CAUSES**

SPEED CONTROL SWITCH STATUS  
 SPEED CONTROL SWITCHES  
 (V37) S/C SIGNAL CIRCUIT SHORTED TO VOLTAGE  
 (V37) S/C SIGNAL CIRCUIT OPEN  
 (K900) SENSOR GROUND OPEN  
 (V37) S/C SIGNAL CIRCUIT SHORTED TO GROUND  
 (V37) S/C SIGNAL CIRCUIT SHORTED TO (K900) SENSOR GROUND  
 PCM

TEST	ACTION	APPLICABILITY
1	<p>Start the engine.                      With the DRBIII®, monitor each which function for the Speed Control Switches.                      Press and release each Speed Control Button.</p> <ul style="list-style-type: none"> <li>- Resume/Accel</li> <li>- Cancel</li> <li>- Decel (Coast)</li> <li>- On/Off</li> <li>- Set</li> </ul> <p>Does each switch function change status when pressing and then depressing each switch?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 2</p>	<p>ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6</p>

**P1593-SPEED CONTROL SWITCH NO.1 STUCK (3.7L, 4.7L) — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.</p> <p>Disconnect and remove the Speed Control Switches from the steering wheel per Service Information.</p> <p>Measure the resistance across each Speed Control Switch.</p> <p>Monitor the ohmmeter while pressing each function button on each switch.</p> <p>Resume/Accel - 15,400 ohms</p> <p>Cancel - 909 +/- 9 ohms</p> <p>Decel (Coast) - 2940 +/- 30 ohms</p> <p>On/Off - 0 ohms</p> <p>Set - 6650 +/- 66 ohms</p> <p>Does the function on the Speed Control Switches have the correct resistance value?</p> <p>Yes → Go To 3</p> <p>No → Replace the Speed Control Switch that had the incorrect resistance value.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
3	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Measure the voltage of the (V37) S/C Switch No.1 Signal circuit at the Speed Control harness connector.</p> <p>Is the voltage above 5.0 volts?</p> <p>Yes → Repair the short to voltage in the (V37) S/C Signal #1 circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 4</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
4	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b></p> <p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (V37) S/C Signal circuit from the Speed Control harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms for both measurement?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (V37) S/C Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
5	<p><b>NOTE: The measurement must be taken from both Speed Control Switch harness connectors.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the Speed Control harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms for both measurement?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K900) Sensor ground circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**P1593-SPEED CONTROL SWITCH NO.1 STUCK (3.7L, 4.7L) — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Measure the resistance between ground and the (V37) S/C Switch No.1 Signal circuit at the Speed Control harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (V37) S/C Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 7</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
7	<p>Measure the resistance between the (V37) S/C Signal circuit and the (K900) Sensor ground circuit at the Speed Control harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the short between the (V37) S/C Signal circuit and the (K900) Sensor ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p> <p>No → Go To 8</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 4.</p>	ENG - 4.7L MAGNUM V8 or MAGNUM 3.7L V6

**Symptom:**  
**P1602-PCM NOT PROGRAMMED**

**When Monitored and Set Condition:**

**P1602-PCM NOT PROGRAMMED**

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: The PCM has not been programmed.

**POSSIBLE CAUSES**

PCM PROGRAMMED

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, erase DTCs.            With the DRBIII® program the PCM.            Start the engine.            Allow the engine to reach normal operating temperature.            With the DRBIII®, read DTCs.            Does the DTC reset?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → The PCM has been successfully programmed. Test is complete.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**Symptom List:**

**P1603-PCM INTERNAL DUAL-PORT RAM COMMUNICATION**

**P1604-PCM INTERNAL DUAL-PORT RAM READ/WRITE INTEGRITY FAILURE**

**P1607-PCM INTERNAL SHUTDOWN TIMER RATIONALITY**

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**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be **P1603-PCM INTERNAL DUAL-PORT RAM COMMUNICATION**.

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**When Monitored and Set Condition:**

**P1603-PCM INTERNAL DUAL-PORT RAM COMMUNICATION**

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: Internal PCM failure detected. One Trip Fault. Three good trips to turn off the MIL.

**P1604-PCM INTERNAL DUAL-PORT RAM READ/WRITE INTEGRITY FAILURE**

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: Internal PCM failure detected. One Trip Fault. Three good trips to turn off the MIL.

**P1607-PCM INTERNAL SHUTDOWN TIMER RATIONALITY**

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: Internal PCM failure detected. Two Trip Fault. Three good trips to turn off the MIL.

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**POSSIBLE CAUSES**

PCM FUSED IGNITION SWITCH OUTPUT CIRCUIT

PCM INTERNAL FAILURE

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**P1603-PCM INTERNAL DUAL-PORT RAM COMMUNICATION — Continued**

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            With a 12-volt test light connected to ground and with special tool #8815 installed, probe the (Y135) Fused Ignition Switch Output circuit.            Perform the above check with the Ignition key in the off lock position, Ignition on, engine not running position, and during cranking.            Wiggle the related wire harness while probing the special tool with the test light to try to interrupt the circuit.            Does the test light illuminate brightly?</p> <p>Yes → Go To 2</p> <p>No → Repair the open or excessive resistance in the (Y135) Fused Ignition Switch (Off, Run, Start) circuits. Inspect the related fuse, if the fuse is open check the circuit for a short to ground.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
2	<p>The Powertrain Control Module is reporting internal errors, view repair to continue.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**Symptom:**

**P1618-PRIMARY 5-VOLT SUPPLY ERRATIC**

**When Monitored and Set Condition:**

**P1618-PRIMARY 5-VOLT SUPPLY ERRATIC**

When Monitored: Ignition on.

Set Condition: When the PCM recognizes the Primary 5-volt Supply circuit voltage is varying too much to quickly. One Trip Fault. ETC light is flashing.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(F855) PRIMARY 5-VOLT SUPPLY SHORTED TO GROUND

SENSOR SHORTED TO GROUND

INTERNAL SENSOR

(F855) PRIMARY 5-VOLT SUPPLY SHORTED TO VOLTAGE

(F855) PRIMARY 5-VOLT SUPPLY CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the PCM harness connectors. Disconnect all the Sensors that share the (F855) Primary 5-volt Supply circuit. <b>NOTE: This code can be caused by the improper installation of after market accessories that may be causing excessive noise on the (F855) 5-volt Supply circuit.</b> Measure the resistance between ground and the (F855) Primary 5-volt Supply circuit at the CKP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) Primary 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P1618-PRIMARY 5-VOLT SUPPLY ERRATIC — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Connect the PCM harness connectors and all the previously disconnected Sensor except for the CKP Sensor harness connector.            Ignition on, engine not running.            Measure the voltage on the (F855) Primary 5-volt Supply circuit at the Throttle Body harness connector.  <b>CAUTION: You must Turn the Ignition OFF when disconnecting any of the Sensor harness connectors and Turn the Ignition On to check the voltage readings.</b>            While monitoring the voltage, disconnect each Sensor harness connector that shares the (F855) Primary 5-volt Supply circuit, one at a time.            Does the voltage increase above 4.5 volts when disconnecting any of the Sensor harness connectors?</p> <p>Yes → Replace the Sensor that causes the (F855) Primary 5-volt Supply circuit voltage to increase when disconnected.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.            Connect all the previously disconnected Sensors except for the CKP Sensor harness connector.            Ignition on, engine not running.            Measure the voltage on the (F855) Primary 5-volt Supply circuit at the CKP Sensor harness connector.            Is the voltage between 4.8 and 5.2 volts?</p> <p>Yes → Replace the Crank Position Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect all the Sensors that share the (F855) Primary 5-volt Supply circuit.            Ignition on, engine not running.            Measure the voltage on the (F855) Primary 5-volt Supply circuit at the CKP Sensor harness connector.            Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (F855) Primary 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All

**P1618-PRIMARY 5-VOLT SUPPLY ERRATIC — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off. Reconnect all the sensors that were disconnected in the previous step except for the CKP Sensor harness connector.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance in the (F855) Primary 5-volt Supply circuit from the Sensor harness connector to the appropriate terminal of special tool #8815. It may be necessary to perform this test from every sensor that uses the (F855) Primary 5-volt Supply circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (F855) Primary 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P1628-AUXILIARY 5-VOLT SUPPLY ERRATIC****When Monitored and Set Condition:****P1628-AUXILIARY 5-VOLT SUPPLY ERRATIC**

When Monitored: Ignition on.

Set Condition: When the PCM recognizes the Auxiliary 5-volt Supply circuit voltage is varying too much to quickly. One Trip Fault. ETC light is flashing.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

(F856) AUXILIARY 5-VOLT SUPPLY SHORTED TO GROUND

SENSOR SHORTED TO GROUND

INTERNAL SENSOR

(F856) AUXILIARY 5-VOLT SUPPLY SHORTED TO VOLTAGE

(F856) AUXILIARY 5-VOLT SUPPLY CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
2	Turn the ignition off. Disconnect the PCM harness connectors. Disconnect all the Sensors that share the (F856) Auxiliary 5-volt Supply circuit. <b>NOTE: This code can be caused by the improper installation of after market accessories that may be causing excessive noise on the (F856) 5-volt Supply circuit.</b> Measure the resistance between ground and the (F856) Auxiliary 5-volt Supply circuit at the CMP Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (F856) Auxiliary 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All

**P1628-AUXILIARY 5-VOLT SUPPLY ERRATIC — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Connect the PCM harness connectors and all the previously disconnected Sensor except for the CMP Sensor harness connector.            Ignition on, engine not running.            Measure the voltage on the (F856) Auxiliary 5-volt Supply circuit at the CMP Sensor harness connector.  <b>CAUTION: You must Turn the Ignition OFF when disconnecting any of the Sensor harness connectors and Turn the Ignition On to check the voltage readings.</b>            While monitoring the voltage, disconnect each Sensor harness connector that shares the (F856) Auxiliary 5-volt Supply circuit, one at a time.            Does the voltage increase above 4.5 volts when disconnecting any of the Sensor harness connectors?</p> <p>Yes → Replace the Sensor that causes the (F856) Auxiliary 5-volt Supply circuit voltage to increase when disconnected.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.            Connect all the previously disconnected Sensors except for the CMP Sensor harness connector.            Ignition on, engine not running.            Measure the voltage on the (F856) Auxiliary 5-volt Supply circuit at the CMP Sensor harness connector.            Is the voltage below 4.5 volts?</p> <p>Yes → Go To 5</p> <p>No → Replace the Cam Position Sensor.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect all the Sensors that share the (F856) Auxiliary 5-volt Supply circuit.            Ignition on, engine not running.            Measure the voltage on the (F856) Auxiliary 5-volt Supply circuit at the CMP Sensor harness connector.            Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (F856) Auxiliary 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All

**P1628-AUXILIARY 5-VOLT SUPPLY ERRATIC — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.  Reconnect all the sensors that were disconnected in the previous step except the CMP Sensor harness connector.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance in the (F856) Auxiliary 5-volt Supply circuit from the Sensor harness connector to the appropriate terminal of special tool #8815.  It may be necessary to perform this test from every sensor that uses the (F856) Auxiliary 5-volt Supply circuit.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (F856) Auxiliary 5-volt Supply circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>  Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per the Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P1696-PCM FAILURE EEPROM WRITE DENIED**

**P1697-PCM FAILURE SRI MILES NOT STORED**

**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1696-PCM FAILURE EEPROM WRITE DENIED.**

**When Monitored and Set Condition:**

**P1696-PCM FAILURE EEPROM WRITE DENIED**

When Monitored: Ignition key on, Continuous.

Set Condition: An attempt to program/write to the internal EEPROM failed, Also checks at powerdown. One Trip Fault. Three good trips to turn off the MIL.

**P1697-PCM FAILURE SRI MILES NOT STORED**

When Monitored: Ignition key on, Continuous.

Set Condition: An attempt to update Service Reminder Indicator mileage in the control module EEPROM failed. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

DRB DISPLAYS WRITE FAILURE  
 DRB DISPLAYS WRITE REFUSED 2ND TIME  
 DRB DISPLAYS SRI MILEAGE INVALID  
 COMPARE SRI MILEAGE WITH ODOMETER

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, perform the SRI Memory Test. Does the DRBIII® display Write Failure?  Yes → Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.  No → Go To 2	All
2	With the DRBIII®, perform the SRI Memory Test. Does the DRBIII® display Write Refused?  Yes → Go To 3  No → Go To 4	All



**P1696-PCM FAILURE EEPROM WRITE DENIED — Continued**

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII®, perform the SRI Memory Test a third time.  <b>NOTE: Retest the SRI Memory two more times.</b>  Does the DRBIII® display Write Refused again?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All
4	<p>With the DRBIII®, perform the SRI Memory Test.  Does the DRBIII® display SRI Mileage Invalid?</p> <p>Yes → Update the mileage and retest the SRI Memory.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 5</p>	All
5	<p>Compare the SRI Mileage stored with the Instrument Panel Odometer.  Is the mileage within the specified range displayed on the DRBIII®?</p> <p>Yes → Test Complete.</p> <p>No → Update the mileage and retest the SRI Memory.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

## Symptom:

### P2072-ETC SYSTEM - ICE BLOCKAGE

## When Monitored and Set Condition:

### P2072-ETC SYSTEM - ICE BLOCKAGE

When Monitored: Ignition on.

Set Condition: The PCM recognizes the Throttle plate is stuck during extremely cold Ambient Temperature operation. The throttle plate goes through a de-icing procedure. If the throttle blade still doesn't move this fault sets. The MIL will not illuminate. The vehicle will be in Limp home condition, limiting rpm and vehicle speed.

## POSSIBLE CAUSES

### THROTTLE BODY INSPECTION

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p><b>NOTE: This DTC sets in extreme cold Ambient Temperatures with the throttle plate stuck by the time the vehicle gets to the dealership the condition may be corrected.</b></p> <p><b>NOTE: Diagnose any other DTCs that may also be set before continuing.</b></p> <p>Turn the ignition off.</p> <p>Remove the Air Cleaner Assembly from the Throttle Body.</p> <p>Check for any signs of a foreign material (ice or dirt) on the Throttle Plate or in the bore causing the Throttle Plate to stick.</p> <p>Is the throttle blade still stuck because it is frozen?</p> <p>Yes → Allow the Throttle Body to thaw naturally in a room temperature climate.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

**Symptom List:****P2096-DOWN STREAM FUEL TRIM LEAN BANK 1****P2097-DOWN STREAM FUEL TRIM RICH BANK 1****P2098-DOWN STREAM FUEL TRIM LEAN BANK 2****P2099-DOWN STREAM FUEL TRIM RICH BANK 2**

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**Test Note: All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be P2096-DOWN STREAM FUEL  
TRIM LEAN BANK 1.**

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**When Monitored and Set Condition:****P2096-DOWN STREAM FUEL TRIM LEAN BANK 1**

When Monitored: With the engine running in closed loop mode, the ambient/battery temperature above (-7°C)20°F, altitude below 8500 ft and fuel level greater than 15%.

Set Condition: If the PCM multiplies short term compensation by long term adaptive and a certain percentage is exceeded for two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored. Two Trip Fault. Three good trips to turn off the MIL.

**P2097-DOWN STREAM FUEL TRIM RICH BANK 1**

When Monitored: With the engine running in closed loop mode, the ambient/battery temperature above (-7°C)20°F and altitude below 8500 ft.

Set Condition: If the PCM multiplies short term compensation by long term adaptive as well as a purge fuel multiplier and the result is below a certain value for 30 seconds over two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored. Two Trip Fault. Three good trips to turn off the MIL.

**P2098-DOWN STREAM FUEL TRIM LEAN BANK 2**

When Monitored: With the engine running in closed loop mode, the ambient/battery temperature above (-7°C)20°F, altitude below 8500 ft and fuel level greater than 15%.

Set Condition: If the PCM multiplies short term compensation by long term adaptive and a certain percentage is exceeded for two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored. Two Trip Fault. Three good trips to turn off the MIL.

**P2099-DOWN STREAM FUEL TRIM RICH BANK 2**

When Monitored: With the engine running in closed loop mode, the ambient/battery temperature above (-7°C)20°F and altitude below 8500 ft.

Set Condition: If the PCM multiplies short term compensation by long term adaptive as well as a purge fuel multiplier and the result is below a certain value for 30 seconds over two trips, a freeze frame is stored, the MIL illuminates and a trouble code is stored. Two Trip Fault. Three good trips to turn off the MIL.

**P2096-DOWN STREAM FUEL TRIM LEAN BANK 1 — Continued**

POSSIBLE CAUSES
<p>GOOD TRIP EQUAL TO ZERO</p> <p>EXHAUST LEAK</p> <p>ENGINE MECHANICAL PROBLEM</p> <p>O2 SENSOR</p> <p>O2 SIGNAL CIRCUIT</p> <p>O2 RETURN CIRCUIT</p> <p>FUEL CONTAMINATION</p>

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Check the vehicle repair history. If the O2 has been replaced ensure that the O2 sensor was properly installed and meets OEM specification.</b></p> <p><b>NOTE: Check for contaminants that may have damaged the O2 Sensor: contaminated fuel, unapproved silicone, oil and coolant.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.</p> <p><b>WARNING: To avoid personal injury from the exhaust system being hot, allow the exhaust to cool down to a safe temperature before performing a physical inspection.</b></p> <p>Visually and Physically inspect the for holes, cracks and blockage in the exhaust system.</p> <p>Is the exhaust system in good condition?</p> <p>Yes → Go To 3</p> <p>No → Repair or Replace as necessary.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P2096-DOWN STREAM FUEL TRIM LEAN BANK 1 — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Check for any of the following conditions/mechanical problems.</p> <p>AIR INDUCTION SYSTEM - must be free from leaks.</p> <p>ENGINE VACUUM - must be at least 13 inches in neutral</p> <p>ENGINE VALVE TIMING - must be within specifications</p> <p>ENGINE COMPRESSION - must be within specifications</p> <p>ENGINE EXHAUST SYSTEM - must be free of any restrictions or leaks.</p> <p>ENGINE PCV SYSTEM - must flow freely</p> <p>TORQUE CONVERTER STALL SPEED - must be within specifications</p> <p>POWER BRAKE BOOSTER - no internal vacuum leaks</p> <p>FUEL - must be free of contamination</p> <p>FUEL INJECTOR - plugged or restricted injector; control wire not connected to correct injector</p> <p>Are there any engine mechanical problems?</p> <p>Yes → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Ignition on, engine not running.</p> <p>Disconnect the O2 Sensor harness connector.</p> <p>With the DRBIII®, monitor the O2 Sensor voltage.</p> <p>The O2 Sensor voltage should read 5.0 volts on the DRBIII® with the connector disconnected.</p> <p>Using a jumper wire, jump the O2 Signal circuit to the O2 Return circuit in the O2 Sensor harness connector.</p> <p><b>NOTE: The voltage should drop from 5.0 volts to 2.5 volts with the jumper wire in place.</b></p> <p>Did the O2 Sensor volts change from 5.0 volts to 2.5 volts?</p> <p>Yes → Replace the O2 Sensor Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Remove the jump wire.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, monitor the O2 Sensor voltage.</p> <p>Is the voltage above 4.8 volts?</p> <p>Yes → Go To 6</p> <p>No → Check the O2 Signal circuit for a short to ground, open, or short to voltage. Inspect the O2 Sensor connector and the PCM harness connector. If OK, replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Measure the voltage on the O2 Return circuit in the O2 Sensor harness connector.</p> <p>Is the voltage at 2.5 volts?</p> <p>Yes → Check the fuel system for contaminants. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Check the O2 Return circuit for a short to ground, open, or short to voltage. Inspect the O2 Sensor connector and the PCM harness connector. If OK, replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P2100-ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT**

**P2118-ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P2100-ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT.**

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**When Monitored and Set Condition:**

**P2100-ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT**

When Monitored: With the ignition on and the ETC Motor is not in Limp Home mode.

Set Condition: When the PCM detects an internal error or a short between the ETC Motor- and ETC Motor + circuits in the ETC Motor Driver. One trip fault. ETC light is flashing.

**P2118-ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE**

When Monitored: Ignition on and ETC Motor is not in Limp Home mode.

Set Condition: Too large of a PWM requested to the ETC motor for too long. +/- 25% duty cycle is usually enough to run the ETC motor. If too large of duty cycle is needed for long periods of time this fault is set. One trip fault. Three good trips to turn off the MIL. ETC light is flashing.

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**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

THROTTLE PLATE / BORE INSPECTION

(K447) ETC POSITIVE CIRCUIT SHORTED TO VOLTAGE

(K448) ETC NEGATIVE CIRCUIT SHORTED TO VOLTAGE

(K447) ETC POSITIVE CIRCUIT SHORTED TO (K448) ETC NEGATIVE CIRCUIT

(K447) ETC POSITIVE CIRCUIT OPEN

(K447) ETC POSITIVE CIRCUIT SHORTED TO GROUND

(K448) ETC NEGATIVE CIRCUIT OPEN

(K448) ETC NEGATIVE CIRCUIT SHORTED TO GROUND

ETC MOTOR

PCM

## P2100-ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p><b>NOTE: If the P2100 is intermittent it is possible that the controller is overheating in extreme hot temperatures, and this is considered normal operation. No repair is necessary.</b></p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Look closely at the temperatures at which this DTC set.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.</p> <p>Remove the Air Cleaner Assembly from the Throttle Body.</p> <p>Check for any signs of a foreign material (ice or dirt) on the Throttle Plate or in the bore causing the Throttle Plate to stick.</p> <p>Were any signs of foreign material or scoring of the throttle plate or bore found?</p> <p>Yes → Remove the debris if possible or replace the Throttle Body Assembly. Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition off.</p> <p>Disconnect the Throttle Body harness connector.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>With a 12-volt test light connected to ground, probe the (K447) ETC Positive circuit at the Throttle Body harness connector.</p> <p>Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage on the (K447) ETC Positive circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Using a 12-volt test light connected to ground, probe the (K447) ETC Negative circuit at the Throttle Body harness connector.</p> <p>Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (K448) ETC Negative circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Measure the resistance between the (K447) ETC Positive circuit and the (K448) ETC Negative circuit at the Throttle Body harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to between the (K447) ETC Positive circuit and the (K448) ETC Negative circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All

## P2100-ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K447) ETC Positive circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K447) ETC Positive circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Measure the resistance between ground and the (K447) ETC Positive circuit between the appropriate terminals of special tool #8815.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K447) ETC Positive circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K448) ETC Negative circuit between the Throttle Body harness connector and the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the (K448) ETC Negative circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
9	<p>Measure the resistance between ground and the (K448) ETC Negative circuit between the appropriate terminals of special tool #8815.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K448) ETC Negative circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 10</p>	All
10	<p><b>NOTE: Take the following measurement using special tool #8815 to avoid possible damage to the Throttle Body harness connector.</b></p> <p>Measure the resistance of the ETC Motor between the (K447) ETC Positive circuit and the (K448) ETC Negative circuit at the appropriate terminals of special tool #8815.</p> <p>Is the resistance between 2.5 and 25 ohms at closed throttle?</p> <p>Yes → Go To 11</p> <p>No → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**P2100-ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT —**  
**Continued**

TEST	ACTION	APPLICABILITY
11	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:**

**P2101-ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE**

**When Monitored and Set Condition:**

**P2101-ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE**

When Monitored: With the vehicle running, ETC Motor not in Limp Home mode, and the TPS adaptation is complete.

Set Condition: The PCM recognizes too large of an error between the actual position of the Throttle Plate and the Set Point position. One trip fault. Three good trips to turn off the MIL ETC light is flashing.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

THROTTLE PLATE / BORE INSPECTION

THROTTLE POSITION IS NOT WITHIN 2° DEGREES OF DESIRED THROTTLE POSITION

ETC MOTOR OPERATION

INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Before continuing visually inspect the throttle blade and bore for any obstructions.</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>While reviewing the Freeze Frame data take notice to the Ambient temperature at which the DTC set because icing of the Throttle Body can cause this DTC to set.</p> <p>Does the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.</p> <p>Remove the Air Cleaner Assembly from the Throttle Body.</p> <p>Check for any signs of a foreign material (ice or dirt) on the Throttle Plate or in the bore causing the Throttle Plate to stick.</p> <p>Manually open and close the throttle plate using your hands.</p> <p>Does the Throttle Plate move?</p> <p>Yes → Go To 3</p> <p>No → Remove the debris if possible or replace the Throttle Body Assembly. Disconnect the Battery when replacing the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select LEARN ETC.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P2101-ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE — Continued

TEST	ACTION	APPLICABILITY
3	<p>Start the engine.            Allow the engine to reach normal operating temperature.            With the DRBIII® in Sensors, monitor the Actual Throttle Position and Desired Throttle Position.            Compare the Actual Throttle Position and the Set Point Throttle Position.            Is the Actual Throttle Position within 2° degrees of the Desired Throttle Position?</p> <p>Yes → Go To 4</p> <p>No → Replace the Throttle Body Assembly. Disconnect the Battery when replacing the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select LEARN ETC.function.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Ignition on, engine not running.            With the DRBIII®, actuate the Electronic Throttle Control Motor.  <b>NOTE: It may be necessary to use a mirror to see the throttle blade.</b>            Observe the throttle blade.  <b>NOTE: Ensure the motion of the throttle blade is smooth and that it opens and closes.</b>            Did the ETC motor operate properly?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P2106-ETC SYSTEM - FORCED LIMITED POWER

## When Monitored and Set Condition:

### P2106-ETC SYSTEM - FORCED LIMITED POWER

When Monitored: Ignition on.

Set Condition: This DTC sets for OBDII MIL illumination purposes. This DTC will always have associated DTCs indicating a system failure. Engine speed is being limited and/or throttle motor is power free.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.  <b>NOTE: This is only an informational DTC. This code should set along with other DTCs. All other DTCs must be properly diagnosed before continuing.</b>            The RPM or power are limited when P2106 sets for safety reasons because other ETC related DTCs have set.            Did the P2106 set by itself?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information.</p> <p>No → Test Complete.</p>	All

**Symptom:****P2110-ELECTRONIC THROTTLE CONTROL - FORCED LIMIT RPM****When Monitored and Set Condition:****P2110-ELECTRONIC THROTTLE CONTROL - FORCED LIMIT RPM**

When Monitored: Ignition on and ETC is working.

Set Condition: When the PCM requests to limit engine speed if PWM is too high for 20.5 seconds and before P2118 sets. One trip fault. ETC light is illuminated.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

THROTTLE PLATE STUCK

(K447) ETC POSITIVE CIRCUIT OPEN

(K448) ETC NEGATIVE CIRCUIT OPEN

(K447) ETC POSITIVE CIRCUIT SHORTED TO GROUND

(K448) ETC NEGATIVE CIRCUIT SHORTED TO GROUND

ETC MOTOR

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII® read DTCs and record the related Freeze Frame data.            In the Freeze Frame data, look at the temperature at which the fault occurred. If it occurred in extreme cold temperatures, Icing of the throttle body may have caused this code to set.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Remove the Air Cleaner Assembly from the Throttle Body.            Check for any signs of a foreign material (ice or dirt) causing the Throttle to stick.            Manually open and close the throttle plate using your hands.            Does the Throttle Plate move?</p> <p>Yes → Go To 3</p> <p>No → Remove the debris if possible or replace the Throttle Body Assembly. Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P2110-ELECTRONIC THROTTLE CONTROL - FORCED LIMIT RPM — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K447) ETC Positive circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (K447) ETC Positive circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K448) ETC Negative circuit between the Throttle Body harness connector and the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K448) ETC Negative circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between a known good ground and the (K447) ETC Positive circuit at the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K447) ETC Positive circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between a known good ground and the (K448) ETC Negative circuit at the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K448) ETC Negative circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p><b>NOTE: Take the following measurement using special tool #8815 to avoid possible damage to the Throttle Body harness connector.</b></p> <p>Measure the resistance of the ETC Motor between the (K447) ETC Positive circuit and the (K448) ETC Negative circuit at the appropriate terminals of special tool #8815.</p> <p>Is the resistance between 2.5 and 25 ohms at closed throttle?</p> <p>Yes → Go To 8</p> <p>No → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P2110-ELECTRONIC THROTTLE CONTROL - FORCED LIMIT RPM —  
Continued**

TEST	ACTION	APPLICABILITY
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### **P2111-ELECTRONIC THROTTLE CONTROL - UNABLE TO CLOSE**

#### When Monitored and Set Condition:

#### **P2111-ELECTRONIC THROTTLE CONTROL - UNABLE TO CLOSE**

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: Just after key on, the throttle is opened and closed to test the system. If the TP Sensor does not return to Limp Home Position at the end of this test, this DTC will set. One trip fault. ETC light is flashing.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

THROTTLE PLATE STUCK ABOVE LIMP HOME POSITION

TP SENSOR NO.1 AND TP SENSOR NO.2 BOTH READ 2.5 VOLTS

(K447) ETC POSITIVE CIRCUIT SHORTED TO VOLTAGE

(K447) ETC POSITIVE CIRCUIT OPEN

(K448) ETC NEGATIVE CIRCUIT OPEN

(K447) ETC POSITIVE CIRCUIT SHORTED TO GROUND

(K448) ETC NEGATIVE CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p><b>NOTE: The PCM tests the ETC Motor by opening and closing the Throttle Plate before starting the engine. If during this test the Throttle plate does not return to the closed position this DTC sets.</b></p> <p>With the DRBIII® read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



## P2111-ELECTRONIC THROTTLE CONTROL - UNABLE TO CLOSE — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.</p> <p><b>NOTE: The PCM tests the ETC Motor by opening and closing the Throttle Plate before starting the engine. If during this test the Throttle plate does not return to the closed position this DTC sets.</b></p> <p>Remove the Air Cleaner Assembly from the Throttle Body.</p> <p>Check for any signs of a foreign material causing the Throttle to remain open.</p> <p>Manually open and close the throttle plate using your hands.</p> <p>Does the Throttle Plate move?</p> <p>Yes → Go To 3</p> <p>No → Remove the debris if possible or replace the Throttle Body Assembly. Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>With the DRBIII®, perform the Throttle Follower test while reading both TP Sensor voltage readings.</p> <p>Are both TP Sensor readings stuck at 2.5 volts?</p> <p>Yes → Check the TP Sensor Signal circuits for excessive resistance, a short to each other, or short to the Sensor Return circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the Throttle Body harness connector.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>With a 12-volt test light connected to ground, probe the (K447) ETC Positive circuit in the Throttle Body harness connector.</p> <p>Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage on the (K447) ETC Positive circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K447) ETC Positive circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K447) ETC Positive circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P2111-ELECTRONIC THROTTLE CONTROL - UNABLE TO CLOSE —**  
**Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K448) ETC Negative circuit between the Throttle Body harness connector and the appropriate terminal of special tool #8815.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K448) ETC Negative circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Measure the resistance between a known good ground and the (K447) ETC Positive circuit at the appropriate terminal of special tool #8815.  Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K447) ETC Positive circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p>Measure the resistance between a known good ground and the (K448) ETC Negative circuit at the appropriate terminal of special tool #8815.  Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K448) ETC Negative circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.  If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P2112-ELECTRONIC THROTTLE CONTROL - UNABLE TO OPEN****When Monitored and Set Condition:****P2112-ELECTRONIC THROTTLE CONTROL - UNABLE TO OPEN**

When Monitored: Ignition on.

Set Condition: Just after key on, the throttle is opened and closed to test the system. If the TP Sensor does not quickly exceed a calibrated value this DTC will set. One trip fault. ETC light is flashing.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

THROTTLE PLATE STUCK AT OR BELOW LIMP HOME POSITION

(K448) ETC NEGATIVE CIRCUIT SHORTED TO VOLTAGE

(K447) ETC POSITIVE CIRCUIT OPEN

(K448) ETC NEGATIVE CIRCUIT OPEN

(K447) ETC POSITIVE CIRCUIT SHORTED TO GROUND

(K448) ETC NEGATIVE CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p><b>NOTE: The PCM tests the ETC Motor by opening and closing the Throttle Plate before starting the engine. If during this test the Throttle plate does not open causing this DTC set.</b></p> <p>With the DRBIII® read DTCs and record the related Freeze Frame data.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P2112-ELECTRONIC THROTTLE CONTROL - UNABLE TO OPEN — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.</p> <p><b>NOTE: The PCM tests the ETC Motor by opening and closing the Throttle Plate before starting the engine. If during this test the Throttle plate does not return to the closed position this DTC sets.</b></p> <p>Remove the Air Cleaner Assembly from the Throttle Body.</p> <p>Check for any signs of a foreign material causing the Throttle to remain open.</p> <p>Manually open and close the throttle plate using your hands.</p> <p>Does the Throttle Plate move?</p> <p>Yes → Go To 3</p> <p>No → Remove the debris if possible or replace the Throttle Body Assembly. Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p>Disconnect the PCM harness connectors.</p> <p>Disconnect the Throttle Body harness connector.</p> <p>Using a 12-volt test light connected to ground, probe the (K448) ETC Negative circuit at the Throttle Body harness connector.</p> <p>Does the test light illuminate brightly?</p> <p>Yes → Repair the short to voltage in the (K448) ETC Negative circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K447) ETC Positive circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K447) ETC Positive circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K448) ETC Negative circuit between the Throttle Body harness connector and the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K448) ETC Negative circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P2112-ELECTRONIC THROTTLE CONTROL - UNABLE TO OPEN — Continued

TEST	ACTION	APPLICABILITY
6	<p>Measure the resistance between a known good ground and the (K447) ETC Positive circuit at the appropriate terminal of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K447) ETC Positive circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All
7	<p>Measure the resistance between a known good ground and the (K448) ETC Negative circuit at the appropriate terminal of special tool #8815. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K448) ETC Negative circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	All
8	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P2115-ACCELERATOR PEDAL POSITION SENSOR NO.1 MINIMUM STOP PERFORMANCE**

**P2116-ACCELERATOR PEDAL POSITION SENSOR NO.2 MINIMUM STOP PERFORMANCE**

**P2166-ACCELERATOR PEDAL POSITION SENSOR NO.1 MAXIMUM STOP PERFORMANCE**

**P2167-ACCELERATOR PEDAL POSITION SENSOR NO.2 MAXIMUM STOP PERFORMANCE**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P2115-ACCELERATOR PEDAL POSITION SENSOR NO.1 MINIMUM STOP PERFORMANCE.**

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**When Monitored and Set Condition:**

**P2115-ACCELERATOR PEDAL POSITION SENSOR NO.1 MINIMUM STOP PERFORMANCE**

When Monitored: Ignition on. During in plant mode the APP Sensors need to be checked to make sure that idle and full pedal travel can be reached on both sensors.

Set Condition: APPS #1 has failed to achieve the required minimum value during In Plant testing. One trip fault. Engine will only idle.

**P2116-ACCELERATOR PEDAL POSITION SENSOR NO.2 MINIMUM STOP PERFORMANCE**

When Monitored: Ignition on. During in plant mode the APP Sensors need to be checked to make sure that idle and full pedal travel can be reached on both sensors.

Set Condition: APPS #2 has failed to achieve the required minimum value during In Plant testing. One trip fault. Engine will only idle.

**P2166-ACCELERATOR PEDAL POSITION SENSOR NO.1 MAXIMUM STOP PERFORMANCE**

When Monitored: Ignition on. During in plant mode the APP Sensors need to be checked to make sure that idle and full pedal travel can be reached on both sensors.

Set Condition: APPS #1 has failed to achieve the required maximum value during In Plant testing. One trip fault. Engine will only idle.

**P2167-ACCELERATOR PEDAL POSITION SENSOR NO.2 MAXIMUM STOP PERFORMANCE**

When Monitored: Ignition on. During in plant mode the APP Sensors need to be checked to make sure that idle and full pedal travel can be reached on both sensors.

Set Condition: APPS #2 has failed to achieve the required maximum value during In Plant testing. One trip fault. Engine will only idle.

## P2115-ACCELERATOR PEDAL POSITION SENSOR NO.1 MINIMUM STOP PERFORMANCE — Continued

### POSSIBLE CAUSES

IN PLANT TEST FAILURE  
APPS RELEARN

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. sdf  <b>NOTE: This DTC is set when the APP Sensors are learned in plant but do not reach the Minimum or Maximum voltage range.</b>            With the DRBIII® read DTCs and record the related Freeze Frame data.            With the DRBIII®, erase DTCs.            Start the engine.            With the DRBIII®, read DTCs.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>With the DRBIII®, choose the Misc Menu and select the LEARN ETC function.            With the DRBIII®, erase DTCs.            Start the engine.            Does the DTC return?</p> <p>Yes → Replace the APPS Assembly per Service Information. When installation is completed, with the DRBIII® select Misc. Menu and select the ETC RELEARN function. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Test Complete.</p>	All

**Symptom:**

**P2122-ACCELERATOR PEDAL POSITION SENSOR NO.1 LOW**

**When Monitored and Set Condition:**

**P2122-ACCELERATOR PEDAL POSITION SENSOR NO.1 LOW**

When Monitored: With the ignition on and no other APPS #1 DTCs present.

Set Condition: When the APP Sensor #1 voltage is too low. Engine will only idle if the Brake pedal is Pressed or has failed. Acceleration rate and Engine output are limited. One trip fault. ETC light is flashing.

**POSSIBLE CAUSES**

APP SENSOR NO.1 SWEEP

INTERMITTENT CONDITION

(F855) 5-VOLT SUPPLY CIRCUIT OPEN

(F855) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

APP SENSOR

(K23) APP SENSOR NO.1 SIGNAL CIRCUIT OPEN

(K23) APP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO GROUND

(K23) APP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO SENSOR RETURN CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the APP Sensor No.1 voltage. Is the voltage below 0.25 of a volt?  Yes → Go To 2 No → Go To 10	All
2	Turn the ignition off. Disconnect the APP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (F855) 5-volt Supply circuit in the APP Sensor harness connector. Is the voltage between 4.5 and 5.2 volts?  Yes → Go To 3 No → Go To 7	All



**P2122-ACCELERATOR PEDAL POSITION SENSOR NO.1 LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Connect a jumper wire between the (F855) 5-volt Supply circuit and the (K23) APP Sensor No.1 Signal circuit in the Sensor harness connector.</p> <p>With the DRBIII®, monitor the APP Sensor No.1 voltage.</p> <p>Is the voltage above 4.5 volts?</p> <p>Yes → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC RELEARN function to relearn the APPS values.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K23) APP Sensor No.1 Signal circuit from the APP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K23) APP Sensor No.1 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (K23) APP Sensor No.1 Signal circuit at the APP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K23) APP Sensor No.1 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between the (K23) APP Sensor No.1 Signal circuit and the (K167) Sensor No.1 Return circuit at the APP Sensor harness connector.</p> <p>Measure the resistance between the (K23) APP Sensor No.1 Signal circuit and the (K400) Sensor No.2 Return circuit at the APP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the appropriate Sensor Return circuit and the (K255) APP Sensor No.1 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All

**P2122-ACCELERATOR PEDAL POSITION SENSOR NO.1 LOW — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F855) 5-volt Supply circuit from the Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p>Measure the resistance between ground and the (F855) 5-volt Supply circuit in the APP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
10	<p>Ignition on, engine not running. With the DRBIII®, monitor the APP Sensor No.1 voltage. Slowly press the Accelerator pedal down. Does voltage start at approximately 0.45 of a volt and go above 4.6 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC RELEARN function to relearn the APPS values. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P2123-ACCELERATOR PEDAL POSITION SENSOR NO.1 HIGH****When Monitored and Set Condition:****P2123-ACCELERATOR PEDAL POSITION SENSOR NO.1 HIGH**

When Monitored: With the ignition on and no other APPS #1 DTCs present.

Set Condition: When APP Sensor #1 voltage is too high. Engine will only idle if the Brake pedal is Pressed or has failed. Acceleration rate and Engine output are limited. One trip fault. ETC light is flashing.

**POSSIBLE CAUSES**

INTERMITTENT CONDITION

APP SENSOR

(K23) APP SENSOR NO.1 SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K23) APP SENSOR NO.1 SIGNAL SHORTED TO 5-VOLT SUPPLY CIRCUIT

(K167) APP SENSOR NO.1 RETURN CIRCUIT OPEN

APP SENSOR NO.1 SWEEP

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII® in Sensors, read the APP Sensor No.1 voltage. Is the voltage above 4.8 volts?  Yes → Go To 2 No → Go To 7	All
2	With the DRBIII®, monitor the Accelerator Pedal Position Sensor voltage with the Sensor still disconnected. Is the voltage above 4.5 volts?  Yes → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC RELEARN function to relearn the APPS values. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All

## P2123-ACCELERATOR PEDAL POSITION SENSOR NO.1 HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage on the (K23) APP Sensor No.1 Signal circuit at the APP Sensor harness connector. Is the voltage above 5.2 volts?</p> <p>Yes → Repair the short to voltage in the (K23) APP Sensor No.1 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Measure the resistance between the (K23) APP Sensor No.1 Signal circuit and the (F855) 5-volt Supply circuit at the APP Sensor harness connector. Measure the resistance between the (K23) APP Sensor No.1 Signal circuit and the (F856) 5-volt Supply circuit at the APP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K23) APP Sensor No.1 Signal circuit and the appropriate 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K167) APP Sensor No.1 Return circuit from the APP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K167) APP Sensor No.1 Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P2123-ACCELERATOR PEDAL POSITION SENSOR NO.1 HIGH — Continued

TEST	ACTION	APPLICABILITY
7	<p>Ignition on, engine not running.            With the DRBIII®, monitor the Accelerator Pedal Position Sensor voltage.            Slowly press the Accelerator Pedal down.            Does voltage start at approximately 0.45 of a volt and go above 4.6 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC LEARN function to relearn the APPS values.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:**

**P2127-ACCELERATOR PEDAL POSITION SENSOR NO.2 LOW**

**When Monitored and Set Condition:**

**P2127-ACCELERATOR PEDAL POSITION SENSOR NO.2 LOW**

When Monitored: With the ignition on and no other APPS #2 DTCs present.

Set Condition: When APP Sensor #2 voltage is too low. Engine will only idle if the Brake pedal is Pressed or has failed. Acceleration rate and Engine output are limited. One trip fault. ETC light is flashing.

**POSSIBLE CAUSES**

APP SENSOR NO.2 SWEEP

INTERMITTENT CONDITION

(F856) 5-VOLT SUPPLY CIRCUIT OPEN

(F856) 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND

APP SENSOR

(K29) APP SENSOR NO.2 SIGNAL CIRCUIT OPEN

(K29) APP SENSOR NO.2 SIGNAL CIRCUIT SHORTED TO GROUND

(K29) APP SENSOR NO.2 SIGNAL CIRCUIT SHORTED TO SENSOR RETURN CIRCUIT

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read the APP Sensor No.2 voltage. Is the voltage below 0.18 of a volt?  Yes → Go To 2 No → Go To 10	All
2	Turn the ignition off. Disconnect the APP Sensor harness connector. Ignition on, engine not running. Measure the voltage on the (F856) 5-volt Supply circuit in the APP Sensor harness connector. Is the voltage between 4.5 and 5.2 volts?  Yes → Go To 3 No → Go To 7	All

**P2127-ACCELERATOR PEDAL POSITION SENSOR NO.2 LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Connect a jumper wire between the (F856) 5-volt Supply circuit and the (K29) APP Sensor No.2 Signal circuit in the Sensor harness connector.</p> <p>With the DRBIII®, monitor the APP Sensor No.2 voltage.</p> <p>Is the voltage above 4.5 volts?</p> <p>Yes → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC RELEARN function to relearn the APPS values.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K29) APP Sensor No.2 Signal circuit from the APP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the open in the (K29) APP Sensor No.2 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
5	<p>Measure the resistance between ground and the (K29) APP Sensor No.2 Signal circuit at the APP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K29) APP Sensor No.2 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 6</p>	All
6	<p>Measure the resistance between the (K29) APP Sensor No.2 Signal circuit and the (K400) APPS #2 Sensor Return circuit at the APP Sensor harness connector.</p> <p>Measure the resistance between the (K29) APP Sensor No.2 Signal circuit and the (K167) APPS #1 Sensor Return circuit at the APP Sensor harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the appropriate APP Sensor Return circuit and the (K29) APP Sensor No.2 Signal circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All

**P2127-ACCELERATOR PEDAL POSITION SENSOR NO.2 LOW — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F856) 5-volt Supply circuit from the APP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the open in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
8	<p>Measure the resistance between ground and the (F856) 5-volt Supply circuit in the APP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
10	<p>Ignition on, engine not running. With the DRBIII®, monitor the APP Sensor No.2 voltage. Slowly press the Accelerator pedal down. Does voltage start at approximately 0.22 of a volt and go above 2.31 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC RELEARN function to relearn the APPS values. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**Symptom:****P2128-ACCELERATOR PEDAL POSITION SENSOR NO.2 HIGH****When Monitored and Set Condition:****P2128-ACCELERATOR PEDAL POSITION SENSOR NO.2 HIGH**

When Monitored: With the ignition on and no other APPS #2 DTCs present.

Set Condition: When APP Sensor #2 voltage is too high. Engine will only idle if the Brake pedal is Pressed or has failed. Acceleration rate and Engine output are limited. One trip fault. ETC light is flashing.

**POSSIBLE CAUSES**

APP SENSOR NO.2 SWEEP

INTERMITTENT CONDITION

APP SENSOR

(K29) APP SENSOR NO.2 SIGNAL CIRCUIT SHORTED TO VOLTAGE

(K29) APP SENSOR NO.2 SIGNAL SHORTED TO 5-VOLT SUPPLY CIRCUIT

(K400) APP SENSOR NO.2 RETURN CIRCUIT OPEN

PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII® in Sensors, read the APP Sensor No.2 voltage. Is the voltage above 3.0 volts?  Yes → Go To 2 No → Go To 7	All
2	With the DRBIII®, monitor the Accelerator Pedal Position Sensor No.2 voltage with the Sensor still disconnected. Is the voltage above 3.0 volts?  Yes → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC RELEARN function to relearn the APPS values. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 3	All

## P2128-ACCELERATOR PEDAL POSITION SENSOR NO.2 HIGH — Continued

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage on the (K29) APP Sensor No.2 Signal circuit in the Throttle Body harness connector. Is the voltage above 5.0 volts?</p> <p>Yes → Repair the short to voltage in the (K29) APP Sensor No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off. Measure the resistance between the (K29) APP Sensor No.2 Signal circuit and the (F856) 5-volt Supply circuit at the APP Sensor harness connector. Measure the resistance between the (K29) APP Sensor No.2 Signal circuit and the (F855) 5-volt Supply circuit at the APP Sensor harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short between the (K29) APP Sensor No.2 Signal circuit and the appropriate 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K400) APP Sensor No.2 Return circuit from the APP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (K400) APP Sensor No.2 Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P2128-ACCELERATOR PEDAL POSITION SENSOR NO.2 HIGH — Continued

TEST	ACTION	APPLICABILITY
7	<p>Ignition on, engine not running.            With the DRBIII®, monitor the APP Sensor No.2 voltage.            Slowly press the Accelerator pedal down.            Does voltage start at approximately 0.22 of a volt and go above 2.31 volts with a smooth transition?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC RELEARN function to relearn the APPS values.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:**

**P2138-ACCELERATOR PEDAL POSITION SENSOR NO.1 AND NO.2 VOLTAGE CORRELATION**

**When Monitored and Set Condition:**

**P2138-ACCELERATOR PEDAL POSITION SENSOR NO.1 AND NO.2 VOLTAGE CORRELATION**

When Monitored: With the ignition on and no APPS #1 and APPS #2 DTC present.

Set Condition: APPS values #1 and #2 are not coherent. Engine will only idle if the Brake pedal is Pressed or failed. Acceleration rate and Engine output are limited. One trip fault. ETC light is flashing.

**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

EXCESSIVE RESISTANCE IN THE 5-VOLT SUPPLY CIRCUITS

EXCESSIVE RESISTANCE IN THE SENSOR RETURN CIRCUITS

CHECKING APPS 1 AND 2 WITH LAB SCOPE

EXCESSIVE RESISTANCE IN THE APP SENSOR SIGNAL CIRCUITS

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p><b>NOTE: Repeat the following test for both APP Sensor signal circuits.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance of (K23) APP Sensor No.1 and (K29) No.2 Signal circuits from the APP Sensor harness connector to the appropriate terminals of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 3</p> <p>No → Repair the excessive resistance in the appropriate APP Sensor Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## P2138-ACCELERATOR PEDAL POSITION SENSOR NO.1 AND NO.2 VOLTAGE CORRELATION — Continued

TEST	ACTION	APPLICABILITY
3	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (F855) 5-volt Supply circuit from the APP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Measure the resistance of the (F856) 5-volt Supply circuit from the APP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the excessive resistance in the (F856) or (F855) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 4</p>	All
4	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K167) APP Sensor No.1 Return circuit from the APP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Measure the resistance of the (K167) APP Sensor No.2 Return circuit from the APP Sensor harness connector to the appropriate terminal special tool #8815.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the excessive resistance in the (K167) or (K400) Sensor Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p>Ignition on, engine not running.</p> <p>With the DRBIII®/PEP Module being used as a Dual Channel Lab Scope with Miller Special tool #6801.</p> <p>Backprobe APP Sensor No.1 Signal circuit using Channel 1 at the APP Sensor harness connector.</p> <p>Backprobe APP Sensor No.2 Signal circuit using Channel 2 at the APP Sensor harness connector.</p> <p>Slowly press and release the Accelerator Pedal while monitoring the DRBIII® screen.</p> <p>Compare the Scope Pattern on the DRBIII® with Charts and Graphs Typical APP Sensor Signal Scope Patterns.</p> <p>Does the scope pattern match the Typical APP Sensor Signal Scope Pattern?</p> <p>Yes → Go To 6</p> <p>No → Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC RELEARN function to relearn the APPS values. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P2161-VEHICLE SPEED SIGNAL NO.2 ERRATIC

#### When Monitored and Set Condition:

#### P2161-VEHICLE SPEED SIGNAL NO.2 ERRATIC

When Monitored: Ignition on.

Set Condition: PCM recognizes Vehicle speed input #2 erratic or high. VSS #2 is based on the average of the Front Wheel Speeds. One trip fault. No MIL and No ETC light. Cruise is disabled.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

(B222) VEHICLE SPEED NO.2 SIGNAL CIRCUIT SHORTED TO VOLTAGE

(B222) VEHICLE SPEED NO.2 SIGNAL CIRCUIT OPEN

(B222) VEHICLE SPEED NO.2 SIGNAL CIRCUIT SHORTED TO GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.  <b>NOTE: Check for active DTCs stored in the CAB Module. Any VSS DTCs in the CAB Module must be properly diagnosed before continuing.</b>            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Disconnect the CAB Module harness connector.            Disconnect the PCM harness connectors.            Ignition on, engine not running.            Measure the voltage of the (B222) Vehicle Speed No.2 Signal circuit at the CAB Module harness connector.            Is the voltage above 6.0 volts?</p> <p>Yes → Repair the short to voltage in the (B222) Vehicle Speed No.2 Signal circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All

**P2161-VEHICLE SPEED SIGNAL NO.2 ERRATIC — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (B222) Vehicle Speed No.2 Signal circuit from the CAB Module harness connector to the appropriate terminal special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the (B222) Vehicle Speed No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Measure the resistance between ground and the (B222) Vehicle Speed No.2 Signal circuit in the CAB Module harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (B222) Vehicle Speed No.2 Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All
5	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there is no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P2172-HIGH AIR FLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)**

**P2173-HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)**

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**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be P2172-HIGH AIR FLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION).

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**When Monitored and Set Condition:**

**P2172-HIGH AIR FLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)**

When Monitored: Ignition on and engine running with no MAP Sensor DTCs.

Set Condition: A large vacuum leak has been detected or both of the TP Sensors have failed based on their position being 2.5 volts and the calculated MAP value is less than the actual MAP minus an Offset value. One trip fault. ETC light will flash.

**P2173-HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)**

When Monitored: Ignition on and engine running with no MAP Sensor DTCs.

Set Condition: A large vacuum leak has been detected or both of the TP Sensors have failed based on their position being 2.5 volts and the Gas Flow Adaptation value too high. One trip fault. ETC light will flash.

POSSIBLE CAUSES
GOOD TRIP EQUAL TO ZERO
VACUUM LEAK
RESISTANCE IN THE (F856) 5-VOLT SUPPLY CIRCUIT
RESISTANCE BETWEEN GROUND AND THE (F856) 5-VOLT SUPPLY CIRCUIT
MAP SENSOR
RESISTANCE IN THE (K1) MAP SIGNAL CIRCUIT
RESISTANCE BETWEEN GROUND AND THE (K1) MAP SIGNAL CIRCUIT
RESISTANCE IN (K900) SENSOR GROUND CIRCUIT
TP SENSOR OPERATION
RESISTANCE IN THE (F855) 5-VOLT SUPPLY CIRCUIT
RESISTANCE BETWEEN GROUND AND THE (F855) 5-VOLT SUPPLY CIRCUIT
TP SENSOR
RESISTANCE IN THE TP SENSOR SIGNAL CIRCUIT



## P2172-HIGH AIR FLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION) — Continued

### POSSIBLE CAUSES

RESISTANCE BETWEEN GROUND AND THE TP SENSOR SIGNAL CIRCUIT  
 RESISTANCE IN THE (K922) SENSOR RETURN CIRCUIT  
 PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: The most likely cause of this DTC is a vacuum leak.</b>  <b>NOTE: Diagnose any TP Sensor or MAP Sensor component DTCs before continuing.</b>  <b>NOTE: The throttle plate should be free from binding and carbon build up.</b>            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
2	<p><b>NOTE: This code is enabled on engines with a plastic intake manifold and is intended to limit the maximum engine speed if a large crack occurs.</b>  <b>NOTE: A large vacuum leak is most likely the cause of this DTC.</b>            Inspect the Intake Manifold and Throttle body for leaks and cracks.            Inspect the Power Brake Booster for any vacuum leaks.            Inspect the PCV system for proper operation or any vacuum leaks.            Inspect the MAP Sensor for proper installation.            Were any vacuum leaks found?</p> <p>Yes → Repair the vacuum leak as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	MAGNUM 5.7L SMPI V8
3	<p>Start the engine.            With the DRBIII®, monitor the MAP Sensor voltage.            Snap the Accelerator pedal.            Does the MAP Sensor voltage vary from below 2.0 volts at idle to above 3.5 volts at WOT?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	MAGNUM 5.7L SMPI V8
4	<p>Ignition on, engine not running.            With the DRBIII®, perform the Throttle Follower Test.            TP Sensor No.1 should start at approximately 0.8 of a volt and increase to 4.2 volts.            TP Sensor No.2 should start at approximately 4.2 volts and decrease to 0.8 of a volt.            Is the voltage transition smooth between the appropriate values?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	MAGNUM 5.7L SMPI V8

**P2172-HIGH AIR FLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION) — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.            Disconnect the Throttle Body harness connector.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (F855) 5-volt Supply circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 100 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the excessive resistance in the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
6	<p>Measure the resistance between ground and (F855) 5-volt Supply circuit between the appropriate terminals of special tool #8815.            Is the resistance above 100k ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the excessive resistance between ground and the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
7	<p>Connect the PCM harness connectors.            Ignition on, engine not running.            With the DRBIII®, monitor the TP Sensor voltage.            Connect a jumper wire between the (K22) TP Sensor No.1 Signal circuit and the (K922) Sensor Return circuit in the Throttle Body harness connector.            TP Sensor No.1 voltage should start at approximately 4.8 volts and decrease to 0.2 of a volt.            Connect a jumper wire between the (K122) TP Sensor No.2 Signal circuit and the (F855) 5-volt Supply circuit in the Throttle Body harness connector.            TP Sensor No.2 voltage should start at approximately 0 volts and increase to 4.8 to 5.2 volts.            Does the TP Sensor voltage change to the appropriate voltage?</p> <p>Yes → Disconnect the Battery before replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p>	MAGNUM 5.7L SMPI V8

## P2172-HIGH AIR FLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION) — Continued

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K22) and (K122) TP Signal circuits from the Throttle Body harness connector to the appropriate terminals of special tool #8815. Is the resistance below 5.0 ohms for each circuit?</p> <p>Yes → Go To 9</p> <p>No → Repair the excessive resistance in the (K22) or (K122) TP Sensor Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
9	<p>Measure the resistance between ground and the (K22) and (K122) TP Signal circuits at the appropriate terminals of special tool #8815. Is the resistance above 100k ohms for each circuit?</p> <p>Yes → Go To 10</p> <p>No → Repair the excessive resistance between ground and the (K22) or (K122) TP Sensor Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
10	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K922) Sensor Return circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 17</p> <p>No → Repair the excessive resistance in the (K922) Sensor Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
11	<p>Turn the ignition off. Disconnect the MAP Sensor harness connector. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F856) 5-volt Supply circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the excessive resistance in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**P2172-HIGH AIR FLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION) — Continued**

TEST	ACTION	APPLICABILITY
12	<p>Measure the resistance between ground and the (F856) 5-volt Supply circuit at the MAP Sensor harness connector. Is the resistance above 100k ohms?</p> <p>Yes → Go To 13</p> <p>No → Repair the excessive resistance between ground and the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
13	<p>Connect the PCM harness connectors. Ignition on, engine not running. With the DRBIII®, monitor the MAP Sensor voltage. Connect a jumper wire between the (K1) MAP Signal circuit and the (K900) Sensor ground circuit. Cycle the ignition switch from off to on. With the DRBIII®, monitor the MAP Sensor voltage. Does the DRBIII® display MAP voltage from approximately 4.9 volts to below 0.5 volt?</p> <p>Yes → Replace the MAP Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 14</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	MAGNUM 5.7L SMPI V8
14	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K1) MAP Signal circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 15</p> <p>No → Repair the excessive resistance in the (K1) MAP Signal circuit Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
15	<p>Measure the resistance between ground and the (K1) MAP Signal circuit at the MAP Sensor harness connector. Is the resistance above 100k ohms?</p> <p>Yes → Go To 16</p> <p>No → Repair the excessive resistance between ground and the (K1) MAP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**P2172-HIGH AIR FLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION) — Continued**

TEST	ACTION	APPLICABILITY
16	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 17</p> <p>No → Repair the excessive resistance in the (K900) Sensor ground circuit.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8
17	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	MAGNUM 5.7L SMPI V8

**Symptom List:**

**P2174-LOW AIRFLOW/RESTRICTION DETECTED (INSTANT ACCUMULATION)**

**P2175-LOW AIRFLOW/RESTRICTION DETECTED (SLOW ACCUMULATION)**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P2174-LOW AIRFLOW/RESTRICTION DETECTED (INSTANT ACCUMULATION).**

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**When Monitored and Set Condition:**

**P2174-LOW AIRFLOW/RESTRICTION DETECTED (INSTANT ACCUMULATION)**

When Monitored: Ignition on, no MAP Sensor or TP Sensor DTC present.

Set Condition: PCM calculated MAP value is greater than actual MAP value plus an offset value. One trip fault. Three good trips to turn off the MIL. ETC light will flash.

**P2175-LOW AIRFLOW/RESTRICTION DETECTED (SLOW ACCUMULATION)**

When Monitored: Ignition on and no MAP Sensor or TP Sensor DTC present.

Set Condition: MAP Sensor has failed in one of four ways based on the Gas Flow Adaptation value being too low. One trip fault. Three good trips to turn off the MIL. ETC light will flash.

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**POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO

RESTRICTED AIR INLET SYSTEM

RESISTANCE IN THE (F856) 5-VOLT SUPPLY CIRCUIT

RESISTANCE BETWEEN GROUND AND THE (F856) 5-VOLT SUPPLY CIRCUIT

MAP SENSOR

RESISTANCE IN THE (K1) MAP SIGNAL CIRCUIT

RESISTANCE BETWEEN GROUND AND THE (K1) MAP SIGNAL CIRCUIT

RESISTANCE IN (K900) SENSOR GROUND CIRCUIT

TP SENSOR OPERATION

RESISTANCE IN THE (F855) 5-VOLT SUPPLY CIRCUIT

RESISTANCE BETWEEN GROUND AND THE (F855) 5-VOLT SUPPLY CIRCUIT

TP SENSOR

RESISTANCE IN THE TP SENSOR SIGNAL CIRCUIT

RESISTANCE BETWEEN GROUND AND THE TP SENSOR SIGNAL CIRCUIT

RESISTANCE IN THE (K922) SENSOR RETURN CIRCUIT

**P2174-LOW AIRFLOW/RESTRICTION DETECTED (INSTANT ACCUMULATION) — Continued**

POSSIBLE CAUSES	
PCM	

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: The most likely cause of this DTC is an air intake restriction.</b>  <b>NOTE: Diagnose any TP Sensor or MAP Sensor component DTCs before continuing.</b>  <b>NOTE: The throttle plate should be free from binding and carbon build up.</b>            Ignition on, engine not running.            With the DRBIII®, read DTCs and record the related Freeze Frame data.            Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off.            Remove the Air Cleaner Assembly.            Remove the Air Filter.            Inspect the Throttle body opening for signal of any foreign material.            Were any restrictions or signs of foreign material found?</p> <p>Yes → Repair the restriction as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 3</p>	All
3	<p>Install the Air Cleaner components.            Start the engine.            With the DRBIII®, monitor the MAP Sensor voltage.            Snap the throttle.            Does the MAP Sensor voltage vary from below 2.0 volts at idle to above 3.5 volts at WOT?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	All
4	<p>Ignition on, engine not running.            With the DRBIII®, perform the Throttle Follower Test and monitor the TP Sensor voltage values while slowly depressing the throttle pedal from closed to WOT.            TP Sensor #1 should start at approximately 0.5 of a volt and increase to 4.5 volts.            TP Sensor #2 should start at approximately 4.5 volts and decrease to 0.5 of a volt.            Is the voltage transition smooth between the appropriate values?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All

**P2174-LOW AIRFLOW/RESTRICTION DETECTED (INSTANT ACCUMULATION) — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off.            Disconnect the Throttle Body harness connector.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the (F855) 5-volt Supply circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 100 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the excessive resistance in the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
6	<p>Measure the resistance between ground and (F855) 5-volt Supply circuit at the Throttle Body harness connector.            Is the resistance above 100k ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the excessive resistance between ground and the (F855) 5-volt Supply circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p>Disconnect the PCM harness connectors.            With the DRBIII®, monitor the TP Sensor voltage.            Ignition on, engine not running.            Connect a jumper wire between the (K22) TP Sensor #1 Signal circuit and the (K101) Sensor Return circuit in the Throttle Body harness connector.            TP Sensor #1 voltage should start at approximately 4.5 volts and decrease to 0.5 of a volt.            Connect a jumper wire between the (K122) TP Sensor #2 Signal circuit and the (K7) 5-volt Supply circuit in the Throttle Body harness connector.            TP Sensor #2 voltage should start at approximately 0 volts and increase to 4.8 to 5.2 volts.            Does the TP Sensor voltage change to the appropriate voltage?</p> <p>Yes → Disconnect the Battery when replacing the Throttle Body Assembly. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 8</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All



## P2174-LOW AIRFLOW/RESTRICTION DETECTED (INSTANT ACCUMULATION) — Continued

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K22) and (K122) TP Signal circuits from the Throttle Body harness connector to the appropriate terminals of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the excessive resistance in the (K22) or (K122) TP Sensor Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
9	<p>Measure the resistance between ground and the (K22) and (K122) TP Signal circuits in the Throttle Body harness connector. Is the resistance above 100k ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the excessive resistance between ground and the (K22) or (K122) TP Sensor Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
10	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K922) Sensor Return circuit from the Throttle Body harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 17</p> <p>No → Repair the excessive resistance in the (K922) Sensor Return circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
11	<p>Turn the ignition off. Disconnect the MAP Sensor harness connector. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (F856) 5-volt Supply circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the excessive resistance in the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

# **P2174-LOW AIRFLOW/RESTRICTION DETECTED (INSTANT ACCUMULATION) — Continued**

TEST	ACTION	APPLICABILITY
12	<p>Measure the resistance between ground and the (F856) 5-volt Supply circuit at the MAP Sensor harness connector. Is the resistance above 100k ohms?</p> <p>Yes → Go To 13</p> <p>No → Repair the excessive resistance between ground and the (F856) 5-volt Supply circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
13	<p>Connect the PCM harness connectors. Ignition on, engine not running. With the DRBIII®, monitor the MAP Sensor voltage. Connect a jumper wire between the (K1) MAP Signal circuit and the (K4) Sensor ground circuit. Cycle the ignition switch from off to on. With the DRBIII®, monitor the MAP Sensor voltage. Does the DRBIII® display MAP voltage from approximately 4.9 volts to below 0.5 volt?</p> <p>Yes → Replace the MAP Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 14</p> <p><b>NOTE: Remove the jumper wire before continuing.</b></p>	All
14	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K1) MAP Signal circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 15</p> <p>No → Repair the excessive resistance in the (K1) MAP Signal circuit Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
15	<p>Measure the resistance between ground and the (K1) MAP Signal circuit at the MAP Sensor harness connector. Is the resistance above 100k ohms?</p> <p>Yes → Go To 16</p> <p>No → Repair the excessive resistance between ground and the (K1) MAP Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P2174-LOW AIRFLOW/RESTRICTION DETECTED (INSTANT ACCUMULATION) — Continued**

TEST	ACTION	APPLICABILITY
16	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K900) Sensor ground circuit from the MAP Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 17</p> <p>No → Repair the excessive resistance in the (K900) Sensor ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
17	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P2181-COOLING SYSTEM PERFORMACE

#### When Monitored and Set Condition:

##### P2181-COOLING SYSTEM PERFORMACE

When Monitored: Ignition on, Engine running, and no ECT DTCs present.

Set Condition: PCM recognizes that the ECT has failed its self coherence test. The coolant temp should only change at a certain rate, if this rate is too slow or too fast this fault will set. Two trip fault, Three good trips to clear MIL. ETC light will illuminate.

#### POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

LOW COOLANT LEVEL

THERMOSTAT OPERATION

ECT SENSOR

(K2) ECT SIGNAL CIRCUIT SHORTED TO BATTERY VOLTAGE

(K2) ECT SIGNAL CIRCUIT OPEN

(K900) SENSOR GROUND CIRCUIT OPEN

(K2) ECT SIGNAL CIRCUIT SHORTED TO GROUND

(K2) ECT SIGNAL CIRCUIT SHORTED TO THE (K900) SENSOR GROUND

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.</p> <p><b>NOTE: If this code sets during extreme ambient temperatures, improper installation of a block heater could be the cause of this DTC.</b></p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data.</p> <p>Diagnose all other ECT and Cooling System codes before continuing.</p> <p>Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**P2181-COOLING SYSTEM PERFORMACE — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>NOTE: If a Engine Coolant Temperature (ECT) DTC is set along with this code, diagnose the ECT DTC first.</b></p> <p><b>NOTE: Inspect the ECT terminals and related PCM terminals. Ensure the terminals are free from corrosion and damage.</b></p> <p><b>NOTE: The best way to diagnose this DTC is to allow the vehicle to sit overnight outside in order to have a totally cold soaked engine.</b></p> <p><b>NOTE: Extremely cold outside ambient temperatures may have caused this DTC to set.</b></p> <p><b>WARNING: Never open the cooling system when the engine is hot. The system is under pressure. Extreme burns or scalding may result. Allow the engine to cool before opening the cooling system.</b></p> <p>Inspect the coolant system for proper level and condition. Is the coolant level and condition OK?</p> <p>Yes → Go To 3</p> <p>No → Inspect the vehicle for a coolant leak and add the necessary amount of coolant. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
3	<p><b>NOTE: This test works best if performed on a cold engine (cold soak)</b></p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, read the Eng Coolant Tmp Deg value. If the engine was allowed to sit overnight (cold soak), the temperature value should be a sensible value that is somewhere close to the ambient temperature.</p> <p><b>NOTE: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 65°C (150°F) is reached.</b></p> <p>Start the Engine.</p> <p>During engine warm-up monitor the Eng Coolant Tmp Deg value. The temp deg value change should be a smooth transition from start up to normal operating temp 82°C (180°F) . Also monitor the actual coolant temperature with a thermometer.</p> <p><b>NOTE: As the engine warms up to operating temperature, the actual coolant temperature (thermometer reading) and the Eng Coolant Tmp Deg in the DRB values should stay relatively close to each other.</b></p> <p>Using the appropriate service information, determine the proper opening temperature of the thermostat.</p> <p>Did the thermostat open at the proper temperature?</p> <p>Yes → Go To 4</p> <p>No → Replace the thermostat. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Connect a jumper between the (K2) ECT Signal circuit and the (K900) Sensor ground circuit in the ECT Sensor harness connector.</p> <p>Turn the ignition off.</p> <p>Disconnect the ECT Sensor harness connector.</p> <p>With the DRBIII®, read the ECT voltage.</p> <p>Is the voltage below 1.0 volt?</p> <p>Yes → Replace the ECT Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 5</p>	All

**P2181-COOLING SYSTEM PERFORMACE — Continued**

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running. Measure the voltage on the (K2) ECT Signal circuit in the ECT Sensor harness connector. Is the voltage above 5.2 volts?  Yes → Repair the short to voltage in the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 6	All
6	Turn the ignition off. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K2) ECT Signal circuit from the ECT Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?  Yes → Go To 7  No → Repair the open in the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
7	<b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the (K900) Sensor ground circuit from the ECT Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?  Yes → Go To 8  No → Repair the open in the (K900) Sensor ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.	All
8	Measure the resistance between ground and the (K2) ECT Signal circuit in the ECT Sensor harness connector. Is the resistance below 100 ohms?  Yes → Repair the short to ground in the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 9	All
9	Measure the resistance between the (K2) ECT Signal circuit and the (K900) Sensor ground circuit at the ECT Sensor harness connector. Is the resistance below 5.0 ohms?  Yes → Repair the short between the (K900) Sensor ground and the (K2) ECT Signal circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.  No → Go To 10	All

**P2181-COOLING SYSTEM PERFORMACE — Continued**

TEST	ACTION	APPLICABILITY
10	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom:****P2299-BRAKE SWITCH POSITION / APPS INCOMPATIBLE****When Monitored and Set Condition:****P2299-BRAKE SWITCH POSITION / APPS INCOMPATIBLE**

When Monitored: Ignition on. No Break or APPS faults present.

Set Condition: The PCM recognizes a brake application following the APPS showing a fixed pedal opening. Temporary or permanent. Internally the PCM will reduce throttle opening below driver demand. One trip fault. ETC light will illuminate.

**POSSIBLE CAUSES**

DTC INFORMATION

INTERMITTENT CONDITION

BRAKE SWITCH OPERATION

APP SENSOR SWEEP

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If a pedal assembly becomes mechanically stuck the voltage output will stay fixed, if this is also Followed by a long application of the brakes this code will set.</b></p> <p><b>NOTE: When this code sets the pedal position in the PCM software will ramp to idle. If the pedal voltage changes and the brake is released, the pedal position in the PCM software will ramp up to the pedal position and the ETC light will go out.</b></p> <p>With the DRBIII®, read DTCs and record the related Freeze Frame data. Diagnose all other Brake Switch and APP Sensor codes before continuing. This code can be set by a driver who uses both feet while driving, one for the Accelerator Pedal and the other for the Brake Pedal. This code may also set while Brake Torquing the engine if the Accelerator was pressed before the Brake Pedal. Ask the driver of the vehicle if these conditions apply to their driving habits. Are the listed conditions part of the customers driving habits?</p> <p>Yes → Advise the customer of what caused the DTC. This is normal operation of a NGC II vehicle because of safety issues. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 2</p>	All
2	<p>With the DRBIII®, read both Brake Switch statuses while pressing and releasing the Brake Pedal. Does the DRBIII® display the Pressed and Released while pressing and releasing the Pedal?</p> <p>Yes → Go To 3</p> <p>No → Check the Brake Switch for proper installation and check the related circuits for opens and shorts using the appropriate wiring diagram. If OK, replace the Brake Lamp Switch assembly. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All



**P2299-BRAKE SWITCH POSITION / APPS INCOMPATIBLE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running.            With the DRBIII®, monitor both APP Sensor voltage readings.            Slowly open the throttle from the idle position to the wide open throttle position.            APPS No.1 voltage should start at approximately 0.45 of a volt and increase to approximately 4.6 volts with a smooth transition.            APPS No.2 voltage should start at approximately 0.22 of a volt and increase to approximately 2.31 volts with a smooth transition.            Does the voltage for the appropriate sensor follow the list specification?</p> <p>Yes → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Check the Signal and Return circuits for opens and shorts. If OK, Replace the APP Sensor Assembly per Service Information. After installation is complete, with the DRBIII® under the Misc. Menu select the ETC LEARN function to relearn the APPS values.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

**Symptom List:**

**P2302-IGNITION COIL NO.1 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**  
**P2305-IGNITION COIL NO.2 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**  
**P2308-IGNITION COIL NO.3 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**  
**P2311-IGNITION COIL NO.4 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**  
**P2314-IGNITION COIL NO.5 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**  
**P2317-IGNITION COIL NO.6 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**  
**P2320-IGNITION COIL NO.7 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**  
**P2323-IGNITION COIL NO.8 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

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**Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P2302-IGNITION COIL NO.1 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION.**

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**When Monitored and Set Condition:**

**P2302-IGNITION COIL NO.1 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

When Monitored: Engine running and battery voltage greater than 10 volts.

Set Condition: If PCM detects that the secondary ignition burn time is incorrect, to short, or not present, an error is detected. One Trip Fault. Three good trips to turn off the MIL.

**P2305-IGNITION COIL NO.2 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

When Monitored: Engine running and battery voltage greater than 10 volts.

Set Condition: If PCM detects that the secondary ignition burn time is incorrect, to short, or not present, an error is detected. One Trip Fault. Three good trips to turn off the MIL.

**P2308-IGNITION COIL NO.3 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

When Monitored: Engine running and battery voltage greater than 10 volts.

Set Condition: If PCM detects that the secondary ignition burn time is incorrect, to short, or not present, an error is detected. One Trip Fault. Three good trips to turn off the MIL.

## **P2302-IGNITION COIL NO.1 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION — Continued**

### **P2311-IGNITION COIL NO.4 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

When Monitored: Engine running and battery voltage greater than 10 volts.

Set Condition: If PCM detects that the secondary ignition burn time is incorrect, to short, or not present, an error is detected. One Trip Fault. Three good trips to turn off the MIL.

### **P2314-IGNITION COIL NO.5 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

When Monitored: Engine running and battery voltage greater than 10 volts.

Set Condition: If PCM detects that the secondary ignition burn time is incorrect, to short, or not present, an error is detected. One Trip Fault. Three good trips to turn off the MIL.

### **P2317-IGNITION COIL NO.6 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

When Monitored: Engine running and battery voltage greater than 10 volts.

Set Condition: If PCM detects that the secondary ignition burn time is incorrect, to short, or not present, an error is detected. One Trip Fault. Three good trips to turn off the MIL.

### **P2320-IGNITION COIL NO.7 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

When Monitored: Engine running and battery voltage greater than 10 volts.

Set Condition: If PCM detects that the secondary ignition burn time is incorrect, to short, or not present, an error is detected. One Trip Fault. Three good trips to turn off the MIL.

### **P2323-IGNITION COIL NO.8 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION**

When Monitored: Engine running and battery voltage greater than 10 volts.

Set Condition: If PCM detects that the secondary ignition burn time is incorrect, to short, or not present, an error is detected. One Trip Fault. Three good trips to turn off the MIL.

#### **POSSIBLE CAUSES**

GOOD TRIP EQUAL TO ZERO  
(K342) ASD RELAY OUTPUT CIRCUIT  
COIL ON PLUG RESISTANCE  
IGNITION COIL  
COIL CONTROL CIRCUIT OPEN  
COIL CONTROL CIRCUIT SHORTED TO GROUND  
PCM

## P2302-IGNITION COIL NO.1 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION — Continued

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
2	<p>Turn the ignition off. Disconnect the Coil on Plug harness connector. Ignition on, engine not running. With the DRBIII®, actuate the ASD Relay. Using a 12-volt test light connected to ground, probe the (K342) ASD Relay Output circuit at the Coil on Plug harness connector. Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the open or short to ground in the (K342) ASD Relay Output circuit between the IPM and Coil harness connector. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p><b>CAUTION: Stop All Actuations</b></p>	All
3	<p>Turn the ignition off. <b>NOTE: The following resistance measurement should be taken at 70°-80° F.</b> Measure the primary resistance of the Coil on Plug. 4.7L and 3.7L Ignition Coil Primary resistance is 0.6 to 0.9 of an ohm at 77°F (25°C). 5.7L Ignition Coil Primary resistance is 0.558 to 0.682 of an ohm at 77°F (25°C). Is the resistance within the given specification for the Ignition Coil being tested?</p> <p>Yes → Go To 4</p> <p>No → Replace the coil on plug. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
4	<p>Using a 12-volt test light connected to a 12-volt source, probe the Ignition Coil Driver circuit. Crank the engine for 5 seconds while observing the test light. What is the condition of the test light while cranking the engine?</p> <p>Brightly blinking. Replace the Ignition Coil. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>ON constantly. Go To 5</p> <p>OFF constantly. Go To 6</p>	All
5	<p>Turn the ignition off. Disconnect the PCM harness connectors. Measure the resistance between ground and the Ignition Coil Control circuit in the Coil on Plug harness connector. Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the Coil Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p> <p>No → Go To 7</p>	All

## P2302-IGNITION COIL NO.1 SECONDARY CIRCUIT- INSUFFICIENT IONIZATION — Continued

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the Coil Control circuit from the Coil on Plug connector to the appropriate terminal of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the Coil Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All
7	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b> Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits. If there are no possible causes remaining, review repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 5.</p>	All

## Symptom:

### P2503-CHARGING SYSTEM OUTPUT LOW

## When Monitored and Set Condition:

### P2503-CHARGING SYSTEM OUTPUT LOW

When Monitored: The engine running. The engine speed greater than 1157 RPM.

Set Condition: The battery sensed voltage is 1 volt below the charging goal for 13.47 seconds. The PCM senses the battery voltage turns off the field driver and senses the battery voltage again. If the voltages are the same, the code is set. One Trip Fault. Three good trips to turn off the MIL.

### POSSIBLE CAUSES

GOOD TRIP COUNTER EQUAL TO ZERO  
 EXCESSIVE RESISTANCE IN THE BATTERY POSITIVE CIRCUIT  
 EXCESSIVE RESISTANCE IN THE CASE GROUND  
 GENERATOR OPERATION  
 (K20) GEN FIELD CONTROL CIRCUIT SHORTED TO VOLTAGE  
 (K20) GEN FIELD CONTROL CIRCUIT OPEN  
 (K20) GEN FIELD CONTROL CIRCUIT SHORTED TO GROUND  
 GENERATOR GROUND CIRCUIT OPEN  
 PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Inspect the vehicle for aftermarket accessories that may exceed the Generator System output.</b>                      Ignition on, engine not running.  <b>NOTE: The battery must be fully charged.</b>  <b>NOTE: The Generator belt tension and condition must be checked before continuing.</b>                      With the DRBIII®, read DTCs and record the related Freeze Frame data.                      With the DRBIII®, erase DTCs.                      Start the engine.                      Allow the idle to stabilize.                      Ignition on, engine not running.                      With the DRBIII®, read DTCs.                      Is the Good Trip Counter equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).                      Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All

**P2503-CHARGING SYSTEM OUTPUT LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Ignition on, engine not running.</p> <p><b>NOTE: Ensure all wires are clear of the engine's moving parts.</b></p> <p>Measure the voltage between the Generator B+ Output Terminal and the Battery+ Post.</p> <p>Start the engine.</p> <p>Is the voltage above 0.4 of a volt?</p> <p>Yes → Repair the excessive resistance in the battery positive circuit between the Generator and Battery. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 3</p>	All
3	<p><b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b></p> <p>Start the engine.</p> <p>Warm the engine to operating temperature.</p> <p><b>NOTE: Ensure all wires are clear of the engine's moving parts.</b></p> <p>Measure the voltage between the Generator Case and Battery ground post.</p> <p>Is the voltage above 0.1 of a volt?</p> <p>Yes → Repair the excessive resistance in the Generator Case Ground. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off.</p> <p>Disconnect the Generator Field harness connector.</p> <p>Using a 12-volt test light, jump it across the Generator Field harness connector.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the Generator Field Driver.</p> <p>Does the test light illuminate brightly and flash on and off?</p> <p>Yes → Replace the Generator. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.</p> <p>Disconnect the PCM harness connectors.</p> <p>Ignition on, engine not running.</p> <p>Measure the voltage on the (K20) Gen Field Control circuit at the Generator Field harness connector.</p> <p>Is the voltage above 1.0 volt?</p> <p>Yes → Repair the short to voltage in the (K20) Gen Field Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 6</p>	All

**P2503-CHARGING SYSTEM OUTPUT LOW — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the (K20) Gen Field Control circuit from the Generator Field harness connector to the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the (K20) Gen Field Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
7	<p>Measure the resistance between ground and the (K20) Gen Field Control circuit in the Generator Field harness connector.</p> <p>Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (K20) Gen Field Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p> <p>No → Go To 8</p>	All
8	<p>Using a 12-volt test connected to battery voltage, probe the Ground circuit in the Generator Field harness connector.</p> <p>Does the test light illuminate brightly?</p> <p>Yes → Go To 9</p> <p>No → Repair the open in the Generator Ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b></p> <p>Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 3.</p>	All



**Symptom:****U0101-NO BUS MESSAGE FROM TRANS CONTROL MODULE****When Monitored and Set Condition:****U0101-NO BUS MESSAGE FROM TRANS CONTROL MODULE**

**When Monitored:** Equipped with automatic transmission. The ignition on and battery voltage greater than 10 volts.

**Set Condition:** No bus messages from the TCM for 20 seconds, two trips required. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

DTC RESET

PCM FUSED IGNITION SWITCH OUTPUT CIRCUIT

PCI BUS UNABLE TO COMMUNICATE WITH DRBIII®

PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.            With the DRBIII®, erase DTCs.            Cycle the ignition key on and off several times. Leaving the ignition on for at least 20 seconds.            With the DRBIII®, read DTCs.            Does the DTC reset?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure).            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
2	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            With a 12-volt test light connected to ground and with special tool #8815 installed, probe the (Y135) Fused Ignition Switch Output circuit.            Perform the above check with the Ignition key in the off lock position, Ignition on, engine not running position, and during cranking.            Wiggle the related wire harness while probing the special tool with the test light to try to interrupt the circuit.            Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the excessive resistance in the (Y135) Fused Ignition Switch (Off, Run, Start) circuit. Inspect the related fuse, if the fuse is open check the circuit for a short to ground.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**U0101-NO BUS MESSAGE FROM TRANS CONTROL MODULE — Continued**

TEST	ACTION	APPLICABILITY
3	<p><b>NOTE: Determine which modules this vehicle is equipped with before beginning.</b></p> <p><b>NOTE: When attempting to communicate with any of the modules on this vehicle, the DRBIII® will display 1 of 2 different communication errors: a NO RESPONSE message or a BUS +/- SIGNALS OPEN MESSAGE.</b></p> <p>Ignition on, engine not running.</p> <p>Use the DRBIII®, attempt to communicate with the remaining control modules.</p> <p>Was the DRBIII® able to communicate with one or more of the Modules?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Refer to the COMMUNICATION category and perform the PCI BUS COMMUNICATION FAILURE Symptom.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**Symptom:****U0155-NO CLUSTER BUS MESSAGE****When Monitored and Set Condition:****U0155-NO CLUSTER BUS MESSAGE**

When Monitored: Ignition key on and battery voltage greater than 10.4 volts.

Set Condition: No messages received from the MIC (Instrument Cluster) for more than 20 seconds. One Trip Fault. Three good trips to turn off the MIL.

**POSSIBLE CAUSES**

DTC RESET  
 COMMUNICATE WITH CLUSTER  
 INSTRUMENT CLUSTER OPERATION  
 PCM

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, erase DTCs. Cycle the ignition key on and off several times. With the DRBIII®, read DTCs. Does the DTC reset?  Yes → Go To 2  No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.	All
2	With the DRBIII®, attempt to communicate with the Instrument cluster. Can communication be established with the Instrument Cluster?  Yes → Go To 3  No → Refer to the Communication Category and perform the appropriate symptom related to no communication with cluster. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.	All
3	Start the engine Allow the engine to idle. Is the correct engine speed display in the instrument cluster (Tach)?  Yes → Replace and program the Powertrain Control Module per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.  No → Refer to the Instrument Category and perform the appropriate symptom. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.	All

## Symptom:

### U0168-NO SKIM BUS MESSAGES

## When Monitored and Set Condition:

### U0168-NO SKIM BUS MESSAGES

When Monitored: Ignition on and battery voltage greater than 10 volts.

Set Condition: No J1850 messages received from the Smart Key Immobilizer Module (SKIM) One Trip Fault. Three good trips to turn off the MIL.

## POSSIBLE CAUSES

GOOD TRIP EQUAL TO ZERO

NO RESPONSE FROM SKIM

PCI BUS CIRCUIT OPEN FROM PCM TO SKIM

SKIM/PCM

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, read the DTCs and record the related Freeze Frame data. Is the Good Trip Counter displayed and equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Refer to the INTERMITTENT CONDITION Symptom (Diagnostic Procedure). Perform SKIS VERIFICATION.</p>	All
2	<p>With the DRBIII®, attempt to communicate with the SKIM. <b>NOTE: This test will indicate if the Bus is operational from the DLC to the SKIM.</b> Was the DRB III able to communicate with the SKIM?</p> <p>Yes → Go To 3</p> <p>No → Refer to symptom BUS +/- SIGNAL OPEN FROM SKIM in the COMMUNICATION category. Perform SKIS VERIFICATION.</p>	All

**U0168-NO SKIM BUS MESSAGES — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect the SKIM harness connector.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the PCI Bus circuit from the SKIM harness connector to the appropriate terminal of special tool #8815.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the PCI Bus circuit between the PCM and the SKIM.            Perform SKIS VERIFICATION.</p>	All
4	<p>Replace the Sentry Key Immobilizer Module per Service Information.            Ignition on, engine not running.            Display and erase all PCM and SKIM DTCs.            Perform 5 ignition key cycles leaving the ignition key on for 90 seconds per cycle.            With the DRB, display PCM DTCs.            Does the DRB display the same DTC?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information.            Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All

## Symptom:

### \*CHECKING A/C OPERATION WITH NO DTCS

POSSIBLE CAUSES
DTC AND COMMUNICATION PRESENT A/C SELECT CIRCUIT OPEN A/C SELECT IN HVAC PCM A/C REQUEST CIRCUIT OPEN REFRIGERATION SYSTEM NOT PROPERLY CHARGED HIGH PRESS CUT-OFF SWITCH A/C CLUTCH COIL (Z1) GROUND CIRCUIT OPEN (C3) A/C CLUTCH RELAY OUTPUT CIRCUIT OPEN (F31) FUSED B+ CIRCUIT OPEN A/C CLUTCH RELAY

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running.  Verify that communication with the HVAC and PCM is available over the BUS.  With the DRBIII®, check for DTCs in the PCM and HVAC module.  Are any A/C DTCs or communication failures present?</p> <p>Yes → Diagnose the related DTC(s) or BUS failure before continuing.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 2</p>	All
2	<p>With the DRBIII®, read the A/C Select status in the PCM.  Turn the A/C Switch on and off a few times.  Does the A/C Select state change?</p> <p>Yes → Go To 3</p> <p>No → Go To 11</p>	All
3	<p>Ignition on, engine not running.  Turn the A/C system on and the fan on high.  With the DRBIII® in Inputs/Outputs, read the A/C request state.  Does the A/C request state change?</p> <p>Yes → Go To 4</p> <p>No → Repair the open in the A/C Request circuit.  Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

**\*CHECKING A/C OPERATION WITH NO DTCS — Continued**

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Verify that the Refrigerant System is properly charged per Service Procedure. Is the Refrigerant System properly charged?  Yes → Go To 5  No → Properly charge the Refrigerant System per Service Information. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
5	Verify the High Pressure Cut-Off Switch operation per Service Information. Is the High Pressure Cut-Off Switch OK?  Yes → Go To 6  No → Replace the High Pressure Cut-Off Switch. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
6	Ignition on, engine not running. With the DRBIII®, actuate the A/C clutch relay. Connect a test light between the ground circuit and the (C3) A/C Clutch Relay Output circuit. Does the test light illuminate brightly on and off with the relay actuation?  Yes → Replace the A/C Clutch Coil. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.  No → Go To 7	All
7	Turn the ignition off. Disconnect the A/C compressor clutch harness connector. Measure the resistance between ground and the (Z1) ground circuit from the A/C Compressor Clutch connector. Is the resistance below 5.0 ohms?  Yes → Go To 8  No → Repair the open in the (Z1) ground circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
8	Remove the A/C Clutch Relay. Measure the resistance of the (C3) A/C Clutch Relay Output circuit between the Relay and the A/C Clutch Coil. Is the resistance below 5.0 ohms?  Yes → Go To 9  No → Repair the open in the (C3) A/C Clutch Relay Output circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
9	Measure the voltage of the (F31) Fused B+ circuit at the A/C Clutch Relay connector. Is the voltage above 11.0 volts?  Yes → Go To 10  No → Repair the open in the (F31) Fused B+ circuit. Inspect the related fuse and repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All
10	If there are no possible causes remaining, view repair.  Repair Replace the A/C Clutch Relay. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.	All

## **\*CHECKING A/C OPERATION WITH NO DTCS — Continued**

TEST	ACTION	APPLICABILITY
11	<p>With the DRBIII® in the HVAC, under the Monitors screen, read the A/C Select Switch state.</p> <p>While monitoring the DRBIII® screen, turn the A/C switch on and off a few times.</p> <p>Does the A/C Select State change on the HVAC Monitors screen.</p> <p>Yes → Test Complete.</p> <p>No → Replace the A/C-Heater Control module.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All



**Symptom:****\*CHECKING PCM POWERS AND GROUNDS****POSSIBLE CAUSES**

PCM FUSED B+ CIRCUITS

PCM FUSED IGNITION SWITCH OUTPUT CIRCUITS

PCM GROUND CIRCUITS

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition off. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Using a 12-volt test light connected to ground, probe the PCM Fused B+ circuits in the appropriate terminals of special tool #8815. Does the test light illuminate brightly?</p> <p>Yes → Go To 2</p> <p>No → Repair the open in the Fused B+ circuit(s). Inspect the related fuses and repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
2	<p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Ignition on, engine not running. Using a 12-volt test light connected to ground, probe the PCM Fused Ignition Switch Output circuits in the appropriate terminals of special tool #8815. Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the open in the Fused Ignition Switch Output circuit(s). Inspect the related fuses and and repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
3	<p>Turn the ignition off. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Using a 12-volt test light connected to battery voltage, probe the PCM ground circuits in the appropriate terminals of special tool #8815. Does the test light illuminate brightly?</p> <p>Yes → Test Complete.</p> <p>No → Repair the open in the PCM ground circuit(s). Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

### **Symptom List:**

**ANTENNA FAILURE**  
**COP FAILURE**  
**EEPROM FAILURE**  
**INTERNAL FAULT**  
**RAM FAILURE**  
**SERIAL LINK INTERNAL FAULT**  
**STACK OVERFLOW FAILURE**

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**Test Note: All symptoms listed above are diagnosed using the same tests.**  
**The title for the tests will be ANTENNA FAILURE.**

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### **When Monitored and Set Condition:**

#### **ANTENNA FAILURE**

When Monitored: Every 250 milliseconds with the ignition on.

Set Condition: The SKIM's microcontroller determines that an antenna circuit fault has occurred for 2.0 consecutive seconds.

#### **COP FAILURE**

When Monitored: With the ignition on.

Set Condition: The COP timer is not reset by the micro controller every 65.5 milliseconds.

#### **EEPROM FAILURE**

When Monitored: With the ignition on.

Set Condition: When the value written to EEPROM memory does not equal the value read back after the write operation.

#### **INTERNAL FAULT**

When Monitored: With the ignition on.

Set Condition: The SKIM has detected a fault during an internal self test.

#### **RAM FAILURE**

When Monitored: With the ignition on.

Set Condition: The RAM fails a test that checks the RAM's ability to retain memory.

#### **SERIAL LINK INTERNAL FAULT**

When Monitored: With the ignition on.

Set Condition: The SKIM fails an internal J1850 communication self test.

#### **STACK OVERFLOW FAILURE**

When Monitored: With the ignition on.

Set Condition: The micro controller has exceeded its stack space limit.

# ANTENNA FAILURE — Continued

POSSIBLE CAUSES
SKIM INTERNAL DTC FAILURE

TEST	ACTION	APPLICABILITY
1	<p><b>Note: This trouble code indicates an internal SKIM fault.</b></p> <p>With the DRBIII®, read and record the SKIM DTCs and then erase the SKIM DTCs. Perform 5 ignition key cycles, leaving the ignition key on for a minimum of 90 seconds per cycle.</p> <p>With the DRBIII®, read the SKIM DTCs.</p> <p>Did the same SKIM DTC return?</p> <p>Yes → Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information. Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All

## Symptom List:

**PCM STATUS FAILURE**

**SERIAL LINK EXTERNAL FAULT**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be PCM STATUS FAILURE.

## When Monitored and Set Condition:

### PCM STATUS FAILURE

When Monitored: With the ignition on.

Set Condition: This DTC exists when a PCM STATUS message was not received from the PCM for at least 20.0 consecutive seconds.

### SERIAL LINK EXTERNAL FAULT

When Monitored: At ignition on, after ignition on during any rolling code handshake that occurs with the PCM due to a SKIM reset, or during SECRET KEY transfers to the PCM.

Set Condition: When the SKIM does not receive an expected PCI BUS message transmission acknowledgement from the PCM after 3 transmit attempts.

## POSSIBLE CAUSES

INTERMITTENT WIRING HARNESS PROBLEM

WIRING HARNESS INSPECTION

SKIM/PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Ensure the PCM has proper power and ground connections before continuing.</b></p> <p>With the DRBIII®, read and record the SKIM DTCs then erase the SKIM DTCs.</p> <p>Turn the ignition off.</p> <p>Wait 2 minutes.</p> <p>Turn the ignition on.</p> <p>With the DRBIII®, read the SKIM DTCs.</p> <p>Does the DRBIII® display the DTC that was previously erased?</p> <p>Yes → Go To 2</p> <p>No → Go To 4</p>	All

PCM STATUS FAILURE — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition off.</p> <p><b>NOTE: Visually inspect the related wiring harness and CCD/PCI Bus (whichever applicable) circuits. Look for any chafed, pierced, pinched, or partially broken wires.</b></p> <p><b>NOTE: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b></p> <p><b>Note: Refer to any Technical Service Bulletins (TSB) that may apply.</b></p> <p>Were any problems found?</p> <p>Yes → Repair as necessary. Perform SKIS VERIFICATION.</p> <p>No → Go To 3</p>	All
3	<p><b>NOTE: Before proceeding it will be necessary to obtain the SKIM PIN.</b></p> <p>Turn the ignition on.</p> <p>With the DRBIII®, display and erase all PCM and SKIM DTC's.</p> <p>Perform 5 ignition key cycles, leaving the ignition key on for a minimum of 90 seconds per cycle.</p> <p>With the DRBIII®, read the SKIM DTCs.</p> <p>Does the code appear?</p> <p>Yes → Replace and program the Powertrain Control Module in accordance with the Service Information. Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All
4	<p>Turn the ignition off.</p> <p><b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b></p> <p><b>NOTE: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b></p> <p><b>Note: Refer to any Technical Service Bulletins (TSB) that may apply.</b></p> <p>Were any problems found?</p> <p>Yes → Repair wiring harness/connectors as necessary. Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All

## Symptom List:

**ROLLING CODE FAILURE  
VIN MISMATCH**

**Test Note:** All symptoms listed above are diagnosed using the same tests.  
The title for the tests will be **ROLLING CODE FAILURE**.

## When Monitored and Set Condition:

### ROLLING CODE FAILURE

**When Monitored:** At ignition on, after ignition on during any rolling code handshake that occurs with the PCM due to a SKIM or PCM reset.

**Set Condition:** When a PCM STATUS message with a Valid Key status is not received by the SKIM within 3.5 seconds of transmitting the last Valid Key Code message to the PCM.

### VIN MISMATCH

**When Monitored:** With the ignition on.

**Set Condition:** When the VIN received from the PCM does not match the VIN stored in the SKIM's EEPROM.

## POSSIBLE CAUSES

VERIFYING PCM VIN  
REPLACE SKIM AND CHECK DTC'S  
INTERMITTENT WIRING HARNESS PROBLEM  
PCM

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, erase the SKIM DTCs. Turn the ignition off. Wait 10 seconds. Turn the ignition on and wait 2 minutes. With the DRBIII®, read the SKIM DTCs. Does the DRBIII® display the DTC that was previously erased?  Yes → Go To 2 No → Go To 4	All

## ROLLING CODE FAILURE — Continued

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition on.            With the DRBIII®, select Engine system from the main menu.            Display and record the Vehicle Identification Number.  <b>NOTE: Ensure that a VIN has been programmed into the PCM. If a VIN is not displayed, attempt to program the PCM with the correct vehicle VIN before continuing.</b>            Does the VIN recorded from the PCM match the VIN of the vehicle?</p> <p>Yes → Go To 3</p> <p>No → Perform the PCM replaced to update the VIN in the PCM.            Perform SKIS VERIFICATION.</p>	All
3	<p>Turn the ignition off.            Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information.            Turn the ignition on.            With the DRBIII®, display and clear all PCM and SKIM DTC's.            Perform 5 ignition key cycles leaving the ignition key on for 90 seconds per cycle.            With the DRBIII®, check for SKIM DTCs.            Does the DRBIII® display the same DTC?</p> <p>Yes → Replace and program the Powertrain Control Module in accordance with the Service Information.            Perform SKIS VERIFICATION.</p> <p>No → The repair is complete.            Perform SKIS VERIFICATION.</p>	All
4	<p>Turn the ignition off.  <b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b>  <b>NOTE: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b>  <b>Note: Refer to any Technical Service Bulletins (TSB) that may apply.</b>            Were any problems found?</p> <p>Yes → Repair wiring harness/connectors as necessary.            Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All

### Symptom List:

**TRANSPONDER COMMUNICATION FAILURE**

**TRANSPONDER CYCLIC REDUNDANCY CHECK (CRC) FAILURE**

**TRANSPONDER ID MISMATCH**

**TRANSPONDER RESPONSE MISMATCH**

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**Test Note:** All symptoms listed above are diagnosed using the same tests. The title for the tests will be **TRANSPONDER COMMUNICATION FAILURE**.

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### When Monitored and Set Condition:

#### **TRANSPONDER COMMUNICATION FAILURE**

When Monitored: At ignition on and during Key Programming Mode.

Set Condition: When the SKIM does not receive a transponder response after 8 consecutive transponder read attempts within 2.0 seconds.

#### **TRANSPONDER CYCLIC REDUNDANCY CHECK (CRC) FAILURE**

When Monitored: At ignition on and during Key Programming Mode.

Set Condition: When 5 consecutive transponder signal transmissions are sent to the SKIM with the correct message format but with invalid data.

#### **TRANSPONDER ID MISMATCH**

When Monitored: At ignition on and during Key Programming Mode.

Set Condition: When the transponder ID read by the SKIM does not match any of the transponder ID's stored in the SKIM's memory.

#### **TRANSPONDER RESPONSE MISMATCH**

When Monitored: At ignition on and during Key Programming Mode.

Set Condition: When the transponder's crypto algorithm result fails to match the SKIM's result.

### POSSIBLE CAUSES

CHECKING MULTIPLE KEY OPERATION

SKIM

INTERMITTENT WIRING HARNESS PROBLEM

REPLACE IGNITION KEY



**TRANSPONDER COMMUNICATION FAILURE — Continued**

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read and record the SKIM DTCs.  With the DRBIII®, erase the SKIM DTCs.  <b>NOTE: Perform the following test several times to ensure the DTC is current.</b>  Turn the ignition off.  Wait 10 seconds.  Turn the ignition on.  With the DRBIII®, read the SKIM DTCs.  Does the DRBIII® display the DTC that was previously erased?</p> <p>Yes → Go To 2  No → Go To 7</p>	All
2	<p>Are there multiple vehicle ignition keys available?</p> <p>Yes → Go To 3  No → Go To 4</p>	All
3	<p><b>NOTE: Perform the following steps using one of the vehicle ignition keys. When finished, repeat the procedure using each of the other vehicle keys one at a time.</b>  With the DRBIII®, erase the SKIM DTCs.  Turn the ignition off.  Wait 10 seconds.  Turn the ignition on.  With the DRBIII®, read the SKIM DTCs.  Is the DTC present for all ignition keys?</p> <p>Yes → Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information.  Perform SKIS VERIFICATION.</p> <p>No → Replace the ignition key(s) that cause the SKIM DTC.  Perform SKIS VERIFICATION.</p>	All
4	<p>With the DRBIII®, attempt to reprogram the ignition keys to the SKIM.  With the DRBIII®, erase the SKIM DTCs.  Wait 10 seconds.  Turn the ignition on.  With the DRBIII®, read the SKIM DTCs.  Does the DTC set again?</p> <p>Yes → Go To 5  No → Test Complete.</p>	All
5	<p>Replace the ignition key with a new key.  With the DRBIII®, program the new ignition key to the SKIM.  With the DRBIII®, erase the SKIM DTCs.  Turn the ignition off.  Wait 10 seconds.  Turn the ignition on.  With the DRBIII®, read the SKIM DTCs.  Does the DTC set again?</p> <p>Yes → Go To 6  No → Test Complete.</p>	All

## TRANSPONDER COMMUNICATION FAILURE — Continued

TEST	ACTION	APPLICABILITY
6	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information.</p> <p>Perform SKIS VERIFICATION.</p>	All
7	<p>Turn the ignition off.</p> <p><b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b></p> <p><b>NOTE: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b></p> <p><b>Note: Refer to any Technical Service Bulletins (TSB) that may apply.</b></p> <p>Were any problems found?</p> <p>Yes → Repair wiring harness/connectors as necessary. Perform SKIS VERIFICATION.</p> <p>No → Test Complete.</p>	All

**Symptom:****\*5.7L INTERMITTENT NO CRANK****POSSIBLE CAUSES**

ETC STARTER INHIBIT

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: This 5.7L engine will try to relearn ETC position when the key is left in the on position for an extended period of time and will not allow the starter to crank during this procedure. This procedure can take up to 2.5 seconds.</b></p> <p>To verify the cause of the no crank condition or delayed crank use the DRBIII®, and read the ETC Starter Inhibit mileage.</p> <p>The controller will store the mileage at which the no start condition occurred because of the ETC testing procedure.</p> <p>This is considered normal operation for an NGC II vehicle and no repairs are necessary.</p> <p>Is a mileage stored under the ETC Starter Inhibit?</p> <p>Yes → Test Complete.</p> <p>No → Refer to the appropriate symptom (diagnostic procedure) in the Starting section of this book for further assistance.</p> <p>Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## STARTING

### Symptom:

#### \*CHECKING FUEL DELIVERY

##### POSSIBLE CAUSES

FUEL PUMP RELAY  
FUEL PRESSURE OUT OF SPECIFICATION  
RESTRICTED FUEL SUPPLY LINE  
FUEL PUMP INLET STRAINER PLUGGED  
FUEL PUMP  
FUEL PUMP RELAY OUTPUT CIRCUIT OPEN

TEST	ACTION	APPLICABILITY
1	<p>Ignition on, engine not running. With the DRBIII®, actuate the Fuel System test. <b>NOTE: It may be necessary to use a mechanics stethoscope in the next step.</b> Listen for fuel pump operation at the fuel tank. Does the Fuel Pump operate?</p> <p>Yes → Go To 2 No → Go To 5</p> <p><b>CAUTION: Stop All Actuations.</b></p>	All
2	<p>Turn the ignition off. <b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b> Install a fuel pressure gauge at the engine. Ignition on, engine not running. With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge. <b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b> Choose a conclusion that best matches your fuel pressure reading.</p> <p>Below Specification Go To 3</p> <p>Within Specification Test Complete.</p> <p>Above Specification Replace the fuel filter/fuel pressure regulator. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p><b>CAUTION: Stop All Actuations.</b></p>	All

**\*CHECKING FUEL DELIVERY — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.</p> <p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Raise vehicle on hoist, and disconnect the fuel pressure line at the fuel pump module. Install special tool #6539 (5/16") or #6631(3/8") fuel line adapter and the fuel pressure gauge between the fuel supply line and the fuel pump module.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.</p> <p><b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b></p> <p>Is the fuel pressure within specification now?</p> <p>Yes → Repair/replace fuel supply line as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 4</p> <p><b>CAUTION: Stop All Actuations.</b></p>	All
4	<p>Turn the ignition off.</p> <p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Remove the Fuel Pump Module and inspect the Fuel Inlet Strainer.</p> <p>Is the Fuel Inlet Strainer plugged?</p> <p>Yes → Replace the Fuel Pump Inlet Strainer. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Replace the Fuel Pump Module. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
5	<p>Turn the ignition off.</p> <p>Remove the Fuel Pump Relay from the IPM.</p> <p>Disconnect the Fuel Pump Module harness connector.</p> <p>Measure the resistance of the Fuel Pump Relay Output circuit from the relay connector to the fuel pump module connector.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Replace the Fuel Pump Relay. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Repair the open in the Fuel Pump Relay Output circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

## STARTING

### Symptom:

#### \*CHECKING HARD START (FUEL SYSTEM)

POSSIBLE CAUSES
<p>RESTRICTED FUEL SUPPLY LINE</p> <p>FUEL PUMP INLET STRAINER PLUGGED</p> <p>FUEL PUMP MODULE</p> <p>FAULTY FUEL PUMP MODULE</p> <p>FUEL INJECTOR(S)</p> <p>FUEL CONTAMINATION</p>

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition off.</p> <p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Install a fuel pressure gauge at the engine.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.</p> <p><b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b></p> <p>Choose a conclusion that best matches your fuel pressure reading.</p> <p style="padding-left: 40px;">Below Specification Go To 2</p> <p style="padding-left: 40px;">Within Specification Go To 4</p>	All
2	<p>Turn the ignition off.</p> <p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Raise vehicle on hoist, and disconnect the fuel supply line at the fuel pump module.</p> <p>Install special tool #6539 (5/16") #6631(3/8") fuel line adapter and the fuel pressure gauge between the fuel supply line and the fuel pump module.</p> <p>Ignition on, engine not running.</p> <p>With the DRBIII®, actuate the ASD Fuel System test and observe the fuel pressure gauge.</p> <p><b>NOTE: Fuel pressure specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b></p> <p>Is the fuel pressure within specification?</p> <p style="padding-left: 40px;">Yes → Visually and physically inspect the fuel supply lines between the fuel tank and the fuel rail. Repair/replace as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p style="padding-left: 40px;">No → Go To 3</p>	All

**\*CHECKING HARD START (FUEL SYSTEM) — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.</p> <p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Remove the Fuel Pump Module and inspect the Fuel Inlet Strainer.</p> <p>Is the Fuel Inlet Strainer plugged?</p> <p>Yes → Replace the Fuel Pump Inlet Strainer. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Replace the Fuel Pump Module. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All
4	<p><b>NOTE: Before continuing visually and physically inspect the fuel delivery system for external leaks or damage. Repair /replace as necessary.</b></p> <p>Turn the ignition off.</p> <p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Install special tool #6539 (5/16") or #6631 (3/8") fuel line adapter.</p> <p>Install the fuel pressure gauge.</p> <p>Start the engine and allow the fuel system to reach maximum pressure.</p> <p>Turn the ignition off.</p> <p><b>NOTE: Fuel specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b></p> <p>Using special tool #C4390, Hose Clamp Pliers, pinch the rubber fuel line between the fuel pressure gauge and the engine.</p> <p>Monitor the fuel pressure gauge for a minimum of 5 minutes.</p> <p><b>NOTE: The pressure should not fall below 241 KPa (35 psi)</b></p> <p>Does the fuel pressure drop?</p> <p>Yes → Replace Fuel Pump Module. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 5</p>	All
5	<p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b></p> <p>Remove special tool #C4390.</p> <p>Start the engine and allow the fuel system to reach maximum pressure.</p> <p>Turn the ignition off.</p> <p><b>NOTE: Fuel specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b></p> <p>Move special tool #C4390, Hose Clamp Pliers, from between the fuel pressure gauge and the engine to between the fuel pressure gauge and fuel pump module.</p> <p>Monitor the fuel pressure gauge for a minimum of 5 minutes.</p> <p><b>NOTE: The pressure should not fall below 241 KPa (35 psi)</b></p> <p>Does the fuel pressure drop?</p> <p>Yes → Replace the leaking fuel injectors. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Check the fuel for contaminants. Perform POWERTRAIN VERIFICATION TEST VER - 2.</p>	All

## Symptom:

### \*ENGINE CRANKS BUT DOES NOT START

#### POSSIBLE CAUSES

NO START PRE-TEST  
 POWERTRAIN FUSES OPEN  
 SECONDARY INDICATORS PRESENT  
 ENGINE MECHANICAL PROBLEM  
 (A142) ASD RELAY OUTPUT CIRCUIT OPEN  
 FUEL CONTAMINATION

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: The following list of items must be checked before continuing with any no start tests.</b></p> <p>The battery must be fully charged and in good condition. A low charged battery may produce invalid test results. If the battery is low, charge the battery and then attempt to start the vehicle by cranking the engine for 15 seconds, 3 consecutive times. This will allow any DTCs to set that may have been erased due to a dead battery. Try to communicate with PCM if not able to communicate check fuses.</p> <p>Ensure the Powers and Ground to the PCM are ok.</p> <p>Make sure the PCM communicates with the DRBIII® and that there are no DTCs stored in the PCM memory. If the PCM reports a No Response condition, refer to the Communication category for the proper tests.</p> <p>Read the PCM DTCs with the DRBIII®. If any DTCs are present, they must be repaired before continuing with any other No Start diagnostic tests. Refer to the Symptom list for the related P-code that is reported by the PCM.</p> <p>Ensure that the Bus is functional. Attempt to communicate with the Instrument Cluster and VTSS, If you are unable to establish communications refer to the Communication category for the proper symptoms.</p> <p>The Sentry Key Immobilizer System must be operating properly. Check for proper communication with the DRBIII® and check for DTCs that may be stored in the Sentry Key Immobilizer Module (SKIM). Repair the DTC(s) before continuing.</p> <p>If no DTCs are found, using the DRBIII®, select Clear PCM (BATT Disconnect).</p> <p>Crank the engine several times. Using the DRBIII®, read DTCs. If a DTC is present perform the DTC diagnostics before continuing.</p> <p>Were any problems found?</p> <p>Yes → Repair as necessary.          Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 2</p>	All
2	<p>Check for any open fuses in the IPM or Junction Block that may be related to the No Start condition.</p> <p>Are any of the fuses open?</p> <p>Yes → Replace the open fuse and check the related circuit(s) for a short to ground.          Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All



**\*ENGINE CRANKS BUT DOES NOT START — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running.            With the DRBIII®, under DTCs &amp; Related Functions, read the Secondary Indicators while cranking the engine.            Are there any Secondary Indicators present while cranking the engine?</p> <p>Yes → Refer to symptom list and perform tests related to the secondary indicator that is reported by the DRBIII®.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 4</p>	All
4	<p>Check for any of the following conditions/mechanical problems.            ENGINE VALVE TIMING - must be within specifications, check for broken timing components            ENGINE COMPRESSION - must be within specifications            ENGINE EXHAUST SYSTEM - must be free of any restrictions or leaks.            Are there any engine mechanical problems?</p> <p>Yes → Repair as necessary.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.            Remove the ASD relay from the IPM.            Disconnect the PCM harness connectors.            Verify the ASD Relay is getting voltage on the Fused B+ circuits before continuing.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Special tool #8815 is only used with NGC controllers.            Measure the resistance of the ASD Relay Output circuit from the ASD Relay connector to the JTEC PCM harness connector or terminal C3-3 of special tool #8815, Ignition coil, and the fuel injectors.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the open in the (A142) ASD Relay Output circuit.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
6	<p>Verify that the Fuel tank is not empty before continuing.            Follow the diagnostics for Checking Fuel Delivery in the Driveability section of this manual.            Was the No Start condition solved after following the above diagnostic test?</p> <p>Yes → Test Complete.</p> <p>No → Check for contamination/water in the fuel. Ensure the fuel being used in this vehicle meets manufactures Fuel Requirement, refer to the service manual.            Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

## Symptom:

### \*FUEL PRESSURE LEAK DOWN

#### POSSIBLE CAUSES

FAULTY FUEL PUMP MODULE

FUEL INJECTOR(S)

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Before continuing visually and physically inspect the fuel delivery system for external leaks or damage. Repair /replace as necessary.</b>  Turn the ignition off.  <b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b>  Install special tool #6539 (5/16") or #6631 (3/8") fuel line adapter.  Install the fuel pressure gauge.  Start the engine and allow the fuel system to reach maximum pressure.  Turn the ignition off.  <b>NOTE: Fuel specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b>  Using special tool #C4390, Hose Clamp Pliers, pinch the rubber fuel line between the fuel pressure gauge and the engine.  Monitor the fuel pressure gauge for a minimum of 5 minutes.  <b>NOTE: The pressure should not fall below 241 KPa (35 psi)</b>  Does the fuel pressure drop?</p> <p>Yes → Replace Fuel Pump Module.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Go To 2</p>	All
2	<p><b>WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.</b>  Remove special tool #C4390.  Start the engine and allow the fuel system to reach maximum pressure.  Turn the ignition off.  <b>NOTE: Fuel specification is 407 KPa +/- 34 KPa (59 psi +/- 5 psi).</b>  Move special tool #C4390, Hose Clamp Pliers, from between the fuel pressure gauge and the engine to between the fuel pressure gauge and fuel pump module.  Monitor the fuel pressure gauge for a minimum of 5 minutes.  <b>NOTE: The pressure should not fall below 241 KPa (35 psi)</b>  Does the fuel pressure drop?</p> <p>Yes → Replace the leaking fuel injectors.  Perform POWERTRAIN VERIFICATION TEST VER - 2.</p> <p>No → Test Complete.</p>	All

**Symptom:****\*NO CRANK CONDITION**

POSSIBLE CAUSES
MECHANICAL CONDITION TRANSMISSION RANGE SENSOR BATTERY CIRCUIT RESISTANCE TOO HIGH FUSED IGNITION SWITCH OUTPUT CIRCUITS STARTER RELAY CONTROL CIRCUIT OPEN FUSED B+ CIRCUIT OPEN STARTER RELAY OUTPUT CIRCUIT OPEN STARTER STARTER RELAY

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Verify the battery is fully charged and capable of passing a load test before continuing.</b></p> <p><b>WARNING: MAKE SURE THE BATTERY IS DISCONNECTED, THEN WAIT TWO MINUTES BEFORE PROCEEDING.</b></p> <p>Turn the engine over by hand to ensure the engine is not seized. Is the engine able to turn over?</p> <p>Yes → Go To 2</p> <p>No → Repair the mechanical condition preventing the starter motor from cranking. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
2	<p>Turn the ignition off. Disconnect the TRS harness connectors. Move the Gear selector through all gear positions, from Park to 1st and back. While moving the gear selector through each gear, measure the resistance between ground and the TRS (T41) Sense (P/NSense) circuit. <b>NOTE: The circuit is grounded in Park and Neutral and open in the other positions.</b> Did the resistance change from above 100 kohms (open) to below 10.0 ohms (grounded)?</p> <p>Yes → Go To 3</p> <p>No → Replace the Transmission Range Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
3	<p>Turn the ignition off. Check the Battery Cables for excessive resistance using the service information procedure. Did either Battery Cable have a voltage drop greater than 0.2 of a volt?</p> <p>Yes → Repair the excessive resistance in the Battery circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 4</p>	All

## \*NO CRANK CONDITION — Continued

TEST	ACTION	APPLICABILITY
4	<p>Turn ignition off. Remove the Starter Relay from IPM. <b>WARNING: The Parking Brake must be on and the Transmission must be in park for a vehicle equipped with an automatic transmission.</b> <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b> Briefly connect a jumper wire between (A149) Fused B+ circuit and the (T40) Starter Relay Output circuit. Did the Starter Motor crank the engine?</p> <p>Yes → Go To 5</p> <p>No → Go To 7</p>	All
5	<p>Turn the ignition off. Remove the Starter Relay from the IPM. Ignition on, engine not running. Using a 12-volt test light, probe the Fused Ignition Switch Output circuit in the Starter Relay connector. While observing 12-volt test light, hold ignition key in the start position. Does the test light illuminate brightly?</p> <p>Yes → Go To 6</p> <p>No → Repair the excessive resistance in the Fused Ignition Switch Output circuits. Inspect related fuses and repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
6	<p>Turn the ignition off. Remove the Starter Relay from the IPM. Disconnect the PCM harness connectors. <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Special tool #8815 is only used with NGC control modules. Measure the resistance in the Starter Relay Control circuit from the Relay terminal and the JTEC PCM harness connector or terminal C3-38 of special tool #8815. Is the resistance below 5.0 ohms?</p> <p>Yes → Replace the Starter Motor Relay. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Repair the open in the Starter Relay Control circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
7	<p>Turn the ignition off. Remove the Starter Relay from the IPM. Using a 12-volt test light connected to ground, probe the Fused B+ circuit at the Starter Relay terminal. Does the test light illuminate brightly?</p> <p>Yes → Go To 8</p> <p>No → Repair the excessive resistance in the Fused B+ circuit. Inspect related fuses and repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**\*NO CRANK CONDITION — Continued**

TEST	ACTION	APPLICABILITY
8	Turn the ignition off. Remove the Starter Relay from the IPM. Disconnect the Starter Relay Output connector from the Starter Solenoid. Measure the resistance of the Starter Relay Output circuit between the Relay and the Solenoid harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 9  No → Repair the open in the Starter Relay Output circuit. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.	All
9	If there are no other possible causes remaining, review repair.  Repair Replace the Starter. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.	All

## Symptom:

**\*NO RESPONSE FROM PCM WITH A NO START CONDITION**

POSSIBLE CAUSES
(A919) PCM FUSED B+ CIRCUIT
PCM NO RESPONSE
PCM FUSED IGNITION SWITCH OUTPUT CIRCUITS
PCM GROUND CIRCUITS
TP SENSOR
(F855) 5-VOLT SENSOR OPEN/SHORTED
(F855) 5-VOLT SUPPLY CIRCUIT SHORT TO GROUND
(F856) 5-VOLT CIRCUIT SUPPLY SHORTED TO GROUND
PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: The DRBIII® and cable must be operating properly for the results of this test to be valid.</b></p> <p><b>NOTE: Ensure the ignition switch was on while trying to communicate with the PCM.</b></p> <p>Turn the ignition off. Disconnect the PCM harness connectors.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Does the test light illuminate brightly?</p> <p>Yes → Go To 2</p> <p>No → Repair the open or short to ground in the (A919) Fused B+ circuit. Inspect and replace fuses as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
2	<p>Turn the ignition off. Disconnect the PCM harness connectors. Ignition on, engine not running.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Using a 12-volt test light connected to ground, probe the PCM Fused Ignition Switch Output circuit in the appropriate terminals of special tool #8815.</p> <p>Does the test light illuminate brightly?</p> <p>Yes → Go To 3</p> <p>No → Repair the Ignition Switch Output circuit. Inspect and replace fuses as necessary. Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**\*NO RESPONSE FROM PCM WITH A NO START CONDITION — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the PCM harness connectors.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Special tool #8815 is only used with the NGC control module.            Using a 12-volt test light connected to battery voltage, probe the PCM ground circuits in the PCM harness connector or the appropriate terminal of special tool #8815.            Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the PCM ground circuits.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
4	<p>Turn the ignition off.            Connect the PCM harness connectors.            Disconnect the TP Sensor/Throttle Body harness connector.            Ignition on, engine not running.            Measure the voltage on the (F855) 5-volt Supply circuit.            Is the voltage between 4.5 and 5.2 volts?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>Turn the ignition off.            Disconnect the CKP Sensor harness connector.  <b>NOTE: Connect the TP Sensor harness connector.</b>            Ignition on, engine not running.            Measure the voltage on the (F855) 5-volt Supply circuit in the MAP Sensor harness connector.            Is the voltage between 4.5 and 5.2 volts?</p> <p>Yes → If communication is available with a PCM on a like vehicle, replace and program the Powertrain Control Module in accordance with Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Disconnect the Battery when replacing the TP Sensor for a 3.7L and 4.7L engines and Throttle Body Assembly on 5.7L. Replace the Throttle Body Assembly. After installation is complete, with the DRBIII® under the Misc. Menu select ETC RELEARN.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
6	<p>Turn the ignition off.            Disconnect the TP Sensor/Throttle Body harness connector.            Ignition on, engine not running.            Measure the voltage on the (F855) 5-volt Supply circuit.            Disconnect all the sensors that use the (F855) 5-volt Supply circuit.            Did the voltage return to 4.5 to 5.2 volts when disconnecting any of the sensors.</p> <p>Yes → Replace the sensor that is pulling down the (F855) 5-volt supply.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 7</p>	All

**\*NO RESPONSE FROM PCM WITH A NO START CONDITION — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off.            Disconnect PCM harness connectors.            Disconnect all the sensors that share the (F855) 5-volt Supply circuit.            Measure the resistance between ground and the (F855) 5-volt Supply circuit at one of the sensor harness connectors.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F855) 5-volt Supply circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off.            Disconnect the PCM harness connectors.            Disconnect all sensors that use the (F856) 5-volt Supply.            Measure the resistance between ground and the (F856) 5-volt Supply circuit at one of the sensors harness connector.            Is the resistance below 100 ohms?</p> <p>Yes → Repair the short to ground in the (F856) 5-volt Supply circuit.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before continuing, check the PCM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there is no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per Service Information.            Perform POWERTRAIN VERIFICATION TEST VER - 1.</p>	All



**Symptom:****\*START AND STALL CONDITION****POSSIBLE CAUSES**

CHECKING DTCS

CHECKING SKIM DTCS

THROTTLE POSITION SENSOR SWEEP

TP SENSOR #1 VOLTAGE GREATER THAN 0.92 VOLTS WITH THROTTLE CLOSED

ECT SENSOR OPERATION

OTHER POSSIBLE CAUSES FOR START &amp; STALL

FUEL CONTAMINATION

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRBIII®, read DTCs. Are any DTCs present?  Yes → Refer to the perform the appropriate Symptom diagnostics. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.  No → Go To 2	All
2	Ignition on, engine not running. <b>NOTE: If you are unable to communicate with the SKIM, refer to the Communication Category and perform the appropriate symptom.</b> With the DRBIII®, read the SKIM codes. Are there any SKIM DTCs?  Yes → Refer to the Sentry Key Immobilizer category and perform the appropriate symptom diagnostics. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.  No → Go To 3	All
3	Ignition on, engine not running. With the DRBIII®, read TP Sensor voltage. While monitoring the DRBIII®, slowly open and close the Throttle. Was the voltage change smooth?  Yes → Go To 4  No → Replace the Throttle Position Sensor or the Throttle Body Assembly on a 5.7L. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.	All
4	Ignition on, engine not running. With the DRBIII®, read Throttle Position Sensor #1 voltage. Throttle must be against stop. Is the voltage 0.92 or less with the Throttle closed?  Yes → Go To 5  No → Check for a binding throttle condition. If OK, replace the Throttle Position Sensor or the Throttle Body Assembly on a 5.7L. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.	All

**\*START AND STALL CONDITION — Continued**

TEST	ACTION	APPLICABILITY
5	<p><b>NOTE: For this test to be valid, the thermostat must be operating correctly.</b></p> <p><b>NOTE: This test works best if performed on a cold engine (cold soaked).</b></p> <p><b>NOTE: If the vehicle was allowed to sit over night with no engine start, coolant temperature should be near ambient temperatures.</b></p> <p>Ignition on, engine not running. With the DRBIII®, read the ECT value.</p> <p><b>NOTE: If engine coolant temperature is above 82° C (180° F), allow the engine to cool until 65° C (150° F) is reached.</b></p> <p>Start the engine.</p> <p>During engine warm-up, monitor the Engine Coolant Temperature value. The temperature value change should be a smooth transition from start up to normal operating temp 82° C (180° F). The value should reach at least 82° C (180° F). Did the Engine Temperature value increase smoothly and did it reach at least 82° C (180° F)?</p> <p>Yes → Go To 6</p> <p>No → Replace the Engine Coolant Temperature Sensor. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All
6	<p>The following additional items should be checked as a possible cause for a start and stall condition.</p> <p>Refer to any Technical Service Bulletins (TSBs) that may apply to the symptom.</p> <p>The exhaust system must be free of any restrictions.</p> <p>The engine compression must be within specifications.</p> <p>The engine valve timing must be within specifications.</p> <p>The engine must be free from vacuum leaks.</p> <p>The throttle body must be free of carbon buildup and dirt.</p> <p>Do any of the above conditions exist?</p> <p>Yes → Repair as necessary. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p> <p>No → Go To 7</p>	All
7	<p>Verify that the Fuel tank is not empty before continuing.</p> <p>Follow the diagnostics for Checking Fuel Delivery in this manual.</p> <p>Was the No Start condition solved after following the above diagnostic test?</p> <p>Yes → Test Complete.</p> <p>No → Check for contamination/water in the fuel. Ensure the fuel being used in this vehicle meets manufactures Fuel Requirement, refer to the service manual. Perform (NGC) POWERTRAIN VERIFICATION TEST VER - 1.</p>	All

**Symptom:****12 VOLT OVER VOLTAGE****When Monitored and Set Condition:****12 VOLT OVER VOLTAGE**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects the Fused B+ voltage rises above 16.0 volts for a period of 2 seconds.

**POSSIBLE CAUSES**

CHARGING SYSTEM DTCS PRESENT

TRANSFER CASE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read Engine DTCs. Are there any Charging System related DTCs present?</p> <p>Yes → Refer to the symptom list for problems related to Charging System and repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 2</p>	All
2	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no Charging System related DTCs or other possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Transfer Case Control Module. Perform TRANSFER CASE VERIFICATION TEST.</p>	All

**Symptom:****12 VOLT UNDER VOLTAGE****When Monitored and Set Condition:****12 VOLT UNDER VOLTAGE**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects the Fused B+ voltage drops below 9.0 volts for a period of 2 seconds.

**POSSIBLE CAUSES**

CHARGING SYSTEM DTC'S PRESENT

FUSED B+ CIRCUIT OPEN

FUSED B+ CIRCUIT SHORT TO GROUND

TRANSFER CASE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read Engine DTCs. Are there any Charging System DTCs present?  Yes → Repair all Engine Charging System DTCs before proceeding. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 2	All
2	With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display 12 VOLT UNDER VOLTAGE?  Yes → Go To 3 No → Go To 6	All
3	Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. Using a 12-volt test light connected to ground, check the Fused B+ circuit at the Transfer Case Control Module harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light illuminate brightly?  Yes → Go To 4 No → Repair the Fused B+ circuit for an open or high resistance. If the fuse is open make sure to check for a short to ground. Perform TRANSFER CASE VERIFICATION TEST.	All

**12 VOLT UNDER VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between ground and the Fused B+ circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Fused B+ circuit for a short to ground.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
6	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorted and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****2WD/AWD INDICATOR OPEN**

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**When Monitored and Set Condition:****2WD/AWD INDICATOR OPEN**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects an open in the 2WD/AWD Indicator circuit.

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**POSSIBLE CAUSES**

2WD/AWD INDICATOR CIRCUIT OPEN  
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN  
2WD/AWD INDICATOR CIRCUIT SHORT TO VOLTAGE  
TRANSFER CASE SELECTOR SWITCH  
TRANSFER CASE CONTROL MODULE  
INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display 2WD/AWD INDICATOR OPEN?  Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the 2WD/AWD Indicator circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector. Is the resistance above 5.0 ohms?  Yes → Repair the 2WD/AWD Indicator circuit for an open. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 3	All

**2WD/AWD INDICATOR OPEN — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Fused Ignition Switch Output circuit.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the Fused Ignition Switch Output circuit for an open or high resistance circuit. If the fuse is open make sure to check for a short to ground and repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the 2WD/AWD Indicator circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 2WD/AWD Indicator circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            While monitoring the 2WD Indicator, momentarily connect a jumper wire between 2WD/AWD Indicator circuit and ground.            Does the 2WD/AWD Indicator illuminate?</p> <p>Yes → Go To 6</p> <p>No → Replace the Transfer Case Selector Switch per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All

**2WD/AWD INDICATOR OPEN — Continued**

TEST	ACTION	APPLICABILITY
7	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All



**Symptom:****2WD/AWD INDICATOR SHORT TO GROUND****When Monitored and Set Condition:****2WD/AWD INDICATOR SHORT TO GROUND**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects a short to ground in the 2WD/AWD Indicator circuit.

**POSSIBLE CAUSES**

2WD/AWD INDICATOR CIRCUIT OPEN  
 2WD/AWD INDICATOR CIRCUIT SHORT TO GROUND  
 2WD/AWD INDICATOR CIRCUIT SHORT TO VOLTAGE  
 TRANSFER CASE SELECTOR SWITCH  
 TRANSFER CASE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase Transfer Case DTC's.            Start the engine and cycle the Transfer Case Selector Switch through all positions.            With the DRBIII®, read Transfer Case DTCs.            Does the DRBIII® display 2WD/AWD INDICATOR SHORT TO GROUND?</p> <p>Yes → Go To 2            No → Go To 7</p>	All
2	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the 2WD/AWD Indicator circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 2WD/AWD Indicator circuit for an open.            Perform TRANSFER CASE VERIFICATION TEST.            No → Go To 3</p>	All

**2WD/AWD INDICATOR SHORT TO GROUND — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between ground and the 2WD/AWD Indicator circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 2WD/AWD Indicator circuit for a short to ground.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the 2WD/AWD Indicator circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 2WD/AWD Indicator circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the resistance between ground and the 2WD/AWD Indicator circuit in the Transfer Case Control Module harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Replace the Transfer Case Selector Switch.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 6</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
7	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorted and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****4WD HI INDICATOR OPEN****When Monitored and Set Condition:****4WD HI INDICATOR OPEN**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects an open in the 4WD HI Indicator circuit.

**POSSIBLE CAUSES**

4WD HI INDICATOR CIRCUIT OPEN  
 FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN  
 4WD HI INDICATOR CIRCUIT SHORT TO VOLTAGE  
 TRANSFER CASE SELECTOR SWITCH  
 TRANSFER CASE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase Transfer Case DTC's.            Start the engine and cycle the Transfer Case Selector Switch through all positions.            With the DRBIII®, read Transfer Case DTCs.            Does the DRBIII® display 4WD HI INDICATOR OPEN?</p> <p>Yes → Go To 2            No → Go To 7</p>	All
2	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the 4WD HI Indicator circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 4WD HI Indicator circuit for an open.            Perform TRANSFER CASE VERIFICATION TEST.            No → Go To 3</p>	All

**4WD HI INDICATOR OPEN — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Fused Ignition Switch Output circuit.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the Fused Ignition Switch Output circuit for an open or high resistance circuit. If the fuse is open make sure to check for a short to ground and repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the 4WD HI Indicator circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 4WD HI Indicator circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            While monitoring the 4WD HI Indicator, momentarily connect a jumper wire between 4WD HI Indicator circuit and ground.            Does the 4WD HI LED illuminate?</p> <p>Yes → Go To 6</p> <p>No → Replace the Transfer Case Selector Switch.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
7	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorted and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****4WD HI INDICATOR SHORT TO GROUND****When Monitored and Set Condition:****4WD HI INDICATOR SHORT TO GROUND**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects a short to ground in the 4WD HI Indicator circuit.

**POSSIBLE CAUSES**

INTERMITTENT WIRING AND CONNECTORS

4WD HI INDICATOR CIRCUIT OPEN

4WD HI INDICATOR CIRCUIT SHORT TO GROUND

4WD HI INDICATOR CIRCUIT SHORT TO VOLTAGE

TRANSFER CASE SELECTOR SWITCH

TRANSFER CASE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display 4WD HI INDICATOR SHORT TO GROUND?</p> <p>Yes → Go To 2</p> <p>No → Go To 7</p>	All
2	<p>Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the 4WD HI Indicator circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 4WD HI Indicator circuit for an open. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 3</p>	All

**4WD HI INDICATOR SHORT TO GROUND — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between ground and the 4WD HI Indicator circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 4WD HI Indicator circuit for a short to ground.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the 4WD HI Indicator circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 4WD HI Indicator circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the resistance between ground and the 4WD HI Indicator circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Replace the Transfer Case Selector Switch.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 6</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
7	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorts and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****4WD LO INDICATOR OPEN****When Monitored and Set Condition:****4WD LO INDICATOR OPEN**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects an open in the 4WD LO Indicator circuit.

**POSSIBLE CAUSES**

4WD LO INDICATOR CIRCUIT OPEN  
 FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN  
 4WD LO INDICATOR CIRCUIT SHORT TO VOLTAGE  
 TRANSFER CASE SELECTOR SWITCH  
 TRANSFER CASE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase Transfer Case DTC's.            Start the engine and cycle the Transfer Case Selector Switch through all positions.            With the DRBIII®, read Transfer Case DTCs.            Does the DRBIII® display 4WD LO INDICATOR OPEN?</p> <p>Yes → Go To 2            No → Go To 7</p>	All
2	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the 4WD LO Indicator circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 4WD LO Indicator circuit for an open.            Perform TRANSFER CASE VERIFICATION TEST.            No → Go To 3</p>	All

**4WD LO INDICATOR OPEN — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Fused Ignition Switch Output circuit.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the Fused Ignition Switch Output circuit for an open or high resistance circuit. If the fuse is open make sure to check for a short to ground and repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the 4WD LO Indicator circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 4WD LO Indicator circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            While monitoring the 4WD LO Indicator, momentarily connect a jumper wire between 4WD LO Indicator circuit and ground.            Does the 4WD LO Indicator illuminate?</p> <p>Yes → Go To 6</p> <p>No → Replace the Transfer Case Selector Switch.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
7	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorted and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All



**Symptom:****4WD LO INDICATOR SHORT TO GROUND****When Monitored and Set Condition:****4WD LO INDICATOR SHORT TO GROUND**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects a short to ground in the 4WD LO Indicator circuit.

**POSSIBLE CAUSES**

INTERMITTENT WIRING AND CONNECTORS

4WD LO INDICATOR CIRCUIT OPEN

4WD LO INDICATOR CIRCUIT SHORT TO GROUND

4WD LO INDICATOR CIRCUIT SHORT TO VOLTAGE

TRANSFER CASE SELECTOR SWITCH

TRANSFER CASE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display 4WD LO INDICATOR SHORT TO GROUND?</p> <p>Yes → Go To 2</p> <p>No → Go To 7</p>	All
2	<p>Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the 4WD LO Indicator circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 4WD LO Indicator circuit for an open. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 3</p>	All

**4WD LO INDICATOR SHORT TO GROUND — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between ground and the 4WD LO Indicator circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 4WD LO Indicator circuit for a short to ground.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the 4WD LO Indicator circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 4WD LO Indicator circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the resistance between ground and the 4WD LO Indicator circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Replace the Transfer Case Selector Switch.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 6</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
7	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorts and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****5 VOLT OVER VOLTAGE****When Monitored and Set Condition:****5 VOLT OVER VOLTAGE**

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects the 5-volt Supply voltage rises above 6.0 volts for a period of 2 seconds.

**POSSIBLE CAUSES**

CHARGING SYSTEM DTC'S PRESENT

5-VOLT SUPPLY CIRCUIT SHORT TO SHIFT MOTOR CONTROL A OR B

5-VOLT SUPPLY CIRCUIT SHORT TO VOLTAGE

TRANSFER CASE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read PCM DTCs. Are there any Charging System DTCs present?  Yes → Repair all PCM Charging System DTCs before proceeding. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 2	All
2	With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display 5 Volt Over Voltage?  Yes → Go To 3 No → Go To 6	All
3	Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. Disconnect the Transfer Case Mode Sensor harness connector. Disconnect the Transfer Case Shift Motor harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the 5-volt Supply circuit and both Shift Motor Control circuits A and B. Is the resistance below 5.0 ohms between the 5-volt Supply circuit and either the A or B circuits?  Yes → Repair the 5-volt Supply circuit for a short to either the Shift Motor Control A or B circuit. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 4	All

**5 VOLT OVER VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Mode Sensor harness connector.            Disconnect the Transfer Case Mode Selector Switch harness connector.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the 5-volt Supply circuit in both the Transfer Case Selector Switch harness connector and the Transfer Case Mode Sensor harness connector.            Is the voltage above 0.5 volt in either harness connector?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
6	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorted and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****5 VOLT UNDER VOLTAGE****When Monitored and Set Condition:****5 VOLT UNDER VOLTAGE**

When Monitored: Continuously with the ignition on

Set Condition: The Transfer Case Control Module detects the 5-volt Supply voltage drops below 4.0 volts for a period of 2 seconds.

**POSSIBLE CAUSES**

5-VOLT SUPPLY CIRCUIT OPEN

5-VOLT SUPPLY CIRCUIT SHORT TO GROUND

TRANSFER CASE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display 5 VOLT UNDER VOLTAGE?</p> <p>Yes → Go To 2</p> <p>No → Go To 6</p>	All
2	<p>Turn the ignition off to the lock position. Disconnect the Transfer Case Mode Selector Switch harness connector. Disconnect the Transfer Case Mode Sensor harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. Measure the voltage of the 5-volt Supply circuit in both the Transfer Case Mode Selector Switch harness connector and the Transfer Case Mode Sensor harness connector.. Is the voltage below 4.0 volts in either 5-volt Supply circuit?</p> <p>Yes → Go To 3</p> <p>No → Test Complete.</p>	All
3	<p>Turn the ignition off to the lock position. Disconnect the Transfer Case Mode Sensor harness connector. Disconnect the Transfer Case Mode Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of both 5-volt Supply circuits from the Transfer Case Control Module harness connectors to the Transfer Case Mode Sensor harness connector and the Transfer Case Mode Selector Switch harness connector. Is the resistance above 5.0 ohms of either 5-volt Supply circuit?</p> <p>Yes → Repair the 5-volt Supply circuit for an open. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All

**5 VOLT UNDER VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Mode Sensor harness connector.            Disconnect the Transfer Case Mode Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between ground and both 5-volt Supply circuits.            Is the resistance below 5.0 ohms in either 5-volt Supply circuit?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to ground.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
6	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorts and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:**  
**INTERNAL ERROR****POSSIBLE CAUSES**

TRANSFER CASE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.	All

## Symptom:

### MISSING BRAKE INPUT

#### When Monitored and Set Condition:

#### MISSING BRAKE INPUT

When Monitored: Continuously with the ignition on.

Set Condition: When the Transfer Case Control Module stops receiving a bus message for Brake status for the period of 5 seconds.

#### POSSIBLE CAUSES

ENGINE DTC'S PRESENT

INTERMITTENT WIRING AND CONNECTORS

TRANSFER CASE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read Engine DTCs. Are there any Communication DTCs present?  Yes → Refer to the Communication category and perform the appropriate symptom. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 2	All
2	With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display MISSING BRAKE INPUT?  Yes → Refer to the Communication category and perform the appropriate symptom. Note: If no Communication problems are found, replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 3	All
3	The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?  Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.  No → Test Complete.	All



**Symptom:**  
**MISSING ENGINE RPM INPUT**

**When Monitored and Set Condition:**

**MISSING ENGINE RPM INPUT**

When Monitored: Continuously with the ignition on.

Set Condition: When the Transfer Case Control Module stops receiving a bus message for Engine RPM for the period of 5 seconds.

**POSSIBLE CAUSES**

COMMUNICATION DTC'S PRESENT

TRANSFER CASE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read Engine DTCs. Are there any Communication DTCs present?  Yes → Refer to the Communication category and perform the appropriate symptom. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 2	All
2	With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display MISSING ENGINE RPM?  Yes → Refer to the Communication category and perform the appropriate symptom. Note: If no Communication problems are found, replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 3	All
3	The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?  Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.  No → Test Complete.	All

## Symptom:

### MISSING IGNITION MESSAGE

#### When Monitored and Set Condition:

#### MISSING IGNITION MESSAGE

When Monitored: Continuously with the ignition on.

Set Condition: This condition occurs when the Transfer Case Control Module stops receiving a bus message for Ignition status for the period of 5 seconds.

#### POSSIBLE CAUSES

COMMUNICATION DTC'S PRESENT

TRANSFER CASE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>Turn the ignition on. With the DRBIII®, read CTM (Durango and Dakota) or Cluster (Ram truck) DTCs. Are there any Communication DTCs present?</p> <p>Yes → Refer to the Communication category and perform the appropriate symptom. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 2</p>	All
2	<p>With the DRBIII®, record and erase Transfer Case Control Module DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display MISSING IGNITION MESSAGE?</p> <p>Yes → Refer to the Communication category and perform the appropriate symptom. Note: If no Communication problems are found, replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 3</p>	All
3	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:**  
**MISSING LAMP DIMMING MESSAGE**

**When Monitored and Set Condition:**

**MISSING LAMP DIMMING MESSAGE**

When Monitored: Continuously with the ignition on.

Set Condition: This condition occurs when the Transfer Case Control Module stops receiving a bus message for Lamp dimming for the period of 5 seconds. The lamps are illuminated to the correct intensity through Pulse Width Modulation (PWM). If this DTC sets the Lamps will illuminate at daytime brightness.

**POSSIBLE CAUSES**

COMMUNICATION DTC'S PRESENT  
 TRANSFER CASE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read CTM (Durango and Dakota) or Cluster (Ram Truck) DTCs. Are there any Communication DTCs present?  Yes → Refer to the Communication category and perform the appropriate symptom. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 2	All
2	With the DRBIII®, record and erase Transfer Case Control Module DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display MISSING LAMP DIMMING MESSAGE?  Yes → Refer to the Communication category and perform the appropriate symptom. Note: If no Communication problems are found Replace and program the Transfer Case Control Module. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 3	All
3	The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?  Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.  No → Test Complete.	All

**Symptom:****MISSING SPEED DIFFERENCE MESSAGE****When Monitored and Set Condition:****MISSING SPEED DIFFERENCE MESSAGE**

**When Monitored:** When the Transfer Case Control Module has received a request to shift while the vehicle is greater than 0 MPH.

**Set Condition:** This DTC will set when the Transfer Case Control Module stops receiving the ABS/RWAL message for 5 seconds.

**POSSIBLE CAUSES**

ABS/RWAL DTCS PRESENT

COMMUNICATION DTCS PRESENT

TRANSFER CASE CONTROL MODULE

ABS/RWAL MODULE

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, check for other ABS/RWAL DTC's. Are there any ABS/RWAL related DTC's present?</p> <p>Yes → Repair all ABS or RWAL DTCs. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 2</p>	All
2	<p>With the DRBIII®, read DTCs. Are any vehicle communication DTCs present?</p> <p>Yes → Refer to the Communication category and perform the appropriate symptom. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, record and erase Transfer Case Control Module DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display MISSING SPEED DIFFERENCE MESSAGE?</p> <p>Yes → Replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All

**MISSING SPEED DIFFERENCE MESSAGE — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Using the schematics as a guide, inspect the wiring and connectors. Pay particular attention to corroded terminals and all power and ground circuits. Repair as necessary.</p> <p>Verify the flash level of the controller and update the controller if available.</p> <p>Check for any Technical Service Bulletins (TSB's) and S.T.A.R. ON-LINE for any possible causes that may apply.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the ABS or RWAL module per the service information.</p> <p>Perform TRANSFER CASE VERIFICATION TEST.</p>	All

**Symptom:**  
**MISSING TRANSFER CASE TYPE**

**When Monitored and Set Condition:**

**MISSING TRANSFER CASE TYPE**

When Monitored: Continuously with the ignition on.

Set Condition: When the Transfer Case Control Module stops receiving a bus message identifying the transfer case type for the period of 5 seconds.

**POSSIBLE CAUSES**

COMMUNICATION DTC'S PRESENT

TRANSFER CASE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read Engine DTCs. Are there any Communication DTCs present?  Yes → Refer to the Communication category and perform the appropriate symptom. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 2	All
2	With the DRBIII®, record and erase Transfer Case Control Module DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display MISSING TRANSFER CASE TYPE?  Yes → Refer to the Communication category and perform the appropriate symptom. Note: If no Communication problems are found, replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 3	All
3	The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?  Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.  No → Test Complete.	All

**Symptom:****MISSING TRANSMISSION POSITION INPUT****When Monitored and Set Condition:****MISSING TRANSMISSION POSITION INPUT**

When Monitored: Continuously with the ignition on.

Set Condition: When the Transfer Case Control Module stops receiving a bus message for Transmission Position for the period of 5 seconds.

**POSSIBLE CAUSES**

CLUSTER DTC'S PRESENT

PCM COMMUNICATION DTC'S PRESENT

TRANSMISSION DTC PRESENT

TRANSFER CASE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read Cluster DTCs. Are any Cluster DTC's present?  Yes → Repair all Cluster DTC's before proceeding. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 2	All
2	Turn the ignition on. With the DRBIII®, read Transmission DTCs. Are there any Transmission DTCs present?  Yes → Repair all Transmission DTCS before proceeding. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 3	All
3	Turn the ignition on. With the DRBIII®, read Engine DTCs. Are there any Communication DTCs present?  Yes → Refer to the Communication category and perform the appropriate symptom. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 4	All

**MISSING TRANSMISSION POSITION INPUT — Continued**

TEST	ACTION	APPLICABILITY
4	<p>With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display MISSING TRANS POSITION INPUT?</p> <p>Yes → Refer to the Communication category and perform the appropriate symptom. Note: If no Communication problems are found, replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All



**Symptom:**  
**MISSING TRANSMISSION TYPE**

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**When Monitored and Set Condition:**

**MISSING TRANSMISSION TYPE**

When Monitored: Continuously with the ignition on.

Set Condition: This condition occurs when the Transfer Case Control Module stops receiving a bus message for Transmission Type for the period of 5 seconds.

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POSSIBLE CAUSES
OTHER DTC'S PRESENT

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**Repair Instructions:**

**OTHER DTC'S PRESENT**

Refer to the Communication category and perform the appropriate symptom.

Perform TRANSFER CASE VERIFICATION TEST.

## Symptom: MISSING VEHICLE SPEED INPUT

### When Monitored and Set Condition:

#### MISSING VEHICLE SPEED INPUT

When Monitored: Continuously with the ignition on.

Set Condition: When the Transfer Case Control Module stops receiving a bus message for Vehicle Speed for the period of 5 seconds.

#### POSSIBLE CAUSES

PCM COMMUNICATION DTC'S PRESENT

VERIFY CLUSTER OPERATION

TRANSFER CASE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII® perform the Cluster Calibration test Select the Speedometer gauge. The Speedometer should match the following points. Speedometer: 0, 20, 55, 75 Did the Speedometer gauge respond correctly to the calibration points?</p> <p>Yes → Go To 2</p> <p>No → Replace the Instrument Cluster per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.</p>	All
2	<p>Turn the ignition on. With the DRBIII®, read Engine DTCs. Are there any Communication DTCs present?</p> <p>Yes → Refer to symptom list in the Communication category and perform the appropriate symptom. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display MISSING VEHICLE SPEED INPUT?</p> <p>Yes → Refer to the Communication category and perform the appropriate symptom. Note: If no Communication problems are found, replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All

**MISSING VEHICLE SPEED INPUT — Continued**

TEST	ACTION	APPLICABILITY
4	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

## Symptom:

### NEUTRAL INDICATOR OPEN

## When Monitored and Set Condition:

### NEUTRAL INDICATOR OPEN

When Monitored: Continuously with the ignition on.

Set Condition: The Transfer Case Control Module detects an open in the Neutral Indicator circuit.

## POSSIBLE CAUSES

FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN  
 NEUTRAL INDICATOR CIRCUIT OPEN  
 NEUTRAL INDICATOR CIRCUIT SHORT TO VOLTAGE  
 TRANSFER CASE SELECTOR SWITCH  
 TRANSFER CASE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display NEUTRAL INDICATOR OPEN?  Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the Neutral Indicator circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector. Is the resistance above 5.0 ohms?  Yes → Repair the Neutral Indicator circuit for an open. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 3	All

**NEUTRAL INDICATOR OPEN — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Fused Ignition Switch Output circuit.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the Fused Ignition Switch Output circuit for an open or high resistance circuit. If the fuse is open make sure to check for a short to ground and repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the Neutral Indicator circuit in the Transfer Case Selector Switch harness connector.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the Neutral Indicator circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            While monitoring the Neutral Indicator, momentarily connect a jumper wire between Neutral Indicator circuit and ground.            Does the Neutral Indicator illuminate?</p> <p>Yes → Go To 6</p> <p>No → Replace the Transfer Case Selector Switch.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All

**NEUTRAL INDICATOR OPEN — Continued**

TEST	ACTION	APPLICABILITY
7	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorts and open circuits. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****NEUTRAL INDICATOR SHORT TO GROUND****When Monitored and Set Condition:****NEUTRAL INDICATOR SHORT TO GROUND**

When Monitored: Continuously with the ignition on

Set Condition: The Transfer Case Control Module detects a short to ground in the Neutral Indicator circuit.

**POSSIBLE CAUSES**

NEUTRAL INDICATOR CIRCUIT OPEN  
 NEUTRAL INDICATOR CIRCUIT SHORT TO GROUND  
 NEUTRAL INDICATOR CIRCUIT SHORT TO VOLTAGE  
 TRANSFER CASE SELECTOR SWITCH  
 TRANSFER CASE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase Transfer Case DTC's.            Start the engine and cycle the Transfer Case Selector Switch through all positions.            With the DRBIII®, read Transfer Case DTCs.            Does the DRBIII® display NEUTRAL INDICATOR SHORT TO GROUND?</p> <p>Yes → Go To 2            No → Go To 7</p>	All
2	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the Neutral Indicator circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Neutral Indicator circuit for an open.            Perform TRANSFER CASE VERIFICATION TEST.            No → Go To 3</p>	All

**NEUTRAL INDICATOR SHORT TO GROUND — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between ground and the Neutral Indicator circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Neutral Indicator circuit for a short to ground.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the Neutral Indicator circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the Neutral Indicator circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the resistance between ground and the Neutral Indicator circuit in the Transfer Case Control Module harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Replace the Transfer Case Selector Switch.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 6</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
7	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wiring while checking for shorts and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All



**Symptom:****SELECTOR SWITCH/TRANSFER CASE - MISMATCH****When Monitored and Set Condition:****SELECTOR SWITCH/TRANSFER CASE - MISMATCH**

When Monitored: Ignition on, with the engine running.

Set Condition: When the default position (2WD/ AWD) is selected on the Transfer Case Selector Switch, the Transfer Case Control Module performs a diagnostic routine to verify that the correct Transfer Case Selector Switch is in place.

**POSSIBLE CAUSES**

CHARGING SYSTEM DTCS PRESENT  
 OTHER TRANSFER CASE DTCS PRESENT  
 VERIFY MODULE TYPE 233/2WD  
 VERIFY MODULE TYPE 244/AWD  
 VERIFY SELECTOR SWITCH 233/2WD  
 VERIFY SELECTOR SWITCH 244/AWD  
 5-VOLT SUPPLY CIRCUIT OPEN  
 MODE SELECT CIRCUIT OPEN  
 TRANSFER CASE SELECTOR SWITCH 233/2WD  
 TRANSFER CASE SELECTOR SWITCH 244/AWD  
 TRANSFER CASE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read Engine DTCs.            Are there any Charging System related DTCs present?</p> <p>Yes → Refer to the symptom list for problems related to Charging System and repair as necessary.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 2</p>	All
2	<p>With the DRBIII®, read Transfer Case DTCs.            Are there any Transfer Case DTCs present?</p> <p>Yes → If there are other DTCs set in the Transfer Control Module, diagnose those first.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 3</p>	All

**SELECTOR SWITCH/TRANSFER CASE - MISMATCH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display SELECTOR SWITCH/TRANSFER CASE MISMATCH?</p> <p>Yes → Go To 4</p> <p>No → Go To 14</p>	All
4	<p>Identify and record the Transfer Case type using the Transfer Case Identification Tag. What Transfer Case type is indicated?</p> <p>233 / 2WD Go To 5</p> <p>244 / AWD Go To 8</p>	All
5	<p>Identify and record the Transfer Case type using the DRBIII® Compare the Transfer Case Tag identification to the DRBIII® identification. Do both identify the Transfer Case as 233/2WD?</p> <p>Yes → Go To 6</p> <p>No → Reprogram the module for Transfer Case type 233/2WD. Perform TRANSFER CASE VERIFICATION TEST.</p>	All
6	<p>Visually identify the Transfer Case Selector Switch type. Does the Selector Switch read 2WD/4HI/4LO?</p> <p>Yes → Go To 7</p> <p>No → Replace the Selector Switch for Transfer Case type 233/2WD. Perform TRANSFER CASE VERIFICATION TEST.</p>	All
7	<p>Turn the ignition off to the lock position. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>NOTE: The Selector Switch must be in the 2WD position.</b> Measure the resistance between the Mode Select and the 5 volt supply circuits in the Transfer Case Selector Switch connector. Is the resistance between 5200 and 5950 ohms?</p> <p>Yes → Go To 11</p> <p>No → Replace the 233/2WD Transfer Case Selector Switch. Perform TRANSFER CASE VERIFICATION TEST.</p>	All
8	<p>Identify and record the Transfer Case type using the DRBIII® Compare the Transfer Case Tag identification to the DRBIII® identification. Do both identify the Transfer Case as 244/AWD?</p> <p>Yes → Go To 9</p> <p>No → Reprogram the module for Transfer Case type 244/AWD. Perform TRANSFER CASE VERIFICATION TEST.</p>	All

**SELECTOR SWITCH/TRANSFER CASE - MISMATCH — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Visually identify the Transfer Case Selector Switch type. Does the Selector Switch read AWD/4HI/4LO?</p> <p>Yes → Go To 10</p> <p>No → Replace the Selector Switch for Transfer Case type 244/AWD. Perform TRANSFER CASE VERIFICATION TEST.</p>	All
10	<p>Turn the ignition off to the lock position. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>NOTE: The Selector Switch must be in the AWD position.</b> Measure the resistance between the Mode Select and the 5 volt supply circuits in the Transfer Case Selector Switch connector. Is the resistance between 3050 and 3600 ohms?</p> <p>Yes → Go To 11</p> <p>No → Replace the 244/AWD Transfer Case Selector Switch. Perform TRANSFER CASE VERIFICATION TEST.</p>	All
11	<p>Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the 5-volt Supply circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for an open or high resistance. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 12</p>	All
12	<p>Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the Mode Select Circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Mode Select circuit for a open or high resistance. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 13</p>	All
13	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.</p>	All

**SELECTOR SWITCH/TRANSFER CASE - MISMATCH — Continued**

TEST	ACTION	APPLICABILITY
14	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****TRANSFER CASE MODE SENSOR ERROR****When Monitored and Set Condition:****TRANSFER CASE MODE SENSOR ERROR**

When Monitored: Continuously with the ignition on.

Set Condition: Whenever the Transfer Case Control Module detects any of the following conditions: 1. The Mode Sensor has an incorrect transition during a shift, then attempts and fails two times and defaults to a 4WD HI position. 2. An invalid Mode Sensor Position. 3. The Mode Sensor has four failed transitions during an ignition cycle.

**POSSIBLE CAUSES**

MODE SENSOR CIRCUIT OPEN  
 MODE SENSOR GROUND CIRCUIT OPEN  
 MODE SENSOR CIRCUIT SHORT TO GROUND  
 MODE SENSOR CIRCUIT SHORT TO VOLTAGE  
 5 VOLT MODE SENSOR SUPPLY CIRCUIT OPEN  
 TRANSFER CASE MODE SENSOR  
 TRANSFER CASE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase Transfer Case DTC's.            Start the engine and cycle the Transfer Case Selector Switch through all positions.            With the DRBIII®, read Transfer Case DTCs.            Does the DRBIII® display TRANSFER CASE MODE SENSOR ERROR</p> <p>Yes → Go To 2            No → Go To 9</p>	All
2	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Mode Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of Mode Sensor circuits A,B,C and D from the Transfer Case Control Module harness connector to the Transfer Case Mode Sensor harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Mode Sensor circuit A/B/C/D for an open.            Perform TRANSFER CASE VERIFICATION TEST.            No → Go To 3</p>	All

**TRANSFER CASE MODE SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Mode Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the Mode Sensor Ground circuit from the Transfer Case Control Module harness connector to the Transfer Case Mode Sensor harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Mode Sensor Ground circuit for an open.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Mode Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between ground and the Mode Sensor circuits A,B,C and D in the Transfer Case Control Module harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Mode Sensor circuit A/B/C/D for a short to ground.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Mode Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the resistance of Mode Sensor circuits A, B, C, and D from the Transfer Case Control Module harness connector to the Transfer Case Mode Sensor harness connector.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the Mode Sensor circuit A/B/C/D for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Mode Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the 5 volt Mode Sensor Supply circuit from the Transfer Case Control Module harness connector to the Transfer Case Mode Sensor harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5 Volt Mode Sensor Supply circuit for an open.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 7</p>	All

**TRANSFER CASE MODE SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
7	Replace the Transfer Case Mode Sensor per the Service Information. With the DRBIII®, erase DTCs. Operate the Transfer Case in all Ranges. Did the Transfer Case Mode Sensor Error DTC set?  Yes → Go To 8  No → Test Complete Perform TRANSFER CASE VERIFICATION TEST.	All
8	Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.  Repair Replace and program the Transfer Case Control Module per the Service Information. Perform TRANSFER CASE VERIFICATION TEST.	All
9	The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?  Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.  No → Test Complete.	All

**Symptom:****TRANSFER CASE SELECTOR SWITCH ERROR****When Monitored and Set Condition:****TRANSFER CASE SELECTOR SWITCH ERROR**

When Monitored: Continuously with the ignition on.

Set Condition: This DTC is set whenever Transfer Case Control Module (TCCM) detects a Selector Switch input of less than 250 ohms, or more than 14.5 kohms. This DTC will also set whenever TCCM detects a Selector Switch input of .25 volts or less, or 5.0 volts or more.

**POSSIBLE CAUSES**

INTERMITTENT WIRING AND CONNECTORS  
 MODE SELECT CIRCUIT OPEN  
 MODE SELECT CIRCUIT SHORT TO GROUND  
 MODE SELECT CIRCUIT SHORT TO VOLTAGE  
 5 VOLT SELECTOR SWITCH SUPPLY CIRCUIT OPEN  
 TRANSFER CASE SELECTOR SWITCH  
 TRANSFER CASE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, record and erase Transfer Case DTC's. Start the engine and cycle the Transfer Case Selector Switch through all positions. With the DRBIII®, read Transfer Case DTCs. Does the DRBIII® display TRANSFER CASE SELECTOR SWITCH ERROR?  Yes → Go To 2 No → Go To 8	All
2	Turn the ignition off to the lock position. Disconnect the Transfer Case Control Module harness connector. Disconnect the Transfer Case Selector Switch harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance of the Mode Select circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector. Is the resistance above 5.0 ohms?  Yes → Repair the Mode Select circuit for an open. Perform TRANSFER CASE VERIFICATION TEST.  No → Go To 3	All



**TRANSFER CASE SELECTOR SWITCH ERROR — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between ground and the Mode Select circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Mode Select circuit for a short to ground.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the Mode Select circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the Mode Select circuit for a short to voltage.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.            Disconnect the Transfer Case Selector Switch harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the 5-volt Selector Switch Supply circuit from the Transfer Case Control Module harness connector to the Transfer Case Selector Switch harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt Selector Switch Supply circuit for an open.            Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position.            Disconnect the Transfer Case Control Module harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between the 5 Volt Supply circuit and the Mode Select circuit in the Transfer Case Control Module harness connector.            Is the resistance between 200 ohms and 15.5k ohms in all Selector Switch ranges?</p> <p>Yes → Go To 7</p> <p>No → Replace the Transfer Case Selector Switch.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All
7	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Transfer Case Control Module per the Service Information.            Perform TRANSFER CASE VERIFICATION TEST.</p>	All

**TRANSFER CASE SELECTOR SWITCH ERROR — Continued**

TEST	ACTION	APPLICABILITY
8	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorted and open circuits. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSFER CASE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0836-4WD MUX SWITCH STUCK****When Monitored and Set Condition:****P0836-4WD MUX SWITCH STUCK**

When Monitored: When Transfer Case in 4WD Low.

Set Condition: Four wheel drive (4WD) muxed switch input detected below minimum or above maximum acceptable voltage.

**POSSIBLE CAUSES**

TRANSFER CASE POSITION SENSOR INPUT CIRCUIT OPEN  
 TRANSFER CASE POSITION SENSOR INPUT CIRCUIT SHORT TO GROUND  
 TRANSFER CASE POSITION SENSOR INPUT CIRCUIT SHORT TO VOLTAGE  
 TRANSFER CASE POSITION SENSOR INPUT CIRCUIT SHORT TO SENSOR RETURN CIRCUIT  
 TRANSFER CASE POSITION SENSOR  
 POWERTRAIN/ENGINE CONTROL MODULE  
 INTERMITTENT OPERATION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase DTC's.            Start the engine and cycle the Transfer Case through all positions.            With the DRBIII®, read Transfer Case DTCs.            Is the Good Trip Counter equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Go To 8</p>	All
2	<p>Turn the ignition off to the lock position.            Disconnect the Powertrain Control Module harness connector.  <b>CAUTION: IF EQUIPPED WITH NGC CONTROLLER, DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Disconnect the Transfer Case Position Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the Transfer Case Position Sensor Input circuit.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Transfer Case Position Sensor input circuit for an open.</p> <p>No → Go To 3</p>	All

**P0836-4WD MUX SWITCH STUCK — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Measure the resistance between ground and the Transfer Case Position Sensor Input circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Transfer Case Position Sensor input circuit for a short to ground.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition on. Measure the voltage of the Transfer Case Position Sensor Input circuit. Is there any voltage present?</p> <p>Yes → Repair the Transfer Case Position Sensor input circuit for a short to voltage.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position. Measure the resistance between the Transfer Case Position Sensor Input circuit and the Sensor Return circuit in the PCM harness connector. Is the resistance above 1000.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the Transfer Case Position Sensor Input circuit for a short to the Sensor Return circuit.</p>	All
6	<p>Measure the resistance between the Transfer Case Position Sensor Input circuit and the Sensor Return circuit in the PCM harness connector. Is the resistance between 55 ohms and 1.3k ohms?</p> <p>Yes → Go To 7</p> <p>No → Replace the Transfer Case Position Sensor.</p>	All
7	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain/Engine Control Module per the Service Information. Perform the appropriate Powertrain verification test.</p>	All
8	<p>The conditions to set this DTC are not present at this time. <b>Note: Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.</b> <b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b> <b>Note: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b> <b>NOTE: Refer to any Technical Service Bulletins that may apply.</b> Were there any problems found?</p> <p>Yes → Repair as necessary.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0837-4WD MUX SWITCH PERFORMANCE****When Monitored and Set Condition:****P0837-4WD MUX SWITCH PERFORMANCE**

When Monitored: Continuously with the ignition on.

Set Condition: The 4WD muxed switch input detected in an invalid range or irrational switch state.

**POSSIBLE CAUSES**

RELATED DTCS PRESENT

TRANSFER CASE SHIFTER OUT OF ADJUSTMENT

TRANSFER CASE POSITION SENSOR OUT OF TOLERANCE

POWERTRAIN/ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, read DTCs. Are any other Transfer Case DTCs present?</p> <p>Yes → Repair all other Transfer Case DTCs before proceeding.</p> <p>No → Go To 2</p>	All
2	<p>Verify proper Transfer Case Shifter adjustment per the Service Information. Is the Transfer Case Shifter adjusted correctly?</p> <p>Yes → Go To 3</p> <p>No → Adjust the Transfer Case shifter linkage per the Service Information.</p>	All
3	<p>Turn the ignition off to the lock position. Disconnect the PCM/ECM harness connector(s). <b>CAUTION: IF EQUIPPED WITH NGC CONTROLLER, DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance across the Transfer Case Position Sensor signal circuit and Sensor Ground circuit at the PCM/ECM harness connector. Place the transfer case in each of the following positions: 2H - resistance should be between 1124 and 1243 ohms. 4H - resistance should be between 650 and 719 ohms. N - resistance should be between 389 and 431 ohms. 4L - resistance should be between 199 and 221 ohms. Were all resistance values in each transfer case position within the specified range?</p> <p>Yes → Go To 4</p> <p>No → Replace the Transfer Case Position Sensor.</p>	All

**P0837-4WD MUX SWITCH PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
4	If there are no possible causes remaining, view repair.  Repair Replace and program the Powertrain/Engine Control Module per the Service Information. Perform the appropriate Powertrain verification test.	All

**Symptom:****P0838-4WD MODE SENSOR LOW****When Monitored and Set Condition:****P0838-4WD MODE SENSOR LOW**

When Monitored: Continuously with the ignition key on.

Set Condition: When the 4WD Mode Sensor input circuit voltage falls below 0.3 volts for 5.72 seconds.

**POSSIBLE CAUSES**

TRANSFER CASE POSITION SENSOR INPUT CIRCUIT SHORT TO GROUND

TRANSFER CASE POSITION SENSOR INPUT CIRCUIT SHORT TO SENSOR RETURN CIRCUIT

TRANSFER CASE POSITION SENSOR

POWERTRAIN/ENGINE CONTROL MODULE

INTERMITTENT OPERATION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase DTC's. Start the engine and cycle the Transfer Case through all positions. With the DRBIII®, read Transfer Case DTCs. Is the Good Trip Counter equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Go To 6</p>	All
2	<p>Turn the ignition off to the lock position. Disconnect the Powertrain Control Module harness connector. <b>CAUTION: IF EQUIPPED WITH NGC CONTROLLER, DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Disconnect the Transfer Case Position Sensor harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance between ground and the Transfer Case Position Sensor Input circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Transfer Case Position Sensor input circuit for a short to ground.</p> <p>No → Go To 3</p>	All

**P0838-4WD MODE SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Measure the resistance between the Transfer Case Position Sensor Input circuit and the Sensor Return circuit in the PCM/ECM harness connector. Is the resistance above 1000.0 ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the Transfer Case Position Sensor Input circuit for a short to the Sensor Return circuit.</p>	All
4	<p>Measure the resistance between the Transfer Case Position Sensor Input circuit and the Sensor Return circuit in the PCM/ECM harness connector. Is the resistance between 55 ohms and 1.3k ohms?</p> <p>Yes → Go To 5</p> <p>No → Replace the Transfer Case Position Sensor.</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain/Engine Control Module per the Service Information. Perform the appropriate Powertrain verification test.</p>	All
6	<p>The conditions to set this DTC are not present at this time. <b>Note: Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.</b> <b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b> <b>Note: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b> <b>NOTE: Refer to any Technical Service Bulletins that may apply.</b> Were there any problems found?</p> <p>Yes → Repair as necessary.</p> <p>No → Test Complete.</p>	All



**Symptom:****P0839-4WD MODE SENSOR HIGH****When Monitored and Set Condition:****P0839-4WD MODE SENSOR HIGH**

When Monitored: Continuously with the ignition key on.

Set Condition: When the 4WD Mode Sensor input circuit voltage raises above 4.78 volts for 5.72 seconds.

**POSSIBLE CAUSES**

TRANSFER CASE POSITION SENSOR INPUT CIRCUIT OPEN  
 TRANSFER CASE POSITION SENSOR INPUT CIRCUIT SHORT TO VOLTAGE  
 TRANSFER CASE POSITION SENSOR  
 POWERTRAIN/ENGINE CONTROL MODULE  
 INTERMITTENT OPERATION

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, record and erase DTC's.            Start the engine and cycle the Transfer Case through all positions.            With the DRBIII®, read Transfer Case DTCs.            Is the Good Trip Counter equal to zero?</p> <p>Yes → Go To 2</p> <p>No → Go To 6</p>	All
2	<p>Turn the ignition off to the lock position.            Disconnect the Powertrain/Engine Control Module harness connectors.  <b>CAUTION: IF EQUIPPED WITH NGC CONTROLLER, DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Disconnect the Transfer Case Position Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the Transfer Case Position Sensor Input circuit.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Transfer Case Position Sensor input circuit for an open.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition on.            Measure the voltage of the Transfer Case Position Sensor Input circuit.            Is there any voltage present?</p> <p>Yes → Repair the Transfer Case Position Sensor input circuit for a short to voltage.</p> <p>No → Go To 4</p>	All

**P0839-4WD MODE SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off to the lock position.            Measure the resistance between the Transfer Case Position Sensor Input circuit and the Sensor Return circuit in the PCM/ECM harness connector.            Is the resistance between 55 ohms and 1.3k ohms?</p> <p>Yes → Go To 5</p> <p>No → Replace the Transfer Case Position Sensor.</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain/Engine Control Module per the Service Information. Perform the appropriate Powertrain verification test.</p>	All
6	<p>The conditions to set this DTC are not present at this time.  <b>Note: Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.</b>  <b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b>  <b>Note: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b>  <b>NOTE: Refer to any Technical Service Bulletins that may apply.</b>            Were there any problems found?</p> <p>Yes → Repair as necessary.</p> <p>No → Test Complete.</p>	All

**Symptom:**  
**P0122-TPS/APPS LOW**

**When Monitored and Set Condition:**

**P0122-TPS/APPS LOW**

When Monitored: Continuously with the ignition on and engine running.

Set Condition: This DTC will set if the monitored TPS voltage drops below .078 volts for the period of 0.48 seconds.

**POSSIBLE CAUSES**

RELATED TPS ENGINE DTC'S PRESENT

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0122-TPS/APPS LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check Engine DTC's, this includes all one trip failures. Are there any Engine TPS DTCs present?</p> <p>Yes → Refer to the Powertrain category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, record the EATX EVENT DATA to help identify the conditions in which the DTC was set. With the DRBIII®, erase Transmission DTCs. <b>NOTE: To erase EATX EVENT DATA information, a BATTERY DISCONNECT must be performed. Performing a BATTERY DISCONNECT will reset all learned Transmission values to controller defaults which may lead to erratic shift schedules.</b> Drive the vehicle and try to duplicate the conditions in which the DTC was reported by the EATX EVENT DATA. With the DRBIII®, read Transmission DTCs. Did the DTC P0122 THROTTLE POSITION SENSOR LOW, reset?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p><b>NOTE: Due to the integration of the Powertrain and Transmission Control Modules, bus communication between the modules is internal.</b> Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. Pay particular attention to the TPS signal and sensor ground circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:**  
**P0123-TPS/APPS HIGH**

**When Monitored and Set Condition:**

**P0123-TPS/APPS HIGH**

When Monitored: Continuously with the ignition on and engine running.

Set Condition: This DTC will set if the monitored TPS voltage rises above 4.94 volts for the period of 0.48 seconds.

**POSSIBLE CAUSES**

RELATED TPS ENGINE DTC'S PRESENT

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0123-TPS/APPS HIGH — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check Engine DTC's, this includes all one trip failures. Are there any Engine TPS DTCs present?</p> <p>Yes → Refer to the Powertrain category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, record the EATX EVENT DATA to help identify the conditions in which the DTC was set. With the DRBIII®, erase Transmission DTCs. <b>NOTE: To erase EATX EVENT DATA information, a BATTERY DISCONNECT must be performed. Performing a BATTERY DISCONNECT will reset all learned Transmission values to controller defaults which may lead to erratic shift schedules.</b> Drive the vehicle and try to duplicate the conditions in which the DTC was reported by the EATX EVENT DATA. With the DRBIII®, read Transmission DTCs. Did the DTC P0123 THROTTLE POSITION SENSOR HIGH, reset?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p><b>NOTE: Due to the integration of the Powertrain and Transmission Control Modules, communication between the modules is internal.</b> Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. Pay particular attention to the TPS signal and sensor ground circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:**  
**P0124-TPS/APPS INTERMITTENT**

**When Monitored and Set Condition:**

**P0124-TPS/APPS INTERMITTENT**

When Monitored: Continuously with the ignition on and engine running.

Set Condition: This DTC will set if the monitored TPS throttle angle between the angles of 6° and 120° and the degree change is greater than 5° within a period of less than 7.0 ms.

**POSSIBLE CAUSES**

RELATED TPS ENGINE DTC'S PRESENT  
 THROTTLE POSITION SENSOR  
 POWERTRAIN CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0124-TPS/APPS INTERMITTENT — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check Engine DTC's, this includes all one trip failures. Are there any Engine TPS DTCs present?</p> <p>Yes → Refer to the Powertrain category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, record the EATX EVENT DATA to help identify the conditions in which the DTC was set. With the DRBIII®, erase Transmission DTCs. <b>NOTE: To erase EATX EVENT DATA information, a BATTERY DISCONNECT must be performed. Performing a BATTERY DISCONNECT will reset all learned Transmission values to controller defaults which may lead to erratic shift schedules.</b> Drive the vehicle and try to duplicate the conditions in which the DTC was reported by the EATX EVENT DATA. With the DRBIII®, read Transmission DTCs. Did the DTC P0124 THROTTLE POSITION SENSOR INTERMITTENT, reset?</p> <p>Yes → Go To 4</p> <p>No → Go To 6</p>	All
4	<p>Ignition On, Engine Not Running. With the DRBIII®, under Transmission Sensors, monitor the TPS voltage in the following step. Slowly open and close the throttle while checking for erratic voltage changes. Did the TPS voltage change smooth and consistent?</p> <p>Yes → Go To 5</p> <p>No → Replace the Throttle Position Sensor per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p><b>NOTE: Due to the integration of the Powertrain and Transmission Control Modules, communication between the modules is internal.</b> Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All



**P0124-TPS/APPS INTERMITTENT — Continued**

TEST	ACTION	APPLICABILITY
6	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>Pay particular attention to the TPS signal and sensor ground circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0218-HIGH TEMPERATURE OPERATION ACTIVATED****When Monitored and Set Condition:****P0218-HIGH TEMPERATURE OPERATION ACTIVATED**

When Monitored: Whenever the engine is running.

Set Condition: This DTC is an informational code and does not necessarily indicate that a failure exists. It merely flags the fact that trans sump oil temperature reached 116°C or 240°F. This temperature level can be reached when operating under heavy load in hot weather. This causes the transmission controller to use an "overheat" shift schedule, which changes the shift patterns in an attempt to control the temperature. Customers may notice a different feeling or response under these conditions. The Owner's Manual includes an explanation of this "Over Temperature Mode" for the customer's information. The DTC sets Immediately after a Overheat shift schedule is activated when Transmission temperature exceeds 116° C or 240°F.

**POSSIBLE CAUSES**

HIGH TEMPERATURE OPERATIONS ACTIVATED

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0218-HIGH TEMPERATURE OPERATION ACTIVATED — Continued**

TEST	ACTION	APPLICABILITY
2	<p>This DTC is an informational DTC designed to aid the Technician in diagnosing shift quality complaints.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>This DTC indicates that the transmission has been operating in the "Overheat" shift schedule which may generate a customer complaint.</p> <p>The customer driving patterns may indicate the need for an additional transmission oil cooler.</p> <p>Severe operation (trailer tow, etc.) in hot weather</p> <p>Verify proper Engine cooling system operation which would affect proper transmission operation.</p> <p>Perform the Oil Pump Volume Check per the Service Information.</p> <p>Note: Converter failure, clutch debris inside the pump (particularly in the cooler bypass circuit) is an indication of converter failure.</p> <p>If there are no possible causes remaining, view repair.</p> <p style="padding-left: 40px;">Repair</p> <p style="padding-left: 80px;">Repair the cause of transmission overheating. Refer to the Service Information for the proper repair procedure. Make sure to check for any Service Bulletins pertaining to this problem.</p> <p style="padding-left: 80px;">Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

### Symptom:

#### **P0562-LOW BATTERY VOLTAGE**

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### When Monitored and Set Condition:

#### **P0562-LOW BATTERY VOLTAGE**

When Monitored: With the engine running and the PCM has closed the Transmission Control Relay.

Set Condition: If the battery voltage of the Transmission Control Relay Output Sense circuit(s) to the PCM is less than 10.0 volts for the period of 15 seconds. Note: P0562 generally indicates a gradually falling battery voltage or a resistive connection(s) to the PCM. The DTC will also set if the battery voltage sensed at the PCM is less than 6.5-volts for 200ms or where Transmission Control Relay Output circuits are less than 7.2-volts for 200ms.

#### **POSSIBLE CAUSES**

RELATED CHARGING SYSTEM DTC'S

GROUND CIRCUIT OPEN OR HIGH RESISTANCE

FUSED B+ CIRCUIT TO PCM HIGH RESISTANCE

TRANSMISSION CONTROL RELAY OUTPUT TO TCM OPEN OR HIGH RESISTANCE

TRANSMISSION CONTROL RELAY - OPEN OR HIGH RESISTANCE

INTERMITTENT WIRING AND CONNECTORS

POWERTRAIN CONTROL MODULE

**P0562-LOW BATTERY VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, read the Engine DTC's.</p> <p>Are there any Charging System related DTC's present also?</p> <p>Yes → Refer to the Charging System category and repair any Engine Charging System DTC's, before testing DTC P0562. <b>NOTE: After repairing the Engine Charging System DTC's, perform the Transmission Verification test to verify the transmission was not damaged.</b></p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p><b>NOTE: Generator, battery, and charging system must be fully functional before performing this test.</b></p> <p>With the DRBIII®, read Transmission DTC's.</p> <p>With the DRBIII®, Check the STARTS SINCE SET counter for P0562.</p> <p><b>Note: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter set at 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 9</p>	All

**P0562-LOW BATTERY VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Using a 12-volt test light connected to 12-volts, check all the PCM Ground circuits at the appropriate terminals of special tool #8815. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light illuminate brightly for all the Ground circuits?</p> <p>Yes → Go To 5</p> <p>No → Repair the Ground circuit and/or circuits for an open or high resistance. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>Turn the ignition off to the lock position. Disconnect the PCM C1 harness connector. Remove the Transmission Control Relay. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Connect a jumper wire between Fused B+ circuit and Transmission Control Relay Output circuit in the Transmission Relay connector. Ignition on, engine not running. Using a 12-volt test light connected to ground, check the Fused B+ circuit at the appropriate terminal of special tool #8815. <b>NOTE: The Test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light illuminate brightly?</p> <p>Yes → Go To 6</p> <p>No → Repair the Fused B+ circuit for an open or high resistance. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0562-LOW BATTERY VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check all Transmission Control Relay Output circuits at the appropriate terminal of special tool #8815.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 7</p> <p>No → Repair the Transmission Control Relay Output circuit for an open or high resistance.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
7	<p>Turn the ignition off to the lock position.            Install a substitute Relay in place of the Transmission Control Relay.            Start the engine.            Using a voltmeter, measure the battery voltage.            With the DRBIII®, monitor the Transmission Switched Battery Voltage.            Compare the DRBIII® Transmission Switched Battery voltage to the actual battery voltage.            Is the DRBIII® voltage within 2.0 volts of the battery voltage?</p> <p>Yes → Replace the Transmission Control Relay.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0562-LOW BATTERY VOLTAGE — Continued**

TEST	ACTION	APPLICABILITY
9	<p>The conditions necessary to set the DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring and connectors while checking for shorted and open circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All



**Symptom:****P0602-CONTROL MODULE PROGRAMMING ERROR****When Monitored and Set Condition:****P0602-CONTROL MODULE PROGRAMMING ERROR**

When Monitored: Continuously

Set Condition: The DTC will always light the MIL, and is designed to signal the technician that the controller still has generic software installed.

**POSSIBLE CAUSES**

ENGINE AND TRANSMISSION NEED TO BE PROGRAMMED  
PCM

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Controller is programmed with generic software and will not allow proper Powertrain operation.</b>  <b>NOTE: This DTC can cause a no start condition in some vehicles.</b>  <b>NOTE: Check controller power and grounds before proceeding.</b>            Ignition on, engine not running.            With the DRBIII®, erase DTCs.            With the DRBIII® program the engine and transmission software.            Start the engine.            Allow the engine to reach normal operating temperature.            With the DRBIII®, read DTCs.            Does the DTC reset?</p> <p>Yes → Replace and program the Powertrain Control Module per Service Information. Note: Program both the engine and transmission software.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → The PCM has been successfully programmed. Test is complete.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:**  
**P0604-INTERNAL TCM**

**When Monitored and Set Condition:**

**P0604-INTERNAL TCM**

When Monitored: Continuously with the ignition on.

Set Condition: Whenever the PCM detects an internal controller problem.

**POSSIBLE CAUSES**

POWER OR GROUND CIRCUIT  
 POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>Using the schematics as a guide, inspect the wiring and connectors specific to the PCM and Transmission Control Relay circuits.</p> <p><b>NOTE: Pay particular attention to all power and ground circuits pertaining to the PCM. Due to the integration of the Powertrain and Transmission Control Modules, the transmission part of the PCM has its own specific power and ground circuits.</b></p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>Check for any applicable TSB's that may apply.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Were there any problems found?</p> <p>Yes → Repair the power and/or ground circuits to the PCM and Transmission Control Relay as necessary.          Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 2</p>	All
2	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:**  
**P0605-INTERNAL TCM**

**When Monitored and Set Condition:**

**P0605-INTERNAL TCM**

When Monitored: Continuously with the ignition on.

Set Condition: Whenever the PCM detects an internal controller problem.

**POSSIBLE CAUSES**

POWER OR GROUND CIRCUIT  
 POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>Using the schematics as a guide, inspect the wiring and connectors specific to the PCM and Transmission Control Relay circuits.</p> <p><b>NOTE: Pay particular attention to all power and ground circuits pertaining to the PCM. Due to the integration of the Powertrain and Transmission Control Modules, the transmission part of the PCM has its own specific power and ground circuits.</b></p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>Check for any applicable TSB's that may apply.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Were there any problems found?</p> <p>Yes → Repair the power and/or ground circuits to the PCM and Transmission Control Relay as necessary.          Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 2</p>	All
2	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits..</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module. WITH THE DRBIII® PERFORM QUICK LEARN.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:**  
**P0613-INTERNAL TCM**

**When Monitored and Set Condition:**

**P0613-INTERNAL TCM**

When Monitored: Continuously with the ignition on.

Set Condition: Whenever the PCM detects an internal controller problem.

**POSSIBLE CAUSES**

POWER OR GROUND CIRCUIT  
 POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p>Using the schematics as a guide, inspect the wiring and connectors specific to the PCM and Transmission Control Relay circuits.</p> <p><b>NOTE: Pay particular attention to all power and ground circuits pertaining to the PCM. Due to the integration of the Powertrain and Transmission Control Modules, the transmission part of the PCM has its own specific power and ground circuits.</b></p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>Check for any applicable TSB's that may apply.</p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Were there any problems found?</p> <p>Yes → Repair the power and/or ground circuits to the PCM and Transmission Control Relay as necessary.          Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 2</p>	All
2	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits..</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0706-CHECK SHIFTER SIGNAL****When Monitored and Set Condition:****P0706-CHECK SHIFTER SIGNAL**

When Monitored: Continuously with the ignition on.

Set Condition: The DTC will set if there are 3 occurrences in one ignition cycle of an invalid PRNDL code which last for more than 0.1 seconds.

**POSSIBLE CAUSES**

SHIFTER OUT OF ADJUSTMENT

TRS T1 SENSE CIRCUIT OPEN

TRS T2 SENSE CIRCUIT OPEN

TRS T3 SENSE CIRCUIT OPEN

TRS T41 SENSE - P/N SENSE CIRCUIT OPEN

TRS T42 SENSE CIRCUIT OPEN

TRS T1 SENSE CIRCUIT SHORT TO GROUND

TRS T2 SENSE CIRCUIT SHORT TO GROUND

TRS T3 SENSE CIRCUIT SHORT TO GROUND

TRS T41 SENSE - P/N SENSE CIRCUIT SHORT TO GROUND

TRS T42 SENSE CIRCUIT SHORT TO GROUND

TRS T1 SENSE CIRCUIT SHORT TO VOLTAGE

TRS T2 SENSE CIRCUIT SHORT TO VOLTAGE

TRS T3 SENSE CIRCUIT SHORT TO VOLTAGE

TRS T41 SENSE - P/N SENSE CIRCUIT SHORT TO VOLTAGE

TRS T42 SENSE CIRCUIT SHORT TO VOLTAGE

TRANSMISSION RANGE SENSOR

TRANSMISSION SOLENOID/TRS ASSEMBLY

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

**P0706-CHECK SHIFTER SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, perform the Shift Lever Position Test.</p> <p>Select the test outcome from the following:</p> <p>Test passes: Go To 3</p> <p>Test fails with Error Code: Go To 4</p> <p>Test fails without Error Code: Go To 23</p>	All
3	<p>The conditions necessary to set the DTC are not present at this time.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p><b>NOTE: If the Transmission Solenoid/TRS connector is disconnected while the ignition key is in the ON or OFF position, code P0706 will be set.</b></p> <p><b>NOTE: In this case, the EATX DTC Event Data may show engine speed as zero, all TRS pin states as OPEN, all pressure switches as OPEN or CLOSED (all switches in the same state), and/or line pressure as zero.</b></p> <p><b>NOTE: Ensure the Transmission Solenoid/TRS connector is properly reconnected.</b></p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wiring and connectors while checking for shorted and open circuits.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**P0706-CHECK SHIFTER SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off to the lock position.  Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>  Install Transmission Simulator, Miller tool #8333.  Ignition on, engine not running.  With the DRBIII®, perform the Shift Lever Position Test.  When the DRBIII® instructs you to put the Gear Selector in a particular position, you must do so using the selector switch on the Transmission Simulator.  The LED for the gear position in question must be illuminated on the Transmission Simulator prior to pressing "ENTER" on the DRBIII®.  <b>NOTE: When the DRBIII® requests the O/D off button be depressed, you must use the O/D OFF button in the vehicle or you will fail the Shift Lever Position Test with a shifter code 11.</b>  Did the Shift Lever Position test pass?</p> <p>Yes → Go To 5  No → Go To 6</p> <p><b>NOTE: Make sure to disconnect the Transmission Simulator and reconnect all disconnected connectors before proceeding.</b></p>	All
5	<p>Remove the Transmission Valve Body assembly for inspection, per the Service Information.  Is there significant metal debris on the manual valve code plate?</p> <p>Yes → Repair internal transmission per the Service Information.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Replace the Transmission Solenoid Assembly per the Service Information.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>With the DRBIII® under Transmission in Inputs/Outputs, for the following step monitor all TRS sense circuits, C1 through C5.  Move the shift lever from P to L, pausing momentarily in each gear position. Watch for one of the circuits to not change state.  Pick the one that did not change state.</p> <p>TRS T1/C4 Sense  Go To 7</p> <p>TRS T2 /C5 Sense  Go To 10</p> <p>TRS T3/C3 Sense  Go To 13</p> <p>TRS T41/C1 Sense  Go To 16</p> <p>TRS T42/C2 Sense  Go To 19</p>	All

**P0706-CHECK SHIFTER SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>NOTE: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the TRS T1 Sense circuit from the Transmission Solenoid/TRS Assembly harness connector to the appropriate terminal of Miller tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the TRS T1 Sense circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the TRS T1 Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the TRS T1 Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the TRS T1 Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the TRS T1 Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 22</p>	All



**P0706-CHECK SHIFTER SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the TRS T2 Sense circuit between the Transmission Solenoid/TRS Assembly harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the TRS T2 Sense circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 11</p>	All
11	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the TRS T2 Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the TRS T2 Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 12</p>	All
12	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the TRS T2 Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the TRS T2 Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 22</p>	All

**P0706-CHECK SHIFTER SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
13	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the TRS T3 Sense circuit from the Solenoid/TRS Assembly harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the TRS T3 Sense circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 14</p>	All
14	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the TRS T3 Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the TRS T3 Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 15</p>	All
15	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the TRS T3 Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the TRS T3 Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 22</p>	All

**P0706-CHECK SHIFTER SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
16	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C3 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the TRS T41 Sense - P/N Sense circuit from the Solenoid/TRS Assembly harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the TRS T41 Sense - P/N Sense circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 17</p>	All
17	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C3 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the TRS T41 Sense - P/N Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the TRS T41 Sense - P/N Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 18</p>	All
18	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C3 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the TRS T41 Sense - P/N Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the TRS T41 Sense - P/N Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 22</p>	All

**P0706-CHECK SHIFTER SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
19	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the TRS T42 Sense circuit from the Solenoid/TRS Assembly harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the TRS T42 Sense circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 20</p>	All
20	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the TRS T42 Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the TRS T42 Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 21</p>	All
21	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the TRS T42 Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the TRS T42 Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 22</p>	All

**P0706-CHECK SHIFTER SIGNAL — Continued**

TEST	ACTION	APPLICABILITY
22	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
23	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Adjust the shifter per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0711-TRANSMISSION TEMPERATURE SENSOR PERFORMANCE****When Monitored and Set Condition:****P0711-TRANSMISSION TEMPERATURE SENSOR PERFORMANCE**

When Monitored: Continuously with the ignition on and engine running.

Set Condition: This DTC will set when the desired transmission temperature does not reach a normal operating temperature within a given time frame. Time is variable due to ambient temperature. Approximate times are starting temperature to warm up time: (-40° F / -40° C - 35 min) (-20° F / -28° C - 25 min) (20° F / -6.6° C - 20 min) (60° F / 15.5 ° C - 10 min)

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT

TRANSMISSION TEMPERATURE SENSOR

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

## P0711-TRANSMISSION TEMPERATURE SENSOR PERFORMANCE — Continued

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check Transmission DTC's. Are there any other Transmission Temperature Sensor related DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0711. <b>NOTE: This counter only applies to the last DTC set.</b> Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 4</p> <p>No → Go To 7</p>	All
4	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the Transmission Simulator, turn the Input/Output switch to OFF. With the DRBIII®, monitor the TRANS TEMP VOLTS while turning the Thermistor Voltage switch to all three positions on the Transmission Simulator. Compare the DRBIII® readings with the numbers listed on the Transmission Simulator. Do the readings on the Transmission Simulator match the DRBIII® readings <math>\pm 0.2</math> volts?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace Transmission Solenoid/TRS assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0711-TRANSMISSION TEMPERATURE SENSOR PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
7	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All



**Symptom:****P0712-TRANSMISSION TEMPERATURE SENSOR LOW****When Monitored and Set Condition:****P0712-TRANSMISSION TEMPERATURE SENSOR LOW**

When Monitored: Continuously with the ignition on and engine running.

Set Condition: The DTC will set when the monitored Temperature Sensor voltage drops below 0.078 volts for the period of 0.45 seconds.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT

TRANSMISSION TEMPERATURE SENSOR SIGNAL CIRCUIT SHORT TO GROUND

TRANSMISSION TEMPERATURE SENSOR

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue</p> <p>Go To 2</p>	All

**P0712-TRANSMISSION TEMPERATURE SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check Transmission DTC's. Are there any Speed Sensor DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0712. <b>NOTE: This counter only applies to the last DTC set.</b> Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 4</p> <p>No → Go To 8</p>	All
4	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the Transmission Simulator, turn the Input/Output switch to OFF. With the DRBIII®, monitor the TRANS TEMP VOLTS while turning the Thermistor Voltage switch to all three positions on the Transmission Simulator. Compare the DRBIII® readings with the numbers listed on the Transmission Simulator. Do the readings on the Transmission Simulator match the DRBIII® readings <math>\pm 0.2</math> volts?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace Transmission Solenoid/TRS assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0712-TRANSMISSION TEMPERATURE SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the Transmission Temperature Sensor Signal circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Transmission Temperature Sensor Signal circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
8	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorted and open circuits.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0713-TRANSMISSION TEMPERATURE SENSOR HIGH****When Monitored and Set Condition:****P0713-TRANSMISSION TEMPERATURE SENSOR HIGH**

When Monitored: Continuously with the ignition on and engine running.

Set Condition: The DTC will set when the monitored Temperature Sensor voltage rises above 4.94 volts for the period of 0.45 seconds.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT

TRANSMISSION TEMPERATURE SENSOR SIGNAL CIRCUIT OPEN

TRANSMISSION TEMPERATURE SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE

TRANSMISSION TEMPERATURE SENSOR

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0713-TRANSMISSION TEMPERATURE SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check Transmission DTC's. Are there any Speed Sensor DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0713. <b>NOTE: This counter only applies to the last DTC set.</b> Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 4</p> <p>No → Go To 9</p>	All
4	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the Transmission Simulator, turn the Input/Output switch to OFF. With the DRBIII®, monitor the TRANS TEMP VOLTS while turning the Thermistor Voltage switch to all three positions on the Transmission Simulator. Compare the DRBIII® readings with the numbers listed on the Transmission Simulator. Do the readings on the Transmission Simulator match the DRBIII® readings <math>\pm 0.2</math> volts?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace Transmission Solenoid/TRS assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0713-TRANSMISSION TEMPERATURE SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid /TRS Assembly harness connector  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Transmission Temperature Sensor Signal circuit from the appropriate terminal of special tool #8815 to the Transmission Solenoid/TRS Assembly harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Transmission Temperature Sensor Signal circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the Transmission Temperature Sensor Signal circuit.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the Transmission Temperature Sensor Signal circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0713-TRANSMISSION TEMPERATURE SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
9	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0714-TRANSMISSION TEMPERATURE SENSOR INTERMITTENT****When Monitored and Set Condition:****P0714-TRANSMISSION TEMPERATURE SENSOR INTERMITTENT**

When Monitored: Continuously with the ignition on and engine running.

Set Condition: The DTC will set when the monitored Temperature Sensor voltage fluctuates or changes abruptly within a predetermined period of time.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT

TRANSMISSION TEMPERATURE SENSOR

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All



## P0714-TRANSMISSION TEMPERATURE SENSOR INTERMITTENT — Continued

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check Transmission DTC's. Are there any Speed Sensor and/or other Temperature Sensor DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0714. <b>NOTE: This counter only applies to the last DTC set.</b> Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 4</p> <p>No → Go To 7</p>	All
4	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the Transmission Simulator, turn the Input/Output switch to OFF. With the DRBIII®, monitor the TRANS TEMP VOLTS while turning the Thermistor Voltage switch to all three positions on the Transmission Simulator. Compare the DRBIII® readings with the numbers listed on the Transmission Simulator. Do the readings on the Transmission Simulator match a non-fluctuating DRBIII® reading <math>\pm 0.2</math> volts?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace Transmission Solenoid/TRS assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0714-TRANSMISSION TEMPERATURE SENSOR INTERMITTENT —  
Continued**

TEST	ACTION	APPLICABILITY
7	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0715-INPUT SPEED SENSOR ERROR****When Monitored and Set Condition:****P0715-INPUT SPEED SENSOR ERROR**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If there is an excessive change in input RPM in any gear. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

INPUT SPEED SENSOR SIGNAL CIRCUIT OPEN  
SPEED SENSOR GROUND CIRCUIT OPEN  
INPUT SPEED SENSOR SIGNAL CIRCUIT SHORT TO GROUND  
SPEED SENSOR GROUND CIRCUIT SHORT TO GROUND  
INPUT SPEED SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE  
SPEED SENSOR GROUND CIRCUIT SHORT TO VOLTAGE  
INPUT SPEED SENSOR  
POWERTRAIN CONTROL MODULE  
INTERMITTENT WIRING AND CONNECTORS

**P0715-INPUT SPEED SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Start the engine in park.</p> <p>With the DRBIII®, observe the Input Speed Sensor Reading.</p> <p>Is the Input Speed Sensor Reading below 400 RPM?</p> <p>Yes → Go To 3</p> <p>No → Go To 12</p>	All
3	<p>Turn the ignition off to the lock position.</p> <p>Remove the Starter Relay.</p> <p><b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b></p> <p>Install the Transmission Simulator, Miller tool #8333.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p>Ignition on, engine not running.</p> <p>With the Transmission Simulator, set the selector switch to 3000/1000 and the Input/Output switch to ON.</p> <p>With the DRBIII®, monitor the Input and Output Speed Sensor RPM.</p> <p>Does the Input speed read 3000 RPM and the Output speed read 1000 RPM ± 50 RPM?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Input Speed Sensor per the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0715-INPUT SPEED SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn ignition switch to the lock position            Disconnect the PCM C4 harness connector.            Disconnect the Input Speed Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Input Speed Sensor Signal circuit from the appropriate terminal of special tool #8815 to the Input Speed Sensor harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Input Speed Sensor Signal circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Input Speed Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the Input Speed Sensor Signal circuit.            Is the resistance Below 5.0 ohms?</p> <p>Yes → Repair the Input Speed Sensor Signal circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Place a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the Input Speed Sensor Signal circuit.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the Input Speed Sensor Signal circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All

**P0715-INPUT SPEED SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Input Speed Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Speed Sensor Ground circuit from the appropriate terminal of special tool #8815 to the Input Speed Sensor harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Speed Sensor Ground circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Input Speed Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the Speed Sensor Ground circuit.            Is the resistance Below 5.0 ohms?</p> <p>Yes → Repair the Speed Sensor Ground circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 10</p>	All
10	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Place a jumper wire between the fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the Speed Sensor Ground circuit.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair Speed Sensor Ground circuit short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 11</p>	All

**P0715-INPUT SPEED SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
12	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0720-OUTPUT SPEED SENSOR ERROR**

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**When Monitored and Set Condition:****P0720-OUTPUT SPEED SENSOR ERROR**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If there is an excessive change in output RPM in any gear. This DTC can take up to five minutes of problem identification before illuminating the MIL.

POSSIBLE CAUSES
OUTPUT SPEED SENSOR SIGNAL CIRCUIT OPEN
SPEED SENSOR GROUND CIRCUIT OPEN
OUTPUT SPEED SENSOR SIGNAL CIRCUIT SHORT TO GROUND
SPEED SENSOR GROUND CIRCUIT SHORT TO GROUND
OUTPUT SPEED SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE
SPEED SENSOR GROUND CIRCUIT SHORT TO VOLTAGE
OUTPUT SPEED SENSOR
POWERTRAIN CONTROL MODULE
INTERMITTENT WIRING AND CONNECTORS



**P0720-OUTPUT SPEED SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Turn the ignition off to the lock position.</p> <p><b>CAUTION: Properly support the vehicle and raise all drive wheels off the ground.</b></p> <p>Start the engine in park.</p> <p>Place the transmission gear selector in drive, release foot from brake.</p> <p><b>WARNING: BE SURE TO KEEP HANDS AND FEET CLEAR OF ROTATING WHEELS.</b></p> <p>With the DRBIII®, monitor the Output Speed Sensor RPM.</p> <p>Is the Output Speed Sensor RPM below 100 RPM?</p> <p>Yes → Go To 3</p> <p>No → Go To 12</p>	All
3	<p>Turn the ignition off to the lock position.</p> <p>Remove the Starter Relay.</p> <p><b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b></p> <p>Install the Transmission Simulator, Miller tool #8333.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p>Ignition on, engine not running.</p> <p>With the Transmission Simulator, set the selector switch to 3000/1000 and the Input/Output switch to ON.</p> <p>With the DRBIII®, monitor the Input and Output Speed Sensor RPM</p> <p>Does the Input Speed read 3000 RPM and the Output Speed read 1000 RPM, ± 50 RPM?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All

**P0720-OUTPUT SPEED SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
4	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Output Speed Sensor per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Output Speed Sensor harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the Output Speed Sensor Signal circuit from the Output Speed Sensor harness connector to the appropriate terminal of special tool #8815. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Output Speed Sensor Signal circuit for an open. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Output Speed Sensor harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance between ground and the Output Speed Sensor Signal circuit. Is the resistance Below 5.0 ohms?</p> <p>Yes → Repair the Output Speed Sensor Signal circuit for a short to ground. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All

**P0720-OUTPUT SPEED SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  <b>Note: Check connectors - Clean/repair as necessary.</b>            Place a jumper wire between the Fused B+ circuit and the Transmission Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the Output Speed Sensor Signal circuit.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the Output Speed Sensor Signal circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Output Speed Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Speed Sensor Ground circuit from the Output Speed Sensor harness connector to the appropriate terminal in the special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Speed Sensor Ground circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Output Speed Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the Speed Sensor Ground circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Speed Sensor Ground circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 10</p>	All

**P0720-OUTPUT SPEED SENSOR ERROR — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay from the PDC.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Place a jumper wire between the Fused B+ circuit and Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the Speed Sensor Ground circuit.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the Speed Sensor Ground circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 11</p>	All
11	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
12	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorted and open circuits.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0725-ENGINE SPEED SENSOR CIRCUIT****When Monitored and Set Condition:****P0725-ENGINE SPEED SENSOR CIRCUIT**

When Monitored: Continuously with engine running.

Set Condition: This code is set when the engine speed sensed by the Transmission is less than 400 RPM and the engine is running (As reported by the PCM over the communication bus) for 2 seconds. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED ENGINE DTC'S PRESENT

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0725-ENGINE SPEED SENSOR CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>NOTE: This is not a Transmission Input Speed Sensor DTC.</b>            Start the engine.            Allow the engine to idle.            With the DRBIII®, check the STARTS SINCE SET counter for P0725.  <b>NOTE: This counter only applies to the last DTC set.</b>            Is the STARTS SINCE SET counter for P0725 set at 0?</p> <p>No → Go To 3            Yes → Go To 4</p>	All
3	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorts and open circuits.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.            No → Test Complete.</p>	All
4	<p>Ignition on, engine not running.            With the DRBIII®, read Engine DTC's.            Are there any Engine DTCs present?</p> <p>Yes → Refer to the Powertrain category and perform the appropriate symptom.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.            No → Go To 5</p>	All
5	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair            Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0731-GEAR RATIO ERROR IN 1ST****When Monitored and Set Condition:****P0731-GEAR RATIO ERROR IN 1ST**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If the ratio of the Input RPM to the Output RPM does not match the current gear ratio. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT  
INTERNAL TRANSMISSION  
INTERMITTENT GEAR RATIO ERRORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0731-GEAR RATIO ERROR IN 1ST — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's If any of these DTC's are present, perform their respective tests first. Are DTC's P0944, P0715, P0720, P1794, P0867, P0932, P0868, or P0869 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. If any of these DTCs are present, they may cause a Speed Ratio Error. Perform the test for P0944 first if it is present. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, perform the 1st Gear Clutch Test. Follow the instructions on the DRBIII®. Increase the throttle angle or TPS Degree to 30° for no more than a few seconds. <b>CAUTION: Do not overheat the transmission.</b> Did the Clutch Test pass, Input Speed remain at zero?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>The conditions to set this DTC are not currently present. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. - If the DTC Event Data shows fault P0731 was set in the Park, Reverse, or Neutral, replace the Powertrain Control Module. - If the DTC Event Data shows fault P0731 set with input RPM = zero, check input speed sensor and related wiring. - If the DTC Event Data shows fault P0731 set with line pressure significantly below Desired Line Pressure, check for cause of low line pressure (i.e., oil level, misinstalled or damages filter or filter seal, sticking main regulator valve in pump, etc.). - If the DTC Event Data shows fault P0731 set with UD pressure switch open (but line pressure matches Desired Line Pressure), air check the UD clutch passage for leakage and if OK, replace the solenoid assembly. Check the gearshift linkage adjustment. Intermittent Gear Ratio DTCs can be set by problems in the Input and Output Speed Sensor circuits and/or Speed Sensor Ground circuit. Remove the Starter Relay from the PDC. <b>NOTE: Failure to remove the Starter Relay can cause a Transmission - No Response condition.</b> Install Transmission Simulator, Miller tool # 8333. Wiggle wiring and connectors while checking for intermittent operation with the Transmission Simulator. Gear ratio DTC's can also be set under extreme temperature conditions, this is usually caused by an internal problem. Verify if the problem is only experienced under extreme hot or cold conditions. Were there any problems found.</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All



**P0731-GEAR RATIO ERROR IN 1ST — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Repair internal transmission as necessary. Refer to the Service Information.</p> <p>If there were any line pressure DTC's present along with this DTC, make sure to inspect the Transmission Oil Pump and Pressure Control Solenoid per the Service Information.</p> <p>If DTC's P0876 and/or P0875 were present in addition to the P0731, replace the Transmission Solenoid/TRS Assembly in addition to necessary internal repairs.</p> <p>Pay particular attention to the following list of possible causes when repairing the transmission condition.</p> <ul style="list-style-type: none"> <li>- Cut UD piston seal</li> <li>- Failed overrunning clutch</li> <li>- Faulty solenoid module</li> <li>- Cut UD accumulator seal ring</li> <li>- Broken UD accumulator piston</li> <li>- Broken reaction shaft support seal ring</li> <li>- Low line pressure</li> <li>- Broken/missing main valve body bleed orifice</li> <li>- Broke/missing dribbles orifice assy in reaction shafts support</li> </ul> <p>If there are no possible causes remaining, view repair.</p> <p style="padding-left: 40px;">Repair</p> <p style="padding-left: 80px;">Repair internal transmission per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0732-GEAR RATIO ERROR IN 2ND****When Monitored and Set Condition:****P0732-GEAR RATIO ERROR IN 2ND**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If the ratio of the Input RPM to the Output RPM does not match the current gear ratio. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT  
 CHECK 2C AND UD CLUTCH  
 EXTRA #7 CHECK BALL IN POCKET OR PASSAGE  
 INTERNAL TRANSMISSION  
 TRANSMISSION SOLENOID/TRS ASSEMBLY  
 INTERMITTENT GEAR RATIO ERRORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0732-GEAR RATIO ERROR IN 2ND — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check Transmission DTC's Are there any Loss of Prime, Speed Sensor, and/or Line Pressure DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. If any of these DTCs are present, they may cause a Speed Ratio Error. Perform the test procedure for P0944-LOSS OF PRIME first if it is present. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check Transmission DTC's Is the DTC P0845 and/or P0846 also present?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>With the DRBIII®, record the EATX DTC EVENT DATA for P0732. Does the EATX DTC EVENT DATA show a Input speed of 0?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>The conditions to set this DTC are not currently present. Check the gearshift linkage adjustment. Intermittent gear ratio DTCs can be set by problems in the Input and Output Speed Sensor circuits and/or Speed Sensor Ground circuit. Remove the Starter Relay. <b>NOTE: Failure to remove the Starter Relay can cause a Transmission - No Response condition.</b> Install Transmission Simulator, Miller tool # 8333. Wiggle wiring and connectors while checking for intermittent operation with the Transmission Simulator. Gear ratio DTC's can also be set under extreme temperature conditions, this is usually caused by an internal problem. Verify if the problem is only experienced under extreme hot or cold conditions. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All
6	<p>Remove the Valve Body and air check the 2C and UD clutches per the Service Information. Do the 2C and UD clutches pass the air test?</p> <p>Yes → Go To 7</p> <p>No → Repair internal transmission per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0732-GEAR RATIO ERROR IN 2ND — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Check the #7 Check Ball pocket and passage for an extra check ball. Is there an extra check ball in the #7 Check Ball pocket or passage?</p> <p>Yes → Remove extra #7 Check Ball. Make sure the check ball to be used is not cut or damaged and repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Repair internal transmission as necessary. Refer to the Service Information. If there are no possible causes remaining, view repair.</p> <p>Repair Repair internal transmission per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0733-GEAR RATIO ERROR IN 3RD****When Monitored and Set Condition:****P0733-GEAR RATIO ERROR IN 3RD**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If the ratio of the Input RPM to the Output RPM does not match the current gear ratio. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT

RELATED PRESSURE SWITCH DTC'S PRESENT

INTERNAL TRANSMISSION

TRANSMISSION SOLENOID/TRS ASSEMBLY

INTERMITTENT GEAR RATIO ERRORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue</p> <p>Go To 2</p>	All

**P0733-GEAR RATIO ERROR IN 3RD — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's If any of these DTC's are present, perform their respective tests first. Are the DTC's P0944, P0715, P0720, P1794, P0867, P0932, P0868, or P0869 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom.. If any of these DTCs are present, they will cause a Speed Ratio Error. Perform the test for P0944 first if it is present. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check for other transmission DTC's Are the DTCs P0870 OD Hydraulic Pressure Switch and/or P0871 OD Pressure Switch present also?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>With the DRBIII®, perform the 3rd Gear Clutch Test. Follow the instructions on the DRBIII®. Increase the throttle angle, TPS Degree, to 30° for no more than a few seconds. <b>CAUTION: Do not overheat the transmission.</b> Did the clutch test pass, Input speed remain at zero?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>The conditions to set this DTC are not currently present. Check the gearshift linkage adjustment. Intermittent gear ratio DTCs can be set by problems in the Input and Output Speed Sensor circuits and/or Speed Sensor Ground circuit. Remove the Starter Relay. <b>NOTE: Failure to remove the Starter Relay can cause a Transmission - No Response condition.</b> Install Transmission Simulator, Miller tool #8333. Wiggle wiring and connectors while checking for intermittent operation with the Transmission Simulator. Gear ratio DTC's can also be set under extreme temperature conditions, this is usually caused by an internal problem. Verify if the problem is only experienced under extreme hot or cold conditions. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found.</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**P0733-GEAR RATIO ERROR IN 3RD — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Repair the transmission as necessary. If there were any line pressure DTC's also present, make sure to inspect the Transmission Oil Pump and Pressure Control Solenoid per the Service Information. NOTE: If DTC's P0871 and/or P0870 are also present, replace the Transmission Solenoid/TRS Assembly in addition to necessary internal repairs. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0734-GEAR RATIO ERROR IN 4TH****When Monitored and Set Condition:****P0734-GEAR RATIO ERROR IN 4TH**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If the ratio of the Input RPM to the Output RPM does not match the current gear ratio. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT

RELATED PRESSURE SWITCH DTC'S PRESENT

INTERNAL TRANSMISSION

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All



**P0734-GEAR RATIO ERROR IN 4TH — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's If any of these DTC's are present, perform their respective tests first. Are the DTC's P0944, P0715, P0720, P1794, P0867, P0932, P0868 or P0869 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. If any of these DTCs are present, they will cause a Speed Ratio Error. Perform the test for P0944 first if it is present. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check for other transmission DTC's Are the DTCs P0987 4C Hydraulic Pressure Switch and/or P0988 4C Pressure Switch present also?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Repair internal transmission as necessary per the Service Information. If there were any line pressure DTC's also present, make sure to inspect the Transmission Oil Pump and Pressure Control Solenoid per the Service Information. If DTC's P0988 and/or P0987 are also present, replace the Transmission Solenoid/TRS Assembly in addition to necessary internal repairs. If there are no possible causes remaining, view repair.</p> <p>Repair Repair internal transmission per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0735-GEAR RATIO ERROR 4TH PRIME****When Monitored and Set Condition:****P0735-GEAR RATIO ERROR 4TH PRIME**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If the ratio of the Input RPM to the Output RPM does not match the current gear ratio. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT  
INTERNAL TRANSMISSION  
INTERMITTENT GEAR RATIO ERRORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0735-GEAR RATIO ERROR 4TH PRIME — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's If any of these DTC's are present, perform their respective tests first. Are the DTC's P0944, P0715, P0720, P1794, P0867, P0932, P0868 or P0869 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. If any of these DTCs are present, they will cause a Speed Ratio Error. Perform the test for P0944 first if it is present. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, perform the 2nd Gear Clutch Test. Follow the instructions on the DRBIII®.</p> <p>With the DRBIII®, perform the 3rd Gear Clutch Test. Follow the instructions on the DRBIII®.</p> <p><b>NOTE: You must test the 2nd and 3rd clutches to verify 4th Prime operation.</b></p> <p>Increase the throttle angle, TPS Degree, to 30° for no more than a few seconds for each Gear tested.</p> <p><b>CAUTION: Do not overheat the transmission.</b></p> <p><b>NOTE: No DTC's will be set while using the DRBIII® to perform a clutch test.</b></p> <p>Did both clutch tests pass, Input speed remain at zero?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>The conditions to set this DTC are not currently present. Check the gearshift linkage adjustment. Intermittent gear ratio DTCs can be set by problems in the Input and Output Speed Sensor circuits and/or Speed Sensor Ground circuit. Remove the Starter Relay from the PDC.</p> <p><b>NOTE: Failure to remove the Starter Relay can cause a Transmission - No Response condition.</b></p> <p>Install Transmission Simulator, Miller tool # 8333. Wiggle wiring and connectors while checking for intermittent operation with the Transmission Simulator.</p> <p>Gear ratio DTC's can also be set under extreme temperature conditions, this is usually caused by an internal problem. Verify if the problem is only experienced under extreme hot or cold conditions. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission as necessary per the Service Information. If any Line Pressure DTC's are present along with this DTC, make sure to inspect the Transmission Oil Pump and the Pressure Control Solenoid per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0736-GEAR RATIO ERROR IN REVERSE****When Monitored and Set Condition:****P0736-GEAR RATIO ERROR IN REVERSE**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If the ratio of the Input RPM to the Output RPM does not match the current gear ratio. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT

INTERNAL TRANSMISSION

INTERMITTENT GEAR RATIO ERRORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0736-GEAR RATIO ERROR IN REVERSE — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's. If any of these DTC's are present, perform their respective tests first. Are the DTC's P0944, P0715, P0720, P1794, P0867, P0932, P0868 or P0869 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. If any of these DTCs are present, they will cause a Speed Ratio Error. Perform the test for P0944 first if it is present. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, perform the Reverse Gear Clutch Test. Follow the instructions on the DRBIII®. Increase the throttle angle , TPS Degree, to 30°, for no more than a few seconds. <b>CAUTION: Do not overheat the transmission.</b> Did the clutch test pass, Input speed remain at zero?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>The conditions to set this DTC are not currently present. Check the gearshift linkage adjustment. Intermittent gear ratio DTCs can be set by problems in the Input and Output Speed Sensor circuits and/or Speed Sensor Ground circuit. Remove the Starter Relay from the PDC. <b>NOTE: Failure to remove the Starter Relay can cause a Transmission - No Response condition.</b> Install Transmission Simulator, Miller tool # 8333. Wiggle wiring and connectors while checking for intermittent operation with the Transmission Simulator. Gear ratio DTC's can also be set under extreme temperature conditions, this is usually caused by an internal problem. Verify if the problem is only experienced under extreme hot or cold conditions With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission as necessary per the Service Information. If there are any Line Pressure DTC's present along with this DTC, make sure to inspect the Transmission Oil Pump and Pressure Control Solenoid per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

## Symptom:

### P0740-TCC OUT OF RANGE

#### When Monitored and Set Condition:

#### P0740-TCC OUT OF RANGE

When Monitored: During Electronically Modulated Converter Clutch (EMCC) Operation.

Set Condition: Transmission must be in EMCC, with input speed > than 1750 RPM. TCC-L/R Solenoid achieves the maximum duty cycle and can not pull engine speed within 60 RPM of input speed. Also when the transmission is in FEMCC and the engine slips TCC > than 100 RPM for 10 seconds. This DTC can take up to five minutes of problem identification before illuminating the MIL.

#### POSSIBLE CAUSES

RELATED DTC P0750 PRESENT

LR SOLENOID

TORQUE CONVERTER AND/OR INTERNAL TRANSMISSION

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0740-TCC OUT OF RANGE — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, read transmission DTC's Is the DTC P0750 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Read and RECORD ALL Transmission DTC's. After recording DTC's, erase DTC's. Drive the vehicle until the transmission temperature is at least 43° C or 110° F and the engine temperature at least 49° C or 120° F. Perform the following steps 3 times. Drive the vehicle to the speed of at least 88 km/h or 55 MPH. Allow 4th gear to engage for at least 10 seconds. Close the throttle. Tip back into the throttle until the TPS angle is between 25 and 29 degrees. <b>NOTE: If the throttle angle goes over 30 degrees, you must close the throttle and try again.</b> Did the TCC engage during any of the attempts, Engine speed approximately equal to input speed?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorts and open circuits. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorts and open circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All
5	<p>With the DRBIII®, check for other transmission DTC's. Is the DTC P1775 or P0841 present also?</p> <p>Yes → Remove the Transmission Valve Body Assembly per the service manual. Inspect the solenoid switch valve and plugs for stickiness. If problems are found, repair as necessary. If no problems are found, replace the Transmission Solenoid Assembly. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All

**P0740-TCC OUT OF RANGE — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Repair internal transmission as necessary per the service manual. Inspect the valves in the pump valve body and clean/ replace as necessary.</p> <p>If no problems are found in the Oil pump valve body, replace the Transmission Solenoid/TRS Assembly. Replace the Torque Converter in either case</p> <p>Pay particular attention to the following list of possible causes when repairing the torque converter or transmission condition.</p> <ul style="list-style-type: none"> <li>- Sticking TCC switch valve in the pump valve body.</li> <li>- Sticking TCC regulator valve in the pump valve body.</li> </ul> <p>Check for the following possible causes. Refer to the Service information for the proper repair procedures.</p> <p>Inspect the Transmission Oil Pump.</p> <p>If no problems are found in the Oil Pump, replace the Transmission Solenoid/TRS Assembly.</p> <p>Check the Torque Converter Switch Valve and the Torque Converter Clutch Control Valve for sticking in the bore.</p> <p>Check the Teflon seal rings on the input shaft.</p> <p>View repair.</p> <p style="margin-left: 40px;">Repair</p> <p style="margin-left: 80px;">Replace the Torque Converter. Make sure to check all other possible causes in addition to the Torque Converter.</p> <p style="margin-left: 80px;">Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All



## Symptom:

### P0750-LR SOLENOID CIRCUIT

#### When Monitored and Set Condition:

#### P0750-LR SOLENOID CIRCUIT

**When Monitored:** Initially at power-up, then every 10 seconds thereafter. The solenoid circuits will also be tested immediately after a gear ratio or pressure switch error is detected.

**Set Condition:** Three consecutive solenoid continuity test failures, or one failure if test is run in response to a gear ratio or pressure switch error.

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue</p> <p>Test Complete.</p>	All

### Symptom:

#### **P0755-2C SOLENOID CIRCUIT**

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### When Monitored and Set Condition:

#### **P0755-2C SOLENOID CIRCUIT**

**When Monitored:** Initially at power-up, then every 10 seconds thereafter. The solenoid circuits will also be tested immediately after a gear ratio or pressure switch error is detected.

**Set Condition:** Three consecutive solenoid continuity test failures, or one failure if test is run in response to a gear ratio or pressure switch error.

<b>POSSIBLE CAUSES</b>
RELATED RELAY DTC'S PRESENT
2C SOLENOID CONTROL CIRCUIT OPEN
TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN
2C SOLENOID CONTROL CIRCUIT SHORT TO GROUND
2C SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE
TRANSMISSION SOLENOID/TRS ASSEMBLY
POWERTRAIN CONTROL MODULE
INTERMITTENT WIRING AND CONNECTORS

**P0755-2C SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other Transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTC's P0890, P0891 or P0888 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0755.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter for P0755 set at 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Remove the Starter Relay.</p> <p><b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b></p> <p>Install Transmission Simulator, Miller tool #8333.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p>Ignition on, engine not running.</p> <p>Monitor the 2C Solenoid LED on the Transmission Simulator.</p> <p>With the DRBIII®, actuate the 2C Solenoid.</p> <p>Did the 2C Solenoid LED on the Transmission Simulator blink on and off?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All

**P0755-2C SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace Transmission Solenoid/TRS Assembly per the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the PCM C4 harness connector.</p> <p>Disconnect the Transmission Solenoid /TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the 2C Solenoid Control circuit from the Transmission Solenoid/TRS Assembly harness connector to the appropriate terminal of the special tool #8815.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 2C Solenoid Control circuit for an open.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the PCM C4 harness connector.</p> <p>Disconnect the Transmission Solenoid/TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance between ground and the 2C Solenoid Control circuit.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 2C Solenoid Control circuit for a short to ground.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All

**P0755-2C SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the 2C Solenoid Control circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 2C Solenoid Control circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Transmission Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 10</p> <p>No → Repair the Transmission Control Relay Output circuit for an open or high resistance.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
10	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0755-2C SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
11	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0760-OD SOLENOID CIRCUIT****When Monitored and Set Condition:****P0760-OD SOLENOID CIRCUIT**

**When Monitored:** Initially at power-up, then every 10 seconds thereafter. The solenoid circuits will also be tested immediately after a gear ratio or pressure switch error is detected.

**Set Condition:** Three consecutive solenoid continuity test failures, or one failure if test is run in response to a gear ratio or pressure switch error.

**POSSIBLE CAUSES**

RELATED RELAY DTC'S PRESENT

OD SOLENOID CONTROL CIRCUIT OPEN

TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN

OD SOLENOID CONTROL CIRCUIT SHORT TO GROUND

OD SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE

TRANSMISSION SOLENOID/TRS ASSEMBLY

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

**P0760-OD SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTC's P0890, P0891 or P0888 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0760.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter for P0760 set at 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Remove the Starter Relay.</p> <p><b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b></p> <p>Install Transmission Simulator, Miller tool #8333.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p>Ignition on, engine not running.</p> <p>Monitor the OD Solenoid LED on the Transmission Simulator.</p> <p>With the DRBIII®, actuate the OD Solenoid.</p> <p>Did the OD Solenoid LED on the Transmission Simulator blink on and off?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All



**P0760-OD SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace Transmission Solenoid/TRS Assembly per the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the Powertrain Control Module C4 harness connector.</p> <p>Disconnect the Transmission Solenoid /TRS Assembly harness connector</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the OD Solenoid Control circuit from the appropriate terminal of special tool #8815 to the Transmission Solenoid/TRS Assembly harness connector.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the OD Solenoid Control circuit for an open.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the Powertrain Control Module C4 harness connector.</p> <p>Disconnect the Transmission Solenoid/TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance between ground and the OD Solenoid Control circuit.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the OD Solenoid Control circuit for a short to ground.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All

**P0760-OD SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the Powertrain Control Module C4 harness connector.            Disconnect the Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the OD Solenoid Control circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the OD Solenoid Control circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Remove the Transmission Control Relay.            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 10</p> <p>No → Repair the Transmission Control Relay Output circuit for an open or high resistance.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
10	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0760-OD SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
11	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

### **Symptom:**

#### **P0765-UD SOLENOID CIRCUIT**

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### **When Monitored and Set Condition:**

#### **P0765-UD SOLENOID CIRCUIT**

**When Monitored:** Initially at power-up, then every 10 seconds thereafter. The solenoid circuits will also be tested immediately after a gear ratio or pressure switch error is detected.

**Set Condition:** Three consecutive solenoid continuity test failures, or one failure if test is run in response to a gear ratio or pressure switch error.

<b>POSSIBLE CAUSES</b>
RELATED RELAY DTC'S PRESENT
TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN
UD SOLENOID CONTROL CIRCUIT OPEN
UD SOLENOID CONTROL CIRCUIT SHORT TO GROUND
UD SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE
TRANSMISSION SOLENOID/TRS ASSEMBLY
POWERTRAIN CONTROL MODULE
INTERMITTENT WIRING AND CONNECTORS

**P0765-UD SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTCs P0890, P0891 or P0888 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0765.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter for P0765 set at 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Remove the Starter Relay.</p> <p><b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b></p> <p>Install Transmission Simulator, Miller tool #8333.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p>Ignition on, engine not running.</p> <p>Monitor the UD Solenoid LED on the Transmission Simulator.</p> <p>With the DRBIII®, actuate the UD Solenoid.</p> <p>Did the UD Solenoid LED on the Transmission Simulator blink on and off?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All

**P0765-UD SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace Transmission Solenoid/TRS Assembly per the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the PCM C4 harness connector.</p> <p>Disconnect the Transmission Solenoid/TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the UD Solenoid Control circuit between the Solenoid/TRS Assembly harness connector and the appropriate terminal of the special tool #8815.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the UD Solenoid Control circuit for an open.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the PCM C4 harness connector.</p> <p>Disconnect the Transmission Solenoid/TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance between ground and the UD Solenoid Control circuit.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the UD Solenoid Control circuit for a short to ground.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All

**P0765-UD SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the UD Solenoid Control circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the UD Solenoid Control circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Transmission Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 10</p> <p>No → Repair the Transmission Control Relay Output circuit for an open or high resistance.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
10	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0765-UD SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
11	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All



**Symptom:****P0770-4C SOLENOID CIRCUIT****When Monitored and Set Condition:****P0770-4C SOLENOID CIRCUIT**

**When Monitored:** Initially at power-up, then every 10 seconds thereafter. The solenoid circuits will also be tested immediately after a gear ratio or pressure switch error is detected.

**Set Condition:** Three consecutive solenoid continuity test failures, or one failure if test is run in response to a gear ratio or pressure switch error.

**POSSIBLE CAUSES**

RELATED RELAY DTC'S PRESENT

4C SOLENOID CONTROL CIRCUIT OPEN

TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN

4C SOLENOID CONTROL CIRCUIT SHORT TO GROUND

4C SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE

TRANSMISSION SOLENOID/TRS ASSEMBLY

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

**P0770-4C SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTC's P0890, P0891 or P0888 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0770.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter for P0770 set at 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Remove the Starter Relay.</p> <p><b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b></p> <p>Install Transmission Simulator Miller tool #8333.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p>Ignition on, engine not running.</p> <p>Monitor the 4C Solenoid LED on the Transmission Simulator, Miller tool #8333.</p> <p>With the DRBIII®, actuate the 4C Solenoid.</p> <p>Did the 4C Solenoid LED on the Transmission Simulator blink on and off?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All

**P0770-4C SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair.</p> <p>Replace Transmission Solenoid/TRS Assembly per the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the PCM C4 harness connector.</p> <p>Disconnect the Transmission Solenoid /TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the 4C Solenoid Control circuit from the appropriate terminal of special tool #8815 to the Solenoid/TRS Assembly harness connector.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 4C Solenoid Control circuit for an open.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the Powertrain Control Module C4 harness connector.</p> <p>Disconnect the Transmission Solenoid/TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance between ground and the 4C Solenoid Control circuit from the appropriate terminal of special tool #8815.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 4C Solenoid Control circuit for a short to ground.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All

**P0770-4C SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the Powertrain Control Module C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the 4C Solenoid Control circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 4C Solenoid Control circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Remove the Transmission Control Relay from the PDC.            Connect a jumper wire between Fused B+ circuit and the Transmission Control Relay Output circuit in the Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 10</p> <p>No → Repair the Transmission Control Relay Output circuit for an open or high resistance.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
10	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0770-4C SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
11	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0841-LR PRESSURE SWITCH SENSE CIRCUIT**

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**When Monitored and Set Condition:****P0841-LR PRESSURE SWITCH SENSE CIRCUIT**

When Monitored: Whenever the engine is running.

Set Condition: The DTC will set if the LR Pressure Switch reads open or closed at the wrong time in a given gear.

POSSIBLE CAUSES
LOSS OF PRIME DTC P0944 PRESENT
RELATED RELAY DTC'S PRESENT
NO. 1 CHECK BALL CUT OR DAMAGED
LR PRESSURE SWITCH SENSE CIRCUIT OPEN
TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN
LR PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND
LR PRESSURE SWITCH SENSE CIRCUIT SHORT TO VOLTAGE
LOW LINE PRESSURE
REVERSE CARRIER SNAP RING DISLODGED
WIRING AND CONNECTORS
TRANSMISSION SOLENOID/TRS ASSEMBLY
POWERTRAIN CONTROL MODULE
POOR WIRING AND CONNECTIONS
INTERMITTENT WIRING AND CONNECTORS

**P0841-LR PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other Transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTC's present?.</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check for other Transmission DTC's.</p> <p>Is the DTC P0944 present in addition to the DTC that you are diagnosing?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>With the DRBIII®, check the EATX DTC EVENT DATA for P0841.</p> <p><b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b></p> <p>Did the DTC set while in reverse?</p> <p>Yes → Go To 12</p> <p>No → Go To 5</p>	All

**P0841-LR PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>With the DRBIII®, check the EATX DTC EVENT DATA for P0841.  <b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b>  Does the LR Pressure Switch read CLOSED?</p> <p>Yes → Go To 6</p> <p>No → Go To 17</p>	All
6	<p>Turn the ignition off to the lock position.  Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>  Install the Transmission Simulator, Miller tool #8333.  <b>Note: Check connectors - Clean/repair as necessary.</b>  Ignition on, engine not running.  Turn the Pressure Switch selector to L/R on the Transmission Simulator.  With the DRBIII®, monitor the L/R Pressure Switch state while pressing the Pressure Switch Test button on the Transmission Simulator.  Did the Pressure Switch state change from open to closed when the test button was pressed?</p> <p>Yes → Go To 7</p> <p>No → Go To 12</p>	All
7	<p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.  Wiggle the wires while checking for shorted and open circuits.  Were there any problems found?</p> <p>Yes → Repair as necessary.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>With the EATX DTC EVENT DATA recorded earlier, check what gear the transmission was in when the DTC P0841 was set.  Does the EATX DTC EVENT DATA show the Present Gear as first gear?</p> <p>Yes → Go To 9</p> <p>No → Go To 11</p>	All
9	<p>Remove the Transmission Valve Body per the Service Information.  Check the No. 1 Check Ball for cuts or damage.  Is the No. 1 Check Ball cut or damaged?</p> <p>Yes → Replace the No. 1 Check Ball and check for clutch debris in the transmission oil pan. If there is excessive debris, perform internal repairs to the LR Clutch Assembly. Refer to the Service Information for proper repair procedures.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 10</p>	All



**P0841-LR PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Looking through the windows in the bottom of the case, check whether the snap ring at the front of the Reverse (center) Carrier has dislodged.</p> <p><b>NOTE: It may be necessary to pry the Input Annulus Gear Shell rearward to check this snap ring.</b></p> <p>Is the Reverse Carrier Snap Ring dislodged?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 11</p>	All
11	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
12	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid /TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the LR Pressure Switch Sense circuit from the Solenoid/TRS Assembly harness connector to the appropriate terminal of the special tool #8815.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the LR Pressure Switch Sense circuit for an open. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 13</p>	All
13	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid/TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance between ground and the LR Pressure Switch Sense circuit.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the LR Pressure Switch Sense circuit for a short to ground. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 14</p>	All

**P0841-LR PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
14	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Remove the Transmission Control Relay from the PDC.            Connect a jumper wire between Fused B+ circuit and the Transmission Control Relay Output circuit in the Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 15</p> <p>No → Repair the Transmission Control Relay Output circuit for an open or high resistance.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
15	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            Were there any problems found</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 16</p>	All
16	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
17	<p>With the EATX DTC EVENT DATA recorded earlier, compare the Line Pressure and the Desired Line Pressure.            Is the Line Pressure less than 40 psi, and significantly below the Desired Line Pressure?</p> <p>Yes → Repair as necessary to correct low line pressure. Check the Primary Oil Filter seal for a split, crack, or improperly installed. Refer to the Service Information for the proper installation procedure. Also check the Main Regulator Valve in the Oil Pump.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 18</p>	All

**P0841-LR PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
18	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the voltage of the LR Pressure Switch Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the LR Pressure Switch Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 19</p>	All
19	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorted and open circuits.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

### Symptom:

#### **P0845-2C HYDRAULIC PRESSURE TEST FAILURE**

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### When Monitored and Set Condition:

#### **P0845-2C HYDRAULIC PRESSURE TEST FAILURE**

**When Monitored:** In any forward gear with engine speed above 1000 RPM shortly after a shift and every minute thereafter.

**Set Condition:** After a shift into a forward gear, with engine speed above 1000 RPM, the PCM momentarily turns on element pressure to the Clutch circuits that don't have pressure to identify the correct Pressure Switch closes. If the Pressure Switch does not close 2 times, the DTC sets.

#### **POSSIBLE CAUSES**

LINE PRESSURE SENSOR  
RELATED LINE PRESSURE DTC'S PRESENT  
TRANSMISSION SOLENOID/TRS ASSEMBLY  
POOR LINE PRESSURE SENSOR CONNECTION  
2C PRESSURE SWITCH SENSE CIRCUIT OPEN  
5-VOLT SUPPLY CIRCUIT OPEN  
TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN  
2C PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND  
5-VOLT SUPPLY CIRCUIT SHORT TO GROUND  
2C PRESSURE SWITCH SENSE CIRCUIT SHORT TO VOLTAGE  
EXCESSIVE DEBRIS IN OIL PAN  
INTERNAL TRANSMISSION  
POWERTRAIN CONTROL MODULE  
INTERMITTENT WIRING AND CONNECTORS

**P0845-2C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's</p> <p>Is there any Loss of Prime, and/or Line Pressure Sensor DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. If the DTC, P0944-LOSS OF PRIME is present, perform its respective test first.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check for other transmission DTC's</p> <p>Is the DTC P0732 and/or P0846 present also?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0845.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 5</p> <p>No → Go To 20</p>	All

**P0845-2C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Start the engine.  Warm the transmission to 82° C or 180° F.  Firmly apply the brakes.  With the DRBIII®, monitor the Line Pressure during the following step.  Move the shift lever to each gear position and record the line pressure reading. Allow the pressure to stabilize for at least 5 seconds in each range.  Did the line pressure remain at a steady value between 585 and 655 kPa or 85 and 95 PSI?</p> <p>Yes → Go To 6  No → Go To 10</p>	All
6	<p>Ignition on, engine not running.  With the DRBIII®, monitor the Line Pressure during the following step.  Firmly push the Transmission Line Pressure Sensor connector towards the Transmission.  Did the Line Pressure change to about 207 kPa or 30 PSI when the connector was pushed?</p> <p>Yes → Disconnect and properly reconnect the Line Pressure Sensor connector. Inspect terminals and repair as necessary.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.  No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.  Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>  Install the Transmission Simulator, Miller tool #8333.  With the Transmission Simulator select the "OFF" position on the "Input/Output Speed" switch.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>  Ignition on, engine not running.  With the DRBIII®, monitor the Line Pressure during the following step.  Using the Transmission Simulator, turn the Pressure Switch selector to each of the 3 line pressure positions.  <b>NOTE: All three DRBIII® Line Pressure readings should be steady and ±14 kPa or 2.0 PSI of the reading specified on the Transmission Simulator.</b>  Did the Line Pressure match the specified readings and remain steady in all three positions?</p> <p>Yes → Go To 19  No → Go To 8</p>	All

**P0845-2C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the 5-volt Supply circuit from the Line Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 5-volt Supply circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 18</p>	All
10	<p>Turn the ignition off to the lock position.            Connect the Line Pressure Adapter, Miller tool # 8259 and 0-300 psi Test Gauge, Miller tool #C-3293-SP. Refer to the Service Information for proper installation procedure.  <b>CAUTION: Apply parking brake.</b>            Start the engine.            With the DRBIII® in Transmission Sensors, in the following steps compare the Actual Line Pressure to the Pressure Gauge readings in each gear.  <b>CAUTION: Do not overheat transmission.</b>            With the gear selector in park and raise the RPM to 1500 and compare line pressure readings.            Firmly apply the brakes, move the gear selector into reverse and raise the RPM to 1500 and compare the line pressure readings.            Firmly apply the brakes, move the gear selector into drive and raise the RPM to 1500 and compare the line pressure readings.            Do the DRBIII® Actual Line Pressure readings match the Pressure Gauge readings <math>\pm 10</math> psi?</p> <p>Yes → Go To 11</p> <p>No → Go To 19</p>	All

**P0845-2C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Failure to remove the Starter Relay can cause a TCM - No Response condition.</b> Install the Transmission Simulator Miller tool# 8333. With the Transmission Simulator Miller tool# 8333, turn the Pressure Switch selector to 2C. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, monitor the 2C Pressure Switch state during the following step. While pressing and holding the Pressure Switch test button, wiggle the wiring harness and connectors pertaining to the 2C Pressure Switch. Did the 2C Pressure Switch state change to closed and remain closed while wiggling the wires?</p> <p>Yes → Go To 12</p> <p>No → Go To 14</p>	All
12	<p>Remove and inspect the Transmission Oil Pan per the Service Information. Does the Transmission Oil Pan contain excessive debris or contamination?</p> <p>Yes → Repair the cause of the excessive debris in the Transmission Oil Pan. Refer to the Service Information for the proper procedures. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 13</p>	All
13	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair Internal Transmission as necessary. Disassemble and inspect the Valve Body and repair or replace as necessary. If no problems are found in the Valve Body, replace the Transmission Solenoid/TRS Assembly. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
14	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid /TRS Assembly harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the 2C Pressure Switch Sense circuit from the appropriate terminal of special tool #8815 to the Transmission Solenoid/TRS Assembly harness connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 2C Pressure Switch Sense circuit for an open. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 15</p>	All



**P0845-2C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
15	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 2C Pressure Switch Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 2C Pressure Switch Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 16</p>	All
16	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the 2C Pressure Switch Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 2C Pressure Switch Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 17</p>	All
17	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Transmission Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 18</p> <p>No → Repair the Transmission Control Relay Output circuit for an open. If the fuse is open make sure to check for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0845-2C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
18	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
19	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Line Pressure Sensor per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
20	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0846-2C PRESSURE SWITCH SENSE CIRCUIT****When Monitored and Set Condition:****P0846-2C PRESSURE SWITCH SENSE CIRCUIT**

When Monitored: Continuously with the ignition on, engine running, with the transmission in gear.

Set Condition: The DTC is set if the 2C Pressure Switch reads open or closed at the wrong time in a given gear .

**POSSIBLE CAUSES**

RELATED RELAY DTC'S PRESENT  
DTC P0871 ALSO PRESENT  
EATX DTC DATA SHOW CURRENT DTC  
LOSS OF 12-VOLT FEED  
2C PRESSURE SWITCH SENSE CIRCUIT OPEN  
2C PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND  
EXCESSIVE FLUID LEAKAGE WITH 2C CLUTCH CIRCUIT  
#5 AND/OR #7 CHECK BALL CUT OR DAMAGED  
LOW LINE PRESSURE  
PRIMARY OIL FILTER SEAL  
TRANSMISSION SOLENOID/TRS ASSEMBLY  
POWERTRAIN CONTROL MODULE  
WIRING AND CONNECTORS

**P0846-2C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTC's P0890, P0891, or P0888 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check the EATX DTC EVENT DATA.</p> <p>Does the EATX DTC EVENT DATA show data for DTC P0846?</p> <p>Yes → Go To 4</p> <p>No → Refer to the Transmission category and perform the appropriate symptom shown in the EATX DTC EVENT DATA. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
4	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there two or more related Pressure Switch Sense DTCs present in addition to P0846?</p> <p>Yes → Go To 5</p> <p>No → Go To 8</p>	All

**P0846-2C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>With the DRBIII®, check the EATX DTC EVENT DATA for P0846.  <b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b>            Do all the pressure switches read CLOSED in the EATX DTC EVENT DATA for P0846?</p> <p>Yes → Refer to Transmission category and perform diagnostics for P0888-RELAY OUTPUT ALWAYS OFF.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All
6	<p>In the EATX DTC EVENT DATA recorded earlier, read the state of all pressure switches.            Do all the pressure switches read OPEN?</p> <p>Yes → Go To 7</p> <p>No → Go To 8</p>	All
7	<p>In the EATX DTC EVENT DATA recorded earlier, compare the Line Pressure and the Desired Line Pressure.            Is the Line Pressure less than 40 psi, and significantly below the Desired Line Pressure?</p> <p>Yes → Repair as necessary to correct low line pressure. Check fluid level and adjust as necessary. If OK, check the Primary Oil Filter seal for crack or improperly installed. If OK, check the Main Regulator Valve in the Oil Pump. Refer to Service information.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 19</p>	All
8	<p>With the DRBIII®, check Transmission DTCs.            Is the DTC P0871 also present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>With the DRBIII®, check the EATX DTC EVENT DATA for P0846.  <b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b>            Does the EATX DTC EVENT DATA show the DTC set in Park, Neutral, or Reverse for P0846?</p> <p>Yes → Go To 13</p> <p>No → Go To 10</p>	All
10	<p>With the DRBIII®, check the EATX DTC EVENT DATA for P0846.  <b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b>            Does the EATX DTC EVENT DATA show the 2C Pressure Switch reading CLOSED?</p> <p>Yes → Go To 11</p> <p>No → Go To 16</p>	All

**P0846-2C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the Transmission Simulator, turn the Pressure Switch selector switch to the 2C position. With the DRBIII®, monitor the 2C Pressure Switch while pressing the Pressure Switch test button on the Transmission Simulator. Did the state of the 2C Pressure Switch change while pressing the Pressure Switch Test button?</p> <p>Yes → Go To 12</p> <p>No → Go To 13</p>	All
12	<p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. Where there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 19</p>	All
13	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid /TRS Assembly harness connector. Disconnect the PCM C4 harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the 2C Pressure Switch Sense circuit from the appropriate terminal of special tool #8815 to the Transmission Solenoid/TRS Assembly harness connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 2C Pressure Switch Sense circuit for an open. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 14</p>	All

**P0846-2C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
14	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 2C Pressure Switch Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 2C Pressure Switch Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 15</p>	All
15	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
16	<p>In the EATX DTC EVENT DATA recorded earlier, compare the Line Pressure and the Desired Line Pressure.            Is the Line Pressure less than 40 psi, and significantly below the Desired Line Pressure?</p> <p>Yes → Repair as necessary to correct low line pressure. Check fluid level and adjust as necessary. If OK, check the Primary Oil Filter seal for crack or improperly installed. If OK, check the Main Regulator Valve in the Oil Pump. Refer to Service information.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 17</p>	All
17	<p>Turn the Ignition off to the lock position.            Remove the Valve Body Assembly per the Service Information.            Inspect the #5 and #7 check balls for any cuts or damage.            Inspect the 2C accumulator piston and seals and also the 2C tower seal on top of the valve body. Refer to the Service Information.            Where there any problems found?</p> <p>Yes → Repair as necessary. Check for excessive clutch debris in the transmission oil pan. If excessive clutch debris is present, repair 2C clutch as necessary. Refer to the Service Information for proper repair procedures.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 18</p>	All

**P0846-2C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
18	<p>Air check the 2C Clutch hydraulic circuit. Refer to the Service Information.</p> <p><b>NOTE: This hydraulic clutch circuit contains a small bleed orifice. Small leakage is considered normal.</b></p> <p>Was there excessive air leakage in the 2C Clutch hydraulic circuit?</p> <p>Yes → Repair as necessary. Refer to the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 19</p>	All
19	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All



**Symptom:****P0868-LINE PRESSURE LOW****When Monitored and Set Condition:****P0868-LINE PRESSURE LOW**

When Monitored: Continuously while driving in a forward gear.

Set Condition: The PCM continuously monitors Actual Line Pressure and compares it to Desired Line Pressure. If Actual Line Pressure is more than 10 PSI below Desired Line Pressure, this code will be set.

**POSSIBLE CAUSES**

CHECK FOR RELATED DTC'S

5-VOLT SUPPLY CIRCUIT OPEN

POOR LINE PRESSURE SENSOR CONNECTION

5-VOLT SUPPLY CIRCUIT SHORT TO GROUND

5-VOLT SUPPLY CIRCUIT SHORT TO VOLTAGE

PRESSURE CONTROL SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE

INTERNAL TRANSMISSION

LINE PRESSURE SENSOR

PLUGGED TRANSMISSION OIL FILTER

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

**P0868-LINE PRESSURE LOW — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's</p> <p>Is the DTC P0932 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check the STARTS SINCE SET counter for P0868.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the START SINCE SET COUNTER 2 or less?</p> <p>Yes → Go To 4</p> <p>No → Go To 14</p>	All
4	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, monitor the Line Pressure, firmly push the Line Pressure Sensor harness connector towards the Transmission.</p> <p>Did the Line Pressure change to about 207 kPa or 30 PSI when the connector was pushed?</p> <p>Yes → Disconnect and properly reconnect the Line Pressure Sensor connector. Inspect terminals and repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All

**P0868-LINE PRESSURE LOW — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. With the Transmission Simulator select the "OFF" position on the "Input/Output Speed" switch. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, monitor the Line Pressure during the following step. Using the Transmission Simulator, set the rotary knob to each of the 3 line pressure positions. <b>NOTE: All three DRBIII® Line Pressure readings should be steady and ±14 kPa or 2.0 PSI of the reading specified on the Transmission Simulator.</b> Did the Line Pressure read within ±14 kPa or 2.0 PSI in all three positions?</p> <p>Yes → Go To 6</p> <p>No → Go To 9</p>	All
6	<p>Turn the ignition off to the lock position. Install the Line Pressure Adaptor, Miller tool #8259, and the Pressure Gauge, Miller tool #C-3293, 0 to 2000 kPa or 0 to 300 PSI. Start the engine in park. With the DRBIII® monitor the Line Pressure. Monitor the reading on the Pressure Gauge Miller tool #C-3293. Compare the Line Pressure readings between the DRBIII® and the Pressure Gauge. Is the Line Pressure Gauge reading within 34 kPa or 5 PSI of the DRBIII® reading?</p> <p>Yes → Go To 7</p> <p>No → Replace the Line Pressure Sensor per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
7	<p>Remove and inspect the Transmission Oil Pan for excessive debris per the Service Information. Remove and inspect the Primary Oil Filter per the Service Information. <b>NOTE: Make sure the Primary Transmission Oil Filter and/or O-ring is not cracked or split.</b> Does the Oil Pan contain excessive debris and/or is the Primary Oil Filter cracked or plugged?</p> <p>Yes → Repair the plugged, cracked, or split Primary Transmission Oil Filter and/or O-ring. If the Primary Transmission Oil Filter is plugged refer to the Service Information for the proper Hydraulic repair procedure. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission and inspect the Transmission Oil Pump per the Service Information and replace if necessary. If no problem is found, replace the Solenoid/TRS assembly. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0868-LINE PRESSURE LOW — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the 5-volt Supply circuit from the Line Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 10</p>	All
10	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 5-volt Supply circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 11</p>	All
11	<p>Turn the ignition off to the lock position.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the 5-volt Supply circuit in the Line Pressure Sensor harness connector.            Is the voltage above 5.5 volts?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 12</p>	All

**P0868-LINE PRESSURE LOW — Continued**

TEST	ACTION	APPLICABILITY
12	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay from the PDC.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the relay connector.            Ignition on, engine not running.            Measure the voltage of the Pressure Control Solenoid control circuit from the appropriate terminal of special tool #8815.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the Pressure Control Solenoid Control circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 13</p>	All
13	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
14	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorts and open circuits.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

### Symptom:

#### **P0869-LINE PRESSURE HIGH**

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### When Monitored and Set Condition:

#### **P0869-LINE PRESSURE HIGH**

When Monitored: Continuously while driving in a forward gear.

Set Condition: The PCM continuously monitors Actual Line Pressure. If the Actual Line Pressure reading is greater than the highest Desired Line Pressure ever used in the current gear, while the Pressure Control Solenoid duty cycle is at or near its maximum value (which should result in minimum line pressure), this code will set.

#### **POSSIBLE CAUSES**

CHECK FOR RELATED DTC'S

5-VOLT SUPPLY CIRCUIT OPEN

LINE PRESSURE SENSOR CONNECTION

PRESSURE CONTROL SOLENOID CONTROL CIRCUIT OPEN

5-VOLT SUPPLY CIRCUIT SHORT TO GROUND

PRESSURE CONTROL SOLENOID CONTROL CIRCUIT SHORT TO GROUND

INTERNAL TRANSMISSION

LINE PRESSURE SENSOR

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

**P0869-LINE PRESSURE HIGH — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other Transmission DTC's</p> <p>Is the DTC P0932 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check the STARTS SINCE SET counter for P0869.</p> <p>Is the STARTS SINCE SET COUNTER 2 or less?</p> <p>Yes → Go To 4</p> <p>No → Go To 13</p>	All
4	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, monitor the Transmission Line Pressure.</p> <p>Firmly push the Line Pressure Sensor harness connector inward towards the Transmission.</p> <p>Did the Line Pressure change to about 207 kPa or 30 PSI when the sensor connector was pushed?</p> <p>Yes → Disconnect and properly reconnect the Line Pressure Sensor connector. Inspect terminals and repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All

**P0869-LINE PRESSURE HIGH — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. With the Transmission Simulator select the "OFF" position on the "Input/Output Speed" switch. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, monitor the Line Pressure during the following step. Using the Transmission Simulator, set the rotary switch to each of the 3 line pressure positions. <b>NOTE: All three DRBIII® Line Pressure readings should be steady and ±14 kPa or 2.0 PSI of the reading specified on the Transmission Simulator.</b> Did the Line Pressure read within ±14 kPa or 2.0 PSI in all three positions?</p> <p>Yes → Go To 6</p> <p>No → Go To 8</p>	All
6	<p>Turn the ignition off to the lock position. Install the Line Pressure Adaptor, Miller tool #8259, and the Pressure Gauge, Miller tool #C-3293, 0 to 2000 kPa or 0 to 300 PSI. Start the engine in park. With the DRBIII®, monitor the Line Pressure. Monitor the reading on the Pressure Gauge, Miller tool #C-3293. Compare the Line Pressure reading between the DRBIII® and the Pressure Gauge. Is the Pressure Gauge reading within 34 kPa or 5 PSI of the DRBIII® reading?</p> <p>Yes → Go To 7</p> <p>No → Replace the Line Pressure Sensor per the Service information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
7	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair the internal transmission and inspect the Transmission Oil Pump per the Service Information and replace if necessary. If no problem is found, replace the Transmission Solenoid/TRS Assembly, possible cause is a stuck Pressure Control Solenoid. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All



**P0869-LINE PRESSURE HIGH — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the Powertrain Control Module C4 harness connector.            Disconnect the Transmission Solenoid /TRS harness connector  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Pressure Control Solenoid Control circuit from the appropriate terminal of special tool #8815 to the Solenoid/TRS harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Pressure Control Solenoid Control circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the Powertrain Control Module C4 harness connector.            Disconnect the Transmission Solenoid/TRS harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the Pressure Control Solenoid Control circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Pressure Control Solenoid Control circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 10</p>	All
10	<p>Turn the ignition off to the lock position.            Disconnect the Powertrain Control Module C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the 5-volt Supply circuit from the Line Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 11</p>	All

**P0869-LINE PRESSURE HIGH — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 5-volt Supply circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 12</p>	All
12	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
13	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorted and open circuits.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0870-OD HYDRAULIC PRESSURE TEST FAILURE****When Monitored and Set Condition:****P0870-OD HYDRAULIC PRESSURE TEST FAILURE**

**When Monitored:** In any forward gear with engine speed above 1000 RPM shortly after a shift and every minute thereafter.

**Set Condition:** After a shift into a forward gear, with engine speed above 1000 RPM, the PCM momentarily turns on element pressure to the clutch circuits that don't have pressure to identify the correct pressure switch closes. If the pressure switch does not close 2 times the DTC sets.

**POSSIBLE CAUSES**

RELATED LINE PRESSURE DTC'S PRESENT  
5-VOLT SUPPLY CIRCUIT OPEN  
OD PRESSURE SWITCH SENSE CIRCUIT OPEN  
POOR LINE PRESSURE SENSOR CONNECTION  
TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN  
5-VOLT SUPPLY CIRCUIT SHORT TO GROUND  
OD PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND  
OD PRESSURE SWITCH SENSE CIRCUIT SHORT TO VOLTAGE  
EXCESSIVE DEBRIS IN OIL PAN  
INTERNAL TRANSMISSION  
LINE PRESSURE SENSOR  
TRANSMISSION SOLENOID/TRS ASSEMBLY  
POWERTRAIN CONTROL MODULE  
INTERMITTENT WIRING AND CONNECTORS

**P0870-OD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other Transmission DTC's</p> <p>Is there any Loss of Prime, and/or Line Pressure Sensor DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. If the DTC, P0944-LOSS OF PRIME is present, perform its respective test first.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check for other Transmission DTC's</p> <p>Is the DTC P0733 and/or P0871 present also?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0870.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 5</p> <p>No → Go To 18</p>	All

**P0870-OD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Start the engine in park.  Warm the transmission to 82° C or 180 ° F.  Firmly apply brakes.  With the DRBIII®, monitor the Transmission Line Pressure.  Move the shift lever to each gear position and record the Line Pressure reading. Allow the pressure to stabilize for at least 5 seconds in each range.  Did the Line Pressure remain at a steady value between 585 and 655 kPa or 85 and 95 PSI?</p> <p>Yes → Go To 6  No → Go To 10</p>	All
6	<p>Ignition on, engine not running.  With the DRBIII®, monitor the Line Pressure while firmly pushing the Line Pressure Sensor connector towards the Transmission.  Did the Line Pressure change to about 207 kPa or 30 PSI when the connector was pushed?</p> <p>Yes → Disconnect and properly reconnect the Line Pressure Sensor harness connector. Inspect the terminals and repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.  No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.  Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>  Install the Transmission Simulator, Miller tool #8333.  With the Transmission Simulator select the "OFF" position on the "Input/Output Speed" switch.  Ignition on, engine not running.  With the DRBIII®, monitor the Line Pressure during the following step.  Using the Transmission Simulator, turn the selector switch to each of the 3 Line Pressure positions.  <b>NOTE: All three DRBIII® Line Pressure readings should be steady and ± 2.0 PSI of the reading specified on the Transmission Simulator.</b>  Did the Line Pressure remain steady in all 3 positions?</p> <p>Yes → Replace the Line Pressure Sensor per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.  No → Go To 8</p>	All

**P0870-OD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the 5-volt Supply circuit from the Line Pressure Sensor harness connector to the appropriate terminal of the special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt supply circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 5-volt Supply circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 17</p>	All
10	<p>Turn the ignition off to the lock position.            Remove the Starter Relay.  <b>NOTE: Failure to remove the Starter Relay can cause a Transmission - No Response condition.</b>            Install the Transmission Simulator, Miller tool #8333.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            With the DRBIII®, monitor the OD Pressure Switch state during the following steps.            With the Transmission Simulator, Miller tool #8333, place the selector switch to the OD position.            While pressing the Pressure Switch test button, wiggle the wiring harness and connectors pertaining to the OD Pressure Switch.            Did the OD pressure switch state change to closed and remain closed while wiggling the wires?</p> <p>Yes → Go To 11</p> <p>No → Go To 13</p>	All

**P0870-OD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Remove and inspect the Transmission Oil Pan per the Service Information. Does the Transmission Oil Pan contain excessive debris or contamination?</p> <p>Yes → Repair the cause of the excessive debris in the Transmission Oil Pan. Refer to the Service Information for the proper repair procedures. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 12</p>	All
12	<p>If there are no possible causes remaining, view repair.</p> <p>Repair Repair Internal Transmission as necessary. Disassemble and inspect the Valve Body and repair or replace as necessary. If no problems are found in the Valve Body, replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
13	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid /TRS Assembly harness connector <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the OD Pressure Switch Sense circuit from the Solenoid/TRS Assembly harness connector to the appropriate terminal of the special tool #8815. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the OD Pressure Switch Sense circuit for an open. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 14</p>	All
14	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid/TRS Assembly harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance between ground and the OD Pressure Switch Sense circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the OD Pressure Switch circuit for a short to ground. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 15</p>	All

**P0870-OD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
15	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the OD Pressure Switch Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the OD Pressure Switch Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 16</p>	All
16	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the Transmission Control Relay.            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit at the Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 17</p> <p>No → Repair the Transmission Control Relay Output circuit for an open. If the fuse is open make sure to check for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
17	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All



**P0870-OD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
18	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0871-OD PRESSURE SWITCH SENSE CIRCUIT**

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**When Monitored and Set Condition:****P0871-OD PRESSURE SWITCH SENSE CIRCUIT**

When Monitored: Whenever the engine is running.

Set Condition: The appropriate code is set if one of the pressure switches are open or closed at the wrong time in a given gear.

POSSIBLE CAUSES
RELATED RELAY DTC'S PRESENT
LINE PRESSURE DTCS PRESENT
NO. 4 OR 6 CHECK BALL CUT OR DAMAGED
OD PRESSURE SWITCH SENSE CIRCUIT OPEN
OD PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND
OD PRESSURE SWITCH SENSE CIRCUIT SHORT TO VOLTAGE
LOW LINE PRESSURE
WIRING AND CONNECTORS
INTERNAL TRANSMISSION
TRANSMISSION SOLENOID/TRS ASSEMBLY
VALVE BODY
POWERTRAIN CONTROL MODULE
POWERTRAIN CONTROL MODULE - INTERNAL
INTERMITTENT WIRING AND CONNECTORS

**P0871-OD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTC's present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, read Transmission DTCs.</p> <p>Are there any Line Pressure DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, read and record the EATX DTC EVENT DATA for P0871.</p> <p><b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b></p> <p>Refer to the recorded EATX DTC EVENT DATA for the following question.</p> <p>Did the OD Pressure Switch DTC set while in Park, Neutral, or Reverse?</p> <p>Yes → Go To 14</p> <p>No → Go To 5</p>	All

**P0871-OD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Ignition on, engine not running.            With the DRBIII®, read and record the EATX DTC EVENT DATA for P0871.  <b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b>            Refer to the recorded EATX DTC EVENT DATA for the following question.            Did the OD Pressure Switch read OPEN?</p> <p>Yes → Go To 6</p> <p>No → Go To 11</p>	All
6	<p>With the EATX DTC EVENT DATA recorded earlier, compare the Line Pressure and the Desired Line Pressure.            Is the Line Pressure less than 40 psi, and significantly below the Desired Line Pressure?</p> <p>Yes → Repair as necessary to correct low line pressure. Check the Primary Oil Filter seal for a split, crack, or improperly installed. Refer to the Service Information for the proper installation procedure. Also check the Main Regulator Valve in the Oil Pump. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the OD Pressure Switch Sense circuit.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the OD Pressure Switch Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Reconnect all previously disconnected connectors.            Make sure all EATX DTC EVENT DATA is recorded before erasure.            With the DRBIII®, erase previously stored DTC's and EATX DTC EVENT DATA. It may be necessary to use Battery Disconnect to erase the EATX DTC EVENT DATA.            Test drive the vehicle, use the EATX DTC EVENT DATA to help duplicate the conditions when the DTC originality set.            Does the DTC P0871 reset?</p> <p>Yes → Go To 9</p> <p>No → Go To 18</p>	All

**P0871-OD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Remove the Transmission Control Relay. Operate the vehicle in Drive. Is the transmission slipping while in Drive?</p> <p>Yes → Go To 10</p> <p>No → Replace the Powertrain Control Module Per the Service Information. With the DRBIII Perform Quick Learn. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
10	<p>Perform an Air Check Transmission Clutch Operation procedure per the Service Information. Is there excessive air leakage in any clutch circuit?</p> <p>Yes → Repair internal transmission as necessary per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Repair or replace the Valve Body per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
11	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install Transmission Simulator, Miller tool #8333. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the Transmission Simulator, turn the Pressure Switch selector switch to OD. With the DRBIII®, monitor the OD Pressure Switch state while pressing the Pressure Switch Test button on the Transmission Simulator. Did the state of the OD Pressure Switch change from OPEN to CLOSED while pressing the Test button?</p> <p>Yes → Go To 12</p> <p>No → Go To 14</p>	All
12	<p>Remove the Transmission Valve Body per the Service Information. Check the No. 4 and 6 Check Balls for cuts or damage. Is the No. 4 and/or 6 Check Ball cut or damaged?</p> <p>Yes → Replace the No. 4 and/or 6 Check Ball and check for clutch debris in the transmission oil pan. If there is excessive debris, perform internal repairs to the OD Clutch Assembly. Refer to the Service Information for proper repair procedures. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 13</p>	All
13	<p>Did the DTC reset during the test drive in the previous step?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 18</p>	All

**P0871-OD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
14	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid /TRS Assembly harness connector  <b>NOTE: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the OD Pressure Switch Sense circuit from the appropriate terminal of special tool #8815 to the Solenoid/TRS Assembly harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the OD Pressure Switch Sense circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 15</p>	All
15	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the OD Pressure Switch Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the OD Pressure Switch Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 16</p>	All
16	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            Were there any problems found</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 17</p>	All
17	<p>Reconnect all previously disconnected connectors.            Make sure all EATX DTC EVENT DATA is recorded before erasure.            With the DRBIII®, erase previously stored DTC's and EATX DTC EVENT DATA. It may be necessary to use Battery Disconnect to erase the EATX DTC EVENT DATA.            Test drive the vehicle, use the EATX DTC EVENT DATA to help duplicate the conditions when the DTC originality set.            Does the DTC P0871 reset?</p> <p>Yes → Replace the Powertrain Control Module Per the Service Information. With the DRBIII Perform Quick Learn.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 18</p>	All

**P0871-OD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
18	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

### Symptom:

#### **P0875-UD HYDRAULIC PRESSURE TEST FAILURE**

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### When Monitored and Set Condition:

#### **P0875-UD HYDRAULIC PRESSURE TEST FAILURE**

**When Monitored:** In any forward gear, with engine speed above 1000 RPM, shortly after a shift and every minute thereafter.

**Set Condition:** After a shift into a forward gear, with engine speed above 1000 RPM, the transmission controller momentarily turns on element pressure to the clutch circuits that do not have pressure to identify the correct pressure switch closes. If the pressure switch does not close 2 times, the DTC sets.

#### **POSSIBLE CAUSES**

RELATED LINE PRESSURE DTC'S PRESENT  
5-VOLT SUPPLY CIRCUIT OPEN  
POOR LINE PRESSURE SENSOR CONNECTION  
TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN  
UD PRESSURE SWITCH SENSE CIRCUIT OPEN  
5-VOLT SUPPLY CIRCUIT SHORT TO GROUND  
UD PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND  
UD PRESSURE SWITCH SENSE CIRCUIT SHORT TO VOLTAGE  
EXCESSIVE DEBRIS IN OIL PAN  
INTERNAL TRANSMISSION  
LINE PRESSURE SENSOR  
TRANSMISSION SOLENOID/TRS ASSEMBLY  
POWERTRAIN CONTROL MODULE  
INTERMITTENT WIRING AND CONNECTORS



**P0875-UD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other Transmission DTC's</p> <p>Are there any line pressure related DTC's, P0867, P0932, P0868, P0869, or P0944 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check for other Transmission DTC's</p> <p>Are the DTC's P0731, P0732, P0733 and/or P0876 present?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0875.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 5</p> <p>No → Go To 18</p>	All

**P0875-UD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Start engine. Warm the transmission to 82° C or 180° F. Firmly apply brakes. With the DRBIII®, monitor the Line Pressure in the following step. Move the shift lever to each gear position and record the Line Pressure reading. Allow the pressure to stabilize for at least 5 seconds in each range. Did the Line Pressure remain at a steady value between 585 and 655 kPa or 85 and 95 PSI?</p> <p>Yes → Go To 6</p> <p>No → Go To 10</p>	All
6	<p>Ignition on, engine not running. With the DRBIII®, monitor the Line Pressure for the following step. Firmly push the Line Pressure Sensor connector inward towards the Transmission. Did the Line Pressure change to about 207 kPa or 30 PSI when the connector was pushed?</p> <p>Yes → Disconnect and properly reconnect the Line Pressure Sensor harness connector. Inspect terminals and repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. With the Transmission Simulator select the "OFF" position on the "Input/Output Speed" switch. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, monitor the Line Pressure in the following step. With the Transmission Simulator, set the rotary knob to each of the 3 line pressure positions. <b>NOTE: All three DRBIII® Line Pressure readings should be steady and ±14kPa or 2.0 PSI of the reading specified on the Transmission Simulator.</b> Did the Line Pressure remain steady in all three positions?</p> <p>Yes → Replace the Line Pressure Sensor per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All

**P0875-UD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the 5-volt Supply circuit from the Line Pressure Sensor harness connector to the appropriate terminal of the special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 5-volt Supply circuit.            Is the resistance Below 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 17</p>	All
10	<p>Turn the ignition off to the lock position.            Remove the Starter Relay.  <b>NOTE: Failure to remove the Starter Relay can cause a Transmission - No Response condition.</b>            Install Transmission Simulator Miller tool #8333.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            With the DRBIII®, monitor the UD Pressure Switch state.            With the Transmission Simulator Miller tool# 8333, place the selector switch to the UD position.            While pressing and holding the Pressure Switch test button, wiggle the wiring harness and connectors pertaining to the UD Pressure Switch.            Did the UD Pressure Switch state change to closed and remain closed while wiggling the wires?</p> <p>Yes → Go To 11</p> <p>No → Go To 13</p>	All

**P0875-UD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Remove and inspect Transmission Oil Pan per the Service Information. Does it contain excessive debris or contamination?</p> <p>Yes → Repair the cause of the excessive debris in the Transmission Oil Pan. Refer to the Service Information for the proper procedures. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 12</p>	All
12	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair Internal Transmission as necessary. Disassemble and inspect the Valve Body and repair or replace as necessary. If no problems are found in the Valve Body, replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
13	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid /TRS Assembly harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the UD Pressure Switch Sense circuit from the Solenoid/TRS Assembly harness connector to the appropriate terminal of the special tool #8815. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the UD Pressure Switch Sense circuit for an open. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 14</p>	All
14	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid/TRS Assembly harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance between ground and the UD Pressure Switch Sense circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the UD Pressure Switch Sense circuit for a short to ground. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 15</p>	All

**P0875-UD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
15	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the UD Pressure Switch Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the UD Pressure Switch Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 16</p>	All
16	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 17</p> <p>No → Repair the Transmission Control Relay Output circuit for an open. If the fuse is open make sure to check for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
17	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0875-UD HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
18	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0876-UD PRESSURE SWITCH SENSE CIRCUIT****When Monitored and Set Condition:****P0876-UD PRESSURE SWITCH SENSE CIRCUIT**

When Monitored: Whenever the engine is running.

Set Condition: This DTC is set if the UD pressure switch is in the wrong state for the current gear. For example, this code would be set if the UD pressure switch remained off while the transmission was in second gear.

**POSSIBLE CAUSES**

RELATED RELAY DTC'S PRESENT

TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN

UD PRESSURE SWITCH SENSE CIRCUIT OPEN

UD PRESSURE SWITCH CIRCUIT SHORT TO GROUND

UD PRESSURE SWITCH SENSE CIRCUIT SHORT TO VOLTAGE

UD PRESSURE SWITCH

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

**P0876-UD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTCs P0890, P0891, and/or P0888 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, Check the STARTS SINCE SET counter for P0876.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter 2 or less for P0876?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	All



**P0876-UD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off to the lock position.  Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>  Install the Transmission Simulator, Miller tool #8333.  <b>Note: Check connectors - Clean/repair as necessary.</b>  Ignition on, engine not running.  With the Transmission Simulator, turn the Pressure Switch selector switch to the UD position.  With the DRBIII®, monitor the UD Pressure Switch state while pressing the Pressure Switch Test button on the Transmission Simulator.  Did the state of the UD Pressure Switch change while pressing the Pressure Switch Test button?</p> <p>Yes → Go To 5  No → Go To 6</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Transmission Solenoid/TRS Assembly per the Service Information.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Turn the ignition off to the lock position.  Disconnect the PCM C4 harness connector.  Disconnect the Transmission Solenoid /TRS Assembly harness connector  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the UD Pressure Switch Sense circuit from the Transmission Solenoid/TRS Assembly harness connector and the appropriate terminal of the special tool #8815.  Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the UD Pressure Switch Sense circuit for an open.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All

**P0876-UD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the UD Pressure Switch Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the UD Pressure Switch Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay from the PDC.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the UD Pressure Switch Sense circuit in the appropriate terminal of the special tool #8815.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the UD Pressure Switch Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 10</p> <p>No → Repair the Transmission Control Relay Output circuit for an open. If the fuse is open make sure to check for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0876-UD PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair.</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
11	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. Check for a Primary Oil filter incorrectly installed, refer to the Service Information for the proper installation procedure. Check the Reverse Carrier Snap Ring, if unseated or dislodged a DTC will typically set on heavy throttle acceleration from a dead stop. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0884-POWER UP AT SPEED****When Monitored and Set Condition:****P0884-POWER UP AT SPEED**

When Monitored: When Powertrain Control Module initially powers up.

Set Condition: This DTC will set if the PCM powers up and senses the vehicle in a valid forward gear, with no PRNDL DTCs, and a output speed above 800 RPM, approximately 32Km/h or 20 MPH.

**POSSIBLE CAUSES**

POWER UP AT SPEED

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0884-POWER UP AT SPEED — Continued**

TEST	ACTION	APPLICABILITY
2	<p>This DTC is set when the Transmission portion of the Powertrain Control Module is initialized while the vehicle is moving down the road in a valid forward gear. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors.</p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission Control Modules, the transmission part of the PCM has its own specific power and ground circuits.</b></p> <p>Check all of the Fused B+, Fused Ignition Switch Output, and ground circuits to the PCM for an intermittent open or short to ground.</p> <p>With the DRBIII®, check the EATX EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Check all power and ground circuits to the PCM and repair as necessary.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

### Symptom:

#### **P0888-RELAY OUTPUT ALWAYS OFF**

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### When Monitored and Set Condition:

#### **P0888-RELAY OUTPUT ALWAYS OFF**

**When Monitored:** When the ignition is turned from "OFF" position to "RUN" position and/or the ignition is turned from "START" position to "RUN" position.

**Set Condition:** This code is set when less than 3 volts are present at the transmission control relay output circuits at the Powertrain Control Module when the PCM is energizing the relay.

#### **POSSIBLE CAUSES**

FUSED B+ CIRCUIT OPEN

TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN

TRANSMISSION CONTROL RELAY CONTROL CIRCUIT OPEN

TRANSMISSION CONTROL RELAY GROUND CIRCUIT OPEN

TRANSMISSION CONTROL RELAY CONTROL CIRCUIT SHORTED TO GROUND

TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT SHORTED TO GROUND

TRANSMISSION CONTROL RELAY STUCK OPEN

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

**P0888-RELAY OUTPUT ALWAYS OFF — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0888.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter equal to 0?</p> <p>Yes → Go To 3</p> <p>No → Go To 11</p>	All
3	<p>Turn the ignition off to the lock position.</p> <p>Remove the Transmission Control Relay.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p>Using a 12-volt test light connected to ground, check the Fused B+ circuit in the Transmission Control Relay connector.</p> <p><b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b></p> <p>Does the test light illuminate brightly?</p> <p>Yes → Go To 4</p> <p>No → Repair the Fused B+ circuit for an open. If the fuse is open make sure to check for a short to ground.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0888-RELAY OUTPUT ALWAYS OFF — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off to the lock position. Remove the Transmission Control Relay. <b>Note: Check connectors - Clean/repair as necessary.</b> Measure the resistance between ground and the Transmission Control Relay ground circuit in the Transmission Control Relay connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Transmission Control Relay Ground circuit for an open. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid/TRS Assembly harness connector. Remove the Transmission Control Relay. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector. Using a 12-volt test light connected to ground, check all three Transmission Control Relay Output circuits in the PCM C4 harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light illuminate brightly on all three circuits?</p> <p>Yes → Go To 6</p> <p>No → Repair the Transmission Control Relay Output circuit for an open or high resistance. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Remove the Transmission Control Relay. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance between ground and the Transmission Control Relay Output circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Transmission Control Relay Output circuit for a short to ground. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All



**P0888-RELAY OUTPUT ALWAYS OFF — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.  Disconnect the PCM C4 harness connector.  Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the Transmission Control Relay Control circuit between the Transmission Control Relay connector and the appropriate terminal of special tool #8815.  Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Transmission Control Relay Control circuit for an open.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off to the lock position.  Disconnect the PCM C4 harness connector.  Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance between ground and the Transmission Control Relay Control circuit.  Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Transmission Control Relay Control circuit for a short to ground.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p><b>NOTE: Before proceeding, all Relay wiring must be operational for this test to be valid.</b>  Turn the ignition off to the lock position.  Disconnect the PCM C4 harness connector.  Remove the Transmission Control Relay  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Connect a jumper wire between the Fused B(+) circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.  Measure the voltage of the Transmission Control Relay Output circuit.  Is the voltage above 10.0 volts?</p> <p>Yes → Replace the Transmission Control Relay.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 10</p>	All

**P0888-RELAY OUTPUT ALWAYS OFF — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
11	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

## Symptom:

### P0890-SWITCHED BATTERY

#### When Monitored and Set Condition:

#### P0890-SWITCHED BATTERY

**When Monitored:** When the ignition is turned from "OFF" position to "RUN" position and/or the ignition is turned from "START" position to "RUN" position.

**Set Condition:** This DTC is set if the Powertrain Control Module senses voltage on any of the pressure switch inputs prior to the Transmission Control Relay being energized.

#### POSSIBLE CAUSES

PRESSURE SWITCH SENSE CIRCUITS SHORT TO VOLTAGE  
TRANSMISSION SOLENOID/TRS ASSEMBLY  
POWERTRAIN CONTROL MODULE  
INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0890-SWITCHED BATTERY — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0890.  <b>NOTE: This counter only applies to the last DTC set.</b>            Is the "Starts Since Set" counter set at 0?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All
3	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the 2C, 4C, LR, OD, and UD Pressure Switch Sense circuits.            Is the voltage above 0.5 volt on any of the measured circuits?</p> <p>Yes → Repair the 2C, 4C, LR, OD, and/or UD Pressure Switch Sense circuit(s) for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p><b>NOTE: Do not reinstall the Transmission Relay.</b>            Turn the ignition off.            Remove the jumper wire.            Connect the Solenoid harness connector.            Disconnect TCM harness connector.            Ignition on, engine not running.            Measure the voltage of the 2C, 4C, LR, OD and UD pressure switch sense circuits in the TCM harness connector.            Is the voltage above 0.5 volts on any of the sense circuits?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All
5	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0890-SWITCHED BATTERY — Continued**

TEST	ACTION	APPLICABILITY
6	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0891-TRANSMISSION RELAY ALWAYS ON****When Monitored and Set Condition:****P0891-TRANSMISSION RELAY ALWAYS ON**

**When Monitored:** When the ignition is turned from "OFF" position to "RUN" position and/or the ignition is turned from "START" position to "RUN" position.

**Set Condition:** This DTC is set if the Powertrain Control Module senses greater than 3.0 volts on the Transmission Control Relay Output circuits prior to a request from the PCM to energize the Transmission Control Relay.

**POSSIBLE CAUSES**

TRANSMISSION CONTROL RELAY CONTROL CIRCUIT SHORT TO VOLTAGE  
 TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT SHORT TO VOLTAGE  
 TRANSMISSION SOLENOID/TRS ASSEMBLY  
 POWERTRAIN CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0891-TRANSMISSION RELAY ALWAYS ON — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, Check the STARTS SINCE SET counter.  <b>NOTE: This counter only applies to the last DTC set.</b>            Is the STARTS SINCE SET counter set to 0?</p> <p>Yes → Go To 3</p> <p>No → Go To 7</p>	All
3	<p>Turn the ignition off to the lock position.            Remove the Transmission Control Relay.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage at the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the Transmission Control Relay Output circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Solenoid harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage at the Transmission Control Relay Control circuit in the Transmission Control Relay connector.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the Transmission Control Relay Control circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Reconnect the solenoid harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance between the Fused B+ circuit and the Transmission Control Relay Output Circuit of the Transmission Control Relay.            Is the resistance above 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Replace the Transmission Solenoid/TRS Assembly.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0891-TRANSMISSION RELAY ALWAYS ON — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
7	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wires while checking for shorted and open circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All



**Symptom:****P0932-LINE PRESSURE SENSOR CIRCUIT FAULT****When Monitored and Set Condition:****P0932-LINE PRESSURE SENSOR CIRCUIT FAULT**

When Monitored: Continuously while driving in a forward gear.

Set Condition: The PCM continuously monitors Actual Line Pressure and compares it to Desired Line Pressure. If the Actual Line Pressure reading is more than 172.4 kPa (25 psi) higher than the Desired Line Pressure, but is less than the highest Line Pressure ever used in the current gear, this code will set.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT  
 LINE PRESSURE CONNECTOR AND WIRING  
 INTERNAL TRANSMISSION  
 INTERMITTENT WIRING AND CONNECTORS  
 POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0932-LINE PRESSURE SENSOR CIRCUIT FAULT — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's. Are there any other line pressure related DTC's P0932, P0868, or P0869 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform the test for P0932 first if it is present. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p><b>CAUTION: Apply Parking Brake</b> Start the engine. <b>CAUTION: Firmly apply the brakes.</b> With the DRBIII®, monitor the Line Pressure, Desired Line Pressure and the TPS Degrees. While firmly applying the brakes place shifter in reverse, then slowly press the accelerator pedal to a TPS degree of 15. Compare the Line Pressure reading to the Desired Line Pressure reading on the DRBIII®. Does the Line Pressure stay within <math>\pm 34</math> kPa or 5 PSI of the Desired Line Pressure?</p> <p>No → Go To 4</p> <p>Yes → Go To 8</p>	All
4	<p>With the DRBIII®, monitor the Line Pressure Sensor voltage while wiggling the wiring harness and connectors pertaining to the Line Pressure Sensor and the Solenoid/TRS assembly. Did the voltage remain steady while wiggling the wiring harness and connectors?</p> <p>Yes → Go To 5</p> <p>No → Disconnect and properly reconnect the Line Pressure Sensor connector. Inspect terminals and repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. With the Transmission Simulator select the "OFF" position on the "Input/Output Speed" switch. Ignition on, engine not running. With the DRBIII®, monitor the Line Pressure during the following step. Using the Transmission Simulator, turn the selector switch to each of the 3 Line Pressure positions. <b>NOTE: All three DRBIII® Line Pressure readings should be steady and <math>\pm 14</math> kPa or 2.0 PSI of the reading specified on the Transmission Simulator.</b> Does the Line Pressure fluctuate up and down more than 69 kPa or 10 PSI at any of the positions?</p> <p>Yes → Go To 6</p> <p>No → Go To 7</p>	All

**P0932-LINE PRESSURE SENSOR CIRCUIT FAULT — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
7	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission and inspect the oil pump per the Service information and replace if necessary. If no problem is found, replace the Transmission Solenoid/TRS Assembly, possible cause is the Pressure Control Solenoid is stuck. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
8	<p>The conditions necessary to set this DTC are not present at this time. Wiggle the wires while checking for shorted and open circuits. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Where there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0934-LINE PRESSURE SENSOR LOW****When Monitored and Set Condition:****P0934-LINE PRESSURE SENSOR LOW**

When Monitored: Continuously with the ignition on and engine running.

Set Condition: This DTC will set when the Line Pressure is 10 PSI below desired line pressure and the Duty Cycle is less than or equal to the minimum Duty Cycle for 3.57 sec.

**POSSIBLE CAUSES**

5-VOLT SUPPLY CIRCUIT OPEN

5-VOLT SUPPLY CIRCUIT SHORT TO GROUND

LINE PRESSURE SENSOR SIGNAL CIRCUIT SHORT TO GROUND

LINE PRESSURE SENSOR

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0934-LINE PRESSURE SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0934.  <b>NOTE: This counter only applies to the last DTC set.</b>            Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 3</p> <p>No → Go To 9</p>	All
3	<p>Turn the ignition off to the lock position.            Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>            Install the Transmission Simulator, Miller tool #8333.            Ignition on, engine not running.            With the DRBIII®, under Transmission Sensors, monitor the Line Pressure.            Using the Transmission Simulator, set the rotary switch to each of the 3 line pressure positions.            Note: The readings should be within <math>\pm 14</math> kPa or 2.0 PSI on the DRBIII® of the pressure reading specified on Transmission Simulator.            Does the Line Pressure on the DRBIII® match the pressures on the Transmission Simulator?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Line Pressure Sensor per the Service Information.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the Line Pressure Sensor Signal circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Line Pressure Sensor Signal circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All

**P0934-LINE PRESSURE SENSOR LOW — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the 5-volt Supply circuit from the Line Pressure Sensor connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 5-volt Supply circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
9	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorted and open circuits.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0935-LINE PRESSURE SENSOR HIGH****When Monitored and Set Condition:****P0935-LINE PRESSURE SENSOR HIGH**

When Monitored: Continuously with ignition on and engine running.

Set Condition: This DTC will set if line pressure is greater than 120 PSI and the Duty Cycle is greater than Duty Cycle maximum for 3.57 sec.

**POSSIBLE CAUSES**

LINE PRESSURE SENSOR SIGNAL CIRCUIT OPEN  
 SENSOR GROUND CIRCUIT OPEN  
 LINE PRESSURE SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE  
 LINE PRESSURE SENSOR  
 POWERTRAIN CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0935-LINE PRESSURE SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P0935.  <b>NOTE: This counter only applies to the last DTC set.</b>            Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 3</p> <p>No → Go To 9</p>	All
3	<p>Turn the ignition off to the lock position.            Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>            Install the Transmission Simulator, Miller tool #8333.            Ignition on, engine not running.            With the DRBIII®, monitor the Line Pressure.            Using the Transmission Simulator, set the rotary switch to each of the 3 line pressure positions.            Note: The readings should be within <math>\pm 14</math> kPa or 2.0 PSI on the DRBIII® of the pressure reading specified on Transmission Simulator.            Does the Line Pressure on the DRBIII® match the pressures on the Transmission Simulator?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Line Pressure Sensor per the Service Information.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the PCM C2 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Sensor Ground circuit from the Line Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Sensor Ground circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All



**P0935-LINE PRESSURE SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Line Pressure Sensor Signal circuit from the Line Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Line Pressure Sensor Signal circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the Line Pressure Sensor Signal circuit.            Is the voltage above 5.5 volts?</p> <p>Yes → Repair the Line Pressure Sensor Signal circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0935-LINE PRESSURE SENSOR HIGH — Continued**

TEST	ACTION	APPLICABILITY
9	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

## Symptom:

### P0944-LOSS OF PRIME

#### When Monitored and Set Condition:

#### P0944-LOSS OF PRIME

**When Monitored:** If the transmission is slipping in any forward gear and all the pressure switches are not indicating pressure, a loss of prime test is run.

**Set Condition:** If the transmission begins to slip in a forward gear and all the pressure switch(s) that should be closed are open a loss of prime test begins. Available elements are turned on by the PCM to see if pump prime exists. The DTC sets if no pressure switch(s) respond.

#### POSSIBLE CAUSES

INVALID PRNDL CODE  
TRANSMISSION OIL FILTER  
TRANSMISSION OIL PUMP  
REVIEW CUSTOMER COMMENTS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0944-LOSS OF PRIME — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Using the DRBIII®, perform a Shift Lever Position test. Follow the instructions on the DRBIII®.</p> <p>Did the Shift Lever Position Test pass?</p> <p>Yes → Go To 3</p> <p>No → Refer to the Transmission category and perform the appropriate symptom.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
3	<p>Place the gear selector in Park.</p> <p>Start the engine.</p> <p>The transmission must be at operating temperature prior to checking pressure. A cold transmission will give higher readings.</p> <p>Run the engine at 1500 RPM.</p> <p>With the DRBIII®, monitor the Transmission Line Pressure.</p> <p>Does the Line Pressure match the Desired Line Pressure within <math>\pm 5</math> psi?</p> <p>No → Go To 7</p> <p>Yes → Go To 4</p>	All
4	<p>Firmly apply the brake and repeat the previous test in both Drive and the Reverse gear positions.</p> <p>With the DRBIII®, monitor the Transmission Line Pressure.</p> <p>Does the Line Pressure match the Desired Line Pressure within <math>\pm 5</math> psi in all gear ranges?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Verify with the customer if a delayed engagement and/or an intermittent "No Drive" condition has occurred.</p> <p>If the customers answer is "No" erase the DTC and return the vehicle to the customer.</p> <p>Make sure to check for any TSBs or controller flash updates that may apply.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Has the customer experienced any delayed engagement and/or "No Drive" conditions?</p> <p>Yes → Repair internal transmission as necessary. Replace the Transmission Oil Pump if inspection reveals no signs of internal seal leakage. Refer to the Service Information for the proper repair procedure.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All
6	<p>Read and record the DTC and Event Data information.</p> <p>Test drive the vehicle and attempt to operate the vehicle within the parameters in which the DTC set.</p> <p>With the DRBIII®, read DTCs.</p> <p>Did any following DTCs set, P0868, P0944, P0841, P0846, P0871, P0876, P0988 or any switch fault?</p> <p>Yes → Go To 7</p> <p>No → Test Complete.</p>	All

**P0944-LOSS OF PRIME — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Remove and inspect the Transmission Oil Pan per the Service Information.  Remove and inspect the Primary Oil Filter per the Service Information.  Inspect the oil filter seal for damage and proper installation.  Does the Oil Pan contain excessive debris and/or is the Oil Filter plugged or seal damaged, or is th</p> <p>Yes → Repair the cause of the plugged transmission oil filter or excessive debris. Check the seal for, installed onto filter neck instead of into the pump bore, not fully seated against pump housing, filter neck not engaged into pump. Repair as necessary.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair the Transmission Oil Pump as necessary. Check for a stuck main regulator valve and clean if necessary. Refer to the Service Information for the proper repair procedure.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P0987-4C HYDRAULIC PRESSURE TEST FAILURE**

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**When Monitored and Set Condition:****P0987-4C HYDRAULIC PRESSURE TEST FAILURE**

**When Monitored:** In any forward gear with engine speed above 1000 RPM shortly after a shift and every minute thereafter.

**Set Condition:** After a shift into a forward gear, with engine speed > 1000 RPM, the PCM momentarily turns on element pressure to the clutch circuits that don't have pressure to identify the correct pressure switch closes. If the pressure switch does not close 2 times the DTC sets

POSSIBLE CAUSES
RELATED LINE PRESSURE DTC'S PRESENT
POOR LINE PRESSURE SENSOR CONNECTION
4C PRESSURE SWITCH SENSE CIRCUIT OPEN
5-VOLT SUPPLY CIRCUIT OPEN
TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN
4C PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND
5-VOLT SUPPLY CIRCUIT SHORT TO GROUND
4C PRESSURE SWITCH SENSE CIRCUIT SHORT TO VOLTAGE
EXCESSIVE DEBRIS IN OIL PAN
INTERNAL TRANSMISSION
LINE PRESSURE SENSOR
TRANSMISSION SOLENOID/TRS ASSEMBLY
POWERTRAIN CONTROL MODULE
INTERMITTENT WIRING AND CONNECTORS

**P0987-4C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's</p> <p>Are there any Line Pressure related DTC's P0867, P0932, P0868, P0869, or P0944 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check for other transmission DTC's</p> <p>Is the DTC P0734 and/or P0988 present also?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Perform a visual inspection of all connectors, wiring, and cooler connections before proceeding. Repair as necessary.</p> <p>With the DRBIII®, Check the STARTS SINCE SET counter for P0987.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 5</p> <p>No → Go To 18</p>	All

**P0987-4C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Start the engine.  Warm the transmission to 82° C or 180° F.  With the DRBIII®, monitor the Transmission Line Pressure.  <b>CAUTION: Firmly apply the brakes.</b>  With the brakes firmly applied, move the shift lever to each gear position and record the Transmission Line Pressure for each position.  Allow the pressure to stabilize for at least 5 seconds in each range.  Did the line pressure remain at a steady value between 586 and 655 Kpa or 85 and 95 PSI?</p> <p>Yes → Go To 6</p> <p>No → Go To 10</p>	All
6	<p>Ignition on, engine not running.  With the DRBIII® in Sensors, monitor the Actual Line Pressure.  While monitoring the Line Pressure, firmly push the Line Pressure Sensor harness connector towards the transmission.  Did the Line Pressure change to about 207 kPa or 30 PSI when the harness connector was pushed?</p> <p>Yes → Disconnect and properly reconnect the Line Pressure Sensor connector. Inspect terminals and repair as necessary.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.  Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>  Install the Transmission Simulator, Miller tool #8333.  With the Transmission Simulator select the "OFF" position on the "Input/Output Speed" switch.  <b>NOTE: All three DRBIII® Line Pressure readings should be steady and ±14 kPa or 2.0 PSI of the reading specified on the Transmission Simulator.</b>  Ignition on, engine not running.  With the DRBIII®, monitor the Line Pressure during the following step.  Using the Transmission Simulator, turn the selector switch to each of the 3 Line Pressure positions.  Did the Line Pressure remain steady in all three positions?</p> <p>Yes → Replace the Line Pressure Sensor per the Service Information.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All



**P0987-4C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the 5-volt Supply circuit from the Line Pressure Sensor harness connector to the appropriate terminal of special tool #8815.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 5-volt Supply circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the PCM C1 harness connector.            Disconnect the Line Pressure Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 5-volt Supply circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair 5-volt Supply circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 17</p>	All
10	<p>Turn the ignition off to the lock position.            Remove the Starter Relay.  <b>NOTE: Failure to remove the Starter Relay can cause a Transmission - No Response condition.</b>            Install the Transmission Simulator, Miller tool #8333.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            On the Transmission Simulator, place the Pressure Switch selector switch to 4C.            With the DRBIII®, monitor the 4C Pressure Switch state.            While monitoring the DRBIII® press the Pressure Switch Test button on the Transmission Simulator while wiggling the wiring pertaining to the 4C Pressure Switch.            Did the 4C Pressure Switch state change to closed and remain closed while wiggling the wires?</p> <p>Yes → Go To 11</p> <p>No → Go To 13</p>	All

**P0987-4C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Remove and inspect Transmission Oil Pan per Service Information. Does the Transmission Oil Pan contain excessive debris or contamination?</p> <p>Yes → Repair the cause of the excessive debris in the Transmission Oil Pan. Refer to the Service Information for the proper procedures. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 12</p>	All
12	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair Internal Transmission as necessary. Disassemble and inspect the Valve Body and repair or replace as necessary. If no problems are found in the Valve Body, replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
13	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid /TRS Assembly harness connector <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance of the 4C Pressure Switch Sense circuit between the appropriate terminal of special tool #8815 to the Transmission Solenoid/TRS Assembly harness connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 4C Pressure Switch Sense circuit for an open. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 14</p>	All
14	<p>Turn the ignition off to the lock position. Disconnect the PCM C4 harness connector. Disconnect the Transmission Solenoid/TRS Assembly harness connector. <b>Note: Check connectors - Clean/repair as necessary.</b> <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b> Measure the resistance between ground and the 4C Pressure Switch Sense circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 4C Pressure Switch Sense circuit for a short to ground. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 15</p>	All

**P0987-4C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
15	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the 4C Pressure Switch Sense circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 4C Pressure Switch Sense circuit for a short to voltage. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 16</p>	All
16	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS harness connector.            Remove the Transmission Control Relay.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Solenoid/TRS Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 17</p> <p>No → Repair the Transmission Control Relay Output circuit for an open. If the fuse is open make sure to check for a short to ground. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
17	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P0987-4C HYDRAULIC PRESSURE TEST FAILURE — Continued**

TEST	ACTION	APPLICABILITY
18	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorted and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0988-4C PRESSURE SWITCH SENSE CIRCUIT****When Monitored and Set Condition:****P0988-4C PRESSURE SWITCH SENSE CIRCUIT**

When Monitored: Whenever the engine is running.

Set Condition: This DTC is set if the 4C pressure switch is in the wrong state for the current gear. For example, this DTC would be set if the 4C pressure switch came on while the transmission was in second gear.

**POSSIBLE CAUSES**

RELATED RELAY DTC'S PRESENT  
DTC P0871 ALSO PRESENT  
EATX DTC DATA SHOW CURRENT DTC  
LOSS OF 12-VOLT FEED  
4C PRESSURE SWITCH SENSE CIRCUIT OPEN  
4C PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND  
EXCESSIVE FLUID LEAKAGE WITH 4C CLUTCH CIRCUIT  
#5 CHECK BALL CUT OR DAMAGED  
LOW LINE PRESSURE  
PRIMARY OIL FILTER SEAL  
TRANSMISSION SOLENOID/TRS ASSEMBLY  
POWERTRAIN CONTROL MODULE  
WIRING AND CONNECTORS

**P0988-4C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTC's P0890, P0891, or P0888 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, check the EATX DTC EVENT DATA.</p> <p>Does the EATX DTC EVENT DATA show data for DTC P0988?</p> <p>Yes → Go To 4</p> <p>No → Refer to the Transmission category and perform the appropriate symptom shown in the EATX DTC EVENT DATA. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
4	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there two or more related Pressure Switch Sense DTCs present in addition to P0988?</p> <p>Yes → Go To 5</p> <p>No → Go To 8</p>	All

**P0988-4C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>With the DRBIII®, check the EATX DTC EVENT DATA for P0988.  <b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b>            Do all the pressure switches read CLOSED in the EATX DTC EVENT DATA for P0988?</p> <p>Yes → Refer to Transmission category and perform diagnostics for P0888-RELAY OUTPUT ALWAYS OFF.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All
6	<p>In the EATX DTC EVENT DATA recorded earlier, read the state of all pressure switches.            Do all the pressure switches read OPEN?</p> <p>Yes → Go To 7</p> <p>No → Go To 8</p>	All
7	<p>In the EATX DTC EVENT DATA recorded earlier, compare the Line Pressure and the Desired Line Pressure.            Is the Line Pressure less than 40 psi, and significantly below the Desired Line Pressure?</p> <p>Yes → Repair as necessary to correct low line pressure. Check fluid level and adjust as necessary. If OK, check the Primary Oil Filter seal for crack or improperly installed. If OK, check the Main Regulator Valve in the Oil Pump. Refer to Service information.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 19</p>	All
8	<p>With the DRBIII®, check Transmission DTCs.            Is the DTC P0871 also present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>With the DRBIII®, check the EATX DTC EVENT DATA for P0846.  <b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b>            Does the EATX DTC EVENT DATA show the DTC set in Park, Neutral, or Reverse for P0988?</p> <p>Yes → Go To 13</p> <p>No → Go To 10</p>	All
10	<p>With the DRBIII®, check the EATX DTC EVENT DATA for P0988.  <b>NOTE: Make sure to record all EATX DTC EVENT DATA stored in the DRBIII® for future reference in this test procedure.</b>            Does the EATX DTC EVENT DATA show the 4C Pressure Switch reading CLOSED?</p> <p>Yes → Go To 11</p> <p>No → Go To 16</p>	All

**P0988-4C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off to the lock position.  Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>  Install the Transmission Simulator, Miller tool #8333.  <b>Note: Check connectors - Clean/repair as necessary.</b>  Ignition on, engine not running.  With the Transmission Simulator, turn the Pressure Switch selector switch to the 4C position.  With the DRBIII®, monitor the 4C Pressure Switch while pressing the Pressure Switch test button on the Transmission Simulator.  Did the state of the 4C Pressure Switch change while pressing the Pressure Switch Test button?</p> <p>Yes → Go To 12  No → Go To 13</p>	All
12	<p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.  Wiggle the wires while checking for shorted and open circuits.  Where there any problems found?</p> <p>Yes → Repair as necessary.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.  No → Go To 15</p>	All
13	<p>Turn the ignition off to the lock position.  Disconnect the Transmission Solenoid /TRS Assembly harness connector.  Disconnect the PCM C4 harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>  Measure the resistance of the 4C Pressure Switch Sense circuit from the appropriate terminal of Miller tool #8815 to the Transmission Solenoid/TRS Assembly harness connector.  Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the 4C Pressure Switch Sense circuit for an open.  Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.  No → Go To 14</p>	All



**P0988-4C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
14	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the 4C Pressure Switch Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the 4C Pressure Switch Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 15</p>	All
15	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
16	<p>In the EATX DTC EVENT DATA recorded earlier, compare the Line Pressure and the Desired Line Pressure.            Is the Line Pressure less than 40 psi, and significantly below the Desired Line Pressure?</p> <p>Yes → Repair as necessary to correct low line pressure. Check fluid level and adjust as necessary. If OK, check the Primary Oil Filter seal for crack or improperly installed. If OK, check the Main Regulator Valve in the Oil Pump. Refer to Service information.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 17</p>	All
17	<p>Turn the Ignition off to the lock position.            Remove the Valve Body Assembly per the Service Information.            Inspect the #5 check ball for any cuts or damage.            Inspect the 4C accumulator piston and seals and also the 4C tower seal on top of the valve body. Refer to the Service Information.            Where there any problems found?</p> <p>Yes → Repair as necessary. Check for excessive clutch debris in the transmission oil pan. If excessive clutch debris is present, repair 4C clutch as necessary. Refer to the Service Information for proper repair procedures.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 18</p>	All

**P0988-4C PRESSURE SWITCH SENSE CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
18	<p>Air check the 4C Clutch hydraulic circuit. Refer to the Service Information.</p> <p><b>NOTE: This hydraulic clutch circuit contains a small bleed orifice. Small leakage is considered normal.</b></p> <p>Was there excessive air leakage in the 4C Clutch hydraulic circuit?</p> <p>Yes → Repair as necessary. Refer to the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 19</p>	All
19	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P1684-BATTERY WAS DISCONNECTED****When Monitored and Set Condition:****P1684-BATTERY WAS DISCONNECTED**

When Monitored: Whenever the key is in the Run/Start position.

Set Condition: This DTC will set whenever Powertrain Control Module is disconnected from Fused B+ or ground. It will also be set during the DRBIII® Battery Disconnect and/or Quick Learn procedure.

**POSSIBLE CAUSES**

BATTERY WAS DISCONNECTED

DRBIII® BATTERY DISCONNECT PERFORMED

PCM WAS REPLACED OR DISCONNECTED

QUICK LEARN WAS PERFORMED

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P1684-BATTERY WAS DISCONNECTED — Continued**

TEST	ACTION	APPLICABILITY
2	<p>This DTC is an informational DTC only. This DTC is set due to a momentary loss of Power or Ground circuits to the PCM. Continue to view the possible causes for this DTC.</p> <p>Continue Go To 3</p>	All
3	<p>Has the battery been disconnected, lost it's charge, or been replaced recently?</p> <p>Yes → This is the cause of the DTC. Erase the DTC and return vehicle to customer. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Has a DRBIII® Battery Disconnect procedure been performed?</p> <p>Yes → This is the cause of the DTC. Erase the DTC and return the vehicle to customer. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All
5	<p>Has a "QUICK LEARN" been performed with the DRBIII®?</p> <p>Yes → This is the cause of the DTC. Erase the DTC and return the vehicle to customer. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All
6	<p>Has the PCM been replaced or disconnected?</p> <p>Yes → Replacing or disconnecting the PCM will set this DTC. Erase the DTC and return the vehicle to the customer. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. <b>NOTE: Check all power and ground circuits to the PCM for intermittent or high resistance circuits.</b> Wiggle the wires while checking for shorts and open circuits. Check for any TSB's or controller flash updates that may apply. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P1694-BUS COMMUNICATION WITH ENGINE MODULE****When Monitored and Set Condition:****P1694-BUS COMMUNICATION WITH ENGINE MODULE**

When Monitored: Continuously with ignition on.

Set Condition: If no bus messages are received from the Powertrain Control Module (PCM) for 10 seconds. Note: Due to the integration of the Powertrain and Transmission Control Modules, bus communication between the modules is internal. Note: Some after market equipment installations, such as remote starters and communication equipment, can set this DTC.

**POSSIBLE CAUSES**

AFTERMARKET EQUIPMENT

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P1694-BUS COMMUNICATION WITH ENGINE MODULE — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Note: Due to the integration of the Powertrain and Transmission Control Modules, bus communication between the modules is internal.</p> <p>With the DRBIII®, erase Transmission DTC's.</p> <p>Start the engine in Park.</p> <p><b>NOTE: The engine must run for at least 20 seconds to reset this DTC.</b></p> <p>With the DRBIII®, read Transmission DTCs.</p> <p>Did the DTC reset after the engine was started?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All
3	<p><b>NOTE: Aftermarket equipment installed incorrectly such as remote starters, communication equipment, etc. can fail to power up certain control modules, if installed improperly.</b></p> <p>Is there any aftermarket electrical equipment installed?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the aftermarket electrical harness connectors.</p> <p>With the DRBIII®, erase DTCs.</p> <p>Road test vehicle.</p> <p>Did the DTC reset?</p> <p>Yes → Go To 5</p> <p>No → Advise customer aftermarket electrical accessories are installed improperly.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Make sure to check for any Communication DTCs or customer complaints concerning a possible bus problem.</p> <p>This includes any other controllers on the bus on this vehicle.</p> <p>If there is a bus problem, refer to the Communication Category for proper diagnosis.</p> <p>Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.</p> <p>Wiggle the wires while checking for shorts and open circuits.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Note: Some after market equipment will set this DTC.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P1715-RESTRICTED PORT IN T3 RANGE****When Monitored and Set Condition:****P1715-RESTRICTED PORT IN T3 RANGE**

When Monitored: Whenever the PRNDL code indicates Temp3.

Set Condition: This code sets when conditions for a code P1776 are satisfied or 3 unsuccessful attempts to engage 1st gear while the shifter is in the temp3 zone. This indicates a restricted port, at the manual valve because the shifter is not fully engaged in the drive position.

**POSSIBLE CAUSES**

RELATED TRANSMISSION DTC'S PRESENT  
CUSTOMER DRIVING HABITS  
MISADJUSTED SHIFTER

TEST	ACTION	APPLICABILITY
1	<p>With the DRBIII®, check for other transmission DTC's Are any of the following DTC's P0731, P0732, P0733, P0734, P1736 or P0715 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 2</p>	All
2	<p>Check Shifter adjustment per the Service Information. Is the shifter properly adjusted?</p> <p>Yes → Go To 3</p> <p>No → Adjust the Shifter Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P1715-RESTRICTED PORT IN T3 RANGE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>This DTC can be set if the customer rests their hand on the shift lever while they are driving. The transmission can be put in the T3 position if just enough forward pressure is exerted on the shift lever.</p> <p>When this occurs, the feed port to the clutch is restricted, the transmission will declare neutral, and this DTC will be set. The customer should be informed not to rest their hand on the shifter while driving.</p> <p>This DTC can also be set by simply bumping the shift lever toward neutral while accelerating.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>This DTC can be set by putting too much forward pressure on the shift lever while it is in the OD position. Make sure the customer is informed.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All



**Symptom:****P1736-GEAR RATIO ERROR IN 2ND PRIME****When Monitored and Set Condition:****P1736-GEAR RATIO ERROR IN 2ND PRIME**

**When Monitored:** The transmission gear ratio is monitored continuously while the transmission is in gear.

**Set Condition:** If the ratio of the Input RPM to the Output RPM does not match the current gear ratio. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC'S PRESENT

INTERNAL TRANSMISSION

INTERMITTENT GEAR RATIO ERRORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P1736-GEAR RATIO ERROR IN 2ND PRIME — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's Are any of the DTC's P0944, P0715, P0720, P1794, P0867, P0932, P0868, or P0869 also present?</p> <p>Yes → If any of these DTCs are present, they will cause a speed ratio error. Refer to appropriate symptom in the Transmission category. Perform the test for P0944 first if it is present. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, perform the 2nd prime Gear Clutch Test. Follow the instructions on the DRBIII®. Increase the throttle angle, TPS Degree, to 30° for no more than a few seconds. <b>CAUTION: Do not overheat the transmission.</b> Did the clutch test pass, Input Speed remain at zero?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>The conditions to set this DTC are not currently present. Check the Shifter adjustment per the Service Information. Intermittent gear ratio DTCs can be set by problems in the Input and Output Speed Sensor circuits and/or Speed Sensor Ground circuit. Check the Speed Sensor wiring and connectors for good connection, then perform a wiggle test using the Transmission Simulator, Miller tool #8333. Gear ratio DTC's can also be set under extreme temperature conditions, this is usually caused by an internal transmission problem. Verify if the problem is only experienced under extreme hot or cold conditions. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. If there are no possible causes remaining, view repair.</p> <p>Repair Repair as necessary. If a internal problem is present, refer to the Service information for the proper repair procedure. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair Repair internal transmission as necessary. If there were any line pressure DTC's present along with this DTC, make sure to inspect the Transmission Oil Pump and the Pressure Control Solenoid per the Service Information. Repair or replace if necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P1775-SOLENOID SWITCH VALVE LATCHED IN TCC POSITION****When Monitored and Set Condition:****P1775-SOLENOID SWITCH VALVE LATCHED IN TCC POSITION**

When Monitored: During an attempted shift into 1st gear.

Set Condition: This DTC is set if three unsuccessful attempts are made to shift into 1st gear in one given key start. This DTC can take up to five minutes to mature before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC P0841 PRESENT  
 SOLENOID SWITCH VALVE STICKING  
 LR PRESSURE SWITCH SENSE CIRCUIT SHORT TO VOLTAGE  
 TRANSMISSION SOLENOID/TRS ASSEMBLY  
 POWERTRAIN CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

## P1775-SOLENOID SWITCH VALVE LATCHED IN TCC POSITION — Continued

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's Is the DTC P0841 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>Perform a visual inspection of all connectors, wiring, and cooler connections before proceeding. Repair as necessary. With the DRBIII®, Check the STARTS SINCE SET counter. <b>NOTE: This counter only applies to the last DTC set.</b> Is the STARTS SINCE SET counter for P1775 at 2 or less?</p> <p>Yes → Go To 4</p> <p>No → Go To 9</p>	All
4	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the Transmission Simulator, turn the Pressure Switch selector switch to LR. With the DRBIII®, monitor the LR Pressure Switch state while pressing the Pressure Switch Test button on the Transmission Simulator. Did the state of the L/R Pressure Switch change while pressing the Pressure Switch Test button?</p> <p>Yes → Go To 5</p> <p>No → Go To 7</p>	All
5	<p>Turn the ignition off to the lock position. Remove the Transmission Oil Pan per the Service Information. Remove the Transmission Valve body per the Service Information. Inspect the Solenoid Switch Valve and Plugs for sticking. Is the Solenoid Switch Valve or Plugs sticking?</p> <p>Yes → Clean and inspect per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All
6	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Transmission Solenoid/TRS Assembly per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

# **P1775-SOLENOID SWITCH VALVE LATCHED IN TCC POSITION — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Remove the Transmission Control Relay from the PDC.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the LR Pressure Switch Sense circuit.            Is the voltage above 0.5 volts?</p> <p>Yes → Repair the LR Pressure Switch Sense circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
9	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorts and open circuits.            This DTC can also be set by the SSV intermittently sticking in it's bore under extreme temperature conditions.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P1776-SOLENOID SWITCH VALVE LATCHED IN LR POSITION****When Monitored and Set Condition:****P1776-SOLENOID SWITCH VALVE LATCHED IN LR POSITION**

**When Monitored:** Continuously when performing partial or full EMCC - PEMCC or FEMCC.

**Set Condition:** If the transmission senses the L/R pressure switch closing while performing PEMCC or FEMCC. This DTC will set after two unsuccessful attempts to perform PEMCC or FEMCC. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

RELATED DTC P0841 PRESENT

LR PRESSURE SWITCH SENSE CIRCUIT OPEN

LR PRESSURE SWITCH SENSE CIRCUIT SHORT TO GROUND

SOLENOID SWITCH VALVE

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue</p> <p>Go To 2</p>	All

# **P1776-SOLENOID SWITCH VALVE LATCHED IN LR POSITION —** **Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, check for other transmission DTC's Is the DTC P0841 present also?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter. <b>NOTE: This counter only applies to the last DTC set.</b> Is the STARTS SINCE SET counter 2 or less?</p> <p>Yes → Go To 4</p> <p>No → Go To 9</p>	All
4	<p>Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install Transmission Simulator, Miller tool #8333. <b>Note: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the Transmission Simulator, turn the Pressure Switch selector switch to the LR position. With the DRBIII®, monitor the LR Pressure Switch state while pressing the Pressure Switch Test button on the Transmission Simulator. Did the state of the LR Pressure Switch change while pressing the Pressure Switch Test button?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p>Remove the Valve Body per the Service Information. Inspect the Solenoid Switch Valve for sticking in the bore and/or wear. Were there any problems found?</p> <p>Yes → Clean and repair as necessary per the Service Information. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All

# **P1776-SOLENOID SWITCH VALVE LATCHED IN LR POSITION —** **Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid /TRS Assembly harness connector  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the LR Pressure Switch Sense circuit from the appropriate terminal of special tool #8815 to the Solenoid/TRS Assembly harness connector.            Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the LR Pressure Switch Sense circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the LR Pressure Switch Sense circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the LR Pressure Switch Sense circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All
8	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
9	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorted and open circuits.            This DTC can also be set by the Solenoid Switch Valve intermittently sticking in it's bore under extreme temperature conditions or a worn Solenoid Switch Valve or plugs.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All



**Symptom:****P1790-FAULT IMMEDIATELY AFTER SHIFT****When Monitored and Set Condition:****P1790-FAULT IMMEDIATELY AFTER SHIFT**

When Monitored: After a speed ratio error is stored.

Set Condition: This code is set if the associated speed ratio code is stored within 1.3 seconds after a shift.

**POSSIBLE CAUSES**

FAULT AFTER SHIFT

INTENDED GEAR TO APPLIED CLUTCH

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P1790-FAULT IMMEDIATELY AFTER SHIFT — Continued**

TEST	ACTION	APPLICABILITY
2	<p>This DTC should set along with a Gear ratio DTC. Perform the appropriate test for the Gear Ratio DTC stored.</p> <p>Check 1 trip failures if there are no current Gear Ratio DTCs.</p> <p>With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.</p> <p>Is there a related speed ratio DTC present?</p> <p style="padding-left: 40px;">Yes → This DTC is set if an associated speed ratio code is stored within 1.3 seconds after a shift. Perform the appropriate speed ratio DTC test.</p> <p style="padding-left: 40px;">Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p style="padding-left: 40px;">No → Go To 3</p>	All
3	<p>Check the EATX DTC EVENT DATA to determine in which gear the slippage occurred and the clutches that were applied.</p> <p>With the EATX DTC EVENT DATA, use the information provided below to determine the proper symptom for diagnosis.</p> <p>G - intended gear, CA - clutches applying, DTC - recommended DTC.</p> <p>G - 1st, CA - UD-LR*, DTC - P0731</p> <p>G - 2nd, CA - UD-2C, DTC - P0732</p> <p>G - 2nd prime, CA - UD-4C, DTC - P1736</p> <p>G - 3rd, CA - UD-OD/MS, DTC - P0733</p> <p>G - 4th, CA - OD/MS-2C, DTC - P0734</p> <p>G - 5th, CA - OD/MS-2C, DTC - P0735</p> <p>G - Rev, CA - UD**-MS, DTC - P0736</p> <p>Notes:</p> <p>* L/R is used only up to 150 output RPM in 1st gear.</p> <p>** UD will show as applied in Reverse but the UD clutch is actually released.</p> <p>OD/MS is OD and/or MS.</p> <p>View repair</p> <p style="padding-left: 40px;">Repair</p> <p style="padding-left: 80px;">Refer to the Transmission category and perform the appropriate symptom identified from the EATX DTC EVENT DATA, intended gear, and applied clutches.</p> <p style="padding-left: 80px;">Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P1793-TRD LINK COMMUNICATION ERROR****When Monitored and Set Condition:****P1793-TRD LINK COMMUNICATION ERROR**

**When Monitored:** During torque managed shifts with Throttle angle above 54 degrees. This system is also tested whenever the vehicle is stopped and the engine speed is below 1000 RPM.

**Set Condition:** This DTC is set when the Transmission system sends two subsequent Torque Reduction messages - pulses the TRD circuit to ground - to the Powertrain Control Module via an internal bus message and the Transmission does not receive a confirmation from the PCM over the communication bus.

**POSSIBLE CAUSES**

PCM - TRD LINK COMMUNICATION ERROR

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P1793-TRD LINK COMMUNICATION ERROR — Continued**

TEST	ACTION	APPLICABILITY
2	<p><b>NOTE: Due to the integration of the Engine and Transmission controllers into one module, the TRD bus messages are sent over a internal bus circuit.</b> Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits. View repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P1794-SPEED SENSOR GROUND ERROR****When Monitored and Set Condition:****P1794-SPEED SENSOR GROUND ERROR**

**When Monitored:** The gear ratio is monitored continuously while the Transmission is in gear.

**Set Condition:** After a controller reset in neutral and a ratio of input to output, of 1 to 2. This DTC can take up to five minutes of problem identification before illuminating the MIL.

**POSSIBLE CAUSES**

SPEED SENSOR GROUND CIRCUIT OPEN  
 SPEED SENSOR GROUND CIRCUIT SHORT TO GROUND  
 SPEED SENSOR GROUND CIRCUIT SHORT TO VOLTAGE  
 POWERTRAIN CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P1794-SPEED SENSOR GROUND ERROR — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Engine Running. Shift lever in park.            With the DRBIII®, read the Transmission Output and Input Speed Sensor states.            Is the Output Speed Sensor reading twice the Input Speed Sensor reading?</p> <p>Yes → Go To 3</p> <p>No → Go To 8</p>	All
3	<p>Turn the ignition off to the lock position.            Remove the Starter Relay.  <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b>            Install the Transmission Simulator, Miller tool 8333.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            With the Transmission Simulator, set the Input/Output Speed selector switch to the "3000/1000" position. Turn the Input/Output Speed switch to "ON".            With the DRBIII®, monitor the Input and Output Speed Sensor state.            Does the Input speed read 3000 RPM and the Output speed read 1000 RPM, within 50 RPM?</p> <p>Yes → Go To 8</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Input and Output Speed Sensor harness connectors.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance of the Speed Sensor Ground circuit from the appropriate terminal of special tool #8815 to the Transmission Solenoid/TRS Assembly and both Input and Output Speed Sensor harness connectors.            Is the resistance above 5.0 ohms on any of the above measurements?</p> <p>Yes → Repair the Speed Sensor Ground circuit for an open.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All

**P1794-SPEED SENSOR GROUND ERROR — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Disconnect the Input and Output Speed Sensor harness connectors.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Measure the resistance between ground and the Input Speed Sensor Ground circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Speed Sensor Ground circuit for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position.            Disconnect the Input and Output Speed Sensors.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Ignition on, engine not running.            Measure the voltage of the Speed Sensor Ground circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the Speed Sensor Ground circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
8	<p>The conditions necessary to set this DTC are not present at this time.            Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.            Wiggle the wires while checking for shorted and open circuits.            With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P2700-INADEQUATE ELEMENT VOLUME LR****When Monitored and Set Condition:****P2700-INADEQUATE ELEMENT VOLUME LR**

**When Monitored:** Whenever the engine is running. The LR volume is updated during a 3-1 or 2-1 manual downshift with throttle angle below 5 degrees. Trans temp must be at least 43 C (110 F)

**Set Condition:** When the LR volume falls below 16.

**POSSIBLE CAUSES**

L/R CLUTCH CIRCUIT LEAKS IN THE VALVE BODY

AIR CHECK L/R CLUTCH CIRCUIT

INTERNAL TRANSMISSION

POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All



**P2700-INADEQUATE ELEMENT VOLUME LR — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, erase DTCs.</p> <p><b>NOTE: The TRANS TEMP DEG must be at least 43°C or 110°F before performing the following steps.</b></p> <p>Drive the vehicle and perform at least ten 3-1 manual downshifts at closed throttle from speeds of about 32 km/h or 20 MPH.</p> <p>With the DRBIII®, read the LR CL VOL INDEX.</p> <p>Is the LR CL VOL INDEX below 20?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All
3	<p>Turn the ignition off to the lock position.</p> <p>Remove the transmission oil pan per the Service Information.</p> <p>Remove the valve body per the service information.</p> <p>Check condition of the L/R accumulator springs.</p> <p>Look for possible leak paths into the L/R clutch hydraulics circuit within the valve body.</p> <p>Were any problems found?</p> <p>Yes → Repair as necessary.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Perform an air check on the L/R Clutch circuit per the Service Information.</p> <p>Watch and listen for L/R Clutch piston movement.</p> <p>Dose the piston stroke and return properly?</p> <p>Yes → Replace the Transmission/TRS Solenoid Assembly per the service information. With the DRBIII®, perform Quick Learn.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission as necessary. Pay attention to the components related to the L/R clutch. A broken or weak L/R clutch return spring or Accumulator Spring or dislocated snap ring could cause this problem.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P2700-INADEQUATE ELEMENT VOLUME LR — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: The TRANS TEMP DEG must be at least 43° C or 110° F before performing the following steps.</b></p> <p>Perform eight learnable starts. A learnable start is defined as follows: Start engine. From a standstill, accelerate lightly to 80 km/h or 50 MPH, then brake lightly to a stop. Turn off engine.</p> <p>With the DRBIII®, record the CL VOL INDEX (CVI) for all clutches</p> <p>With the DRBIII®, perform a BATTERY DISCONNECT.</p> <p>With the DRBIII®, read the CVI's and compare them to the readings recorded before the BATTERY DISCONNECT.</p> <p>Are any of the CVI's less than 5 or different than before the BATTERY DISCONNECT?</p> <p>Yes → Go To 7</p> <p>No → Test Complete.</p>	All
7	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P2701-INADEQUATE ELEMENT VOLUME 2C****When Monitored and Set Condition:****P2701-INADEQUATE ELEMENT VOLUME 2C**

**When Monitored:** Whenever the engine is running. The 2C CVI is updated during a 3-2 kickdown with throttle angle between 10 and 54 degrees. Transmission temperature must be at least 43° C or 110° F.

**Set Condition:** When the 2C CVI falls below 5.

**POSSIBLE CAUSES**

2C CLUTCH CIRCUIT LEAKS IN THE VALVE BODY

AIR CHECK 2C CLUTCH CIRCUIT

INTERNAL TRANSMISSION

POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P2701-INADEQUATE ELEMENT VOLUME 2C — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, erase Transmission DTC's</p> <p>Drive the vehicle at about 80 km/h or 50 MPH, then depress the OD off button. This will put the vehicle into third gear.</p> <p><b>NOTE: The TRANS TEMP DEG must be at least 43° C or 110° F before performing the following steps.</b></p> <p>Perform at least ten 3-2 kickdowns by depressing the throttle between 10 and 54 TPS DEGREES at speeds of about 80 km/h or 50 MPH.</p> <p>With the DRBIII®, read the 2C CL VOL INDEX.</p> <p>Is the 2C CL VOL INDEX below 10?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All
3	<p>Turn the ignition off to the lock position.</p> <p>Remove the transmission oil pan per the Service Information.</p> <p>Remove the valve body per the service information.</p> <p>Check condition of the 2C accumulator springs .</p> <p>Look for possible leak paths into the 2C clutch hydraulics circuit within the valve body.</p> <p>Were any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Perform an air check on the 2C Clutch circuit per the Service Information.</p> <p>Watch and listen for 2C Clutch piston movement.</p> <p>Dose the piston stroke and return properly?</p> <p>Yes → Replace the Transmission/TRS Solenoid Assembly per the service information. With the DRBIII®, perform Quick Learn. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission as necessary. Pay attention to the components related to the 2C clutch. A broken or dislodged 2C return spring, snap ring or broken 2C Accumulator Spring could cause this problem.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P2701-INADEQUATE ELEMENT VOLUME 2C — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: The TRANS TEMP DEG must be at least 43° C or 110° F before performing the following steps.</b></p> <p>Perform eight learnable starts. A learnable start is defined as follows: Start engine. From a standstill, accelerate lightly to 80 km/h or 50 MPH, then brake lightly to a stop. Turn off engine.</p> <p>With the DRBIII®, record the CL VOL INDEX (CVI) for all clutches</p> <p>With the DRBIII®, perform a BATTERY DISCONNECT.</p> <p>With the DRBIII®, read the CVI's and compare them to the readings recorded before the BATTERY DISCONNECT.</p> <p>Are any of the CVI's less than 5 or different than before the BATTERY DISCONNECT?</p> <p>Yes → Go To 7</p> <p>No → Test Complete.</p>	All
7	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P2702-INADEQUATE ELEMENT VOLUME OD****When Monitored and Set Condition:****P2702-INADEQUATE ELEMENT VOLUME OD**

**When Monitored:** Whenever the engine is running. The OD volume is updated during a 2-3 upshift with throttle angle between 10 and 54 degrees. Trans temp must be at least 43 C (110 F)

**Set Condition:** When the OD volume falls below 5.

**POSSIBLE CAUSES**

OD CLUTCH CIRCUIT LEAKS IN THE VALVE BODY

AIR CHECK OD CLUTCH CIRCUIT

INTERNAL TRANSMISSION

POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P2702-INADEQUATE ELEMENT VOLUME OD — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, erase DTCs.  <b>NOTE: The TRANS TEMP DEG must be at least 43° C or 110° F before performing the following steps.</b>            Drive the vehicle and perform at least ten 2-3 upshifts with the TPS degree between 10 and 54.            With the DRBIII®, read the OD CL VOL INDEX.            Is the OD CL VOL INDEX below 10?</p> <p>Yes → Go To 3            No → Go To 6</p>	All
3	<p>Turn the ignition off to the lock position.            Remove the transmission oil pan per the Service Information.            Remove the valve body per the service information.            Check condition of the OD accumulator springs.            Look for possible leak paths into the OD clutch hydraulics circuit within the valve body.            Were any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.            No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Perform an air check on the OD Clutch circuit per the Service Information.            Watch and listen for OD Clutch piston movement.            Air check all other pump passages and watch for air leakage into the OD clutch passage.  <b>NOTE: There is a bleed orifice between the OD and L/R Clutch passages, so a small amount of air leakage from L/R to OD is normal.</b>            Were any problems found?</p> <p>Yes → Go To 5            No → Replace the Transmission/TRS Solenoid Assembly per the service information. With the DRBIII®, perform Quick Learn.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission. Pay attention to the OD Clutch. Broken or weak return spring or a dislocated snap ring could cause this problem. If no problems were found in the OD clutch, or if leakage into the OD passage was noted replace Pump Assembly. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P2702-INADEQUATE ELEMENT VOLUME OD — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: The TRANS TEMP DEG must be at least 43° C or 110° F before performing the following steps.</b></p> <p>Perform eight learnable starts. A learnable start is defined as follows: Start engine. From a standstill, accelerate lightly to 80 km/h or 50 MPH, then brake lightly to a stop. Turn off engine.</p> <p>With the DRBIII®, record the CL VOL INDEX (CVI) for all clutches.</p> <p>With the DRBIII®, perform a BATTERY DISCONNECT.</p> <p>With the DRBIII®, read the CVI's and compare them to the readings recorded before the BATTERY DISCONNECT.</p> <p>Are any of the CVI's less than 5 or different than before the BATTERY DISCONNECT?</p> <p>Yes → Go To 7</p> <p>No → Test Complete.</p>	All
7	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All



**Symptom:****P2703- INADEQUATE ELEMENT VOLUME UD****When Monitored and Set Condition:****P2703- INADEQUATE ELEMENT VOLUME UD**

**When Monitored:** Whenever the engine is running. The UD CVI is updated during a 4-3 kickdown with throttle angle between 10 and 54 degrees. Transmission temperature must be at least 43 C (110 F)

**Set Condition:** When the UD CVI falls below 11.

**POSSIBLE CAUSES**

UD CLUTCH CIRCUIT LEAKS IN THE VALVE BODY

AIR CHECK UD CLUTCH CIRCUIT

INTERNAL TRANSMISSION

POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue</p> <p>Go To 2</p>	All

**P2703- INADEQUATE ELEMENT VOLUME UD — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, erase Transmission DTCs.</p> <p><b>NOTE: The TRANS TEMP DEG must be at least 43° C or 110° F before performing the following steps.</b></p> <p>Drive the vehicle and perform at least ten 4-3 kickdowns by depressing the throttle between 30 and 54 TPS DEGREES at speeds about 80 km/h or 50 MPH.</p> <p>With the DRBIII®, read the UD CL VOL INDEX.</p> <p>Is the UD CL VOL INDEX below 10?</p> <p>Yes → Go To 3</p> <p>No → Go To 6</p>	All
3	<p>Turn the ignition off to the lock position.</p> <p>Remove the transmission oil pan per the Service Information.</p> <p>Remove the valve body per the Service Information.</p> <p>Check condition of the UD accumulator springs .</p> <p>Look for possible leak paths into the UD clutch hydraulics circuit within the valve body.</p> <p>Were any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Perform an air check on the UD Clutch circuit per the Service Information.</p> <p>Watch and listen for UD Clutch piston movement.</p> <p>Were any problems found?</p> <p>Yes → Go To 5</p> <p>No → Replace the Transmission/TRS Solenoid Assembly per the service information. With the DRBIII®, perform Quick Learn. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission. Pay attention to components related to the UD clutch. Broken or weak return spring or a dislocated snap ring. If no trouble is found in UD clutch component or UD clutch leakage was noted in passage, replace the Pump Assembly.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P2703- INADEQUATE ELEMENT VOLUME UD — Continued**

TEST	ACTION	APPLICABILITY
6	<p><b>NOTE: The TRANS TEMP DEG must be at least 43° C or 110° F before performing the following steps.</b></p> <p>Perform eight learnable starts. A learnable start is defined as follows: Start engine. From a standstill, accelerate lightly to 80 km/h or 50 MPH, then brake lightly to a stop. Turn off engine.</p> <p>With the DRBIII®, record CL VOL INDEX (CVI) for all clutches.</p> <p>With the DRBIII®, perform a BATTERY DISCONNECT.</p> <p>With the DRBIII®, read the CVI's and compare them to the readings recorded before the BATTERY DISCONNECT.</p> <p>Are any of the CVI's less than 5 or different than before the BATTERY DISCONNECT?</p> <p>Yes → Go To 7</p> <p>No → Test Complete.</p>	All
7	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P2704-INADEQUATE ELEMENT VOLUME 4C****When Monitored and Set Condition:****P2704-INADEQUATE ELEMENT VOLUME 4C**

**When Monitored:** Whenever the engine is running. The 4C volume is updated during a 3-4 upshift with throttle angle between 10 and 54 degrees. Trans temp must be at least 43 C (110 F)

**Set Condition:** When the 4C volume falls below 5.

**POSSIBLE CAUSES**

DTC P0876 PRESENT

4C CLUTCH CIRCUIT LEAKS IN THE VALVE BODY

AIR CHECK 4C CLUTCH CIRCUIT

INTERNAL TRANSMISSION

POWERTRAIN CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVI's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue</p> <p>Go To 2</p>	All

**P2704-INADEQUATE ELEMENT VOLUME 4C — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, record the 4C CL VOL INDEX.            With the DRBIII®, erase DTC's.            Perform at least 10, 3-4 upshifts with the throttle between 10 and 54 degrees. The Transmission temperature must be at least 43°C or 110 °F.            With the DRBIII®, read the 4C CL VOL INDEX.            Is the current 4C CL VOL INDEX below 10?</p> <p>Yes → Go To 3            No → Go To 7</p>	All
3	<p>With the DRBIII®, read DTCs.  <b>NOTE: The DTC P0876 must also be set with P2704 in order for this test to be valid.</b>            Is the DTC P0876 also present?</p> <p>Yes → Replace the Transmission Solenoid/TRS Assembly per the Service Information.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 4</p>	All
4	<p>Turn the ignition off to the lock position.            Remove the transmission oil pan per the Service Information.            Remove the valve body per the Service Information.            Check condition of the 4C accumulator springs.            Look for possible leak paths into the 4C clutch hydraulics circuit within the valve body.            Were any problems found?</p> <p>Yes → Repair as necessary.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Perform an air check on the 4C Clutch circuit per the Service Information.            Listen for proper 4C Clutch piston movement.            Were any problems found?</p> <p>Yes → Go To 6            No → Replace the Transmission/TRS Solenoid Assembly per the service information. With the DRBIII®, perform Quick Learn.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair Internal transmission as necessary. Pay attention to the mechanical components related to the 4th clutch. A broken or weak return spring or a dislocated snap ring could cause this problem.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P2704-INADEQUATE ELEMENT VOLUME 4C — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Perform eight learnable starts. A learnable start is defined as follows: Start engine. From a standstill, accelerate lightly to 50 MPH, then brake lightly to a stop. Turn off engine.</p> <p>With the DRBIII®, record Transmission CL VOL INDEX (CVI) for all clutches.</p> <p>With the DRBIII®, perform a BATTERY DISCONNECT.</p> <p>With the DRBIII®, read the CVI's and compare them to the reading recorded before the BATTERY DISCONNECT.</p> <p>Are any of the CVI's less than 5 or are they different than before the battery disconnect?</p> <p>Yes → Go To 8</p> <p>No → Test Complete.</p>	All
8	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.</p> <p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**Symptom:****P2706-MS SOLENOID CIRCUIT****When Monitored and Set Condition:****P2706-MS SOLENOID CIRCUIT**

**When Monitored:** Initially at power-up, then every 10 seconds thereafter. The solenoid circuits will also be tested immediately after a gear ratio or a pressure switch error is detected.

**Set Condition:** Three consecutive solenoid continuity test failures, or one failure if test is run in response to a gear ratio or pressure switch error.

**POSSIBLE CAUSES**

RELATED RELAY DTC'S PRESENT

MS SOLENOID CONTROL CIRCUIT OPEN

TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN

MS SOLENOID CONTROL CIRCUIT SHORT TO GROUND

MS SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE

MS SOLENOID

POWERTRAIN CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

**P2706-MS SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all Engine DTC's prior to performing Transmission symptom diagnostics.</p> <p>With the DRBIII®, read Transmission DTC's. Record all DTC's and 1 Trip Failures.</p> <p><b>NOTE: Diagnose 1 Trip Failures as a fully matured DTC.</b></p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to Symptom test for P0706 Check Shifter Signal.</p> <p>For Gear Ratio DTC's, check and record all CVT's.</p> <p>Most DTC's set on start up but some must be set by driving the vehicle to ensure that all diagnostic monitors have run.</p> <p><b>NOTE: Verify flash level of Powertrain Controller. Some problems are corrected by software upgrades to the Transmission and Engine Systems.</b></p> <p><b>NOTE: Due to the integration of the Powertrain and Transmission control modules - if a controller flash is performed it is necessary to perform Quick Learn and the Drive Learn procedures. Failure to do so may result in shift quality complaints.</b></p> <p><b>NOTE: Check for applicable TSB's that may apply.</b></p> <p>Perform this procedure prior to Symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, check for other transmission DTC's.</p> <p>Are there any Transmission Control Relay related DTCs P0890, P0891, and/or P0888 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, Check the STARTS SINCE SET counter for P2706.</p> <p><b>NOTE: This counter only applies to the last DTC set.</b></p> <p>Is the STARTS SINCE SET counter for P2706 set at 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 11</p>	All
4	<p>Turn the ignition off to the lock position.</p> <p>Remove the Starter Relay.</p> <p><b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b></p> <p>Install the Transmission Simulator, Miller tool #8333.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p>Ignition on, engine not running..</p> <p>With the DRBIII®, actuate the MS Solenoid.</p> <p>Monitor the MS Solenoid LED on the Transmission Simulator.</p> <p>Did the LED on the Transmission Simulator blink on and off?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All



**P2706-MS SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Transmission Solenoid/TRS Assembly per the Service Information.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
6	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the PCM C4 harness connector.</p> <p>Disconnect the Transmission Solenoid /TRS Assembly harness connector</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance of the MS Solenoid Control circuit between Transmission Solenoid/TRS Assembly harness connector and the appropriate terminal of special tool #8815.</p> <p>Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the MS Solenoid Control circuit for an open.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position.</p> <p>Disconnect the PCM C4 harness connector.</p> <p>Disconnect the Transmission Solenoid/TRS Assembly harness connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary.</b></p> <p><b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b></p> <p>Measure the resistance between ground and the MS Solenoid Control circuit.</p> <p>Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the MS Solenoid Control circuit for a short to ground.</p> <p>Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 8</p>	All

**P2706-MS SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.            Disconnect the PCM C4 harness connector.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.  <b>Note: Check connectors - Clean/repair as necessary.</b>  <b>CAUTION: DO NOT PROBE THE PCM HARNESS CONNECTORS. PROBING THE PCM HARNESS CONNECTORS WILL DAMAGE THE PCM TERMINALS RESULTING IN POOR TERMINAL TO PIN CONNECTION. INSTALL MILLER SPECIAL TOOL #8815 TO PERFORM DIAGNOSIS.</b>            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Measure the voltage of the MS Solenoid Control circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the MS Solenoid Control circuit for a short to voltage.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid/TRS Assembly harness connector.            Remove the Transmission Control Relay.            Connect a jumper wire between the Fused B+ circuit and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.            Ignition on, engine not running.            Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Solenoid/TRS harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Go To 10</p> <p>No → Repair the Transmission Control Relay Output circuit for an open. If the fuse is open make sure to check for a short to ground.            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All
10	<p>Using the schematics as a guide, inspect the wiring and connectors. Repair as necessary. Pay particular attention to all power and ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Powertrain Control Module per the Service Information. WITH THE DRBIII® PERFORM QUICK LEARN            Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p>	All

**P2706-MS SOLENOID CIRCUIT — Continued**

TEST	ACTION	APPLICABILITY
11	<p>The conditions necessary to set this DTC are not present at this time. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Wiggle the wires while checking for shorted or open circuits. With the DRBIII®, check the EATX DTC EVENT DATA to help identify the conditions in which the DTC was set. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform (NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.</p> <p>No → Test Complete.</p>	All

**Symptom:**

**\*BACKUP LAMPS COME ON WHILE SHIFTER IS NOT IN REVERSE POSITION**

**POSSIBLE CAUSES**

FUSED IGNITION SWITCH OUTPUT (RUN) CIRCUIT SHORT TO VOLTAGE  
TRANSMISSION RANGE SENSOR

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. Firmly apply brakes. Place the Shift Lever in the position which causes the Backup Lamps to come on at the wrong time. Do the Backup Lamps come while the shifter is not in Reverse?  Yes → Go To 2 No → Test Complete.	All
2	Ignition on, engine not running. Place the shift lever in a position that causes the Backup Lamps to come on when they should not. Disconnect the Transmission Solenoid /TRS Assembly harness connector. Did the Backup Lamps go out when the connector was disconnected?  Yes → Go To 3 No → Go To 4	All
3	If there are no possible causes remaining, view repair.  Repair Replace Transmission Solenoid/TRS Assembly per the Service Information. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.	All
4	Turn the ignition off to the lock position. Disconnect the Transmission Solenoid/TRS Assembly harness connector. Ignition on, engine not running. Measure the voltage of the Fused Ignition Switch Output (Run) circuit in the Solenoid/TRS harness connector. Is the voltage above 0.5 volt?  Yes → Repair the Fused Ignition Switch Output (Run) circuit for a short to voltage. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.  No → Test Complete.	All

**Symptom:****\*BACKUP LAMPS INOPERATIVE****POSSIBLE CAUSES**

BACK UP LAMP GROUND CIRCUIT OPEN

FUSED IGNITION SWITCH OUTPUT (RUN) CIRCUIT OPEN

FUSED IGNITION SWITCH OUTPUT (RUN) CIRCUIT SHORT TO GROUND

OPEN BACKUP LAMP BULBS

TRANSMISSION RANGE SENSOR

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. Place foot firmly on brake pedal. Place the shift lever in the reverse position. Do the Backup Lamps work?  Yes → Test Complete.  No → Go To 2	All
2	Turn the ignition off to the lock position. Remove the Starter Relay. <b>NOTE: Removal of the Starter Relay is to prevent a Transmission, NO RESPONSE, condition and disable the starter.</b> Install the Transmission Simulator, Miller tool #8333. Ignition on, engine not running. Press the Reverse Light Test button on the Transmission Simulator while observing the Backup Lamps. Do either of the Backup Lamps come on?  Yes → Go To 3  No → Go To 4	All
3	If there are no possible causes remaining, view repair.  Repair Replace Transmission Solenoid/TRS Assembly per the Service Information. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.	All
4	Remove both Backup Lamp bulbs. Measure the resistance of both Backup Lamp bulbs. Is the resistance above 5.0 ohms for either Backup Lamp bulb?  Yes → Replace the Backup Lamp bulb or bulbs as necessary. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.  No → Go To 5	All

**\*BACKUP LAMPS INOPERATIVE — Continued**

TEST	ACTION	APPLICABILITY
5	<p>Remove the Backup Lamp bulbs. Using a 12-volt test light connected to 12-volts, check the Backup Lamp ground circuit. Does the light illuminate brightly?</p> <p>Yes → Go To 6</p> <p>No → Repair the Backup Lamp Ground circuit for an open. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p>	All
6	<p>Turn the ignition off to the lock position. Remove the Backup Lamp bulbs. Disconnect the Transmission Solenoid /TRS Assembly harness connector. Measure the resistance of the Fused Ignition Switch Output (Run) circuit from the Backup lamp Socket to the Solenoid/TRS Assembly harness connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the Fused Ignition Switch Output (Run) circuit for an open. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p> <p>No → Go To 7</p>	All
7	<p>Turn the ignition off to the lock position. Remove the Backup Lamp bulbs. Disconnect the Transmission Solenoid/TRS Assembly harness connector. Measure the resistance between ground and the Fused Ignition Switch Output (Run) circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Fused Ignition Switch Output (Run) circuit for a short to ground. Replace fuse if necessary. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****\*BUMP FELT SHORTLY AFTER STOP WITH NO DTC'S PRESENT****POSSIBLE CAUSES**

STICKING SLIP JOINT

TEST	ACTION	APPLICABILITY
1	<p>This condition is normally caused by a stick and slip condition between the prop shaft slip joint and the transfer case output shaft. Refer to the Service Information for proper repair procedures. If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Check for TSB's relating to this condition. Repair as necessary. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p>	All

**Symptom:**

**\*BUMP FELT WHILE COASTING IN NEUTRAL WITH NO DTC'S PRESENT**

**POSSIBLE CAUSES**

DRIVE LEARN PROCEDURE/PCM FLASH UPDATE

TEST	ACTION	APPLICABILITY
1	<p>Check for a Transmission or Powertrain controller flash update or TSB to address this issue.</p> <p>Perform the drive learn procedure for the LR clutch element.</p> <p><b>NOTE: Some bump while coasting in neutral is normal.</b></p> <p>Perform the above procedures to reduce excessive bump in neutral.</p> <p>Repair</p> <p>Perform controller flash update, Drive Learn Procedure, or any TSBs that may apply.</p> <p>Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p>	All



**Symptom:****\*POOR SHIFT QUALITY****POSSIBLE CAUSES**

POOR SHIFT QUALITY

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: A under or over filled Transmission Fluid Level can cause many shift quality problems. If the fluid level is low locate and repair any leaks, then check and adjust the fluid level per the Service Information.</b></p> <p>If the transmission shifts early when cold, this is a normal condition. The controller software is designed to protect the transmission from high torque and/or high RPM shifts during cold operation.</p> <p>Check and repair all engine DTC's prior to any Transmission diagnostics. A inconsistent TPS/APPS operation can cause an abnormal or erratic shift pattern.</p> <p>With the DRBIII®, check the TPS/APPS voltage for a smooth voltage change while slowly opening and closing the throttle. If the voltage change is not smooth, replace the sensor.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p>Perform the Shift Lever Position Test. If the test does not pass, refer to the test, P0706 Check Shifter Signal, in the transmission category.</p> <p><b>NOTE: Verify the flash level of the transmission controller. Some problems are corrected by software upgrades to the transmission controller.</b></p> <p>If a controller software update was performed, make sure to perform the Drive Learn Procedure. A abnormal or erratic shift pattern may transpire if the Drive Learn Procedure is not performed.</p> <p><b>NOTE: Check for any applicable TSB's that may apply.</b></p> <p>Where there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****\*TRANSMISSION NOISY WITH NO DTC'S PRESENT****POSSIBLE CAUSES**

INCORRECT FLUID LEVEL

INTERNAL TRANSMISSION - NOISY WHILE DRIVING

INTERNAL TRANSMISSION - NOISY WHILE STANDING STILL

TEST	ACTION	APPLICABILITY
1	<p>Place vehicle on a hoist. Run vehicle on hoist under conditions necessary to duplicate the noise. Using Chassis Ears or other suitable device, verify that the noise is coming from the transmission. Is the noise coming from the transmission?</p> <p>Yes → Go To 2 No → Test Complete.</p>	All
2	<p>Check the Transmission Fluid level per the Service Information. <b>NOTE: The transmission must be hot when checking fluid level. When the temperature is below 10° C or 50° F, it is possible that no oil will show on the dipstick even though the transmission has an adequate fill level when warm.</b> Is the Transmission fluid level correct?</p> <p>Yes → Go To 3 No → Adjust fluid level per the Service Information and repair cause of incorrect fluid level. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p>	All
3	<p>With the shift lever in neutral, raise the engine speed and listen to the noise. <b>Note: Make sure the radio is turned OFF. Alternator noise can come through the speakers and be misinterpreted as Transmission Pump Whine. This can happen even with the volume turned down, THE RADIO MUST BE TURNED OFF.</b> Does the noise get louder or change pitch while the engine speed is changing?</p> <p>Yes → Go To 4 No → Go To 5</p>	All
4	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission per the Service Information. Inspect all of the transmission components for signs of wear. Pay particular attention to bearings in the front half of the transmission. If no problems are found, replace the Primary Oil Pump. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p>	All

**\*TRANSMISSION NOISY WITH NO DTC'S PRESENT — Continued**

TEST	ACTION	APPLICABILITY
5	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Repair internal transmission as necessary. Inspect all of the transmission components for signs of wear. Pay particular attention to bearings, pinion gears, etc. Refer to the Service Information for proper repair procedures.</p> <p>Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p>	All

**Symptom:****\*TRANSMISSION SHIFTS EARLY WITH NO DTC'S****POSSIBLE CAUSES**

COLD TRANSMISSION OR BUS COMMUNICATION PROBLEM

TEST	ACTION	APPLICABILITY
1	<p>If the transmission shifts early when cold, this is a normal condition. The controller software is designed to protect the transmission from high torque and/or high RPM shifts during cold operation.</p> <p><b>NOTE: Verify the flash level of the transmission controller. Some problems are corrected by software upgrades to the transmission controller.</b></p> <p>Check and repair all engine DTC's prior to any Transmission diagnostics. A inconsistent TPS/APPS operation can cause an abnormal or erratic shift pattern. With the DRBIII®, check the TPS/APPS voltage for a smooth voltage change while slowly opening and closing the throttle. If the voltage change is not smooth, replace the sensor.</p> <p>Using the DRBIII®, attempt communication with other Modules, check for signs of a bus problem such as bus related DTC's and/or communication problems.</p> <p>Where there any problems found?</p> <p>Yes → Repair as necessary. If a bus problem exist, refer to the Communication category and perform the appropriate symptom. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****\*TRANSMISSION SHIFTS ROUGH AFTER PCM REPLACEMENT OR REFLASH****POSSIBLE CAUSES**

TRANSMISSION SHIFTS ROUGH AFTER PCM REPLACEMENT OR FLASH

TEST	ACTION	APPLICABILITY
1	<p>Perform this procedure if the transmission shifts rough after PCM was replaced or Reflashed.</p> <p>Does the transmission shift rough after a PCM replacement or Reflash?</p> <p>Yes → Perform Quick Learn and the Drive Learn procedures. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All

**Symptom:****\*TRANSMISSION SIMULATOR WILL NOT POWER UP**

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: If the Transmission Simulator Miller tool #8333 will not power up, this is a symptom of the Transmission Relay being open (such as Limp-in ) and/or this also could be a indication of the Transmission Simulator not installed correctly on the vehicle.</b></p> <p><b>NOTE: Check the Transmission Simulator ground cable for a clean and proper connection.</b></p> <p>Repair these symptoms before having the Transmission Simulator 8333 repaired.</p> <p>Continue</p> <p>Test Complete.</p>	All

**Symptom:****\*VEHICLE IS SLUGGISH WITH NO DTC'S PRESENT****POSSIBLE CAUSES**

ENGINE VISCOUS FAN

COLD TRANSMISSION

BUS PROBLEMS

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Engine viscous fan sticking can cause this complaint.</b> Check the engine viscous fan for proper operation per the Service Information. Does the engine fan operate correctly?</p> <p>Yes → Go To 2</p> <p>No → Repair the engine viscous fan per the Service Information. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p>	All
2	<p>If the transmission shifts too early when the transmission is cold, this is a normal condition. Did the problem occur when the transmission temperature was cold?</p> <p>Yes → The software is designed to protect the transmission from high torque and/or high RPM shifts during cold operation. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, attempt to communicate with other control modules on the bus. Check for any bus related DTC and/or communication problem. Although it takes two occurrences of a missed TRD link message to set the fault code, one missed message will cause the transmission to short shift until the next start up. If the vehicle has any indications of a bus problem, the bus must be repaired first Do any of the other modules show signs of a bus problem?</p> <p>Yes → Refer to the Communication category and perform the appropriate symptom. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p> <p>No → Go To 4</p>	All

**\*VEHICLE IS SLUGGISH WITH NO DTC'S PRESENT — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Using the schematics as a guide, inspect the wiring and connectors specific to the PCM. Wiggle the wires while checking for shorts and open circuits. Although it takes two occurrences of a missed TRD link message to set the DTC, one missed message will cause the transmission to short shift until the next start up. If the vehicle has any indications of a bus problem, the bus must be repaired first. Were any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSMISSION NO TROUBLE CODE VERIFICATION TEST.</p> <p>No → Test Complete.</p>	All



**Symptom:****P0711-TRANS TEMP SENSOR, NO TEMP RISE AFTER START****When Monitored and Set Condition:****P0711-TRANS TEMP SENSOR, NO TEMP RISE AFTER START**

When Monitored: Continuously with the key on and the engine running.

Set Condition: After 2 trips in which the trans sump temp is < 5°C (40° F) and does not rise more than 8°C (16° F) after 20 minutes of run time with Veh Spd > 48 kmh (30 MPH). It will also set if the eng temp is < 38°C (100° F) with trans temp > 127°C (260° F).

**POSSIBLE CAUSES**

MULTIPLE TRANSMISSION DTC'S SET

INTERMITTENT TRANSMISSION TEMPERATURE SENSOR

TRANSMISSION TEMPERATURE SENSOR

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Turn the ignition on.</p> <p>With the DRBIII®, read DTCs.</p> <p>Is the Good Trip Counter for P0711 equal to 0?</p> <p>Yes → Go To 3</p> <p>No → Go To 7</p>	All
3	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, read DTCs.</p> <p>Check for any Park/Neutral DTC or Transmission Temperature too Low or too High DTCs.</p> <p>Were there any Park/Neutral or Transmission Temperature Sensor DTCs present?</p> <p>Yes → Repair all other Transmission DTC's before proceeding. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 4</p>	All

**P0711-TRANS TEMP SENSOR, NO TEMP RISE AFTER START — Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition on.</p> <p><b>Note: To test the transmission temperature sensor, the engine and transmission temperature must be at or below 29.4°C (85° F).</b></p> <p>With the DRBIII® read:</p> <p>Engine Coolant temperature and record.</p> <p>Transmission temperature and record.</p> <p>Is the transmission temperature within 5°C (9°F) of the engine coolant temperature?</p> <p>Yes → Go To 5</p> <p>No → Go To 6</p>	All
5	<p><b>Note: To test the transmission temperature sensor, the engine and transmission temperature must be at or below 29.4°C (85° F).</b></p> <p>Start the engine and let it idle in Drive with parking brake on, while monitoring the Transmission Temperature Sensor with the DRBIII®.</p> <p>Look for the temperature to rise 8°C (15°F) within a ten minute period.</p> <p>Did the trans temperature increase at a steady rate and rise 8°C (15°F) over a 10 minute period?</p> <p>Yes → Go To 7</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position.</p> <p>Remove the Transmission pan.</p> <p>Disconnect the Governor Pressure Sensor/Transmission Temperature Sensor connector.</p> <p><b>Note: Check connectors - Clean/repair as necessary</b></p> <p>Measure the resistance of the Transmission Temperature Sensor.</p> <p><b>Note: Acceptable Sensor Resistance Ranges in OHMS</b></p> <p>Sensor Temperature compared to min to max ohm reading.</p> <p>-40°C (-40°F) - 1094 to 1176 ohms</p> <p>0.00°C (32°F) - 1587 to 1672 ohms</p> <p>25.0°C (77°F) - 1960 to 2040 ohms</p> <p>70.0°C (158°F) - 2709 to 2860 ohms</p> <p>100°C (212°F) - 3284 to 3500 ohms</p> <p>120°C (120°F) - 3684 to 3950 ohms</p> <p>150°C (302°F) - 4110 to 4450 ohms</p> <p>Is the resistance within the specified range when the sensor is at the given temperature?</p> <p>Yes → Test Complete.</p> <p>No → Replace the Governor Pressure/Transmission Temperature Sensor per the Service Information.</p> <p>Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P0711-TRANS TEMP SENSOR, NO TEMP RISE AFTER START — Continued**

TEST	ACTION	APPLICABILITY
7	<p>The conditions to set this DTC are not present at this time.</p> <p><b>Note: Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.</b></p> <p><b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b></p> <p><b>Note: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b></p> <p><b>NOTE: Refer to any Technical Service Bulletins that may apply.</b></p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0712-TRANS TEMP SENSOR VOLTAGE TOO LOW****When Monitored and Set Condition:****P0712-TRANS TEMP SENSOR VOLTAGE TOO LOW**

When Monitored: Continuously with the key on and the engine running.

Set Condition: This code will set if the Transmission Temperature Sensor Signal circuit voltage goes below 1.55 volts for 2.2 seconds.

**POSSIBLE CAUSES**

INTERMITTENT TRANSMISSION TEMPERATURE SENSOR  
 TRANS TEMP SENSOR SIGNAL CIRCUIT SHORT TO GROUND  
 TRANS TEMP SENSOR SIGNAL CIRCUIT SHORT TO THE SENSOR GROUND CIRCUIT  
 TRANS TEMP SENSOR SIGNAL CIRCUIT SHORT TO GROUND INSIDE TRANS  
 TRANS TEMP SENSOR SIGNAL CIRCUIT SHORT TO THE SENSOR GROUND CIRCUIT INSIDE TRANS  
 TRANSMISSION TEMPERATURE SENSOR  
 ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Turn the ignition on.</p> <p>With the DRBIII®, read DTCs.</p> <p>Is the Specific Good Trip Counter for P0712 equal to 0?</p> <p>Yes → Go To 3</p> <p>No → Go To 9</p>	All

**P0712-TRANS TEMP SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.            Check connectors - Clean/repair as necessary.            Measure the resistance between ground and the Transmission Temperature Sensor Signal circuit in the Transmission Solenoid Assembly harness connector.            Is the resistance above 100k ohms?</p> <p>Yes → Go To 4</p> <p>No → Repair the Transmission Temperature Sensor Signal circuit for a short to ground.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
4	<p>Turn the ignition off.            Disconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.            Check connectors - Clean/repair as necessary.            Measure the resistance between the Transmission Temperature Sensor Signal circuit and Sensor Ground circuit in the Transmission Solenoid Assembly harness connector.            Is the resistance above 100k ohms?</p> <p>Yes → Go To 5</p> <p>No → Repair the Transmission Temperature Sensor Signal circuit for a short to the Sensor Ground circuit.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
5	<p>Turn the ignition off.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the transmission oil pan.            Disconnect the Governor Pressure/Transmission Temperature Sensor connector.            Check connectors - Clean/repair as necessary.            Measure the resistance between ground and the Transmission Temperature Sensor Signal circuit at the Governor Pressure/Transmission Temperature Sensor connector.            Is the resistance above 100 kohms?</p> <p>Yes → Go To 6</p> <p>No → Replace the Transmission Solenoid Assembly per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
6	<p>Turn the ignition off.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the transmission oil pan.            Disconnect the Governor Pressure/Transmission Temperature Sensor connector.            Check connectors - Clean/repair as necessary.            Measure the resistance between the Transmission Temperature Sensor Signal circuit and Sensor Ground circuit at the Governor Pressure/Transmission Temperature Sensor connector.            Is the resistance above 100k ohms?</p> <p>Yes → Go To 7</p> <p>No → Replace the Transmission Solenoid Assembly per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P0712-TRANS TEMP SENSOR VOLTAGE TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off.  Remove the transmission oil pan.  Disconnect the Governor Pressure/Transmission Temperature Sensor connector.  <b>Note: Check connectors - Clean/repair as necessary</b>  Measure the resistance of the Transmission Temperature Sensor.  <b>NOTE: Acceptable sensor resistance ranges in ohms.</b>  Sensor Temperature compared to min to max ohm readings  -40°C (-40°F) - 1094 to 1176 ohms  0°C (32°F) - 1587 to 1672 ohms  25°C (77°F) - 1960 to 2040 ohms  70°C (158°F) - 2709 to 2860 ohms  100°C (212°F) - 3284 to 3500 ohms  120°C (248°F) - 3684 to 3950 ohms  150°C (302°F) - 4110 to 4450 ohms  Is the resistance below the minimum specification for the sensor temperature?</p> <p>Yes → Replace the Governor Pressure/Transmission Temperature Sensor per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off.  Reconnect the all disconnected connectors.  With the DRBIII®, erase DTCs.  With the DRBIII® monitor transmission DTC's.  Disconnect the Transmission Temperature Sensor connector.  Turn the ignition on.  Did the DTC for Transmission Oil Temperature Sensor Voltage to High set?</p> <p>Yes → Go To 9</p> <p>No → Replace and program the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
9	<p>At this time, the conditions required to set the DTC are not present.  <b>Note: Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.</b>  <b>Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</b>  <b>Note: Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</b>  <b>Note: Refer to any technical service bulletins that may apply.</b>  Were there any problems found?</p> <p>Yes → Repair as necessary.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0713-TRANS TEMP SENSOR VOLTAGE TOO HIGH****When Monitored and Set Condition:****P0713-TRANS TEMP SENSOR VOLTAGE TOO HIGH**

When Monitored: Continuously with the key on and the engine running.

Set Condition: This code will set if the Transmission Temperature Sensor Signal circuit voltage goes above 3.76 volts for 2.2 seconds.

**POSSIBLE CAUSES**

TRANS TEMP SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE  
 TRANS TEMP SENSOR SIGNAL CIRCUIT SHORT TO 5-VOLT SUPPLY CIRCUIT  
 TRANS TEMP SENSOR SIGNAL CIRCUIT OPEN  
 SENSOR GROUND CIRCUIT OPEN  
 5 VOLT SUPPLY OPEN IN TRANSMISSION  
 TRANS TEMP SENSOR SIGNAL CIRCUIT SHORT TO 5-VOLT SUPPLY CIRCUIT INSIDE TRANS  
 TRANS TEMP SENSOR SIGNAL CIRCUIT OPEN INSIDE TRANS  
 SENSOR GROUND CIRCUIT OPEN INSIDE TRANS  
 TRANSMISSION TEMPERATURE SENSOR  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0713-TRANS TEMP SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
2	Turn the ignition on. With the DRBIII®, read DTCs. Is the Good Trip Counter for P0713 set at 0?  Yes → Go To 3 No → Go To 13	All
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. Check connectors - Clean/repair as necessary Turn the ignition on. Remove the Transmission Control Relay from the PDC. Connect a jumper wire between Transmission Control Relay cavity 30 and cavity 87. Measure the voltage of the Transmission Temperature Sensor Signal circuit in the ECM harness connector. Is the voltage above 0.5 volts?  Yes → Repair the Transmission Temperature Sensor Signal circuit for a short to voltage. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Go To 4	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance between the Transmission Temperature Sensor Signal circuit and the 5-volt Supply circuit in the Transmission Solenoid Assembly harness connector. Is the resistance above 100k ohms?  Yes → Go To 5 No → Repair the Transmission Temperature Sensor Signal circuit for a short to the 5-volt Supply circuit. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
5	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. Check connectors - Clean/repair as necessary Measure the resistance of the Transmission Temperature Sensor Signal circuit between the ECM harness connector and the Transmission Solenoid Assembly harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 6 No → Repair the Transmission Temperature Sensor Signal circuit for an open. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All



**P0713-TRANS TEMP SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. Check connectors - Clean/repair as necessary Measure the resistance of the Sensor Ground circuit between the ECM harness connector and the Transmission Solenoid Assembly harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 7  No → Repair the Sensor Ground circuit for an open. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
7	Turn the ignition off. Disconnect the Transmission Solenoid Assembly harness connector. Remove the transmission oil pan. Disconnect the Governor Pressure/Transmission Temperature Sensor connector. Measure the resistance between the Transmission Temperature Sensor Signal circuit and 5-volt Supply circuit in the Governor Pressure/Transmission Temperature Sensor connector. Is the resistance above 100k ohms?  Yes → Go To 8  No → Replace the Transmission Solenoid Assembly per the Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
8	Turn the ignition off. Disconnect the Transmission Solenoid Assembly harness connector. Remove the transmission oil pan. Disconnect the Governor Pressure/Transmission Temperature Sensor harness connector. Check connectors - Clean/repair as necessary Measure the resistance of the Transmission Temperature Sensor Signal circuit between the Transmission Solenoid Assembly connector (transmission side) and the Governor Pressure/Transmission Temperature Sensor connector. Is the resistance below 5.0 ohms?  Yes → Go To 9  No → Replace the Transmission Solenoid Assembly per the Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
9	Turn the ignition off. Disconnect the Transmission Solenoid Assembly harness connector. Remove the transmission oil pan. Disconnect the Governor Pressure/Transmission Temperature Sensor harness connector. Check connectors - Clean/repair as necessary Measure the resistance of the 5 Volt Supply circuit between Transmission Solenoid Assembly connector (transmission side) and the Governor Pressure/Transmission Temperature Sensor connector. Is the resistance below 5.0 ohms?  Yes → Go To 10  No → Replace the Transmission Solenoid Assembly per the Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All

**P0713-TRANS TEMP SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
10	<p>Turn the ignition off.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the transmission oil pan.            Disconnect the Governor Pressure/Transmission Temperature Sensor connector.            Check connectors - Clean/repair as necessary            Measure the resistance of the Sensor Ground circuit between the Transmission Solenoid Assembly connector (transmission side) and the Governor Pressure/Transmission Temperature Sensor connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 11</p> <p>No → Replace the Transmission Solenoid Assembly per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
11	<p>Turn the ignition off.            Remove the transmission oil pan.            Disconnect the Governor Pressure/Transmission Temperature Sensor connector.  <b>Note: Check connectors - Clean/repair as necessary</b>            Measure the resistance of the Transmission Temperature Sensor.  <b>NOTE: Acceptable sensor resistance ranges in ohms</b>            Sensor Temperature compared to max to min ohm reading.            -40°C (-40°F) - 1094 to 1176 ohms            0°C (32°F) - 1587 to 1672 ohms            25°C (77°F) - 1960 to 2040 ohms            70°C (158°F) - 2709 to 2860 ohms            100°C (212°F) - 3284 to 3500 ohms            120°C (248°F) - 3684 to 3950 ohms            150°C (302°F) - 4110 to 4450 ohms            Is the resistance above the maximum specification for the sensor temperature?</p> <p>Yes → Replace the Governor Pressure/Transmission Temperature Sensor per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 12</p>	All
12	<p>Turn the ignition off.            Reconnect all disconnected connectors.            With the DRBIII®, erase DTCs.            Disconnect the Transmission Solenoid Assembly connector.            With the DRBIII®, monitor transmission DTCs.            Connect a jumper wire between the Transmission Temperature Sensor Signal circuit and the Sensor Ground circuit in the Transmission Solenoid Assembly harness connector.            Did the DTC Transmission Oil Temperature Sensor Voltage Too Low set?</p> <p>Yes → Go To 13</p> <p>No → Replace and program the Engine Control Module per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P0713-TRANS TEMP SENSOR VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
13	<p>The conditions necessary set this DTC are not present at this time.</p> <p>Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.</p> <p>Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Refer to any technical service bulletins that may apply.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0720-LOW OUTPUT SPEED SENSOR - RPM ABOVE 15 MPH****When Monitored and Set Condition:****P0720-LOW OUTPUT SPEED SENSOR - RPM ABOVE 15 MPH**

**When Monitored:** Continuously with the ignition on, engine running, and gear selector NOT in park or neutral.

**Set Condition:** This DTC will set if the vehicle speed (reported from the CAB module) is above 24 Km/h (15 MPH), and the monitored Output Shaft Speed is below 60 RPM for 2.6 seconds.

**POSSIBLE CAUSES**

PARK/NEUTRAL DTC PRESENT  
 INTERMITTENT WIRING AND CONNECTORS  
 OUTPUT SPEED SENSOR GROUND CIRCUIT OPEN  
 OUTPUT SPEED SENSOR SIGNAL CIRCUIT OPEN  
 OUTPUT SPEED SENSOR GROUND CIRCUIT SHORTED TO OTHER CIRCUITS  
 OUTPUT SPEED SENSOR SIGNAL CIRCUIT SHORT TO GROUND  
 OUTPUT SPEED SENSOR SIGNAL CIRCUIT SHORTED TO OTHER CIRCUITS  
 OUTPUT SPEED SENSOR GROUND CIRCUIT SHORT TO VOLTAGE  
 OUTPUT SPEED SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE  
 OUTPUT SPEED SENSOR  
 ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0720-LOW OUTPUT SPEED SENSOR - RPM ABOVE 15 MPH — Continued**

TEST	ACTION	APPLICABILITY
2	Ignition on, engine not running. With the DRBIII®, read DTCs. Is the Good Trip Counter for P0720 equal to 0?  Yes → Go To 3 No → Go To 13	All
3	Ignition on, engine not running. With the DRBIII®, read the Engine DTC's. Is there a Park/Neutral DTC present?  Yes → Repair the Park/Neutral DTC before proceeding. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Go To 4	All
4	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Output Speed Sensor harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance of the Output Speed Sensor Signal circuit between the ECM harness connector and the Output Speed Sensor harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 5 No → Repair the Output Speed Sensor Signal circuit for an open. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
5	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Output Speed Sensor harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance between ground and the Output Speed Sensor Signal circuit. Is the resistance greater than 100K ohms?  Yes → Go To 6 No → Repair the Output Speed Sensor Signal circuit for a short to ground. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
6	Turn the ignition off to the lock position. Disconnect the ECM harness connector. Disconnect the Output Speed Sensor harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance between the Output Speed Sensor Signal circuit and all other circuits in the ECM connector. Is the resistance greater than 100K ohms?  Yes → Go To 7 No → Repair the Output Speed Sensor Signal circuit for a short to other circuits. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All

**P0720-LOW OUTPUT SPEED SENSOR - RPM ABOVE 15 MPH — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connector.            Disconnect the Output Speed Sensor harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary</b>            Measure the resistance of the Output Speed Sensor ground circuit between the ECM harness connector and the Output Speed Sensor harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the Output Speed Sensor Ground circuit for an open.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
8	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connector.            Disconnect the Output Speed Sensor harness connector.            Ignition on, engine not running.            Measure the voltage of the Output Speed Sensor Signal circuit in the Output Speed Sensor harness connector.            Is there any voltage present?</p> <p>Yes → Repair the Output Speed Sensor Signal circuit for a short to voltage.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connectors.            Disconnect the Output Speed Sensor harness connector.  <b>Check connectors - Clean/repair as necessary</b>            Ignition on, engine not running.            Measure the voltage of the Output Speed Sensor ground circuit in the Output Speed Sensor harness connector.            Is there any voltage present?</p> <p>Yes → Repair the Output Speed Sensor ground circuit for a short to voltage.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 10</p>	All
10	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connector.            Disconnect the Output Speed Sensor harness connector.  <b>Check connectors - Clean/repair as necessary</b>            Measure the resistance between the Output Speed Sensor Ground circuit and all other circuits in the ECM connector.            Is the resistance greater than 100K ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair the Output Speed Sensor Ground circuit for a short to other circuits.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P0720-LOW OUTPUT SPEED SENSOR - RPM ABOVE 15 MPH — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off.            Disconnect the Output Speed Sensor harness connector.  <b>Check connectors - Clean/repair as necessary</b>            Measure the resistance between the terminals of the Output Speed Sensor.            Is the resistance between 300.0 and 1200.0 ohms?</p> <p>Yes → Go To 12</p> <p>No → Replace the Output Speed Sensor per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
12	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Engine Control Module per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
13	<p>At this time, the conditions required to set the DTC are not present.            Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.            Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.            Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.            Refer to any Technical Service Bulletins that may apply.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0748-PRESSURE SOL CONTROL/TRANS RELAY CIRCUITS****When Monitored and Set Condition:****P0748-PRESSURE SOL CONTROL/TRANS RELAY CIRCUITS**

When Monitored: Continuously with the ignition on.

Set Condition: This DTC will set if the ECM monitored voltage detected on the Governor Pressure Solenoid Control circuit is different than the expected voltage. Note: To clear this DTC it is necessary to drive the vehicle at a sustained speed which would allow the TCC and/or Overdrive Clutch to operate

**POSSIBLE CAUSES**

CHECK IF THE DTC P0882 IS PRESENT  
 FUSED B+ CIRCUIT OPEN  
 TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN  
 TRANSMISSION RELAY OUTPUT CIRCUIT SHORT TO GROUND  
 GOVERNOR PRESSURE SOLENOID CONTROL CIRCUIT OPEN  
 GOVERNOR PRESSURE SOLENOID CONTROL CIRCUIT SHORT TO GROUND  
 GOVERNOR PRESSURE SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE  
 GOVERNOR PRESSURE SOLENOID CONTROL CIRCUIT SHORT TO OTHER CIRCUITS  
 TRANSMISSION CONTROL RELAY - POOR CONTACTS  
 GOVERNOR PRESSURE SOLENOID  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All



**P0748-PRESSURE SOL CONTROL/TRANS RELAY CIRCUITS — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, read DTCs. Is the DTC P0882 present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All
3	<p>Ignition on, engine not running. With the DRBIII®, read DTCs. Is the Good Trip Counter for P0748 equal to 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 14</p>	All
4	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, actuate the Transmission Control Relay. Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Transmission Solenoid Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Go To 5</p> <p>No → Go To 11</p>	All
5	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connectors. Disconnect the ECM harness connectors. <b>Check connectors - Clean/repair as necessary.</b> Measure the resistance of the Governor Pressure Solenoid Control circuit between the Transmission Solenoid Assembly harness connector and the ECM harness connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 6</p> <p>No → Repair the Governor Pressure Solenoid Control circuit for an open. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
6	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. Disconnect the ECM harness connectors. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance between ground and the Governor Pressure Solenoid Control circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Governor Pressure Solenoid Control circuit for a short to ground. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 7</p>	All

**P0748-PRESSURE SOL CONTROL/TRANS RELAY CIRCUITS — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.            Ignition on, engine not running.            Measure the voltage of the Governor Pressure Solenoid Control circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the Governor Pressure Solenoid Control circuit for a short to voltage.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the Transmission Control Relay.  <b>Check connectors - Clean/repair as necessary</b>            Measure the resistance between the Governor Pressure Solenoid Control circuit and all other circuits in the Transmission Solenoid Assembly harness connector.            Is the resistance below 5.0 ohms on any other circuit(s)?</p> <p>Yes → Repair the Governor Pressure Solenoid Control circuit for a short to other circuit(s).            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off to the lock position.            Remove the Transmission Oil Pan per the Service Information.            Check all internal wiring pertaining to the Governor Pressure Solenoid for an open, short, and bent or broken terminals.            If no internal wiring problems are found, replace the Governor Pressure Solenoid per the Service Information.            Drive the vehicle performing multiple upshifts and downshifts.            With the DRBIII®, read Transmission DTCs.            Does the DTC reset?</p> <p>Yes → Go To 10</p> <p>No → Test Complete.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Engine Control Module per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P0748-PRESSURE SOL CONTROL/TRANS RELAY CIRCUITS — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off to the lock position. Remove the Transmission Control Relay. Ignition on, engine not running. Using a 12-volt test light connected to ground, check the Fused B+ circuit in the Transmission Control Relay connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light illuminate brightly?</p> <p>Yes → Go To 12</p> <p>No → Repair the Fused B+ circuit for an open. If the fuse is open, make sure to check for a short to ground. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
12	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. Remove the Transmission Control Relay. Measure the resistance between ground and the Transmission Control Relay Output circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Transmission Control Relay Output circuit for a short to ground. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 13</p>	All
13	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. Check connectors - Clean/repair as necessary Ignition on, engine not running. Connect a jumper wire between the Fused Transmission Relay Output circuit and Fused B+ in the Transmission Relay connector. Using a 12-volt test light connected to ground, check the Transmission Relay Control Output circuit in the Transmission Solenoid Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light illuminate brightly?</p> <p>Yes → Replace the Transmission Control Relay. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Repair the Transmission Control Relay Output circuit for an open. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
14	<p>The conditions necessary set this DTC are not present at this time. Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any technical service bulletins that may apply. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0850-P/N SWITCH PERFORMANCE****When Monitored and Set Condition:****P0850-P/N SWITCH PERFORMANCE**

When Monitored: While the engine is running.

Set Condition: Transmission governor pressure set point is above a threshold while in park or the P/N switch is in drive during an engine start.

**POSSIBLE CAUSES**

TRS CONNECTOR DAMAGE OR CORROSION  
 ECM CONNECTOR DAMAGE OR CORROSION  
 P/N POSITION SWITCH SENSE CIRCUIT OPEN  
 P/N POSITION SWITCH SENSE CIRCUIT SHORTED TO GROUND  
 P/N POSITION SWITCH SENSE CIRCUIT SHORTED TO OTHER CIRCUITS  
 TRANS RANGE SENSOR  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Ignition on, engine not running.</p> <p>With the DRBIII®, read the PNP switch input state.</p> <p>While moving the gear selector through all gear positions Park to 1st and back to Park, watch the DRBIII® display.</p> <p>Did the DRBIII® display P/N and D/R in the correct gear positions?</p> <p>Yes → Go To 3</p> <p>No → Go To 4</p>	All

**P0850-P/N SWITCH PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
3	<p>The conditions necessary set this DTC are not present at this time.            Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.            Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.            Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.            Refer to any technical service bulletins that may apply.            Were there any problems found?</p> <p>Yes → Repair as necessary.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All
4	<p>Turn the ignition off.            Disconnect the TRS harness connector.  <b>NOTE: Inspect the TRS wiring and connector for damage, pushed out pins, or corrosion, etc.</b>            Was there any damage?</p> <p>Yes → Repair as necessary.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.            Disconnect the ECM harness connector.  <b>NOTE: Inspect the ECM wiring and connector for damage, pushed out pins, or corrosion, etc.</b>            Was there any damage?</p> <p>Yes → Repair as necessary.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off.            Disconnect the ECM harness connector.            Disconnect the TRS harness connector.  <b>Check connectors - Clean/repair as necessary</b>            Measure the resistance of the P/N Position Switch Sense circuit between the ECM harness connector and the TRS switch harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the open in the P/N Position Switch Sense circuit.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
7	<p>Turn the ignition off.            Disconnect the ECM harness connector.            Disconnect the TRS harness connector.            Measure the resistance between ground and the P/N Position Switch Sense circuit.            Is the resistance greater than 100k ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the short to ground in the P/N Position Switch Sense circuit.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P0850-P/N SWITCH PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off.            Disconnect the ECM harness connector.            Disconnect the TRS harness connector.            Measure the resistance between the P/N Position Switch Sense circuit and all other circuits in the ECM connectors.            Is the resistance greater 100k ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the short to other circuits in the P/N Position Switch Sense circuit.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
9	<p>Turn the ignition off.            Disconnect the Engine Control Module Connector.            Connect the Transmission Range Sensor harness connector.            Move the gear selector through all gear positions, from Park to 1st and back.            While moving the gear selector through the gear positions, measure the resistance between ground and the P/N Position Switch Sense circuit in the ECM harness connector.  <b>NOTE: The circuit is grounded in Park and Neutral and open in the other positions.</b>            Did the display change from above 100k ohms (open) to below 10.0 ohms (grounded)?</p> <p>Yes → Go To 10</p> <p>No → Replace the Transmission Range Sensor per Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p><b>NOTE: Before continuing, check the ECM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.</b>            Using the schematics as a guide, inspect the wire harness and connectors. Pay particular attention to all Power and Ground circuits.            If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace and program the Engine Control Module per Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**Symptom:****P0868-GOVERNOR PRESSURE SENSOR VOLTS TOO HI****When Monitored and Set Condition:****P0868-GOVERNOR PRESSURE SENSOR VOLTS TOO HI**

When Monitored: Continuously with the key on and the engine running.

Set Condition: This code will set when the voltage from the governor pressure sensor is above 4.89 volts for 8.5 seconds.

**POSSIBLE CAUSES**

OTHER TRANSMISSION DTC'S PRESENT  
 PARK NEUTRAL DTC PRESENT  
 GOV PRESSURE SENSOR SIGNAL CIRCUIT OPEN  
 SENSOR GROUND CIRCUIT OPEN  
 GOV PRESS SENSOR SIGNAL CKT SHORT TO VOLTAGE  
 GOVERNOR PRESSURE SENSOR SIGNAL CIRCUIT SHORT TO OTHER CIRCUITS  
 GOV PRESS SENSOR SIGNAL CKT OPEN INSIDE TRANS  
 SENSOR GROUND CKT OPEN INSIDE TRANS  
 GOV PRESS SENSOR SIGNAL CKT SHORT TO VOLTAGE INSIDE TRANS  
 GOVERNOR PRESSURE SENSOR  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P0868-GOVERNOR PRESSURE SENSOR VOLTS TOO HI — Continued**

TEST	ACTION	APPLICABILITY
2	Turn the ignition on. With the DRBIII®, read Transmission DTCs. Is the Good Trip Counter for P0868 equal to 0?  Yes → Go To 3 No → Go To 14	All
3	Turn the ignition on. With the DRBIII®, read Engine DTCs. Are there any Park/Neutral DTC's present?  Yes → Repair any Park/Neutral DTC's before proceeding. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Go To 4	All
4	Turn the ignition on. With the DRBIII®, read Transmission DTCs. Are any other Transmission DTCs present?  Yes → Repair all other Transmission DTCs before proceeding. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Go To 5	All
5	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance of the Governor Pressure Sensor Signal circuit between the Transmission Solenoid Assembly harness connector and the ECM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 6 No → Repair the Governor Pressure Sensor Signal circuit for an open. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
6	Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. Disconnect the ECM harness connectors. <b>Check connectors - Clean/repair as necessary.</b> Measure the resistance of the Sensor Ground circuit between the Transmission Solenoid Assembly harness connector and the ECM harness connector. Is the resistance below 5.0 ohms?  Yes → Go To 7 No → Repair the Sensor Ground circuit for an open. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All



**P0868-GOVERNOR PRESSURE SENSOR VOLTS TOO HI — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid Assembly harness connector.            Disconnect the ECM harness connectors.  <b>Check connectors - Clean/repair as necessary.</b>            Turn the ignition on.            Measure the voltage of the Governor Pressure Sensor Signal circuit in the Transmission Solenoid Assembly harness connector.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the Governor Pressure Sensor Signal circuit for a short to voltage.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.  <b>Check connectors - Clean/repair as necessary</b>            Measure the resistance between the Governor Pressure Sensor Signal circuit in the ECM connector and all other circuits.            Is the resistance greater than 100k ohms on all other circuit(s)?</p> <p>Yes → Go To 9</p> <p>No → Repair the Governor Pressure Sensor Signal circuit for a short to other circuit(s).            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
9	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the transmission oil pan.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the Governor Pressure Sensor Signal circuit between the Transmission Solenoid Assembly (transmission side) connector and the Governor Pressure/Transmission Temperature Sensor harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 10</p> <p>No → Replace the Transmission Solenoid Assembly per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the transmission oil pan.            Disconnect the Governor Pressure/Transmission Temperature Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>            Measure the resistance of the Sensor Ground circuit between the Transmission Solenoid Assembly connector (transmission side) and the Governor Pressure/Transmission Temperature Sensor harness connector.            Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 11</p> <p>No → Replace the Transmission Solenoid Assembly per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P0868-GOVERNOR PRESSURE SENSOR VOLTS TOO HI — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off to the lock position.  <b>Note: The Transmission Solenoid Assembly harness connector must be connected before proceeding.</b>  Remove the transmission oil pan.  Disconnect the Governor Pressure/Transmission Temperature Sensor harness connector.  <b>Note: Check connectors - Clean/repair as necessary.</b>  Turn the ignition on.  Measure the voltage of the Governor Pressure Sensor Signal circuit in the Governor Pressure/Transmission Temperature Sensor harness connector.  Is the voltage above 0.5 volt?</p> <p>Yes → Replace the Transmission Solenoid Assembly per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 12</p>	All
12	<p>Turn the ignition off to the lock position.  Reconnect the ECM harness connector.  Reconnect the Transmission Solenoid harness connector.  With the DRBIII®, erase DTCs.  Connect a jumper wire between the Governor Pressure Sensor Signal circuit and Sensor Ground in the Transmission Governor Pressure/Temperature Sensor connector.  Did the DTC Governor Pressure Sensor Volts Too Low set?</p> <p>Yes → Go To 13</p> <p>No → Replace and program the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
13	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Governor Pressure/Transmission Temperature Sensor per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
14	<p>The conditions necessary set this DTC are not present at this time.  Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.  Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.  Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.  Refer to any technical service bulletins that may apply.  Were there any problems found?</p> <p>Yes → Repair as necessary.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0869-GOVERNOR PRESSURE SENSOR VOLTS TOO LOW****When Monitored and Set Condition:****P0869-GOVERNOR PRESSURE SENSOR VOLTS TOO LOW**

When Monitored: Continuously with the ignition on and the engine running.

Set Condition: This DTC will set if the monitored voltage from the Governor Pressure Sensor drops below 0.12 volts for the period of 8.5 seconds.

**POSSIBLE CAUSES**

OTHER TRANSMISSION DTC'S PRESENT

PARK NEUTRAL DTC PRESENT

GOVERNOR PRESSURE SENSOR SIGNAL CIRCUIT SHORT TO GROUND

GOVERNOR PRESSURE SENSOR SIGNAL CIRCUIT SHORT TO OTHER CIRCUITS

TRANSMISSION SOLENOID ASSEMBLY

GOVERNOR PRESSURE SENSOR/ TRANSMISSION TEMPERATURE SENSOR

ENGINE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Turn the ignition on.</p> <p>With the DRBIII®, read Transmission DTCs.</p> <p>Is the Good Trip Counter for P0869 equal to 0?</p> <p>Yes → Go To 3</p> <p>No → Go To 10</p>	All

**P0869-GOVERNOR PRESSURE SENSOR VOLTS TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
3	Turn the ignition on. With the DRBIII®, read DTCs. Are there any Park/Neutral DTC's present?  Yes → Repair the Park/Neutral DTC before proceeding. Perform TRANSMISSION VERIFICATION TEST VER - 1.  No → Go To 4	All
4	Turn the ignition on. With the DRBIII®, read DTCs. Are any other Transmission DTCs present?  Yes → Refer to the Transmission category and perform the appropriate symptom. Perform TRANSMISSION VERIFICATION TEST VER - 1.  No → Go To 5	All
5	Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. Disconnect the ECM harness connectors. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance between Ground and the Governor Pressure Sensor Signal circuit in the Transmission Solenoid Assembly harness connector. Is the resistance greater than 100k ohms?  Yes → Go To 6  No → Repair the Governor Pressure Sensor Signal circuit for a short to ground. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
6	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance between the Governor Pressure Sensor Signal circuit in the ECM connector and all other circuits. Is the resistance greater than 100k ohms on all other circuit(s)?  Yes → Go To 7  No → Repair the Governor Pressure Sensor Signal circuit for a short to other circuit(s). Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
7	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Reconnect the Transmission Solenoid Assembly Remove the Transmission Oil Pan Disconnect the Governor Pressure/Transmission Temperature Sensor connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Measure the resistance between the Governor Pressure Sensor Signal Circuit in the ECM connector to all other circuits in the ECM connector. Is the resistance greater than 100k ohms?  Yes → Go To 8  No → Replace the Transmission Solenoid Assembly per the Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All

**P0869-GOVERNOR PRESSURE SENSOR VOLTS TOO LOW — Continued**

TEST	ACTION	APPLICABILITY
8	<p>Turn the ignition off to the lock position.  Reconnect the ECM harness connectors.  Reconnect the Transmission Solenoid Assembly harness connector.  Remove the Transmission Oil Pan  Disconnect the Governor Pressure/Temperature Sensor harness connector.  Turn the ignition on.  With the DRBIII®, erase DTCs.  Connect a jumper wire between the Governor Pressure Sensor Signal circuit and the 5 Volt Supply circuit in the Governor Pressure Sensor connector.  With the DRBIII®, read DTCs.  Did the Transmission Governor Pressure Too High DTC set?</p> <p>Yes → Remove the Transmission Oil pan and inspect the Sensor wiring for damage. If no problems are found, replace the Governor Pressure Sensor/Transmission Temperature Sensor per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 9</p>	All
9	<p>If there are no possible causes remaining, view repair.</p> <p>Yes → Replace and program the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p>The conditions necessary set this DTC are not present at this time.  Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.  Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.  Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.  Refer to any technical service bulletins that may apply.  Were there any problems found?</p> <p>Yes → Repair as necessary.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0882-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT LOW****When Monitored and Set Condition:****P0882-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT LOW**

When Monitored: Continuously with the Ignition on.

Set Condition: This DTC will set if the ECM monitored voltage of the Transmission Control Relay Control circuit is different than the expected voltage for the period 3.0 seconds.

**POSSIBLE CAUSES**

GENERATOR SOURCE CIRCUIT OPEN  
 TRANSMISSION CONTROL RELAY CONTROL CIRCUIT OPEN  
 GENERATOR SOURCE CIRCUIT SHORT TO GROUND  
 TRANSMISSION CONTROL RELAY CONTROL CIRCUIT SHORT TO GROUND  
 TRANSMISSION CONTROL RELAY CONTROL SHORT TO OTHER CIRCUITS  
 TRANSMISSION CONTROL RELAY  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Turn the ignition on.</p> <p>With the DRBIII®, read DTCs.</p> <p>Is the Good Trip Counter for P0882 equal to 0?</p> <p>Yes → Go To 3</p> <p>No → Go To 11</p>	All

# **P0882-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT LOW —** **Continued**

TEST	ACTION	APPLICABILITY
3	Turn the ignition on. With the DRBIII®, actuate the Transmission Control Relay. Is the Transmission Control Relay clicking?  Yes → Go To 11 No → Go To 4	All
4	Turn the ignition off. Remove the Transmission Control Relay from the PDC. <b>Check connectors - Clean/repair as necessary.</b> Install a substitute relay in place of the Transmission Control Relay. Turn the ignition on. With the DRBIII®, erase DTCs. Start the engine. With the DRBIII®, read DTCs. Does the DRBIII® display the DTC P0882?  Yes → Go To 5 No → Replace the Transmission Control Relay. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
5	Turn the ignition off. Remove the Transmission Control Relay from the PDC. <b>Check connectors - Clean/repair as necessary.</b> Turn the ignition on. Using a 12-volt test light connected to ground, check the Generator Source circuit in the Transmission Control Relay connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light illuminate brightly?  Yes → Go To 6 No → Repair the Generator Source circuit for an open. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
6	Turn the ignition off. Remove the Transmission Control Relay from the PDC. Disconnect the ECM harness connectors. <b>Check connectors - Clean/repair as necessary.</b> Measure the resistance between ground and the Generator Source circuit in the Transmission Control Relay connector. Is the resistance above 100k ohms?  Yes → Go To 7 No → Repair the Generator Source circuit for a short to ground. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All

# **P0882-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT LOW —** **Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off.  Remove the Transmission Control Relay from the PDC.  Disconnect the ECM harness connectors.  <b>Check connectors - Clean/repair as necessary.</b>  Measure the resistance of the Transmission Control Relay Control circuit between the Transmission Control Relay connector and the ECM harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 8</p> <p>No → Repair the Transmission Control Relay Control circuit for an open.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
8	<p>Turn the ignition off.  Remove the Transmission Control Relay from the PDC.  Disconnect the ECM harness connectors.  <b>Check connectors - Clean/repair as necessary.</b>  Measure the resistance between ground and the Transmission Control Relay Control circuit in the Transmission Control Relay connector.  Is the resistance above 100k ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the Transmission Control Relay Control circuit for a short to ground.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
9	<p>Turn the ignition off to the lock position.  Remove the Transmission Control Relay.  Disconnect the ECM harness connector.  <b>Check connectors - Clean/repair as necessary</b>  Measure the resistance between the Transmission Control Relay Control Circuit in the ECM connector and all other circuits.  Is the resistance greater than 100k ohms on all other circuit(s)?</p> <p>Yes → Go To 10</p> <p>No → Repair the Transmission Control Relay Control circuit for a short to other circuit(s).  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p>Turn the ignition off to the lock position.  Remove the Transmission Relay.  With the DRBIII®, actuate the Transmission Relay.  Using a 12-volt test light connected to 12-volts, probe the Transmission Control Relay Control circuit.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>  Does the Test Light cycle on and off and illuminate brightly?</p> <p>Yes → Test Complete.</p> <p>No → Replace and program the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All



**P0882-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT LOW —  
Continued**

TEST	ACTION	APPLICABILITY
11	<p>The conditions necessary to set this DTC are not present at this time. Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any Technical Service Bulletins that may apply. Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0883-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT HIGH****When Monitored and Set Condition:****P0883-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT HIGH**

When Monitored: Ignition on.

Set Condition: This DTC will set if the ECM monitored voltage of the Transmission Control Relay Control circuit is different than the expected voltage for the period 3.0 seconds.

**POSSIBLE CAUSES**

TRANSMISSION CONTROL RELAY CONTROL CIRCUIT SHORT TO VOLTAGE  
 TRANSMISSION CONTROL RELAY CONTROL SHORT TO OTHER CIRCUITS  
 TRANSMISSION CONTROL RELAY  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Turn the ignition on.</p> <p>With the DRBIII®, read DTCs.</p> <p>Is the Good Trip Counter for P0883 equal to 0?</p> <p>Yes → Go To 3</p> <p>No → Go To 8</p>	All
3	<p>Turn the ignition on.</p> <p>With the DRBIII®, actuate the Transmission Control Relay.</p> <p>Is the Transmission Control Relay clicking?</p> <p>Yes → Go To 8</p> <p>No → Go To 4</p>	All

# **P0883-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT HIGH —** **Continued**

TEST	ACTION	APPLICABILITY
4	<p>Turn the ignition off.  Remove the Transmission Control Relay from the PDC.  <b>Check connectors - Clean/repair as necessary.</b>  Install a substitute relay in place of the Transmission Control Relay.  Turn the ignition on.  With the DRBIII®, actuate the Transmission Control Relay.  Is the Transmission Control Relay Clicking?</p> <p>Yes → Replace the Transmission Control Relay.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off.  Remove the Transmission Control Relay from the PDC.  Disconnect the ECM harness connectors.  <b>Check connectors - Clean/repair as necessary.</b>  Measure the voltage of the Transmission Control Relay Control circuit in the Transmission Control Relay connector.  Is the voltage above 1volt?</p> <p>Yes → Repair the Transmission Control Relay Control circuit for a short to voltage.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position.  Remove the Transmission Control Relay.  Disconnect the ECM harness connector.  <b>Check connectors - Clean/repair as necessary</b>  Measure the resistance between the Transmission Control Relay Control Circuit in the ECM connector and all other circuits.  Is the resistance greater than 100k ohms on all other circuit(s)?</p> <p>Yes → Go To 7</p> <p>No → Repair the Transmission Control Relay Control circuit for a short to other circuit(s).  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
7	<p>Turn the ignition off to the lock position.  Remove the Transmission Relay.  With the DRBIII®, actuate the Transmission Relay.  Using a 12-volt test light connected to 12-volts, probe the Transmission Control Relay Control circuit.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>  Does the Test Light cycle on and off and illuminate brightly?</p> <p>Yes → Test Complete.</p> <p>No → Replace the Engine Control Module.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P0883-TRANS 12 VOLT SUPPLY RELAY CONTROL CIRCUIT HIGH —**  
**Continued**

TEST	ACTION	APPLICABILITY
8	<p>The conditions necessary to set this DTC are not present at this time.</p> <p>Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.</p> <p>Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Refer to any Technical Service Bulletins that may apply.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P0973-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO LOW****When Monitored and Set Condition:****P0973-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO LOW**

When Monitored: Continuously with ignition on.

Set Condition: This code will set if the voltage detected on the 3-4 Shift Solenoid Control circuit at the ECM is different then the expected voltage. Note: To clear this DTC it is necessary to drive the vehicle at a sustained speed which would allow the TCC and/or Overdrive Clutch to operate

**POSSIBLE CAUSES**

TRANSMISSION CONTROL RELAY DTC PRESENT  
 3-4 SHIFT SOLENOID CONTROL CIRCUIT OPEN  
 FUSED B+ CIRCUIT OPEN  
 TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN  
 3-4 SHIFT SOLENOID CONTROL CIRCUIT SHORT TO GROUND  
 TRANSMISSION RELAY OUTPUT CIRCUIT SHORT TO GROUND  
 3-4 SHIFT SOLENOID CIRCUIT SHORT TO OTHER CIRCUITS  
 TRANSMISSION CONTROL RELAY - POOR CONTACTS  
 3-4 SHIFT SOLENOID  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All

# **P0973-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO LOW —** **Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, read Transmission DTCs. Are any Transmission Control Relay DTC's present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Repair any Transmission Control Relay DTCs before proceeding.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition on. With the DRBIII®, read DTCs. Is the Good Trip Counter for P0973 set at 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 13</p>	All
4	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, actuate the Transmission Control Relay. Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Transmission Solenoid Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Go To 5</p> <p>No → Go To 10</p>	All
5	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. Ignition on, engine not running. With the DRBIII®, actuate the Overdrive (3-4) Solenoid. Using a 12-volt test light connected to 12-volts, check the 3-4 Shift Solenoid Control circuit in the Transmission Solenoid Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to when connected directly to the battery.</b> Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Check all internal wiring pertaining to the 3-4 Shift Solenoid for an open, short and bent or broken terminals. If no internal wiring problems are found, replace the Transmission Solenoid Assembly per the Service Information.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. <b>Check connectors - Clean/repair as necessary.</b> Measure the resistance of the 3-4 Shift Solenoid Control circuit between the Transmission Solenoid Assembly harness connector and the ECM harness connectors. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 7</p> <p>No → Repair the 3-4 Shift Solenoid Control circuit for an open.</p>	All

# **P0973-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO LOW —** **Continued**

TEST	ACTION	APPLICABILITY
7	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance between ground and the 3-4 Shift Solenoid Control circuit. Is the resistance above 100k ohms?  Yes → Go To 8  No → Repair the 3-4 Shift Solenoid Control circuit for a short to ground.	All
8	Turn the ignition off to the lock position. Disconnect the ECM harness connector. Disconnect the Transmission Solenoid Assembly harness connector. <b>Check connectors - Clean/repair as necessary</b> Measure the resistance between the 3-4 Shift Solenoid Control Circuit in the ECM connector and all other circuits. Is the resistance greater than 100k ohms on all other circuit(s)?  Yes → Go To 9  No → Repair the 3-4 Shift Solenoid Control circuit for a short to other circuit(s).	All
9	Turn the ignition off to the lock position. Reconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. Turn the ignition on, engine not running. With the DRBIII®, actuate the 3-4 (overdrive) Shift Solenoid. Using a 12-volt test light connected to 12-volts, check the 3-4 Shift Solenoid Control circuit in the Transmission Solenoid Assembly. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the Test Light cycle on and off and illuminate brightly?  Yes → Test Complete.  No → Replace and program the Engine Control Module per the Service Information.	All
10	Turn the ignition off to the lock position. Remove the Transmission Control Relay. Ignition on, engine not running. Using a 12-volt test light connected to ground, check the Fused B+ circuit in the Transmission Control Relay connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to when connected directly to the battery.</b> Does the light illuminate brightly?  Yes → Go To 11  No → Repair the Fused B+ circuit for an open.	All

# **P0973-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO LOW —** **Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn ignition off to the lock position.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the Transmission Control Relay.            Measure the resistance between ground and the Transmission Control Relay Output circuit.            Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the Fused Transmission Control Relay Output circuit for a short to ground.</p> <p>No → Go To 12</p>	All
12	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid Assembly harness connector.            Check connectors - Clean/repair as necessary            Ignition on, engine not running.            Connect a jumper wire between the Fused Transmission Relay Output circuit and the Fused B+ in the Transmission Relay connector.            Using a 12-volt test light connected to ground, check the Fused Transmission Relay Control Output circuit in the Transmission Solenoid Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to when connected directly to the battery.</b>            Does the test light illuminate brightly?</p> <p>Yes → Replace the Transmission Control Relay.</p> <p>No → Repair the Fused Transmission Control Relay Output circuit for an open. If the Fuse is open, make sure to check for a short to ground.</p>	All
13	<p>The conditions necessary set this DTC are not present at this time.            Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.            Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.            Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.            Refer to any technical service bulletins that may apply.            Were there any problems found?</p> <p>Yes → Repair as necessary.</p> <p>No → Test Complete.</p>	All



**Symptom:****P0974-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO HIGH****When Monitored and Set Condition:****P0974-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO HIGH**

When Monitored: Continuously with ignition on.

Set Condition: This code will set if the voltage detected on the 3-4 Shift Solenoid Control circuit at the ECM is different then the expected voltage. Note: To clear this DTC it is necessary to drive the vehicle at a sustained speed which would allow the TCC and/or Overdrive Clutch to operate

**POSSIBLE CAUSES**

RELAY DTC PRESENT

3-4 SHIFT SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE

3-4 SHIFT SOLENOID CONTROL CIRCUIT SHORT TO OTHER CIRCUITS

3-4 SHIFT SOLENOID

ENGINE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, read Transmission DTCs.</p> <p>Are any relay DTC's present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Repair this DTC first before proceeding.</p> <p>No → Go To 3</p>	All

# **P0974-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO HIGH —** **Continued**

TEST	ACTION	APPLICABILITY
3	<p>Turn the ignition on.            With the DRBIII®, read DTCs.            Is the Good Trip Counter for P0974 set at 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 8</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid Assembly harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the Overdrive (3-4) Solenoid.            Using a 12-volt test light connected to 12-volts, check the 3-4 Shift Solenoid Control circuit in the Transmission Solenoid Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Check all internal wiring pertaining to the 3-4 Shift Solenoid for an open, short and bent or broken terminals. If no internal wiring problems are found, replace the Transmission Solenoid Assembly per the Service Information.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.            Ignition on, engine not running.            Measure the voltage of the 3-4 Shift Solenoid Control circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the 3-4 Shift Solenoid Control circuit for a short to voltage.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connector.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the Transmission Control Relay.  <b>Check connectors - Clean/repair as necessary</b>            Measure the resistance between the 3-4 Shift Solenoid Control circuit and all other circuits in the ECM harness connector.            Is the resistance below 5.0 ohms on any circuit?</p> <p>Yes → Repair the 3-4 Shift Solenoid Control circuit for a short to other circuit(s).</p> <p>No → Go To 7</p>	All

# **P0974-TRANSMISSION OVERDRIVE CIRCUIT VOLTAGE TOO HIGH — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.            Install the Transmission Control Relay            Reconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the Overdrive (3-4) Solenoid.            Using a 12-volt test light connected to 12-volts, check the 3-4 Shift Solenoid Control circuit in the Transmission Solenoid Assembly harness connector.            Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Test Complete.</p> <p>No → Replace and program the Engine Control Module per the Service Information.</p>	All
8	<p>The conditions necessary set this DTC are not present at this time.            Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.            Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.            Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.            Refer to any technical service bulletins that may apply.            Were there any problems found?</p> <p>Yes → Repair as necessary.</p> <p>No → Test Complete.</p>	All

**Symptom:****P1740-TCC O/D SOL PERFORMANCE****When Monitored and Set Condition:****P1740-TCC O/D SOL PERFORMANCE**

**When Monitored:** The Torque Converter Clutch (TCC) and Overdrive Clutch (O/D) will be tested each time the ECM requests TCC engagement in 3rd gear and O/D.

**Set Condition:** The code will set if the expected RPM drop is not achieved while attempting to engage TCC or O/D. This indicates a malfunctioning torque converter or overdrive clutch.

**POSSIBLE CAUSES**

ENGINE DTCS PRESENT  
 TRANSMISSION DTCS PRESENT  
 TRANSMISSION TEMPERATURE TOO COLD  
 OIL PAN CONTAINS EXCESSIVE DEBRIS  
 3-4 SHIFT SOLENOID  
 SHAFT OR SEAL DAMAGE  
 TCC SOLENOID  
 TORQUE CONVERTER  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P1740-TCC O/D SOL PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, read Engine DTCs. Are any Cam, Engine RPM, Misfire, P/N, or TPS DTC's present?</p> <p>Yes → Refer to the Driveability category and perform the appropriate symptom. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All
3	<p>With the DRBIII®, read Transmission DTCs. Is P0720, P0973, P0974, P2769, or P2770, transmission DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 4</p>	All
4	<p>With the DRBIII®, read Engine and Transmission DTCs. Is the Good Trip counter for P1740 displayed and equal to 0?</p> <p>Yes → Go To 5</p> <p>No → Go To 17</p>	All
5	<p>With the DRBIII® in Sensors, read the Transmission Fluid Temperature. Is the Transmission Fluid Temperature below 0 ° Celsius or 32 ° Fahrenheit?</p> <p>Yes → Warm the transmission fluid temperature to above 0° C (32° F). Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 6</p>	All
6	<p>With the DRBIII®, build a custom display. Display Engine RPM, Output Shaft Speed, TCC Solenoid, O/D Solenoid and TPS. <b>NOTE: This display will monitor the operation of the components.</b> Turn off Overdrive or Tow Haul. Test drive the vehicle. Attain a steady speed of 88.5 Km/h or 55 MPH with a minimum of 1.15 volts throttle opening for 20 seconds. <b>NOTE: Check the Shift pattern as the vehicle upshifts to 88.5 Km/h or 55 MPH.</b> Is the Engine RPM within 60 RPM of the Output Shaft Speed RPM?</p> <p>Yes → Go To 12</p> <p>No → Go To 7</p>	All
7	<p>Is the Output Shaft Speed greater than Engine RPM?</p> <p>Yes → Go To 8</p> <p>No → Go To 12</p>	All

**P1740-TCC O/D SOL PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
8	<p>With the DRBIII®, build a custom display.            Display Engine RPM, Output Shaft Speed, TCC Solenoid, O/D Solenoid and TPS.  <b>NOTE: This display will monitor the operation of the components.</b>            Turn off Overdrive or Tow Haul.            Test drive the vehicle.            Attain a steady speed of 88.5 Km/h or 55 MPH with a minimum of 1.15 volts throttle opening for 20 seconds.            With the DRBIII®, verify the 3-4 Solenoid (O/D) Solenoid is on and the TCC solenoid is locked  <b>NOTE: Use this formula, Output Shaft Speed x 0.69 = expected Engine RPM.</b>            Did the Engine drop to 0.69 of the Output Shaft Speed RPM?</p> <p>Yes → Go To 12</p> <p>No → Go To 9</p>	All
9	<p>Turn the ignition off.            Connect a 0 to 2068 Kpa or 0 to 300 PSI pressure gauge to the Overdrive Clutch Test Port.            Connect a 0 to 2068 Kpa or 0 to 300 PSI pressure gauge to the Governor Test Port.            Start the engine.  <b>NOTE: Allow the transmission temperature to rise to normal operating temperature.</b>            While observing both pressure gauges, select 4th Gear from Gov and 3-4 System Test.  <b>NOTE: The Governor pressure should rise to above 137.8 Kpa or 20 PSI, shortly after this the OD pressure should rise to above 275.7 Kpa or 40 PSI.</b>            Did the pressure act as described?</p> <p>Yes → Go To 10</p> <p>No → Go To 11</p>	All
10	<p>Remove the transmission oil pan per the Service information.            Is the oil burnt or does the pan contain excessive debris?</p> <p>Yes → If the Transmission Fluid is in a contaminated or burnt condition, refer to the Service Information for the proper repair procedure.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 12</p>	All
11	<p>Turn the ignition off to the lock position.            Replace the 3-4 shift solenoid per the Service information.            Connect a 0 to 2068 Kpa or 0 to 300 PSI pressure gauge to the Overdrive Clutch Test Port.            Connect a 0 to 2068 Kpa or 0 to 300 PSI pressure gauge to the Governor Test Port.            Start the engine.  <b>NOTE: Allow the transmission temperature to rise to normal operating temperature.</b>            While observing both pressure gauges, select 4th gear from the Governor 3-4 shift valve system test.  <b>NOTE: The Governor pressure should rise to above 137.8 Kpa or 20 PSI, shortly after this the OD pressure should rise to above 275.7 Kpa or 40 PSI.</b>            Did the pressure act as described?</p> <p>Yes → Test Complete.</p> <p>No → Overhaul the transmission per the Service information. Carefully inspect the seals and clutches related to the OD Clutch.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P1740-TCC O/D SOL PERFORMANCE — Continued**

TEST	ACTION	APPLICABILITY
12	Turn the ignition on. With the DRBIII®, perform the Torque Converter Clutch test. Did the engine stall?  Yes → Go To 13 No → Go To 15	All
13	Start the engine. Perform the Governor and 3-4 Shift Valve System Test, select 4th gear. Did the vehicle stall?  Yes → Go To 14 No → Go To 15	All
14	Replace the TCC solenoid. Perform the Gov and 3-4 Shift Valve System test, select 4th gear. Did the vehicle stall?  Yes → Repair internal transmission problem. Check for blocked passages. Refer to Transmission Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Test Complete.	All
15	Remove the Transmission Oil Pump per the Service information. Inspect the Reaction shaft, Input Shaft and Input seal. Are any of the parts damaged or worn?  Yes → Repair as necessary, also replace the Torque Converter. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Go To 16	All
16	If there are no possible causes remaining, view repair.  Repair Replace the Torque converter. NOTE: Inspect the Reaction Shaft, Input Shaft and Input Seal. Replace as necessary if any of the parts are damaged or worn. Perform TRANSMISSION VERIFICATION TEST VER - 1.	All
17	The conditions necessary set this DTC are not present at this time. Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Refer to any technical service bulletins that may apply. Were there any problems found?  Yes → Repair as necessary. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Test Complete.	All

**Symptom:****P1756-GOV PRESS NOT EQUAL TO TARGET @ 35 - 40 PSI****When Monitored and Set Condition:****P1756-GOV PRESS NOT EQUAL TO TARGET @ 35 - 40 PSI**

When Monitored: While driving and the commanded governor pressure is equal to the pressure required for third gear.

Set Condition: If the governor pressure sensor output is less than 407 KPa (60 PSI) or greater than 621 KPa (80 PSI) when the requested pressure is 407-621 KPa (60-80 PSI) for 2.2 seconds. This DTC will set if there are two trips of five consecutive bad 2.2 second tests with the sump temp between 23.5 and 88 deg C (74-190 deg F).

**POSSIBLE CAUSES**

OTHER TRANSMISSION DTCS PRESENT  
5-VOLT SUPPLY CIRCUIT OPEN - EXTERNAL  
5-VOLT SUPPLY CIRCUIT OPEN - INTERNAL  
GOVERNOR PRESSURE SENSOR  
VALVE BODY  
INTERNAL TRANSMISSION  
ENGINE CONTROL MODULE  
TRANSMISSION - INTERNAL DAMAGE  
INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All



**P1756-GOV PRESS NOT EQUAL TO TARGET @ 35 - 40 PSI — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition on. With the DRBIII®, read DTCs. Are any other transmission DTCs present?</p> <p>Yes → Return to the symptom list and perform the appropriate procedure for any other transmission DTCs that are set. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All
3	<p><b>Caution: Apply the parking brake.</b> Start the engine and allow it to reach normal operating temperature. <b>Caution: Apply the brakes.</b> With the engine at idle, place the gear selector in Drive. With the DRBIII® in sensors, read the Governor Pressure. Is the Governor Pressure above 21 KPa or 3 PSI?</p> <p>Yes → Go To 4</p> <p>No → Go To 5</p>	All
4	<p>Turn the ignition off. Install a pressure gauge at the Governor Pressure test port. <b>NOTE: Use the appropriate pressure gauge for the pressure range measured.</b> <b>Caution: Apply the parking brake.</b> Start the engine and allow it to reach normal operating temperature. With the engine at idle, place the gear selector in Drive. <b>Caution: Apply the brakes.</b> Read the governor pressure on the gauge. Is the governor pressure on the gauge below 21 KPa or 3 PSI with the engine at idle and the gear sel</p> <p>Yes → Go To 8</p> <p>No → Go To 11</p> <p><b>NOTE: If you answered Yes, the Governor Pressure Solenoid is functioning properly.</b></p>	All
5	<p><b>Caution: Apply the parking brake.</b> Place the gear selector in Park. Start the engine. Warm the transmission to normal operating temperature. With the engine still running, remove the Transmission Control Relay from the PDC. <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b> <b>NOTE: Relay removal may set various codes. Disregard any DTC that may set due to relay removal.</b> <b>Caution: Apply the brakes.</b> Place the gear selector in Drive allow the engine to idle for 30 seconds. With the DRBIII® read the Actual Governor Pressure at idle. Is the governor pressure on the DRBIII® 276 - 379 KPa (40 - 55 PSI)?</p> <p>Yes → Go To 6</p> <p>No → Go To 7</p>	All

**P1756-GOV PRESS NOT EQUAL TO TARGET @ 35 - 40 PSI — Continued**

TEST	ACTION	APPLICABILITY
6	<p>Turn the ignition off.            Replace the Governor Pressure Solenoid per the Service Information.            Warm the engine to normal operating temperature.            With the DRBIII®, monitor the target governor pressure and actual governor pressure.            Drive the vehicle at a constant speed 40 - 48 Km/h (25 - 30 MPH).  <b>NOTE: The Actual Governor Pressure should be within 21 KPa (3 PSI) of the Target Governor Pressure within 3 seconds.</b>            Is the Actual Governor Pressure within 21 KPa (3 PSI) of the Target Governor Pressure?</p> <p>Yes → Go To 14</p> <p>No → Repair internal transmission leak. Inspect all components pertaining to the Governor Pressure Sensor and/or Governor Pressure Solenoid.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
7	<p>Turn the ignition off.            Install a pressure gauge at the governor pressure test port.  <b>Caution: Apply the parking brake.</b>            Place the gear selector in Park.            Start the engine.            Warm the engine to normal operating temperature.            With the engine still running, remove the Transmission Control Relay from the PDC.  <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b>  <b>NOTE: Relay removal may set various codes. Disregard any DTC that may set due to relay removal.</b>  <b>Caution: Apply the brakes.</b>            Place the gear selector in Drive with the engine at idle.            Read the governor pressure on the gauge.            Is the governor pressure on the gauge 276 - 379 KPa (40 - 55 PSI)?</p> <p>Yes → Go To 8</p> <p>No → Go To 11</p>	All
8	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid Assembly harness connector.            Disconnect the ECM harness connectors.  <b>Check connectors - Clean/repair as necessary</b>            Measure the resistance of the 5-volt Supply circuit between the Transmission Solenoid Assembly harness connector and the ECM harness connector.            Is the resistance less than 10 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open 5-volt Supply circuit.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P1756-GOV PRESS NOT EQUAL TO TARGET @ 35 - 40 PSI — Continued**

TEST	ACTION	APPLICABILITY
9	<p>Turn the ignition off to the lock position.  Remove the transmission oil pan.  Disconnect the Transmission Solenoid Assembly harness connector.  Disconnect the Governor Pressure sensor connector.  <b>Check connectors - Clean/repair as necessary</b>  Measure the resistance of the 5-volt Supply circuit between the Transmission Solenoid Assembly harness connector and the Governor Pressure sensor connector internal to the transmission.  Is the resistance less than 10 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair or replace the open 5-volt Supply circuit internal to the transmission.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p>Turn the ignition off to the lock position.  Disconnect the Transmission Solenoid Assembly harness connector.  Check connectors - Clean/repair as necessary.  <b>NOTE: The ECM must not be disconnected during this test.</b>  Turn the ignition on.  Measure the voltage of the 5-volt Supply circuit at the Transmission Solenoid Assembly harness connector.  Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Replace the Governor Pressure Sensor per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Replace the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
11	<p>Turn the ignition off to the lock position.  Remove the transmission oil pan per the Service Information.  Inspect the transmission for burnt oil and the transmission pan for excessive debris.  Does the transmission contain burnt oil and/or excessive debris?</p> <p>Yes → Repair the internal transmission damage per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 12</p>	All
12	<p>Turn the ignition off.  Replace the Governor Pressure Solenoid per the Service Information.  Install a pressure gauge at the governor pressure test port.  Start the engine.  Warm the transmission to normal operating temperature.  <b>Caution: Apply the brakes.</b>  Place the gear selector in Drive and allow the engine to idle.  Read the governor pressure on the pressure gauge in Drive.  Is the governor pressure on the gauge below 21 KPa or 3 PSI?</p> <p>Yes → Go To 13</p> <p>No → Repair or replace the Valve Body per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P1756-GOV PRESS NOT EQUAL TO TARGET @ 35 - 40 PSI — Continued**

TEST	ACTION	APPLICABILITY
13	<p>Remove the pressure gauge from the transmission.  Reconnect all circuits.  Install the transmission oil pan and refill the transmission.  Test drive the vehicle.  Be sure to drive the vehicle at a constant speed of 40-48 Km/h or 25-30 MPH during the drive cycle.  With the DRBIII®, read DTCs.  Did the DTC reset?</p> <p>Yes → Replace the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 14</p>	All
14	<p>The conditions necessary set this DTC are not present at this time.  Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.  Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.  Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.  Refer to any technical service bulletins that may apply.  Were there any problems found?</p> <p>Yes → Repair as necessary.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P1757-GOV PRESS ABOVE 3 PSI IN GEAR WITH 0 MPH****When Monitored and Set Condition:****P1757-GOV PRESS ABOVE 3 PSI IN GEAR WITH 0 MPH**

**When Monitored:** While the engine is running and the gear selector is in the Drive Position.

**Set Condition:** This code will set if the Governor Pressure is greater than 41.4 kPa (6 PSI) for 5 seconds while the gear selector is in the Drive position with the road speed equal to zero - six times during a drive cycle. The transmission oil temperature must be between 23-88 C (73-190 F).

**POSSIBLE CAUSES**

OTHER TRANSMISSION DTC'S PRESENT

5-VOLT SUPPLY CIRCUIT OPEN

5-VOLT SUPPLY CIRCUIT OPEN INSIDE THE TRANSMISSION

OIL BURNT OR OIL PAN HAS EXCESSIVE DEBRIS

GOVERNOR PRESSURE SENSOR

VALVE BODY

ENGINE CONTROL MODULE

ENGINE CONTROL MODULE - 5 VOLT SUPPLY

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue</p> <p>Go To 2</p>	All

**P1757-GOV PRESS ABOVE 3 PSI IN GEAR WITH 0 MPH — Continued**

TEST	ACTION	APPLICABILITY
2	<p>Turn the ignition on. With the DRBIII®, read DTCs. Are any other Transmission DTCs present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All
3	<p>Turn the ignition on. With the DRBIII®, read Transmission DTCs. Is the Good Trip Counter for P1757 set to 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 13</p>	All
4	<p>Start the engine. Warm the engine to normal operating temperature. Place the gear selector in Drive with the engine at idle. With the DRBIII®, read the governor pressure. Is the governor pressure above 41.4 kPa (6 PSI)?</p> <p>Yes → Go To 5</p> <p>No → Go To 13</p>	All
5	<p>Turn the ignition off. Install a 700 kPa (100 PSI) pressure gauge to the Governor Pressure Test Port. <b>Caution: Apply the parking brake.</b> Start the engine. Allow the engine and transmission to reach normal operating temperature. <b>CAUTION: Apply the brakes.</b> With the DRBIII® in Sensors, record the Governor Pressure with the vehicle in drive. Record the Governor Pressure on the gauge in Drive. Does the DRBIII® Governor Pressure reading match the Gauge pressure within 6.9 kPa (1 PSI)?</p> <p>Yes → Go To 6</p> <p>No → Go To 9</p>	All
6	<p>Turn the ignition off to the lock position. Remove the transmission oil pan per the Service Information and inspect for burnt oil and excessive debris. Is the transmission oil burnt or does the transmission oil pan contain excessive debris?</p> <p>Yes → Repair the Internal Transmission per the Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 7</p>	All

**P1757-GOV PRESS ABOVE 3 PSI IN GEAR WITH 0 MPH — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.  Replace the Governor Pressure Solenoid per with the Service Information.  Install a pressure gauge at the governor pressure test port.  Start the engine.  Warm the engine to normal operating temperature.  <b>Caution: Apply the brakes.</b>  Place the gear selector in Drive with the engine at idle.  Read the governor pressure on the gauge in Drive.  Is the governor pressure on the gauge above 41.4 kPa (6 PSI)?</p> <p>Yes → Replace the Valve Body per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 8</p>	All
8	<p>Turn the ignition off to the lock position.  Remove pressure gauge from transmission.  Reconnect all disconnected connectors.  Install the Transmission Oil Pan and refill the transmission fluid per the service information.  With the DRBIII®, erase DTCs.  Test drive the vehicle.  Be sure to stop the vehicle, with the vehicle in drive on six separate occurrences for at least 5 seconds each.  With the DRBIII®, read DTCs.  Did the P1757 DTC reset?</p> <p>Yes → Replace the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All
9	<p>Turn the ignition off.  Disconnect the ECM harness connectors.  Disconnect the Transmission Solenoid Assembly harness connector.  <b>Check connectors - Clean/repair as necessary</b>  Measure the resistance of the 5-volt Supply circuit between the Transmission Solenoid Assembly harness connector and the ECM harness connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair the 5-volt Supply circuit for an open.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p>Turn the ignition off to the lock position.  Remove the oil pan.  Disconnect the Governor Pressure Sensor connectors.  Disconnect the Transmission Solenoid Assembly harness connector.  <b>Check connectors - Clean/repair as necessary</b>  Measure the resistance of the 5-volt Supply circuit between the Transmission Solenoid Assembly connector (transmission side) and the Governor Pressure Sensor connector.  Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair the 5-volt Supply circuit for an open.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P1757-GOV PRESS ABOVE 3 PSI IN GEAR WITH 0 MPH — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off to the lock position.  Reconnect the ECM connectors.  Disconnect the Transmission Solenoid Assembly harness connector.  <b>NOTE: Check connectors - Clean/repair as necessary.</b>  Turn the ignition on.  Measure the voltage of the 5 Volt Supply circuit in the Transmission Solenoid connector.  Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Go To 12</p> <p>No → Replace the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
12	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Governor Pressure Sensor per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
13	<p>The conditions necessary set this DTC are not present at this time.  Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.  Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.  Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.  Refer to any technical service bulletins that may apply.  Were there any problems found?</p> <p>Yes → Repair as necessary.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All



**Symptom:****P1762-GOV PRESS SENSOR OFFSET VOLTS TOO LO OR HIGH****When Monitored and Set Condition:****P1762-GOV PRESS SENSOR OFFSET VOLTS TOO LO OR HIGH**

**When Monitored:** While the engine is running and the vehicle is in Park with the throttle position less than 76%.

**Set Condition:** Thsi DTC will set if the Governor Pressure is greater than 3 PSI while the vehicle is in Park 3 times in a drive cycle.

**POSSIBLE CAUSES**

OTHER TRANSMISSION DTCS PRESENT

5-VOLT SUPPLY CIRCUIT OPEN - EXTERNAL

5-VOLT SUPPLY CIRCUIT OPEN - INTERNAL

GOVERNOR PRESSURE SENSOR

TRANSMISSION - INTERNAL DAMAGE

TRANSMISSION - INTERNAL LEAK

ENGINE CONTROL MODULE

INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>Turn the ignition on.</p> <p>With the DRBIII®, read DTCs.</p> <p>Are any other transmission DTCs present?</p> <p>Yes → Return to the symptom list and perform the appropriate procedure for any other transmission DTCs that are set. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All

# **P1762-GOV PRESS SENSOR OFFSET VOLTS TOO LO OR HIGH —** **Continued**

TEST	ACTION	APPLICABILITY
3	<b>CAUTION: Apply the parking brake.</b> Start the engine and allow the engine to idle. With the DRBIII® in Sensors, read the Governor Pressure with the Transmission Shift selector in Park. Is the Governor Pressure reading on the DRBIII® above 21 kPa or 3 PSI?  Yes → Go To 4 No → Go To 11	All
4	Turn the ignition off. Connect the DRBIII® and a 700 kPa (100 PSI) Pressure Gauge to the Governor Pressure test port. Start the engine and allow the engine to idle. <b>WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.</b> Allow the transmission to reach normal operating temperature. With the DRBIII® in Sensors, read and record the Governor Pressure. With the DRBIII®, read the Governor Pressure Gauge reading. Compare the DRBIII® Governor Pressure reading with the Pressure Gauge reading. Does the DRBIII® Governor Pressure reading match the Pressure Gauge reading within 6.9 kPa or 1 PSI?  Yes → Go To 5 No → Go To 8	All
5	Turn the ignition off to the lock position. Remove the transmission oil pan per the Service Information. Inspect the transmission for burnt oil and the transmission pan for excessive debris. Does the transmission contain burnt oil and/or excessive debris?  Yes → Repair the internal transmission damage per the Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Go To 6	All
6	Turn the ignition off to the lock position. Inspect the transmission for internal fluid leakage in the valve body or the Governor Pressure Solenoid. Were any problems found?  Yes → Repair the internal transmission as necessary per the Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1. No → Go To 7	All

# **P1762-GOV PRESS SENSOR OFFSET VOLTS TOO LO OR HIGH —** **Continued**

TEST	ACTION	APPLICABILITY
7	<p>Remove the pressure gauge from the transmission.  Reconnect all circuits.  Install the transmission oil pan and refill the transmission.  Test drive the vehicle.  Be sure to stop the vehicle and move the gear selector into the park position for a minimum of 5 seconds at least three times during the drive cycle.  With the DRBIII®, read DTCs.  Did the DTC reset?</p> <p>Yes → Replace and program the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 11</p>	All
8	<p>Turn the ignition off to the lock position.  Disconnect the Transmission Solenoid Assembly harness connector.  Disconnect the ECM harness connectors.  <b>Check connectors - Clean/repair as necessary</b>  Measure the resistance of the 5-volt Supply circuit between the Transmission Solenoid Assembly harness connector and the ECM harness connector.  Is the resistance less than 10 ohms?</p> <p>Yes → Go To 9</p> <p>No → Repair the open 5-volt Supply circuit.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
9	<p>Turn the ignition off to the lock position.  Remove the transmission oil pan.  Disconnect the Transmission Solenoid Assembly harness connector.  Disconnect the Governor Pressure sensor connector.  <b>Check connectors - Clean/repair as necessary</b>  Measure the resistance of the 5-volt Supply circuit between the Transmission Solenoid Assembly harness connector and the Governor Pressure sensor connector internal to the transmission.  Is the resistance less than 10 ohms?</p> <p>Yes → Go To 10</p> <p>No → Repair or replace the open 5-volt Supply circuit internal to the transmission.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p>Turn the ignition off to the lock position.  Disconnect the Transmission Solenoid Assembly harness connector.  Check connectors - Clean/repair as necessary.  <b>NOTE: The ECM must not be disconnected during this test.</b>  Turn the ignition on.  Measure the voltage of the 5-volt Supply circuit at the Transmission Solenoid Assembly harness connector.  Is the voltage between 4.5 and 5.5 volts?</p> <p>Yes → Replace the Governor Pressure Sensor per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Replace and program the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P1762-GOV PRESS SENSOR OFFSET VOLTS TOO LO OR HIGH —**  
**Continued**

TEST	ACTION	APPLICABILITY
11	<p>The conditions necessary set this DTC are not present at this time.</p> <p>Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.</p> <p>Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.</p> <p>Refer to any technical service bulletins that may apply.</p> <p>Were there any problems found?</p> <p>Yes → Repair as necessary. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****P2769-TRANSMISSION TCC CONTROL CIRCUIT LOW****When Monitored and Set Condition:****P2769-TRANSMISSION TCC CONTROL CIRCUIT LOW**

When Monitored: Continuously with the ignition on.

Set Condition: This DTC will set if the voltage detected by the ECM for the Torque Converter Clutch Solenoid Control circuit is different than the expected voltage. Note: To clear this DTC it is necessary to drive the vehicle at a sustained speed which would allow the TCC and/or Overdrive Clutch to operate

**POSSIBLE CAUSES**

TRANSMISSION CONTROL RELAY DTCS PRESENT  
 GENERATOR SOURCE CIRCUIT OPEN  
 TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT OPEN  
 TRANSMISSION CONTROL RELAY OUTPUT CIRCUIT SHORT TO GROUND  
 TCC SOLENOID CONTROL CIRCUIT SHORT TO GROUND  
 TCC SOLENOID CONTROL CIRCUIT SHORT TO OTHER CIRCUITS  
 TRANSMISSION CONTROL RELAY - POOR CONTACTS  
 TORQUE CONVERTER CLUTCH SOLENOID  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All

**P2769-TRANSMISSION TCC CONTROL CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
2	<p>With the DRBIII®, read DTCs. Are there any Transmission Control Relay DTCs also present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All
3	<p>Ignition on, engine not running. With the DRBIII®, read DTCs. Is the Good Trip Counter for P2769 set to 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 12</p>	All
4	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. <b>NOTE: Check connectors - Clean/repair as necessary.</b> Ignition on, engine not running. With the DRBIII®, actuate the Transmission Control Relay. Using a 12-volt test light connected to ground, check the Transmission Control Relay Output circuit in the Transmission Solenoid Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Go To 5</p> <p>No → Go To 9</p>	All
5	<p>Turn the ignition off to the lock position. Disconnect the Transmission Solenoid Assembly harness connector. Ignition on, engine not running. With the DRBIII®, actuate the TCC Solenoid. Using a 12-volt test light connected to 12-volts, check the TCC Solenoid Control circuit in the Transmission Solenoid Assembly harness connector. <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b> Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Check all internal wiring pertaining to the TCC Solenoid for an open, short, and bent or broken terminals. If no internal wiring problems are found, replace the Transmission Solenoid Assembly per the Service Information. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transmission Solenoid Assembly harness connector. Measure the resistance between ground and the TCC Solenoid Control circuit. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair the TCC Solenoid Control circuit for a short to ground. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 7</p>	All

**P2769-TRANSMISSION TCC CONTROL CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.  Disconnect the ECM harness connectors.  Disconnect the Transmission Solenoid Assembly harness connector.  Remove the Transmission Control Relay.  <b>Check connectors - Clean/repair as necessary</b>  Measure the resistance between the TCC Solenoid Control circuit and all other circuits in the Transmission Solenoid Assembly harness connector.  Is the resistance between the TCC Solenoid Control circuit and any other circuit below 5.0 ohms?</p> <p>Yes → Repair the TCC Solenoid Control circuit for a short to other circuit(s).  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 8</p>	All
8	<p>If there are no possible causes remaining, view repair.</p> <p>Repair</p> <p>Replace the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
9	<p>Turn the ignition off.  Remove the Transmission Control Relay from the PDC.  <b>Check connectors - Clean/repair as necessary.</b>  Turn the ignition on.  Using a 12-volt test light connected to ground, check the Generator Source circuit in the Transmission Control Relay connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>  Does the test light illuminate brightly?</p> <p>Yes → Go To 10</p> <p>No → Repair the Generator Source circuit for an open.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
10	<p>Turn the ignition off to the lock position.  Disconnect the Transmission Solenoid Assembly harness connector.  Check connectors - Clean/repair as necessary  Ignition on, engine not running.  Connect a jumper wire between the Fused Transmission Relay Output circuit and the Fused B+ in the Transmission Relay connector.  Using a 12-volt test light connected to ground, check the Fused Transmission Relay Control Output circuit in the Transmission Solenoid Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>  Does the test light illuminate brightly?</p> <p>Yes → Go To 11</p> <p>No → Repair the Transmission Control Relay Output circuit for an open. If the fuse is open make sure to check for a short to ground.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All

**P2769-TRANSMISSION TCC CONTROL CIRCUIT LOW — Continued**

TEST	ACTION	APPLICABILITY
11	<p>Turn the ignition off.  Remove the Transmission Control Relay from the PDC.  Disconnect the Transmission Solenoid Assembly harness connector.  <b>Check connectors - Clean/repair as necessary.</b>  Measure the resistance between ground and the Transmission Control Relay Output circuit in the Transmission Control Relay connector.  Is the resistance above 100k ohms?</p> <p>Yes → Replace the Transmission Control Relay.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Repair the Transmission Control Relay Output circuit for a short to ground.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
12	<p>The conditions necessary set this DTC are not present at this time.  Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.  Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.  Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.  Refer to any technical service bulletins that may apply.  Were there any problems found?</p> <p>Yes → Repair as necessary.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All



**Symptom:****P2770-TRANSMISSION TCC CONTROL CIRCUIT HIGH****When Monitored and Set Condition:****P2770-TRANSMISSION TCC CONTROL CIRCUIT HIGH**

When Monitored: Continuously with the ignition on.

Set Condition: This code will set if the voltage detected on the Torque Converter Clutch Solenoid Control circuit at the PCM is different than the expected voltage. Note: To clear this DTC it is necessary to drive the vehicle at a sustained speed which would allow the TCC and/or Overdrive Clutch to operate

**POSSIBLE CAUSES**

TRANSMISSION CONTROL RELAY DTC PRESENT  
 TCC SOLENOID CONTROL CIRCUIT SHORT TO VOLTAGE  
 TCC SOLENOID CONTROL CIRCUIT SHORT TO OTHER CIRCUITS  
 TORQUE CONVERTER CLUTCH SOLENOID  
 ENGINE CONTROL MODULE  
 INTERMITTENT WIRING AND CONNECTORS

TEST	ACTION	APPLICABILITY
1	<p><b>NOTE: Always perform diagnostics with a fully charged battery to avoid false symptoms.</b></p> <p><b>NOTE: Low fluid level can be the cause of many transmission problems. If the fluid level is low locate and repair the leak then check and adjust the fluid level per the service information.</b></p> <p>With the DRBIII®, read the engine DTC's. Check and repair all engine DTC's prior to performing transmission symptom diagnostics.</p> <p>Check the TV linkage adjustment per the Service Information.</p> <p>Using the wiring diagram/schematic as a guide, inspect the wiring and connectors. Repair as necessary.</p> <p><b>NOTE: Verify the flash level of the Engine Control Module. Some problems are corrected by software upgrades. Check for any applicable TSB's related to this condition.</b></p> <p>Perform these procedures prior to symptom diagnosis.</p> <p>Continue Go To 2</p>	All
2	<p>With the DRBIII®, read DTCs.</p> <p>Are any Transmission Relay DTC's present?</p> <p>Yes → Refer to the Transmission category and perform the appropriate symptom. Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 3</p>	All

**P2770-TRANSMISSION TCC CONTROL CIRCUIT HIGH — Continued**

TEST	ACTION	APPLICABILITY
3	<p>Ignition on, engine not running.            With the DRBIII®, read DTCs.            Is the Good Trip Counter for P2770 set to 0?</p> <p>Yes → Go To 4</p> <p>No → Go To 8</p>	All
4	<p>Turn the ignition off to the lock position.            Disconnect the Transmission Solenoid Assembly harness connector.            Ignition on, engine not running.            With the DRBIII®, actuate the TCC Solenoid.            Using a 12-volt test light connected to 12-volts, check the TCC Solenoid Control circuit in the Transmission Solenoid Assembly harness connector.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>            Does the test light cycle on and off and illuminate brightly?</p> <p>Yes → Check all internal wiring pertaining to the TCC Solenoid for an open, short, and bent or broken terminals. If no internal wiring problems are found, replace the Transmission Solenoid Assembly per the Service Information.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 5</p>	All
5	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.            Ignition on, engine not running.            Measure the voltage of the TCC Solenoid Control circuit.            Is the voltage above 0.5 volt?</p> <p>Yes → Repair the TCC Solenoid Control circuit for a short to voltage.            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 6</p>	All
6	<p>Turn the ignition off to the lock position.            Disconnect the ECM harness connectors.            Disconnect the Transmission Solenoid Assembly harness connector.            Remove the Transmission Control Relay.  <b>Check connectors - Clean/repair as necessary</b>            Measure the resistance between the TCC Solenoid Control circuit and all other circuits in the Transmission Solenoid Assembly harness connector.            Is the resistance below 5.0 ohms on any other circuit?</p> <p>Yes → Repair the TCC Solenoid Control circuit for a short to other circuit(s).            Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Go To 7</p>	All

**P2770-TRANSMISSION TCC CONTROL CIRCUIT HIGH — Continued**

TEST	ACTION	APPLICABILITY
7	<p>Turn the ignition off to the lock position.  Reconnect the ECM harness connectors.  Disconnect the Transmission Solenoid Assembly harness connector.  Turn the ignition on, engine not running.  With the DRBIII®, actuate the TCC Shift Solenoid.  Using a 12-volt test light connected to 12-volts, check the TCC Shift Solenoid Control circuit in the Transmission Solenoid Assembly.  <b>NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.</b>  Does the Test Light cycle on and off and illuminate brightly?</p> <p>Yes → Test Complete.</p> <p>No → Replace the Engine Control Module per the Service Information.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p>	All
8	<p>The conditions necessary set this DTC are not present at this time.  Use the Freeze Frame Data to help duplicate the conditions that set the DTC. Pay particular attention to the DTC set conditions, such as, VSS, MAP, ECT, and Load.  Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.  Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.  Refer to any technical service bulletins that may apply.  Were there any problems found?</p> <p>Yes → Repair as necessary.  Perform TRANSMISSION VERIFICATION TEST VER - 1.</p> <p>No → Test Complete.</p>	All

**Symptom:****\*O/D TOW /HAUL SWITCH****POSSIBLE CAUSES**

O/D TOW/HAUL OFF SWITCH SENSE CIRCUIT SHORTED TO GROUND

O/D TOW/HAUL SWITCH

ECM - O/D TOW/HAUL SWITCH

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the ECM harness connector. Disconnect the O/D Tow/Haul switch harness connector. Measure the resistance between ground and the O/D Tow/Haul switch sense circuit in the ECM harness connector. Is the resistance below 5.0 ohms?  Yes → Repair the O/D OFF switch sense circuit for a short to ground. No → Go To 2	All
2	Turn the ignition off. Disconnect the ECM harness connector. Measure the resistance between ground and the O/D Tow/Haul switch sense circuit in the ECM C2 harness connector. Press the O/D Tow/Haul switch button. Does the resistance change from above 5.0 ohms to below 5.0 ohms while pressing the O/D Tow/Haul Swi  Yes → Go To 3 No → Replace the O/D Tow/Haul switch in accordance with the Service Information.	All
3	If there are no possible causes remaining, view repair.  Repair Replace and program the Engine Control Module per the Service Information.	All

## Verification Tests

(NGC) 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1	APPLICABILITY
<p><b>1. NOTE: After completion of the Transmission Verification Test, the Powertrain Verification Test must be performed.</b></p> <p>2. Connect the DRBIII® to the Data Link Connector (DLC).</p> <p>3. Reconnect any disconnected components.</p> <p>4. With the DRBIII®, perform a BATTERY DISCONNECT, this will clear the EATX EVENT DATA</p> <p>5. With the DRBIII®, erase all Transmission and Engine DTC's.</p> <p><b>6. NOTE: If the PCM has been replaced or if the transmission has been repaired or replaced it is necessary to perform the DRBIII® Quick Learn Procedure.</b></p> <p>7. With the DRBIII®, display Transmission Temperature. Start and run the engine until the Transmission Temperature is HOT, above 43° C or 110° F.</p> <p>8. Check the Transmission fluid level and adjust if necessary. Refer to the Service Information for the Fluid Fill procedure.</p> <p>9. Road test the vehicle.</p> <p>10. Perform the following shifts from a standing start with a constant throttle opening of 20 to 25 degrees to the speeds of 97 Km/h or 60 MPH; make fifteen to twenty 1 to 2, 2 to 3, 3 to 4 upshifts and for 545RFE, 4 to 4-prime.</p> <p>11. Perform the following shifts with speeds below 40 Km/h or 25 MPH; make five to eight wide open throttle kickdowns to 1st gear. Allow at least 5 seconds each in 2nd and 3rd gear between each kickdown.</p> <p>12. Check for DTC's during the road test.</p> <p><b>13. NOTE: Use the EATX OBDII task manager to run Good Trip time in each gear, this will confirm the repair and to ensure that the DTC has not re-matured.</b></p> <p>Were there any Diagnostic Trouble Codes (DTCs) set during the road test?</p> <p>Yes → Refer to the Symptom List for the appropriate diagnostic tests.</p> <p>No → Repair is complete.</p>	All

(NGC) POWERTRAIN VERIFICATION TEST VER - 1	APPLICABILITY
<p><b>1. NOTE: If this vehicle is equipped with a 5.7L NGCII system and the APP Sensors, PCM, or Throttle Body Assembly has been replaced use the DRBIII® under the Misc. Menu. to perform the LEARN ETC function.</b></p> <p><b>2. NOTE: After completing the Powertrain Verification Test the Transmission Verification Test must be performed.</b></p> <p><b>3. NOTE: If the PCM has been replaced and the correct VIN and mileage have not been programmed, a DTC will set in the ABS Module, Airbag Module and the SKIM.</b></p> <p><b>4. NOTE: If the vehicle is equipped with a Sentry Key Immobilizer System, Secret Key data must be updated. Refer to the Service Information for the PCM, SKIM and the Transponder (ignition key) for programming information.</b></p> <p>5. Inspect the vehicle to ensure that all components related to the repair are properly installed and connected.</p> <p>6. Inspect the engine oil for fuel contamination. Replace the oil and filter as necessary.</p> <p>7. Attempt to start the engine.</p> <p>8. If the No Start condition is still present, refer to the symptom list and perform the diagnostic testing as necessary, refer to any Technical Service Bulletins that may apply.</p> <p>9. Run the engine for one warm-up cycle to verify operation.</p> <p>10. With the DRBIII®, confirm that no DTCs or Secondary Indicators are present and that all components are functioning properly.</p> <p>Are any DTCs or symptoms remaining?</p> <p>Yes → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure).</p> <p>No → Repair is complete.</p>	All

## Verification Tests — Continued

(NGC) POWERTRAIN VERIFICATION TEST VER - 2	APPLICABILITY
<p><b>1. NOTE: If this vehicle is equipped with a 5.7L NGCII system and the APP Sensors, PCM, or Throttle Body Assembly has been replaced use the DRBIII® under the Misc. Menu. to perform the LEARN ETC function.</b></p> <p><b>2. NOTE: After completing the Powertrain Verification Test the Transmission Verification Test must be performed.</b></p> <p><b>3. NOTE: If the PCM has been replaced and the correct VIN and mileage have not been programmed, a DTC will set in the ABS Module, Airbag Module and the SKIM.</b></p> <p><b>4. NOTE: If the vehicle is equipped with a Sentry Key Immobilizer System, Secret Key data must be updated. Refer to the Service Information for the PCM, SKIM and the Transponder (ignition key) for programming information.</b></p> <p>5. Inspect the vehicle to ensure that all components related to the repair are properly installed and connected.</p> <p>6. With the DRBIII®, clear DTCs and Reset Memory all engine values.</p> <p>7. Run the engine for one warm-up cycle to verify proper operation.</p> <p>8. Road test the vehicle. Use all accessories that may be related to this repair.</p> <p>9. With the DRBIII®, confirm that no DTC's or Secondary Indicators are present and that all components are functioning properly.</p> <p>10. If this test is being performed after a No Trouble Code test, verify the symptom is no longer present.</p> <p>Are any DTCs or symptoms remaining?</p> <p>Yes → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure).</p> <p>No → Repair is complete.</p>	All

(NGC) POWERTRAIN VERIFICATION TEST VER - 3	APPLICABILITY
<p><b>1. NOTE: If this vehicle is equipped with a 5.7L NGCII system and the APP Sensors, PCM, or Throttle Body Assembly has been replaced use the DRBIII® under the Misc. Menu. to perform the LEARN ETC function.</b></p> <p><b>2. NOTE: After completing the Powertrain Verification Test the Transmission Verification Test must be performed.</b></p> <p><b>3. NOTE: If the PCM has been replaced and the correct VIN and mileage have not been programmed, a DTC will set in the ABS Module, Airbag Module and the SKIM.</b></p> <p><b>4. NOTE: If the vehicle is equipped with a Sentry Key Immobilizer System, Secret Key data must be updated. Refer to the Service Information for the PCM, SKIM and the Transponder (ignition key) for programming information.</b></p> <p>5. Inspect the vehicle to ensure that all components related to the repair are properly installed and connected.</p> <p>6. With the DRBIII®, clear DTCs.</p> <p>7. Perform generator output test. Refer to the appropriate service information as necessary.</p> <p>8. Start the engine and set engine speed to 2000 RPM for at least thirty seconds.</p> <p>9. Cycle the ignition key off and on.</p> <p>10. With the DRBIII®, read the DTCs.</p> <p>Are any DTCs or symptoms remaining?</p> <p>Yes → Check for any Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure).</p> <p>No → Repair is complete.</p>	All

## Verification Tests — Continued

(NGC) POWERTRAIN VERIFICATION TEST VER - 4	APPLICABILITY
<p>1. NOTE: If this vehicle is equipped with a 5.7L NGCII system and the APP Sensors, PCM, or Throttle Body Assembly has been replaced use the DRBIII® under the Misc. Menu. to perform the LEARN ETC function.</p> <p><b>2. NOTE: After completing the Powertrain Verification Test the Transmission Verification Test must be performed.</b></p> <p><b>3. NOTE: If the PCM has been replaced and the correct VIN and mileage have not been programmed, a DTC will set in the ABS Module, Airbag Module and the SKIM.</b></p> <p><b>4. NOTE: If the vehicle is equipped with a Sentry Key Immobilizer System, Secret Key data must be updated. Refer to the Service Information for the PCM, SKIM and the Transponder (ignition key) for programming information.</b></p> <p>5. Inspect the vehicle to ensure that all engine components are properly installed and connected.</p> <p>6. Connect the DRBIII® to the data link connector and erase all codes.</p> <p>7. Turn the speed control ON (if equipped, cruise light will be on).</p> <p>8. Depress and release the SET Switch when the vehicle speed is greater than 35 MPH. The speed control should engage and hold the selected speed.</p> <p>9. Press and hold the RESUME/ACCEL Switch. The vehicle speed should increase by at least 2 MPH.</p> <p>10. Press and hold the COAST switch. The vehicle speed should decrease.</p> <p>11. Using caution, press and release the brake pedal. The speed control should disengage.</p> <p>12. Bring the vehicle speed back up to 35 MPH.</p> <p>13. Press the RESUME/ACCEL switch. The speed control should resume the previously set speed.</p> <p>14. Hold down the SET switch. The vehicle should decelerate.</p> <p>15. Ensure vehicle speed is greater than 35 mph and release the SET Switch. The vehicle should adjust and set a new vehicle speed.</p> <p>16. Press and release the CANCEL switch. The speed control should disengage.</p> <p>17. Bring the vehicle speed back up above 35 mph and engage speed control.</p> <p>18. Turn the Speed Control Off. (Cruise light will be off). The speed control should disengage.</p> <p>19. NOTE: OVERSHOOT/UNDERSHOOT FOLLOWING SPEED CONTROL SET.</p> <p>20. If the vehicle operator repeatedly presses and releases the SET button with their foot off of the accelerator (referred to as "lift foot set"), the vehicle may accelerate and exceed the desired set speed by up to 5 mph (8 km/h).</p> <p>21. It may also decelerate to less than the desired set speed, before finally achieving the desired set speed.</p> <p>22. The Speed Control System has an adaptive strategy that compensates for vehicle-to-vehicle variations in speed control cable lengths.</p> <p>23. When the speed control is set with the vehicles operators foot off of the accelerator pedal, the speed control thinks there is excessive speed control cable slack and adapts accordingly.</p> <p>24. If the "lift foot sets" are continually used, a speed control overshoot/undershoot condition will develop.</p> <p>25. To "unlearn" the overshoot/undershoot condition, the vehicle operator has to press and release the set button while maintaining the desired set speed using the accelerator pedal (not decelerating or accelerating).</p> <p>26. Then turn the cruise control switch to the OFF position (or press the CANCEL button if equipped) after waiting 10 seconds.</p> <p>27. This procedure must be performed approximately 10-15 times to completely unlearn the overshoot/undershoot condition.</p> <p>Did the Speed Control pass the above test?</p> <p>Yes → Repair is complete.</p> <p>No → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure).</p>	<p>All</p>

## Verification Tests — Continued

(NGC) POWERTRAIN VERIFICATION TEST VER - 5	APPLICABILITY
<p><b>1. NOTE: After completing the Powertrain Verification Test the Transmission Verification Test must be performed.</b></p> <p><b>2. NOTE: If the PCM has been replaced and the correct VIN and mileage have not been programmed, a DTC will set in the ABS Module, Airbag Module and the SKIM.</b></p> <p><b>3. NOTE: If the vehicle is equipped with a Sentry Key Immobilizer System, Secret Key data must be updated. Refer to the Service Information for the PCM, SKIM and the Transponder (ignition key) for programming information.</b></p> <p><b>4. NOTE: If this vehicle is equipped with a 5.7L NGCII system and the APP Sensors, PCM, or Throttle Body Assembly has been replaced use the DRBIII® under the Misc. Menu. to perform the LEARN ETC function.</b></p> <p><b>5. NOTE: When replacing an O2 Sensor, the PCM RAM memory must be cleared, either by disconnecting the PCM C-1 connector or momentarily disconnecting the Battery negative terminal.</b></p> <p>6. The NGC learns the characteristics of each O2 heater element and these old values should be cleared when installing a new O2 sensor. The customer may experience driveability issues if this is not performed.</p> <p>7. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</p> <p>8. Connect the DRBIII® to the data link connector.</p> <p>9. Ensure the fuel tank has at least a quarter tank of fuel. Turn off all accessories.</p> <p>10. If the Catalyst was replaced, with the DRBIII® go to the Miscellaneous Menu Option "Catalyst Replaced" and press enter.</p> <p>11. If a Comprehensive Component DTC was repaired, perform steps 9 - 12. If a Major OBDII Monitor DTC was repaired skip those steps and continue verification.</p> <p>12. After the ignition has been off for at least 10 seconds, restart the vehicle and run 2 minutes.</p> <p>13. With the DRBIII®, monitor the appropriate pre-test enabling conditions until all conditions have been met. Once the conditions have been met, switch screen to the appropriate OBDII monitor, (Audible beeps when the monitor is running).</p> <p>14. If the repaired OBDII trouble code has reset or was seen in the monitor while on the road test, the repair is not complete. Check for any related technical service bulletins or flash updates and return to Symptom List.</p> <p>15. If the conditions cannot be duplicated, erase all DTCs with the DRBIII®.</p> <p>16. If another DTC has set, return to the Symptom List and follow the path specified for that DTC.</p> <p>Did the OBDII Monitor run successfully and has the Good Trip Counter changed to one or more?</p> <p>Yes → Repair is complete.</p> <p>No → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure).</p>	<p>All</p>



## Verification Tests — Continued

(NGC) POWERTRAIN VERIFICATION TEST VER - 6	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Install the Miller Tool #8404 Evaporative Emission Leak Detector (EELD). according to the instructions in the previous DTC table.</li> <li>2. Set the smoke/air control switch to AIR.</li> <li>3. Insert the tester's AIR supply tip (clear hose) into the appropriate calibration orifice on the tester's control panel (based on DTC leak size).</li> <li>4. Press the remote smoke/air start button.</li> <li>5. Position the red flag on the air flow meter so it is aligned with the indicator ball.</li> <li>6. When the calibration is complete, release the remote button. The EELD is now calibrated the flow meter in liters per minute to the size leak indicated by the DTC set in the PCM.</li> <li>7. Install the service port adapter #8404-14 on the vehicle's service port.</li> <li>8. Connect the Air supply hose from the EELD to the vehicle.</li> <li>9. Press the remote button to activate AIR flow.</li> <li><b>10. NOTE: Larger volume fuel tanks, lower fuel levels or if the vehicle is equipped with a Flow Management Valve may indicate high flow and will require 4 to 5 minutes to fill.</b></li> <li>11. Compare the flow meter indicator ball reading to the red flag.</li> <li>12. ABOVE the red flag indicates a leak present.</li> <li>13. BELOW the red flag indicates a sealed system.</li> <li>14. NOTE: If this vehicle is equipped with a 5.7L NGCIII system and the APP Sensors, PCM, or Throttle Body Assembly has been replaced use the DRBIII® under the Misc. Menu. to perform the LEARN ETC function.</li> <li>15. If the indicator ball shows a leak present, perform the smoke test indicated in the previous test and identify the leak and repair. Perform this verification test when the repair is complete. Did the indicator ball indicate the a leak is present??</li> </ol> <p style="margin-left: 40px;">Yes → Repeat the DTC test to identify the leak and repair.</p> <p style="margin-left: 40px;">No → Repair is complete.</p>	All

BODY VERIFICATION TEST - VER 1	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Disconnect all jumper wires and reconnect all previously disconnected components and connectors.</li> <li><b>2. NOTE: If the SKIM, PCM or FCM was replaced, refer to the service information for proper programming procedures.</b></li> <li>3. If the Instrument Cluster was replaced, disconnect the negative battery cable for 5 seconds to power down FCM then reconnect and turn the ignition on for 15 seconds to learn VIN.</li> <li>4. If the Instrument Cluster was replaced and the vehicle is equipped with VTSS, cycle the key in the driver door cylinder lock switch to enable VTSS.</li> <li>5. Program tire size, country code, radio EQ setting and all RKE transmitters (if RKE Module was replaced) and other options as necessary.</li> <li>6. If any HVAC door actuator circuits were repaired, with the DRBIII® in HVAC, System Tests, select Actuator Circuit Test.</li> <li>7. If any HVAC door actuators were replaced/door linkage was repaired, with the DRBIII® in HVAC, System Tests, select HVAC Door Recalibration.</li> <li>8. Ensure all accessories are turned off and the battery is fully charged.</li> <li>9. With the DRBIII®, record and erase all DTC's from ALL modules. Start and run the engine for 2 minutes. Operate all functions of the system that caused the original concern.</li> <li>10. Turn the ignition off and wait 5 seconds. Turn the ignition on and using the DRBIII®, read DTC's from ALL modules.</li> </ol> <p>Are any DTC's present or is the original condition still present?</p> <p style="margin-left: 40px;">Yes → Repair is not complete, refer to the appropriate symptom.</p> <p style="margin-left: 40px;">No → Repair is complete.</p>	All

## Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 1	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</li> <li>2. Inspect the engine oil for contamination. If oil contamination is suspected, change the oil and filter.</li> <li>3. If the PCM was not replaced skip steps 4 through 6 and continue the verification.</li> <li>4. If the PCM was replaced the correct VIN and mileage must be programmed or a DTC will set in the ABS and Air Bag modules. In addition, if the vehicle is equipped with Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable start.</li> <li>5. For ABS and Air Bag systems: Enter correct VIN and Mileage in PCM. Erase codes in ABS and Air Bag modules.</li> <li>6. For SKIM theft alarm: Connect DRBIII® to data link conn. Go to Theft Alarm, SKIM, Misc. and place SKIM in secured access mode, by using the appropriate PIN code for this vehicle. Select Update the Secret Key data. Data will be transferred from SKIM to PCM</li> <li>7. Attempt to start the engine.</li> </ol> <p>Is the vehicle still unable to start or are there any DTCs or symptoms remaining?</p> <p>Yes → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptoms list (Diagnostic Procedure).</p> <p>No → Repair is complete.</p>	All

POWERTRAIN VERIFICATION TEST VER - 1 (DIESEL)	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Clear the DTC before continuing.</li> <li>2. Check if any of the following conditions exist.</li> <li>3. The ECM has been disconnected or replaced.</li> <li>4. The battery power has been disconnected.</li> <li>5. The APPS has been disconnected or replaced.</li> <li>6. If any of the conditions exist, perform the following steps, otherwise go to step 8.</li> <li>7. APPS Programming Procedure: Reassemble all components. Turn the ignition key to the ON or RUN position. Without starting the engine, slowly press the throttle pedal to the floor and then slowly release.</li> <li>8. This step must be done (only once) to ensure the accelerator pedal position sensor calibration has been programmed in the ECM.</li> <li>9. <b>CAUTION: Do not attempt to adjust screws or disassemble the APPS sensor. These settings are set at the factory and are not intended to be changed.</b></li> <li>10. If the ECM has been replaced, do the following: (Other go to step 12).</li> <li>11. <b>NOTE: If the Engine Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag Modules and SKIM module.</b></li> <li>12. For ABS and Airbag Systems: Action: Enter correct VIN and Mileage in PCM. Erase ABS and Airbag Module codes.</li> <li>13. If the ECM has not been replaced, do the following.</li> <li>14. Inspect the vehicles to ensure that all engine components are connected. Reassemble and reconnect components as necessary.</li> <li>15. Attempt to start the engine.</li> <li>16. If the engine is unable to start, look for any Technical Service Bulletins that may relate to this condition. Return to Symptom list if necessary.</li> <li>17. If the there are no DTCs present and all components are functional, the repair is complete. Are any DTC(s) present?</li> </ol> <p>Yes → Repair is not complete, refer to appropriate symptom.</p> <p>No → Repair is complete.</p>	All

## Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 2	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</li> <li>2. If this verification procedure is being performed after a NO TROUBLE CODE repair, perform steps 3 and 4.</li> <li>3. Check to see if the initial symptom still exists. If there are DTCs or the symptom no longer exists, the repair was successful and testing is complete.</li> <li>4. If the initial or another symptom exists, the repair is not complete. Check all technical service bulletins or flash updates and return to Symptoms if necessary.</li> <li>5. If this verification procedure is being performed after a DTC repair, perform steps 6 through 13.</li> <li>6. Connect the DRBIII® to the data link connector. With the DRBIII®, erase DTCs and reset all values.</li> <li>7. If the PCM was not replaced, skip steps 8 through 10 and continue with the verification.</li> <li>8. If the PCM was replaced, the correct VIN and mileage must be programmed or a DTC will set in the ABS and Air Bag modules. In addition, if the vehicle is equipped with Sentry Key Immobilizer System (SKIS), Secret Key data must be updated to enable start.</li> <li>9. For ABS and Air Bag systems: Enter correct VIN and Mileage in PCM. Erase codes in ABS and Air Bag modules.</li> <li>10. For SKIS theft alarm: Connect DRBIII® to data link conn. Go to Theft Alarm, SKIM, and Misc. Place SKIM in secured access mode by using the appropriate PIN code for this vehicle. Select Update the Secret Key data. Data will be transferred from SKIM to PCM</li> <li>11. If equipped with a Transfer Case Position Switch, Perform step 12, otherwise, continue with step 13.</li> <li>12. With the ignition switch on, place the Transfer Case Shift Lever in each gear position, stopping for 15 seconds in each position.</li> <li>13. Road test the vehicle. If the test is for an A/C DTC, ensure it is operating during the following test.</li> <li>14. Drive the vehicle for at least 5 minutes at 64 Km/h (40 mph). Ensure the transmission shifts properly through all gears. At some point stop the vehicle and turn off the engine for at least 10 seconds.</li> <li>15. With the DRBIII®, read DTCs.</li> </ol> <p>Are any DTCs or symptoms remaining?</p> <p style="padding-left: 40px;">Yes → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure).</p> <p style="padding-left: 40px;">No → Repair is complete.</p>	<p style="text-align: center;">All</p>

## Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 2 (DIESEL)	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Check if any of the following conditions exist.</li> <li>2. The ECM has been disconnected or replace.</li> <li>3. The Battery power has been disconnected.</li> <li>4. The APPS has been disconnected or replaced.</li> <li>5. If any of the conditions exist, perform the followings steps, otherwise go to step 8.</li> <li>6. APPS Programming Procedure: Reassemble all components. Turn the ignition key to the On or Run position. Without starting the engine, slowly press the throttle pedal position sensor calibration has been programmed in the ECM.</li> <li>7. This system step must be done (only once) to ensure the accelerator position sensor calibration has been programmed in the ECM.</li> <li><b>8. CAUTION: Do not attempt to adjust screws or disassemble the APPS sensor. These setting are set at the factory and are not intended to be changed.</b></li> <li>9. If the PCM has been replaced, do the following: (Otherwise go to step 12)</li> <li><b>10. NOTE: If the Engine Control Module has been changed and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS and Airbag Module.</b></li> <li>11. For ABS and Airbag Systems: Action: Enter correct VIN and Mileage in the ECM. Erase ABS and Airbag Module codes.</li> <li>12. If the ECM has been replace, do the following.</li> <li>13. If this verification procedure is being performed after a No Trouble Code repair, do the following.</li> <li>14. Check to see if the initial symptom still exists. If the initial or another symptom exists, the repair is not complete. Check all pertinent Technical Service Bulletins and return to the Symptom list if necessary.</li> <li>15. If this verification procedure is being performed after a Trouble Code repair, do the following.</li> <li>16. Connect the DRBIII® to the data link connector and erase trouble codes.</li> <li>17. With the DRBIII®, reset all memory values.</li> <li>18. If this test is for an A/C trouble code, ensure it is operating during the following road test.</li> <li>19. Drive the vehicle for at least five minutes, For some of the drive, go at least 40 MPH; at some point stop the vehicle and turn the engine off for 10 seconds or more; then restart and continue. Ensure the transmission shifts through all gears.</li> <li>20. Upon completion of the road test, turn the engine off and read trouble codes with the DRBIII®. If a trouble code has been set, return to the Symptom list and follow the path specified.</li> </ol> <p>Is there any DTC(s) present?</p> <p style="padding-left: 40px;">Yes → Repair is not complete, refer to appropriate symptom.</p> <p style="padding-left: 40px;">No → Repair is complete.</p>	<p style="text-align: center;">All</p>

## Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 3	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</li> <li>2. Connect the DRBIII® to the Data Link Connector and erase the DTCs.</li> <li>3. If the PCM was not replaced, skip steps 4 through 6 then continue the verification.</li> <li>4. If the PCM was replaced, the correct VIN and mileage must be programmed or a DTC will set in the ABS and Air Bag modules. In addition, if the vehicle is equipped with Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable start.</li> <li>5. For ABS and Air Bag systems: Enter correct VIN and Mileage in PCM. Erase codes in ABS and Air Bag modules.</li> <li>6. For SKIM theft alarm: Connect DRBIII® to data link conn. Go to Theft Alarm, SKIM, Misc. and place SKIM in secured access mode, by using the appropriate PIN code for this vehicle. Select Update the Secret Key data. Data will be transferred from SKIM to PCM</li> <li>7. Perform the generator output test per service manual information.</li> <li>8. Start the engine and set the engine speed to 2000 rpm for at least 30 seconds.</li> <li>9. Allow the engine to return to idle.</li> <li>10. Cycle the ignition key off then on.</li> <li>11. With the DRBIII®, read DTCs.</li> </ol> <p>Are any DTCs or symptoms present at this time?</p> <p style="padding-left: 40px;">Yes → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure).</p> <p style="padding-left: 40px;">No → Repair is not complete, refer to appropriate symptom.</p>	All

## Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 4	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</li> <li>2. With the DRBIII®, erase DTCs.</li> <li>3. If the PCM was not replaced, skip steps 4 through 6, then continue with the verification.</li> <li>4. If the PCM was replaced, the correct VIN and mileage must be programmed or a DTC will set in the ABS and Air Bag modules. In addition, if the vehicle is equipped with Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable start.</li> <li>5. For ABS and Air Bag systems: Enter correct VIN and Mileage in PCM. Erase codes in ABS and Air Bag modules.</li> <li>6. For SKIM theft alarm: Connect DRBIII® to data link conn. Go to Theft Alarm, SKIM, Misc. and place SKIM in secured access mode, by using the appropriate PIN code for this vehicle. Select Update the Secret Key data. Data will be transferred from SKIM to PCM</li> <li>7. Turn the speed control ON (if equipped, cruise light will be on).</li> <li>8. Depress and release the SET Switch when the vehicle speed is greater than 35MPH. The speed control should engage and hold the selected speed.</li> <li>9. Depress and hold the RESUME/ACCEL Switch. The vehicle speed should increase by at least 2 mph.</li> <li>10. Press and hold the COAST switch. The vehicle speed should decrease.</li> <li>11. Using caution, depress and release the brake pedal. The speed control should disengage.</li> <li>12. Bring the vehicle speed back up to 35 MPH.</li> <li>13. Depress the RESUME/ACCEL switch. The speed control should resume the previously set speed.</li> <li>14. Hold down the SET switch. The vehicle should decelerate.</li> <li>15. Ensure vehicle speed is greater than 35 mph and release the SET Switch. The vehicle should adjust and set a new vehicle speed.</li> <li>16. Depress and release the CANCEL switch. The speed control should disengage.</li> <li>17. Bring the vehicle speed back up above 35 mph and engage speed control.</li> <li>18. Depress the OFF switch to turn OFF, (Cruise light will be off). The speed control should disengage.</li> <li>19. NOTE: OVERSHOOT/UNDERSHOOT FOLLOWING SPEED CONTROL SET.</li> <li>20. If the vehicle operator repeatedly presses and releases the SET button with their foot off of the accelerator (referred to as "lift foot set"), the vehicle may accelerate and exceed the desired set speed by up to 5 mph (8 km/h).</li> <li>21. It may also decelerate to less than the desired set speed, before finally achieving the desired set speed.</li> <li>22. The Speed Control System has an adaptive strategy that compensates for vehicle-to-vehicle variations in speed control cable lengths.</li> <li>23. When the speed control is set with the vehicles operators foot off of the accelerator pedal, the speed control thinks there is excessive speed control cable slack and adapts accordingly.</li> <li>24. If the "lift foot sets" are continually used, a speed control overshoot/undershoot condition will develop.</li> <li>25. To "unlearn" the overshoot/undershoot condition, the vehicle operator has to press and release the set button while maintaining the desired set speed using the accelerator pedal (not decelerating or accelerating).</li> <li>26. Then turning the cruise control switch to the OFF position (or press the CANCEL button if equipped) after waiting 10 seconds.</li> <li>27. This procedure must be performed approximately 10-15 times to completely unlearn the overshoot/undershoot condition.</li> </ol> <p>Did the Speed Control pass the above test?</p> <p style="margin-left: 40px;">Yes → Repair is complete.</p> <p style="margin-left: 40px;">No → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure).</p>	<p style="text-align: center;">All</p>

# Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 4 (DIESEL)	APPLICABILITY
<p>1. Check if any of the following conditions exist.</p> <p>2. The ECM has been disconnected or replace.</p> <p>3. The Battery power has been disconnected.</p> <p>4. The APPS has been disconnect or replace.</p> <p>5. If any of the conditions exist, perform the following steps, otherwise go to step 9.</p> <p>6. APPS Programming Procedure: Reassemble all components. Turn the ignition key to the On or Run position. Without starting the engine, slowly press the throttle pedal to the floor and then slowly release.</p> <p>7. This step must be done to ensure the accelerator pedal position sensor calibration has been programmed in the ECM.</p> <p><b>8. CAUTION: Do not attempt to adjust screws or disassemble the APPS sensor. These settings are set at the factory and are intended to be changed.</b></p> <p>9. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</p> <p>10. With the DRBIII®, erase DTCs.</p> <p>11. If the ECM has been replaced, perform steps 11 through 13, then continue with the verification.</p> <p>12. If ECM has been changed and correct VIN and mileage have not been programmed, a DTC will be set in ABS and Air bag modules. In addition, if vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable start.</p> <p>13. For ABS and Air Bag systems: Enter correct VIN and Mileage in ECM. Erase codes in ABS and Air Bag modules.</p> <p>14. For SKIM theft alarm: Connect DRBIII® to data link conn. Go to Theft Alarm, SKIM, Misc. and place SKIM in secured access mode, by using the appropriate PIN code for this vehicle. Select Update the Secret Key data. Data will be transferred from SKIM to PCM</p> <p>15. Turn the speed control ON (if equipped, cruise light will be on).</p> <p>16. Depress and release the SET Switch. If the speed control did not engage, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>17. Depress and hold the RESUME/ACCEL Switch. If the vehicle speed did not increase by at least 2 mph, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>18. Press and hold the COAST switch. The vehicle speed should decrease. If it did not decrease, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>19. Using caution, depress and release the brake pedal. If the speed control did not disengage, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>20. Bring the vehicle speed back up to 35 MPH.</p> <p>21. Depress the RESUME/ACCEL switch. If the speed control did not resume the previously set speed, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>22. Hold down the SET switch. If the vehicle did not decelerate, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>23. Ensure vehicle speed is greater than 35 mph and release the SET Switch. If vehicle did not adjust and set a new vehicle speed, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>24. Depress and release the CANCEL switch. If the speed control did not disengage, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>25. Bring the vehicle speed back up above 35 mph and engage speed control.</p> <p>26. Depress the OFF switch to turn OFF, (Cruise light will be off). If the speed control did not disengage, the repair is not complete. Check for TSBs that pertain to speed control problem and then, if necessary, return to Symptom List.</p> <p>27. If the vehicle successfully passed all of the previous tests, the speed control system is now functioning as designed. The repair is now complete.</p> <p>28. NOTE: OVERSHOOT/UNDERSHOOT FOLLOWING SPEED CONTROL SET.</p> <p>29. If the vehicle operator repeatedly presses and releases the SET button with their foot off of the accelerator (referred to as "lift foot set"), the vehicle may accelerate and exceed the desired set speed by up to 5 mph (8 km/h).</p> <p>30. It may also decelerate to less than the desired set speed, before finally achieving the desired set speed.</p> <p>31. The Speed Control System has an adaptive strategy that compensates for vehicle-to-vehicle variations in speed control cable lengths.</p> <p>32. When the speed control is set with the vehicles operators foot off of the accelerator pedal, the speed control thinks there is excessive speed control cable slack and adapts accordingly.</p> <p>33. If the "lift foot sets" are continually used, a speed control overshoot/undershoot condition will develop.</p> <p>34. To "unlearn" the overshoot/undershoot condition, the vehicle operator has to press and release the set button while maintaining the desired set speed using the accelerator pedal (not decelerating or accelerating).</p> <p>35. Then turning the cruise control switch to the OFF position (or press the CANCEL button if equipped) after waiting 10 seconds.</p> <p>36. This procedure must be performed approximately 10-15 times to completely unlearn the overshoot/undershoot condition.</p> <p>Did the Speed Control pass the above test?</p> <p>Yes → Repair is not complete, refer to appropriate symptom.</p> <p>No → Repair is complete.</p>	<p>All</p>



## Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 5	APPLICABILITY
<p>1. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</p> <p>2. If any existing diagnostic trouble codes have not been repaired, go to the appropriate Symptom List and follow path specified.</p> <p>3. Connect the DRBIII® to the data link connector.</p> <p>4. Ensure the fuel tank has at least a quarter tank of fuel. Turn off all accessories.</p> <p>5. If the PCM was not replaced skip steps 6 through 8 and continue the verification.</p> <p>6. If the PCM was replaced, the correct VIN and mileage must be programmed or a DTC will set in the ABS and Air Bag modules. In addition, if the vehicle is equipped with Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable start.</p> <p>7. For ABS and Air Bag systems: Enter correct VIN and Mileage in PCM. Erase codes in ABS and Air Bag modules.</p> <p>8. For SKIM theft alarm: Connect DRBIII® to data link connector to Theft Alarm, SKIM, Misc. and place SKIM in secured access mode by using the appropriate PIN code for this vehicle. Select Update the Secret Key data. Data will be transferred from SKIM to PCM.</p> <p>9. If the Catalyst was replaced, with the DRBIII® go to the miscellaneous Menu Option "Catalyst Replaced" and press enter.</p> <p>10. If a Comprehensive Component DTC was repaired, perform steps 11 and 13. If a Major OBDII Monitor DTC was repaired skip step 11 and continue the verification.</p> <p>11. After the ignition has been off for at least 10 seconds, restart the vehicle and run 2 minutes.</p> <p>12. With the DRBIII®, monitor the appropriate pre-test enabling conditions until all conditions have been met. Once the conditions have been met, switch screen to the appropriate OBDII monitor, (Audible beeps when the monitor is running).</p> <p>13. If the conditions cannot be duplicated, erase all DTCs with the DRBIII®.</p> <p>14. If another DTC has set, return to the Symptom List and follow the path specified for that DTC.</p> <p>Did the OBDII monitor run successfully and has the Good Trip Counter changed to one or more?</p> <p>Yes → Repair is complete.</p> <p>No → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptoms list (Diagnostic Procedure).</p>	<p>All</p>



## Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 5 (DIESEL)	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Check if any of the following conditions exist.</li> <li>2. The ECM has been disconnected or replace.</li> <li>3. The Battery power has been disconnected.</li> <li>4. The APPS has been disconnect or replace.</li> <li>5. If any of the conditions exist, perform the following steps, otherwise go to step 9.</li> <li>6. APPS Programming Procedure: Reassemble all components. Turn the ignition key to the On or Run position. Without starting the engine, slowly press the throttle pedal to the floor and then slowly release.</li> <li>7. This step must be done to ensure the accelerator pedal position sensor calibration has been programmed in the ECM.</li> <li><b>8. CAUTION: Do not attempt to adjust screws or disassemble the APPS sensor. These settings are set at the factory and are intended to be changed.</b></li> <li>9. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</li> <li>10. If any existing diagnostic trouble codes have not been repaired, go to Symptom List and follow path specified.</li> <li>11. Connect the DRBIII® to the data link connector.</li> <li>12. Ensure the fuel tank has at least a quarter tank of fuel. Turn off all accessories.</li> <li>13. Perform steps 15 through 17 if the PCM has been replaced. Then proceed with the verification. If the ECM has not been replaced skip those steps and continue verification.</li> <li>14. If ECM has been changed and correct VIN and mileage have not been programmed, a DTC will be set in ABS and Air bag modules. In addition, if vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable start.</li> <li>15. For ABS and Air Bag systems: Enter correct VIN and Mileage in ECM. Erase codes in ABS and Air Bag modules.</li> <li>16. For SKIM theft alarm: Connect DRBIII® to data link connector to Theft Alarm, SKIM, Misc. and place SKIM in secured access mode by using appropriate PIN code for this vehicle. Select Update the Secret Key data. Data will be transferred from SKIM to PCM.</li> <li>17. If a Comprehensive Component DTC was repaired, perform steps 10-13. If a Major OBDII Monitor DTC was repaired skip those steps and continue verification.</li> <li>18. After the ignition has been off for at least 10 seconds, restart the vehicle and run 2 minutes.</li> <li>19. If there are no new DTC's, the repair was successful and is now complete. Erase DTC's and disconnect the DRBIII®.</li> <li>20. If the repaired DTC has reset, the repair is not complete. Check for any related TSB's or flash updates and return to the Symptom list.</li> <li>21. If another DTC has set, return to the Symptom List and follow the path specified for that DTC.</li> <li>22. With the DRBIII®, monitor the appropriate pre-test enabling conditions until all conditions have been met. Once the conditions have been met, switch screen to the appropriate OBDII monitor, (Audible beeps when the monitor is running).</li> <li>23. If the monitor ran, the repair was successful and is now complete. Erase DTC's and disconnect the DRBIII®.</li> <li>24. If the repaired OBDII trouble code has reset or was seen in the monitor while on the road test, the repair is not complete. Check for any related technical service bulletins or flash updates and return to Symptom List.</li> <li>25. If another DTC has set, return to the Symptom List and follow the path specified for that DTC.</li> </ol> <p>Is any DTC(s) present?</p> <p style="padding-left: 40px;">Yes → Repair is not complete, refer to appropriate symptom.</p> <p style="padding-left: 40px;">No → Repair is complete.</p>	<p style="text-align: center;">All</p>

## Verification Tests — Continued

POWERTRAIN VERIFICATION TEST VER - 6	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary.</li> <li>2. If any existing diagnostic trouble codes are not repaired, go to symptom list and follow path specified. After all diagnostic trouble codes have been repaired, return to TEST VER-6A and run LDP Dealer Test Mode under Systems Test in DRBIII®.</li> <li>3. If the PCM was not replaced, skip steps 4 through 6 then continue with the verification.</li> <li>4. If the PCM was replaced, the correct VIN and mileage must be programmed or a DTC will set in the ABS and Air Bag modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable start.</li> <li>5. For ABS and Airbag Systems: Enter correct VIN and Mileage in PCM. Erase codes in ABS and Airbag modules.</li> <li>6. For SKIM theft alarm: Connect DRBIII® to data link conn. Go to Theft Alarm, SKIM, Misc. and place SKIM in secured access mode, by using the appropriate PIN code for this vehicle. Select Update the Secret Key data. Data will be transferred from SKIM to PCM</li> <li>7. The LDP Monitor Test is a useful way to run a total LDP system performance test. Use this test to verify any type of LDP system repair.</li> <li>8. Connect the DRBIII® to the data link connector. Engine running, turn off all accessories. With the DRBIII® in System Tests, perform the LDP Monitor Test.</li> <li>9. Note: While test is being performed, PCM must see RPM, minimum MAP, No Vehicle speed and minimum Throttle Position sensor (At idle, in park.)</li> </ol> <p>Are any DTCs or symptoms remaining?</p> <p>Yes → Check for any related Technical Service Bulletins and/or refer to the appropriate Symptom list (Diagnostic Procedure)</p> <p>No → Repair is complete.</p>	All

SKIS VERIFICATION	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Reconnect all previously disconnected components and connectors.</li> <li>2. Obtain the vehicle's unique Personal Identification Number (PIN) assigned to it's original SKIM. This number can be obtained from the vehicle's invoice or Chrysler's Customer Center (1-800-992-1997).</li> <li>3. <b>NOTE: When entering the PIN, care should be taken because the SKIM will only allow 3 consecutive attempts to enter the correct PIN. If 3 consecutive incorrect PINs are entered, the SKIM will Lock Out the DRB for 1 hour.</b></li> <li>4. To exit Lock Out mode, the ignition key must remain in the Run position continually for 1 hour. Turn off all accessories and connect a battery charger if necessary.</li> <li>5. With the DRB, select Theft Alarm, SKIM and Miscellaneous. Then, select the desired procedure and follow the steps that will be displayed.</li> <li>6. If the SKIM has been replaced, ensure all of the vehicle ignition keys are programmed to the new SKIM.</li> <li>7. <b>NOTE: Prior to returning vehicle to the customer, perform a module scan to be sure that all DTCs are erased. Erase any DTCs that are found.</b></li> <li>8. With the DRB, erase all DTCs. Perform 5 ignition key cycles leaving the key on for at least 90 seconds per cycle.</li> <li>9. With the DRB, read the SKIM DTCs.</li> </ol> <p>Are there any SKIM DTCs?</p> <p>Yes → Repair is not complete, refer to appropriate symptom.</p> <p>No → Repair is complete.</p>	All

## Verification Tests — Continued

TRANSFER CASE VERIFICATION TEST	APPLICABILITY
<p>1. Disconnect all jumper wires and reconnect all previously disconnected components and connectors.</p> <p>2. Connect the DRBIII® to the Data Link Connector and erase DTC's</p> <p>3. Ensure all accessories are turned off and the battery is fully charged.</p> <p>4. Rotate the Transfer Case Selector Switch to the desired position.</p> <p>5. Test drive the vehicle in each of the Transfer Case ranges and ensure that it is functioning properly in each of the ranges selected.</p> <p><b>6. NOTE: To select or deselect 2WD/AWD mode or 4HI mode the vehicle must be below 55 mph (88 km/h) and all wheels at vehicle speed.</b></p> <p><b>7. CAUTION: If the front and rear wheels are at different speeds and a transfer case shift is requested, damage to the transfer case may result.</b></p> <p><b>8. NOTE: To select or deselect 4LO(If Equipped), the vehicle must be less than 3 Mph - 5 Km/h or completely stopped, ignition ON and the Automatic Transmission Selector in Neutral or the clutch depressed on Manual Transmissions.</b></p> <p><b>9. NOTE: Press the recessed Neutral button (If Equipped) on the Transfer Case Selector Switch until the Neutral indicator is illuminated.</b></p> <p><b>10. WARNING: Apply Parking Brake. The vehicle may roll with the transfer case in Neutral.</b></p> <p><b>11. NOTE: To select or deselect Transfer Case Neutral, the vehicle must be stopped, ignition key in the ON position with the engine OFF, brake pedal applied and the Automatic Transmission Selector in Neutral or clutch depressed on Manual Transmissions.</b></p> <p>12. To verify the transfer case is in Neutral, shift the Automatic Transmission selector into Reverse, release the brake pedal for three seconds or the Manual Transmission into gear and slowly release the clutch to ensure that there is no vehicle movement.</p> <p>13. With the DRBIII®, read DTCs from the Transfer Case Control Module (TCCM). Are there any Transfer Case DTC's?</p> <p>Yes → Repair is not complete, refer to appropriate symptom.</p> <p>No → Repair is complete.</p>	All

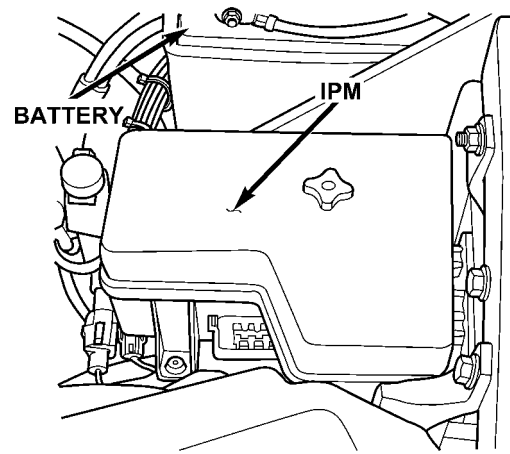
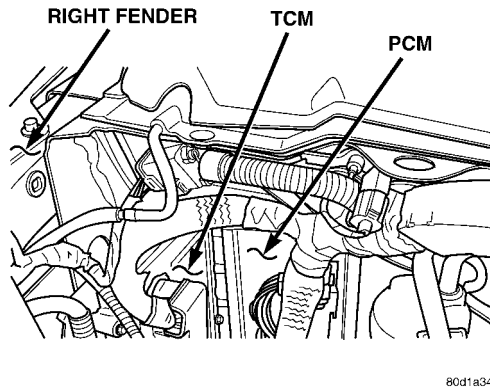
TRANSMISSION NO TROUBLE CODE VERIFICATION TEST	APPLICABILITY
<p>1. Inspect the vehicle to ensure that all engine and transmission components are properly installed and connected. Assemble and connect components as necessary.</p> <p>2. Check if the initial symptom still exists, this may require a road test. If the symptom still exists, return to the symptom list and perform the appropriate symptom. Make sure to check for any Technical Service Bulletins that may apply.</p> <p>3. With the DRBIII®, erase any erroneous DTCs that may have been set due to a test procedure. Does the symptom still exist?</p> <p>Yes → Repair is not complete, refer to appropriate symptom.</p> <p>No → Repair is complete.</p>	All

## Verification Tests — Continued

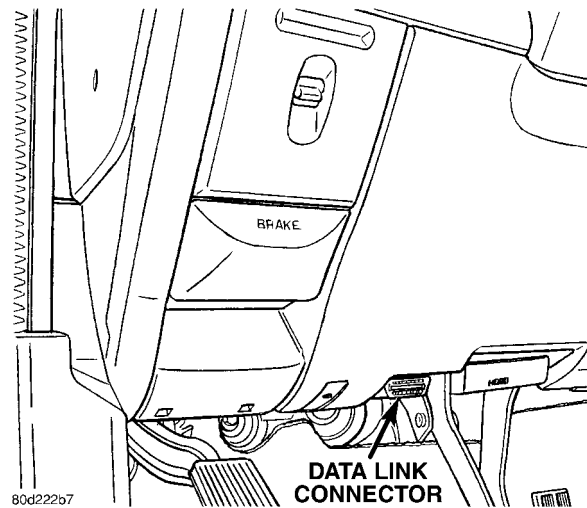
TRANSMISSION VERIFICATION TEST VER - 1	APPLICABILITY
<ol style="list-style-type: none"> <li>1. Inspect the vehicle to ensure that all engine and transmission components are properly installed and connected. Reassemble and reconnect components as necessary.</li> <li>2. If any existing diagnostic trouble codes have not been repaired, go to Symptom List and follow path specified.</li> <li>3. Connect a DRBIII® to the data link connector.</li> <li>4. Ensure the fuel tank has at least a quarter tank of fuel. Turn off all accessories.</li> <li>5. Start and run the engine until the transmission temperature is above 43°C (110°F).</li> <li>6. Check the transmission fluid level per the Service Information. Adjust if necessary.</li> <li>7. Road test the vehicle. Make 15 to 20 1-2, 2-3 and 3-4 up shifts. Perform these shifts from a standing start to 72 km/h (45 MPH) with a constant throttle opening of 20-25%.</li> <li>8. Below 40 km/h (25 MPH), make 5 to 8 wide open throttle kick downs to 1st gear. Allow at least 5 seconds each in 2nd and 3rd between each kick down.</li> <li>9. For a specific DTC, drive the vehicle in accordance with the Symptom's When Monitored and Set Conditions to verify the DTC repair.</li> <li>10. If a DTC sets during the road test, return to the Symptom List and follow the path. If no DTC sets, the repair is complete.</li> </ol> <p>Are there any DTCs or symptoms remaining?</p> <p>Yes → Repair is not complete, refer to appropriate symptom.</p> <p>No → Repair is complete.</p>	All

## 8.0 COMPONENT LOCATIONS

### 8.1 CONTROL MODULES AND IPM

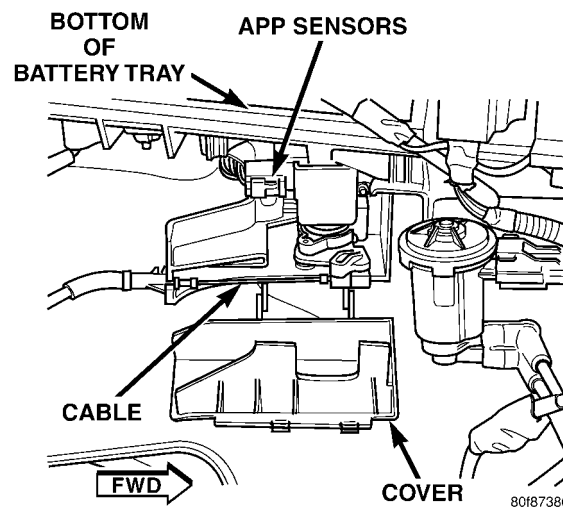


### 8.2 DATA LINK CONNECTOR



### 8.3 SENSORS AND SOLENOIDS

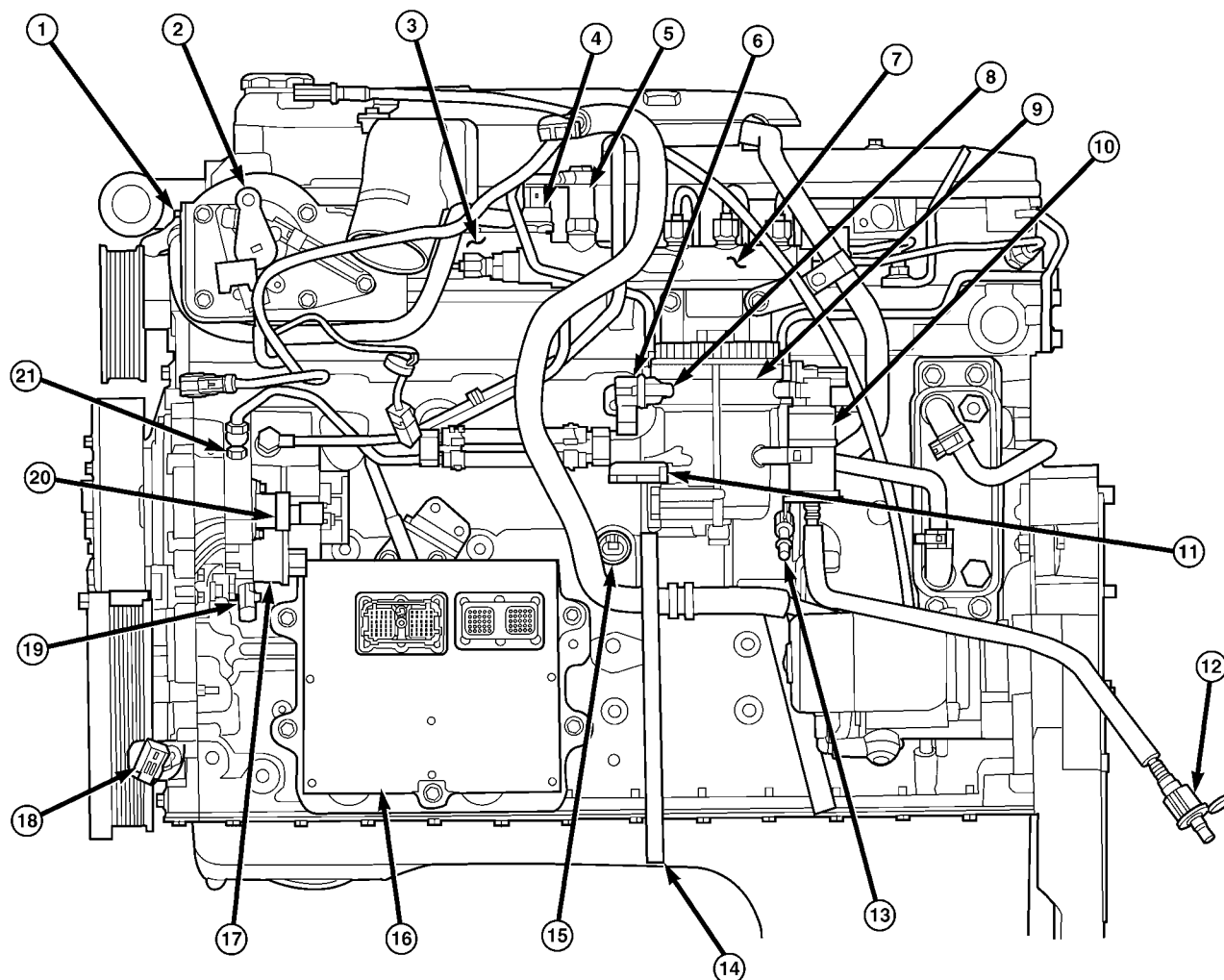
#### 5.7L AND DIESEL MANUAL TRANS



## COMPONENT LOCATIONS

### 8.3 SENSORS AND SOLENOIDS (Continued)

#### DIESEL



1. ENGINE COOLANT TEMPERATURE (ECT) SENSOR

2. THROTTLE LEVER BELLCRANK AND  
APPS (ACCELERATOR PEDAL POSITION SENSOR)  
AUTOMATIC & EARLY MANUAL TRANSMISSION

3. INTAKE MANIFOLD AIR HEATER/ELEMENTS

4. FUEL PRESSURE SENSOR

5. FUEL LIMITING VALVE

6. FUEL HEATER

7. HIGH PRESSURE FUEL INJECTOR RAIL

8. FUEL HEATER TEMPERATURE SENSOR (THERMOSTAT)

9. FUEL FILTER/WATER SEPARATOR

10. FUEL TRANSFER (LIFT) PUMP

11. DRAIN VALVE

12. FUEL SUPPLY LINE  
(LOW-PRESSURE, TO ENGINE)

13. FUEL RETURN LINE CONNECTION  
(TO FUEL TANK)

14. FUEL DRAIN TUBE

15. OIL PRESSURE SENSOR

16. ENGINE CONTROL MODULE (ECM)

17. FUEL INJECTION PUMP

18. CRANKSHAFT POSITION  
(ENGINE SPEED) SENSOR

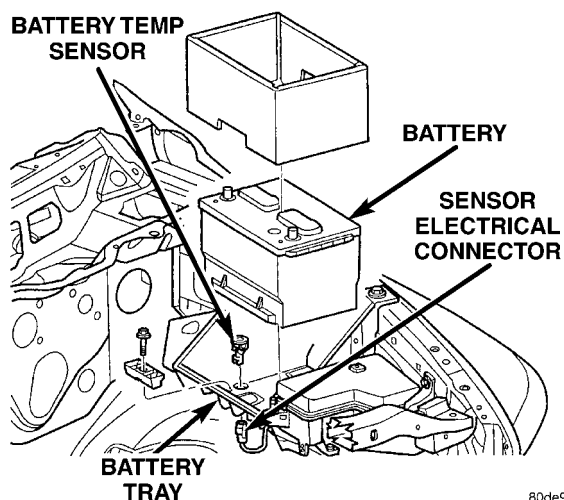
19. CAMSHAFT POSITION SENSOR (CMP)

20. FUEL CONTROL ACTUATOR (FCA)

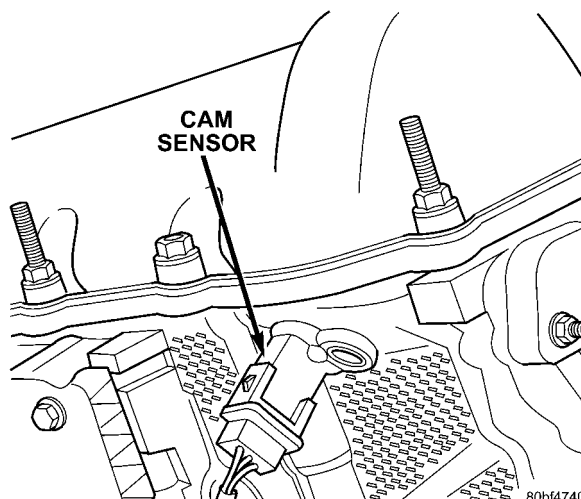
21. CASCADE OVERFLOW VALVE

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## 3.7L

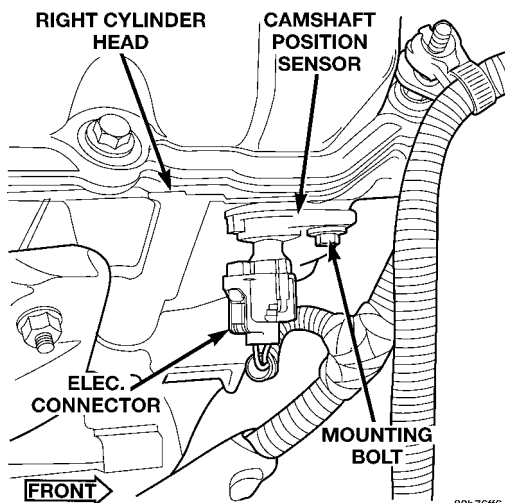


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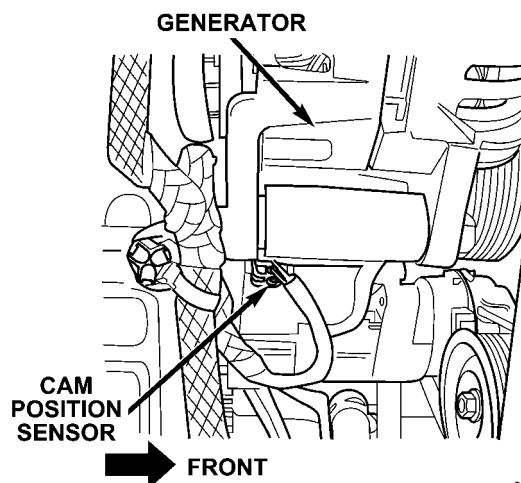
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## 4.7L



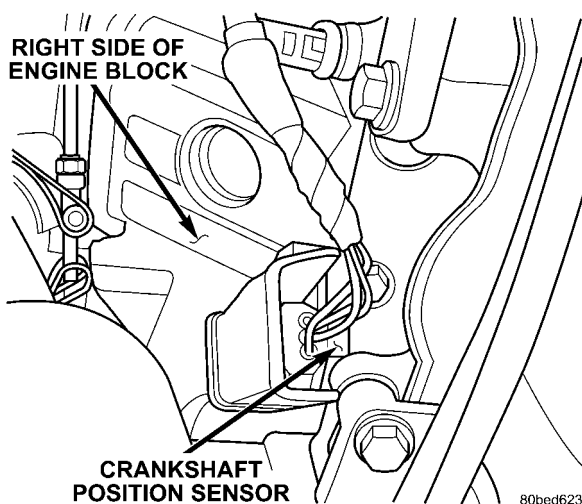
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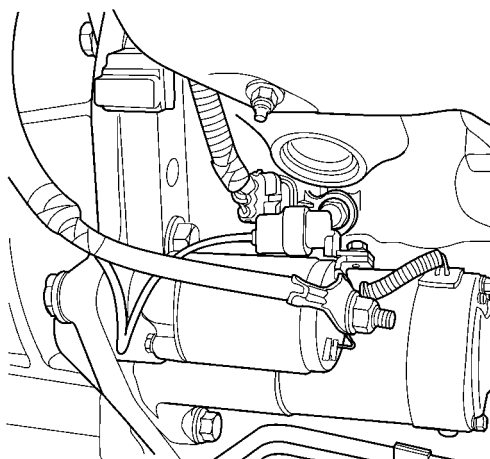
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## 3.7L



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## 4.7L



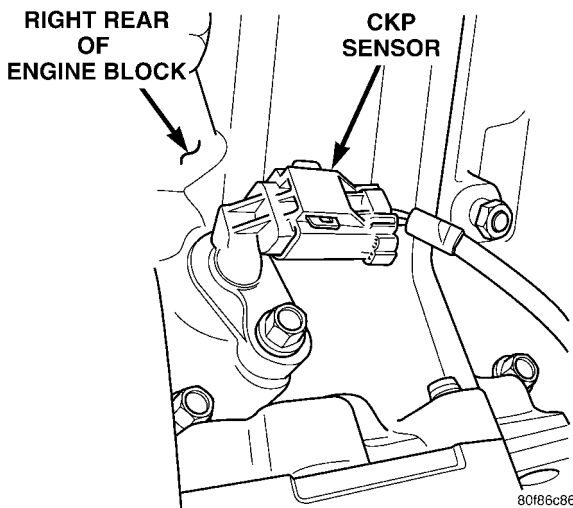
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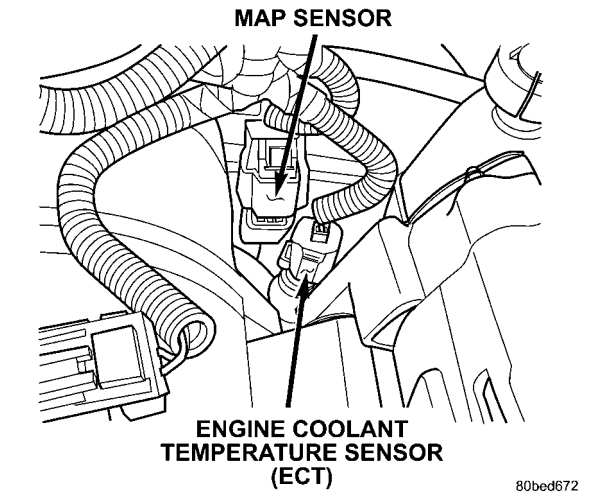
# COMPONENT LOCATIONS

## 8.3 SENSORS AND SOLENOIDS (Continued)

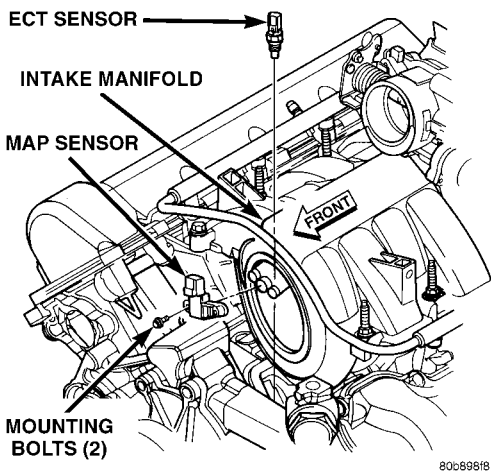
### 5.7L



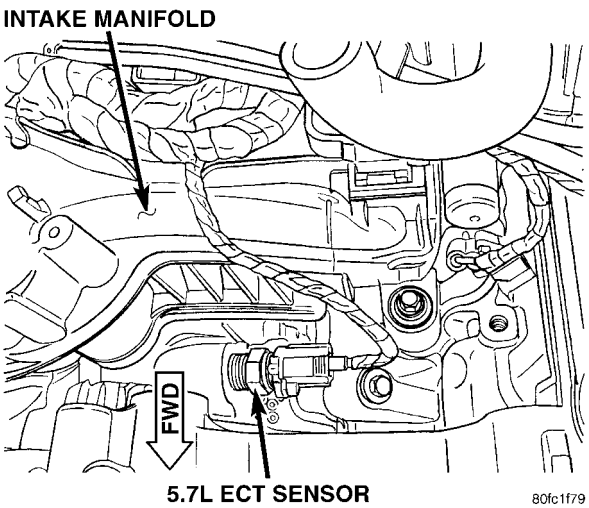
### 3.7L



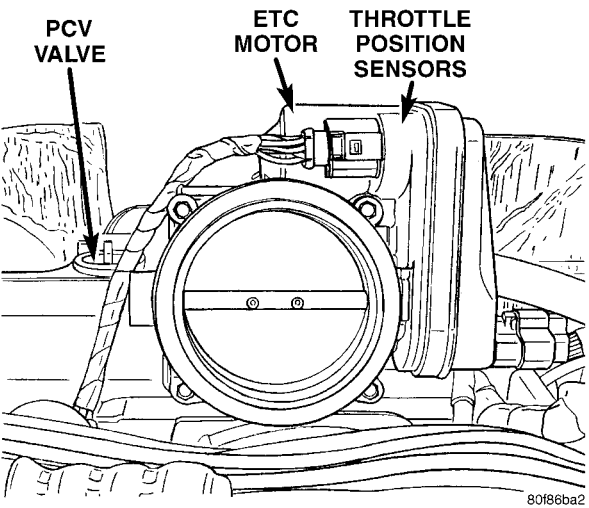
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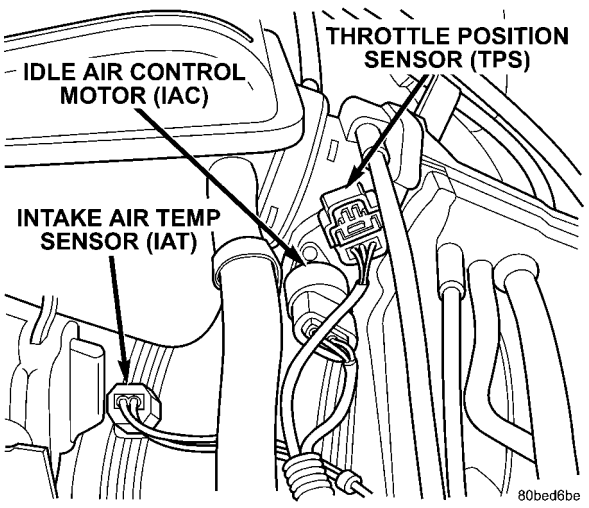
### 5.7L



### 5.7L

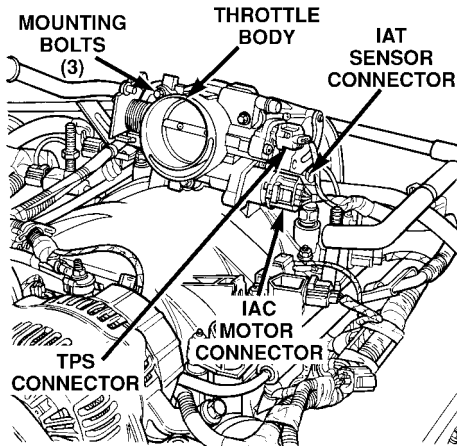


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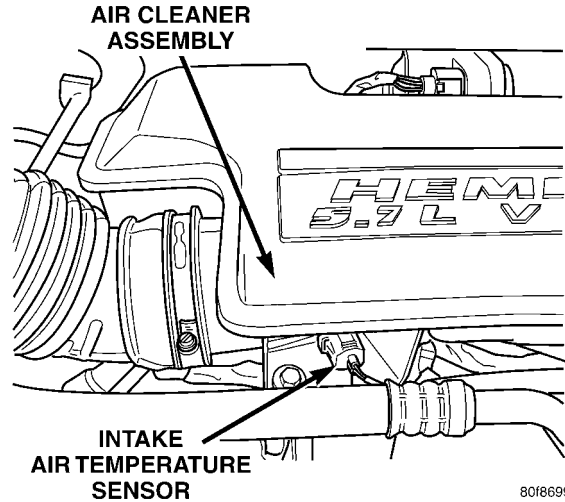


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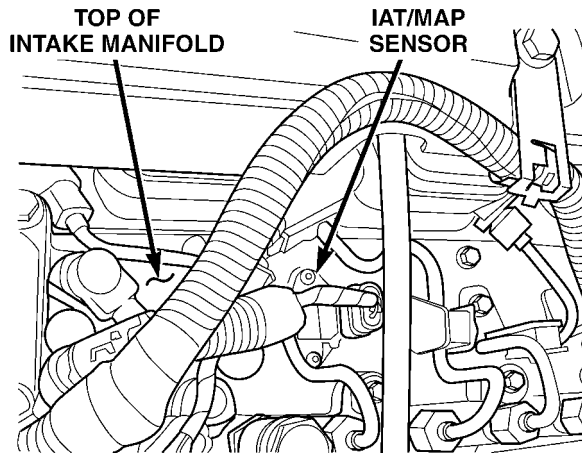
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## 5.7L



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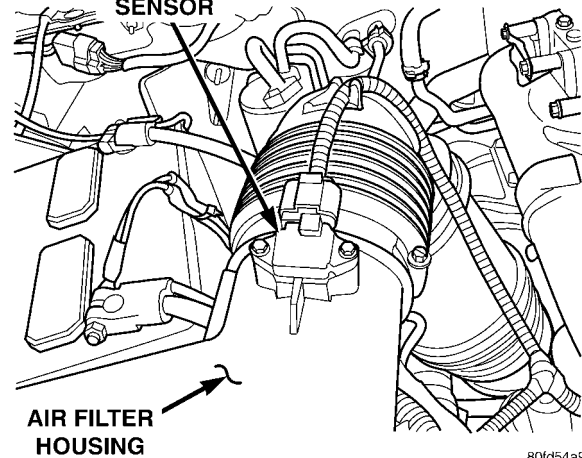
## DIESEL



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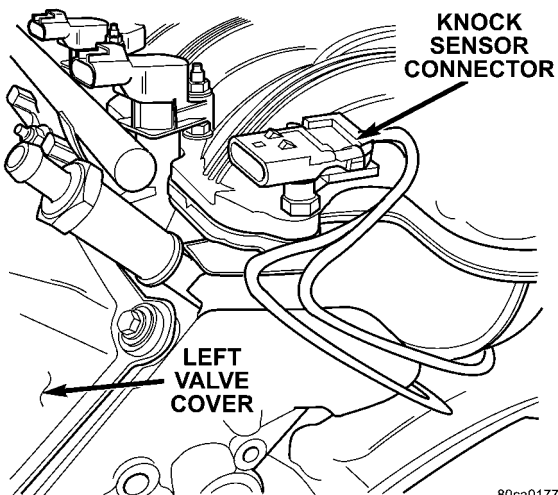
## DIESEL

### INLET AIR TEMP/PRESSURE SENSOR



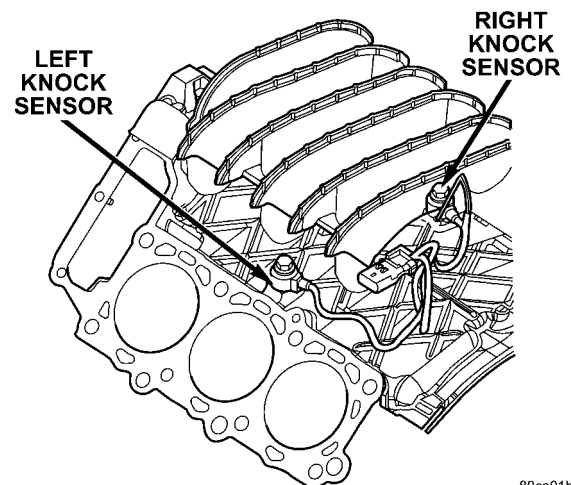
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## 3.7L



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## 3.7L

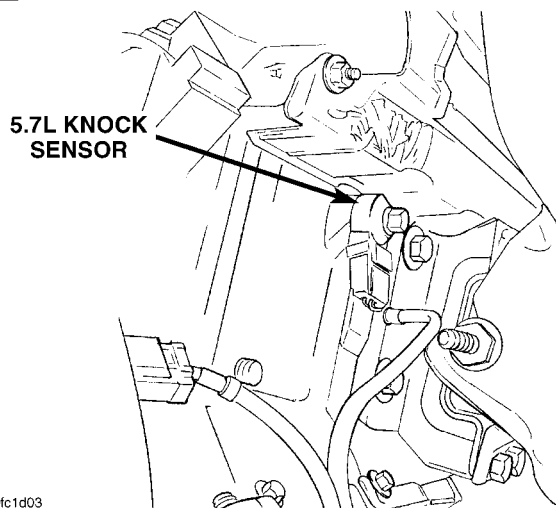


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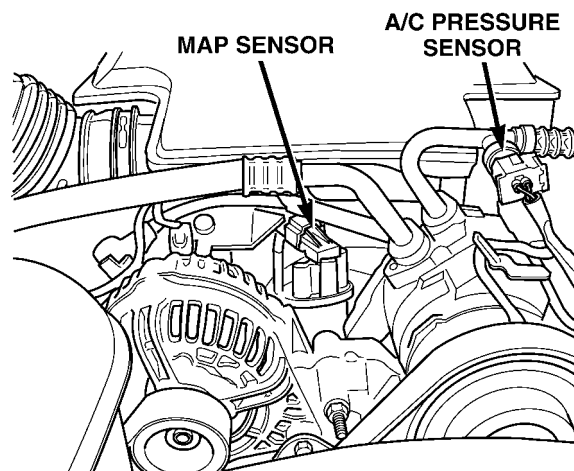
## COMPONENT LOCATIONS

### 8.3 SENSORS AND SOLENOIDS (Continued)

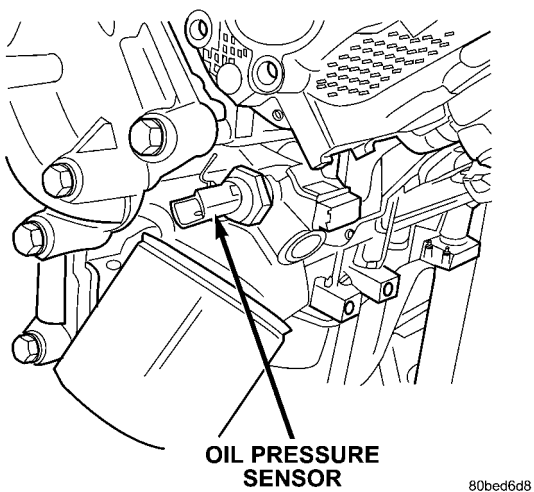
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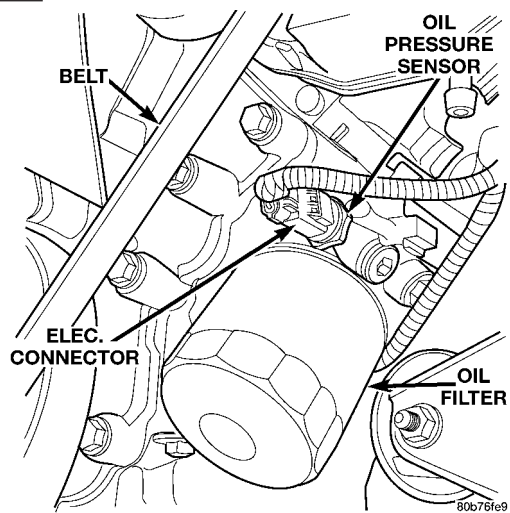
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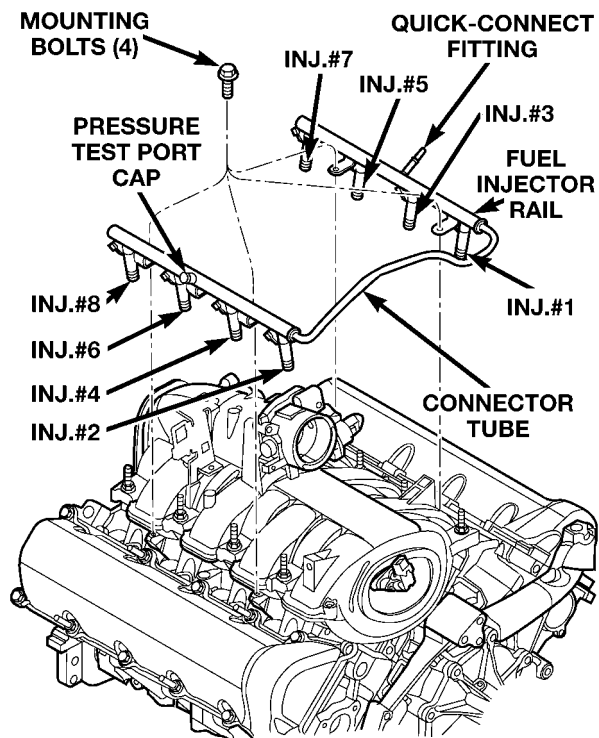
#### 3.7L



#### 4.7L

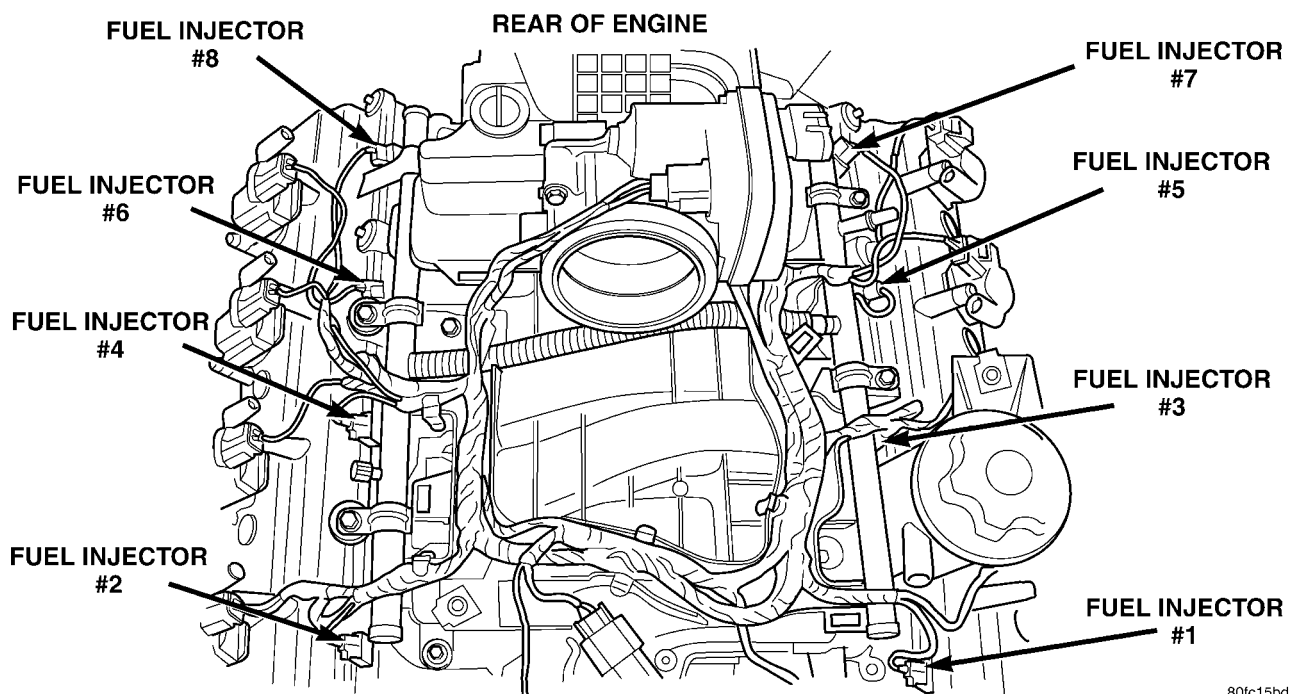


## 4.7L



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## 5.7L

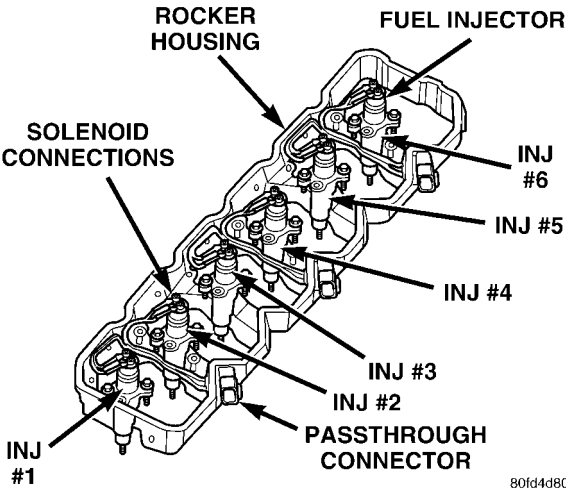


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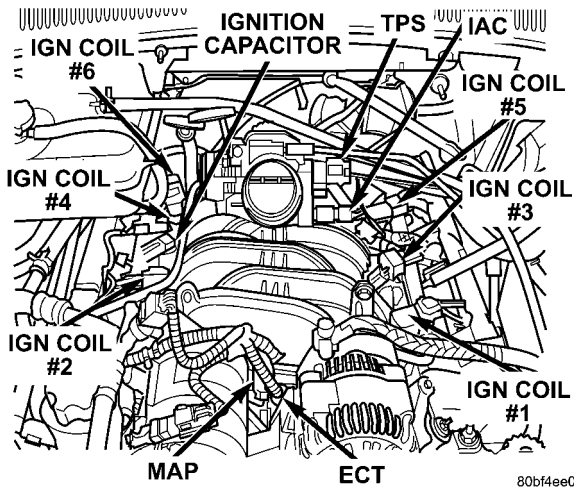
# COMPONENT LOCATIONS

## 8.3 SENSORS AND SOLENOIDS (Continued)

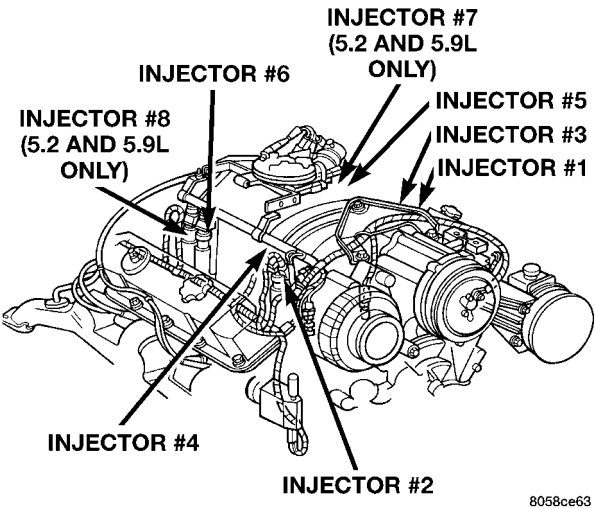
### DIESEL



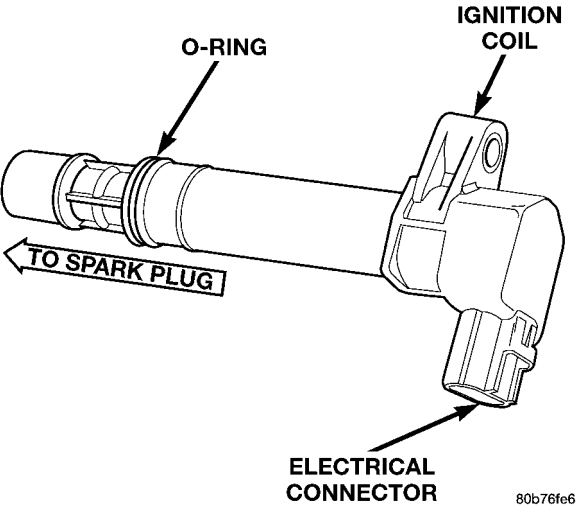
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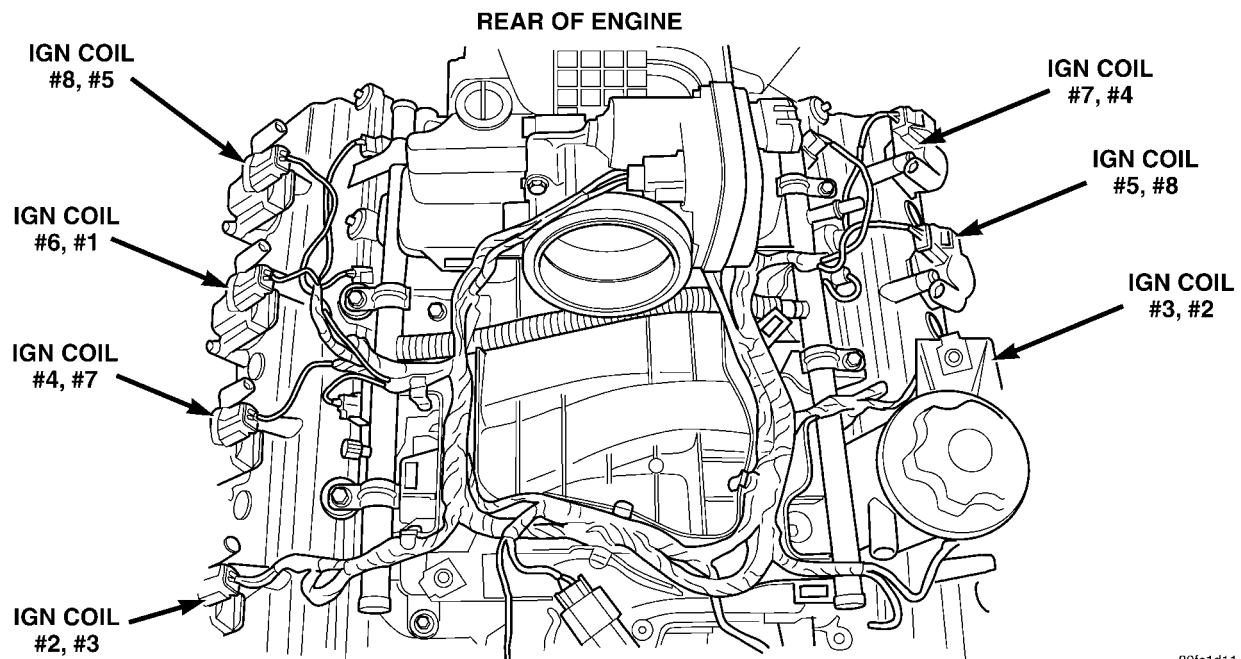
### 5.7L GAS



### 3.7L/4.7L

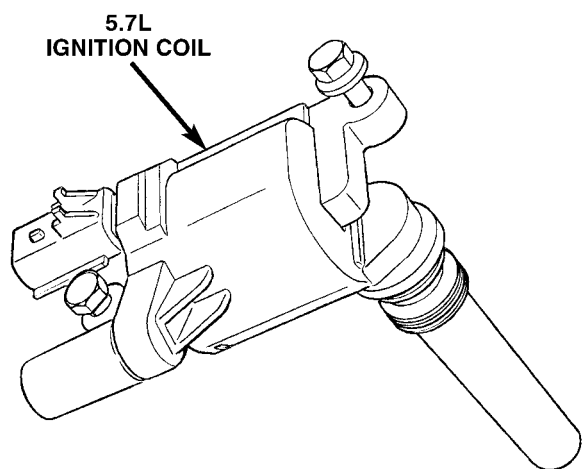


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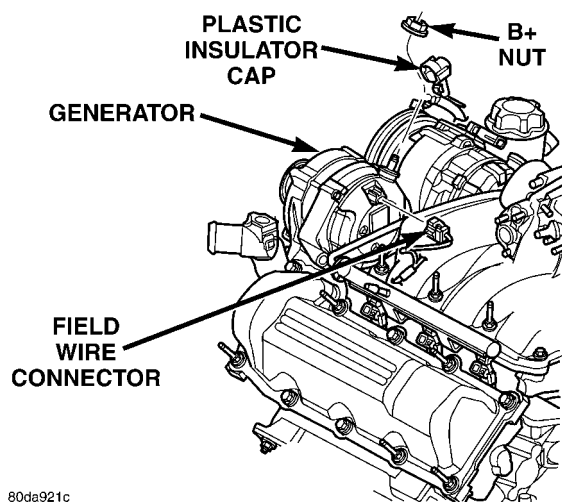
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## 5.7L



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## 3.7L



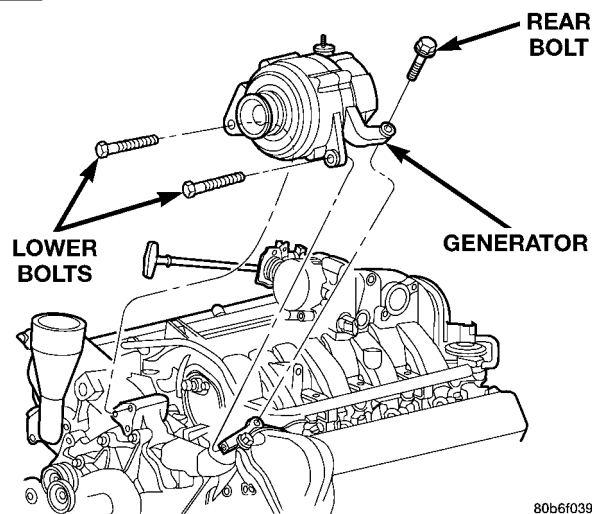
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## COMPONENT LOCATIONS

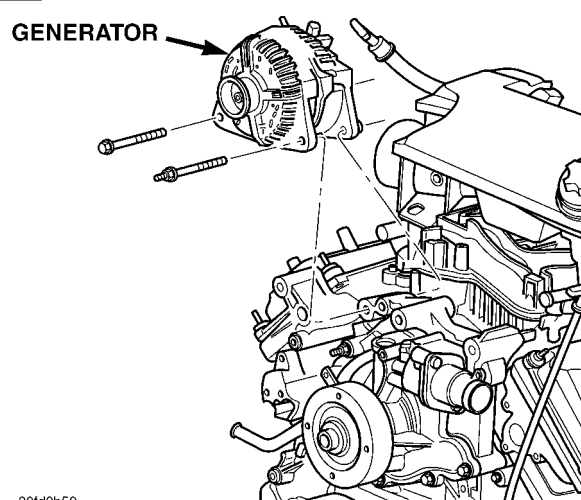
### 8.3 SENSORS AND SOLENOIDS (Continued)

#### 4.7L



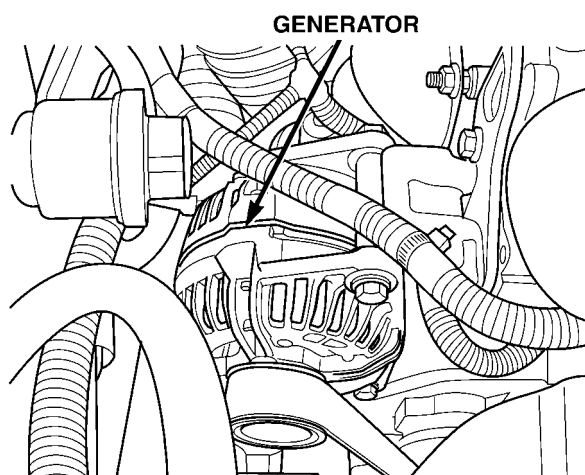
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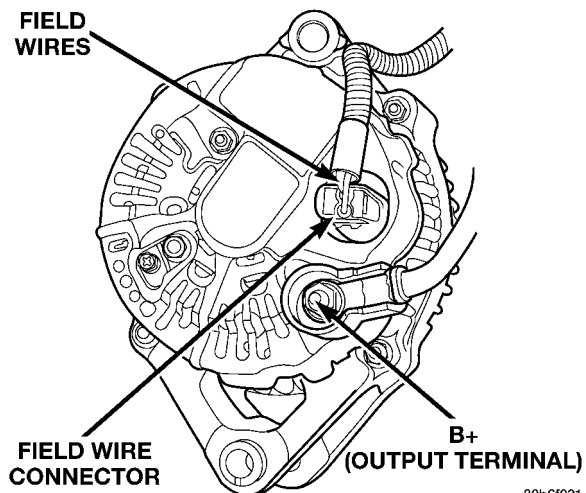


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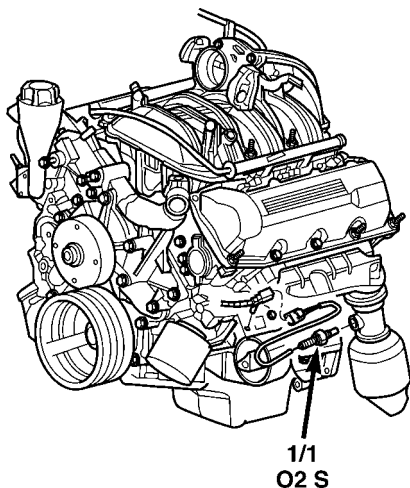


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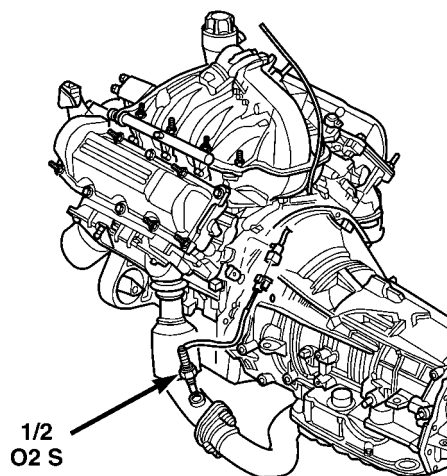
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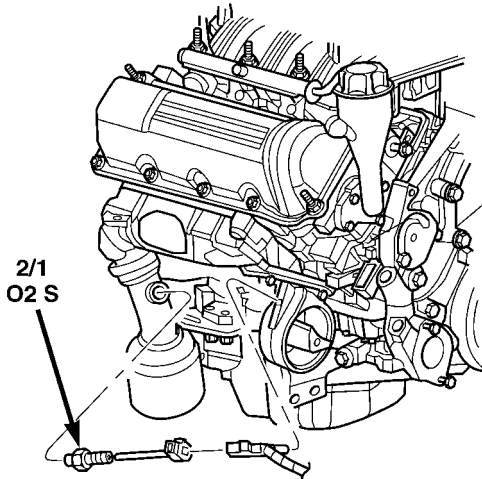
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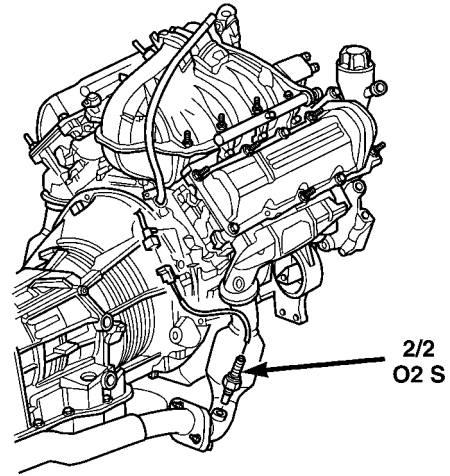
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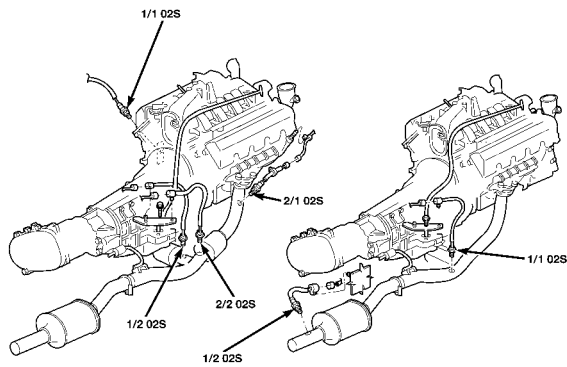
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## 3.7L



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## 4.7L

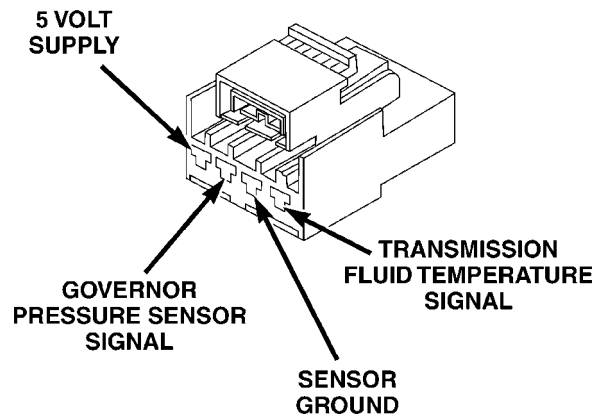


CALIFORNIA EMISSIONS

FEDERAL EMISSIONS

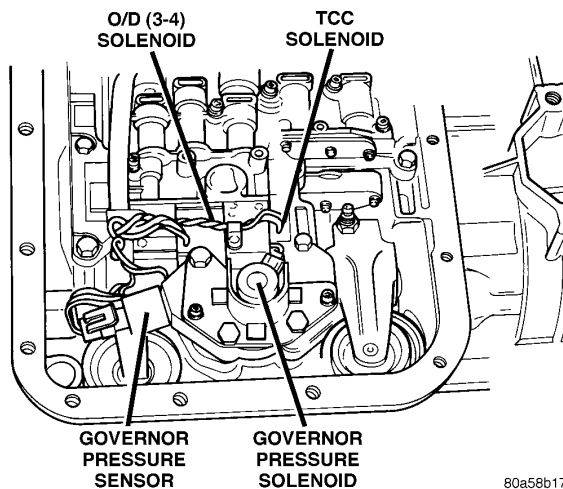
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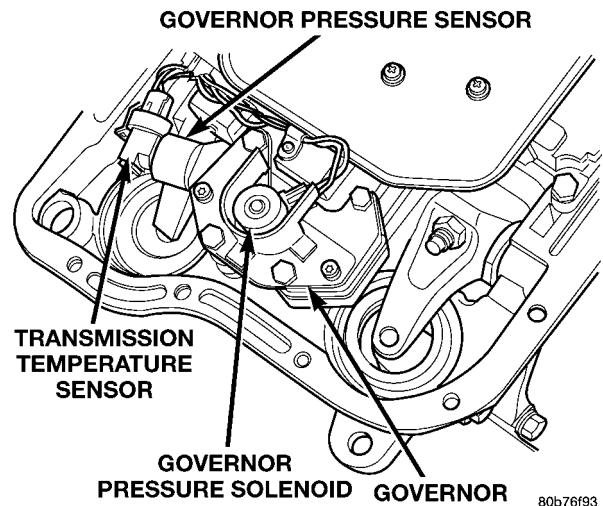
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## RE

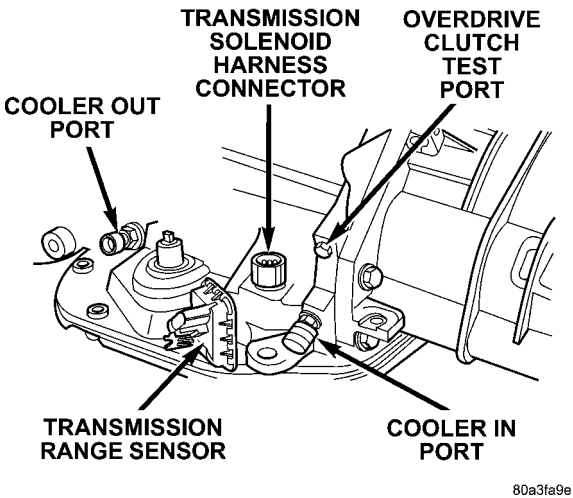


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# COMPONENT LOCATIONS

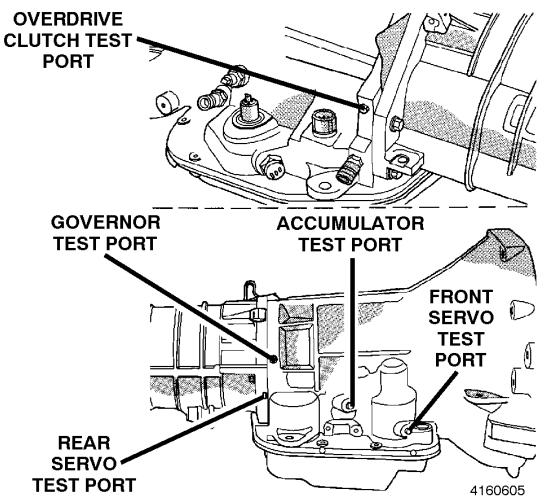
## 8.3 SENSORS AND SOLENOIDS (Continued)

**RE**



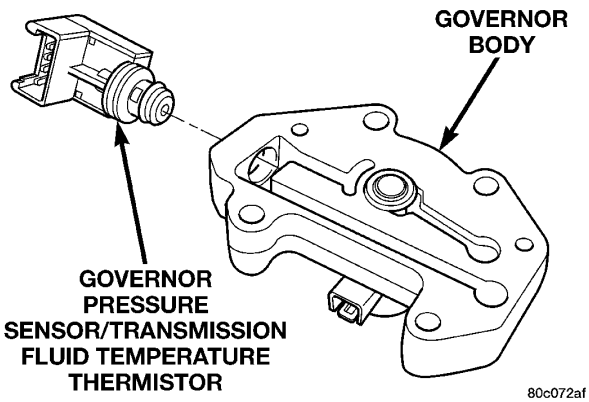
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**RE**



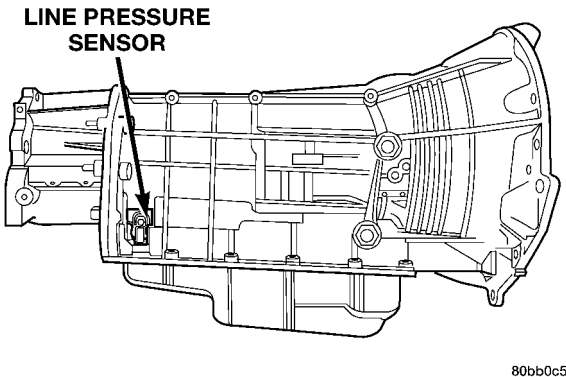
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**RE**



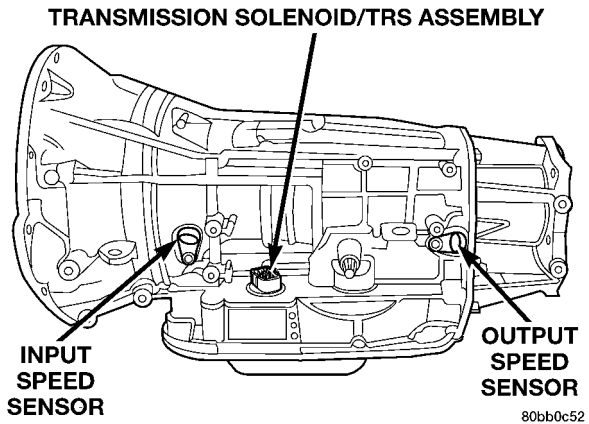
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**RFE**

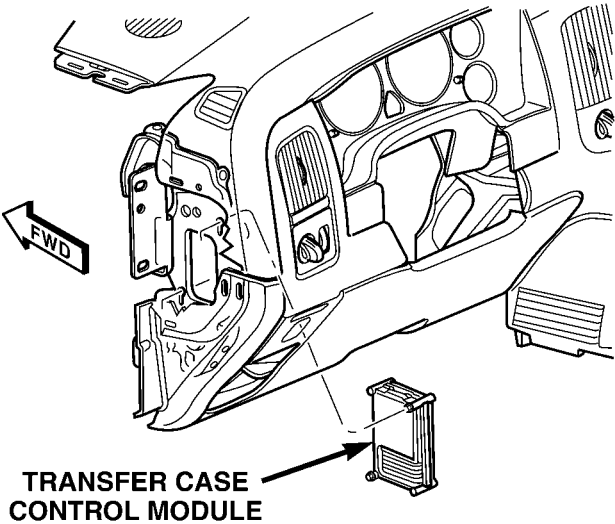


80bb0c51

**RFE**

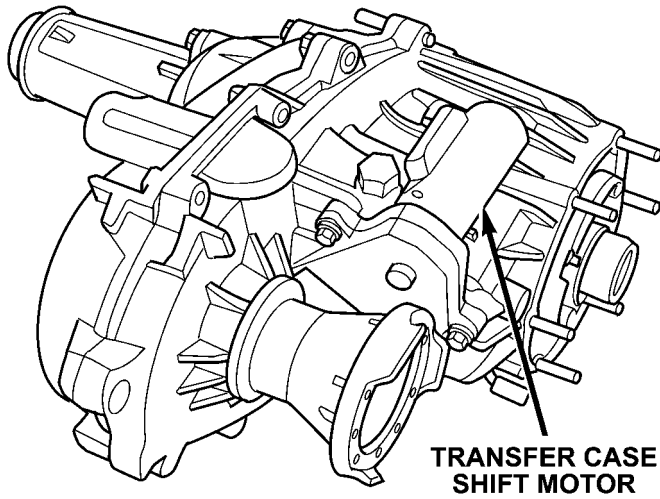


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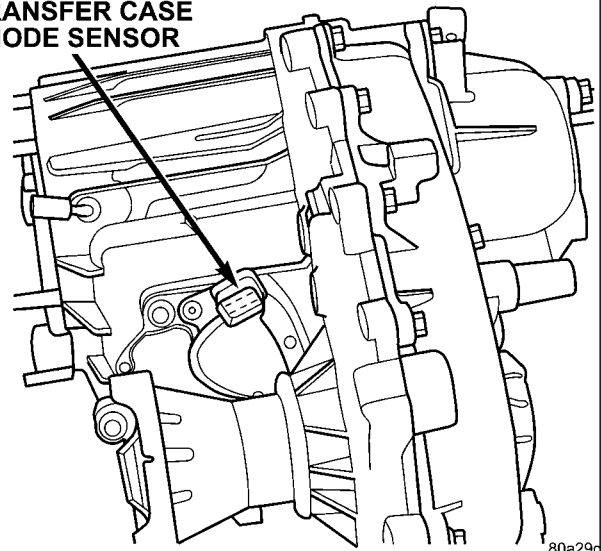
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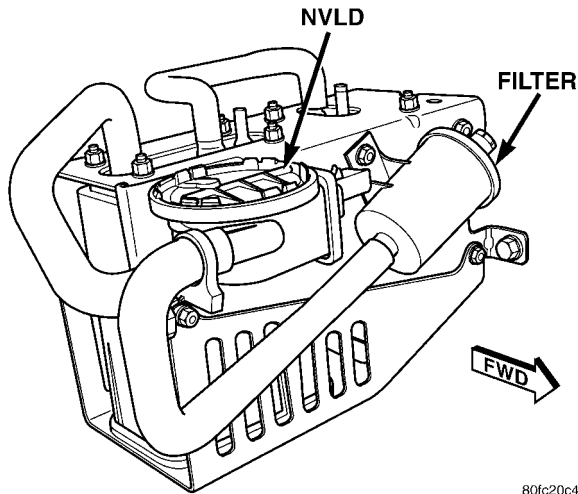
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TRANSFER CASE  
MODE SENSOR

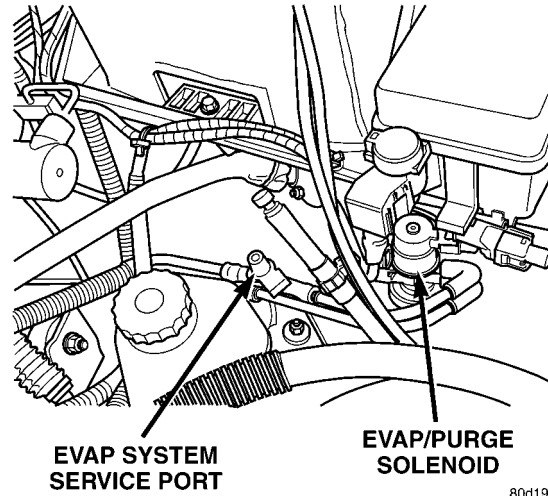


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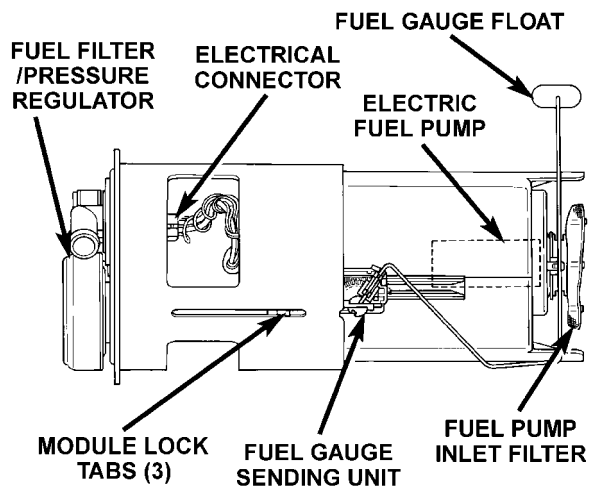
## 8.4 FUEL SYSTEM



80fc20c4

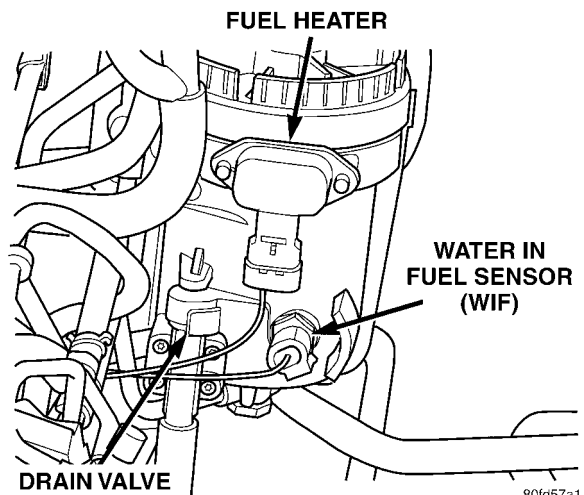


80d19d28



80a61214

## DIESEL (LATE)

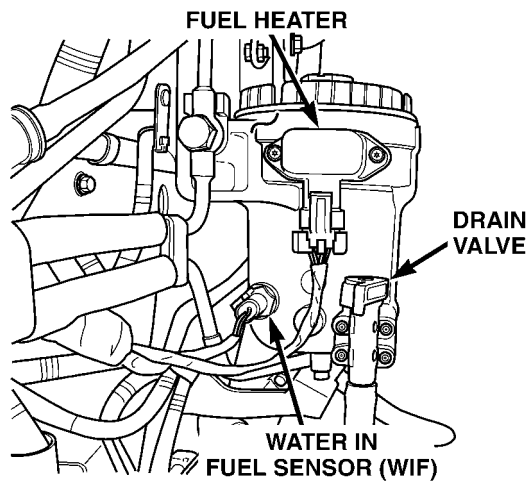


80fd57a1

# COMPONENT LOCATIONS

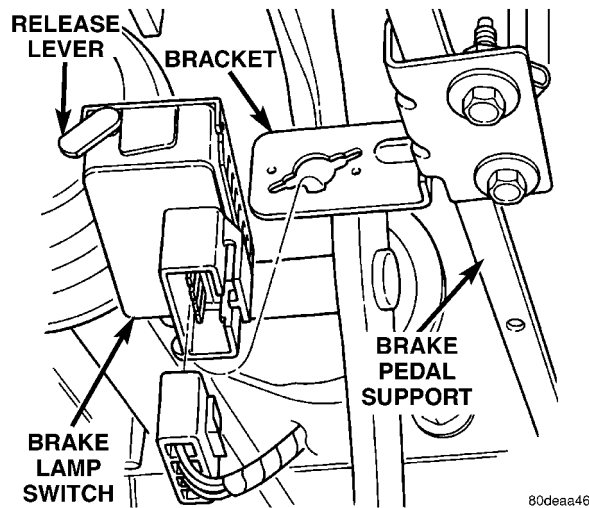
## 8.4 FUEL SYSTEM (Continued)

### DIESEL (EARLY)

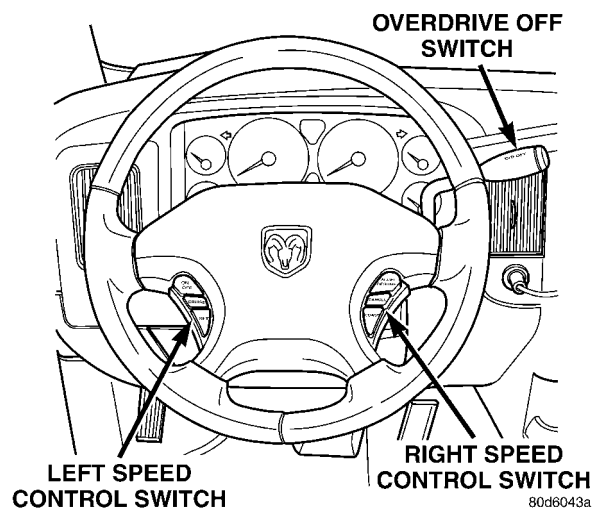


80fd57ae

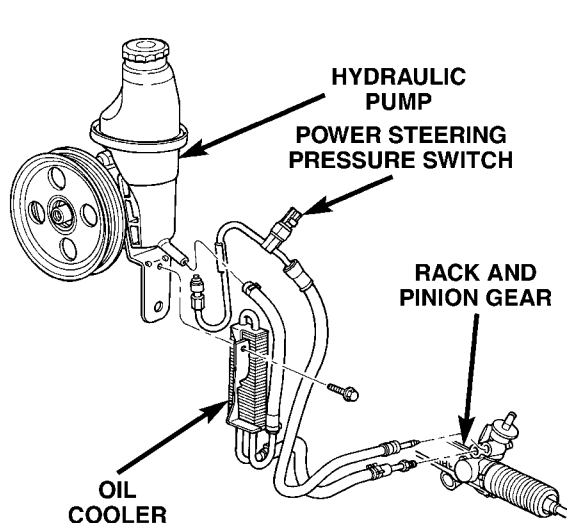
## 8.5 SWITCHES



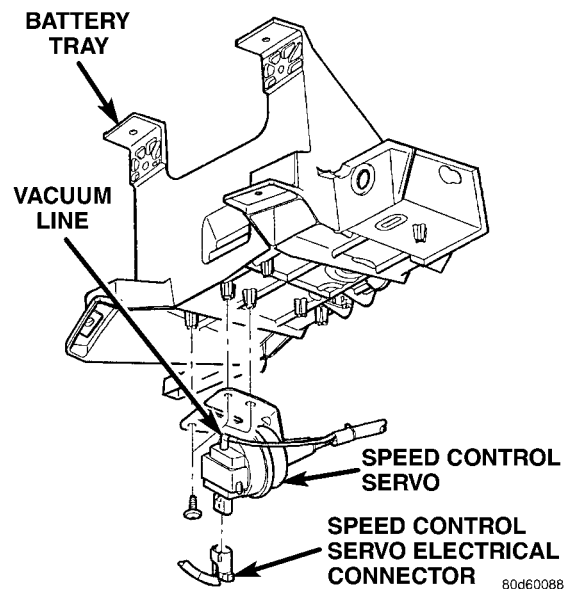
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80d6043a

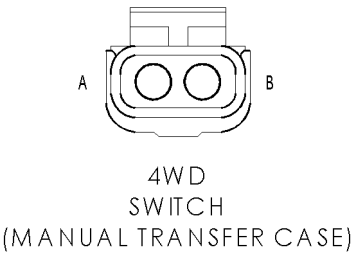


80bfe152

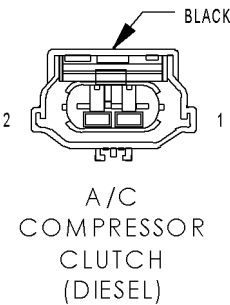


80d60088

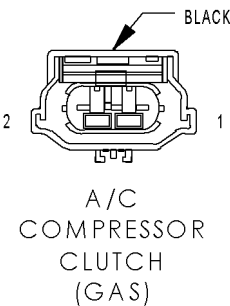
9.0 CONNECTOR PINOUTS



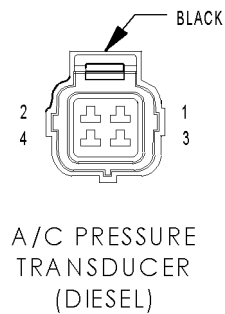
4WD SWITCH (MANUAL TRANSFER CASE) - 2 WAY		
CAV	CIRCUIT	FUNCTION
1	K77 18BR/WT	TRANSFER CASE POSITION SENSOR INPUT
2	Z901 18BK	GROUND



A/C COMPRESSOR CLUTCH (DIESEL) - BLACK 2 WAY		
CAV	CIRCUIT	FUNCTION
1	C3 18DB/YL	A/C COMPRESSOR CLUTCH RELAY OUTPUT
2	Z816 18BK	GROUND

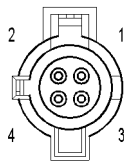


A/C COMPRESSOR CLUTCH (GAS) - BLACK 2 WAY		
CAV	CIRCUIT	FUNCTION
1	C3 20DB/YL	A/C CLUTCH RELAY OUTPUT
2	Z153 18BK/GY	GROUND



A/C PRESSURE TRANSDUCER (DIESEL) - BLACK 4 WAY		
CAV	CIRCUIT	FUNCTION
1	K916 18BR/OR	SENSOR GROUND
2	F855 18PK/YL	5 VOLT SUPPLY
3	C918 18BK/LB	A/C PRESSURE SENSOR GROUND
4	-	-

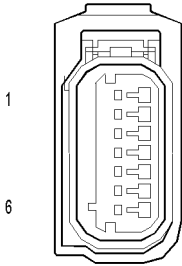
# CONNECTOR PINOUTS



A/C  
PRESSURE  
TRANSDUCER  
(NGC)

A/C PRESSURE TRANSDUCER (NGC) - 4 WAY

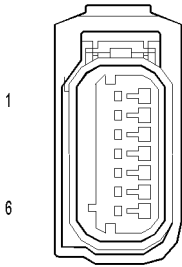
CAV	CIRCUIT	FUNCTION
1	K900 18DB/DG	SENSOR GROUND
2	F855 18PK/YL	5 VOLT SUPPLY
3	C918 18BK/LB	A/C PRESSURE SIGNAL
4	-	-



ACCELERATOR  
PEDAL  
POSITION  
SENSOR  
(5.7L)

ACCELERATOR PEDAL POSITION SENSOR (5.7L) - 6 WAY

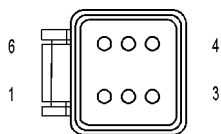
CAV	CIRCUIT	FUNCTION
1	K29 20WT/BR	APPS NO. 2 SIGNAL
2	F856 20YL/PK	5 VOLT SUPPLY
3	F855 20PK/YL	5 VOLT SUPPLY
4	K400 20BR/VT	APPS NO.2 RETURN
5	K23 20BR/WT	APPS NO. 1 SIGNAL
6	K167 20BR/YL	APPS NO.1 RETURN



ACCELERATOR  
PEDAL  
POSITION  
SENSOR  
(DIESEL M/T)

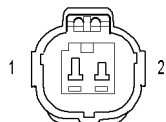
ACCELERATOR PEDAL POSITION SENSOR (DIESEL M/T) - 6 WAY

CAV	CIRCUIT	FUNCTION
1	K29 20WT/BR	APPS NO. 2 SIGNAL
2	K854 20VT/BR	APPS NO. 2 5 VOLT SUPPLY
3	K852 20BR/LB	APPS NO. 1 5 VOLT SUPPLY
4	K400 20BR/VT	APPS NO. 2 RETURN
5	K23 20BR/WT	APPS NO. 1 SIGNAL
6	K167 20BR/YL	APPS NO. 1 RETURN



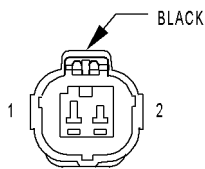
ACCELERATOR  
PEDAL POSITION  
SENSOR  
(DIESEL A/T)

ACCELERATOR PEDEL POSITION SENSOR (DIESEL A/T) - 6 WAY		
CAV	CIRCUIT	FUNCTION
1	K914 18RD/WT	SENSOR GROUND
2	K556 18OR/BR	NOT IDLE SWITCH
3	K22 18BR/WT	TP SIGNAL
4	K922 18LG/OR	THROTTLE POSITION SENSOR RETURN
5	K851 18VT/PK	5-VOLT SUPPLY
6	K565 18OR	IDLE SWITCH



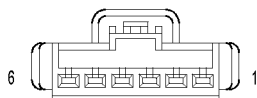
AMBIENT  
TEMPERATURE  
SENSOR

AMBIENT TEMPERATURE SENSOR - 2 WAY		
CAV	CIRCUIT	FUNCTION
1	G31 20VT/LG	AAT SIGNAL
2	K900 20DB/DG	SENSOR GROUND



BATTERY  
TEMPERATURE  
SENSOR

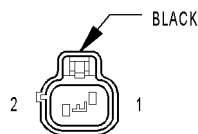
BATTERY TEMPERATURE SENSOR - BLACK 2 WAY		
CAV	CIRCUIT	FUNCTION
1	K25 18DB/VT	BATT TEMP SIGNAL
2	K900 20DB/DG	SENSOR GROUND



BRAKE  
LAMP  
SWITCH

BRAKE LAMP SWITCH - 6 WAY		
CAV	CIRCUIT	FUNCTION
1	A103 18GY/RD	FUSED B(+)
2	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
3	V30 20VT/WT	S/C BRAKE SWITCH OUTPUT
3	V30 20VT/WT (5.7L)	FUSED IGNITION SWITCH (RUN-START)
4	V32 20VT/YL	SPEED CONTROL SUPPLY
4	V32 20VT/YL (5.7L)	BRAKE SWITCH NO. 2 SIGNAL
5	Z429 20BK/OR	GROUND
6	B29 20DG/WT	BRAKE SWITCH SIGNAL
6	B29 20DG/WT (5.7L)	BRAKE SWITCH NO. 1 SIGNAL

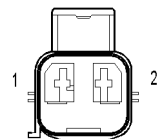
# CONNECTOR PINOUTS



BRAKE  
TRANSMISSION  
SHIFT INTERLOCK  
SOLENOID

**BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID - BLACK 2 WAY**

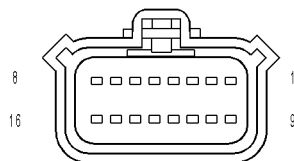
CAV	CIRCUIT	FUNCTION
1	K32 18DB/YL	BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID CONTROL
2	Z101 18BK/VT	GROUND



C102  
(NGC)

**C102 (NGC) - (AMBIENT TEMPERATURE SENSOR SIDE)**

CAV	CIRCUIT
1	G31 20VT/LG
2	K900 20DB/DG

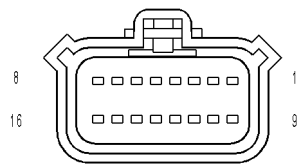


C106  
(5.7L A/T)

**C106 (5.7L A/T) - (ENGINE SIDE)**

CAV	CIRCUIT
1	K11 18BR/YL
2	K12 18BR/DB
3	K13 18BR/LB
4	K14 18BR/TN
5	K38 18BR/OR
6	K58 18BR/VT
7	K26 18BR/YL
8	K28 18BR/LB
9	K19 18DB/DG
10	K17 18DB/TN
11	K18 18DB/OR
12	K15 18DB/GY
13	K16 18DB/YL
14	K10 18DB/OR
15	K97 18BR
16	K98 18DB/YL

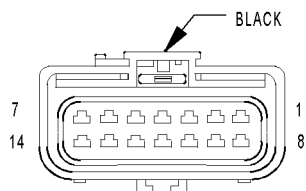
C106 (5.7L A/T) - (INTAKE AIR FUEL MODULE SIDE)



C106  
(5.7L A/T)

CAV	CIRCUIT
1	K11 18BR/YL
2	K12 18BR/DB
3	K13 18BR/LB
4	K14 18BR/TN
5	K38 18BR/OR
6	K58 18BR/VT
7	K26 18BR/YL
8	K28 18BR/LB
9	K19 18DB/DG
10	K17 18DB/TN
11	K18 18DB/OR
12	K15 18DB/GY
13	K16 18DB/YL
14	K10 18DB/OR
15	K97 18BR
16	K98 18DB/YL

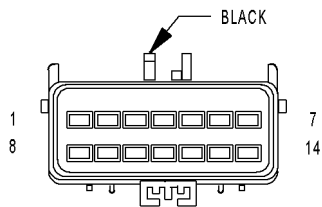
C107 (5.7L) - BLACK (ENGINE SIDE)



C107  
(5.7L)

CAV	CIRCUIT
1	K900 18DB/DG
2	K1 18VT/BR
3	K21 18DB/LG
4	K922 18BR/DB
5	F856 18YL/PK
6	K447 18TN/YL
7	K342 16BR/WT
8	F855 18PK/YL
9	K2 18VT/OR
10	K122 18BR/DG
11	K22 18BR/OR
12	-
13	K448 18TN/OR
14	K342 16BR/WT

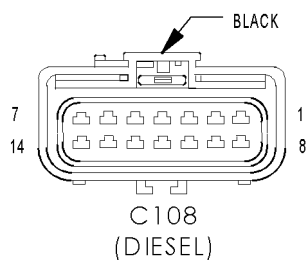
C107 (5.7L) - BLACK (INTAKE AIR FUEL MODULE SIDE)



C107  
(5.7L)

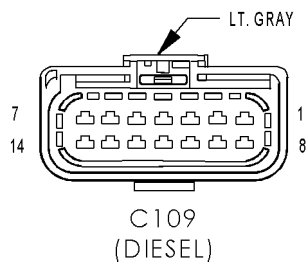
CAV	CIRCUIT
1	K900 18DB/DG
2	K1 18VT/BR
3	K21 18DB/LG
4	K922 18BR/DB
5	F856 18YL/PK
6	K447 18TN/YL
7	K342 16BR/WT
8	F855 18PK/YL
9	K2 18VT/OR
10	K122 18BR/DG
11	K22 18BR/OR
12	-
13	K448 18TN/OR
14	K342 16BR/WT

# CONNECTOR PINOUTS



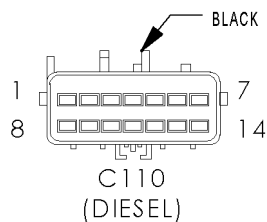
**C108 (DIESEL) - BLACK (TRANSMISSION SIDE)**

CAV	CIRCUIT
1	B22 20DG/YL
2	C13 20LB/OR
3	A961 14RD
4	K25 18DB/VT
5	N4 18DB/WT
6	D25 20WT/VT
7	-
8	V32 20VT/YL (M/T)
9	K174 18BR/YL
10	-
11	K176 18BR/OR
12	K23 20BR/WT (M/T)
13	K852 20BR/LB (M/T)
14	K167 20BR/YL (M/T)



**C109 (DIESEL) - LT GRAY (TRANSMISSION SIDE)**

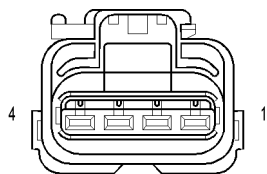
CAV	CIRCUIT
1	V35 20VT/OR
2	V32 20VT/YL
3	T41 20YL/DB
4	T6 20DG
5	T118 18DG
6	T9 18DG/TN
7	-
8	T38 18YL/BR
9	T75 18YL/LB
10	T54 18DG/OR
11	T515 20YL/DB
12	V36 20VT/YL
13	T14 18DG/BR
14	T13 18DG/VT



**C110 (DIESEL) - BLACK (TRANSMISSION SIDE)**

CAV	CIRCUIT
1	C3 20DB/YL
2	B29 20DG/WT
3	-
4	K900 20DB/DG
5	V37 20VT
6	K160 18BR/OR
7	K161 18BR/LB
8	F856 18YL/PK
9	D20 20WT/LG
10	D21 20WT/BR
11	F202 20PK/GY
12	K29 20WT/BR (M/T)
13	K854 20VT/BR (M/T)
14	K400 20BR/VT (M/T)

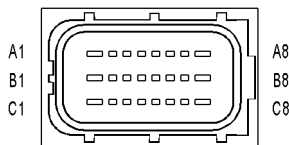




C112  
(DIESEL A/T)

C112 (DIESEL A/T) - (TRANSMISSION SIDE)

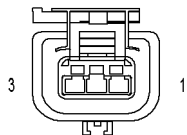
CAV	CIRCUIT
1	C3 18DB/YL
2	A961 14RD
3	K615 18VT/WT
4	K616 18BR/YL



C130  
(DIESEL)

C130 (DIESEL) - (TRANSMISSION SIDE)

CAV	CIRCUIT
A1	-
A2	C3 20DB/YL
A3	T41 20YL/DB (A/T)
A4	K400 20BR/VT (M/T)
A5	K900 20DB/DG
A6	K29 20WT/BR (M/T)
A7	K852 20BR/LB (M/T)
A8	Z901 18BK (MANUAL TRANSFER CASE)
B1	T16 18YL/OR (A/T)
B2	L1 18WT/LG
B3	L10 18WT/GY
B4	F202 20PK/GY
B5	B22 20DG/YL
B6	T515 20YL/DB (A/T)
B7	K77 18BR/WT (MANUAL TRANSFER CASE)
B8	N4 18DB/WT
C1	K174 18BR/YL
C2	C13 20LB/OR
C3	D25 20WT/VT
C4	K854 20VT/BR (M/T)
C5	K167 20BR/YL (M/T)
C6	K23 20BR/WT (M/T)
C7	T6 20DG (A/T)
C8	K176 18BR/OR

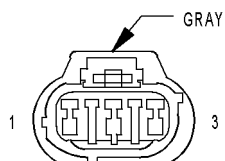


CAMSHAFT  
POSITION  
SENSOR  
(DIESEL)

CAMSHAFT POSITION SENSOR (DIESEL) - 3 WAY

CAV	CIRCUIT	FUNCTION
1	F855 18PK/YL	5 VOLT SUPPLY
2	K916 18BR/OR	SENSOR GROUND
3	K44 18DB/GY	CMP SIGNAL

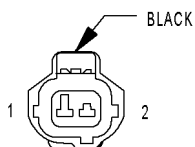
# CONNECTOR PINOUTS



CAMSHAFT  
POSITION  
SENSOR  
(NGC)

**CAMSHAFT POSITION SENSOR (NGC) - GRAY 3 WAY**

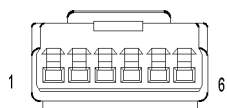
CAV	CIRCUIT	FUNCTION
1	K44 20DB/GY	CMP SIGNAL
2	K900 20DB/DG	SENSOR GROUND
3	F856 20YL/PK	5 VOLT SUPPLY



CAPACITOR  
(3.7L/4.7L)

**CAPACITOR (3.7L/4.7L) - BLACK 2 WAY**

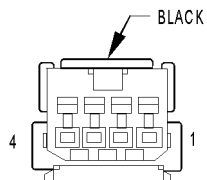
CAV	CIRCUIT	FUNCTION
1	K342 16BR/WT	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	-	-



CLOCKSPRING-C1

**CLOCKSPRING C1 - 6 WAY**

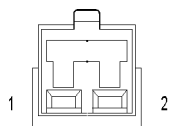
CAV	CIRCUIT	FUNCTION
1	Z909 20BK (DSAB ETC)	GROUND
2	X20 20GY/WT (DSAB ETC)	RADIO CONTROL MUX
3	V38 20VT/OR	S/C SWITCH NO. 2 SIGNAL
4	V37 20VT	S/C SWITCH NO. 1 SIGNAL
5	V937 20VT/BR	S/C SWITCH RETURN
6	X3 20DG/VT	HORN SWITCH SENSE



CLOCKSPRING C3

**CLOCKSPRING C3 - BLACK 4 WAY**

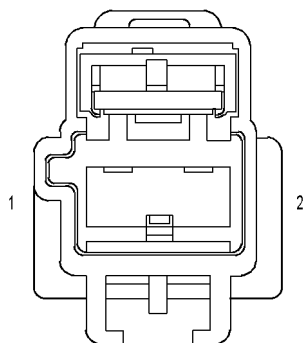
CAV	CIRCUIT	FUNCTION
1	X3 20DG/VT	HORN SWITCH SENSE
2	V937 20VT/BR	S/C SWITCH RETURN
3	V37 20VT	S/C SWITCH NO. 1 SIGNAL
4	V38 20VT/OR (DSAB ETC)	S/C SWITCH NO. 2 SIGNAL



CLOCKSPRING C4

**CLOCKSPRING C4 - 2 WAY**

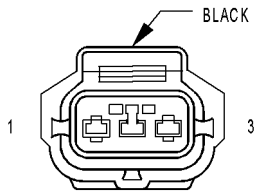
CAV	CIRCUIT	FUNCTION
1	Z909 22BK	GROUND
2	X20 22GY/WT	RADIO CONTROL MUX



CLUTCH  
INTERLOCK  
BRAKE  
SWITCH

CLUTCH INTERLOCK BRAKE SWITCH - 2 WAY

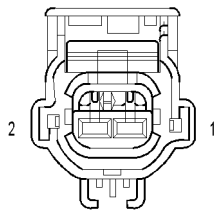
CAV	CIRCUIT	FUNCTION
1	T41 20YL/DB	TRS T41 SENSE
2	Z911 18BK	GROUND



COIL ON  
PLUG NO. 1  
(3.7L/4.7L)

COIL ON PLUG NO. 1 (3.7L/4.7L) - BLACK 3 WAY

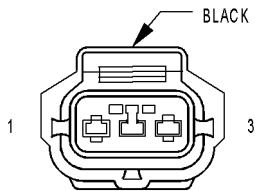
CAV	CIRCUIT	FUNCTION
1	K19 18DB/DG	COIL CONTROL NO. 1
2	K342 16BR/WT	ASD RELAY OUTPUT
3	-	-



COIL ON  
PLUG  
NO. 1  
(5.7L)

COIL ON PLUG NO. 1 (5.7L) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K342 16BR/WT	ASD RELAY OUTPUT
2	K19 18DB/DG	COIL CONTROL NO. 1

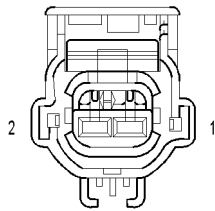


COIL ON  
PLUG NO. 2  
(3.7L/4.7L)

COIL ON PLUG NO. 2 (3.7L/4.7L) - BLACK 3 WAY

CAV	CIRCUIT	FUNCTION
1	K17 18DB/TN	COIL CONTROL NO. 2
2	K342 16BR/WT	ASD RELAY OUTPUT
3	-	-

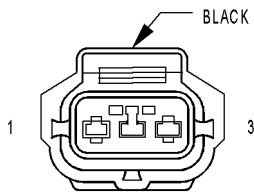
# CONNECTOR PINOUTS



COIL ON  
PLUG  
NO. 2  
(5.7L)

COIL ON PLUG NO. 2 (5.7L) - 2 WAY

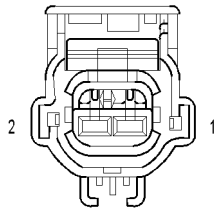
CAV	CIRCUIT	FUNCTION
1	K342 16BR/WT	ASD RELAY OUTPUT
2	K17 18DB/TN	COIL CONTROL NO. 2



COIL ON  
PLUG NO. 3  
(3.7L/4.7L)

COIL ON PLUG NO. 3 (3.7L/4.7L) - BLACK 3 WAY

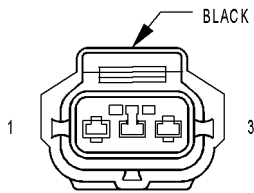
CAV	CIRCUIT	FUNCTION
1	K18 18DB/OR	COIL CONTROL NO. 3
2	K342 16BR/WT	ASD RELAY OUTPUT
3	-	-



COIL ON  
PLUG  
NO. 3  
(5.7L)

COIL ON PLUG NO. 3 (5.7L) - 2 WAY

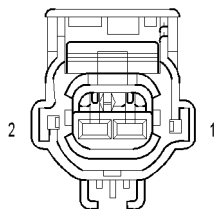
CAV	CIRCUIT	FUNCTION
1	K342 16BR/WT	ASD RELAY OUTPUT
2	K18 18DB/OR	COIL CONTROL NO. 3



COIL ON  
PLUG NO. 4  
(3.7L/4.7L)

COIL ON PLUG NO. 4 (3.7L/4.7L) - BLACK 3 WAY

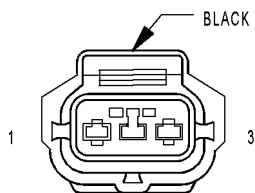
CAV	CIRCUIT	FUNCTION
1	K15 18DB/GY	COIL CONTROL NO. 4
2	K342 16BR/WT	ASD RELAY OUTPUT
3	-	-



COIL ON  
PLUG  
NO. 4  
(5.7L)

COIL ON PLUG NO. 4 (5.7L) - 2 WAY

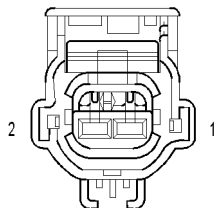
CAV	CIRCUIT	FUNCTION
1	K342 16BR/WT	ASD RELAY OUTPUT
2	K15 18DB/GY	COIL CONTROL NO. 4



COIL ON  
PLUG NO. 7  
(4.7L)

COIL ON PLUG NO. 7 (4.7L) - BLACK 3 WAY

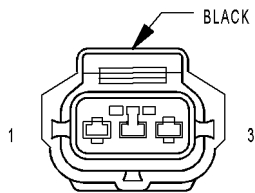
CAV	CIRCUIT	FUNCTION
1	K97 18DB/YL	COIL CONTROL NO. 7
2	K342 16BR/WT	ASD RELAY OUTPUT
3	-	-



COIL ON  
PLUG  
NO. 7  
(5.7L)

COIL ON PLUG NO. 7 (5.7L) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K342 16BR/WT	ASD RELAY OUTPUT
2	K97 18BR	COIL CONTROL NO. 7

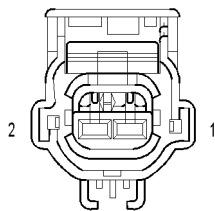


COIL ON  
PLUG NO. 8  
(4.7L)

COIL ON PLUG NO. 8 (4.7L) - BLACK 3 WAY

CAV	CIRCUIT	FUNCTION
1	K98 18DB/YL	COIL CONTROL NO. 8
2	K342 16BR/WT	ASD RELAY OUTPUT
3	-	-

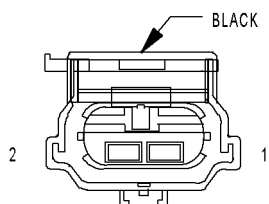
# CONNECTOR PINOUTS



COIL ON  
PLUG  
NO. 8  
(5.7L)

COIL ON PLUG NO. 8 (5.7L) - 2 WAY

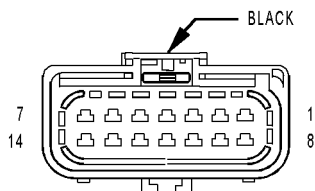
CAV	CIRCUIT	FUNCTION
1	K342 16BR/WT	ASD RELAY OUTPUT
2	K98 18DB/YL	COIL CONTROL NO. 8



CONDENSER FAN  
(NGC)

CONDENSER FAN (NGC) - BLACK 2 WAY

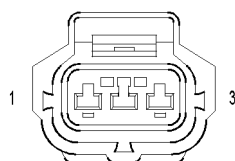
CAV	CIRCUIT	FUNCTION
1	Z823 16BK/DG	GROUND
2	C123 16LB/WT	CONDENSER FAN RELAY OUTPUT



CONTROLLER  
ANTILOCK  
BRAKE C1

CONTROLLER ANITLOCK BRAKE C1 - BLACK 14 WAY

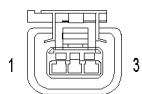
CAV	CIRCUIT	FUNCTION
1	B4 20DG/GY	REAR WHEEL SPEED SENSOR (+)
2	B222 20DG/WT (ETC)	VEHICLE SPEED SIGNAL NO. 2
3	D25 20WT/VT	PCI BUS
4	F500 20DG/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
5	B9 20DG/LG (ETC)	LEFT FRONT WHEEL SPEED SENSOR (+)
6	Z107 12BK/DG	GROUND
7	A111 14DG/RD	FUSED B(+)
8	B3 20DG/YL	REAR WHEEL SPEED SENSOR (-)
9	B29 20DG/WT	BRAKE SWITCH SIGNAL
10	B8 20DG/TN (ETC)	LEFT FRONT WHEEL SPEED SENSOR (-)
11	B20 20DG/OR	BRAKE FLUID LEVEL SWITCH SENSE
12	B22 20DG/YL	VEHICLE SPEED SIGNAL NO. 1
13	Z127 12BK/DG (ABS)	GROUND
14	A111 14DG/RD (ABS)	FUSED B(+)



CRANKSHAFT  
POSITION  
SENSOR  
(3.7L)

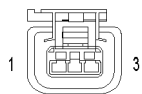
CRANKSHAFT POSITION SENSOR (3.7L) - 3 WAY

CAV	CIRCUIT	FUNCTION
1	K24 20BR/LB	CKP SIGNAL
2	K900 20DB/DG	SENSOR GROUND
3	F855 20PK/YL	5 VOLT SUPPLY



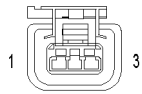
CRANKSHAFT  
POSITION  
SENSOR  
(4.7L)

CRANKSHAFT POSITION SENSOR (4.7L) - 3 WAY		
CAV	CIRCUIT	FUNCTION
1	K24 20BR/LB	CKP SIGNAL
2	K900 20DB/DG	SENSOR GROUND
3	F855 20PK/YL	5 VOLT SUPPLY



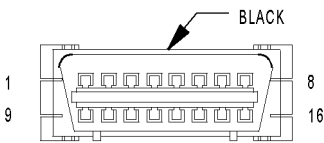
CRANKSHAFT  
POSITION  
SENSOR  
(5.7L)

CRANKSHAFT POSITION SENSOR (5.7L) - 3 WAY		
CAV	CIRCUIT	FUNCTION
1	F855 20PK/YL	5 VOLT SUPPLY
2	K900 20DB/DG	SENSOR GROUND
3	K24 20BR/LB	CKP SIGNAL



CRANKSHAFT  
POSITION  
SENSOR  
(DIESEL)

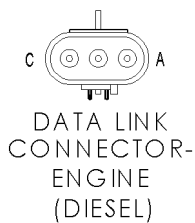
CRANKSHAFT POSITION SENSOR (DIESEL) - 3 WAY		
CAV	CIRCUIT	FUNCTION
1	K853 18DB/BR	5 VOLT SUPPLY
2	K975 18BR/BK	SENSOR GROUND
2	K975 18BR/OR	SENSOR GROUND
3	K24 18BR/LB	CKP SIGNAL
3	K24 18LB/BR	CKP SIGNAL



DATA LINK  
CONNECTOR

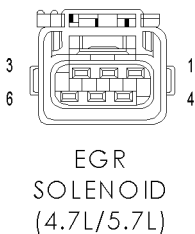
DATA LINK CONNECTOR - BLACK 16 WAY		
CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 20WT/VT	PCI BUS
3	-	-
4	Z11 18BK/LG	GROUND
5	Z111 18BK/WT	GROUND
6	-	-
7	D21 18WT/BR	SCI TRANSMIT (PCM)
8	-	-
9	D16 18WT/OR	SCI RECEIVE (TCM)
10	-	-
11	-	-
12	D20 20WT/LG	SCI RECEIVE (PCM)
13	-	-
14	-	-
15	D15 18WT/DG	SCI TRANSMIT (TCM)
16	A114 18GY/RD	FUSED B(+)

# CONNECTOR PINOUTS



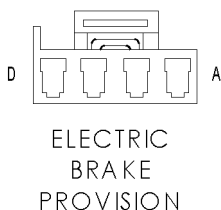
**DATA LINK CONNECTOR-ENGINE (DIESEL) - 3 WAY**

CAV	CIRCUIT	FUNCTION
1	D72 18WT/LB	CCD BUS (+)
2	D71 18WT/DB	CCD BUS (-)
3	Z816 14BK (A/T)	GROUND
3	Z11 14BK/LG (M/T)	GROUND



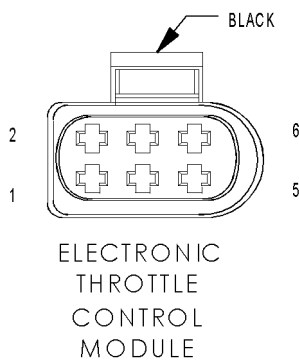
**EGR SOLENOID (4.7L/5.7L) - 6 WAY**

CAV	CIRCUIT	FUNCTION
1	K34 18DB/LG	EGR SENSOR SIGNAL
2	F856 20YL/PK	5 VOLT SUPPLY
3	K900 20DB/DG	SENSOR GROUND
4	Z335 18BK/WT	GROUND
5	-	-
6	K35 18DB/VT	EGR SOLENOID CONTROL



**ELECTRIC BRAKE PROVISION - 4 WAY**

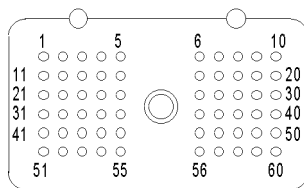
CAV	CIRCUIT	FUNCTION
A	A400 14TN/RD	FUSED B(+)
B	B40 14DG	TRAILER TOW BRAKE B(+)
C	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
D	Z998 18BK	GROUND



**ELECTRIC THROTTLE CONTROL MODULE - BLACK 6 WAY**

CAV	CIRCUIT	FUNCTION
1	K22 18BR/OR	TP NO. 1 SIGNAL
2	F855 18PK/YL	5 VOLT SUPPLY
3	K447 18TN/YL	ETC MOTOR (+)
4	K122 18BR/DG	TP NO. 2 SIGNAL
5	K448 18TN/OR	ETC MOTOR (-)
6	K922 18BR/DB	TP SENSOR RETURN



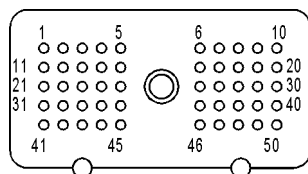


ENGINE CONTROL  
MODULE C1  
(DIESEL)

ENGINE CONTROL MODULE C1 (DIESEL) - 60 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	-	-
4	D72 18WT/LB	CCD BUS (+)
5	D71 18WT/DB	CCD BUS (-)
6	K65 18BR/LB	FUEL PUMP RELAY RETURN
7	K20 18BR/GY	GEN FIELD CONTROL
8	-	-
9	-	-
10	-	-
11	K2 18TN/BK (A/T)	ECT SIGNAL
11	K2 18VT/OR (M/T)	ECT SIGNAL
12	K181 18BR/YL	FUEL PUMP DRIVER
13	-	-
14	K22 18BR/WT (A/T)	TP SIGNAL
14	K23 18DB/WT (M/T)	APPS NO. 1 SIGNAL
15	K21 18DB/LG	INTAKE AIR TEMPERATURE SENSOR SIGNAL
16	-	-
16	K29 18WT/BR (M/T)	APPS NO. 2 SIGNAL
17	-	-
18	-	-
19	K31 18BR	FUEL PUMP RELAY CONTROL
20	-	-
21	-	-
22	K24 18LB/BR (A/T)	CKP SIGNAL
22	K24 18BR/LB (M/T)	CKP SIGNAL
23	K914 18RD/WT (A/T)	SENSOR GROUND
23	K914 18BR/WT (M/T)	SENSOR GROUND
24	K44 18DB/GY	CMP SIGNAL
25	K668 18LG (A/T)	SUPPLY VOLTAGE
25	K688 18BR (M/T)	SUPPLY VOLTAGE
26	C918 18BK/LB	A/C PRESSURE SENSOR GROUND
27	K853 18DB/BR	5 VOLT SUPPLY
28	-	-
29	K690 18DG/YL (A/T)	INLET AIR TEMPERATURE/PRESSURE RETURN
29	K690 18BR/YL (M/T)	INLET AIR TEMPERATURE/PRESSURE RETURN
30	K11 16WT/DB (A/T)	INJECTOR CONTROL NO. 1
30	K11 16BR/YL (M/T)	INJECTOR CONTROL NO.1
31	G123 18VT/LG	WATER IN FUEL SENSOR SIGNAL
32	K916 18BR/OR	SENSOR GROUND
33	K922 18LG/OR (A/T)	THROTTLE POSITION SENSOR RETURN
33	K167 18BR/YL (M/T)	APPS NO. 1 RETURN
34	K565 18OR	IDLE SWITCH
35	-	-
36	K14 16BR/TN	INJECTOR CONTROL NO. 4
37	-	-
38	-	-
39	-	-
40	K13 16TN (A/T)	INJECTOR CONTROL NO. 3
40	K13 16BR/LB (M/T)	INJECTOR CONTROL NO.3
41	-	-
42	K851 18VT/PK (A/T)	5-VOLT SUPPLY
42	K852 18BR/VT (M/T)	APPS 1 5-VOLT SUPPLY
43	K37 18LB (A/T)	BOOST PRESSURE SENSOR SIGNAL
43	K37 18BR/OR (M/T)	BOOST PRESSURE SENSOR SIGNAL
44	K556 18OR/BR	NOT IDLE SWITCH
45	N2 18DB/YL	LIFT PUMP FEED
46	K58 16BR/VT	INJECTOR CONTROL NO. 6
47	-	-
48	-	-
49	-	-
50	K12 16BR/DB	INJECTOR CONTROL NO. 2
51	-	-
52	K975 18BR/BK (A/T)	SENSOR GROUND
52	K975 18BR/OR (M/T)	SENSOR GROUND
53	K915 18VT/RD	FUEL RAIL SENSOR RETURN
54	F855 18PK/YL	5 VOLT SUPPLY
55	-	-
56	K38 16GY (A/T)	INJECTOR CONTROL NO. 5
56	K38 16BR/OR (M/T)	INJECTOR CONTROL NO. 5
57	K229 16TN/PK (A/T)	ENG-INJECTOR HIGH SIDE DRIVER-BANK 2
57	K229 16BR/LB (M/T)	ENG-INJECTOR HIGH SIDE DRIVER-BANK 2
58	-	-
59	K227 16BR/LG	ENG-INJECTOR HIGH SIDE DRIVER-BANK 1
60	-	-

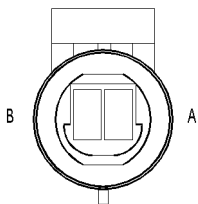
# CONNECTOR PINOUTS



ENGINE CONTROL  
MODULE C2  
(DIESEL)

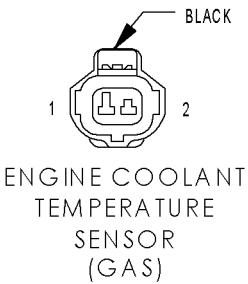
ENGINE CONTROL MODULE C2 (DIESEL) - 50 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	K615 18VT/WT	INLET AIR TEMPERATURE SENSE
3	K615 18BR/WT (M/T)	INLET AIR TEMPERATURE SENSE
4	V35 18VT/OR (A/T)	S/C VENT CONTROL
5	K176 18BR/OR	INTAKE AIR HEATER RELAY NO 2 CONTROL
6	K174 18BR/YL	INTAKE AIR HEATER RELAY NO 1 CONTROL
7	V32 18VT/YL (A/T)	SPEED CONTROL SUPPLY
8	-	-
9	T41 18YL/DB (A/T)	PARK/NEUTRAL POSITION SWITCH SENSE (T41)
10	K161 18BR/LB	FAN SPEED SENSOR
11	B22 18DG/YL	VEHICLE SPEED SENSOR SIGNAL NO. 1
12	G6 18VT/GY	OIL PRESSURE SIGNAL
13	T6 18DG (A/T)	TOW/HAUL OVERDRIVE OFF SWITCH SENSE
14	T118 18DG (A/T)	GOVERNOR PRESSURE SOLENOID CONTROL
15	T9 18DG/TN (A/T)	3-4 SOLENIOD CONTROL
16	D21 18WT/BR	SCI TRANSMIT (PCM)
16	D21 18PK (M/T)	SCI TRANSMIT
17	-	-
18	T38 18YL/BR (A/T)	GOVERNOR PRESSURE SENSOR SIGNAL
19	D20 18WT/LG	SCI RECEIVE (PCM)
20	A209 16RD	FUSED B(+)
21	Z902 16BK	GROUND
22	-	-
23	F856 18YL/PK	5 VOLT SUPPLY
24	K900 18DB/DG	SENSOR GROUND
25	T75 18YL/LB (A/T)	TORQUE CONVERTER CLUTCH SOLENOID CONTROL
26	N4 18DB/WT	FUEL LEVEL SENSOR SIGNAL
27	-	-
28	D25 18WT/VT	PCI BUS
29	T54 18DG/OR (A/T)	TRANSMISSION TEMPERATURE SENSOR SIGNAL
30	A209 16RD	FUSED B(+)
31	T515 18YL/DB (A/T)	TRANSMISSION CONTROL RELAY CONTROL
32	F202 18PK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-START)
33	K854 18VT/BR (M/T)	5 VOLT SUPPLY
34	V36 18VT/YL (A/T)	S/C VACUUM CONTROL
35	K616 18BR/YL	INLET AIR PRESSURE SENSE
36	V32 18VT/YL (M/T)	SPEED CONTROL SUPPLY
37	B29 18DG/WT	BRAKE SWITCH SIGNAL
38	-	-
39	-	-
40	A209 16RD	FUSED B(+)
41	C13 18LB/OR	A/C CLUTCH RELAY CONTROL
42	-	-
43	K160 18BR/OR	PARK LOCKOUT SOLENOID CONTROL
44	T14 18DG/BR (A/T)	OUTPUT SPEED SENSOR SIGNAL
45	T13 18DG/VT (A/T)	SENSOR GROUND
46	V37 18VT	S/C SWITCH NO. 1 SIGNAL
47	K25 18DB/VT	BATT TEMP SIGNAL
48	K400 18BR/VT (M/T)	APPS NO.2 RETURN
49	Z902 16BK	GROUND
50	Z902 16BK	GROUND



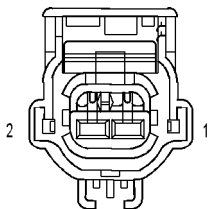
ENGINE  
COOLANT  
TEMPERATURE  
SENSOR  
(DIESEL)

ENGINE COOLANT TEMPERATURE SENSOR (DIESEL) - 2 WAY		
CAV	CIRCUIT	FUNCTION
A	K914 18RD/WT	SENSOR GROUND
A	K914 18BR/WT	SENSOR GROUND
B	K2 18TN/BK	ECT SIGNAL
B	K2 18VT/OR	ECT SIGNAL



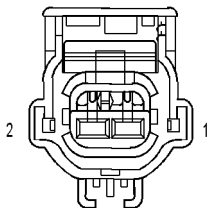
ENGINE COOLANT  
TEMPERATURE  
SENSOR  
(GAS)

ENGINE COOLANT TEMPERATURE SENSOR (GAS) - BLACK 2 WAY		
CAV	CIRCUIT	FUNCTION
1	K900 18DB/DG	SENSOR GROUND
2	K2 18VT/OR	ECT SIGNAL



ENGINE  
OIL  
PRESSURE  
SWITCH

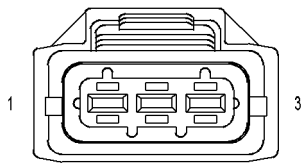
ENGINE OIL PRESSURE SWITCH - 2 WAY		
CAV	CIRCUIT	FUNCTION
1	G6 18VT/GY	OIL PRESSURE SIGNAL
2	-	-



EVAP/PURGE  
SOLENOID  
(NGC)

EVAP/PURGE SOLENOID (NGC) - 2 WAY		
CAV	CIRCUIT	FUNCTION
1	K52 18DB/WT	EVAP PURGE CONTROL
2	K70 18DB/BR	EVAP PURGE RETURN

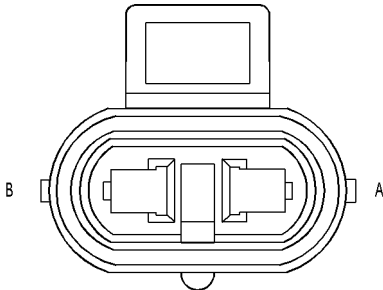
# CONNECTOR PINOUTS



FUEL  
CONTROL  
ACTUATOR  
(DIESEL)

FUEL CONTROL ACTUATOR (DIESEL) - 3 WAY

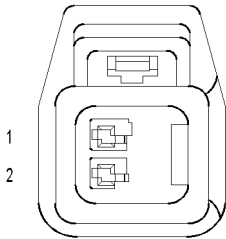
CAV	CIRCUIT	FUNCTION
1	K915 18VT/RD	FUEL RAIL SENSOR RETURN
2	K181 18BR/YL	FUEL PUMP DRIVER
3	F855 18PK/YL	5 VOLT SUPPLY



FUEL  
HEATER  
(DIESEL)

FUEL HEATER (DIESEL) - 2 WAY

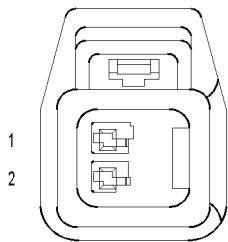
CAV	CIRCUIT	FUNCTION
A	Z816 14BK	GROUND
B	A961 14RD	FUEL HEATER RELAY OUTPUT



FUEL  
INJECTOR  
NO. 1  
(GAS)

FUEL INJECTOR NO. 1 (GAS) - 2 WAY

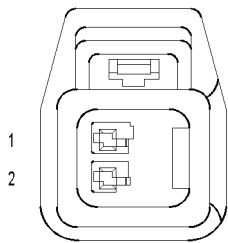
CAV	CIRCUIT	FUNCTION
1	K11 18BR/YL	INJECTOR CONTROL NO. 1
2	K342 16BR/WT	ASD RELAY OUTPUT



FUEL  
INJECTOR  
NO. 2  
(GAS)

FUEL INJECTOR NO. 2 (GAS) - 2 WAY

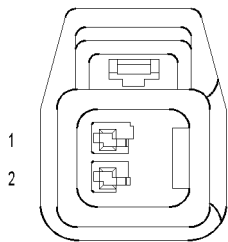
CAV	CIRCUIT	FUNCTION
1	K12 18BR/DB	INJECTOR CONTROL NO. 2
2	K342 16BR/WT	ASD RELAY OUTPUT



FUEL  
INJECTOR  
NO. 3  
(GAS)

FUEL INJECTOR NO. 3 (GAS) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K13 18BR/LB	INJECTOR CONTROL NO. 3
2	K342 16BR/WT	ASD RELAY OUTPUT

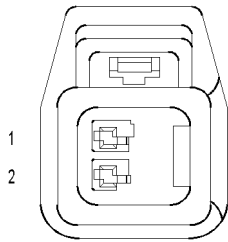


FUEL  
INJECTOR  
NO. 4  
(GAS)

FUEL INJECTOR NO. 4 (GAS) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K14 18BR/TN	INJECTOR CONTROL NO. 4
2	K342 16BR/WT	ASD RELAY OUTPUT

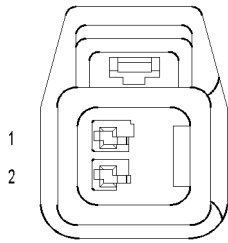
# CONNECTOR PINOUTS



FUEL  
INJECTOR  
NO. 5  
(GAS)

FUEL INJECTOR NO. 5 (GAS) - 2 WAY

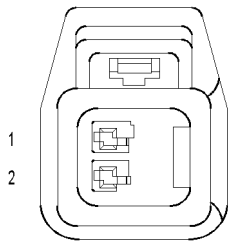
CAV	CIRCUIT	FUNCTION
1	K38 18BR/OR	INJECTOR CONTROL NO. 5
2	K342 16BR/WT	ASD RELAY OUTPUT



FUEL  
INJECTOR  
NO. 6  
(GAS)

FUEL INJECTOR NO. 6 (GAS) - 2 WAY

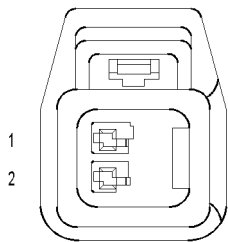
CAV	CIRCUIT	FUNCTION
1	K58 18BR/VT	INJECTOR CONTROL NO. 6
2	K342 16BR/WT	ASD RELAY OUTPUT



FUEL  
INJECTOR  
NO. 7  
(GAS)

FUEL INJECTOR NO. 7 (GAS) - 2 WAY

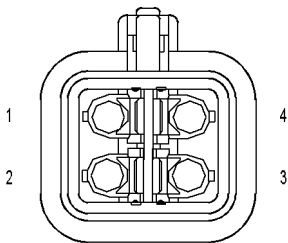
CAV	CIRCUIT	FUNCTION
1	K26 18BR/YL	INJECTOR CONTROL NO. 7
2	K342 16BR/WT	ASD RELAY OUTPUT



FUEL  
INJECTOR  
NO. 8  
(GAS)

FUEL INJECTOR NO. 8 (GAS) - 2 WAY

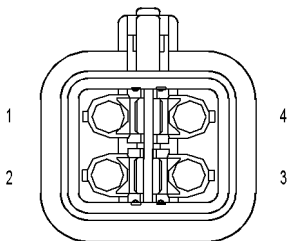
CAV	CIRCUIT	FUNCTION
1	K28 18BR/LB	INJECTOR CONTROL NO. 8
2	K342 16BR/WT	ASD RELAY OUTPUT



FUEL  
INJECTOR  
PACK NO. 1  
(DIESEL)

FUEL INJECTOR PACK NO. 1 (DIESEL) - 4 WAY

CAV	CIRCUIT	FUNCTION
1	K227 14BR/LG	ENG - INJECTOR HIGH SIDE DRIVER - BANK 1
2	K12 14BR/DB	INJECTOR CONTROL NO. 2
3	K227 14BR/LG	ENG - INJECTOR HIGH SIDE DRIVER - BANK 1
4	K11 14BR/YL	INJECTOR CONTROL NO. 1
4	K11 14WT/DB	INJECTOR CONTROL NO. 1

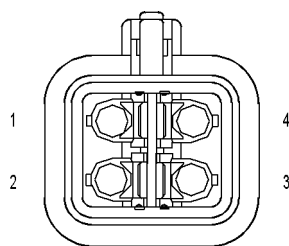


FUEL  
INJECTOR  
PACK NO. 2  
(DIESEL)

FUEL INJECTOR PACK NO. 2 (DIESEL) - 4 WAY

CAV	CIRCUIT	FUNCTION
1	K229 14BR/LB	ENG - INJECTOR HIGH SIDE DRIVER - BANK 2
1	K229 14TN/PK	ENG - INJECTOR HIGH SIDE DRIVER - BANK 2
2	K14 14BR/TN	INJECTOR CONTROL NO. 4
3	K227 14BR/LG	ENG - INJECTOR HIGH SIDE DRIVER - BANK 1
4	K13 14BR/LB	INJECTOR CONTROL NO. 3
4	K13 14TN	INJECTOR CONTROL NO. 3

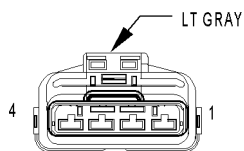
# CONNECTOR PINOUTS



FUEL  
INJECTOR  
PACK NO. 3  
(DIESEL)

FUEL INJECTOR PACK NO. 3 (DIESEL) - 4 WAY

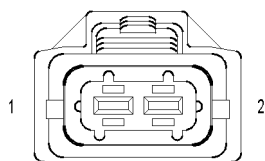
CAV	CIRCUIT	FUNCTION
1	K229 14BR/LB	ENG - INJECTOR HIGH SIDE DRIVER - BANK 2
1	K229 14TN/PK	ENG - INJECTOR HIGH SIDE DRIVER - BANK 2
2	K58 14BR/VT	INJECTOR CONTROL NO. 6
3	K229 14TN/PK	ENG - INJECTOR HIGH SIDE DRIVER - BANK 2
3	K229 14BR/LB	ENG - INJECTOR HIGH SIDE DRIVER - BANK 2
4	K38 14BR/OR	INJECTOR CONTROL NO. 5
4	K38 14GY	INJECTOR CONTROL NO. 5



FUEL PUMP  
MODULE

FUEL PUMP MODULE - LT GRAY 4 WAY

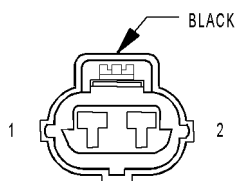
CAV	CIRCUIT	FUNCTION
1	Z201 12BK/OR	GROUND
2	K900 18DB/DG	SENSOR GROUND
3	N4 18DB/WT	FUEL LEVEL SENSOR SIGNAL
4	A109 14OR/RD	FUEL PUMP RELAY OUTPUT



FUEL  
PUMP  
MOTOR  
(DIESEL)

FUEL PUMP MOTOR (DIESEL) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K31 18BR	FUEL PUMP RELAY CONTROL
2	K65 18BR/LB	FUEL PUMP RELAY RETURN

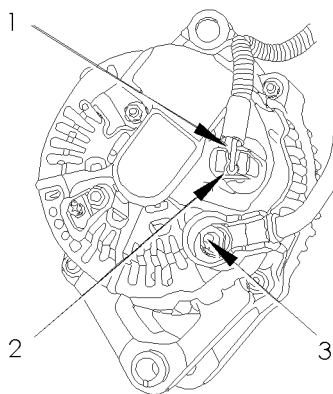


GENERATOR

GENERATOR - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	K20 18BR/GY	GEN FIELD CONTROL
2	Z816 18BK (DIESEL)	GROUND
2	Z20 18BR/BK (NGC)	GROUND





GENERATOR

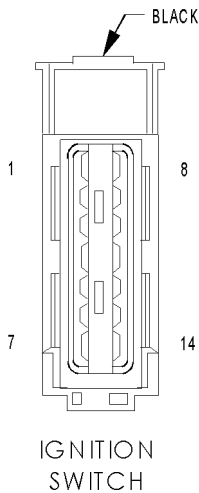
GENERATOR (COMPONENT SIDE)

CAV	CIRCUIT	FUNCTION
1	-	FIELD WIRES
2	-	FIELD WIRE CONNECTOR
3	-	B(+) (OUTPUT TERMINAL)



IDLE AIR CONTROL MOTOR (3.7L/4.7L) - BLACK 2 WAY

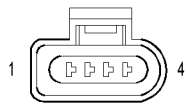
CAV	CIRCUIT	FUNCTION
1	K961 18BR/VT	IAC RETURN
2	K61 18VT/GY	IAC MOTOR CONTROL



IGNITION SWITCH - BLACK 14 WAY

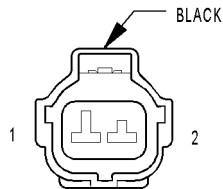
CAV	CIRCUIT	FUNCTION
1	A970 10RD	FUSED B(+)
2	F1 16PK/WT	FUSED IGNITION SWITCH OUTPUT (OFF-RUN-START)
3	F951 16PK/LG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
4	A951 16RD	FUSED B(+)
5	G15 20VT/TN	KEY IN IGNITION SWITCH SENSE
6	Z943 20BK	GROUND
7	A921 16RD	FUSED B(+)
8	C7 10DB	BLOWER MOTOR FEED
9	F982 14PK/YL	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
10	F991 10PK/YL (POWER WINDOWS)	FUSED IGNITION SWITCH OUTPUT (RUN-START)
11	A981 14RD	FUSED B(+)
12	A991 10RD (POWER WINDOWS)	FUSED B(+)
13	T751 16YL	FUSED IGNITION SWITCH OUTPUT (START)
14	F922 16PK/YL	FUSED IGNITION SWITCH OUTPUT (RUN)

# CONNECTOR PINOUTS



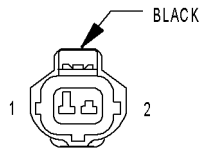
INLET AIR  
TEMPERATURE  
SENSOR

INLET AIR TEMPERATURE SENSOR - 4 WAY		
CAV	CIRCUIT	FUNCTION
1	K690 18BR/YL (A/T)	INLET AIR TEMPERATURE/PRESSURE RETURN
1	K690 18DG/YL (M/T)	INLET AIR TEMPERATURE/PRESSURE RETURN
2	K615 18VT/WT (A/T)	INLET AIR TEMPERATURE SENSE
2	K615 18BR/WT (M/T)	INLET AIR TEMPERATURE SENSE
3	K668 18BR (A/T)	SUPPLY VOLTAGE
3	K668 18LG (M/T)	SUPPLY VOLTAGE
4	K616 18BR/YL	INLET AIR PRESSURE SENSE



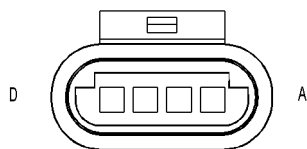
INPUT  
SPEED  
SENSOR  
(RFE)

INPUT SPEED SENSOR (RFE) - BLACK 2 WAY		
CAV	CIRCUIT	FUNCTION
1	T52 18DG/OR	INPUT SPEED SENSOR SIGNAL
2	T13 18DG/VT	SPEED SENSOR GROUND



INTAKE AIR  
TEMPERATURE SENSOR  
(GAS)

INTAKE AIR TEMPERATURE SENSOR (GAS) - BLACK 2 WAY		
CAV	CIRCUIT	FUNCTION
1	K900 18DB/DG	SENSOR GROUND
2	K21 18DB/LG	IAT SIGNAL



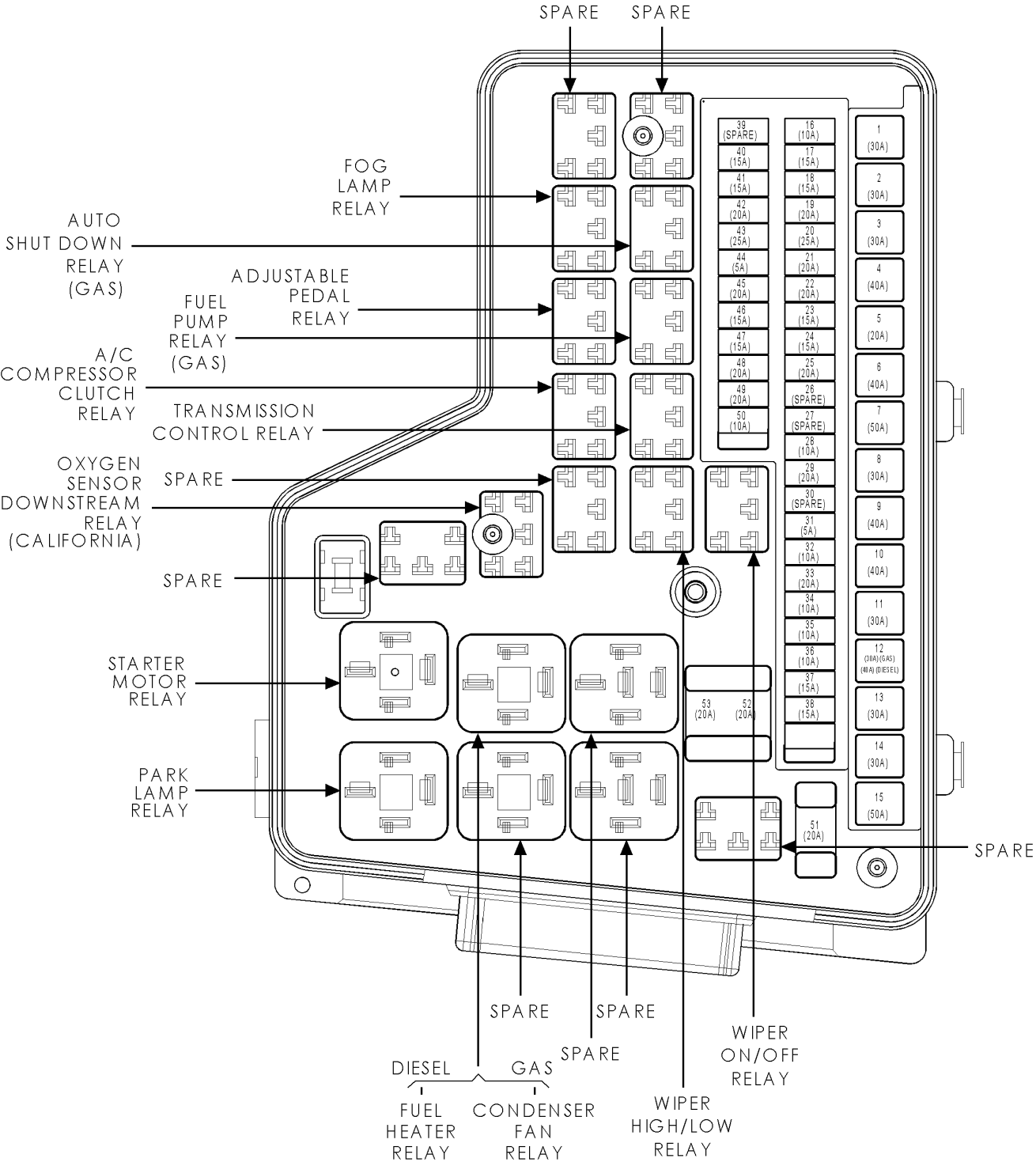
INTAKE AIR  
TEMPERATURE/  
MANIFOLD  
ABSOLUTE  
PRESSURE  
SENSOR  
(DIESEL)

INTAKE AIR TEMPERATURE/MANIFOLD ABSOLUTE PRESSURE SENSOR (DIESEL) - 4 WAY		
CAV	CIRCUIT	FUNCTION
A	K916 18BR/OR	SENSOR GROUND
B	K21 18DB/LG	INTAKE AIR TEMPERATURE SENSOR SIGNAL
C	F855 18PK/YL	5 VOLT SUPPLY
D	K37 18LB (A/T)	BOOST PRESSURE SENSOR SIGNAL
D	K37 18BR/OR (M/T)	BOOST PRESSURE SENSOR SIGNAL

CONNECTOR PINOUTS

INTEGRATED POWER MODULE

CONNECTOR PINOUTS



# CONNECTOR PINOUTS

## FUSES (IPM)

FUSE NO.	AMPS	FUSED CIRCUIT	FUNCTION
1	30A	A400 14TN/RD	FUSED B(+)
2	30A	INTERNAL	FUSED B(+)
3	30A	A921 16RD	FUSED B(+)
4	40A	A970 10RD	FUSED B(+)
5	20A	INTERNAL	FUSED B(+)
6	40A	A111 14DG/RD (ABS)	FUSED B(+)
7	50A	A210 120R/RD	FUSED B(+)
8	30A	INTERNAL	FUSED B(+)
9	40A	A991 10RD	FUSED B(+)
10	40A	A981 14RD	FUSED B(+)
11	30A	INTERNAL	FUSED B(+)
12	40A	A960 14RD (DIESEL)	FUSED B(+)
12	30A	A16 16RD/BR (GAS)	FUSED B(+)
13	30A	INTERNAL	FUSED B(+)
14	30A	INTERNAL	FUSED B(+)
15	50A	INTERNAL	FUSED B(+)
16	10A	INTERNAL	FUSED B(+)
17	50	INTERNAL	FUSED B(+)
18	15A	A944 20RD	FUSED B(+)
19	20A	A100 14RD/VT	FUSED B(+)
20	25A	A951 16RD	FUSED B(+)
21	20A	A116 18YL/RD	FUSED B(+)
22	20A	A941 18RD	FUSED B(+)
23	15A	A919 20RD	FUSED B(+)
24	15A	A103 18GY/RD	FUSED B(+)
25	20A	A205 18RD/OR	FUSED B(+)
26	25A	INTERNAL	FUSED B(+)
27	15A	INTERNAL	FUSED B(+)
28	10A	F21 20PK/DG	FUSED IGNITION SWITCH OUTPUT (RUN)
29	20A	F984 18PK/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
30	-	-	-
31	-	-	-
32	10A	L70 18WT/GY	FUSED PARK LAMP RELAY OUTPUT
33	20A	L678 18BR	FUSED PARK LAMP RELAY OUTPUT
34	10A	L7 18WT/YL	FUSED PARK LAMP RELAY OUTPUT
35	10A	F500 20DG/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
36	10A	F504 20GY/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
37	-	-	-
38	15A	L10 18WT/GY	FUSED IGNITION SWITCH OUTPUT (RUN)
39	25A	INTERNAL	BACK-UP LAMP FEED
40	15A	INTERNAL	FUSED B(+)
41	15A	INTERNAL	BACK-UP LAMP FEED
42	20A	A405 18RD/DB	FUSED B(+)
43	25A	A34 16RD/WT (ELECTRONIC TRANSFER CASE)	FUSED B(+)
44	20A	INTERNAL	FUSED B(+)
45	20A	INTERNAL	FUSED B(+)
46	15A	INTERNAL	FUSED B(+)
47	15A	INTERNAL	FUSED B(+)
48	20A	A930 18RD	FUSED B(+)
49	10A	INTERNAL	FUSED B(+)
50	10A	F202 20PK/GY	FUSED IGNITION SWITCH OUTPUT (RUN)
51	20A	A114 18GY/RD (BASE)	FUSED B(+)
52	20A	F100 18PK/VT	FUSED IGNITION SWITCH OUTPUT (RUN)
53	15A	F201 18PK/OR	FUSED IGNITION SWITCH OUTPUT (RUN)

## A/C COMPRESSOR CLUTCH RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	INTERNAL	FUSED IGNITION SWITCH OUTPUT (RUN-START)
86	C13 18DB/OR (DIESEL)	A/C CLUTCH RELAY CONTROL
86	C13 20DB/OR (NGC)	A/C CLUTCH RELAY CONTROL
87	C3 18DB/BK	A/C CLUTCH RELAY OUTPUT
87A	-	-

## AUTO SHUT DOWN RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	INTERNAL	FUSED B(+)
86	K51 20DB/YL	ASD RELAY CONTROL
87	INTERNAL	ASD RELAY OUTPUT
87A	-	-

## CONDENSER FAN RELAY

CAV	CIRCUIT	FUNCTION
30	A16 16RD/BR	FUSED B(+)
85	A16 16RD/BR	FUSED B(+)
86	K173 18BR/VT	CONDENSER FAN RELAY CONTROL
87	C123 16LB/WT	CONDENSER FAN RELAY OUTPUT
87A	-	-

# CONNECTOR PINOUTS

## INTEGRATED POWER MODULE (FCM) - 49 WAY

CAV	CIRCUIT	FUNCTION
1	L44 18WT/TN	RIGHT LOW BEAM DRIVER
2	L33 18WT/LG	LEFT HIGH BEAM DRIVER
3	INTERNAL	FUSED B(+)
4	INTERNAL	FUSED B(+)
5	W10 20BR	WASHER PUMP MOTOR SENSE
6	INTERNAL	FUSED B(+)
7	INTERNAL	FUSED B(+)
8	L34 18WT/GY	RIGHT HIGH BEAM DRIVER
9	L43 18WT/DB	LEFT LOW BEAM DRIVER
10	INTERNAL	FUSED B(+)
11	-	-
12	Z117 18BK/WT	GROUND
13	-	-
14	INTERNAL	TRAILER TOW LEFT TURN RELAY CONTROL
15	INTERNAL	PARK LAMP RELAY CONTROL
16	-	-
17	INTERNAL	WIPER ON/OFF RELAY CONTROL
18	INTERNAL	FOG LAMP RELAY CONTROL
19	L62 18WT/YL	RIGHT REAR TURN LAMP DRIVER
20	-	-
21	-	-
22	L1 18WT/LG	BACKUP LAMP FEED
23	-	-
24	-	-
25	-	-
26	-	-
27	Z116 18BK/VT	GROUND
28	W1 20BR/TN	WASHER FLUID SWITCH SENSE
29	G31 20VT/LG (DIESEL)	AAT SIGNAL
30	Z118 18BK/YL	GROUND
31	Z117 18BK/WT	GROUND
32	INTERNAL	HORN RELAY CONTROL
33	-	-
34	INTERNAL	TRAILER TOW RIGHT TURN RELAY CONTROL
35	INTERNAL	ADJUSTABLE PEDAL RELAY CONTROL
36	-	-
37	INTERNAL	WIPER SPEED RELAY CONTROL
38	D25 20VT/PK	PCI BUS
39	-	-
40	-	-
41	L54 18WT/LG	RIGHT STOP LAMP DRIVER
42	L61 18WT/LG	LEFT FRONT TURN LAMP DRIVER
43	L53 18DG/WT	LEFT STOP LAMP DRIVER
44	L63 18WT/DG	LEFT REAR TURN LAMP DRIVER
45	L60 18WT/TN	RIGHT FRONT TURN LAMP DRIVER
46	G180 20 VT/YL (DIESEL)	SENSOR GROUND
47	Z118 18BK/YL	GROUND
48	INTERNAL	FUSED IGNITION SWITCH OUTPUT (RUN-START)
49	W7 20BR/GY	WIPER PARK SWITCH SENSE

## FUEL PUMP RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	INTERNAL	FUSED IGNITION SWITCH OUTPUT (RUN-START)
86	K31 18BR	FUEL PUMP RELAY CONTROL
87	A109 16OR/RD	FUEL PUMP RELAY OUTPUT
87A	-	-

## STARTER MOTOR RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	T751 16YL	FUSED IGNITION SWITCH OUTPUT (START)
86	T41 20YL/DB (DIESEL)	TRS T41 SENSE
86	T752 20DG/OR (GAS)	STARTER RELAY CONTROL
87	T750 14YL/GY	STARTER MOTOR RELAY OUTPUT
87A	-	-

## TRAILER TOW LEFT TURN RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	INTERNAL	FUSED B(+)
86	INTERNAL	TRAILER TOW LEFT TURN RELAY CONTROL
87	L673 18YL	TRAILER TOW LEFT TURN RELAY OUTPUT
87A	-	-

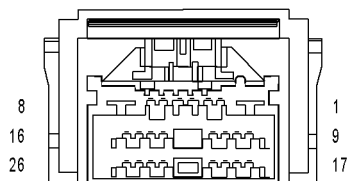
## TRAILER TOW RIGHT TURN RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	INTERNAL	FUSED B(+)
86	INTERNAL	TRAILER TOW RIGHT TURN RELAY CONTROL
87	L674 18LG	TRAILER TOW RIGHT TURN RELAY OUTPUT
87A	-	-

## TRANSMISSION CONTROL RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	T515 20YL/DB	TRANSMISSION CONTROL RELAY CONTROL
86	Z912 20BK	GROUND
87	T16 18YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
87A	-	-

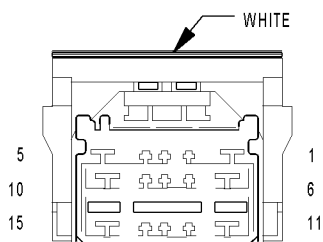
# CONNECTOR PINOUTS



INTEGRATED  
POWER  
MODULE C1

INTEGRATED POWER MODULE C1 - 26 WAY

CAV	CIRCUIT	FUNCTION
1	A960 14RD (DIESEL)	FUSED B(+)
1	A16 16RD/BR (NGC)	FUSED B(+)
2	F21 20PK/DG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
3	-	-
4	F500 20DG/PK	FUSED IGNITION SWITCH OUTPUT (RUN)
5	L673 18YL	TRAILER TOW LEFT TURN RELAY OUTPUT
6	-	-
7	L674 18LG	TRAILER TOW RIGHT TURN RELAY OUTPUT
8	A981 14RD	FUSED B(+)
9	A114 18GY/RD	FUSED B(+)
10	L70 18WT/GY	FUSED PARK LAMP RELAY OUTPUT
11	F951 16PK/LG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
12	A941 18RD	FUSED B(+)
13	A919 20RD	FUSED B(+)
14	X2 18DG/OR	HORN RELAY OUTPUT
15	-	-
16	A103 18GY/RD	FUSED B(+)
17	L678 18BR	PARK LAMP RELAY OUTPUT
18	-	-
19	L7 18WT/YL	FUSED PARK LAMP RELAY OUTPUT
20	-	-
21	-	-
22	-	-
23	-	-
24	-	-
25	-	-
26	-	-

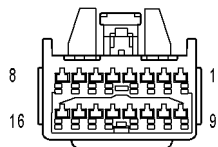


INTEGRATED  
POWER  
MODULE C2

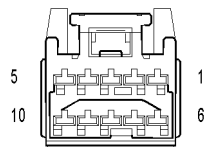
INTEGRATED POWER MODULE C2 - WHITE 15 WAY

CAV	CIRCUIT	FUNCTION
1	A991 10RD	FUSED B(+)
2	A34 16RD/WT (ELEC-TRONIC TRANSFERCASE))	FUSED B(+)
3	A405 18RD/DB	FUSED B(+)
4	-	-
5	A210 12OR/RD	FUSED B(+)
6	A970 10RD	FUSED B(+)
7	A100 14RD/VT	FUSED B(+)
8	A111 14DG/RD	FUSED B(+)
9	A205 18RD/OR	FUSED B(+)
10	A921 16RD	FUSED B(+)
11	-	-
12	F984 18PK/YL	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
13	A116 18YL/RD	FUSED B(+)
14	A951 16RD	FUSED B(+)
15	-	-





INTEGRATED  
POWER  
MODULE C3



INTEGRATED  
POWER  
MODULE C4

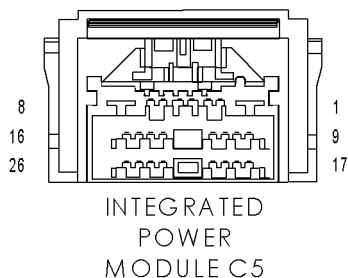
INTEGRATED POWER MODULE C3 - 16 WAY

CAV	CIRCUIT	FUNCTION
1	W10 20BR	WASHER PUMP MOTOR CONTROL
2	L62 18WT/YL	RIGHT REAR TURN LAMP DRIVER
3	Z117 18BK/WT	GROUND
4	G31 20VT/LG (DIESEL)	AAT SIGNAL
5	Z118 18BK/YL	GROUND
6	L1 18WT/LG	BACKUP LAMP FEED
7	-	-
8	-	-
9	-	-
10	D25 20VT/PK	PCI BUS
11	-	-
12	L61 18WT/LG	LEFT FRONT TURN LAMP DRIVER
13	L53 18DG/WT	LEFT STOP LAMP FEED
14	L63 18WT/DG	LEFT REAR TURN LAMP DRIVER
15	L60 18WT/TN	RIGHT FRONT TURN LAMP DRIVER
16	G180 20VT/YL (DIESEL)	SENSOR GROUND

INTEGRATED POWER MODULE C4 - 10 WAY

CAV	CIRCUIT	FUNCTION
1	Z116 18BK/VT	GROUND
2	L54 18WT/LG	RIGHT STOP LAMP FEED
3	W1 20BR/TN	WASHER FLUID SWITCH SENSE
4	-	-
5	-	-
6	F941 20PK/LG (DIESEL)	FUSED IGNITION SWITCH OUTPUT (RUN-START)
7	W7 20BR/GY	WIPER PARK SWITCH SENSE
8	-	-
9	-	-
10	F202 20PK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-START)

# CONNECTOR PINOUTS

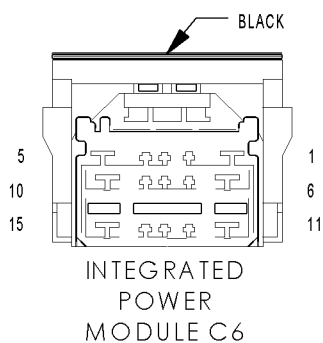


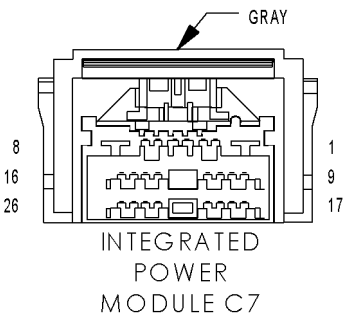
INTEGRATED POWER MODULE C5 - 26 WAY

CAV	CIRCUIT	FUNCTION
1	F922 16PK/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
2	F941 20PK/LG (DIESEL)	FUSED IGNITION SWITCH OUTPUT (RUN-START)
2	Z912 20BK (GAS)	GROUND
3	-	-
4	L10 18WT/GY	FUSED IGNITION SWITCH OUTPUT (RUN)
5	-	-
6	-	-
7	-	-
8	Z920 12BK	GROUND
9	C110 20DB/LB	DEFOGGER RELAY CONTROL
10	-	-
11	C13 20LB/OR	A/C CLUTCH RELAY CONTROL
12	-	-
13	-	-
14	Z114 20BK/LG (DIESEL)	GROUND
14	K173 18BR/VT (NGC)	CONDENSER FAN RELAY CONTROL
15	F202 20PK/GY (DIESEL)	FUSED IGNITION SWITCH OUTPUT (RUN-START)
15	A16 16RD/BR (NGC)	FUSED B(+)
16	T515 20YL/DB	TRANSMISSION CONTROL RELAY CONTROL
17	C16 16DB/GY	HEATED MIRROR RELAY OUTPUT
18	C3 20DB/YL	A/C CLUTCH RELAY OUTPUT
19	-	-
20	-	-
21	C110 20DB/LB	DEFOGGER RELAY CONTROL
22	W4 16BR/OR	WIPER RELAY HIGH SPEED OUTPUT
23	F100 18PK/VT	FUSED IGNITION SWITCH OUTPUT (RUN)
24	F201 18PK/OR	FUSED IGNITION SWITCH OUTPUT (RUN)
25	-	-
26	F504 20GY/PK	FUSED IGNITION SWITCH OUTPUT (RUN)

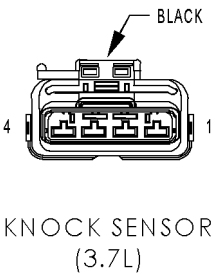
INTEGRATED POWER MODULE C6 - BLACK 15 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	A400 14TN/RD	FUSED B(+)
3	-	-
4	K342 16BR/WT	ASD RELAY OUTPUT
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	A961 14RD (DIESEL)	FUEL HEATER RELAY OUTPUT
10	C123 16LB/WT (NGC)	CONDENSER FAN RELAY OUTPUT
11	A960 14RD (DIESEL)	FUSED B(+)
11	A16 16RD/BR (NGC)	FUSED B(+)
12	F982 14PK/YL	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
13	-	-
14	T16 18YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
15	-	-

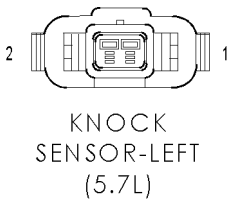




INTEGRATED POWER MODULE C7 - GRAY 26 WAY		
CAV	CIRCUIT	FUNCTION
1	T750 14YL/GY	STARTER MOTOR RELAY OUTPUT
2	W3 16BR/WT	WIPER RELAY LOW SPEED OUTPUT
3	F983 20PK/YL	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
4	A930 18RD	FUSED B(+)
5	-	-
6	L43 18WT/DB	LEFT LOW BEAM OUTPUT
7	L34 18WT/GY	RIGHT HIGH BEAM OUTPUT
8	-	-
9	A109 16OR/RD (GAS)	FUEL PUMP RELAY OUTPUT
10	-	-
11	K51 20BR/WT (GAS)	ASD RELAY CONTROL
13	-	-
14	-	-
15	L33 18WT/LG	LEFT HIGH BEAM OUTPUT
16	-	-
16	A72 18RD/OR	ADJUSTABLE PEDAL RELAY OUTPUT
17	-	-
17	C15 16DB/WT	REAR WINDOW DEFOGGER RELAY OUTPUT
18	-	-
19	K31 20BR	FUEL PUMP RELAY CONTROL
20	-	-
20	L89 18WT/YL (FOG LAMPS)	FOG LAMP RELAY OUTPUT
21	T751 16YL	FUSED IGNITION SWITCH OUTPUT (START)
22	L44 18WT/TN	RIGHT LOW BEAM OUTPUT
23	T41 20YL/DB (EXCEPT NGC)	TRS T41 SENSE
23	T752 20DG/OR (NGC)	STARTER RELAY CONTROL
24	A944 20RD	FUSED B(+)
26	-	-

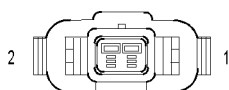


KNOCK SENSOR (3.7L) - BLACK 4 WAY		
CAV	CIRCUIT	FUNCTION
1	K42 18DB/YL	KNOCK SENSOR NO. 1 SIGNAL
2	K942 18BR/LG	KNOCK SENSOR NO. 1 RETURN
3	K242 18BR/WT	KNOCK SENSOR NO. 2 SIGNAL
4	K924 18WT/BR	KNOCK SENSOR NO. 2 RETURN



KNOCK SENSOR-LEFT (5.7L) - 2 WAY		
CAV	CIRCUIT	FUNCTION
1	K42 18DB/YL	KNOCK SENSOR NO. 1 SIGNAL
2	K942 18BR/LG	KNOCK SENSOR NO. 1 RETURN

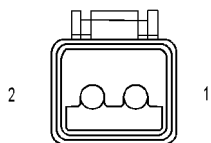
# CONNECTOR PINOUTS



KNOCK  
SENSOR-RIGHT  
(5.7L)

KNOCK SENSOR-RIGHT (5.7L) - 2 WAY

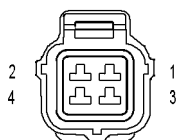
CAV	CIRCUIT	FUNCTION
1	K242 18BR/WT	KNOCK SENSOR NO. 2 SIGNAL
2	K924 18WT/BR	KNOCK SENSOR NO. 2 RETURN



LIFT  
PUMP  
MOTOR  
(DIESEL)

LIFT PUMP MOTOR (DIESEL) - 2 WAY

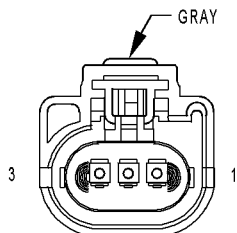
CAV	CIRCUIT	FUNCTION
1	N2 18DB/YL	LIFT PUMP FEED
2	Z816 18BK	GROUND



LINE  
PRESSURE  
SENSOR  
(RFE)

LINE PRESSURE SENSOR (RFE) - 4 WAY

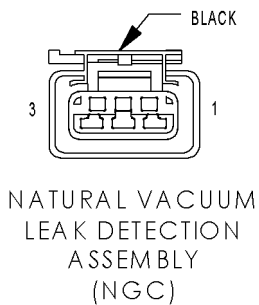
CAV	CIRCUIT	FUNCTION
1	K900 18DB/DG	SENSOR GROUND
2	F856 18YL/PK	5 VOLT SUPPLY
3	T38 18YL/BR	LINE PRESSURE SENSOR SIGNAL
4	-	-



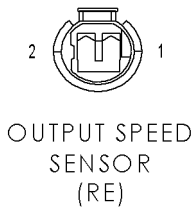
MANIFOLD ABSOLUTE  
PRESSURE SENSOR  
(NGC)

MANIFOLD ABSOLUTE PRESSURE SENSOR (NGC) - GRAY 3 WAY

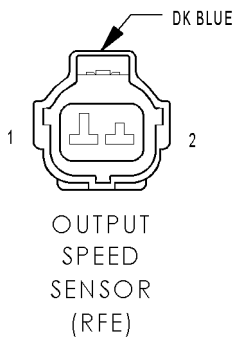
CAV	CIRCUIT	FUNCTION
1	K1 18VT/BR	MAP SIGNAL
2	K900 18DB/DG	SENSOR GROUND
2	K900 20DB/DG	SENSOR GROUND
3	F856 18YL/PK	5 VOLT SUPPLY



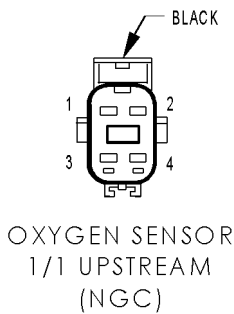
NATURAL VACUUM LEAK DETECTION ASSEMBLY (NGC) - BLACK 3 WAY		
CAV	CIRCUIT	FUNCTION
1	Z910 18BK	GROUND
2	K107 18VT/WT	NVLD SWITCH SIGNAL
3	K106 18VT/LB	NVLD SOLENOID CONTROL



OUTPUT SPEED SENSOR (RE) - 2 WAY		
CAV	CIRCUIT	FUNCTION
1	T14 18DG/BR	OUTPUT SPEED SENSOR SIGNAL
2	T13 18DG/VT	SPEED SENSOR GROUND

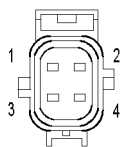


OUTPUT SPEED SENSOR (RFE) - DK BLUE 2 WAY		
CAV	CIRCUIT	FUNCTION
1	T14 18DG/BR	OUTPUT SPEED SENSOR SIGNAL
2	T13 18DG/VT	SPEED SENSOR GROUND



OXYGEN SENSOR 1/1 UPSTREAM (NGC) - BLACK 4 WAY		
CAV	CIRCUIT	FUNCTION
1	K99 18BR/LG	O2 1/1 HEATER CONTROL
2	Z42 18BK/LG	GROUND
3	K902 18BR/DG	O2 RETURN (UP)
4	K41 18DB/LB	O2 1/1 SIGNAL

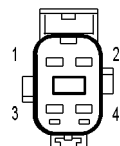
# CONNECTOR PINOUTS



OXYGEN  
SENSOR 1/2  
DOWNSTREAM  
(NGC)

OXYGEN SENSOR 1/2 DOWNSTREAM (NGC) - 4 WAY

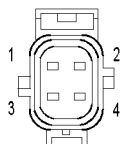
CAV	CIRCUIT	FUNCTION
1	K299 18BR/WT	O2 1/2 HEATER CONTROL
2	Z43 18BK/LB	GROUND
3	K904 18DB/DG	O2 RETURN (DOWN)
4	K141 18DB/YL	O2 1/2 SIGNAL



OXYGEN SENSOR  
2/1 UPSTREAM  
(NGC)

OXYGEN SENSOR 2/1 UPSTREAM (NGC) - 4 WAY

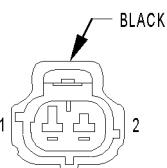
CAV	CIRCUIT	FUNCTION
1	K199 18BR/VT	O2 2/1 HEATER CONTROL
2	Z934 18BK	GROUND
3	K902 18BR/DG	O2 RETURN (UP)
4	K43 18DB/LG	O2 2/1 SIGNAL



OXYGEN  
SENSOR 2/2  
DOWNSTREAM  
(NGC)

OXYGEN SENSOR 2/2 DOWNSTREAM (NGC) - 4 WAY

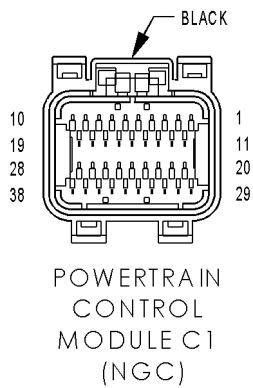
CAV	CIRCUIT	FUNCTION
1	K399 18BR/GY	O2 2/2 HEATER CONTROL
2	Z992 18BK	GROUND
3	K904 18DB/DG	O2 RETURN (DOWN)
4	K243 18BR	O2 2/2 SIGNAL



POWER STEERING  
PRESSURE SWITCH  
(NGC)

POWER STEERING PRESSURE SWITCH (NGC) - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	Z988 20BK	GROUND
2	K66 18DB/WT	P/S SWITCH SIGNAL



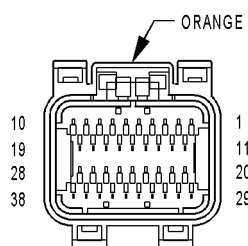
POWERTRAIN CONTROL MODULE C1 (NGC) - BLACK 38 WAY

CAV	CIRCUIT	FUNCTION
1	K98 18DB/YL (EXCEPT 3.7L)	COIL CONTROL NO. 8
2	-	-
3	K97 18BR/YL (4.7L)	COIL CONTROL NO. 7
3	K97 18BR (5.7L)	COIL CONTROL NO. 7
4	K28 18BR/LB (EXCEPT 3.7L)	INJECTOR CONTROL NO. 8
5	K26 18BR/YL (EXCEPT 3.7L)	INJECTOR CONTROL NO. 7
6	-	-
7	-	-
8	B222 20DG/WT	VEHICLE SPEED SIGNAL NO. 2
9	Z130 16BK/BR	GROUND
10	-	-
11	F202 20PK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-START)
12	F1 16PK/WT	FUSED IGNITION SWITCH OUTPUT (OFF-RUN-START)
13	B22 20DG/YL	VEHICLE SPEED SIGNAL NO. 1
14	-	-
15	-	-
16	-	-
17	-	-
18	Z131 16BK/DG	GROUND
19	-	-
20	G6 18VT/GY	OIL PRESSURE SIGNAL
21	C918 18BK/LB	A/C PRESSURE SIGNAL
22	G31 18VT/LG	AAT SIGNAL
23	-	-
24	-	-
25	D20 20WT/LG (5.7L)	SCI RECEIVE (PCM)
25	D20 17WT/LG (EXCEPT 5.7L)	SCI RECEIVE (PCM)
26	D16 18WT/OR (EXCEPT 3.7L M/T)	SCI RECEIVE (TCM)
27	F856 18YL/PK	5 VOLT SUPPLY
28	-	-
29	A919 20RD	FUSED B(+)
30	T751 16YL	FUSED IGNITION SWITCH OUTPUT (START)
31	K141 18DB/YL	O2 1/2 SIGNAL
32	K902 18BR/DG	O2 RETURN (UP)
33	K243 18BR	O2 2/2 SIGNAL
34	-	-
35	-	-
36	D21 20WT/BR (5.7L)	SCI TRANSMIT (PCM)
36	D21 18WT/BR (EXCEPT 5.7L)	SCI TRANSMIT (PCM)
37	D15 18WT/DG (EXCEPT 3.7L)	SCI TRANSMIT (TCM)
38	D25 20WT/VT	PCI BUS

# CONNECTOR PINOUTS

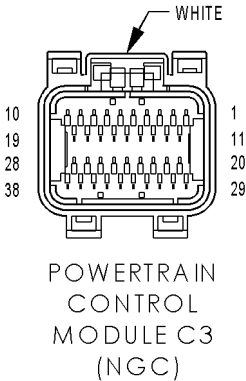
POWERTRAIN CONTROL MODULE C2 (NGC) - ORANGE 38 WAY

CAV	CIRCUIT	FUNCTION
1	K10 18DB/OR	COIL CONTROL NO. 6
2	K16 18DB/YL	COIL CONTROL NO. 5
3	K15 18DB/GY	COIL CONTROL NO. 4
4	K58 18BR/VT	INJECTOR CONTROL NO. 6
5	K38 18BR/OR	INJECTOR CONTROL NO. 5
6	K447 18TN/YL (5.7L)	ETC MOTOR (+)
7	K18 18DB/OR	COIL CONTROL NO. 3
8	K35 18DB/VT (5.7L LIGHT DUTY)	EGR SOLENOID CONTROL
9	K17 18DB/TN	COIL CONTROL NO. 2
10	K19 18DB/DG	COIL CONTROL NO. 1
11	K14 18BR/TN	INJECTOR CONTROL NO. 4
12	K13 18BR/LB	INJECTOR CONTROL NO. 3
13	K12 18BR/DB	INJECTOR CONTROL NO. 2
14	K11 18BR/YL	INJECTOR CONTROL NO. 1
15	K922 18BR/DB (5.7L)	THROTTLE POSITION SENSOR GROUND
16	-	-
17	K199 18BR/VT	O2 2/1 HEATER CONTROL
18	K99 18BR/LG	O2 1/1 HEATER CONTROL
19	K20 18BR/GY	GEN FIELD CONTROL
20	K2 18VT/OR	ECT SIGNAL
21	K22 18BR/OR	TP NO. 1 SIGNAL
22	K34 18DB/LG (5.7L LIGHT DUTY)	EGR SENSOR SIGNAL
23	K1 18VT/BR	MAP SIGNAL
24	K942 18BR/LG (EXCEPT 4.7L)	KNOCK SENSOR NO. 1 RETURN
25	K42 18DB/YL (EXCEPT 4.7L)	KNOCK SENSOR NO. 1 SIGNAL
26	-	-
27	K900 18DB/DG	SENSOR GROUND
28	K122 18BR/DG (5.7L)	TP NO. 2 SIGNAL
28	K961 18BR/VT (EXCEPT 5.7L)	IAC RETURN
29	F855 18PK/YL	5 VOLT SUPPLY
30	K21 18DB/LG	IAT SIGNAL
31	K41 18DB/LB	O2 1/1 SIGNAL
32	K904 18DB/DG	O2 RETURN (DOWN)
33	K43 18DB/LG	O2 2/1 SIGNAL
34	K44 20DB/GY	CMP SIGNAL
35	K24 20BR/LB	CKP SIGNAL
36	K242 18BR/WT (EXCEPT 4.7L)	KNOCK SENSOR NO. 2 SIGNAL
37	K924 18WT/BR (EXCEPT 4.7L)	KNOCK SENSOR NO. 2 RETURN
38	K448 18TN/OR (5.7L)	ETC MOTOR (-)
38	K61 18VT/GY (EXCEPT 5.7L)	IAC MOTOR CONTROL



POWERTRAIN  
CONTROL  
MODULE C2  
(NGC)



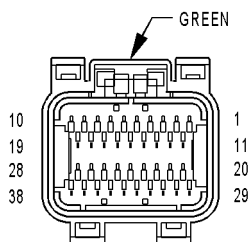


POWERTRAIN CONTROL MODULE C3 (NGC) - WHITE 38 WAY		
CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	K51 20BR/WT	ASD RELAY CONTROL
4	-	-
5	V35 20VT/OR (4.7L)	S/C VENT CONTROL
6	K173 18BR/VT	CONDENSER FAN RELAY CONTROL
7	V32 20VT/YL (4.7L)	S/C POWER SUPPLY
8	K106 18VT/LB	NVLD SOLENOID CONTROL
9	K299 18BR/WT	O2 1/2 HEATER CONTROL
10	K399 18BR/GY	O2 2/2 HEATER CONTROL
11	C13 20LB/OR	A/C CLUTCH RELAY CONTROL
12	V36 20VT/YL (4.7L)	S/C VACUUM CONTROL
13	-	-
14	V32 20VT/YL (5.7L)	BRAKE SWITCH NO. 2 SIGNAL
15	V937 20VT/BR (5.7L)	S/C SWITCH RETURN
16	K167 20BR/YL (5.7L)	APPS NO. 1 RETURN
17	K400 20BR/VT (5.7L)	APPS NO. 2 RETURN
18	V38 20VT/OR (5.7L)	S/C SWITCH NO. 2 SIGNAL
19	K342 16BR/WT	ASD RELAY OUTPUT
20	K52 18DB/WT	EVAP PURGE CONTROL
21	T41 20YL/DB	TRS T41 SENSE
22	G113 18VT	PTO SWITCH SENSE
23	B29 20DG/WT	BRAKE SWITCH SIGNAL
24	-	-
25	K23 20BR/WT (5.7L)	APPS NO. 1 SIGNAL
26	-	-
27	-	-
28	K342 16BR/WT	ASD RELAY OUTPUT
29	K70 18DB/BR	EVAP PURGE RETURN
30	K66 18DB/WT	P/S SWITCH SIGNAL
31	-	-
32	K25 18DB/VT	BATT TEMP SIGNAL
33	N4 18DB/WT (3.7L/4.7L)	FUEL LEVEL SENSOR SIGNAL
33	N4 20DB/WT (5.7L)	FUEL LEVEL SENSOR SIGNAL
34	V37 20VT	S/C SWITCH NO. 1 SIGNAL
35	K107 18VT/WT	NVLD SWITCH SIGNAL
36	K29 20WT/BR (5.7L)	APPS NO. 2 SIGNAL
37	K31 20BR	FUEL PUMP RELAY CONTROL
38	T752 20DG/OR	STARTER RELAY CONTROL

# CONNECTOR PINOUTS

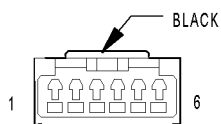
**POWERTRAIN CONTROL MODULE C4 (NGC) - GREEN 38 WAY**

CAV	CIRCUIT	FUNCTION
1	T60 18YL/GY	OVERDRIVE SOLENOID CONTROL
2	T259 18YL/DG	4C SOLENOID CONTROL
3	-	-
4	T118 18DG	MS SOLENOID CONTROL
5	-	-
6	T219 18YL/LG	2C SOLENOID CONTROL
7	-	-
8	T59 18YL/LB	UNDERDRIVE SOLENOID CONTROL
9	-	-
10	T20 18DG/WT	L/R SOLENOID CONTROL
11	T140 18YL/GY	PRESSURE CONTROL SOLENOID CONTROL
12	Z908 18BK	GROUND
13	Z977 18BK	GROUND
14	Z904 18BK (A/T)	GROUND
15	T1 18DG/LB	TRS T1 SENSE
16	T3 18DG/DB	TRS T3 SENSE
17	T6 18DG	TOW/HAUL OVERDRIVE OFF SWITCH SENSE
18	T515 20YL/DB	TRANSMISSION CONTROL RELAY CONTROL
19	T16 18YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
20	T48 18BR/YL	4C PRESSURE SWITCH SENSE
21	T29 18YL/WT	UNDERDRIVE PRESSURE SWITCH SENSE
22	T9 18DG/TN	OVERDRIVE PRESSURE SWITCH SENSE
23	-	-
24	-	-
25	-	-
26	T4 18DG/LB	TRS T2 SENSE
27	-	-
28	T16 18YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
29	T50 18YL/TN	LOW/REVERSE PRESSURE SWITCH SENSE
30	T147 18DG/YL	2C PRESSURE SWITCH SENSE
31	T38 18YL/BR	LINE PRESSURE SENSOR SIGNAL
32	T14 18DG/BR	OUTPUT SPEED SENSOR SIGNAL
33	T52 18DG/OR	INPUT SPEED SENSOR SIGNAL
34	T13 18DG/VT	SPEED SENSOR GROUND
35	T54 18DG/OR	TRANSMISSION TEMPERATURE SENSOR SIGNAL
36	-	-
37	T42 18DG/YL	TRS T42 SENSE
38	T16 18YL/OR	TRANSMISSION CONTROL RELAY OUTPUT



**POWERTRAIN  
CONTROL  
MODULE C4  
(NGC)**

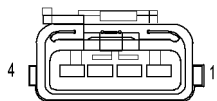
CONNECTOR PINOUTS



**SENTRY KEY  
IMMOBILIZER  
MODULE  
(SKIM)**

**SENTRY KEY IMMOBILIZER MODULE (SKIM) - BLACK 6 WAY**

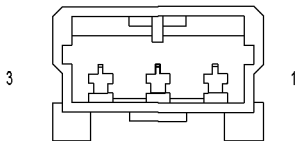
CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 20WT/VT	PCI BUS
3	-	-
4	F202 20PK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-START)
5	Z120 20BK/WT	GROUND
6	A919 20RD	FUSED B(+)



SPEED  
CONTROL SERVO  
(DIESEL A/T/NGC)

SPEED CONTROL SERVO (DIESEL A/T/NGC) - 4 WAY

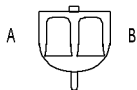
CAV	CIRCUIT	FUNCTION
1	V36 20VT/YL	S/C VACUUM CONTROL
2	V35 20VT/OR	S/C VENT CONTROL
3	V30 20VT/WT	S/C BRAKE SWITCH OUTPUT
4	Z913 20BK	GROUND



SPEED CONTROL  
SWITCH-LEFT  
(ETC)

SPEED CONTROL SWITCH-LEFT (ETC) - 3 WAY

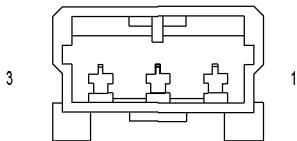
CAV	CIRCUIT	FUNCTION
1	V38 20VT/OR	S/C SWITCH NO. 2 SIGNAL
2	V937 20VT/BR	S/C SWITCH RETURN
3	V37 20VT	S/C SWITCH NO. 1 SIGNAL



SPEED CONTROL  
SWITCH-LEFT  
(EXCEPT ETC)

SPEED CONTROL SWITCH-LEFT (EXCEPT ETC) - 2 WAY

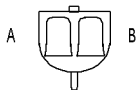
CAV	CIRCUIT	FUNCTION
A	V37 20VT	S/C SWITCH NO. 1 SIGNAL
B	V937 20VT/BR	S/C SWITCH RETURN



SPEED CONTROL  
SWITCH-RIGHT  
(ETC)

SPEED CONTROL SWITCH-RIGHT (ETC) - 3 WAY

CAV	CIRCUIT	FUNCTION
1	V38 20VT/OR	S/C SWITCH NO. 2 SIGNAL
2	V937 20VT/BR	S/C SWITCH RETURN
3	V37 20VT	S/C SWITCH NO. 1 SIGNAL

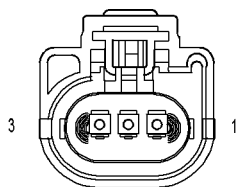


SPEED CONTROL  
SWITCH-RIGHT  
(EXCEPT ETC)

SPEED CONTROL SWITCH-RIGHT (EXCEPT ETC) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	V37 20VT	S/C SWITCH NO. 1 SIGNAL
2	V937 20VT/BR	S/C SWITCH RETURN

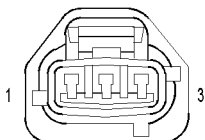
# CONNECTOR PINOUTS



THROTTLE  
POSITION SENSOR  
(3.7L)

## THROTTLE POSITION SENSOR (3.7L) - 3 WAY

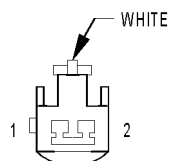
CAV	CIRCUIT	FUNCTION
1	F855 18PK/YL	5 VOLT SUPPLY
2	K900 18DB/DG	SENSOR GROUND
3	K22 18BR/OR	TP NO. 1 SIGNAL



THROTTLE POSITION  
SENSOR  
(4.7L)

## THROTTLE POSITION SENSOR (4.7L) - 3 WAY

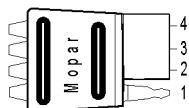
CAV	CIRCUIT	FUNCTION
1	F855 18PK/YL	5 VOLT SUPPLY
2	K22 18BR/OR	TP NO. 1 SIGNAL
3	K900 18DB/DG	SENSOR GROUND



TOW/HAUL  
OVERDRIVE SWITCH

## TOW/HAUL OVERDRIVE SWITCH - WHITE 2 WAY

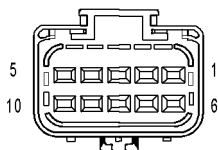
CAV	CIRCUIT	FUNCTION
1	T6 20DG	TOW/HAUL OVERDRIVE OFF SWITCH SENSE
2	Z71 20LB/BK	GROUND



TRAILER TOW  
CONNECTOR

## TRAILER TOW CONNECTOR - 4 WAY

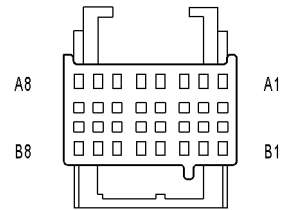
CAV	CIRCUIT	FUNCTION
1	Z999 14BK	GROUND
2	L678 18BR	PARK LAMP RELAY OUTPUT
3	L673 18YL	TRAILER TOW LEFT TURN RELAY OUTPUT
4	L674 18LG	TRAILER TOW RIGHT TURN RELAY OUTPUT



TRAILER TOW  
CONNECTOR-ADD ON

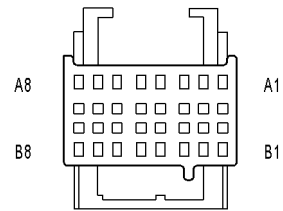
## TRAILER TOW CONNECTOR-ADD ON - 10 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	L674 18LG	TRAILER TOW RIGHT TURN RELAY OUTPUT
3	L1 18WT/LG	BACKUP LAMP FEED
4	A100 14RD/VT	FUSED B(+)
5	L678 18BR	PARK LAMP RELAY OUTPUT
6	-	-
7	B40 14DG	TRAILER TOW BRAKE B(+)
8	Z999 14BK	GROUND
9	Z999 14BK	GROUND
10	L673 18YL	TRAILER TOW LEFT TURN RELAY OUTPUT



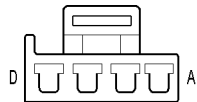
TRANSFER CASE  
CONTROL MODULE C1  
(ELECTRIC 4x4)

TRANSFER CASE CONTROL MODULE C1 (ELECTRIC 4x4) - 16 WAY		
CAV	CIRCUIT	FUNCTION
A1	D25 20VT/DB	PCI BUS
A2	-	-
A3	-	-
A4	G92 20VT/OR	4WD LOW INDICATOR
A5	G91 20VT/WT	4WD HIGH INDICATOR
A6	K977 20BR/WT	MODE SELECT
A7	T885 20YL/GY	MODE SENSOR GROUND
A8	Z905 18BK	GROUND
A9	-	-
A10	-	-
A11	-	-
A12	G95 20VT/BR	NEUTRAL INDICATOR
A13	G2 20BR/WT	IGNITION SWITCH SENSE
A14	D200 20WT/LG	MODE SENSOR D
A15	-	-
A16	Z905 20BK	GROUND



TRANSFER CASE  
CONTROL MODULE C2  
(ELECTRIC 4x4)

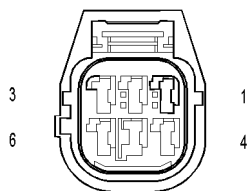
TRANSFER CASE CONTROL MODULE C2 (ELECTRIC 4x4) - 16 WAY		
CAV	CIRCUIT	FUNCTION
B1	D202 20WT/VT	MODE SENSOR B
B2	D201 20WT/DG	MODE SENSOR A
B3	-	-
B4	-	-
B5	-	-
B6	T41 20YL/DB	TRS T41 SENSE
B7	-	-
B8	T313 20YL/LG	5 VOLT MODE SENSOR SUPPLY
B9	-	-
B10	D203 20WT/BR	MODE SENSOR C
B11	-	-
B12	-	-
B13	-	-
B14	-	-
B15	-	-
B16	T322 20DG/GY	5 VOLT SELECTOR SWITCH SUPPLY



TRANSFER CASE  
CONTROL MODULE  
C3  
(ELECTRIC 4x4)

TRANSFER CASE CONTROL MODULE C3 (ELECTRIC 4x4) - 4 WAY		
CAV	CIRCUIT	FUNCTION
A	Z905 16BK	GROUND
B	A34 16RD/WT	FUSED B(+)
C	T315 16YL/BR	SHIFT MOTOR CONTROL A
D	T316 16YL/GY	SHIFT MOTOR CONTROL B

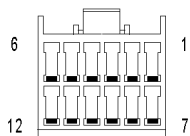
# CONNECTOR PINOUTS



TRANSFER CASE  
MODE SENSOR

## TRANSFER CASE MODE SENSOR - 6 WAY

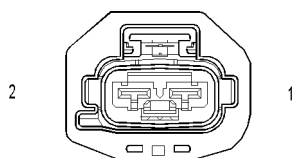
CAV	CIRCUIT	FUNCTION
1	D200 20WT/LG	MODE SENSOR D
2	T313 20YL/LG	5 VOLT MODE SENSOR SUPPLY
3	D202 20WT/VT	MODE SENSOR B
4	T885 20YL/GY	MODE SENSOR GROUND
5	D201 20WT/DG	MODE SENSOR A
6	D203 20WT/BR	MODE SENSOR C



TRANSFER CASE  
SELECTOR SWITCH

## TRANSFER CASE SELECTOR SWITCH - 12 WAY

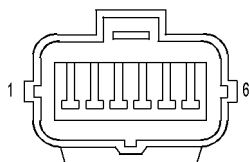
CAV	CIRCUIT	FUNCTION
1	T322 20DG/GY	5 VOLT SELECTOR SWITCH SUPPLY
2	G2 20BR/WT	IGNITION SWITCH SENSE
3	-	-
4	G95 20VT/BR	NEUTRAL INDICATOR
5	K977 20BR/WT	MODE SELECT
6	E11 20OR/DB	PANEL LAMPS DRIVER
7	F21 20PK/DG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
8	G92 20VT/OR	4WD LOW INDICATOR
9	G91 20VT/WT	4WD HIGH INDICATOR
10	-	-
11	Z905 20BK	GROUND
12	-	-



TRANSFER CASE  
SHIFT MOTOR

## TRANSFER CASE SHIFT MOTOR - 2 WAY

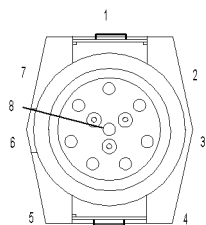
CAV	CIRCUIT	FUNCTION
1	T316 16YL/GY	SHIFT MOTOR CONTROL B
2	T315 16YL/BR	SHIFT MOTOR CONTROL A



TRANSMISSION  
RANGE SENSOR  
(RE)

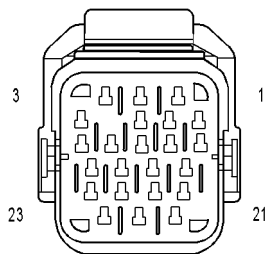
## TRANSMISSION RANGE SENSOR (RE) - 6 WAY

CAV	CIRCUIT	FUNCTION
1	L10 18WT/GY	FUSED IGNITION SWITCH OUTPUT (RUN)
2	T117 20DG/YL	TRANS RANGE SENSOR ELECTRONIC CLUSTER 5 VOLT SUPPLY
3	-	-
4	L1 18WT/LG	BACKUP LAMP FEED
5	T917 20YL/TN	TRANS RANGE SENSOR ELECTRONIC CLUSTER MUX
6	T41 20YL/DB	PARK NEUTRAL POSITION SWITCH SENSE (T41)
6	T41 18YL/DB	PARK NEUTRAL POSITION SWITCH SENSE (T41)



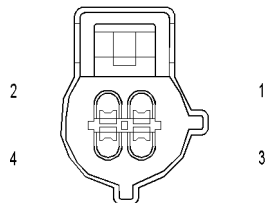
TRANSMISSION  
SOLENOID ASSEMBLY  
(RE)

TRANSMISSION SOLENOID ASSEMBLY (RE) - 8 WAY		
CAV	CIRCUIT	FUNCTION
1	T16 18YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
2	F856 18YL/PK	5 VOLT SUPPLY
3	K900 20DB/DG	SENSOR GROUND
3	K900 18DB/DG	SENSOR GROUND
4	T38 18YL/BR	GOVERNOR PRESSURE SENSOR SIGNAL
5	T118 18DG	GOVERNOR PRESSURE SOLENOID CONTROL
6	T9 18DG/TN	3-4 SHIFT SOLENOID
7	T75 18YL/LB	TORQUE CONVERTER CLUTCH SOLENOID CONTROL
8	T54 18DG/OR	TRANSMISSION TEMPERATURE SENSOR SIGNAL



TRANSMISSION  
SOLENOID/TRS  
ASSEMBLY  
(RFE)

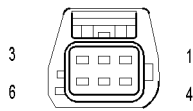
TRANSMISSION SOLENOID/TRS ASSEMBLY (RFE) - 23 WAY		
CAV	CIRCUIT	FUNCTION
1	L10 18WT/GY	FUSED IGNITION SWITCH OUTPUT (RUN)
2	T20 18DG/WT	L/R SOLENOID CONTROL
3	-	-
4	T41 20YL/DB	TRS T41 SENSE
5	T42 18DG/YL	TRS T42 SENSE
6	L1 18WT/LG	BACKUP LAMP FEED
7	T60 18YL/GY	OVERDRIVE SOLENOID CONTROL
8	T3 18DG/DB	TRS T3 SENSE
9	T1 18DG/LB	TRS T1 SENSE
10	T16 18YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
11	T48 18BR/YL	4C PRESSURE SWITCH SENSE
12	T140 18YL/GY	PRESSURE CONTROL SOLENOID CONTROL
13	T4 18DG/LB	TRS T2 SENSE
14	T50 18YL/TN	LOW/REVERSE PRESSURE SWITCH SENSE
15	T147 18DG/YL	2C PRESSURE SWITCH SENSE
16	T9 18DG/TN	OVERDRIVE PRESSURE SWITCH SENSE
17	T59 18YL/LB	UNDERDRIVE SOLENOID CONTROL
18	T29 18YL/WT	UNDERDRIVE PRESSURE SWITCH SENSE
19	T259 18YL/DG	4C SOLENOID CONTROL
20	T219 18YL/LG	2C SOLENOID CONTROL
21	T118 18DG	MS SOLENOID CONTROL
22	K900 18DB/DG	SENSOR GROUND
23	T54 18DG/OR	TRANSMISSION TEMPERATURE SENSOR SIGNAL



VACUUM  
PUMP  
(DIESEL)

VACUUM PUMP (DIESEL) - 4 WAY		
CAV	CIRCUIT	FUNCTION
1	-	-
2	F202 20PK/GY	FUSED IGNITION SWITCH OUTPUT (RUN-START)
3	-	-
4	Z936 18BK	GROUND

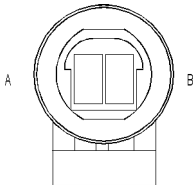
# CONNECTOR PINOUTS



VISTRONIC  
FAN DRIVE  
(DIESEL)

VISTRONIC FAN DRIVE (DIESEL) - 6 WAY

CAV	CIRCUIT	FUNCTION
1	K160 18BR/OR	PARK LOCKOUT SOLENOID CONTROL
2	K900 18DB/DG	SENSOR GROUND
3	K161 18BR/LB	FAN SPEED SENSOR
4	-	-
5	F856 18YL/PK	5 VOLT SUPPLY
6	F504 20GY/PK	FUSED IGNITION SWITCH OUTPUT (RUN)



WATER IN  
FUEL SENSOR

WATER IN FUEL SENSOR - 2 WAY

CAV	CIRCUIT	FUNCTION
A	K914 18RD/WT (A/T)	SENSOR GROUND
A	K914 18BR/WT (M/T)	SENSOR GROUND
B	G123 18VT/LG	WATER IN FUEL SENSOR SIGNAL

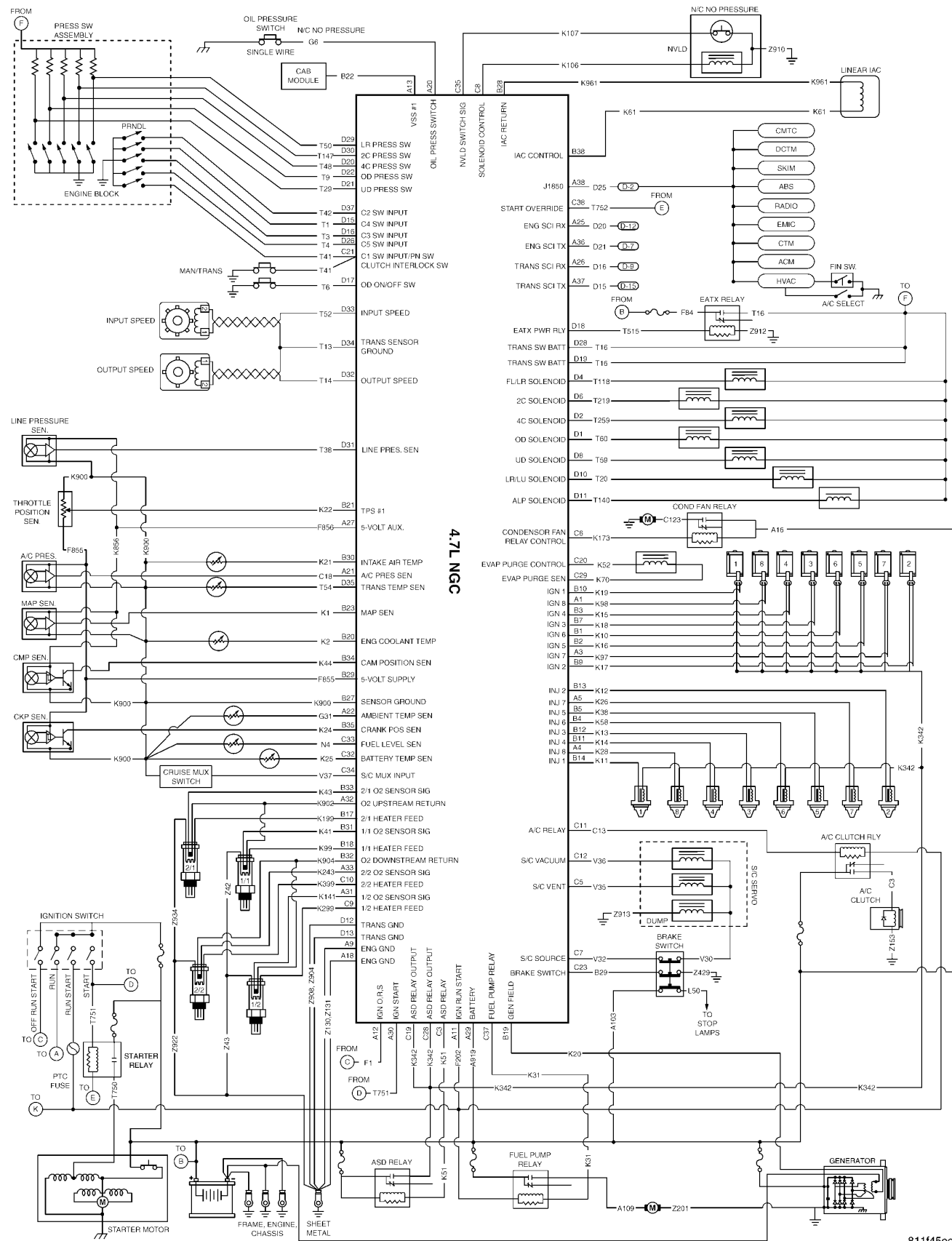


### 10.1 3.7L NGC



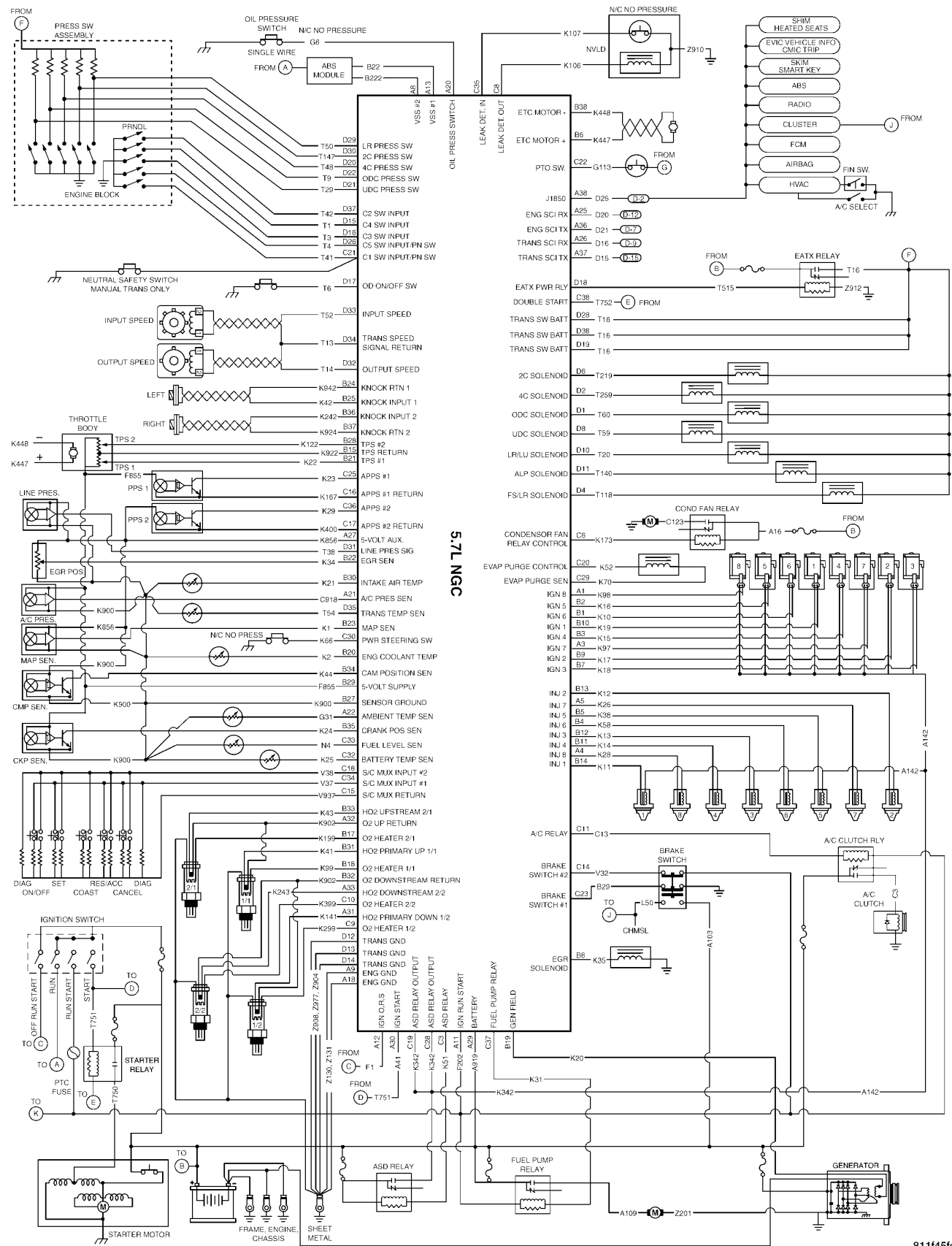
# SCHEMATIC DIAGRAMS

## 10.2 4.7L NGC



811f45ee

## 10.3 5.7L NGC

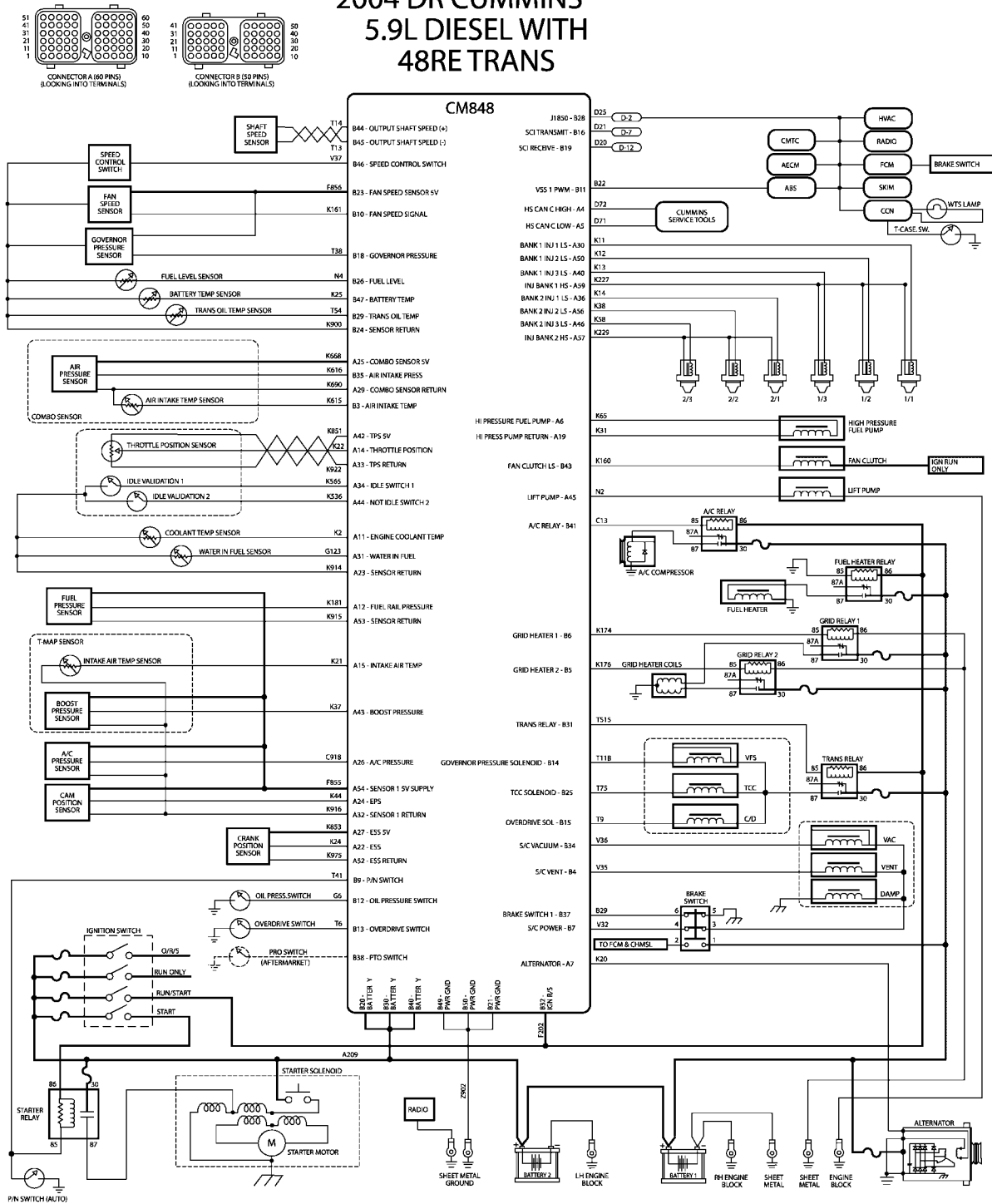


81145fe

# SCHEMATIC DIAGRAMS

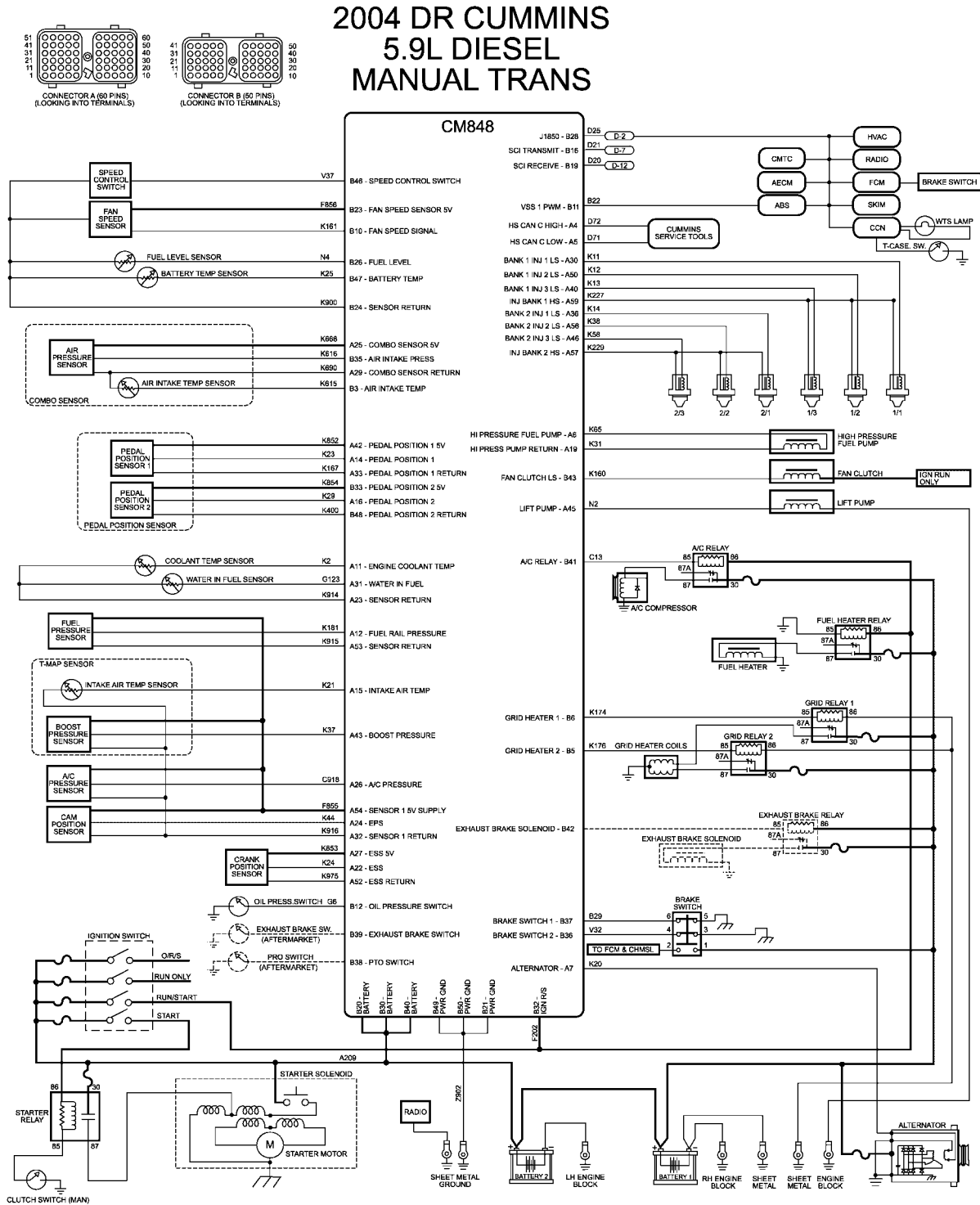
## 10.4 5.9L DIESEL AUTOMATIC

### 2004 DR CUMMINS 5.9L DIESEL WITH 48RE TRANS



81208c30

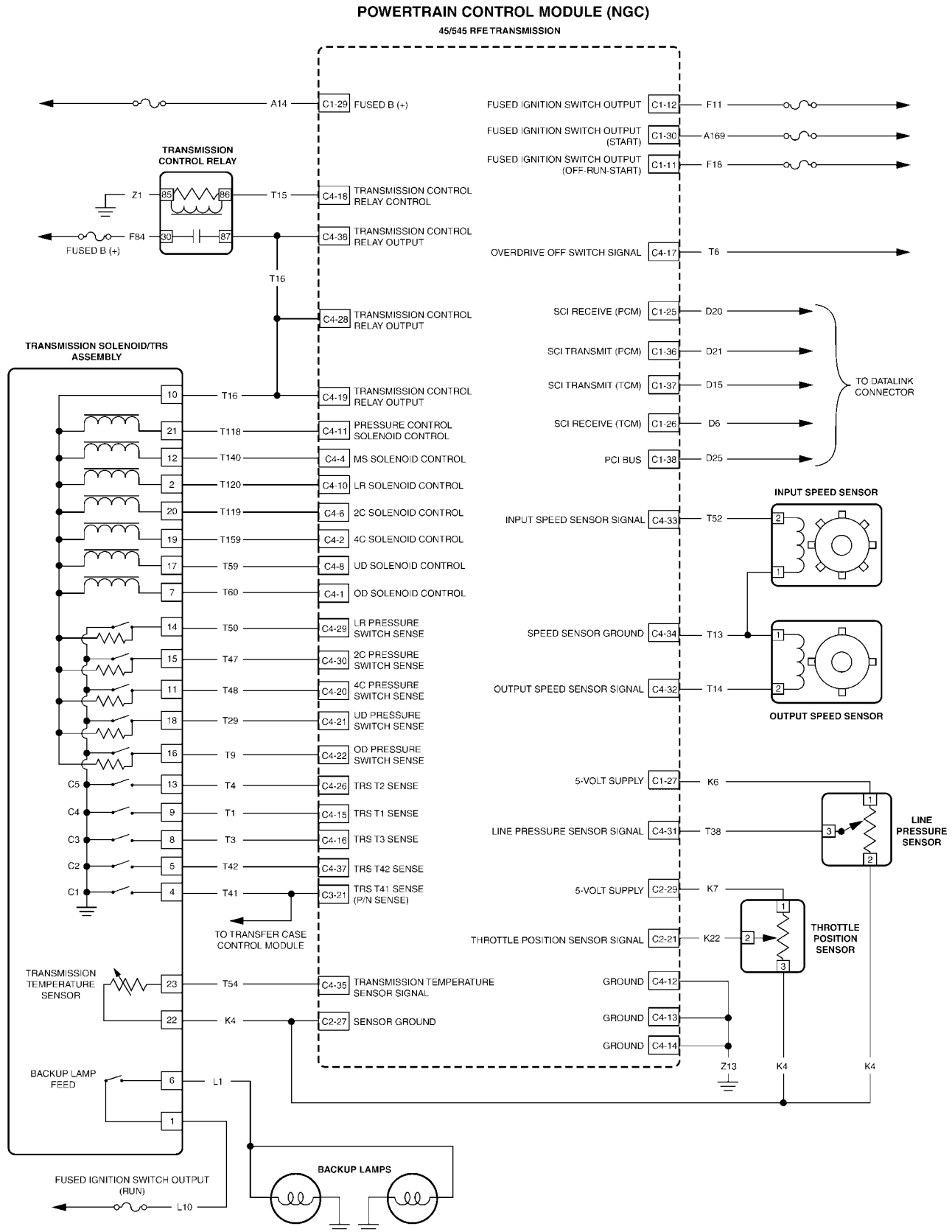
## 10.5 5.9L DIESEL MANUAL TRANS



81208c3a

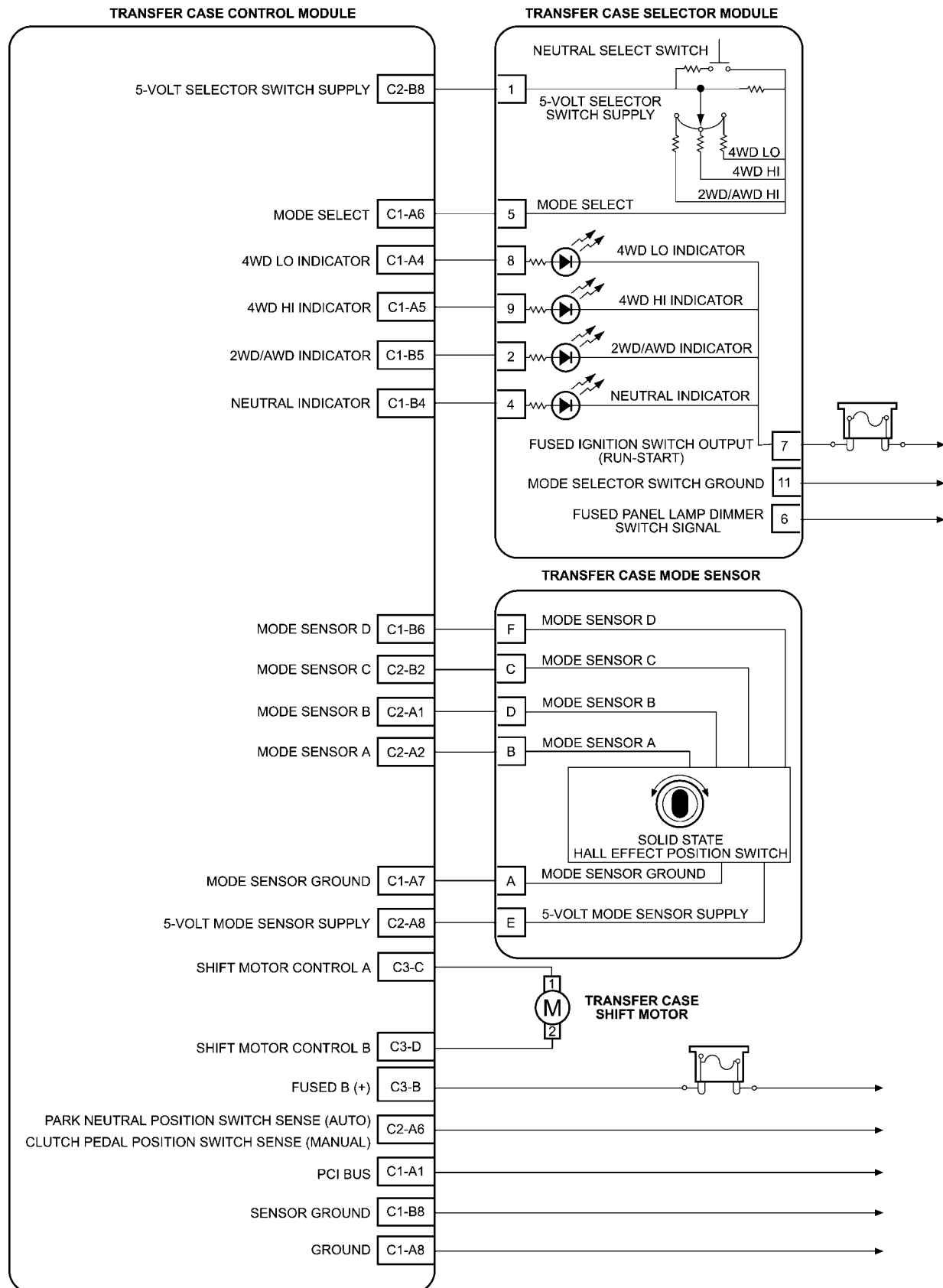
# SCHEMATIC DIAGRAMS

## 10.6 45/545 RFE TRANSMISSION



80e94305

## 10.7 ELECTRONIC TRANSFER CASE



80b42797

NOTES



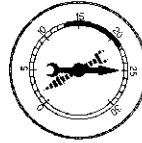
## 11.0 CHARTS AND GRAPHS

11.1 ENGINE VACUUM READINGS

**NORMAL  
READING  
RANGE  
AT IDLE**



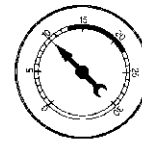
**BLOWN  
HEAD  
GASKET  
AT IDLE**



**NORMAL  
READING  
RAPID  
ACCELERATION/  
DECELERATION**



**WORN  
RINGS OR  
DILUTED OIL  
RAPID  
ACCELERATION/  
DECELERATION**



**LATE VALVE  
TIMING,  
VACUUM  
LEAK AT  
IDLE**



**RESTRICTED  
EXHAUST  
(DROPS  
TOWARD  
ZERO AS  
ENGINE RPM  
INCREASES)**



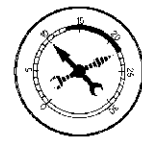
**POOR  
VALVE  
SEATING  
AT IDLE**



**STICKING  
VALVE  
AT IDLE**



**WORN VALVE  
GUIDES  
(STEADIES AS  
ENGINE  
SPEED  
INCREASES)**



**WORN VALVE  
SPRINGS  
(MORE  
PRONOUNCED  
AS ENGINE  
SPEED  
INCREASES)**

0920606

## CHARTS AND GRAPHS

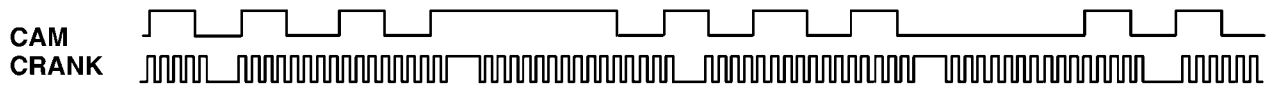
### 11.2 O2 SENSOR CONFIGURATION

#### O2 SENSOR CONFIGURATION

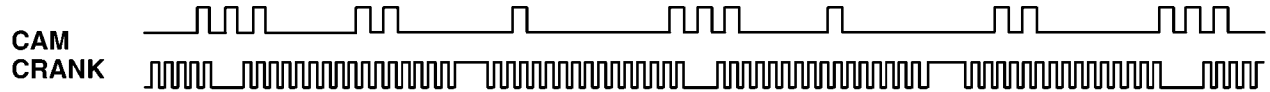
AB 3.9L	1/1	UPSTREAM	DR 5.7L	1/1	LEFT BANK UPSTREAM
AB 3.9L	1/2	DOWNSTREAM	DR 5.7L	1/2	LEFT BANK DOWNSTREAM
			DR 5.7L	2/1	RIGHT BANK UPSTREAM
AB 5.2L	1/1	LEFT BANK UPSTREAM	DR 5.7L	2/2	RIGHT BANK DOWNSTREAM
AB 5.2L	1/2	LEFT BANK DOWNSTREAM			
AB 5.2L	2/1	RIGHT BANK UPSTREAM	DR 5.9L	1/1	UPSTREAM
AB 5.2L	2/2	RIGHT BANK DOWNSTREAM	DR 5.9L	1/2	DOWNSTREAM
AB 5.9L	1/1	UPSTREAM	DR 8.0L	1/1	LEFT BANK UPSTREAM
AB 5.9L	1/2	DOWNSTREAM	DR 8.0L	1/2	PRE CATALYST
			DR 8.0L	1/3	POST CATALYST
AN 2.5L	1/1	UPSTREAM	DR 8.0L	2/1	RIGHT BANK UPSTREAM
AN 2.5L	1/2	DOWNSTREAM			
			KJ 2.4L	1/1	UPSTREAM
AN 3.9L	1/1	UPSTREAM	KJ 2.4L	1/2	DOWNSTREAM
AN 3.9L	1/2	DOWNSTREAM			
			KJ 3.7L	1/1	LEFT BANK UPSTREAM
AN 4.7L	1/1	LEFT BANK UPSTREAM	KJ 3.7L	1/2	LEFT BANK DOWNSTREAM
AN 4.7L	1/2	LEFT BANK DOWNSTREAM	KJ 3.7L	2/1	RIGHT BANK UPSTREAM
AN 4.7L	2/1	RIGHT BANK UPSTREAM	KJ 3.7L	2/2	RIGHT BANK DOWNSTREAM
AN 4.7L	2/2	RIGHT BANK DOWNSTREAM			
			TJ 2.4L	1/1	UPSTREAM
AN 5.9L 2WD	1/1	LEFT BANK UPSTREAM	TJ 2.4L	1/2	DOWNSTREAM
AN 5.9L 2WD	1/2	PRE CATALYST			
AN 5.9L 2WD	1/3	POST CATALYST	TJ 4.0L	1/1	FRONT UPSTREAM
AN 5.9L 2WD	2/1	RIGHT BANK UPSTREAM	TJ 4.0L	1/2	FRONT DOWNSTREAM
			TJ 4.0L	2/1	REAR UPSTREAM
AN 5.9L 4WD	1/1	UPSTREAM	TJ 4.0L	2/2	REAR DOWNSTREAM
AN 5.9L 4WD	1/2	DOWNSTREAM			
			WJ 4.0L	1/1	FRONT UPSTREAM
DN 3.9L	1/1	UPSTREAM	WJ 4.0L	1/2	FRONT DOWNSTREAM
DN 3.9L	1/2	DOWNSTREAM	WJ 4.0L	2/1	REAR UPSTREAM
			WJ 4.0L	2/2	REAR DOWNSTREAM
DN 4.7L	1/1	LEFT BANK UPSTREAM			
DN 4.7L	1/2	LEFT BANK DOWNSTREAM	WJ 4.7L	1/1	LEFT BANK UPSTREAM
DN 4.7L	2/1	RIGHT BANK UPSTREAM	WJ 4.7L	1/2	LEFT BANK DOWNSTREAM
DN 4.7L	2/2	RIGHT BANK DOWNSTREAM	WJ 4.7L	2/1	RIGHT BANK UPSTREAM
			WJ 4.7L	2/2	RIGHT BANK DOWNSTREAM
DN 5.9L	1/1	UPSTREAM			
DN 5.9L	1/2	DOWNSTREAM	WJ 5.9L	1/1	UPSTREAM
			WJ 5.9L	1/2	DOWNSTREAM
DR 3.7L	1/1	UPSTREAM			
DR 3.7L	1/2	DOWNSTREAM	ZB 8.3L	1/1	LEFT BANK UPSTREAM
			ZB 8.3L	1/2	LEFT BANK DOWNSTREAM
DR 4.7L	1/1	LEFT BANK UPSTREAM	ZB 8.3L	2/1	RIGHT BANK UPSTREAM
DR 4.7L	1/2	LEFT BANK DOWNSTREAM	ZB 8.3L	2/2	RIGHT BANK DOWNSTREAM
DR 4.7L	2/1	RIGHT BANK UPSTREAM			
DR 4.7L	2/2	RIGHT BANK DOWNSTREAM			

11.3 NGC CAM AND CRANK PATTERNSNGC TYPICAL SCOPE PATTERNS  
CAMSHAFT AND CRANKSHAFT SENSOR

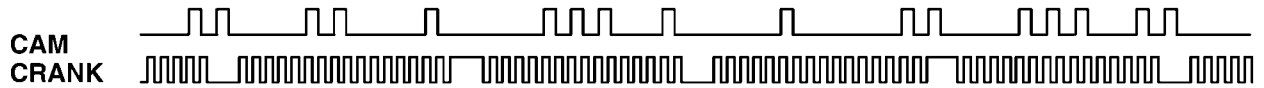
## 4 CYL ENGINES



## 6 CYL ENGINES



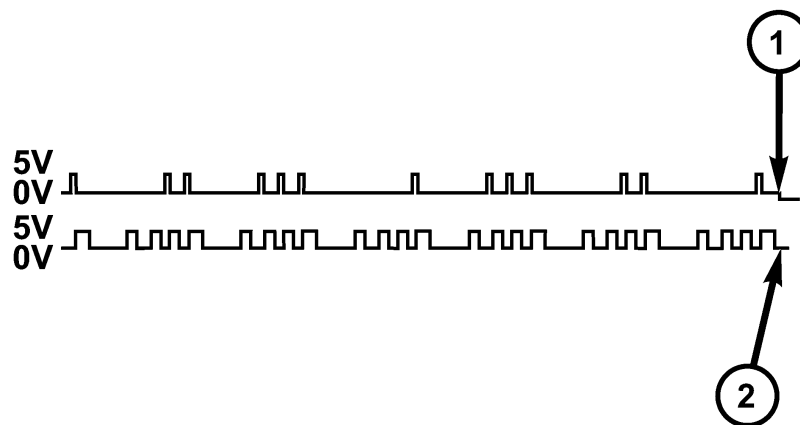
## 8 CYL ENGINES



80dd1b34

11.4 3.7L

## 3.7L ENGINE



1. CAMSHAFT SIGNAL  
2. CRANKSHAFT SIGNAL

80ca24f3

## CHARTS AND GRAPHS

### 11.5 RFE PRESSURE SWITCH STATES

**45RFE/545RFE NORMAL PRESSURE SWITCH STATES**

GEAR	L/R	2C	4C	UD	OD
<b>R</b>	OPEN	OPEN	OPEN	OPEN	OPEN
<b>N</b>	CLOSED	OPEN	OPEN	OPEN	OPEN
<b>1ST</b>	CLOSED	OPEN	OPEN	CLOSED	OPEN
<b>2ND</b>	OPEN	CLOSED	OPEN	CLOSED	OPEN
<b>2 PRIME</b>	OPEN	OPEN	CLOSED	CLOSED	OPEN
<b>3RD</b>	OPEN	OPEN	OPEN	CLOSED	CLOSED
<b>4TH</b>	OPEN	CLOSED	CLOSED	OPEN	CLOSED
<b>4 PRIME</b>	OPEN	OPEN	OPEN	OPEN	CLOSED

**NOTE: L/R PRESSURE SWITCH OPENS ABOVE 150 OUTPUT RPM IN 1ST GEAR AND CLOSSES BELOW 100 OUTPUT RPM.**

80e94351

### 11.6 RFE SHIFT LEVER ERROR CODES

**SHIFT LEVER ERROR CODES  
REPORTED BY THE DRBIII®**

ERROR CODE	SWITCH STUCK	POSITION
<b>1</b>	<b>T41/C1 STUCK</b>	<b>OPEN</b>
<b>2</b>	<b>T41/C1 STUCK</b>	<b>CLOSED</b>
<b>3</b>	<b>T42/C2 STUCK</b>	<b>OPEN</b>
<b>4</b>	<b>T42/C2 STUCK</b>	<b>CLOSED</b>
<b>5</b>	<b>T3/C3 STUCK</b>	<b>OPEN</b>
<b>6</b>	<b>T3/C3 STUCK</b>	<b>CLOSED</b>
<b>7</b>	<b>T1/C4 STUCK</b>	<b>OPEN</b>
<b>8</b>	<b>T1/C4 STUCK</b>	<b>CLOSED</b>
<b>9</b>	<b>T2/C5 STUCK</b>	<b>OPEN</b>
<b>10</b>	<b>T2/C5 STUCK</b>	<b>CLOSED</b>
<b>11</b>	<b>OD LOCKOUT STUCK</b>	<b>OPEN</b>
<b>12</b>	<b>OD LOCKOUT STUCK</b>	<b>CLOSED</b>

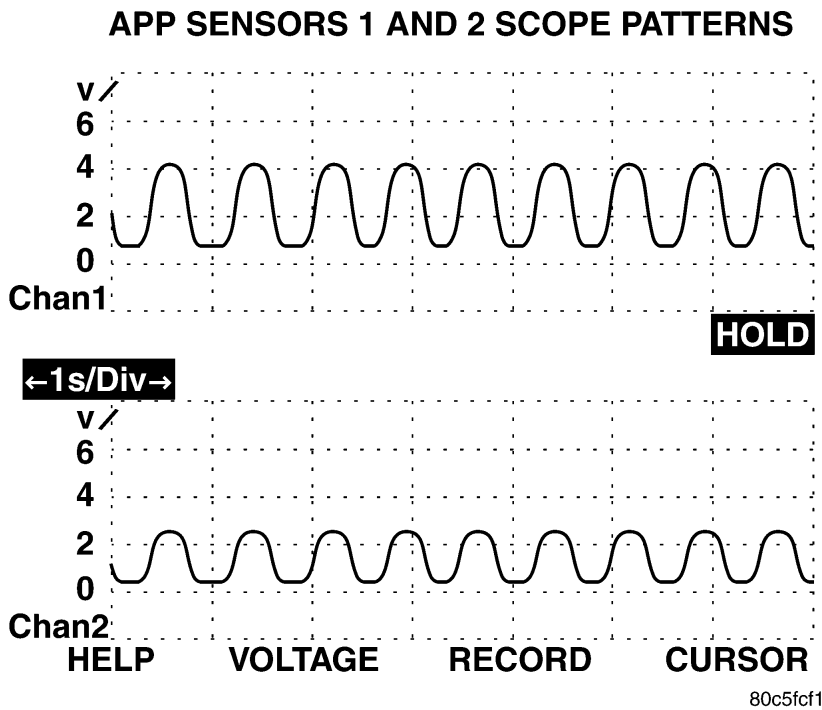
80ccf5bb

11.7 RFE TRS SWITCH STATES

45RFE/545RFE TRS SWITCH STATES												
TRS	PARK	TMP1	REV	TMP 2	N1	N2	TMP 3	D	TMP 4	2	TMP 5	L
T1 (C4)	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	OPEN
T2 (C5)	CLOSED	CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	CLOSED
T3 (C3)	OPEN	OPEN	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	OPEN	OPEN	CLOSED
T41 (C1)	CLOSED	OPEN	OPEN	OPEN	CLOSED	CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
T42 (C2)	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN

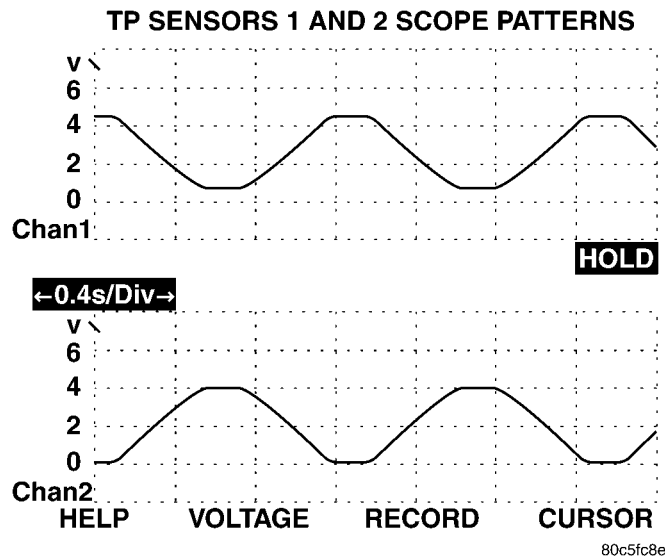
80b3845e

11.8 5.7L

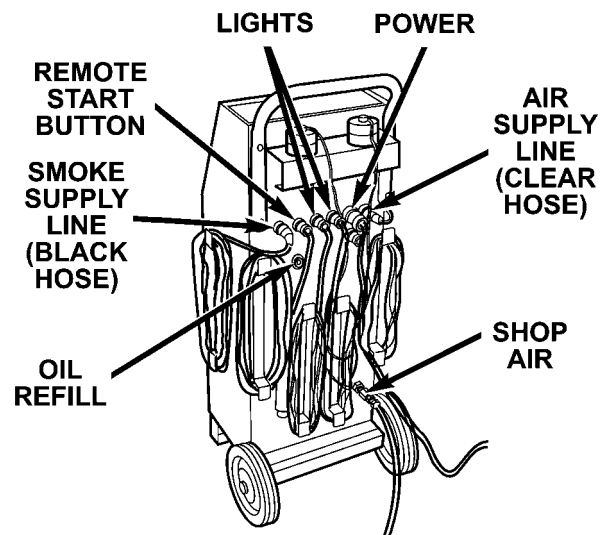
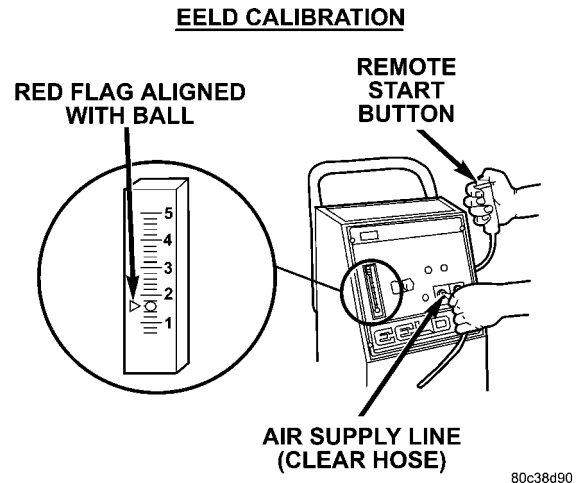
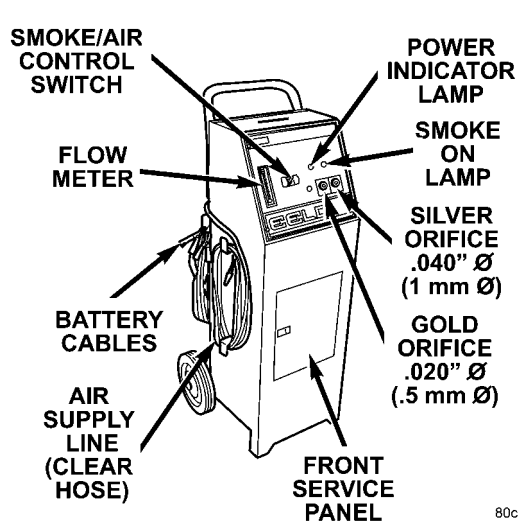


# CHARTS AND GRAPHS

## 11.9 5.7L



## 11.10 EELD



## DIAGNOSTIC TEST PROCEDURES — TELL US!

DaimlerChrysler Corporation is constantly working to provide the technician the best diagnostic manuals possible. Your comments and recommendations regarding the diagnostic manuals and procedures are appreciated.

To best understand your suggestion, please complete the form giving us as much detail as possible.

---

Model \_\_\_\_\_ Year \_\_\_\_\_ Body Type \_\_\_\_\_ Engine \_\_\_\_\_

Transmission \_\_\_\_\_ Vehicle Mileage \_\_\_\_\_ MDH \_\_\_\_\_

Diagnostic Procedure \_\_\_\_\_ Book No. \_\_\_\_\_ Page \_\_\_\_\_

Comments/recommendations (if necessary, draw sketch)

Name \_\_\_\_\_

Submitted by: \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Business Phone # \_\_\_\_\_

All comments become property of DaimlerChrysler Corporation and may be used without compensation.

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