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1.0 INTRODUCTION

The procedures contained in this manual include specifications, instructions, and graphics needed to diagnose the PCM Powertrain System. The diagnostics in this manual are based on the failure condition or symptom being present at time of diagnosis.

Please follow the recommendations below when choosing your diagnostic path.

1. First make sure the DRBIII® is communicating with the appropriate modules; ie., if the DRBIII® displays a "No Response" condition, you must diagnose this first before proceeding.
2. Read DTC's (diagnostic trouble codes) with the DRBIII®.
3. If no DTC's 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 schematics are in Section 10.0.

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; carryover systems may be enhanced. READ THIS MANUAL BEFORE TRYING TO DIAGNOSE A VEHICLE CODE. It is recommended that you review the entire manual to become familiar with all new and changed 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 procedures manual covers the following 2000 Chrysler Caravan Voyager vehicles equipped with the 2.0L, 2.4L DOHC, 3.0L MPI, 3.3L/3.8L MPI, or 3.3L E85 compatible Engine.

1.2 SIX-STEP TROUBLESHOOTING PROCEDURE

Diagnosis of the powertrain control module (PCM) 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 Control Module (PCM) monitors and controls:

- Fuel system
- Ignition system
- charging system
- speed control system
- cooling system

3.0 SYSTEM DESCRIPTION AND FUNCTIONAL OPERATION

3.1 GENERAL DESCRIPTION

These Sequential Fuel Injection (SFI) engine systems have the latest in technical advances. The on-board Euro Stage III On-Board Diagnostic incorporated with the powertrain control module (PCM) are intended to assist the field technician in repairing vehicle problems by the quickest means.

3.2 FUNCTION OPERATION

3.2.1 FUEL CONTROL

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, manifold absolute pressure, and air temperature change.

Different fuel calculation strategies are used dependent 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 has been programmed to monitor many different circuits of the fuel injection system. This monitoring is called “on-board diagnosis.”

Certain criteria, or “arming conditions,” must be met for a trouble code to be entered into the PCM memory. The criteria may be a range of: engine rpm, engine temperature, and/or input voltage to the PCM. If a problem is sensed with a monitored circuit, and all of the criteria or arming conditions are met, then a trouble code will be stored in the PCM.

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

The PCM compares input signal voltages from each input device with specifications (the established high and low limits of the range) that are programmed into it for that device. If the input voltage is not within specifications and other trouble code criteria (arming conditions) are met, a trouble code will be stored in the PCM memory.

The On Board Diagnostics have evolved to the second Generation of Diagnostics referred to as Euro Stage III On-Board Diagnostic.

The following table summarizes the various OBDII monitors operation.

EURO STAGE III OBD MONITOR INFORMATION

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
One Trip Faults - Turns On The MIL and Sets DTC After One Failure (except for most rationality tests which are two trip)	Two Trip Faults - Turns On The MIL and Sets DTC After Two Consecutive Failures	Two Trip Faults - Turns On The MIL and Sets DTC After Two Consecutive Failures
Priority 3	**Priority 1 or 3**	**Priority 2 or 4**
All Checked For Continuity Open Short To Ground Short To Voltage Inputs Checked For Rationality Outputs Checked For Functionality	Done Stop Testing = Yes Oxygen Sensor Heater Oxygen Sensor Response Catalytic Converter Efficiency Except EWMA - up to 6 tests per trip and a one trip fault EGR System	**Fuel Control Monitor** Monitors Fuel Control System For: Fuel System Lean Fuel System Rich Requires 3 Consecutive *Fuel System Good Trips* To Extinguish The MIL **Misfire Monitor** Monitors For Engine Misfire at: 1000 RPM Counter (Type B) **200 RPM Counter (Type A)
Requires 3 Consecutive *Global/Alternate Good Trips* to Extinguish the MIL*	Requires 3 Consecutive *Global Good Trips* to Extinguish the MIL*	Requires 3 Consecutive *Misfire Good Trips* To Extinguish the MIL **Type A misfire is a one trip failure. The MIL will illuminate and blink at the first failure.

***40 Warm Up Cycles** are required to erase DTC's *after* the MIL has been extinguished.

3.2.3 OTHER CONTROLS

CHARGING SYSTEM

The charging system is turned on when the engine is started and ASD relay energized. When the ASD relay is on, ASD output voltage is supplied to the ASD sense circuit at the PCM. This voltage is connected in some cases, through the PCM and supplied to one of the generator field terminals (Gen Source +). All others, the Gen field is connected directly to the ASD output voltage. The amount of current produced by the generator is controlled by the Electronic Voltage Regulator (EVR) circuitry, in the PCM. A battery temperature sensor, located either in the battery tray, using the ambient sensor, or in the PCM itself, is used to sense battery temperature. This temperature along with sensed line voltage, is used by the PCM to vary the battery charging rate. This is done by cycling the ground path to the other generator field terminal (Gen field driver).

SPEED CONTROL SYSTEM

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 switch turned off, shifting into neutral, excessive RPM (tires spinning) or ignition key off.

3.2.4 PCM OPERATING MODES

As input signals to the powertrain control module (PCM) change, the PCM adjusts its response to output devices. For example, the PCM must calculate a different injector pulse width and ignition timing for idle than it does for wide open throttle. There are several different modes of operation that determine how the PCM responds to the various input signals.

There are two types of engine control operation: **open loop** and **closed loop.**

In open loop operation, the PCM receives input signals and responds according to preset programming. Inputs from the heated oxygen sensors are not monitored.

In closed loop operation, the PCM monitors the inputs from the heated oxygen sensors. This input indicates to the PCM whether or not the calculated injector pulse width results in the ideal air-fuel ratio of 14.7 parts air to 1 part fuel. By monitoring the exhaust oxygen content through the oxygen sensor, the PCM can fine tune injector pulse width. Fine tuning injector pulse width allows the PCM to achieve the lowest emission levels while maintaining optimum fuel economy.

The engine start-up (crank), engine warm-up, and wide open throttle modes are open loop modes. Under most operating conditions, closed loop modes occur with the engine at operating temperature.

IGNITION SWITCH ON (ENGINE OFF) MODE

When the ignition switch activates the fuel injection system, the following actions occur:

1. The PCM determines atmospheric air pressure from the MAP sensor input to determine basic fuel strategy.
2. The PCM monitors the engine coolant temperature sensor and throttle position sensor input. The PCM modifies fuel strategy based on this input.

When the key is in the “on” position and the engine is not running (zero rpm), the auto shutdown relay and fuel pump relay are not energized. Therefore, voltage is not supplied to the fuel pump, ignition coil, and fuel injectors.

Engine Start-up Mode - This is an open loop mode. The following actions occur when the starter motor is engaged:

1. The auto shutdown and fuel pump relays are energized. If the PCM does not receive the camshaft and crankshaft signal within approximately one second, these relays are de-energized.
2. The PCM energizes all fuel injectors until it determines crankshaft position from the camshaft and crankshaft signals. The PCM determines crankshaft position within one engine revolution. After the crankshaft position has been determined, the PCM energizes the fuel injectors in sequence. The PCM adjusts the injector pulse width and synchronizes the fuel injectors by controlling the fuel injectors' ground paths.
3. Once the engine idles within 64 rpm of its target engine speed, the PCM compares the current MAP sensor value with the value received during the ignition switch on (zero rpm) mode. A diagnostic trouble code is written to PCM memory if a minimum difference between the two values is not found.

Once the auto shutdown and fuel pump relays have been energized, the PCM determines the fuel injector pulse width based on the following:

– engine coolant temperature

– manifold absolute pressure

– intake air temperature

– engine revolutions

– throttle position

The PCM determines the spark advance based on the following:

– engine coolant temperature
– crankshaft position
– camshaft position
– intake air temperature
– manifold absolute pressure
– throttle position

Engine Warm-Up Mode - This is an open loop-mode. The PCM adjusts injector pulse width and controls injector synchronization by controlling the fuel injectors' ground paths. The PCM adjusts ignition timing and engine idle speed. The PCM adjusts the idle speed by controlling the idle air control motor and spark advance.

Cruise or Idle Mode - When the engine is at normal operating temperature, this is a closed loop mode.

Acceleration Mode - This is a closed loop mode. The PCM recognizes an increase in throttle position and a decrease in manifold vacuum as engine load increases. In response, the PCM increases the injector pulse width to meet the increased load. The A/C compressor may be de-energized for a short period of time.

Deceleration - This is a closed loop mode. The PCM recognizes a decrease in throttle position and an increase in manifold vacuum as engine load decreases. In response, the PCM decreases the injector pulse width to meet the decreased load. Full injector shut off may be obtained during high speed deceleration.

Wide Open Throttle Mode - This is an open loop mode. The throttle position sensor notifies the PCM of a wide open throttle condition. Once a wide open throttle is sensed, the PCM de-energizes the A/C compressor clutch relay for 15 seconds.

3.2.5 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.(*)

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 if a fuel injector is clogged, the pintle is sticking, or the wrong injectors are 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 stream 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.

3.2.6 SKIS OVERVIEW

The Sentry Key Immobilizer System (SKIS) is an immobilizer system design to prevent unauthorized vehicle operation. The system consists of a Sentry Key Immobilizer Module (SKIM), ignition key(s) equipped with a transponder chip and engine controller. When the ignition switch is turned on, the SKIM interrogates the ignition key. If the ignition key is "Valid", the SKIM sends a CCD Bus message to the engine controller indicating the presence of a valid igntion key. Upon receiving a "Valid" key signal the PCM will allow the engine to continue to operate.

3.2.7 SKIM ON-BOARD DIAGNOSTICS

The SKIM has been programmed to transmit and monitor many different coded messages as well as CCD Bus messages. This monitoring is called "On Board Diagnosis".

Certain criteria must be met for a diagnostic trouble code to be entered into the SKIM memeory. The criteria may be a range of; Input voltage, CCD Bus message, or coded messages to the SKIM. If all of the criteria for monitoring a circuit or function are met and a fault is sensed, a diagnostic trouble code will be stored in the SKIM memory.

3.2.8 SKIS OPERATION

When ignition power is supplied to the SKIM, the SKIM performs an internal self-test. After the self-test is completed, the SKIM neergizes the antenna (this activates the transponder chop responds to the challenge by generating an encrypted response message using the following:

Secret Key - This is an electronically stored value (identification number) that is unique to each SKIS. The secret key is stored in the SKIM, PCM and all ignition key tranponders.

Challenge - This is a random numbr that is generated by the SKIM at each ignition key cycle.

The secret key and challenge are plugged into an algorithm that produces the encrypted response message. The transponder uses the crypto algorithm to receive, decode and respond to the message sent by the SKIM. After responding to the coded message, the transponder sends a transponder ID message to the SKIM. The SKIM compares the transponder ID to the available valid key codes in the SKIM memory (8 key maximum). After validating the key the SKIM sends a CCD Bus message called a “Seed Request” to the engine controller then waits for a PCM response. If the PCM does not respond, the SKIM will send the seed request agian. After three failed attempts the SKIM will stop sending the seed request and store a trouble code. If the PCM sends a seed response, the SKIM sends a valid/invalid key message to the PCM. This is an encrypted message that is generated using the following:

VIN - Vehicle Identification Number

Seed - This is a random number that is generated by the PCM at each ignition key cycle.

The VIN and seed are plugged into a rolling code algorithm that encrypts the “valid/invalid key” message. The PCM uses the rolling code algorithm to receive, decode and respond to the valid/invalid key message sent by the SKIM. After sending the valid/invalid key massage the SKIM waits 3.5 seconds for a PCM status message from the PCM. If the PCM does not respond with a valid key message to the SKIM, a fault is detected and a trouble code is stored.

The SKIS incorporates a warning lamp (“ALARM SET”) located in the message center. The lamp receives switched ignition voltage and is hardwired to the body control module. The lamp is actuated when the SKIM sends a CCD Bus message to the body controller requesting the lamp on. The body controller then provides the ground for the lamp. The SKIM will request lamp operation for the following:

- bulb checks at ignition on
- to alert the vehicle operator to a SKIS malfunction

For all faults except transponder faults and VIN mismatch, the lamp remains on steady. In the event of a tranponder fault the light flashes at a rate of 1 Hz (once per second). If a fault is pesent the lamp will emain on or flashing for the complete ignition cycle. If a fault is stored in SKIM memory which prevents the system form operating properly, the PCM will allow the engine to start and run (for 2 seconds) up to six times. After the sixth attempt, the PCM disables the starter relay until the fault is corrected.

3.2.9 PROGRAMMING THE POWERTRAIN CONTROL MODULE

Important Note: Before replacing the PCM for a failed driver, control circuit or ground circuit, be sure to check the related component/circuit integrity for failures not detected due to a double fault in the circuit. Most PCM driver/control circuit failures are caused by internal failure to components (i.e. 12-volt pull-ups, drivers and ground sensors). These failures are difficult to detect when a double fault has occurred and only one DTC has set.

NOTE: IF THE PCM AND THE SKIM ARE REPLACED AT THE SAME TIME, PROGRAM THE VIN INTO THE PCM FIRST. ALL VEHICLE KEYS WILL THEN NEED TO BE REPLACED AND PROGRAMMED TO THE NEW SKIM.

The SKIS “Secret Key” is an ID code that is unique to each SKIS. This code is programmed and stored in the SKIM, engine controller and transponder ship (ignition key). When replacing the PCM it is necessary to program the secret key into the PCM.

1. Turn the ignition on (transmission in park/neutral).
2. Use the DRB and select “THEFT ALARM”, SKIM then MISCELLANEOUS”.
3. Select “PCM REPLACED”.
4. Enter secured access mode by entering the vehicle four-digit PIN.

NOTE: IF THREE ATTEMPTS ARE MADE TO ENTER THE SECURE ACCESS MODE USING AN INCORRECT PIN, SECURED ACCESS MODE WILL BE LOCKED OUT FOR ONE HOUR. TO EXIT THIS LOCKOUT MODE, TURN THE IGNITION TO THE RUN POSITION FOR ONE HOUR THEN ENTER THE CORRECT PIN. (ENSURE ALL ACCESSORIES ARE TURNED OFF. ALSO MONITOR THE BATTERY STATE AND CONNECT A BATTERY CHARGER IF NECESSARY).

5. Press “ENTER” to transfer the secret key (the SKIM will send the secret key to the PCM).

3.2.10 PROGRAMMING THE SENTRY KEY IMMOBILIZER MODULE

NOTE: IF THE PCM AND THE SKIM ARE REPLACED AT THE SAME TIME, PROGRAM THE VIN INTO THE PCM FIRST. ALL VEHICLE KEYS WILL THEN NEED TO BE REPLACED AND PROGRAMMMED TO THE NEW SKIM.

1. Turn the ignition on (transmission in park/ neutral).
2. Use the DRB and select “THEFT ALARM”, “SKIM” then MISCELLLANEOUS.
3. Select “SKIM MOSULE REPLACEMENT (GASOLINE)”
4. Program the vehicle four-digit PIN into the SKIM.
5. Select “COUNTRY CODE” and enter the correct country.

NOTE: BE SURE TO ENTER THE CORRECT COUNTRY CODE. IF THE INCORRECT COUNTRY CODE IS PROGRAMMED INTO SKIM, THE SKIM MUST BE REPLACED.

6. Select “UPDATE VIN” (the SKIM will learn the VIN from the PCM).
7. Press “ENTER” to transfer the VIN (the PCM will send the VIN to the SKIM).
8. The DRB will ask if you want to transfer the secret key. Select “ENTER” to transfer secret key from the PCM. This will ensure the current vehicle ignition keys will still operate the SKIS system.

3.2.11 PROGRAMMING THE IGNITION KEYS TO THE SENTRY KEY IMMOBILIZER MODULE

1. Turn the ignition on (transmission in park/ neutral).
2. Use the DRB and select “THEFT ALARM”, “SKIM” then “MISCELLANEOUS”.
3. Select “PROGRAM IGNITION KEYS”.
4. Enter secured access mode by entering the vehicle four-digit PIN.

NOTE: A MAXIMUM OF EIGHT KEYS CAN BE LEARNED TO EACH SKIM. ONCE A KEY IS LEARNED TO A SKIM IT (THE KEY) CANNOT BE RANFERRED TO ANOTHER VEHICLE.

If ignition key programming is unsuccessful, the DRB will display one of the following messages:

Programming Not Attempted - The DRB attempts to read the programmed key status and there are no keys programmmed in the SKIM memory.

Programming Key Failed - (Possible Used Key From Wrong Vehicle) - SKIM is unable to program key due to one of the following:

- faulty ignition key transponder
- ignition key is programmed to another vehicle.

8 Keys Already Learned, Programming Not Done - SKIM transponder ID memory is full.

1. Obtain ignition keys to be programmed from customer (8 keys maximum)
2. Using the DRB, erase all ignition keys by selecting “MISCELLANEOUS” and “ERASE ALL CURRENT IGN. KEYS”
3. Program all ignition keys.

Learned Key In Ignition - Ignition key transponder ID is currently programmed in SKIM memory.

3.3 DIAGNOSTIC TROUBLE CODES

Each diagnostic trouble code is diagnosed by following a specific testing procedure. The diagnostic test procedures contain step-by-step instructions for determining the cause of trouble codes as well as no trouble code problems. It is not necessary to perform all of the tests in this book to diagnose an individual code.

Always begin by reading the diagnostic trouble codes using the DRBIII®.

3.3.1 HARD CODE

A diagnostic trouble code that comes back within one cycle of the ignition key is a “hard” code. This means that the defect is there every time the powertrain control module checks that circuit or function. Procedures in this manual verify if the trouble code is a hard code at a the beginning of each test. When it is not a hard code, an “intermittent” test must be performed.

Codes that are for Euro Stage III OBD 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 EURO STAGE III OBD DTCs will be set after one or in some cases two 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.

3.3.2 INTERMITTENT CODE

A diagnostic trouble code that is not there every time the PCM checks the circuit is an "intermittent" code. Most intermittent codes are caused by wiring or connector problems. Defects 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 checks 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 Hotline Newsletters or technical service bulletins that may apply.
- Use the DRBIII® data recorder or co-pilot.
- Use the DRBIII® PEP module lab scope.

3.3.3 RESET COUNTER

The reset counter counts the number of times the vehicle has been started since codes were last set, erased, or the battery was disconnected. The reset 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 DTC'S Detected" and the reset counter will show "STARTS since clear = XXX."

3.3.4 HANDLING NO TROUBLE CODE PROBLEMS

Symptom checks cannot be used properly unless the driveability problem characteristic actually happens while the vehicle is being tested.

Select the symptom that most accurately describes the vehicle's driveability problem and then perform the test routine that pertains to this symptom. Perform each routine test in sequence until the problem is found. For definitions, see Section 6.0 Glossary of Terms.

SYMPTOM	**DIAGNOSTIC TEST**
HARD START	CHECKING THE 5-VOLT SUPPLY CIRCUIT
	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING ENGINE VACUUM
	CHECKING THE FUEL PRESSURE
	CHECKING COOLANT SENSOR CALIBRATION
	CHECKING THROTTLE POSITION SENSOR CALIBRATION
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW
	CHECKING IDLE AIR CONTROL MOTOR OPERATION
	CHECKING ENGINE MECHANICAL SYSTEMS
	CHECKING EVAP EMISSION SYSTEM
	CHECKING EGR SYSTEM
	CHECKING IAT SENSOR
START AND STALL	CHECKING THE 5-VOLT SUPPLY CIRCUIT
	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING THE FUEL PRESSURE
	CHECKING COOLANT SENSOR CALIBRATION
	CHECKING THROTTLE POSITION SENSOR CALIBRATION
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW

	CHECKING IDLE AIR CONTROL MOTOR OPERATION
HESITATION/ SAG/ STUMBLE	CHECKING THE 5-VOLT SUPPLY CIRCUIT
	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING ENGINE VACUUM
	CHECKING THE FUEL PRESSURE
	CHECKING COOLANT SENSOR CALIBRATION
	CHECKING THROTTLE POSITION SENSOR CALIBRATION
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW
	CHECKING FOR OXYGEN SENSOR SWITCHING
	CHECKING O2S HEATER
	CHECKING IDLE AIR CONTROL MOTOR OPERATION
	CHECKING ENGINE MECHANICAL SYSTEMS
	CHECKING EVAP EMISSION SYSTEM
	CHECKING EGR SYSTEM
	CHECKING IAT SENSOR
	CHECKING PNP SWITCH
SURGE	CHECKING THE 5-VOLT SUPPLY CIRCUIT
	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING THE FUEL PRESSURE
	CHECKING COOLANT SENSOR CALIBRATION
	CHECKING THROTTLE POSITION SENSOR CALIBRATION
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW
	CHECKING FOR OXYGEN SENSOR SWITCHING
	CHECKING IDLE AIR CONTROL MOTOR OPERATION
	CHECKING EVAP EMISSION SYSTEM
LACK OF POWER/ SLUGGISH	CHECKING THE 5-VOLT SUPPLY CIRCUIT
	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING THE FUEL PRESSURE
	CHECKING COOLANT SENSOR CALIBRATION
	CHECKING THROTTLE POSITION SENSOR CALIBRATION
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW
	CHECKING FOR OXYGEN SENSOR SWITCHING
	CHECKING IDLE AIR CONTROL MOTOR OPERATION
	CHECKING EGR SYSTEM
SPARK KNOCK/ DETONATION	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING THE FUEL PRESSURE
	CHECKING COOLANT SENSOR CALIBRATION

	CHECKING THROTTLE POSITION SENSOR CALIBRATION
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW
	CHECKING FOR OXYGEN SENSOR SWITCHING
	CHECKING IDLE AIR CONTROL MOTOR OPERATION
	CHECKING EVAP EMISSION SYSTEM
CUTS OUT/ MISSES	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING THE FUEL PRESSURE
	CHECKING THE MINIMUM IDLE AIR FLOW
	CHECKING FOR OXYGEN SENSOR SWITCHING
	CHECKING IDLE AIR CONTROL MOTOR OPERATION
	CHECKING EGR SYSTEM
BACKFIRE/ POPBACK	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING THE FUEL PRESSURE
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW
	CHECKING FOR OXYGEN SENSOR SWITCHING
	CHECKING EGR SYSTEM
RUNS ROUGH/ UNSTABLE/ ERRATIC IDLE	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING ENGINE VACUUM
	CHECKING THE FUEL PRESSURE
	CHECKING COOLANT SENSOR CALIBRATION
	CHECKING THROTTLE POSITION SENSOR CALIBRATION
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW
	CHECKING FOR OXYGEN SENSOR SWITCHING
	CHECKING O2S HEATER
	CHECKING IDLE AIR CONTROL MOTOR OPERATION
	CHECKING ENGINE MECHANICAL SYSTEMS
	CHECKING EVAP EMISSION SYSTEM
	CHECKING EGR SYSTEM
	CHECKING IAT SENSOR
	CHECKING PNP SWITCH
POOR FUEL ECONOMY	CHECKING SECONDARY IGNITION SYSTEM
	CHECKING PCM POWER AND GND CKT
	CHECKING ENGING VACUUM
	CHECKING THE FUEL PRESSURE
	CHECKING COOLANT SENSOR CALIBRATION
	CHECKING THROTTLE POSITION SENSOR CALIBRATION
	CHECKING MAP SENSOR CALIBRATION
	CHECKING THE MINIMUM IDLE AIR FLOW

CHECKING FOR OXYGEN SENSOR SWITCHING

CHECKING O2S HEATER

CHECKING IDLE AIR CONTROL MOTOR OPERATION

CHECKING ENGINE MECHANICAL SYSTEMS

CHECKING EVAP EMISSION SYSTEM

CHECKING EGR SYSTEM

CHECKING IAT SENSOR

CHECKING PNP SWITCH

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 DRB ERROR MESSAGES AND BLANK SCREEN

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

– User-Requested WARM Boot or User-Requested COLD Boot.

This is a sample of such an error message display:

```
ver: 2.14
date: 26 Jul93
file: key_itf.cc
date: Jul 26 1993
line: 548
err: 0x1
User-Requested COLD Boot

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

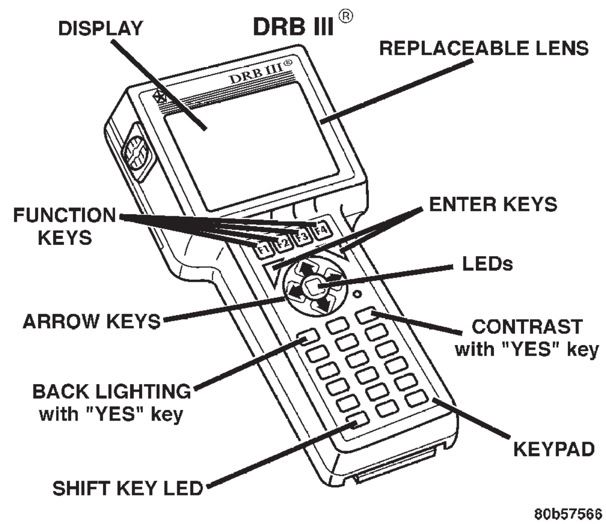
3.5.1 DRB III® DOES NOT POWER UP

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). A minimum of 11 volts is required to adequately power the DRBIII®.

If all connections are proper between the DRBIII® and 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.



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: 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 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 codes or error messages may occur.

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 subcomponents 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 DRB 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
Temperature	-58 - 1100°F -50 - 600°C

* 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.
- The circuit being tested must be protected by a 10A fuse or circuit breaker.
- 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 DRB 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 DRB SCREEN WHILE IN MOTION. DO NOT HANG THE DRB FROM THE REAR VIEW MIRROR OR OPERATE IT YOURSELF. HAVE AN ASSISTANT AVAILABLE TO OPERATE THE DRB.

4.3.2 VEHICLE DAMAGE CAUTIONS

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

When testing voltage or continuity at any control module, use the terminal side (not the wire end) of the connector. Do not probe a wire through the insulation; this will damage it and eventually cause it 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 code could be set, making diagnosis of the original problem more difficult.

4.3.3 ELECTRONIC PINION FACTOR WARNING

The pinion factor must be set for all new transmission control modules. If the pinion factor is not set or if it is set incorrectly, any speed-related accessories will not operate or will operate inaccurately. This includes the speedometer, speed control, rolling door locks, and other devices that are operated by the powertrain and body control modules. For instructions on setting the pinion factor, see the appropriate transmission diagnostic manual or the service manual.

5.0 RECOMMENDED TOOLS AND EQUIPMENT

DRBIII® (diagnostic readout box) scan tool
fuel pressure adapter (C-6631) or #6539
fuel pressure kit (C-4799-B) or #5069
fuel release hose (C-4799-1)
MinAir flow fitting #6457
jumper wires
ohmmeter
oscilloscope
vacuum gauge
voltmeter
12 volt test light minimum 25 ohms resistance with probe #8382

CAUTION: A 12 VOLT TEST LIGHT SHOULD NOT BE USED FOR THE FOLLOWING CIRCUITS, DAMAGE TO THE POWERTRAIN CONTROLLER WILL OCCUR.

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

6.0 GLOSSARY OF TERMS

ABS	antilock brake system
backfire, popback	fuel ignites in either the intake or the exhaust system
CKP	crank position sensor
CMP	camshaft position sensor
cuts out, misses	a steady pulsation or the inability of the engine to maintain a consistent rpm
DLC	data link connector (previously called “engine diagnostic connector”)
detonation, spark knock	a mild to severe ping, especially under loaded engine conditions
ECT	engine coolant temperature sensor
EGR	exhaust gas recirculation valve and system
generator	previously called “alternator”
hard start	The engine takes longer than usual to start, even though it is able to crank normally.
hesitation, sag, stumble	There is a momentary lack of response when the throttle is opened. This can occur at all vehicle speeds. If it is severe enough, the engine may stall.
IAT	intake air temperature sensor
IAC	idle air control valve
JTEC	Combined engine and transmission control module
lack of power, sluggish	The engine has less than expected power, with little or no increase in vehicle speed when the throttle is opened.
LDP	Leak Detection Pump
MAP	manifold absolute pressure sensor
MIL	malfunction indicator lamp
MTV	manifold tuning valve
O2S	oxygen sensor
PCI	Programmable Communication Interface
PCM	powertrain control module
PCM	powertrain control module
PCV	positive crankcase ventilation
PEP	Peripheral Expansion Port
poor fuel economy	There is significantly less fuel mileage than other vehicles of the same design and configuration
rough, unstable, or erratic idle stalling	The engine runs unevenly at idle and causes the engine to shake if it is severe enough. The engine idle rpm may vary (called “hunting”). This condition may cause stalling if it is severe enough.
SKIM	Sentry Key Immobilizer Module
SKIS	Sentry Key Immobilizer System
start and stall	The engine starts but immediately dies.

surge engine rpm fluctuation without corresponding change in throttle position sensor

TPS throttle position sensor

TRS transmission range sensor

VSS vehicle speed sensor/signal

7.0

DIAGNOSTIC INFORMATION AND PROCEDURES

Symptom:
P-0622 GENERATOR FIELD NOT SWITCHING PROPERLY

When Monitored and Set Condition:

P-0622 GENERATOR FIELD NOT SWITCHING PROPERLY

When Monitored: With the ignition key on and the engine not running.

Set Condition: This trouble code sets when the PCM tries to regulate the generator field with no result during monitoring.

POSSIBLE CAUSES
GENERATOR FIELD RESISTANCE > = 5.0 OHMS
ASD WIRING HARNESS INTERMITTENT DEFECT
ASD WIRING HARNESS OBSERVABLE DEFECT
GENERATOR FIELD DRIVE CIRCUIT SHORT TO GROUND
GENERATOR FIELD DRIVER CIRCUIT OPEN
PCM DEFECTIVE (GENERATOR)
ASD RELAY OUTPUT CIRCUIT OPEN

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running. With the DRB, actuate the Generator Field Driver Circuit. Backprobe the ASD Relay Output Circuit at the back of the Generator. Is the voltage above 10.0 volts? Yes → Go To 2 No → Repair the open ASD Relay Output Circuit, Generator to Harness Splice.	All
2	Engine Running With the DRB, actuate the Generator Field Driver Circuit. Backprobe the Generator Field Driver Circuit at the back of the Generator. Does the voltage shift from low to high? Yes → Go To 3 No → Go To 5	All
3	Ignition On, Engine Not Running. With the DRB, actuate the Generator Field Driver Circuit. With the DRB, read codes. Wiggle Wiring Harness from the Generator to PCM. Does the Generator Field Driver Circuit code return? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-3A. No → Go To 4	All

P-0622 GENERATOR FIELD NOT SWITCHING PROPERLY — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off. Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-3A. No → Test Complete.	All
5	Ignition Off Disconnect the PCM. Disconnect the Generator Field Harness Connector at back of the Generator. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, test resistance across the Generator Field Terminals. Is the resistance below 5.0 ohms? Yes → Go To 6 No → Repair the Generator as necessary. Perform Powertrain Verification Test VER-3A.	All
6	Ignition Off Disconnect the PCM. Disconnect the Generator Field Harness Connector at back of the Generator. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of Generator Field Driver Circuit from the at Generator Harness Connector to ground. Is the resistance below 5.0 ohms? Yes → Repair the Generator Field Driver Circuit short to ground. Perform Powertrain Verification Test VER-3A. No → Go To 7	All
7	Ignition Off Disconnect the PCM. Disconnect the Generator Field Harness Connector at back of the Generator. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, test the resistance of the Generator Field Driver Circuit Generator Connector to PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair open Generator Field Driver Circuit Generator to PCM. Perform Powertrain Verification Test VER-3A.	All
8	Ignition Off If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-3A.	All

Symptom List:
P-1492 BATTERY TEMP SENSOR VOLTAGE TOO HIGH
P-1493 BATTERY TEMP SENSOR VOLTAGE TOO LOW

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P-1492 BATTERY TEMP SENSOR VOLTAGE TOO HIGH.

When Monitored and Set Condition:

P-1492 BATTERY TEMP SENSOR VOLTAGE TOO HIGH

When Monitored: With the ignition key on.

Set Condition: The PCM senses the voltage from the BTS to be either below 0.1 volts or above 4.9 volts for 3 seconds.

P-1493 BATTERY TEMP SENSOR VOLTAGE TOO LOW

When Monitored: With the ignition key on.

Set Condition: The PCM senses the voltage from the BTS to be either below 0.1 volts or above 4.9 volts for 3 seconds.

POSSIBLE CAUSES
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the Trouble Codes. Does the DRB show ″Battery Temperature Sensor Voltage″ with a run count of zero? Yes → Replace the PCM. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-1594 CHARGING SYSTEM VOLTAGE TOO HIGH

POSSIBLE CAUSES
GENERATOR FIELD DRIVER CIRCUIT SHORT TO GROUND
GENERATOR SHORTED
PCM DEFECTIVE (CHARGING SYSTEM)
PCM BATT TEMP NOT W/I −12 DEGREES C (10 DEGREES F) UNDER HOOD TEMP
PCM VOLT & TARGET CHARGING VOLT DIFFER BY > 1.0 V

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. **Note: Battery must be fully charged.** **Note: Generator Belt tension and condition must be checked before continuing.** With the DRB, actuate the Generator Field Driver. Using a voltmeter, backprobe the Generator Field Driver Circuit voltage in back of Generator. Does the DRB show voltage shift low to high? Yes → Go To 2 No → Go To 6	All
2	Ignition On, Engine Not Running With the DRB, stop the Generator Field Driver actuation. Read the target charging voltage. Is the target charging voltage between 13.0 to 14.9 volts? Yes → Test Complete. No → Go To 3	All
3	Engine running. Manually set the engine speed to 1600 RPM. With the DRB, read both the voltage and the target charging voltage. Compare the "target" to the "volt" reading. Watch for up to 5 minutes, if necessary, for a 1.0 volt difference or more. Was there more than a 1.0 volt difference? Yes → Replace PCM. Perform Powertrain Verification Test VER-3A. No → Go To 4	All
4	Ignition On, Engine Not Running Using the DRB Temperature Probe, measure the under hood temperature near PCM. With the DRB, read the BTS temperature. Is the Battery Temperature within −12 degrees C (10 degrees F) of the under hood temperature? Yes → Go To 5 No → Replace PCM. Perform Powertrain Verification Test VER-3A.	All

P-1594 CHARGING SYSTEM VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
5	Turn ignition on, engine not running. Erase trouble codes. Refer to symptom * CHARGING SYSTEM NO CODE TEST in the CHARGING category.	All
6	Ignition Off Disconnect the Field Harness Connector at back of Generator. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure resistance of one of the Generator Field Terminals at the Generator to Ground. Is the resistance below 5.0 ohms? Yes → Repair or replace the shorted Generator as necessary. Perform Powertrain Verification Test VER-3A. No → Go To 7	All
7	Ignition Off Disconnect the PCM Connector. Disconnect the Field Harness Connector at back of Generator. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the Generator Field Driver Circuit from PCM Connector to ground. Is the resistance below 5.0 ohms? Yes → Repair the Generator Field Driver Circuit short to ground. Perform Powertrain Verification Test VER-3A. No → Go To 8	All
8	Ignition off. If there are no potential causes remaining, the PCM is assumed to be defective. View repair options Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-3A.	All

Symptom:
P-1682 CHARGING SYSTEM VOLTAGE TOO LOW

When Monitored and Set Condition:

P-1682 CHARGING SYSTEM VOLTAGE TOO LOW

When Monitored: With no other charging system codes set. With the ignition on and the engine running above 1500 RPM.

Set Condition: The battery sensed voltage is 1 volt below the charging system goal for 25 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.

POSSIBLE CAUSES
ASD RELAY OUTPUT CIRCUIT OPEN
GENERATOR FIELD DRIVER CIRCUIT OPEN
GENERATOR DEFECTIVE
GENERATOR DEFECTIVE (B)
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Start engine, and allow it to idle. **Note: Battery must be fully charged.** **Note: Generator Belt tension and condition must be checked before continuing.** With the DRB, read the Target Charging voltage. Is the Target Charging voltage above 15.1 volts? Yes → Go To 2 No → Go To 6	All
2	Ignition On, Engine Not Running Using DRB Temperature Probe, measure the under hood temperature near PCM. With the DRB, read the Ambient/BAT Temp. Is the battery temperature within −12 degrees C (10 degrees) of the under hood temperature? Yes → Go To 3 No → Replace the PCM. Perform Powertrain Verification Test VER-3A.	All

P-1682 CHARGING SYSTEM VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off **Note: Battery must be fully charged.** **Note: Generator Belt tension and condition must be checked before continuing.** Disconnect the Generator Field Connector. Disconnect PCM connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the ASD Output Circuit from PCM Connector to Field Connector. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the ASD Relay Output Circuit, open circuit. Perform Powertrain Verification Test VER-3A.	All
4	Ignition Off **Note: Battery must be fully charged.** **Note: Generator belt tension and condition must be checked before continuing.** Disconnect the Generator Field Connector. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the Generator Field Driver Circuit from PCM Connector to Generator Field Connector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Driver Circuit. Perform Powertrain Verification Test VER-3A.	All
5	If there are no potential causes remaining, the Generator is assumed to be defective. View repair options. Repair Repair or replace the Generator as necessary. Perform Powertrain Verification Test VER-3A.	All
6	Ignition Off **Note: Battery must be fully charged.** **Note: Generator Belt tension and condition must be checked before continuing.** Disconnect the Generator Field Connector. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the ASD Output Circuit from PCM Connector to Field Connector. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the ASD Relay Output Circuit, open circuit. Perform Powertrain Verification Test VER-3A.	All

P-1682 CHARGING SYSTEM VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
7	Ignition Off **Note: Battery must be fully charged.** **Note: Generator belt tension and condition must be checked before continuing.** Disconnect the Generator Field Connector. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the Generator Field Driver Circuit from PCM Connector to Generator Field Connector. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair the open Driver Circuit. Perform Powertrain Verification Test VER-3A.	All
8	If there are no potential causes remaining, the Generator is assumed to be defective. View repair options. Repair Repair or replace the Generator as necessary. Perform Powertrain Verification Test VER-3A.	All

Symptom:
* CHECKING CHARGING SYSTEM OPERATION WITH NO DTC'S

POSSIBLE CAUSES
TROUBLE CODES PRESENT
VOLTAGE DIFFERENCE >= 1 VOLT
GENERATOR FIELD TERMINAL INTERMITTENT DEFECTIVE
GENERATOR GROUND CIRCUIT HIGH RESISTANCE
B+ CIRCUIT HIGH RESISTANCE (0.4 VOLT)
B+ CIRCUIT HIGH RESISTANCE (1 VOLT)
PCM DEFECTIVE (CHARGING SYSTEM NO CODE)
GENERATOR BELT VISIBLY DEFECTIVE
TROUBLE CODES PRESENT 1600 RPM

TEST	ACTION	APPLICABILITY
1	**Note: Battery condition must be verified prior to this test.** Inspect the Generator Belt tension and condition. Is the Generator Belt in good condition? Yes → Go To 2 No → Repair as necessary. Perform Powertrain Verification Test VER-3A.	All
2	Engine Running With the DRB, set engine speed to 1600 RPM for 30 seconds. With the DRB, return the engine to idle speed and read codes. Are there any Charging System trouble codes? Yes → Refer to Symptom List for problems related to Charging. Perform Powertrain Verification Test VER-3A. No → Go To 3	All
3	Turn ignition on. (Engine off) With the DRB, actuate the Generator field. Using a Voltmeter, backprobe Generator Field Driver Terminal at the back of Generator. **Note: The voltage should cycle from 7.2 volts to Battery voltage every 1.4 seconds, at both Terminals.** While monitoring the Voltmeter, wiggle the field Terminals back to the PCM and ASD Relay. Was there any interruption in the normal cycle between 7.2 volts and Battery voltage? Yes → Repair the Wire where wiggling interrupted the voltage cycle. Perform Powertrain Verification Test VER-3A. No → Go To 4	All

* CHECKING CHARGING SYSTEM OPERATION WITH NO DTC'S — Continued

TEST	ACTION	APPLICABILITY
4	Engine Running With the DRB, read trouble codes. Are there any Charging System trouble codes? Yes → Refer to Symptom List for problems related to Charging. Perform Powertrain Verification Test VER-3A. No → Go To 5	All
5	Ignition Off Using a Voltmeter, measure the voltage between the Generator Case and Battery (-) side. **Caution: Ensure all Wires are clear of the engine's moving parts.** Start the engine. Is the voltage above 0.4 volt? Yes → Repair Generator Ground high resistance Generator Case to Battery (-) side. Perform Powertrain Verification Test VER-3A. No → Go To 6	All
6	Ignition Off Connect Voltmeter between the Generator (12V) B+ Terminal and the Battery (+) side. **Caution: Ensure all Wires are clear of the engine's moving parts.** Start the engine. Is the voltage above 0.4 volt? Yes → Repair the B(+) Circuit for high resistance between the Generator and Battery. Perform Powertrain Verification Test VER-3A. No → Go To 7	All
7	Turn engine off, ignition key on. With the DRB, read Battery voltage and record. Using a Voltmeter, measure Battery voltage B(+) to B(-) Terminal. Record second voltage reading. Compare the two voltage readings. Is the voltage difference less than one volt? Yes → Test Complete. Perform Powertrain Verification Test VER-3A. No → Go To 8	All
8	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using a voltmeter, measure the fused B(+) at PCM. Is the voltage within one volt of the DRB recorded reading? Yes → Repair the B(+) Circuit for high resistance between the PCM and the Battery. Perform Powertrain Verification Test VER-3A. No → Go To 9	All

* CHECKING CHARGING SYSTEM OPERATION WITH NO DTC'S — Continued

TEST	ACTION	APPLICABILITY
9	If there are no other potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-3A.	All

Symptom:
P-0106 BAROMETRIC PRESSURE OUT OF RANGE

When Monitored and Set Condition:

P-0106 BAROMETRIC PRESSURE OUT OF RANGE

When Monitored: With the ignition key on at less than 350 milliseconds and engine speed at less than 255 RPM.

Set Condition: The PCM senses the voltage from the MAP sensor to be less than 2.196 volts but above 0.019 volt for 300 milliseconds

POSSIBLE CAUSES
MAP SENSOR 5V SUPPLY CIRCUIT OPEN
MAP SENSOR 5V SUPPLY CIRCUIT SHORT TO GROUND
MAP SENSOR SIGNAL CIRCUIT OPEN
MAP SENSOR SIGNAL CIRCUIT PARTIAL SHORT TO GROUND
MAP SENSOR WIRING HARNESS INTERMITTENT DEFECT
MAP SENSOR WIRING HARNESS OBSERVABLE DEFECT
MAP SENSOR DEFECTIVE
PCM DEFECTIVE (VOLTAGE HIGH)
PCM DEFECTIVE (VOLTAGE LOW)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the MAP Sensor voltage. Is the voltage below 2.2 volts? Yes → Go To 2 No → Go To 11	All
2	Ignition Off Disconnect the MAP Sensor Electrical Connector. Turn the ignition on, engine not running. **Note: Check connectors - Clean/repair as necessary.** Using a Voltmeter, measure voltage of the 5-Volt Supply Circuit at the Map Sensor Connector. Is the voltage above 4.5 volts? Yes → Go To 3 No → Go To 7	All

P-0106 BAROMETRIC PRESSURE OUT OF RANGE — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on, with engine not running. With the DRB, read the MAP Sensor voltage. Is the voltage above 4.9 volts? Yes → Replace the MAP Sensor. Perform Powertrain Verification Test VER-2A. No → Go To 4	All
4	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of the MAP Sensor Signal Circuit. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open MAP Sensor Signal Circuit between MAP Sensor and PCM. Perform Powertrain Verification Test VER-2A.	All
5	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on, with engine not running. With the DRB, read the MAP Sensor voltage. Is the voltage above 2.2 volts? Yes → Repair the MAP Sensor Signal Circuit for a partial short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 6	All
6	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
7	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the 5-Volt Supply Circuit. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair the open 5-Volt Supply Circuit between MAP Sensor and PCM Connectors. Perform Powertrain Verification Test VER-2A.	All

P-0106 BAROMETRIC PRESSURE OUT OF RANGE — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the 5-Volt Supply Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the 5-Volt Supply Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 9	All
9	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on, with engine not running. With the DRB, read the MAP Sensor voltage. Is the voltage above 2.2 volts? Yes → Repair the MAP Sensor Signal Circuit for a partial short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 10	All
10	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
11	Ignition On, Engine Not Running Wiggle the Wiring Harness from the MAP Sensor to the Powertrain Control Module. Monitor the MAP Sensor voltage with the DRB, while wiggling the Wiring Harness. Did the voltage go below 2.2 volts? Yes → Repair Wiring as necessary where wiggling caused voltage drop. Perform Powertrain Verification Test VER-2A. No → Go To 12	All
12	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
P-0107 MAP SENSOR VOLTAGE TOO LOW

When Monitored and Set Condition:

P-0107 MAP SENSOR VOLTAGE TOO LOW

When Monitored: With engine rpm above 400 but less than 1500 and the TP Sensor voltage less than 1.0 volt.

Set Condition: The MAP Sensor Signal voltage is below 1.2 volts at start, or below .02 volt for 1.76 seconds with engine running.

POSSIBLE CAUSES
MAP SENSOR CONN/WIRING HARNESS INTERMITTENT DEF
MAP SENSOR CONN/WIRING HARNESS OBSERVABLE DEFECT
MAP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
MANIFOLD ABSOLUTE PRESSURE SENSOR DEFECTIVE
POWERTRAIN CONTROL MODULE DEFECTIVE
MAP SENSOR SIGNAL CIRCUIT OPEN
MAP SENSOR SIGNAL CKT SHORTED TO SENSOR GROUND CKT

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the MAP Sensor voltage. Is the MAP Sensor voltage below 1.2 volts? Yes → Go To 2 No → Go To 6	All
2	Ignition Off Disconnect the MAP Sensor Electrical Connector. Ignition on, engine not running. **Note: Check connectors - Clean/repair as necessary.** Use the DRB to read MAP Sensor voltage. Is the MAP Sensor voltage above 4.0 volts? Yes → Replace the MAP Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 3	All

P-0107 MAP SENSOR VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the MAP Sensor Signal Circuit to ground. Is resistance below 5.0 ohms? Yes → Repair MAP Sensor Signal Circuit shorted to ground. Perform Powertrain Verification Test VER-5A. No → Go To 4	All
4	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the MAP Sensor Signal Circuit to Sensor Ground at MAP Sensor Connector. Is resistance below 5.0 ohms? Yes → Repair MAP Sensor Signal Circuit shorted to Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	All
6	Ignition On, Engine Not Running Wiggle MAP Sensor Connector & Harness. Monitor the DRB display. Was there any MAP Sensor voltage change? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0108 MAP SENSOR VOLTAGE TOO HIGH

When Monitored and Set Condition:

P-0108 MAP SENSOR VOLTAGE TOO HIGH

When Monitored: With engine rpm above 400 but less than 1500 and closed throttle.

Set Condition: The MAP Sensor Signal voltage is greater than 4.6.

POSSIBLE CAUSES
MAP SENSOR GROUND CIRCUIT OPEN
MAP SENSOR SIGNAL CIRCUIT OPEN
MAP SENSOR DEFECTIVE
MAP SENSOR WIRING HARN AND CONN INTERMITTENT DEF
MAP SENSOR WIRING HARNESS AND CONN OBSERVABLE DEF
PCM DEFECTIVE (MAP SENSOR VOLTAGE TOO HIGH)

TEST	ACTION	APPLICABILITY
1	Start the engine. With the DRB, read the MAP Sensor voltage. Is the MAP Sensor voltage above 4.6 volts? Yes → Go To 2 No → Go To 6	All
2	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the Sensor Signal and Sensor Ground Circuits. Turn ignition on, use the DRB to read the MAP Sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the MAP Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the Sensor Signal Circuit and an engine ground. Ignition On. Read the MAP Sensor voltage. Is the MAP Sensor voltage below 1.0 volt? Yes → Repair the open MAP Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 4	All

P-0108 MAP SENSOR VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, test the MAP Sensor Signal Circuit for resistance. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open MAP Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	All
5	If no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All
6	Start the engine. With the DRB, read the MAP Sensor voltage. Wiggle MAP Sensor Connector and Harness. Monitor the MAP Sensor voltage. Was there any MAP Sensor voltage change when wiggled? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Using the schematic as a guide inspect the Harness and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0112 INTAKE AIR TEMP SENSOR VOLTAGE LOW

When Monitored and Set Condition:

P-0112 INTAKE AIR TEMP SENSOR VOLTAGE LOW

When Monitored: With the ignition on and the engine running.

Set Condition: The intake air sensor circuit voltage at PCM cavity 37 goes below .51 volt.

POSSIBLE CAUSES
IAT SEN WIRING HARNESS INTERMITTENT DEFECT
IAT SEN WRING HARNESS OBSERVABLE DEFECT
SENSOR SIGNAL CIRCUIT SHORT TO GROUND
SENSOR SIGNAL CIRCUIT SHORT TO SENSOR GND CIRCUIT
IAT SENSOR VOLTAGE GREATER THAN 4.0 VOLTS
PCM DEFECTIVE (IAT SENSOR)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the IAT Sensor voltage. Is the IAT Sensor voltage below 0.5 volt? Yes → Go To 2 No → Go To 6	All
2	Ignition Off Disconnect the IAT Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition On, Engine Not Running With the DRB, read the IAT Sensor voltage. Is the IAT Sensor voltage above 4.0 volts? Yes → Replace the IAT Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition Off Disconnect the IAT Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connector. **Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the Sensor Signal Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 4	All

P-0112 INTAKE AIR TEMP SENSOR VOLTAGE LOW — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the IAT Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the Sensor Signal and Sensor Ground Circuits. Is the resistance below 5.0 ohms? Yes → Repair the Sensor Signal Circuit shorted to Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	If there are no potential causes remaining, the PCM (IAT Sensor) is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All
6	Ignition On, Engine Not Running Use the schematic as a guide and wiggle the Sensor Connector and Harness. Monitor the DRB display. Was there any IAT Sensor voltage change? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0113 INTAKE AIR TEMPERATURE SENSOR VOLT HIGH

When Monitored and Set Condition:

P-0113 INTAKE AIR TEMPERATURE SENSOR VOLT HIGH

When Monitored: With the ignition on and the engine running.

Set Condition: The intake air sensor circuit voltage at PCM cavity 37 goes above 4.9 volts.

POSSIBLE CAUSES
IAT SENSOR DEFECTIVE
IAT SENSOR SIGNAL CIRCUIT OPEN
SENSOR GROUND CIRCUIT OPEN
IAT SENSOR WIRING HARNESS INTERMITTENT DEFECT
IAT SENSOR WIRING HARNESS OBSERVABLE DEFECT
PCM DEF (IAT SENSOR)

TEST	ACTION	APPLICABILITY
1	Ignition on with engine not running. Read the IAT Sensor voltage. Is the IAT Sensor voltage above 4.5 volts? Yes → Go To 2 No → Go To 6	All
2	Ignition Off. Disconnect the IAT Sensor. **Check Connectors - clean/repair as necessary.** Ignition on with engine not running. Connect the jumper wire between the IAT Signal and Sensor Ground Circuits. With the DRB, read the IAT Sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the IAT Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition Off Disconnect the IAT Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the IAT Signal Circuit and an engine ground. Ignition on, engine not running. Read the Intake Air Temperature Sensor voltage. Is the voltage below 1.0 volt? Yes → Go To 4 No → Repair the open Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A.	All

P-0113 INTAKE AIR TEMPERATURE SENSOR VOLT HIGH — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the IAT Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connector. **Note: Check Connectors - clean/repair as necessary.** With the Ohmmeter, measure the IAT Sensor Signal Circuit from the PCM to the IAT Connector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open IAT Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	All
5	Ignition off. If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All
6	Ignition on with engine not running. Use the schematic as a guide and wiggle the Sensor Connector and Harness. Monitor DRB display. Was there any IAT Sensor voltage change? Yes → Repair the Harness or Connector that caused the voltage to change. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition off. Using schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0117 ECT SENSOR VOLTAGE TOO LOW

When Monitored and Set Condition:

P-0117 ECT SENSOR VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The engine coolant temperature sensor circuit voltage at PCM cavity 26 goes below .5 volt for more than 3 seconds.

POSSIBLE CAUSES
ECT SENSOR VOLTAGE ABOVE 4.0 VOLTS
ECT SENSOR SIGNAL CIRCUIT SHORT TO GROUND
ECT SENSOR SIGNAL CIRCUIT SHORTED TO GROUND CKT
ECT WIRING HARNESS INTERMITTENT DEFECT
ECT WIRING HARNESS OBSERVABLE DEFECT
PCM DEFECTIVE (ECT SENSOR V LOW)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the Engine Coolant Temperature (ECT) Sensor voltage. Is the Engine Coolant Temperature Sensor voltage below 0.5 volt? Yes → Go To 2 No → Go To 6	All
2	Ignition Off Disconnect the Engine Coolant Temperature (ECT) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on, engine not running. With the DRB, read the Engine Coolant Temperature Sensor voltage. Is the ECT Sensor voltage above 4.0 volts? Yes → Replace the Engine Coolant Temperature Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 3	All

P-0117 ECT SENSOR VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Engine Coolant Temperature Sensor (ECT) Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** With an ohmmeter, measure the resistance between the ECT Sensor Signal Circuit and the ECT Sensor Ground Circuit. Is the resistance below 5.0 ohms? Yes → Repair the ECT Sensor Signal Circuit shorted to the ECT Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 4	All
4	Ignition Off Disconnect the Engine Coolant Temperature (ECT) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the ECT Sensor Signal Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the ECT Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	Ignition Off If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	All
6	Ignition On, Engine Not Running Using the schematic, wiggle the ECT Sensor Connector and Harness. Monitor the DRB display. Was there any ECT Sensor voltage change? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0118 ECT SENSOR VOLTAGE TOO HIGH

When Monitored and Set Condition:

P-0118 ECT SENSOR VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The engine coolant temperature sensor circuit voltage at PCM cavity 26 goes above 4.9 volts for more than 3 seconds.

POSSIBLE CAUSES
ECT SENSOR DEFECTIVE
ECT SENSOR GROUND CIRCUIT OPEN
ECT SENSOR SIGNAL CIRCUIT OPEN
ECT SENSOR WIRING HARNESS INTERMITTENT DEFECT
ECT SENSOR WIRING HARNESS OBSERVABLE DEFECT
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the ECT Sensor voltage. Is the ECT Sensor voltage above 4.9 volts? Yes → Go To 2 No → Go To 6	All
2	Ignition On, Engine Not Running Disconnect the ECT Sensor. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the ECT Sensor Signal Circuit and the Sensor Ground Circuit. With the DRB, read the ECT Sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the ECT Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 3	All

P-0118 ECT SENSOR VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the ECT Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the ECT Sensor Signal Circuit and an engine ground. Turn the ignition on, with the engine not running. With the DRB, read the Engine Coolant Temperature Sensor voltage. Is the voltage below 1.0 volt? Yes → Repair the open ECT Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 4	All
4	Ignition Off Disconnect the ECT Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the ECT Sensor Signal Circuit from the PCM to the ECT. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open ECT Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	All
5	Ignition Off If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All
6	Ignition On, Engine Not Running Use the schematic as a guide and wiggle the ECT Sensor Connector & Harness. Monitor the DRB display. Was there any ECT Sensor voltage change? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0121 TPS VOLTAGE DOES NOT AGREE WITH MAP

When Monitored and Set Condition:

P-0121 TPS VOLTAGE DOES NOT AGREE WITH MAP

When Monitored: With the engine running and no MAP sensor or TP sensor trouble codes.

Set Condition: PCM - 2 tests on TPS. High Voltage Test=>engine speed low, manifold vac high (throttle plate nearly closed, TPS output low). Low Voltage Test=>road/load speed>40 kph(>25mph), vacuum low(throttle plate open,TPS signal high). If improper TPS voltage, code in 7sec.

POSSIBLE CAUSES
MAP SENSOR TROUBLE CODE PRESENT
TPS 5-VOLT SUPPLY CIRCUIT OPEN
TPS CONN & TERM CORR, DAM, PUSHED OUT OR MISWIRED
TPS HARNESS OR CONNECTORS INTERMITTENT DEFECT
TPS VOLTAGE ABOVE 1.0 VOLT
TPS VOLTAGE ABOVE 3.5 VOLTS
TPS VOLTAGE CHANGE NOT SMOOTH

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running Using the DRB, read trouble codes. Is the ″No Vehicle Speed Sensor Signal″ trouble code present? Yes → Refer to symptom P-0500 NO VEHICLE SPEED SENSOR SIGNAL in the DRIVEABILITY category. No → Go To 2	All
2	Ignition On, Engine Not Running Using the DRB read trouble codes. Is a MAP Sensor trouble code present? Yes → Refer to Symptom List for problems related to Driveability. No → Go To 3	All
3	Ignition On, Engine Not Running With the DRB read the MAP Sensor voltage. Is MAP Sensor voltage below 3.5 volts? Yes → Refer to symptom * CHECKING MAP SENSOR CALIBRATION in the DRIVEABILITY category. No → Go To 4	All

P-0121 TPS VOLTAGE DOES NOT AGREE WITH MAP — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition on. With the DRB, read the FREEZE FRAME DATA. Using the FREEZE FRAME DATA, attempt to duplicate the condition that has set this fault. While using the FREEZE FRAME DATA, pay particular attention to the fault setting conditions, such as vehicle speed, engine temperature, vehicle load, and MAP vacuum. Does P0121 reset? Yes → Go To 6 No → Go To 5	All
5	Ignition Off Start engine. With the DRB, read the MAP Sensor voltage. Did the MAP Sensor voltage drop from above 3.5 volts to below 2.0 volts? Yes → Go To 6 No → Refer to symptom * CHECKING MAP SENSOR CALIBRATION in the DRIVEABILITY category.	All
6	Ignition On, Engine Not Running Using the schematic as a guide, wiggle the TPS Harness and Connectors to PCM. While monitoring the DRB, observe for the TPS voltage to change. Did the TPS voltage change at any time? Yes → Repair the Harness or Connectors as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition On, Engine Not Running With the DRB, read the Throttle Position Sensor voltage. Is the Throttle Position Sensor voltage above 1.0 volt? Yes → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 8	All
8	Ignition On, Engine Not Running While monitoring the DRB, open the Throttle Plate to wide open throttle. Is the Throttle Position Sensor voltage above 3.5 volts? Yes → Go To 9 No → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A.	All
9	Ignition On, Engine Not Running While monitoring the DRB slowly open and close the Throttle Plate. **Note: You must move linkage very slowly while looking for a jump in voltage.** Is the voltage change smooth? Yes → Go To 10 No → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A.	All

P-0121 TPS VOLTAGE DOES NOT AGREE WITH MAP — Continued

TEST	ACTION	APPLICABILITY
10	Ignition Off Disconnect the Throttle Position Sensor. **Note: Check connectors - Clean/repair as necessary.** Ignition on, engine not running. Using a Voltmeter, probe the 5-Volt Supply Circuit at the TP Sensor. Is the voltage below 5.0 volts? Yes → Repair the open 5-volt Supply Circuit to Throttle Position sensor. Perform Powertrain Verification Test VER-5A. No → Go To 11	All
11	Ignition Off Check Throttle Plate and Linkage for a binding condition. Ensure the Throttle Linkage is at the Idle Position. **Note: TPS Ground Circuit and the 5-Volt Supply Circuit switched will cause this code to appear.** Disconnect the TP Sensor. Inspect the TPS Wire colors for the correct cavities. **Note: Check connectors - Clean/repair as necessary.** Is any terminal damaged, pushed out, miswired or corroded? Yes → Clean or repair Connector as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0122 THROTTLE POSITION SENSOR VOLTAGE LOW

When Monitored and Set Condition:

P-0122 THROTTLE POSITION SENSOR VOLTAGE LOW

When Monitored: With the ignition on.

Set Condition: The TP sensor signal voltage goes below 0.16 volt.

POSSIBLE CAUSES
TPS 5-VOLT SUPPLY CIRCUIT OPEN
TPS SIGNAL CIRCUIT SHORT TO GROUND
TPS SIGNAL CIRCUIT SHORT TO SENSOR GROUND CIRCUIT
TPS WIRING HARNESS INTERMITTENT DEFECT
TPS WIRING HARNESS OBSERVABLE DEFECT
PCM DEFECTIVE (TPS)
THROTTLE POSITION SENSOR DEFECTIVE
THROTTLE POSITION SENSOR VOLTAGE CHANGE NOT SMOOTH
TRANSMISSION CONTROL MODULE DEFECTIVE (TPS)

TEST	ACTION	APPLICABILITY
1	Turn key on, engine off. With the DRB, read the Throttle Position Sensor (TP Sensor) voltage. Is the Throttle Position Sensor voltage below 0.16 volt? Yes → Go To 2 No → Go To 8	All
2	Ignition Off Disconnect the Throttle Position Sensor. **Note: Check connectors - Clean/repair as necessary.** Ignition On, Engine Not Running. Measure the voltage at the 5-Volt Supply Circuit at TPS Connector. Is the voltage below 4.0 volts? Yes → Repair the open TP Sensor 5-Volt Supply Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 3	All

P-0122 THROTTLE POSITION SENSOR VOLTAGE LOW — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Throttle Position Sensor. **Note: Check connectors - Clean repair as necessary.** Ignition On, Engine Not Running. With the DRB, read the Throttle Position Sensor voltage. Is the voltage above 1.0 volt? Yes → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 4	All
4	Ignition Off Disconnect the Throttle Position Sensor. Disconnect the Transmission Control Module. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Measure the resistance between the TP Sensor Signal Circuit and ground. Is the resistance below 5.0 ohms? Yes → Repair the Throttle Position Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	Ignition Off Disconnect the Throttle Position Sensor. Disconnect the Transmission Control Module. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Measure the resistance between the TP Sensor Signal Circuit and the Sensor Ground Circuit. Is the resistance below 5.0 ohms? Yes → Repair the Sensor Signal Circuit shorted to Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	Ignition Off Disconnect the Throttle Position Sensor. Disconnect the Transmission Control Module if equipped.. **Note: Check connectors - Clean/repair as necessary.** Key On With the DRB, read the Throttle Position Sensor voltage. Is the voltage above 1.0 volt? Yes → Replace the Transmission Control Module. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

P-0122 THROTTLE POSITION SENSOR VOLTAGE LOW — Continued

TEST	ACTION	APPLICABILITY
8	Ignition on, engine not running. With the DRB, read the Throttle Position Sensor (TP Sensor) voltage. Wiggle Throttle Position Sensor Connectors and Harness. Monitor the DRB display. Was there any change in the Throttle Position Sensor voltage when wiggled? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-5A. No → Go To 9	All
9	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 10	All
10	Ignition On, Engine Not Running With the DRB, read the Throttle Position Sensor (TP Sensor) voltage. While monitoring the DRB, slowly open and close the Throttle. Is the voltage change smooth? Yes → Test Complete. No → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0123 THROTTLE POSITION SENSOR VOLTAGE HIGH

When Monitored and Set Condition:

P-0123 THROTTLE POSITION SENSOR VOLTAGE HIGH

When Monitored: With the ignition on.

Set Condition: TP sensor signal voltage goes above 4.5 volts for .704 seconds.

POSSIBLE CAUSES
THROTTLE POSITION SENSOR GROUND CIRCUIT OPEN
THROTTLE POSITION SENSOR SIGNAL CIRCUIT OPEN
TPS SIGNAL CKT TO TPS 5 VOLT SUPPLY CKT SHORTED
TPS WIRING HARNESS INTERMITTENT DEFECT
TPS WIRING HARNESS OBSERVABLE DEFECT
POWERTRAIN CONTROL MODULE DEFECTIVE (TPS)
THROTTLE POSITION SENSOR VOLTAGE BELOW 1.0 VOLT
THROTTLE POSITION SENSOR VOLTAGE CHANGE NOT SMOOTH

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running Using the DRB, read the Throttle Position Sensor voltage. Is the Throttle Position Sensor voltage above 4.5 volts? Yes → Go To 2 No → Go To 8	All
2	Ignition Off Disconnect the Throttle Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition On. With the DRB actuate the ASD relay. Measure the voltage of the TP sensor signal circuit. Is the voltage above 4.9 volts? Yes → Repair the short voltage in the Throttle Position Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 3	All

P-0123 THROTTLE POSITION SENSOR VOLTAGE HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Throttle Position Sensor Connector. Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the 5-volt Supply Circuit and the Throttle Position Sensor Signal Circuit at the Throttle Position Sensor Connector. Is the resistance below 5.0 ohms? Yes → Repair the Throttle Position Sensor Signal Circuit shorted to the 5-volt Supply Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 4	All
4	Turn the Ignition Off Disconnect the TCM harness connector. Turn the Ignition On. Using the DRB, monitor the TP sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the Transmission Control Module. No → Go To 5	All
5	Ignition Off Disconnect the Throttle Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the Throttle Position Sensor Signal Circuit and Sensor Ground Circuit. Ignition on, engine not running. Using the DRB, read the Throttle Position Sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	Ignition Off Disconnect the TPS Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the TPS Signal Circuit and a good engine ground. Ignition on, engine not running. Using the DRB, read the Throttle Position Sensor voltage. Is the voltage below 1.0 volt? Yes → Repair the open Throttle Position Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 7	All

P-0123 THROTTLE POSITION SENSOR VOLTAGE HIGH — Continued

TEST	ACTION	APPLICABILITY
7	Ignition Off Disconnect the Throttle Position Sensor. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the TPS Signal Circuit from the TPS Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A. No → Repair the open Throttle Position Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	All
8	Ignition On, Engine Not Running Wiggle Throttle Position Sensor Connectors and Harness. Monitor the DRB display. Was there any change in Throttle Position Sensor voltage when wiggled? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-5A. No → Go To 9	All
9	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 10	All
10	Ignition On, Engine Not Running While monitoring the DRB, slowly open and close the Throttle. Is the voltage change smooth? Yes → Test Complete. No → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0125 CLOSED LOOP TEMP NOT REACHED

When Monitored and Set Condition:

P-0125 CLOSED LOOP TEMP NOT REACHED

When Monitored: After engine is started, for ten minutes.

Set Condition: The engine temperature does not go above 10 degrees C (50 degrees F) by 13 minutes after the engine is started for 2 consecutive trips.

POSSIBLE CAUSES
PCM CONNECTOR AND TERM DAM, PSHD OUT, OR MISWIRED
ECT SENSOR CONN AND TERM DAM, PSHD OUT, MISWIRED
ECT SENSOR RESISTANCE >=11.00 K OHMS
PCM DEFECTIVE
THERMOSTAT DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, read the FREEZE FRAME DATA. Using the FREEZE FRAME DATA, attempt to duplicate the condition that has set this fault. Note that the DTC is a 2 trip failure. Does P0121 reset? Yes → Go To 3 No → Go To 2	All
2	The conditions required to set the DTC are no longer present. Ensure the engine cooling system is operating properly, coolant level is at specification, and no external or internal coolant leaks. Refer to the appropriate service category for cooling system information. Is the Cooling System operating correctly? Yes → Test complete No → Repair as necessary. Perform Powertrain verification Test VER-5A	All
3	Ignition off. Disconnect the ECT Sensor Connector. **Note: Check Connectors - clean/repair as necessary.** Is any Terminal damaged, pushed out, or miswired? Yes → Clean or repair connector as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 4	All

P-0125 CLOSED LOOP TEMP NOT REACHED — Continued

TEST	ACTION	APPLICABILITY
4	Ignition off. Disconnect PCM. **Note: Check Connectors - clean/repair as necessary.** Is any Terminal damaged, pushed out, or miswired? Yes → Clean or repair connector as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	Ignition off. Disconnect the ECT Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance of the ECT Sensor. Is the resistance below 11.0 k ohms? Yes → Go To 6 No → Replace the ECT Sensor. Perform Powertrain Verification Test VER-5A.	All
6	Ignition off. **Note: This test procedure will be invalid if the Thermostat is stuck open.** Is the Thermostat operating correctly? Yes → Go To 7 No → Replace the Thermostat. Perform Powertrain Verification Test VER-5A.	All
7	Ignition off. If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0131 1/1 O2 SENSOR VOLTAGE SHORTED TO GROUND

When Monitored and Set Condition:

P-0131 1/1 O2 SENSOR VOLTAGE SHORTED TO GROUND

When Monitored: With the ignition key off, after the O2 Sensor cools down; and after the next key on provided that it is a cold start (coolant temperature less than 38 degrees C (100.4 degrees F)) and ambient temperature within 13 degrees C (7.2 degrees F) of coolant temperature.

Set Condition: The upstream O2 Sensor Signal voltage is below 0.156 volt prior to O2 Sensor Heater test (cool down period), and O2 voltage less than 0.156 volt after the key on in the subsequent start.

POSSIBLE CAUSES
1/1 02 SENSOR VOLTAGE LOW
1/1 O2S SIGNAL CIRCUIT SHORT TO GROUND
1/1 O2S SIGNAL CKT SHORT TO GROUND CIRCUIT
1/1 O2 SENSOR DEFECTIVE
PCM DEFECTIVE (1/1 O2S)

TEST	ACTION	APPLICABILITY
1	Ignition Off Turn ignition on. With the DRB, monitor the Upstream O2 Sensor voltage for a few minutes. Wait three minutes or until the voltage stabilizes (between 0.4 and 0.6 volt). With the DRB, monitor the Upstream O2 Sensor voltage. Is the Upstream O2 Sensor voltage below 0.156 volt? Yes → Go To 2 No → The condition required to set this trouble code is not present at this time. Perform Powertrain Verification Test VER-5A.	All
2	Ignition Off Disconnect the Upstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Key on. With the DRB, monitor the Upstream O2 Sensor voltage. Is the Upstream O2 Sensor voltage below 0.156 volts? Yes → Go To 3 No → Replace the Upstream O2 Sensor. Perform Powertrain Verification Test VER-5A.	All

P-0131 1/1 O2 SENSOR VOLTAGE SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Upstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connectors. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the Upstream O2 Sensor Signal Circuit and a good ground. Is the resistance below 5.0 ohms? Yes → Repair the Upstream O2S Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 4	All
4	Ignition Off Disconnect the Upstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connectors. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the Upstream O2 Sensor Signal Circuit and the Sensor Ground Circuit. Is the resistance below 5.0 ohms? Yes → Repair the Upstream O2 Sensor Signal Circuit for a short to the Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0132 1/1 O2 SENSOR SHORTED TO VOLTAGE

When Monitored and Set Condition:

P-0132 1/1 O2 SENSOR SHORTED TO VOLTAGE

When Monitored: With the engine running for more than 2 minutes and coolant temperature above 76 degrees C (170 degrees F).

Set Condition: The Upstream Oxygen Sensor Signal voltage is above 1.2 volts.

POSSIBLE CAUSES
1/1 O2 SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE
1/1 O2 SEN HARNESS INTERMITTENT SHORT TO VOLTAGE
1/1 O2 SENSOR CONNECTOR OBSERVABLE DEFECT (A)
1/1 O2 SENSOR CONNECTOR OBSERVABLE DEFECT (B)
1/1 O2 SENSOR HARNESS OBSERVABLE DEFECT
1/1 O2 SENSOR DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Start the engine. With the DRB, read the Upstream O2 Sensor voltage. Is the Upstream O2 Sensor voltage above 1.2 volts? Yes → Go To 2 No → Go To 5	All
2	Ignition Off Disconnect the Upstream O2 Sensor. **Note: Check connectors - Clean/repair as necessary.** Start the engine. With the DRB, read the Upstream O2 Sensor Voltage. Is the Upstream O2 Sensor voltage above 1.2 volts? Yes → Repair the Upstream O2 Sensor Signal Circuit for a short to voltage. If ok, replace the PCM. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition Off Disconnect the Upstream O2 Sensor. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair or replace as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 4	All

P-0132 1/1 O2 SENSOR SHORTED TO VOLTAGE — Continued

TEST	ACTION	APPLICABILITY
4	If there are no potential causes remaining, the Upstream O2 Sensor is assumed to be defective. View repair options. Repair Replace the Upstream O2 Sensor. Perform Powertrain Verification Test VER-5A.	All
5	Start the engine. Wiggle Upstream O2 Sensor Connector and Harness. While wiggling the Harness, watch the Upstream O2 Sensor voltage. Did the O2 Sensor voltage go above 1.2 volts at any time? Yes → Repair the Harness or Connector that has the intermittent short to voltage. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition Off Disconnect the Upstream O2 Sensor. **Note: Check connectors - Clean/repair as necessary.** Inspect connectors. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0133 1/1 O2S SLOW RESPONSE

When Monitored and Set Condition:

P-0133 1/1 O2S SLOW RESPONSE

When Monitored: With engine temperature greater than 63 degrees C (147 degrees F), after reaching vehicle speed of 16 kmh (10 mph), and throttle remaining open (off idle), for 2 minutes bring vehicle to a stop and allow engine to idle with transmission in drive (auto) or in neutral (manual).

Set Condition: The Oxygen Sensor Signal voltage is switching from below 0.27 volt to above 0.62 volt and back fewer times than required.

POSSIBLE CAUSES
ENGINE MECHANICAL PROBLEM
1/1 O2 SENSOR GROUND CKT HIGH RESISTANCE
1/1 O2 SENSOR GROUND CKT POOR CONNECTION
1/1 O2 SENSOR SIGNAL CKT HIGH RESISTANCE
1/1 O2 SENSOR SIGNAL CKT POOR CONNECTION
1/1 O2 SENSOR SLOW RESPONSE
EXHAUST LEAK
1/1 O2S SLOW RESPONSE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the GLOBAL GOOD TRIP counter displayed and equal to zero? Yes → Go To 5 No → Go To 2	All
2	Turn Ignition On (Engine Off). During the following voltage drop measurement, wiggle wires between O2S Connector and PCM Connector. Using a voltmeter, backprobe O2S (Sensor Ground) Circuit between O2S Connector (Sensor Ground) and PCM Connector (Sensor Ground). While wiggling wires, is the voltage drop reading below 0.10 VDC? Yes → Go To 3 No → Repair poor connection (high resistance) on O2 Sensor Ground Circuit. Perform VERIFICATION TEST VER-5A3.	All

P-0133 1/1 O2S SLOW RESPONSE — Continued

TEST	ACTION	APPLICABILITY
3	Turn Ignition On (Engine Off). During the following voltage drop measurement, wiggle wires between O2S Connector and PCM Connector. Using a voltmeter, backprobe O2S (Signal) Circuit between O2S Connector (O2S Signal) and PCM Connector (O2S Signal). While wiggling wires, is the voltage drop reading below 0.10 VDC? Yes → Go To 4 No → Repair poor connection (high resistance) on O2S Signal Circuit. Perform VERIFICATION TEST VER-5A3.	All
4	At this time the 1/1 O2S SLOW RESPONSE does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME DATA. With this screen, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the 1/1 O2S SLOW RESPONSE reoccur? Yes → Go To 5 No → The 1/1 O2S SLOW RESPONSE no longer exists. Perform VERIFICATION TEST VER-5A3.	All
5	The following are possible causes for O2 Sensor Slow Response: exhaust leak, fuel contamination, O2 sensor failure, electrical wiring connectors, electrical mechanical, and O2 heater failure. Start the Engine. **NOTE: Check the exhaust for excessive smoke caused by oil or coolant consumption.** Is there an oil or coolant consumption condition present? Yes → Repair engine mechanical as necessary and replace O2 Sensor. Perform VERIFICATION TEST VER-5A3. No → Go To 6	All
6	The following are possible causes for O2 Sensor Slow Response: exhaust leak, fuel contamination, O2 sensor failure, electrical wiring connectors, electrical mechanical, and O2 heater failure. Start the Engine. Check the Exhaust System for leaks between the Engine and the catalyst. Are there any leaks? Yes → Repair or replace leaking Exhaust System as necessary. Perform VERIFICATION TEST VER-5A3. No → Go To 7	All
7	The following are possible causes for O2 Sensor Slow Response: exhaust leak, fuel contamination, O2 sensor failure, electrical wiring connectors, electrical mechanical, and O2 heater failure. Turn Ignition On (Engine Off). Using a voltmeter, backprobe O2S (Signal) Circuit between O2S Connector (O2S Signal) and PCM Connector (O2S Signal). Is the voltage drop reading below 0.10 VDC? Yes → Go To 8 No → Repair poor connection (high resistance) on O2S Signal Circuit. Perform VERIFICATION TEST VER-5A3.	All

P-0133 1/1 O2S SLOW RESPONSE — Continued

TEST	ACTION	APPLICABILITY
8	The following are possible causes for O2 Sensor Slow Response: exhaust leak, fuel contamination, O2 sensor failure, electrical wiring connectors, electrical mechanical, and O2 heater failure. Turn Ignition On (Engine Off). Using a voltmeter, backprobe O2S (Sensor Ground) Circuit between O2S Connector (Sensor Ground) and PCM Connector (Sensor Ground). Is the voltage drop reading below 0.10 VDC? Yes → Replace the O2 Sensor. Perform VERIFICATION TEST VER-5A3. No → Repair poor connection (high resistance) on O2 Sensor Ground Circuit. Perform VERIFICATION TEST VER-5A3.	All

Symptom:
P-0134 1/1 O2 SENSOR STAYS AT CENTER

When Monitored and Set Condition:

P-0134 1/1 O2 SENSOR STAYS AT CENTER

When Monitored: With the engine running for more than 2 minutes and engine temperature greater than 76 degrees C (170 degrees F).

Set Condition: The Upstream Oxygen Sensor Signal voltage is between 0.35 volt and 0.55 volt for 1.5 minutes.

POSSIBLE CAUSES
O2 SENSOR 1/1 GROUND CIRCUIT OPEN
O2 SENSOR 1/1 SIGNAL CIRCUIT OPEN
1/1 O2 SENSOR WIRING HARN INTER DEFECT
1/1 O2 SENSOR WIRING HARN OBS DEFECT
O2 SENSOR 1/1 DEFECTIVE
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Start the engine and allow it to reach normal operating temperature. With the DRB in actuator tests, set RPM to 1500. In sensors, read the Upstream Oxygen Sensor State. Is the Upstream O2 Sensor level switching? Yes → Go To 2 No → Go To 4	All
2	Ignition Off Start the engine and allow it to reach normal operating temperature. Using the DRB, set the engine speed to 1500 RPM. With the DRB, read the Upstream O2 Sensor level. Wiggle Upstream O2 Sensor Connector and Harness. While wiggling the Harness, monitor the DRB display. At any time was the Upstream O2 Sensor state locked at center? Yes → Repair the open Harness or Connector that caused the O2 Sensor state to stay at center. Perform Powertrain Verification Test VER-5A. No → Go To 3	All

P-0134 1/1 O2 SENSOR STAYS AT CENTER — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All
4	Ignition Off Disconnect the Upstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on, engine not running. Using an Ohmmeter, measure the resistance between the Upstream O2 Sensor Ground Circuit and a good engine ground. Is the resistance above 5.0 ohms? Yes → Repair the open Upstream O2 sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	Ignition Off Disconnect the Upstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the Upstream O2 Sensor Signal Circuit and B(+). Ignition on, engine not running. Using the DRB in sensors, read the Upstream Oxygen Sensor voltage. Is the voltage above 1.0 volt? Yes → Replace the Upstream O2 Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	Ignition Off Disconnect the Upstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance of the Upstream O2 Sensor Signal Circuit from the O2 Sensor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open Upstream O2 Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	All
7	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0135 O2S HEATER FAILURE

When Monitored and Set Condition:

P-0135 O2S HEATER FAILURE

When Monitored: With the ignition key off, after the engine cools down.

Set Condition: No sensor output signal is received when the PCM powers up the sensor heater.

POSSIBLE CAUSES
1/1 O2 SENSOR CONNECTOR DAMAGED
1/1 O2 SENSOR GND CIRCUIT OPEN
ASD RELAY OUTPUT CIRCUIT OPEN
1/1 O2 SENSOR FAILURE
1/1 O2 SENSOR HEATER ELEMENT FAILURE
1/1 O2S HEATER FAILURE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the GLOBAL GOOD TRIP counter displayed and equal to zero? Yes → Go To 2 No → Go To 3	All
2	Turn Ignition On (Engine Off), wait three minutes. With the DRB , monitor the O2 Sensor voltage for a few minutes until the voltage stabilizes between .4 and .6 volts. With the DRB, actuate the O2 Heater Test. Monitor O2 voltage for up to two minutes. Is the O2 Sensor voltage still between .4 and .6 volts? Yes → Go To 4 No → Go To 3	All
3	At this time the 1/1 O2S HEATER FAILURE does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME DATA. With this screen, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME DATA pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the 1/1 O2S HEATER FAILURE reoccur? Yes → Go To 4 No → 1/1 O2S Heater failure no longer exists. Perform VERIFICATION TEST VER-5A3.	All

P-0135 O2S HEATER FAILURE — Continued

TEST	ACTION	APPLICABILITY
4	Disconnect the 1/1 O2 Sensor Connector. **Check connectors - Clean / repair as necessary.** Is any terminal corroded, damaged, pushed out or miswired? Yes → Repair or replace as necessary. Perform VERIFICATION TEST VER-5A3. No → Go To 5	All
5	Turn Ignition On (Engine Off). Disconnect the 1/1 O2 Sensor Connector. **Check connectors - Clean / repair as necessary.** With the DRB, actuate the ASD Relay. Using a voltmeter, measure the ASD Relay Output Circuit at the O2 Sensor Connector (harness side). Is the voltage above 10.0 volts? Yes → Go To 6 No → Repair the open ASD Relay Output Circuit. Perform VERIFICATION TEST VER-5A3.	All
6	Disconnect the 1/1 O2 Sensor Connector. **Check connectors - Clean / repair as necessary.** Using an ohmmeter, measure the O2 Sensor Heater Element at the O2 Sensor Connector (component side). Is the resistance between 4 and 7 ohms? Yes → Go To 7 No → Replace the 1/1 O2 Sensor. Perform VERIFICATION TEST VER-5A3.	All
7	Disconnect the 1/1 O2 Sensor Connector. **Check connectors - Clean / repair as necessary.** Using an ohmmeter, measure from the Heater Ground Circuit to ground at the O2 Sensor Connector (harness side). Is the resistance below 5.0 ohms? Yes → Replace the 1/1 O2 Sensor. Perform VERIFICATION TEST VER-5A3. No → Repair the open 1/1 O2 Sensor Ground Circuit. Perform VERIFICATION TEST VER-5A3.	All

Symptom:
P-0137 1/2 O2 SENSOR VOLTAGE SHORTED TO GROUND

When Monitored and Set Condition:

P-0137 1/2 O2 SENSOR VOLTAGE SHORTED TO GROUND

When Monitored: With the ignition key off, after the O2 Sensor cools down; and after the next key on provided that it is a cold start (coolant temperature less than 38 degrees C (100.4 degrees F) and ambient temperature within 13.7 degrees C (7.2 degrees F) of coolant temperature.

Set Condition: The Downstream O2 Sensor Signal voltage is below 0.156 volt prior to O2 Sensor Heater test (cool down period), and O2 voltage less than 0.156 volt after the key on in the subsequent start.

POSSIBLE CAUSES
1/2 02 SENSOR VOLTAGE LOW
1/2 O2S SIGNAL CIRCUIT SHORT TO GROUND
1/2 O2S SIGNAL CKT SHORT TO GROUND CIRCUIT
1/2 O2 SENSOR DEFECTIVE
PCM DEFECTIVE (1/2 O2S)

TEST	ACTION	APPLICABILITY
1	Ignition Off Turn ignition on. With the DRB, monitor the Downstream O2 Sensor voltage for a few minutes. Wait three minutes or until the voltage stabilizes (between 0.4 and 0.6 volt). With the DRB, monitor the Downstream O2 Sensor voltage. Is the Downstream O2 Sensor voltage below 0.156 volt? Yes → Go To 2 No → The condition required to set this trouble code is not present at this time. Perform Powertrain Verification Test VER-5A.	All
2	Ignition Off Disconnect the Downstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Key on. With the DRB, monitor the Downstream O2 Sensor voltage. Is the Downstream O2 Sensor voltage below 0.156 volts? Yes → Go To 3 No → Replace the Downstream O2 Sensor. Perform Powertrain Verification Test VER-5A.	All

P-0137 1/2 O2 SENSOR VOLTAGE SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Downstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connectors. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the Downstream O2 Sensor Signal Circuit and a good ground. Is the resistance below 5.0 ohms? Yes → Repair the Downstream O2S Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 4	All
4	Ignition Off Disconnect the Downstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connectors. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the Downstream O2 Sensor Signal Circuit and the Sensor Ground Circuit. Is the resistance below 5.0 ohms? Yes → Repair the Downstream O2 Sensor Signal Circuit for a short to the Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0138 1/2 O2 SENSOR SHORTED TO VOLTAGE

When Monitored and Set Condition:

P-0138 1/2 O2 SENSOR SHORTED TO VOLTAGE

When Monitored: With the engine running for more than 2 minutes and coolant temperature above 76 degrees C (170 degrees F).

Set Condition: The Downstream Oxygen Sensor Signal voltage is above 1.2 volts.

POSSIBLE CAUSES
1/2 O2 SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE
1/2 O2 SEN HARNESS INTERMITTENT SHORT TO VOLTAGE
1/2 O2 SENSOR CONNECTOR OBSERVABLE DEFECT (A)
1/2 O2 SENSOR CONNECTOR OBSERVABLE DEFECT (B)
1/2 O2 SENSOR HARNESS OBSERVABLE DEFECT
1/2 O2 SENSOR DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Start the engine. With the DRB, read the Downstream O2 Sensor voltage. Is the Downstream O2 Sensor voltage above 1.2 volts? Yes → Go To 2 No → Go To 5	All
2	Ignition Off Disconnect the Downstream O2 Sensor. **Note: Check connectors - Clean/repair as necessary.** Start the engine. With the DRB, read the Downstream O2 Sensor Voltage. Is the Upstream O2 Sensor voltage above 1.2 volts? Yes → Repair the Downstream O2 Sensor Signal Circuit for a short to voltage. If ok, replace the PCM. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition Off Disconnect the Downstream O2 Sensor. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair or replace as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 4	All

P-0138 1/2 O2 SENSOR SHORTED TO VOLTAGE — Continued

TEST	ACTION	APPLICABILITY
4	If there are no potential causes remaining, the Downstream O2 Sensor is assumed to be defective. View repair options. Repair Replace the Upstream O2 Sensor. Perform Powertrain Verification Test VER-5A.	All
5	Start the engine. Wiggle Downstream O2 Sensor Connector and Harness. While wiggling the Harness, watch the Downstream O2 Sensor voltage. Did the O2 Sensor voltage go above 1.2 volts at any time? Yes → Repair the Harness or Connector that has the intermittent short to voltage. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition Off Disconnect the Downstream O2 Sensor. **Note: Check connectors - Clean/repair as necessary.** Inspect connectors. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0139 1/2 O2S SLOW RESPONSE

When Monitored and Set Condition:

P-0139 1/2 O2S SLOW RESPONSE

When Monitored: With the engine running, engine at normal operating temperature, ambient air temperature greater than −7°C (20°F) and vehicle odometer is greater than 6437 Kilometers (4000 miles).

Set Condition: The Oxygen Sensor Signal voltage does not exceed 0.53 volts and does not fall below 0.35 volts once during the drive cycle.

POSSIBLE CAUSES
ENGINE MECHANICAL PROBLEM
1/2 O2 SENSOR GROUND CKT HIGH RESISTANCE
1/2 O2 SENSOR GROUND CKT POOR CONNECTION
1/2 O2 SENSOR SIGNAL CKT HIGH RESISTANCE
1/2 O2 SENSOR SIGNAL CKT POOR CONNECTION
1/2 O2 SENSOR SLOW RESPONSE
EXHAUST LEAK
1/2 O2S SLOW RESPONSE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the GLOBAL GOOD TRIP counter displayed and equal to zero? Yes → Go To 5 No → Go To 2	All
2	Turn Ignition On (Engine Off). During the following voltage drop measurement, wiggle wires between O2S Connector and PCM Connector. Using a voltmeter, backprobe O2S (Sensor Ground) Circuit between O2S Connector (Sensor Ground) and PCM Connector (Sensor Ground). While wiggling wires, is the voltage drop reading below 0.10 VDC? Yes → Go To 3 No → Repair poor connection (high resistance) on O2 Sensor Ground Circuit. Perform VERIFICATION TEST VER-5A3.	All

P-0139 1/2 O2S SLOW RESPONSE — Continued

TEST	ACTION	APPLICABILITY
3	Turn Ignition On (Engine Off). During the following voltage drop measurement, wiggle wires between O2S Connector and PCM Connector. Using a voltmeter, backprobe O2S (Signal) Circuit between O2S Connector (O2S Signal) and PCM Connector (O2S Signal). While wiggling wires, is the voltage drop reading below 0.10 VDC? Yes → Go To 4 No → Repair poor connection (high resistance) on O2S Signal Circuit. Perform VERIFICATION TEST VER-5A3.	All
4	At this time the 1/2 O2S SLOW RESPONSE does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME DATA. With this screen, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME DATA pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the 1/2 O2S SLOW RESPONSE reoccur? Yes → Go To 5 No → The 1/2 O2S SLOW RESPONSE no longer exists. Perform VERIFICATION TEST VER-5A3.	All
5	The following are possible causes for O2 Sensor Slow Response: exhaust leak, fuel contamination, O2 sensor failure, electrical wiring connectors, electrical mechanical, and O2 heater failure. Start the Engine. **NOTE: Check the exhaust for excessive smoke caused by oil or coolant consumption.** Is there an oil or coolant consumption condition present? Yes → Repair engine mechanical as necessary and replace O2 Sensor. Perform VERIFICATION TEST VER-5A3. No → Go To 6	All
6	The following are possible causes for O2 Sensor Slow Response: exhaust leak, fuel contamination, O2 sensor failure, electrical wiring connectors, electrical mechanical, and O2 heater failure. Start the Engine. Check the Exhaust System for leaks between the Engine and the catalyst. Are there any leaks? Yes → Repair or replace leaking Exhaust System as necessary. Perform VERIFICATION TEST VER-5A3. No → Go To 7	All
7	The following are possible causes for O2 Sensor Slow Response: exhaust leak, fuel contamination, O2 sensor failure, electrical wiring connectors, electrical mechanical, and O2 heater failure. Turn Ignition On (Engine Off). Using a voltmeter, backprobe O2S (Signal) Circuit between O2S Connector (O2S Signal) and PCM Connector (O2S Signal). Is the voltage drop reading below 0.10 VDC? Yes → Go To 8 No → Repair poor connection (high resistance) on O2S Signal Circuit. Perform VERIFICATION TEST VER-5A3.	All

P-0139 1/2 O2S SLOW RESPONSE — Continued

TEST	ACTION	APPLICABILITY
8	The following are possible causes for O2 Sensor Slow Response: exhaust leak, fuel contamination, O2 sensor failure, electrical wiring connectors, electrical mechanical, and O2 heater failure. Turn Ignition On (Engine Off). Using a voltmeter, backprobe O2S (Sensor Ground) Circuit between O2S Connector (Sensor Ground) and PCM Connector (Sensor Ground). Is the voltage drop reading below 0.10 VDC? Yes → Replace the O2 Sensor. Perform VERIFICATION TEST VER-5A3. No → Repair poor connection (high resistance) on O2 Sensor Ground Circuit. Perform VERIFICATION TEST VER-5A3.	All

Symptom:
P-0140 1/2 O2 SENSOR STAYS AT CENTER

When Monitored and Set Condition:

P-0140 1/2 O2 SENSOR STAYS AT CENTER

When Monitored: With the engine running for more than 2 minutes and engine temperature greater than 76 degrees C (170 degrees F).

Set Condition: The Upstream Oxygen Sensor Signal voltage is between 0.35 volt and 0.55 volt for 1.5 minutes.

POSSIBLE CAUSES
O2 SENSOR 1/2 GROUND CIRCUIT OPEN
O2 SENSOR 1/2 SIGNAL CIRCUIT OPEN
1/2 O2 SENSOR WIRING HARN INTER DEFECT
1/2 O2 SENSOR WIRING HARN OBS DEFECT
O2 SENSOR 1/2 DEFECTIVE
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Start the engine and allow it to reach normal operating temperature. With the DRB in actuator tests, set RPM to 1500. In sensors, read the Downstream Oxygen Sensor Level. Is the Downstream O2 Sensor Level switching? Yes → Go To 2 No → Go To 4	All
2	Ignition Off Start the engine and allow it to reach normal operating temperature. Using the DRB, set the engine speed to 1500 RPM. With the DRB, read the Downstream O2 Sensor state. Wiggle Downstream O2 Sensor Connector and Harness. While wiggling the Harness, monitor the DRB display. At any time was the Downstream O2 Sensor state locked at center? Yes → Repair the open Harness or Connector that caused the O2 Sensor state to stay at center. Perform Powertrain Verification Test VER-5A. No → Go To 3	All

P-0140 1/2 O2 SENSOR STAYS AT CENTER — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All
4	Ignition Off Disconnect the Downstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on, engine not running. Using an Ohmmeter, measure the resistance between the Downstream O2 Sensor Ground Circuit and a good engine ground. Is the resistance above 5.0 ohms? Yes → Repair the open Downstream O2 sensor Ground Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	Ignition Off Disconnect the Downstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire between the Downstream O2 Sensor Signal Circuit and B(+). Ignition on, engine not running. Using the DRB in sensors, read the Downstream Oxygen Sensor voltage. Is the voltage above 1.0 volt? Yes → Replace the Downstream O2 Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	Ignition Off Disconnect the Downstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance of the Downstream O2 Sensor Signal Circuit from the O2 Sensor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open Downstream O2 Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	All
7	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0141 1/2 O2S HEATER FAILURE

When Monitored and Set Condition:

P-0141 1/2 O2S HEATER FAILURE

When Monitored: With the ignition key off, after the engine cools down.

Set Condition: No sensor output signal is received when the PCM powers up the sensor heater.

POSSIBLE CAUSES
1/2 O2 SENSOR CONNECTOR DAMAGED
1/2 O2 SENSOR GND CIRCUIT OPEN
ASD RELAY OUTPUT CIRCUIT OPEN
1/2 O2 SENSOR FAILURE
1/2 O2 SENSOR HEATER ELEMENT FAILURE
1/2 O2S HEATER FAILURE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the GLOBAL GOOD TRIP counter displayed and equal to zero? Yes → Go To 2 No → Go To 3	All
2	Turn Ignition On (Engine Off), wait three minutes. With the DRB, monitor the O2 Sensor voltage for a few minutes until the voltage stabilizes between .4 and .6 volts. With the DRB, actuate the O2 Heater test. Monitor O2 voltage for up to two minutes. Is the O2 Sensor voltage still between .4 and .6 volts? Yes → Go To 3 No → Go To 4	All
3	At this time the 1/2 O2S HEATER FAILURE does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME DATA. With this screen, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME DATA pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the 1/2 O2S HEATER FAILURE reoccur? Yes → Go To 4 No → 1/2 O2S Heater failure no longer exists. Perform VERIFICATION TEST VER-5A3.	All

P-0141 1/2 O2S HEATER FAILURE — Continued

TEST	ACTION	APPLICABILITY
4	Disconnect the 1/2 O2 Sensor Connector. **Check connectors - Clean / repair as necessary.** Is any terminal corroded, damaged, pushed out or miswired? Yes → Repair or replace as necessary. Perform VERIFICATION TEST VER-5A3. No → Go To 5	All
5	Turn Ignition On (Engine Off). Disconnect the 1/2 O2 Sensor Connector. **Check connectors - Clean / repair as necessary.** With the DRB, actuate the ASD Relay. Using a voltmeter, measure the ASD Relay Output Circuit at the O2 Sensor Connector (harness side). Is the voltage above 10.0 volts? Yes → Go To 6 No → Repair the open ASD Relay Output Circuit. Perform VERIFICATION TEST VER-5A3.	All
6	Disconnect the 1/2 O2 Sensor Connector. **Check connectors - Clean / repair as necessary.** Using an ohmmeter, measure the O2 Sensor Heater Element at the O2 Sensor Connector (component side). Is the resistance between 4 and 7 ohms? Yes → Go To 7 No → Replace the 1/2 O2 Sensor. Perform VERIFICATION TEST VER-5A3.	All
7	Disconnect the 1/2 O2 Sensor Connector. **Check connectors - Clean / repair as necessary.** Using an ohmmeter, measure from the Heater Ground Circuit to ground at the O2 Sensor Connector (harness side). Is the resistance below 5.0 ohms? Yes → Replace the 1/2 O2 Sensor. Perform VERIFICATION TEST VER-5A3. No → Repair the open 1/2 O2 Sensor Ground Circuit. Perform VERIFICATION TEST VER-5A3.	All

Symptom:
P-0171–1/1 FUEL SYSTEM LEAN

When Monitored and Set Condition:

P-0171–1/1 FUEL SYSTEM LEAN

When Monitored: With the engine running in closed loop mode, the ambient, battery temperature above —5 deg. C (20 deg. 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
FUEL PUMP MODULE DEFECTIVE
TPS VOLTAGE CHANGE NOT SMOOTH
TPS VOLTAGE <0.92V
FUEL INLET STRAINER PLUGGED
ECT SENSOR DEFECTIVE (OUT OF CALIBRATION)
MAP SENSOR DEFECTIVE (OUT OF CALIBRATION)
ENGINE MECHANICAL PROBLEM
FUEL FILTER/PRESSURE REGULATOR DEFECTIVE (HIGH)
FUEL FILTER/PRESSURE REGULATOR DEFECTIVE (LOW)
FUEL PUMP CAPACITY (VOLUME) OUT OF SPECS

TEST	ACTION	APPLICABILITY
1	Turn ignition on. With the DRB, read the DTC's. Is the Global Good Trip Counter displayed and equal to zero for P0171? Yes → Go To 2 No → Go To 13	All
2	Ignition On, Engine Not Running With the DRB, read the TPS voltage. While monitoring the DRB, slowly open and close the Throttle. Is the voltage change smooth? Yes → Go To 3 No → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A.	All

P-0171–1/1 FUEL SYSTEM LEAN — Continued

TEST	ACTION	APPLICABILITY
3	Ignition On, Engine Not Running. With the DRB, read TPS Sensor voltage. Throttle must be against stop. Is the voltage 0.92 or less with the Throttle closed? Yes → Go To 4 No → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A.	All
4	Turn ignition On. With the DRB in sensors, read the “Engine Coolant Tmp Deg” value. **Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 62°C (150°F) is reached.** Start the Engine. While monitoring the DRB, allow the engine to reach normal operating temperature above 82°C (180°F). Did the engine coolant temperature value reach 82°C (180°F) or above? Yes → Go To 5 No → Replace the Engine Coolant Temperature Sensor. Perform Powertrain Verification Test VER-5A.	All
5	Turn ignition On. With the DRB in sensors, read the ′′Eng Coolant Tmp Deg'' value **Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 62°C (150°F) is reached.** Start the Engine. While monitoring the DRB, allow the engine to reach normal operating temperature above 82°C (180°F). Was the coolant temperature value increase a smooth transition? Yes → Go To 6 No → Replace the Engine Coolant Temperature Sensor. Perform Verificatino Test VER-5A.	All
6	Turn ignition off. Connect a Vacuum Gauge to a Manifold Vacuum source. Start the engine. Allow the engine to idle. **Note: If engine will not idle, maintain a constant RPM above idle.** Using the DRB in Sensors, read the MAP Sensor vacuum value. Is the DRB reading within 1″ of the Vacuum Gauge reading? Yes → Go To 7 No → Replace the MAP Sensor. Perform Powertrain Verification Test VER-5A.	All

P-0171–1/1 FUEL SYSTEM LEAN — Continued

TEST	ACTION	APPLICABILITY
7	Turn ignition off. **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.** Remove the pressure test port cap at the fuel rail test port. Connect a fuel pressure gauge to the test port pressure fitting on the fuel rail. Ignition on. With the DRB, actuate the ASD Fuel System test and observe the fuel pressure gauge. **Note: Fuel pressure specification is 49.2 psi +/- 5 psi** Choose a conclusion that best matches your fuel pressure reading. Below Specification Go To 8 Within Specification Go To 11 Above Specification Replace the fuel filter pressure regulator. **Caution: Stop ALL Actuations.**	All
8	Turn ignition off. **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.** Raise vehicle on hoist,and disconnect the fuel pressure line at the fuel pump module. Install speial 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. With the DRB, actuate the ASD Fuel System test and observe the fuel pressure gauge. **Note: Fuel pressure specification is 49.2 psi +/- 5 psi.** Is the fuel pressure within specification now? Yes → Repair the restriction in the chassis fuel supply line between the fuel tank and fuel rail. No → Go to 9 **Caution: Stop ALL Actuations.**	ALL
9	**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.** Remove the Fuel Pump Module and inspect the Fuel Inlet Strainer. Is the Fuel Inlet Strainer plugged? Yes → Replace the Fuel Inlet Strainer. No → Go To 10	All
10	If there are no potential causes remaining, the Fuel Pump Module is assumed to be defective. View repair options. Repair Replace the Fuel Pump Module	All

P-0171–1/1 FUEL SYSTEM LEAN — Continued

TEST	ACTION	APPLICABILITY
11	Check for any of the following conditions/mechanical problems. 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 PVC 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? Yes → Repair as necessary. Perform FUEL SYSTEM/MISFIRE MONITOR VERIFICATION TEST No → Go To 12	All
12	Turn ignition off. **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.** Disconnect the fuel supply line at the fuel rail. Connect fuel line adapter #6539(5/16″) or #6631 (3/8″) to the disconnected fuel supply line. Insert the other end of the adapter into a graduated container. **Caution: Do not operate the fuel pump for more than 7 seconds in the next step. Fuel pump module reservoir may run empty and damage to the fuel pump may result.** **Specification: A good fuel pump will deliver at least 1/4 liter of fuel in 7 seconds.** With the DRB, actuate the ASD Fuel System test for 7 seconds. Is the fuel pump capacity within specification? Yes → Test Complete. No → Check for a kinked/damaged fuel supply line between the fuel tank and fuel rail. If OK, replace the fuel filter/pressure regulator. **Caution: Stop ALL Actuations.**	All
13	The conditions required to set the DTC are no longer present. With the DRB read and record the freeze frame data and the “Fuel System Similar Conditions Window” data. Utilize the data and try to duplicate the operating conditions at which the DTC was set. Pay particular attention to the ECT and RPM for added diagnostics. **Note: Refer to any TSB’s that may apply to the symptom.** Test Complete Repair Test Complete.	

Symptom
P0172 -1/1 FUEL SYSTEM RICH

When Monitored and Set Condition:

P0172 -1/1 FUEL SYSTEM RICH

When Monitored: With the engine in closed loop mode, the ambient/battery temperature above −5 deg. C (20 deg. 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
FUEL PUMP MODULE DEFECTIVE
TPS VOLTAGE CHANGE NOT SMOOTH
TPS VOLTAGE <0.92V
FUEL INLET STRAINER PLUGGED
ECT SENSOR DEFECTIVE (OUT OF CALIBRATION)
MAP SENSOR DEFECTIVE (OUT OF CALIBRATION)
ENGINE MECHANICAL PROBLEM
FUEL FILTER/PRESSURE REGULATOR DEFECTIVE (HIGH)
FUEL FILTER/PRESSURE REGULATOR DEFECTIVE (LOW)

TEST	ACTION	APPLICABILITY
1	Turn ignition on. With the DRB, read the DTC's. Is the DTC Specific Good Trip Counter displayed and equal to zero? Yes → Go To 2 No → Go To 14	All
2	Ignition On, Engine Not Running With the DRB, read the TPS voltage. While monitoring the DRB, slowly open and close the Throttle. Is the voltage change smooth? Yes → Go To 3 No → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A.	All

P0172 -1/1 FUEL SYSTEM RICH — Continued

TEST	ACTION	APPLICABILITY
3	Ignition On, Engine Not Running. With the DRB, read TP Sensor voltage. Throttle must be against stop. Is the voltage 0.92 or less with the Throttle closed? Yes → Go To 4 No → Replace the Throttle Position Sensor. Perform Powertrain Verification Test VER-5A.	All
4	Turn ignition on. With the DRB in sensors, read the “Eng Coolant Tmp Deg” value. **Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 62°C (150°F) is reached.** Start the Engine. While monitoring the DRB, allow the engine to reach normal operating temperature above 82°C (180°F). Did the engine coolant temperature value reach 180°F or above? Yes → Go To 5 No → Replace the Engine Coolant Temperature Sensor. Perform Powertrain Verification Test VER-5A.	All
5	Turn ignition On. With the DRB in sensors, read the “Eng Coolant Tmp Deg” value **Note: If engine coolant temperature is above 82°C (180°F), allow the engine to cool until 62°C (150°F) is reached.** Start the Engine. While monitoring the DRB, allow the engine to reach normal operating temperature above 82°C (180°F). Was the coolant temperature value increase a smooth transition? Yes → Go To 6 No → Replace the Engine Coolant Temperature Sensor. Perform Verification Test VER-5A.	All
6	Turn ignition off. Connect a Vacuum Gauge to a Manifold Vacuum source. Start the engine. Allow the engine to idle. **Note: If engine will not idle, maintain a constant RPM above idle.** Using the DRB in Sensors, read the MAP Sensor vacuum value. Is the DRB reading within 1″ of the Vacuum Gauge reading? Yes → Go To 7 No → Replace the MAP Sensor. Perform Powertrain Verification Test VER-5A.	All
7	**Note: Engine must be at operating temp and in closed loop to perform this test.** Start engine and run until operating temp and closed loop mode is reached. With the DRB under System Tests, go to “Purge Vapors Test”. Observe the Short Term Adaptive value and press 3 to flow. **Note: Short Term Adaptive should change.** Did the Short Term Adaptive value change? Yes → Go To 8 No → Refer to symptom *CHECKING EVAPORATIVE EMISSION SYSTEM in the DRIVEABILITY category.	All

P0172 -1/1 FUEL SYSTEM RICH — Continued

<table>
<tr><th>TEST</th><th>ACTION</th><th>APPLICABILITY</th></tr>
<tr><td>8</td><td>Turn ignition off.
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.
Remove the pressure test port cap at the fuel rail test port. Connect a fuel pressure gauge to the test port pressure fitting on the fuel rail.
Ignition on. With the DRB, actuate the ASD Fuel System test and observe the fuel pressure gauge.
Note: Fuel pressure specification is 49.2 psi +/− 5 psi.
Choose a conclusion that best matches your fuel pressure reading.

Below Specification
Go To 9

Within Specification
Go To 13

Above Specification
Replace the fuel filter/pressure regulator.

Caution: Stop ALL Actuations.</td><td>All</td></tr>
<tr><td>9</td><td>Check for any of the following conditions/mechanical problems.
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 PVC 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?

Yes → Repair as necessary.
Perform FUEL SYSTEM/MISFIRE MONITOR VERIFICATION TEST

No → Go To 10</td><td>All</td></tr>
<tr><td>10</td><td>Turn ignition off.
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.
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. With the DRB, actuate the ASD Fuel System test and observe the fuel pressure gauge.
Note: Fuel pressure specification is 49.2 psi +/- 5 psi.
Is the fuel pressure within specification now?

Yes → Repair the restriction in the chassis fuel supply line between the fuel tank and fuel rail.

No → Go to 11

Caution: Stop ALL Actuations.</td><td>All</td></tr>
</table>

P0172 -1/1 FUEL SYSTEM RICH — Continued

TEST	ACTION	APPLICABILITY
11	**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.** Remove the Fuel Pump Module and inspect the Fuel Inlet Strainer. Is the Fuel Inlet Strainer plugged? Yes → Replace the Fuel Inlet Strainer. No → Go To 12	All
12	If there are no potential causes remaining, the Fuel Pump Module is assumed to be defective. View repair options. Repair Replace the Fuel Pump Module	All
13	Check for any of the following conditions/mechanical problems. 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 PVC 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? Yes → Repair as necessary. Perform FUEL SYSTEM/MISFIRE MONITOR VERIFICATION TEST No → Test Complete.	All
14	The conditions required to set the DTC are no longer present. With the DRB read and record the freeze frame data and the “Fuel System Similar Conditions Window” data. Utilize the data and try to duplicate the operating conditions at which the DTC was set. Pay particular attention to the ECT and RPM for added diagnostics. **Note: Refer to any TSB’s that may apply to the symptom.** Test Complete Repair Test Complete.	

Symptom:start here
P-0201 INJECTOR #1 CONTROL CIRCUIT

When Monitored and Set Condition:

P-0201 INJECTOR #1 CONTROL CIRCUIT

When Monitored: With battery voltage greater than 12 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
ASD RELAY OUTPUT CIRCUIT OPEN
INJECTOR DEFECTIVE
INJECTOR #1 DRIVER CIRCUIT OPEN
INJECTOR #1 DRIVER CIRCUIT SHORTED TO GROUND
POWERTRAIN CONTROL MODULE DEFECTIVE
INJECTOR #1 DRIVER CIRCUIT SHORT TO GROUND
INJECTOR #1 DRIVER CIRCUIT SHORT TO GROUND (PCM)

TEST	ACTION	APPLICABILITY
1	Ignition Off Start engine, let idle for at least 20 seconds. Key on, engine off. With the DRB, read Trouble Codes. Is the Global Good Trip counter displayed and equal to zero? Yes → Go To 2 No → Go To 7	All
2	Ignition Off Disconnect the Injector #1 Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of Injector #1. Is the resistance between 10.0 and 16.0 ohms? Yes → Go To 3 No → Replace the Fuel Injector. Perform Powertrain Verification Test VER-5A.	All

P-0201 INJECTOR #1 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Injector #1 Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. With the DRB, actuate the Auto Shutdown Relay. Using a Voltmeter, measure the ASD Relay Output voltage. Does the voltage cycle high and low? Yes → Go To 4 No → Repair the open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-5A.	All
4	Ignition Off Disconnect the Injector #1 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Use an Ohmmeter in the following step. Measure the Injector #1 Driver Circuit from the PCM to the Injector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Injector #1 Driver Circuit. Perform Powertrain Verification Test VER-5A.	All
5	Ignition Off Disconnect the Injector #1 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #1 Driver Circuit. Is the resistance below 5.0 ohms? Yes → Repair the Injector #1 Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	All
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 8	All

P-0201 INJECTOR #1 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Engine Running Wiggle Wiring Harness from the Injector to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused the problem to appear. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0202 INJECTOR #2 CONTROL CIRCUIT

When Monitored and Set Condition:

P-0202 INJECTOR #2 CONTROL CIRCUIT

When Monitored: With battery voltage greater than 12 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
ASD RELAY OUTPUT CIRCUIT OPEN
INJECTOR DEFECTIVE
INJECTOR #2 DRIVER CIRCUIT OPEN
INJECTOR #2 DRIVER CIRCUIT SHORTED TO GROUND
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Start engine, let idle for at least 20 seconds. Key on, engine off. With the DRB, read Trouble Codes. Is the Global Good Trip counter displayed and equal to zero? Yes → Go To 2 No → Go To 7	All
2	Ignition Off **Note: It may be necessary to remove the Intake Plenum in the following steps.** Disconnect the Injector #2 Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of Injector #2. Is the resistance between 10.0 and 16.0 ohms? Yes → Go To 3 No → Replace the Fuel Injector. Perform Powertrain Verification Test VER-5A.	All

P-0202 INJECTOR #2 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	**Note: It may be necessary to remove the Intake Plenum in the following steps.** Ignition Off Disconnect the Injector #2 Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. With the DRB, actuate the Auto Shutdown Relay. Using a Voltmeter, measure the ASD Relay Output Circuit voltage. Does the voltage cycle high and low? Yes → Go To 4 No → Repair the open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-5A.	All
4	Ignition Off Disconnect the Injector #2 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Use an Ohmmeter in the following step. Measure the Injector #2 Driver Circuit from the PCM to the Injector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Injector #2 Driver Circuit. Perform Powertrain Verification Test VER-5A.	All
5	Ignition Off Disconnect the Injector #2 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check Connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #2 Driver Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Injector #2 Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	All
7	Engine Running Wiggle Wiring Harness from the Injector to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused the problem to appear. Perform Powertrain Verification Test VER-5A. No → Go To 8	All

P-0202 INJECTOR #2 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0203 INJECTOR #3 CONTROL CIRCUIT

When Monitored and Set Condition:

P-0203 INJECTOR #3 CONTROL CIRCUIT

When Monitored: With battery voltage greater than 12 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
ASD RELAY OUTPUT CIRCUIT OPEN
FUEL INJECTOR #3 DEFECTIVE
INJECTOR #3 DRIVER CIRCUIT OPEN
INJECTOR #3 DRIVER CIRCUIT SHORTED TO GROUND
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Start engine, let idle for at least 20 seconds. Key on, engine off. With the DRB, read Trouble Codes. Is the Global Good Trip counter displayed and equal to zero? Yes → Go To 2 No → Go To 7	All
2	Ignition Off **Note: It may be necessary to remove the Intake Plenum in the following steps.** Disconnect the Injector #3 Connector. **Note: Check connectors - Clear/repair as necessary.** Using an Ohmmeter, measure the resistance of Injector #3. Is the resistance between 10.0 and 16.0 ohms? Yes → Go To 3 No → Replace the Fuel Injector. Perform Powertrain Verification Test VER-5A.	All

P-0203 INJECTOR #3 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off. **Note: It may be necessary to remove the Intake Plenum in the following steps.** Disconnect the Injector #3 Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition On, Engine Not Running. With the DRB, actuate the Auto Shutdown Relay. Using a Voltmeter, measure the ASD Relay output voltage. Does the voltage cycle high and low? Yes → Go To 4 No → Repair the open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-5A.	All
4	Ignition Off. **Note: It may be necessary to remove the Intake Plenum in the following steps.** Disconnect the Injector #3 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #3 Driver from the PCM to the Injector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Injector #3 Driver Circuit. Perform Powertrain Verification Test VER-5A.	All
5	Ignition Off. **Note: It may be necessary to remove the Intake Plenum in the following steps.** Disconnect the Injector #3 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #3 Driver Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Injector #3 Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	All
7	Engine Running Wiggle Wiring Harness from the Injector to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused the problem to appear. Perform Powertrain Verification Test VER-5A. No → Go To 8	All

P-0203 INJECTOR #3 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0204 INJECTOR #4 CONTROL CIRCUIT

When Monitored and Set Condition:

P-0204 INJECTOR #4 CONTROL CIRCUIT

When Monitored: With battery voltage greater than 12 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
ASD RELAY OUTPUT CIRCUIT OPEN
INJECTOR #4 DEFECTIVE
INJECTOR #4 DRIVER CIRCUIT OPEN
INJECTOR #4 DRIVER CIRCUIT SHORTED TO GROUND
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Start engine, let idle for at least 20 seconds. Key on, engine off. With the DRB, read Trouble Codes. Is the Global Good Trip counter displayed and equal to zero? Yes → Go To 2 No → Go To 7	ALL
2	**Note: It may be necessary to remove the Intake Plenum in the following steps.** Key off. Disconnect the #4 Injector Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of Injector #4. Is the resistance between 10.0 and 16.0 ohms? Yes → Go To 3 No → Replace the Fuel Injector. Perform Powertrain Verification Test VER-5A.	ALL

P-0204 INJECTOR #4 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	**Note: It may be necessary to remove the Intake Plenum in the following steps.** Disconnect the #4 Injector Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. With the DRB, actuate the Auto Shutdown Relay. Using a Voltmeter, measure the ASD Relay Output voltage. Does the voltage cycle high and low? Yes → Go To 4 No → Repair the open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-5A.	ALL
4	**Note: It may be necessary to remove the Intake Plenum in the following steps.** Key off. Disconnect the Injector #4 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure across the Injector #4 Driver Circuit from the PCM to the Injector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Injector #4 Driver Circuit. Perform Powertrain Verification Test VER-5A.	ALL
5	**Note: It may be necessary to remove the Intake Plenum in the following steps.** Key off. Disconnect the #4 Injector Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #4 Driver Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Injector #4 Control Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 6	ALL
6	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	ALL
7	Engine Running Wiggle Wiring Harness from the Injector to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused the problem to appear. Perform Powertrain Verification Test VER-5A. No → Go To 8	ALL

P-0204 INJECTOR #4 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ALL

Symptom:
P-0205 INJECTOR #5 CONTROL CIRCUIT

When Monitored and Set Condition:

P-0205 INJECTOR #5 CONTROL CIRCUIT

When Monitored: With battery voltage greater than 12 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
ASD RELAY OUTPUT CIRCUIT OPEN
INJECTOR #5 DEFECTIVE
INJECTOR #5 DRIVER CIRCUIT OPEN
INJECTOR #5 DRIVER CIRCUIT SHORT TO GROUND
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Start engine, let idle for at least 20 seconds. Key on, engine off. With the DRB, read Trouble Codes. Is the Global Good Trip counter displayed and equal to zero? Yes → Go To 2 No → Go To 7	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
2	Ignition Off Disconnect Injector #5 Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of Injector #5. Is the resistance between 10.0 and 16.0 ohms? Yes → Go To 3 No → Replace the Fuel Injector. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
3	Ignition Off Disconnect Injector #5 Connector. **Note: Check connectors - Clean/repair as necessary.** Turn the ignition on. With the DRB, actuate the Auto Shutdown Relay. Using a Voltmeter, measure the ASD Relay Output voltage. Does the voltage cycle high and low? Yes → Go To 4 No → Repair the open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0205 INJECTOR #5 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect Injector #5 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #5 Driver Circuit from the PCM to the Injector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Injector #5 Driver Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
5	Ignition Off Disconnect Injector #5 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #5 Driver Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Injector #5 Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 6	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
6	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 8	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
8	Engine Running Wiggle Wiring Harness from the Injector to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused the problem to appear. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

Symptom:
P-0206 INJECTOR #6 CONTROL CIRCUIT

When Monitored and Set Condition:

P-0206 INJECTOR #6 CONTROL CIRCUIT

When Monitored: With battery voltage greater than 12 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
AUTO SHUTDOWN RELAY OUTPUT CIRCUIT OPEN
INJECTOR #6 DEFECTIVE (RESISTANCE OUT OF RANGE)
INJECTOR #6 DRIVER CIRCUIT OPEN
INJECTOR #6 DRIVER CIRCUIT SHORTED TO GROUND
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Start engine, let idle for at least 20 seconds. Key on, engine off. With the DRB, read Trouble Codes. Is the Global Good Trip counter displayed and equal to zero? Yes → Go To 2 No → Go To 7	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
2	Ignition Off **Note: It may be necessary to remove the Intake Plenum in the following step.** Disconnect the Injector #6 Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of Injector #6. Is the resistance between 10.0 and 16.0 ohms? Yes → Go To 3 No → Replace the Fuel Injector. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0206 INJECTOR #6 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off **Note: It may be necessary to remove the Intake Plenum in the following step.** Disconnect the Injector #6 Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. With the DRB, actuate the ASD Relay. Using a Voltmeter, measure the ASD Relay Output voltage. Does the voltage cycle high and low? Yes → Go To 4 No → Repair the open Auto Shutdown Relay Output Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
4	Ignition Off **Note: It may be necessary to remove the Intake Plenum in the following step.** Disconnect the Injector #6 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #6 Driver Circuit from the PCM to the Injector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Injector #6 Driver Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
5	Ignition Off **Note: It may be necessary to remove the Intake Plenum in the following step.** Disconnect the Injector #6 Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Injector #6 Driver Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Injector #6 Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 6	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
6	It there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0206 INJECTOR #6 CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 8	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
8	Engine Running Wiggle Wiring Harness from the Injector to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused the problem to appear. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE - 3.0L, 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

Symptom List:

P-0300 MULTIPLE CYLINDER MIS-FIRE
P-0301 CYLINDER #1 MIS-FIRE
P-0302 CYLINDER #2 MIS-FIRE
P-0303 CYLINDER #3 MIS-FIRE
P-0304 CYLINDER #4 MIS-FIRE

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P-0300 MULTIPLE CYLINDER MIS-FIRE.

When Monitored and Set Condition:

P-0300 MULTIPLE CYLINDER MIS-FIRE

When Monitored: With the engine running, after successfully performing Crank Sensor learn.

Set Condition: When more than a 2% misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip.

P-0301 CYLINDER #1 MIS-FIRE

When Monitored: With the engine running, after successfully performing Crank Sensor learn.

Set Condition: When more than a 2% misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip.

P-0302 CYLINDER #2 MIS-FIRE

When Monitored: With the engine running, after successfully performing Crank Sensor learn.

Set Condition: When more than a 2% misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip.

P-0303 CYLINDER #3 MIS-FIRE

When Monitored: With the engine running, after successfully performing Crank Sensor learn.

Set Condition: When more than a 2% misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip.

P-0304 CYLINDER #4 MIS-FIRE

When Monitored: With the engine running, after successfully performing Crank Sensor learn.

Set Condition: When more than a 2% misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip.

P-0300 MULTIPLE CYLINDER MIS-FIRE — Continued

POSSIBLE CAUSES
OTHER POSSIBLE CAUSES FOR MIS-FIRE
CAM, CRANK, VALVE TIMING, OR VACUUM PROBLEM
ELECTRONIC IGNITION COIL OUTPUT LOW
ENGINE MECHANICAL PROBLEM
SECONDARY IGNITION PATTERN IRREGULAR
FUEL CONTAMINATION
FUEL PRESSURE LEAK DOWN OUT OF SPECIFICATION
FUEL PUMP AMPERAGE OUT OF SPECIFICATION
FUEL PUMP CAPACITY OUT OF SPECIFICATION
FUEL PUMP PRESSURE OUT OF SPECIFICATION
MIS-FIRE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the MIS-FIRE GOOD TRIP counter displayed and equal to zero? Yes → Go To 2 No → Go To 3	All
2	At this time the conditions that set this fault are present. With the DRB, read the FREEZE FRAME and SIMILAR CONDITIONS WINDOWS. Attempt to operate the vehicle in the similar conditions. When the vehicle is operating in the SIMILAR CONDITIONS WINDOW, go to the WHICH CYLINDER IS MISFIRING screen. Is the DRB counting mis-fires at this time? Yes → Go To 4 No → Go To 3	All
3	At this time the mis-fire does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME and SIMILAR CONDITIONS WINDOW. With these screens, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the mis-fire reoccur? Yes → Go To 4 No → Mis-fire no longer exists. Perform VERIFICATION TEST VER-5A2.	All
4	With the DRB, read the FREEZE FRAME DATA. Use the freeze frame data and attempt to determine the cause. In the FREEZE FRAME, are the adaptive fuel percentages greater than +/- 15%? Yes → Go To 5 No → Go To 10	All

P-0300 MULTIPLE CYLINDER MIS-FIRE — Continued

TEST	ACTION	APPLICABILITY
5	With an appropriate container, obtain a fuel sample from the vehicle. Is the fuel free from contamination? Yes → Go To 6 No → Replace contaminated fuel and clean system. Perform VERIFICATION TEST VER-5A2.	All
6	Perform Fuel Pressure Leak Down Test per service instructions. Did the Fuel Pressure Leak Down Test pass? Yes → Go To 7 No → Relieve fuel pressure and repair as necessary. Perform VERIFICATION TEST VER-5A2.	All
7	Perform Fuel Pump Amperage Test per service instructions. Did the Fuel Pump Amperage Test pass? Yes → Go To 8 No → Relieve fuel pressure and repair as necessary. Perform VERIFICATION TEST VER-5A2.	All
8	Perform Fuel Pump Capacity Test per service instructions. Did the Fuel Pump Capacity Test pass? Yes → Go To 9 No → Relieve fuel pressure and repair as necessary. Perform VERIFICATION TEST VER-5A2.	All
9	Perform Fuel Pump Pressure Test per service instructions. Did the Fuel Pump Pressure Test pass? Yes → Go To 10 No → Relieve fuel pressure and repair as necessary. Perform VERIFICATION TEST VER-5A2.	All
10	With the DRB, read the FREEZE FRAME DATA. Use the freeze frame data and attempt to determine the cause. In the FREEZE FRAME, is the LOAD VALUE over 50% and the temp normal operating temp normal? Yes → Go To 12 No → Go To 11	All
11	With the DRB, read the FREEZE FRAME window. Use the freeze frame data and attempt to determine the cause. In the FREEZE FRAME, is the ENGINE RPM over 3000 and the operating temp normal? Yes → Lab scope cam and crank sensor, check valve timing, running vacuum test. Perform VERIFICATION TEST VER-5A2. No → Go To 14	All

P-0300 MULTIPLE CYLINDER MIS-FIRE — Continued

TEST	ACTION	APPLICABILITY
12	Engine Off. Connect a suitable engine analyzer to the engine. Allow the Engine to idle. **NOTE: If the Engine will not idle, maintain a constant RPM above idle.** **NOTE: Set the scope to read display or parade pattern.** Remove any spark plug wire. Observe the Secondary KV Line. Is the open secondary voltage at least 25 KV? Yes → Go To 13 No → Replace the Ignition Coil. Perform VERIFICATION TEST VER-5A2.	All
13	Engine Off. Connect a suitable engine analyzer to the engine. Allow the Engine to idle. **NOTE: If the Engine will not idle, maintain a constant RPM above idle.** **NOTE: Set the scope to read display or parade pattern.** Follow the equipment manufacturer's procedure for pattern analysis. Is the secondary ignition pattern OK? Yes → Go To 14 No → Repair the indicated component in the Secondary Ignition System. Perform VERIFICATION TEST VER-5A2.	All
14	The following are possible causes for mis-fire: Injector harness connectors, ignition coil circuit, spark plug, mechanical engine problem, PCM power grounds, irregular cam and crank signal, injectors, restricted exhaust, intake restriction, PCM, Evap System, EGR System, damaged trigger wheel, and accessory drive belts. Do any of the above causes exist? Yes → Repair as necessary. Perform VERIFICATION TEST VER-5A2. No → Go To 15	All
15	**The following additional items should be checked as possible mechanical problems:** 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 ENGINE PCV SYSTEM - must flow freely ENGINE DRIVE SPROCKETS - must be properly positioned 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? Yes → Repair as necessary. Perform VERIFICATION TEST VER-5A2. No → Test Complete.	All

Symptom List:
P-0305 CYLINDER #5 MIS-FIRE
P-0306 CYLINDER #6 MIS-FIRE

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P-0305 CYLINDER #5 MIS-FIRE.

When Monitored and Set Condition:

P-0305 CYLINDER #5 MIS-FIRE

When Monitored: With the engine running, after successfully performing Crank Sensor learn.

Set Condition: When more than a 2% misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip.

P-0306 CYLINDER #6 MIS-FIRE

When Monitored: With the engine running, after successfully performing Crank Sensor learn.

Set Condition: When more than a 2% misfire rate is measured during two trips, or with a 10% to 30% misfire rate during one trip.

POSSIBLE CAUSES
OTHER POSSIBLE CAUSES FOR MIS-FIRE
CAM, CRANK, VALVE TIMING, OR VACUUM PROBLEM
ELECTRONIC IGNITION COIL OUTPUT LOW
ENGINE MECHANICAL PROBLEM
SECONDARY IGNITION PATTERN IRREGULAR
FUEL CONTAMINATION
FUEL PRESSURE LEAK DOWN OUT OF SPECIFICATION
FUEL PUMP AMPERAGE OUT OF SPECIFICATION
FUEL PUMP CAPACITY OUT OF SPECIFICATION
FUEL PUMP PRESSURE OUT OF SPECIFICATION
MIS-FIRE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the MIS-FIRE GOOD TRIP counter displayed and equal to zero? Yes → Go To 2 No → Go To 3	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0305 CYLINDER #5 MIS-FIRE — Continued

TEST	ACTION	APPLICABILITY
2	At this time the conditions that set this fault are present. With the DRB, read the FREEZE FRAME DATA and SIMILAR CONDITIONS WINDOWS. Attempt to operate the vehicle in the similar conditions. When the vehicle is operating in the SIMILAR CONDITIONS window, go to the WHICH CYLINDER IS MISFIRING monitor. Is the DRB counting mis-fires at this time? Yes → Go To 4 No → Go To 3	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
3	At this time the mis-fire does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME DATA and SIMILAR CONDITIONS WINDOW. With these screens, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME DATA pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the mis-fire reoccur? Yes → Go To 4 No → Mis-fire no longer exists. Perform VERIFICATION TEST VER-5A2.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
4	With the DRB, read the FREEZE FRAME DATA. Use the freeze frame data and attempt to determine the cause of the misfire. In the FREEZE FRAME, are the adaptive fuel percentages greater than +/- 15 percent? Yes → Go To 5 No → Go To 10	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
5	With an appropriate container, obtain a fuel sample from the vehicle. Is the fuel free from contamination? Yes → Go To 6 No → Replace contaminated fuel and clean system. Perform VERIFICATION TEST VER-5A2.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
6	Perform Fuel Pressure Leak Down Test per service instructions. Did the Fuel Pressure Leak Down Test pass? Yes → Go To 7 No → Relieve fuel pressure and repair as necessary. Perform VERIFICATION TEST VER-5A2.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0305 CYLINDER #5 MIS-FIRE — Continued

TEST	ACTION	APPLICABILITY
7	Perform Fuel Pump Amperage Test per service instructions. Did the Fuel Pump Amperage Test pass? Yes → Go To 8 No → Relieve fuel pressure and repair as necessary. Perform VERIFICATION TEST VER-5A2.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
8	Perform Fuel Pump Capacity Test per service instructions. Did the Fuel Pump Capacity Test pass? Yes → Go To 9 No → Relieve fuel pressure and repair as necessary. Perform VERIFICATION TEST VER-5A2.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
9	Perform Fuel Pump Pressure Test per service instructions. Did the Fuel Pump Pressure Test pass? Yes → Go To 10 No → Relieve fuel pressure and repair as necessary. Perform VERIFICATION TEST VER-5A2.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
10	With the DRB, read the FREEZE FRAME DATA. Use the freeze frame data and attempt to determine the cause of the misfire. In the FREEZE FRAME, is the LOAD VALUE over 50% and the temp normal operating temp? Yes → Go To 11 No → Go To 13	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
11	Engine Off. Connect a suitable engine analyzer to the engine. Allow the Engine to idle. **NOTE: If the Engine will not idle, maintain a constant RPM above idle.** **NOTE: Set the scope to read display or parade pattern.** Remove any spark plug wire. Observe the Secondary KV Line. Is the open secondary voltage at least 25 KV? Yes → Go To 12 No → Replace the Electonic Ignition Coil. Perform VERIFICATION TEST VER-5A2.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0305 CYLINDER #5 MIS-FIRE — Continued

TEST	ACTION	APPLICABILITY
12	Engine Off. Connect a suitable engine analyzer to the engine. Allow the Engine to idle. **NOTE: If the Engine will not idle, maintain a constant RPM above idle.** **NOTE: Set the scope to read display or parade pattern.** Follow the equipment manufacturer's procedure for pattern analysis. Is the secondary ignition pattern OK? Yes → Go To 13 No → Repair the indicated component in the Secondary Ignition System. Perform VERIFICATION TEST VER-5A2.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
13	With the DRB, read the FREEZE FRAME DATA. Use the freeze frame data and attempt to determine the cause of the misfire. In the FREEZE FRAME, is the ENGINE RPM over 3000 and the operating temp normal? Yes → Lab scope cam and crank sensor, check valve timing, running vacuum test. Perform VERIFICATION TEST VER-5A2. No → Go To 14	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
14	**The following additional items should be checked as possible mechanical problems:** 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 ENGINE PCV SYSTEM - must flow freely ENGINE DRIVE SPROCKETS - must be properly positioned 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? Yes → Repair as necessary. Perform VERIFICATION TEST VER-5A2. No → Go To 15	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
15	The following are other possible causes for mis-fire: Injector harness connectors, ignition coil circuit, spark plug, mechanical engine problem, PCM power grounds, irregular cam and crank signal, injectors, restricted exhaust, intake restriction, PCM, Evap System, EGR System, damaged trigger wheel, and accessory drive belts. Do any of the above causes exist? Yes → Repair as necessary. Perform VERIFICATION TEST VER-5A2. No → Test Complete.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

Symptom:
P-0320 NO CRANK REFERENCE SIGNAL AT PCM

When Monitored and Set Condition:

P-0320 NO CRANK REFERENCE SIGNAL AT PCM

When Monitored: During cranking, with battery voltage between 4.0 volts and 11.6 volts and manifold vacuum present.

Set Condition: No signal from the crank position sensor is present during engine cranking or the cam position signal is present with no crank signal.

POSSIBLE CAUSES
CKP SENSOR DEFECTIVE
CRANK POSITION SENSOR GROUND CIRCUIT OPEN
CRANKSHAFT NOTCHES DAMAGED
FLYWHEEL DAMAGED
8-VOLT SUPPLY CIRCUIT OPEN
8-VOLT SUPPLY CIRCUIT SHORT TO GROUND
CKP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
CMP/CKP SENSOR WIRING HARNESS INTERMITTENT DEFECT
CMP/CKP SENSOR WIRING HARNESS OBSERVABLE DEFECT
CRANK POSITION SENSOR SIGNAL CIRCUIT OPEN
PCM DEFECTIVE
PCM DEFECTIVE (NO CRANK REF SIG)

TEST	ACTION	APPLICABILITY
1	Cycle the ignition off, then on. Attempt to start engine. With the DRB in Input/Output display, read the current CMP and CKP states. Did the CMP or CKP states change to present while cranking engine? Yes → Go To 2 No → Go To 6	All
2	Cycle the ignition off, then on. Attempt to start engine. With the DRB in Input/Output display, read the current CMP and CKP states. Did only the CMP state change while cranking engine? Yes → Go To 6 No → Go To 3	All

P-0320 NO CRANK REFERENCE SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
3	Cycle the ignition off, then on. Attempt to start engine. With the DRB in Input/Output display, read the current CMP and CKP states. Did only the CKP state change? Yes → Refer to symptom P-0340 NO CAM SIGNAL AT PCM in the DRIVEABILITY category. No → Go To 4	All
4	Start the engine. Wiggle the Wiring Harness from CMP and CKP Sensors to the Powertrain Control Module. Did the engine miss or die out when wiggling Wires? Yes → Repair Circuit as necessary where wiggling caused the engine to miss or die out. Perform Powertrain Verification Test VER-2A. No → Go To 5	All
5	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All
6	Ignition Off Disconnect the Crank Position (CKP) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. Using a voltmeter, measure voltage from the 8-Volt Supply Circuit. Is the voltage above 7.0 volts? Yes → Go To 7 No → Go To 15	All
7	Ignition Off Disconnect the Crank Position (CKP) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Sensor Ground Circuit for resistance from the CKP Sensor Connector to a good ground. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair the open Sensor Ground Circuit. Perform Powertrain Verification Test VER-2A.	All

P-0320 NO CRANK REFERENCE SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Disconnect the Crank Position (CKP) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Connect one end of a jumper wire to the Crank Position Signal Circuit. Turn ignition on. With the DRB, monitor the current CKP state. Tap the other end of jumper to Sensor ground several times. Does the CKP state change to present? Yes → Go To 9 No → Go To 10	All
9	Ignition Off Remove the Crankshaft Position (CKP) Sensor. Inspect the Flywheel for damage. (3.0L, 3.3L and 3.8L) Inspect the Crankshaft Notches for debris or damage. Is the Flywheel damaged? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Replace the Crankshaft Position Sensor. Perform Powertrain Verification Test VER-2A.	All
10	Ignition Off Disconnect the Crank Position (CKP) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of the CKP Signal Circuit to a good ground. Is the resistance below 5.0 ohms? Yes → Repair the Crank Position Sensor Signal Circuit for a short to ground. Note: Check TCM for short. Perform Powertrain Verification Test VER-2A. No → Go To 11	All
11	Ignition Off Disconnect the Crank Position (CKP) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CKP Sensor Signal Circuit from the CKP Sensor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 12 No → Repair the open Crank Position Sensor Signal Circuit. Perform Powertrain Verification Test VER-2A.	All

P-0320 NO CRANK REFERENCE SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
12	Start the engine. Wiggle the Wiring Harness from CMP and CKP Sensors to the Powertrain Control Module. Did the engine miss or die out when wiggling Wires? Yes → Repair Circuit as necessary where wiggling caused the engine to miss or die out. Perform Powertrain Verification Test VER-2A. No → Go To 13	All
13	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 14	All
14	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A.	All
15	Ignition Off Disconnect the Crank Position (CKP) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on with engine not running. Using a Voltmeter, measure the voltage from 8-Volt Supply Circuit in the CKP Sensor Connector. Is the voltage above 7.0 volts? Yes → Replace the Camshaft Position Sensor. Perform Powertrain Verification Test VER-2A. No → Go To 16	All
16	Ignition Off Disconnect the Crank Position (CKP) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the 8-Volt Supply Circuit from the CKP Sensor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 17 No → Repair the open 8-Volt Supply Circuit. Perform Powertrain Verification Test VER-2A.	All

P-0320 NO CRANK REFERENCE SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
17	Ignition Off Disconnect the Crank Position (CKP) Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance from the 8-Volt Supply Circuit to a good ground. Is the resistance below 5.0 ohms? Yes → Repair the 8-V Supply Circuit for a short to ground. Note: Check VSS on 3 Speed Transmission. Perform Powertrain Verification Test VER-2A. No → Go To 18	All
18	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-0340 NO CAM SIGNAL AT PCM

When Monitored and Set Condition:

P-0340 NO CAM SIGNAL AT PCM

When Monitored: During engine cranking, after 64 crank position signals.

Set Condition: If no signal from the cam position sensor is present with crank signal, the code will set.

POSSIBLE CAUSES
ENGINE DOES NOT START
8-VOLT SUPPLY CIRCUIT OPEN
CAMSHAFT SPROCKET OBSERVABLE DEFECT
CMP SENSOR GROUND CIRCUIT OPEN
CMP SENSOR WIRING HARNESS OBSERVABLE DEFECT
DISTRIBUTOR AND PULSE RING OBSERVABLE DEFECT
CAMSHAFT TARGET MAGNET OBSERVABLE DEFECT
CMP SENSOR DEFECTIVE
CMP SENSOR CONNECTOR OBSERVABLE DEFECT
PCM DEFECTIVE
CMP SENSOR SIGNAL CIRCUIT OPEN
CMP SENSOR SIGNAL CIRCUIT SHORTED TO 8-VOLT SUPPLY
CMP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
CMP SENSOR SIGNAL CIRCUIT SHORTED TO SENSOR GROUND

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running. Using the DRB, read Trouble Codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 2 No → Go To 12	ENGINE - 2.0L and 2.4L
2	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. Using a Voltmeter, measure the 8-Volt Supply Circuit. Is the voltage above 7.0 volts? Yes → Go To 3 No → Repair the open 8-Volt Supply Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L and 2.4L

P-0340 NO CAM SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Ground Circuit from the CMP Sensor Connector to a good ground. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the open CMP Sensor Ground Circuit to the Harness splice. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L and 2.4L
4	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 5	ENGINE - 2.0L and 2.4L
5	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Connect one end of a jumper wire to the CMP Sensor Signal Circuit. Ignition On, Engine Not Running. With the DRB, monitor the CMP state while tapping the other end of the jumper to Sensor Ground. Does the current CMP state change? Yes → Go To 6 No → Go To 7	ENGINE - 2.0L and 2.4L
6	Ignition Off Remove the Camshaft Position Sensor. **Note: Check connectors - Clean/repair as necessary.** Remove and inspect the CMP Sensor Target Magnet for damage or misalignment. Is the Camshaft Target Magnet okay? Yes → Replace the Camshaft Position Sensor. Perform Powertrain Verification Test VER-5A No → Repair or replace the Camshaft Target Magnet as necessary. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L and 2.4L
7	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Signal Circuit from the CMP Sensor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair the open CMP Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L and 2.4L

P-0340 NO CAM SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the CMP Sensor Signal Circuit and the 8-Volt Supply Circuit at the CMP Sensor Connector. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to the 8-volt Supply Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 9	ENGINE - 2.0L and 2.4L
9	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Signal Circuit from the CMP Sensor Connector to a good ground. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 10	ENGINE - 2.0L and 2.4L
10	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the CMP Sensor Signal Circuit and the Sensor Ground Circuit at the CMP Sensor Connector. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to the Sensor ground. Perform Powertrain Verification Test VER-5A. No → Go To 11	ENGINE - 2.0L and 2.4L
11	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L and 2.4L
12	Attempt to start the engine if not already running. Does the engine start? Yes → Go To 13 No → Return to symptom list and select symptoms for a no start condition.	ENGINE - 2.0L and 2.4L

P-0340 NO CAM SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
13	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE - 2.0L and 2.4L
14	Ignition On, Engine Not Running. Using the DRB, read Trouble Codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 15 No → Go To 25	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
15	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. Using a Voltmeter, measure the 8-Volt Supply Circuit. Is the voltage above 7.0 volts? Yes → Go To 16 No → Repair the open 8-Volt Supply Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
16	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Ground Circuit from the CMP Sensor Connector to a good ground. Is the resistance below 5.0 ohms? Yes → Go To 17 No → Repair the open CMP Sensor Ground Circuit to the Harness splice. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
17	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 18	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0340 NO CAM SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
18	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Connect one end of a jumper wire to the CMP Sensor Signal Circuit. Ignition On, Engine Not Running. With the DRB, monitor the CMP state while tapping the other end of the jumper to Sensor Ground. Does the current CMP state change? Yes → Go To 19 No → Go To 20	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
19	Ignition Off Remove the Camshaft Position Sensor. **Note: Check connectors - Clean/repair as necessary.** Inspect the Camshaft Sprocket per service manual instructions. Is the Camshaft Sprocket okay? Yes → Replace the Camshaft Position Sensor. Perform Powertrain Verification Test VER-5A. No → Repair as necessary. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
20	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Signal Circuit from the CMP Sensor Connector to the PCM. Is the resistance below 5.0 ohms? Yes → Go To 21 No → Repair the open CMP Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
21	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the CMP Sensor Signal Circuit and the 8-Volt Supply Circuit at the CMP Sensor Connector. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to the 8-volt Supply Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 22	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0340 NO CAM SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
22	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Signal Circuit from the CMP Sensor Connector to a good ground. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 23	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
23	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the CMP Sensor Signal Circuit and the Sensor Ground Circuit at the CMP Sensor Connector. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to the Sensor ground. Perform Powertrain Verification Test VER-5A. No → Go To 24	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
24	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
25	Attempt to start the engine if not already running. Does the engine start? Yes → Go To 26 No → Return to symptom list and select symptoms for a no start condition.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
26	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-0340 NO CAM SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
27	Ignition On, Engine Not Running. Using the DRB, read Trouble Codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 28 No → Go To 38	ENGINE - 3.0L V6
28	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. Using a Voltmeter, measure the 8-Volt Supply Circuit. Is the voltage above 7.0 volts? Yes → Go To 29 No → Repair the open 8-Volt Supply Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L V6
29	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Ground Circuit from the CMP Sensor Connector to a good ground. Is the resistance below 5.0 ohms? Yes → Go To 30 No → Repair the open CMP Sensor Ground Circuit to the Harness splice. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L V6
30	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 31	ENGINE - 3.0L V6
31	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Connect one end of a jumper wire to the CMP Sensor Signal Circuit. Ignition On, Engine Not Running. With the DRB, monitor the CMP state while tapping the other end of the jumper to Sensor Ground. Does the current CMP state change? Yes → Go To 32 No → Go To 33	ENGINE - 3.0L V6

P-0340 NO CAM SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
32	Ignition Off Remove the Distributor Cap and Rotor. Inspect the Pulse Ring for damage or misalignment. Is the Pulse Ring okay? Yes → Replace the Camshaft Position Sensor. No → Repair or replace the Distributor Pulse Ring as necessary. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L V6
33	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Signal Circuit from the CMP Sensor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 34 No → Repair the open CMP Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L V6
34	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the CMP Sensor Signal Circuit and the 8-Volt Supply Circuit at the CMP Sensor Connector. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to the 8-volt Supply Circuit. Perform Powertrain Verification Test VER-5A. No → Go To 35	ENGINE - 3.0L V6
35	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the CMP Sensor Signal Circuit from the CMP Sensor Connector to a good ground. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 36	ENGINE - 3.0L V6

P-0340 NO CAM SIGNAL AT PCM — Continued

TEST	ACTION	APPLICABILITY
36	Ignition Off Disconnect the Camshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the CMP Sensor Signal Circuit and the Sensor Ground Circuit at the CMP Sensor Connector. Is the resistance below 5.0 ohms? Yes → Repair the CMP Sensor Signal Circuit for a short to the Sensor ground. Perform Powertrain Verification Test VER-5A. No → Go To 37	ENGINE - 3.0L V6
37	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L V6
38	Attempt to start the engine if not already running. Does the engine start? Yes → Go To 39 No → Return to symptom list and select symptoms for a no start condition.	ENGINE - 3.0L V6
39	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE - 3.0L V6

Symptom:
P-0351 IGNITION COIL #1 PRIMARY CIRCUIT

When Monitored and Set Condition:

P-0351 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, and none of the coils in dwell when checked.

Set Condition: Peak current is not achieved with 2.5ms of dwell. It takes 3 seconds during cranking or up to 6 seconds while running to set.

POSSIBLE CAUSES
ASD OUTPUT CIRCUIT OPEN
IGNITION COIL #1 CONNECTOR TERMINAL OBSERVABLE DEF
IGNITION COIL #1 DRIVER CIRCUIT OPEN
IGNITION COIL #1 DRIVER CIRCUIT SHORTED TO GROUND
IGNITION COIL CIRCUIT WIRING HARNESS INTER DEFECT
IGNITION COIL CIRCUIT WIRING HARNESS OBS DEFECT
IGNITION COIL #1 RESISTANCE ABOVE 2.0 OHMS
PCM DEFECTIVE (IGN COIL #1)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 2 No → Go To 8	All
2	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on, engine not running. With the DRB, actuate Ignition Coil #1. With a Voltmeter, measure the ASD Output Circuit. Is the voltage above 10.0 volts? No → Repair the open ASD Output Circuit. Perform Powertrain Verification Test VER-5A. Yes → Go To 3	All

P-0351 IGNITION COIL #1 PRIMARY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Is any terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 4	All
4	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the Ignition Coil #1 Primary Circuit for resistance. Is the resistance below 2.0 ohms? Yes → Go To 5 No → Replace the Ignition Coil. Perform Powertrain Verification Test VER-5A.	All
5	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Ignition Coil #1 Driver Circuit for resistance to ground. Is the resistance below 5.0 ohms? Yes → Repair the Ignition Coil #1 Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, test the resistance of #1 Driver Circuit. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open Ignition Coil #1 Driver Circuit. Perform Powertrain Verification Test VER-5A.	All
7	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All
8	Ignition Off Start Engine. Wiggle Wiring Harness from the Ignition Coil to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-5A. No → Go To 9	All

P-0351 IGNITION COIL #1 PRIMARY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
9	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-0352 IGNITION COIL #2 PRIMARY CIRCUIT

When Monitored and Set Condition:

P-0352 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, and none of the coils in dwell when checked.

Set Condition: Peak current is not achieved with 2.5ms of dwell. It takes 3 seconds during cranking or up to 6 seconds while running to set.

POSSIBLE CAUSES
AUTO SHUTDOWN OUTPUT CIRCUIT OPEN
IGNITION COIL #2 CONNECTOR TERMINAL OBSERVABLE DEF
IGNITION COIL #2 DRIVER CIRCUIT OPEN
IGNITION COIL #2 DRIVER CIRCUIT SHORTED TO GROUND
IGNITION COIL CIRCUIT WIRING HARNESS INTER DEFECT
IGNITION COIL CIRCUIT WIRING HARNESS OBS DEFECT
IGNITION COIL #2 DEFECTIVE
PCM DEFECTIVE (IGN COIL #2)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 2 No → Go To 8	All
2	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on, engine not running. With the DRB, actuate Ignition Coil #2. With a Voltmeter, measure the ASD Output Circuit. Is the voltage above 10.0 volts? Yes → Go To 3 No → Repair the open ASD Output Circuit. Perform Powertrain Verification Test VER-2A.	All

P-0352 IGNITION COIL #2 PRIMARY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 4	All
4	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Ignition Coil #2 Primary Circuit for resistance. Is the resistance below 2.0 ohms? Yes → Go To 5 No → Replace the Ignition Coil. Perform Powertrain Verification Test VER-2A.	All
5	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the resistance of the Ignition Coil Driver #2 Circuit to ground at the PCM Connector. Is the resistance below 5.0 ohms? Yes → Repair the Ignition Coil #2 Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 6	All
6	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, test the Ignition Coil #2 Driver Circuit for resistance. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open Ignition Coil #2 Driver Circuit. Perform Powertrain Verification Test VER-2A.	All
7	Ignition off. If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All

P-0352 IGNITION COIL #2 PRIMARY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Start Engine. Wiggle Wiring Harness from the Ignition Coil to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-2A. No → Go To 9	All
9	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
P-0353 IGNITION COIL #3 PRIMARY CIRCUIT

When Monitored and Set Condition:

P-0353 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, and none of the coils in dwell when checked.

Set Condition: Peak current is not achieved with 2.5ms of dwell. It takes 3 seconds during cranking or up to 6 seconds while running to set.

POSSIBLE CAUSES
ASD OUTPUT CIRCUIT OPEN
IGNITION COIL CONNECTOR #3 TERMINAL OBSERVABLE DEF
IGNITION COIL #3 DRIVER CIRCUIT OPEN
IGNITION COIL #3 DRIVER CIRCUIT SHORTED TO GROUND
IGNITION COIL CIRCUIT WIRING HARNESS INTER DEFECT
IGNITION COIL CIRCUIT WIRING HARNESS OBS DEFECT
IGNITION COIL #3 RESISTANCE NOT ABOVE 2.0 OHMS
PCM DEFECTIVE (IGN COIL #3)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 2 No → Go To 8	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV
2	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Key on. With the DRB, actuate Ignition Coil #3. With a Voltmeter, probe the ASD Output Circuit. Is the voltage above 10.0 volts? Yes → Go To 3 No → Repair the open ASD Output Circuit. Perform Powertrain Verification Test VER-2A.	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV

P-0353 IGNITION COIL #3 PRIMARY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Is any terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 4	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV
4	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the Ignition Coil #3 Primary Circuit for resistance. Is the resistance below 2.0 ohms? Yes → Go To 5 No → Replace the Ignition Coil. Perform Powertrain Verification Test VER-2A.	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV
5	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Measure the resistance of Ignition Coil #3 Driver Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Ignition Coil #3 Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 6	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV
6	Ignition Off Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the Ignition Coil #3 Driver Circuit for resistance from the PCM Connector to the Coil Connector. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open Ignition Coil #3 Driver Circuit. Perform Powertrain Verification Test VER-2A.	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV
7	Ignition Off If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV

P-0353 IGNITION COIL #3 PRIMARY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Start Engine. Wiggle Wiring Harness from the Ignition Coil to the PCM. Does the engine miss or stall? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-2A. No → Go To 9	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV
9	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	Engine — 3.3L V6 and/or 3.8L V6 and/or Engine — 3.3L V6 FFV

Symptom:
P-0401 EGR SYSTEM FAILURE

When Monitored and Set Condition:

P-0401 EGR SYSTEM FAILURE

When Monitored: With engine temp > than 82 degrees C (180 degrees F), ambient temp > 4 degrees C (40 degrees F), engine in closed loop, O2 Sensor operational, engine under a steady load with throttle open, and O2 Controller not at or near its limits.

Set Condition: If all conditions met, turn EGR off & on. O2 Snsr Sig is monitored for change in output sig. If no major change or too much change, flag is set. Repeat test up to 3x in run cycle (2 trips). If fails every time, code sets. If any pass, diags are suspended.

POSSIBLE CAUSES
EXHAUST LEAK
INTAKE MANIFOLD RESTRICTED
EGR BACK PRESSURE TRANSDUCER DEFECTIVE
EGR VALVE ASSEMBLY DEFECTIVE
EGR VALVE ASSEMBLY MOUNTED INCORRECTLY
EGR SYSTEM FAILURE DOES NOT REOCCUR
EGR TRANSDUCER LINE BLOCKED
EGR VALVE ASSEMBLY DIAPHRAM DEFECTIVE
VACUUM SUPPLY TO EGR SOLENOID INADEQUATE

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the GLOBAL GOOD TRIP displayed and equal to zero? Yes → Go To 3 No → Go To 2	All
2	At this time the EGR System Failure does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME. With this screen, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME, pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the EGR System Failure reoccur? Yes → Go To 3 No → EGR System Failure no longer exists. Perform VERIFICATION TEST VER-5A3.	All

P-0401 EGR SYSTEM FAILURE — Continued

TEST	ACTION	APPLICABILITY
3	Turn off all accessories. Start engine, allow engine to reach normal operating temperature. Disconnect the Vacuum Supply Hose to the EGR Solenoid. Connect a vacuum gauge to the disconnected hose. Does the gauge read over 10″ of vacuum? Yes → Go To 4 No → Repair the Vacuum Supply to the EGR Solenoid. Perform VERIFICATION TEST VER-5A3.	All
4	Engine still running. Reconnect the Vacuum Hose to the EGR Solenoid. Disconnect the vacuum hose to the EGR Valve. Connect a vacuum gauge to the disconnected hose. Does the gauge pulsate? Yes → Go To 5 No → Go To 7	All
5	While observing gauge, momentarily raise engine speed above 2000 rpm. Did vacuum stabilize? Yes → Go To 6 No → Replace EGR Valve Assembly. Perform VERIFICATION TEST VER-5A3.	All
6	Remove the EGR Valve and inspect manifold and tube for restrictions. Were any restrictions found? Yes → Repair or replace as necessary. Perform VERIFICATION TEST VER-5A3. No → Replace EGR Valve Assembly. Perform VERIFICATION TEST VER-5A3.	All
7	Check for sizeable exhaust leak. Were any leaks found? Yes → Repair as necessary. Perform VERIFICATION TEST VER-5A3. No → Go To 8	All
8	Engine Running. Disconnect Back Pressure Hose from Transducer. Connect a pressure gauge to the Back Pressure Hose. Is pressure gauge pulsating? Yes → Replace EGR Assembly. Perform VERIFICATION TEST VER-5A3. No → Go To 9	All
9	Check EGR Back Mount. Check Valve tightness. Check EGR Valve Gasket. Were any problems found? Yes → Repair or replace as necessary. Perform VERIFICATION TEST VER-5A3. No → Replace EGR Valve Assembly. Perform VERIFICATION TEST VER-5A3.	All

Symptom:
P-0403 EGR SOLENOID CIRCUIT

When Monitored and Set Condition:

P-0403 EGR SOLENOID CIRCUIT

When Monitored: With the ignition key on and engine running and battery voltage > 10 volts.

Set Condition: The EGR solenoid control circuit is not in the expected state when requested to operate by the PCM.

POSSIBLE CAUSES
EGR SOLENOID DEFECTIVE
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
EGR SOLENOID CIRCUIT WIRING HARNESS INTER DEFECT
EGR SOLENOID CIRCUIT WIRING HARNESS OBSERVABLE DEF
EGR SOLENOID CONTROL CIRCUIT OPEN
EGR SOLENOID CONTROL CIRCUIT SHORT TO GROUND
PCM DEFECTIVE (EGR SOL CKT)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 2 No → Go To 7	All
2	Ignition Off Disconnect the EGR Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on with engine not running. Using the DRB, actuate the EGR Solenoid. Using a Voltmeter, probe the Fused Ignition Switch Output Circuit at the EGR Solenoid Connector. Is the voltage above 10.0 volts? Yes → Go To 3 No → Repair the open Fused Ignition Switch Output Circuit. Perform Powertrain Verification Test VER-2A.	All

P-0403 EGR SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the EGR Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the EGR Solenoid. Is the resistance between 25.0 and 50.0 ohms? Yes → Go To 4 No → Replace the EGR Solenoid. Perform Powertrain Verification Test VER-2A.	All
4	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the EGR Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the EGR Solenoid Control Circuit. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open EGR Solenoid Control Circuit. Perform Powertrain Verification Test VER-2A.	All
5	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the EGR Solenoid Connector. **Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the EGR Solenoid Control Circuit at the EGR Solenoid Connector to a good ground. Is the resistance below 5.0 ohms? Yes → Repair the EGR Solenoid Control Circuit short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 6	All
6	Ignition Off If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
7	Ignition On, Engine Not Running With the DRB, actuate the EGR Solenoid. Wiggle Wiring Harness from the Solenoid to PCM. Feel the EGR Assembly. Does the EGR Solenoid stop actuating? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-2A. No → Go To 8	All

P-0403 EGR SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
P-0420 1/1 CATALYTIC CONVERTER EFFICIENCY

When Monitored and Set Condition:

P-0420 1/1 CATALYTIC CONVERTER EFFICIENCY

When Monitored: After engine warm up to 63 degrees C (147 degrees F), 180 seconds of open throttle operation, at a speed greater than 30 Km/h (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
EXHAUST LEAK
ENGINE MECHANICAL PROBLEM
CATALYTIC CONVERTER DEFECTIVE
UPSTREAM O2 SENSOR OLDER THAN DOWNSTREAM O2 SENSOR
CATALYST EFFICIENCY FAILURE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the GLOBAL GOOD TRIPS counter displayed and equal to zero? Yes → Go To 3 No → Go To 2	All
2	At this time the Catalyst Efficiency Failure does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME DATA. With this screen, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME DATA pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the Catalyst Efficiency Failure Reoccur? Yes → Go To 3 No → The Catalytic Conveter Efficiency Failure no longer exists. Perform VERIFICATION TEST VER-5A3.	All
3	Start Engine and let idle. Check for exhaust leaks between the Engine and the appropriate Downstream O2 Sensor. Are there any exhaust leaks? Yes → Repair or replace leaking exhaust parts as necessary. Perform VERIFICATION TEST VER-5A3. No → Go To 4	All

P-0420 1/1 CATALYTIC CONVERTER EFFICIENCY — Continued

TEST	ACTION	APPLICABILITY
4	**NOTE: Check the exhaust for excessive smoke from internal oil or coolant leaks.** Is there an oil or coolant consumption condition present? Yes → Repair engine mechanical as necessary and replace Catalytic Converter. Perform VERIFICATION TEST VER-5A3. No → Go To 5	All
5	**NOTE: A new Downstream O2 Sensor along with an aging Upstream O2 Sensor may cause this trouble code to set.** Review vehicle repair history. Has the Downstream O2 Sensor been replaced without replacing the Upstream O2 Sensor? Yes → Replace the appropriate Upstream Oxygen Sensor. Perform VERIFICATION TEST VER-5A3. No → Replace the Catalytic Converter. Perform VERIFICATION TEST VER-5A3.	All

Symptom:
P-0441 EVAP PURGE FLOW MONITOR FAILURE

When Monitored and Set Condition:

P-0441 EVAP PURGE FLOW MONITOR FAILURE

When Monitored: With engine temperature greater than 170°F, engine 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: Note: with LDP: must pass stricter evap system test first. No air flow through the evaporative system is detected by the evap monitor.

POSSIBLE CAUSES
PURGE CANISTER LINE DAMAGED
PURGE SOLENOID AND CANISTER DEFECTIVE
PURGE SOLENOID DEFECTIVE
VACUUM HOSES DAMAGED OR PLUGGED
EVAP PURGE MONITOR FAILURE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	With the DRB, read the DTCs. Is the GLOBAL GOOD TRIP counter displayed and equal to zero? Yes → Go To 3 No → Go To 2	All
2	At this time the Evap Purge Flow Monitor Failure does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME DATA. With these screens, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the Evap Purge Flow Monitor Failure reoccur? Yes → Go To 3 No → The Evap Purge Flow Monitor failure no longer exists. Perform VERIFICATION TEST VER-5A3.	All
3	**NOTE: Carefully inspect all vacuum hoses for proper routing and for pinched or plugged hoses from the engine to the solenoid to the gas tank.** Are all vacuum hoses OK? Yes → Go To 4 No → Repair the vacuum hoses as necessary. Perform VERIFICATION TEST VER-5A3.	All

P-0441 EVAP PURGE FLOW MONITOR FAILURE — Continued

TEST	ACTION	APPLICABILITY
4	Remove Purge Solenoid and tap the ports against a clean solid surface. Did any foreign material fall out? Yes → Go To 5 No → Replace the Purge Solenoid. Perform VERIFICATION TEST VER-5A3.	All
5	Inspect the line from the Purge Solenoid to the Canister. Is the line disconnected, ripped, or cut? Yes → Repair the line and replace Purge Solenoid. Perform VERIFICATION TEST VER-5A3. No → Clean out line and replace Purge Solenoid and Canister. Perform VERIFICATION TEST VER-5A3.	All

Symptom List:
P-0442 EVAP LEAK MONITOR SMALL LEAK DETECTED
P-0455 EVAP LEAK MONITOR LARGE LEAK DETECTED

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P-0442 EVAP LEAK MONITOR SMALL LEAK DETECTED.

When Monitored and Set Condition:

P-0442 EVAP LEAK MONITOR SMALL LEAK DETECTED

When Monitored: See DRB III.

Set Condition: See DRB III.

P-0455 EVAP LEAK MONITOR LARGE LEAK DETECTED

When Monitored: See DRB III.

Set Condition: See DRB III.

POSSIBLE CAUSES
EVAP SYSTEM HOSES OR WIRING DAMAGED
EVAP SYSTEM COMPONENT LEAKING
LEAK DETECTION PUMP LEAKING
EVAP LEAK MONITOR SMALL OR LARGE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	**NOTE: Replacing the Powertrain Control Module will not correct this problem.** With the DRB, read the DTCs. Is the GLOBAL GOOD TRIP counter displayed and equal to zero? Yes → Go To 3 No → Go To 2	All
2	At this time, the conditions required to set this DTC are not present. With the DRB, perform the LDP Monitor Test. Follow the instructions on the DRB and allow the PCM to run the monitor. After the monitor has finished running, does the DRB show “TEST FAILED THIS TRIP : YES” on the monitor screen? Yes → Go To 3 No → The Evap Leak Monitor DTC is not present at this time. Perform VERIFICATION TEST VER-6A.	All

P-0442 EVAP LEAK MONITOR SMALL LEAK DETECTED — Continued

TEST	ACTION	APPLICABILITY
3	**Note: Leaving the Gas Cap loose could cause this trouble code to set.** To continue testing you will need Miller Tool Kit #6872A and #8382. **NOTE: The Fuel Tank must have 1/2 tank of fuel to perform this test.** Perform Evaporative System Pressure Pump Self Test that is specified on the tester cover. **Warning: Verify the vehicle fuel tank contains at least 3 gallons of fuel.** Attach the DRB III to the vehicle. Turn the Key On. At: ENGINE SYSTEM TESTS select: LEAK DETECTION PUMP TEST. Read instructions and then press ENTER. At: LEAK DETECTION PUMP TEST select #3 HOLD PSI. At the vacuum hose going to the LDP, attach and apply a continuous vacuum (i.e. 20″ Hg). Remove Gas Cap. Install 8382 on the Gas Cap and on the vehicle. Attach the supply hose from 6872A to 8382. Attach the power source from the 6872A, clip to Battery(+) and ground clip to Battery(-). On the 6872A set the Pressure/Hold Valve to Open and set the Vent Valve to Closed. Turn the timer on and watch the gauge. When the gauge pressure reaches 14 in. H2O, turn the Pressure/Hold Valve to Closed. Turn the timer off. Note the time and pressure. Did pressure drop more than 6 in. H2O (to 8 inches H2O on the gauge) in two minutes? Yes → Go To 4 No → Go To 5	All

P-0442 EVAP LEAK MONITOR SMALL LEAK DETECTED — Continued

TEST	ACTION	APPLICABILITY
4	To continue testing you will need Miller Tool Kit #6872A, #8382 and #6904 Ultrasonic Leak Detector. **NOTE: The Fuel Tank must have 1/2 tank of fuel to perform this test.** Perform Evaporative System Pressure Pump Self Test that is specified on the tester cover. **Warning: Verify the vehicle fuel tank contains at least 3 gallons of fuel.** Attach the DRB III to the vehicle. Turn the Key On. At: ENGINE SYSTEM TESTS select: LEAK DETECTION PUMP TEST. Read instructions and then press ENTER. At: LEAK DETECTION PUMP TEST select #3 HOLD PSI. At the vacuum hose going to the LDP, attach and apply a continuous vacuum (i.e. 20″ Hg). Remove Gas Cap. Install 8382 on the Gas Cap and on the vehicle. Attach the supply hose from 6872A to 8382. Attach the power source from the 6872A, clip to Battery(+) and ground clip to Battery(-). Set Pressure Hold to Open and set Vent to Open. Turn Pump Timer On. To prevent noise from interfering with test, move tool #6872 away from vehicle. Using the Ultrasonic Leak Detector, start listening for leaks at Gas Cap then proceed to Rollover Valve, Canister, Leak Detection Pump, and Evap Purge Solenoid. Were any leaks heard with the Ultrasonic Leak Detector? Yes → Repair or replace leaking component. Perform VERIFICATION TEST VER-6A. No → Replace Leak Detection Pump. Perform VERIFICATION TEST VER-6A.	All
5	At this time, the condition required to set the code is not present. Using the schematic as a guide, inspect the wiring, connectors and hoses. Were any problems found? Yes → Repair as necessary. Perform VERIFICATION TEST VER-6A. No → Test Complete.	All

Symptom:
P-0443 EVAP PURGE SOLENOID CIRCUIT

When Monitored and Set Condition:

P-0443 EVAP PURGE SOLENOID CIRCUIT

When Monitored: With the ignition key on and the engine running.

Set Condition: After arming conditions are satisfied: not powering down, not already in limp-in, time since last solenoid activation > 72 micro seconds. The PCM will set a trouble code if the actual sate of the solenoid does not match the intended state.

POSSIBLE CAUSES
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
PROPORTIONAL EVAP PURGE SOLENOID DEFECTIVE
EVAP PURGE SOL CKT WIRING HARNESS INTERMITTENT DEF
EVAP PURGE SOLENOID CKT WIRING HARNESS OBS DEFECT
EVAP PURGE SOLENOID CONTROL CIRCUIT OPEN
EVAP PURGE SOLENOID CONTROL CIRCUIT SHORT TO GND
PROPORTIONAL PURGE SOL CONTROL CKT SHORT TO GROUND
PROPORTIONAL PURGE SOLENOID CONTROL CIRCUIT OPEN
PWM PURGE SENSE CIRCUIT OPEN
PWM PURGE SENSE CIRCUIT SHORT TO GROUND
POWERTRAIN CONTROL MODULE DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Is the vehicle equipped with a Proportional Purge solenoid? Yes → Go To 10 No → Go To 2	ALL
2	Ignition On, Engine Not Running. With the DRB, actuate the Evap Purge Solenoid. With the DRB, read codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 3 No → Go To 8	ALL

P-0443 EVAP PURGE SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off. Disconnect the Evap Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Key On. Using a Voltmeter, measure the voltage of the Ignition Switch Output Circuit at Solenoid Connector. Is the voltage above 10.0 volts? Yes → Go To 4 No → Repair the open Fused Ignition Switch Output Circuit. Perform Powertrain Verification Test VER-5A.	ALL
4	Ignition Off. Disconnect the Evap Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Key On. Connect a test light from the Evap Purge Solenoid Control EKT to the Ignition Switch out CKT. Using a DRB, actuate the Evap Purge Solenoid. Does the test light flash on and off? Yes → Replace the Evap Purge Solenoid. Perform Powertrain Verification Test VER-5A. No → Go To 5	ALL
5	Ignition Off. Disconnect Evap Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Evap Purge Solenoid Control Circuit. Is the resistance below 5.0 ohms? Yes → Go To 6 No → Repair the open Evap Purge Solenoid Control Circuit. Perform Powertrain Verification Test VER-5A.	ALL
6	Ignition Off. Disconnect Evap Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Evap Purge Solenoid Control Circuit at Connector to Ground. Is the resistance below 5.0 ohms? Yes → Repair the Evap Purge Solenoid Control Circuit short to Ground. Perform Powertrain Verification Test VER-5A. No → Go To 7	ALL
7	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	ALL

P-0443 EVAP PURGE SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Ignition On, Engine Not Running. With the DRB, read codes. With the DRB, actuate the Evap Purge Solenoid. Wiggle Wiring Harness from the Solenoid to PCM. Does the Evap Purge Solenoid Control Circuit code return? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-5A. No → Go To 9	ALL
9	Ignition Off. Using the Schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 10	ALL
10	Check the freeze frame data to determine the conditions when code was set. Attempt duplication of ’freeze frame’ conditions for added diagnostics. If there are no other possible causes remaining there is assumed to be an ″intermittent″ problem with a Wiring Harness Connector or Wire. View repair options. Repair Visually inspect related Wire Harness Connectors and Harnesses. Look for broken, bent, pushed out, or corroded terminals and for chafed, pierced, or partiallly broken wire, respectively. Refer to any hotlines or technical service bulletins that apply.	ALL
11	Ignition On, Engine Not Running. With the DRB, actuate the Evap Purge Solenoid. With the DRB, read codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 12 No → Go To 18	ALL
12	Ignition Off. Disconnect Proportional Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the Proportional Purge Solenoid. Is the resistance 14.2 ohms +/- 1.4? Yes → Go To 13 No → Replace the open Proportional Purge Solenoid. Perform Powertrain Verification Test VER-5A.	ALL

P-0443 EVAP PURGE SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
13	Ignition Off. Disconnect Proportional Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the battery. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Evap Purge Solenoid Control Circuit at Connector to ground. Is the resistance below 5.0 ohms? Yes → Repair the Proportional Purge Solenoid Control Circuit short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 14	ALL
14	Ignition Off. Disconnect Proportional Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the battery. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using and Ohmmeter, measure the Proportional Purge Solenoid Control Circuit PCM to Solenoid Connector. Is the resistance below 5.0 ohms? Yes → Go To 15 No → Repair the open PPS Control Circuit. Perform Powertrain Verification Test VER-5A.	ALL
15	Ignition Off. Disconnect Proportional Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the battery. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the PWM Purge Sense Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the PWM Purge Sense Circuit short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 16	ALL

P-0443 EVAP PURGE SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
16	Ignition Off. Disconnect Proportional Purge Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the battery. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using and Ohmmeter, measure the PWM Purge Sense Circuit PCM to Solenoid Connector. Is the resistance below 5.0 ohms? Yes → Go To 17 No → Repair the open PWM Purge Sense Circuit. Perform Powertrain Verification Test VER-5A.	ALL
17	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	ALL
18	Ignition On, Engine Not Running. With the DRB, actuate the Evap Purge Solenoid. With the DRB, read codes. Wiggle Wiring Harness from the Solenoid to PCM. Does the Evap Purge Solenoid Control Circuit code return? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-5A. No → Go To 19	ALL
19	Ignition Off. Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 20	ALL
20	Check the freeze frame data to determine the conditions when code was set. Attempt duplication of 'freeze frame' conditions for added diagnostics. If there are no other possible causes remaining there is assumed to be an "intermittent" problem with a Wiring Harness Connector or Wire. View repair options. Repair Visually inspect related Wire Harness Connectors and Harnesses. Look for broken, bent, pushed out, or corroded terminals and for chafed, pierced, or partiallly broken wire, respectively. Refer to any hotlines or technical service bulletins that apply.	ALL

Symptom:
P-0460 FUEL LEVEL UNIT NO CHANGE OVER MILES

POSSIBLE CAUSES
FUEL LEVEL SENSOR WIRING/HARNESS OBSERVABLE DEFECT
FUEL TANK OBSTRUCTED
TEST COMPLETE

TEST	ACTION	APPLICABILITY
1	Ignition On With the DRB, read the Fuel Level Sensor voltage and make a note of the voltage. Add two gallons of fuel to the Fuel Tank. With the DRB, read the Fuel Level Sensor voltage. Did the Fuel Level Sensor voltage decrease by at least 0.2 volts? Yes → Go To 2 No → Check for an obstruction in the Fuel Tank. If ok replace Fuel Level Sensor. Perform Powertrain Verification Test VER-2A.	All
2	Ignition Off Using the schematic as a guide, inspect the wiring and connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-0462 FUEL LEVEL SENDING UNIT VOLTS TOO LOW

POSSIBLE CAUSES
FUEL LEVEL SENSOR DEFECTIVE
FUEL LEVEL SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
FUEL LEVEL SENSOR WIRING/HARNESS INTERMITENT DEFECT
BODY CONTROL MODULE DEFECTIVE
FUEL LEVEL SENSOR WIRING/HARNESS OBSERVABLE DEFECT
TEST COMPLETE

TEST	ACTION	APPLICABILITY
1	Ignition On With the DRB, read the DTC's. is the Global Good Trip counter displayed and equal to zero? Yes → Go To 2 No → Go To 5	All
2	Ignition Off Disconnect the Fuel Pump Module Harness Connector. **Note: Check connectors - Clean/repair as necessary.** With the DRB, read the Fuel Level Sensor voltage. Is the Fuel Level Sensor voltage above 4.5 volts? Yes → Replace the Fuel Level Sensor. Perform Powertrain Verification Test VER-2A. No → Go To 3	All
3	Key Off Disconnect the Body Control Module ″B″ (GREY) Connector. Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the Fuel Level Sensor Signal Circuit for resistance to ground. Is the resistance below 5.0 ohms? Yes → Repair the Fuel Level Sensor Signal Circuit shorted to ground. Perform Powertrain Verification Test VER-2A. No → Go To 4	All
4	If there are no potential causes remaining, the BCM is assumed to be defective. View repair options. Repair Replace the Body Control Module. Perform Powertrain Verification Test VER-2A.	All

P-0462 FUEL LEVEL SENDING UNIT VOLTS TOO LOW — Continued

TEST	ACTION	APPLICABILITY
5	Ignition On Use the schematic as a guide and wiggle the Connector & Harness. Using the DRB, monitor the Fuel Level Sensor voltage. Was there any Fuel Level Sensor Voltage change? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-2A. No → Go To 6	All
6	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-0463 FUEL LEVEL SENDING UNIT VOLTS TOO HIGH

POSSIBLE CAUSES
FUEL LEVEL SENSOR DEFECTIVE
FUEL LEVEL SENSOR SIGNAL CIRCUIT OPEN
FUEL PUMP MODULE WIRING/HARNESS INTERMITENT DEFECT
BODY CONTROL MODULE DEFECTIVE
FUEL PUMP MODULE OBSERVABLE DEFECT
FUEL PUMP MODULE GROUND CIRCUIT DEFECTIVE
TEST COMPLETE

TEST	ACTION	APPLICABILITY
1	Ignition On With the DRB, read the DTC's. Is the Global Good Trip counter dispalyed and equal to zero? Yes → Go To 2 No → Go To 6	All
2	Key Off Disconnect the Fuel Pump Module Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper between the Fuel Level Sensor Signal Circuit and the Ground Circuit at the Fuel Pump Module Connector. With the DRB, read the Fuel Level Sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the Fuel Level Sensor. Perform Powertrain Verification Test VER-2A. No → Go To 3	All
3	Key Off Disconnect the Fuel Pump Module Connector. **Note: Check connectors - Clean/repair as necessary.** Measure resistance of the Ground Circuit at the Fuel Pump Module Connector. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the Ground Circuit as necessary. Perform Powertrain Verification Test VER-2A.	All

P-0463 FUEL LEVEL SENDING UNIT VOLTS TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
4	Key Off Disconnect the Fuel Pump Module Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Body Control Module "B" (GREY) Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Fuel Level Sensor Signal Circuit from the BCM to the Fuel Pump Module Connector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Fuel Level Sensor Signal Circuit. Perform Powertrain Verification Test VER-2A.	All
5	If there are no potential causes remaining, the BCM is assumed to be defective. View repair options. Repair Replace the Body Control Module. Perform Powertrain Verification Test VER-2A.	All
6	Ignition On Using the schematic as a guide, wiggle the Fuel Pump Module Connector and Harness. Using the DRB, monitor the Fuel Level Sensor voltage. Was there any Fuel Level Sensor voltage change? Yes → Repair the Harness or Connector that caused the voltage change. Perform Powertrain Verification Test VER-2A. No → Go To 7	All
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete. Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-0500 NO VEHICLE SPEED SENSOR SIGNAL

When Monitored and Set Condition:

P-0500 NO VEHICLE SPEED SENSOR SIGNAL

When Monitored: For 3 Speed: With engine running, transmission not in park or neutral, brakes not applied, engine rpm greater than 1500. For 4 Speed: With the engine running, transmission not in park or neutral, brakes not applied, engine rpm greater than 1500.

Set Condition: For 3 Speed: No signal from the vehicle speed sensor for more than 11 seconds for 2 consecutive trips. For 4 Speed: No signal from the vehicle speed sensor (TCM) is present for more than 11 seconds for 2 consecutive trips.

POSSIBLE CAUSES
ELECTRONIC AUTO TRANSAXLE TROUBLE CODES PRESENT
8-VOLT SUPPLY CIRCUIT OPEN
PCM DEF (NO VSS SIGNAL CKT)
PCM TERMINAL DEFECTIVE
VEHICLE SPEED SENSOR GROUND CIRCUIT OPEN
VEHICLE SPEED SENSOR SIGNAL CIRCUIT WIRING HARNESS OBSERVABLE DEFECT
PINION GEAR DEFECTIVE
OUTPUT SPEED SENSOR CIRCUIT OPEN
OUTPUT SPEED SENSOR CIRCUIT SHORTED TO GROUND
VEHICLE SPEED SENSOR SIGNAL CIRCUIT OPEN
VSS SIGNAL CIRCUIT SHORTED TO GROUND
OUTPUT SPEED SENSOR DEFECTIVE
OUTPUT SPEED SENSOR DEFECTIVE (RES > 5.0)
PCM DEFECTIVE (NO VSS SIGNAL CKT)
PCM DEFECTIVE (NO VSS SIGNAL CKT)
TCM DEFECTIVE (VSS SIG CKT)
VSS DEFECTIVE

P-0500 NO VEHICLE SPEED SENSOR SIGNAL — Continued

TEST	ACTION	APPLICABILITY
1	Ignition Off Raise the Drive Wheels off the ground. **Warning: Be sure to keep hands and feet clear of rotating wheels.** Start Engine. With DRB, read the Vehicle Speed Sensor. Put Transmission on any forward gear. Does the DRB show above zero MPH? Yes → Go To 2 No → Go To 3	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
2	Ignition off. Using the Schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE -2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
3	Ignition Off Disconnect the VSS Connector. **Note: Check connectors - Clean/repair as necessary.** Key On Using a Voltmeter, probe the 8-Volt Power Supply Circuit. Is the voltage above 7.0 volts? Yes → Go To 4 No → Repair the open 8-volt Supply Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
4	Ignition Off Disconnect the VSS Connector. **Note: Check connectors - Clean/repair as necessary.** Key On. Using a Voltmeter, Probe the Vehicle Speed Sensor Signal. Is the voltage above 4.0 volts? Yes → Go To 5 No → Go To 11	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
5	Ignition Off Disconnect the VSS Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire from the Sensor Signal to the Sensor Ground Circuit. Key On With the DRB, read the VSS Signal. While observing display, tap other end of jumper to VSS Signal Circuit. Does the display show more than 0 MPH? Yes → Go To 6 No → Go To 8	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX

P-0500 NO VEHICLE SPEED SENSOR SIGNAL — Continued

TEST	ACTION	APPLICABILITY
6	Ignition Off Remove the Vehicle Speed Sensor. Inspect the Speedometer Pinion Gear. Is the Pinion Gear okay? Yes → Go To 7 No → Repair as necessary. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
7	If there are no potential causes remaining, the Vehicle Speed Sensor is assumed to be defective. View repair options. Repair Replace the VSS. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
8	Ignition Off Disconnect the VSS Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the Sensor Ground Circuit and Engine Ground. Is the resistance below 5.0 ohms? Yes → Go To 9 No → Repair the open Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
9	Ignition Off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 10	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
10	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
11	Ignition Off Disconnect the VSS Connector. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the VSS Signal Circuit from the PCM to the VSS Connector. Is the resistance below 5.0 ohms? Yes → Go To 12 No → Repair the open Speed Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX

P-0500 NO VEHICLE SPEED SENSOR SIGNAL — Continued

TEST	ACTION	APPLICABILITY
12	Ignition Off Disconnect the VSS Connector. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** With the DRB in Ohmmeter mode, measure between the VSS Signal Circuit in the Powertrain Control Module Connector. Is the resistance below 5.0 ohms? Yes → Repair the Speed Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 13	ENGINE -2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
13	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.0L V6 w/o EATX
14	Ignition Off Raise the Drive Wheels off the ground. **Warning: Be sure to keep hands and feet clear of rotating wheels.** Start Engine. With DRB, read the Vehicle Speed Sensor. Put Transmission on any forward gear. Does the DRB show above zero MPH? Yes → Go To 15 No → Go To 16	ENGINE -2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
15	Ignition off. Using the Schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
16	Ignition On, Engine Not Running With the DRB, read the EATX Trouble Codes. Are any codes P0731- P0734, P0736, P0715, P0720, P1794 present or Pinion Factor not programmed? Yes → Refer to the symptom list for problems related to Transmission. No → Go To 17	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
17	Ignition Off Disconnect the Transmission Control Module. **Note: Check connectors - Clean/repair as necessary.** Connect a Jumper Wire to the VSS Signal Circuit. Key on. With the DRB, read the VSS Signal. While observing display, tap the other end of Jumper to ground. Does the display show above zero MPH? Yes → Go To 18 No → Go To 25	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX

P-0500 NO VEHICLE SPEED SENSOR SIGNAL — Continued

TEST	ACTION	APPLICABILITY
18	Ignition Off Disconnect the Transmission Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the Output Speed Sensor Circuit at the TCM Connector and Ground. Is the resistance below 5.0 ohms? Yes → Go To 19 No → Go To 21	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
19	Ignition off. Disconnect the Transmission Control Module. Disconnect the Output Speed Sensor. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the Output Speed Sensor Circuit at the TCM Connector and Ground. Is the resistance below 5.0 ohms? Yes → Repair the Output Speed Sensor Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 20	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
20	If there are no potential causes remaining, the Output Speed Sensor is assumed to be defective. View repair options. Repair Replace the Output Speed Sensor. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
21	Ignition Off Disconnect theTransmission Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the Speed Sensor Ground Circuit and the Output Speed Sensor Circuit at the TCM Connector.. Is the resistance between 300.0 and 1200.0 ohms? Yes → Replace the Transmission Control Module, reprogram Pinion Factor, and perform quick learn procedure. Perform Powertrain Verification Test VER-5A. No → Go To 22	ENGINE -2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
22	Ignition Off Disconnect the Transmission Control Circuit. Disconnect the Output Speed Sensor. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Speed Sensor Ground Circuit from the TCM to the Output Speed Sensor. Is the resistance under 5.0 ohms? Yes → Go To 23 No → Repair the open Speed Sensor Ground Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX

P-0500 NO VEHICLE SPEED SENSOR SIGNAL — Continued

TEST	ACTION	APPLICABILITY
23	Ignition off. Disconnect the Transmission Control Module. Disconnect the Output Speed Sensor. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Output Speed Sensor (OSS) from the TCM to the OSS. Is the resistance under 5.0 ohms? Yes → Go To 24 No → Repair the open Output Speed Sensor Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
24	If there are no potential causes remaining, the Output Speed Sensor is assumed to be defective. View repair options. Repair Replace the Output Speed Sensor. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
25	Ignition Off Disconnect the Transmission Control Module. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the VSS Signal Circuit and ground. Is the resistance below 5.0 ohms? Yes → Repair the Vehicle Speed Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 26	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
26	Ignition off. Disconnect the Transmission Control Module. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the VSS Signal Circuit from the PCM to the TCM. Is the resistance below 5.0 ohms? Yes → Go To 27 No → Repair the open Vehicle Speed Sensor Signal Circuit. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX
27	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L, 2.4L, 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 w/EATX

Symptom:
P-0505 IDLE AIR CONTROL MOTOR CIRCUITS

When Monitored and Set Condition:

P-0505 IDLE AIR CONTROL MOTOR CIRCUITS

When Monitored: At key on 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 IAC driver circuits for 2.75 seconds while the IAC motor is active.

POSSIBLE CAUSES
IAC #4 DRIVER CIRCUIT SHORTED TO GROUND
IDLE AIR CONTROL MOTOR DEFECTIVE
POWERTRAIN CTRL MODULE CONNECTOR OBSERVABLE DEFECT
IAC #1 DRIVER CIRCUIT SHORTED TO #2, #3, OR #4
IAC #1 DRIVER CIRCUIT SHORTED TO GROUND
IAC #2 DRIVER CIRCUIT SHORTED TO #3 OR #4
IAC #2 DRIVER CIRCUIT SHORTED TO GROUND
IAC #3 DRIVER CIRCUIT SHORTED TO #4
IAC #3 DRIVER CIRCUIT SHORTED TO GROUND
IAC MOTOR WIRING HARNESS INTERMITTENT DEFECT
IAC MOTOR WIRING HARNESS OBSERVABLE DEFECT

TEST	ACTION	APPLICABILITY
1	Turn ignition off for 10 seconds, then start engine and let idle. Allow engine to reach normal operating temperature. With the DRB in actuators, set RPM to 1400. Is the engine speed 1400 +/- 100 RPM? Yes → Go To 2 No → Go To 6	All
2	Turn ignition off for 10 seconds, then start engine and let idle. Allow engine to reach normal operating temperature. With the DRB in actuators, set RPM to 900. Is the engine speed 900 +/- 100 RPM? Yes → Go To 3 No → Go To 6	All

P-0505 IDLE AIR CONTROL MOTOR CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
3	Turn ignition off for 10 seconds, then start engine and let idle. Allow engine to reach normal operating temperature. With the DRB in Systems Test, perform the IAC Wiggle Test. **Note: The idle speed should raise and lower with the display.** Does the IAC Motor operate properly? Yes → Go To 4 No → Go To 6	All
4	Turn ignition off for 10 seconds, then start engine and let idle. Allow engine to reach normal operating temperature. With the DRB in Systems Test, perform the IAC Wiggle Test. **Note: The idle speed should raise and lower with the display.** Wiggle the Wiring Harness from the IAC Motor to the PCM. Observe for the IAC Motor to stop operating. Did the IAC Motor stop operating at any time? Yes → Repair the Harness or Connectors as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All
6	Start engine and let idle. Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Using a Voltmeter, measure the IAC Driver #1 Circuit. Was the voltage over 5.0 volts at any time? Yes → Go To 7 No → Refer to symptom P-0505B IDLE AIR CONTROL MOTOR CIRCUIT in the DRIVEABILITY category.	All
7	Ignition Off Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between IAC #4 Driver and ground. Is the resistance below 5.0 ohms? Yes → Repair the IAC #4 Driver Circuit shorted to ground. Perform Powertrain Verification Test VER-5A. No → Go To 8	All

P-0505 IDLE AIR CONTROL MOTOR CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
8	Start engine and let idle. Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Using a Voltmeter, measure the IAC Driver #2 Circuit. Was the voltage over 5.0 volts at any time? Yes → Go To 9 No → Refer to symptom P-0505C IDLE AIR CONTROL MOTOR CIRCUIT in the DRIVEABILITY category.	All
9	Ignition Off Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between IAC #1 Driver and ground.. Is the resistance below 5.0 ohms? Yes → Repair the IAC #1 Driver Circuit shorted to ground. Perform Powertrain Verification Test VER-5A. No → Go To 10	All
10	Ignition Off Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between IAC #2 Driver and ground.. Is the resistance below 5.0 ohms? Yes → Repair the IAC #2 Driver Circuit shorted to ground. Perform Powertrain Verification Test VER-5A. No → Go To 11	All
11	Start engine and let idle. Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Using a Voltmeter, measure the IAC Driver #3 Circuit. Was the voltage over 5.0 volts at any time? Yes → Go To 12 No → Refer to symptom P-0505D IDLE AIR CONTROL MOTOR CIRCUIT in the DRIVEABILITY category.	All
12	Ignition Off Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between IAC #3 Driver and ground.. Is the resistance below 5.0 ohms? Yes → Repair the IAC #3 Driver Circuit shorted to ground. Perform Powertrain Verification Test VER-5A. No → Go To 13	All

P-0505 IDLE AIR CONTROL MOTOR CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
13	Start engine and let idle. Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Using a Voltmeter, measure the IAC Driver #4 Circuit. Was the voltage over 5.0 volts at any time? Yes → Go To 14 No → Refer to symptom P-0505E IDLE AIR CONTROL MOTOR CIRCUIT in the DRIVEABILITY category.	All
14	Ignition Off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 15	All
15	Ignition Off Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the IAC #1 Driver and #2, #3, #4 Drivers. Is the resistance below 5.0 ohms on any of the Drivers? Yes → Repair the IAC Driver Circuits shorted together. Perform Powertrain Verification Test VER-5A. No → Go To 16	All
16	Ignition Off Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the IAC #2 Driver and #3, #4 Drivers. Is the resistance below 5.0 ohms on any of the Drivers? Yes → Repair the IAC Driver Circuits shorted together. Perform Powertrain Verification Test VER-5A. No → Go To 17	All
17	Ignition Off Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the IAC #3 Driver and #4 Driver. Is the resistance below 5.0 ohms? Yes → Repair the IAC Driver Circuits shorted together. Perform Powertrain Verification Test VER-5A. No → Go To 18	All

P-0505 IDLE AIR CONTROL MOTOR CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
18	If there are no potential causes remaining, the Idle Air Control Motor is assumed to be defective. View repair options. Repair Replace the Idle Air Control Motor. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0505B IDLE AIR CONTROL MOTOR CIRCUIT

POSSIBLE CAUSES
IAC MOTOR DRIVER (IAC#1) CIRCUIT OPEN
PCM CONN (IAC#1) TERM DAMAGED, PUSH OUT, OR MISWIRED
PCM DEFECTIVE (IAC#1)

TEST	ACTION	APPLICABILITY
1	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of the IAC #1 Driver Circuit from the IAC Motor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 2 No → Repair the open IAC Motor Driver Control Circuit. Perform Powertrain Verification Test VER-5A.	All
2	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition Off If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0505C IDLE AIR CONTROL MOTOR CIRCUIT

POSSIBLE CAUSES
IAC MOTOR DRIVER (IAC #2) CIRCUIT OPEN
PCM CONN (IAC#2) TERM DAMAGED, PUSH OUT, OR MISWIRED
PCM DEF (IAC #2)

TEST	ACTION	APPLICABILITY
1	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of the IAC #2 Driver Circuit from the IAC Motor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 2 No → Repair the open IAC Motor Driver Control Circuit. Perform Powertrain Verification Test VER-5A.	All
2	Ignition Off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Visually inspect Connector. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition off. If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0505D IDLE AIR CONTROL MOTOR CIRCUIT

POSSIBLE CAUSES
IAC MOTOR DRIVER (IAC#3) CIRCUIT OPEN
PCM CONN (IAC#3) TERM DAMAGED, PUSH OUT, OR MISWIRED
PCM DEF (IAC #3)

TEST	ACTION	APPLICABILITY
1	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of the IAC #3 Driver Circuit from the IAC Motor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 2 No → Repair the open IAC Motor Driver Control Circuit. Perform Powertrain Verification Test VER-5A.	All
2	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Visually inspect Connector. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0505E IDLE AIR CONTROL MOTOR CIRCUIT

POSSIBLE CAUSES
IAC MOTOR DRIVER (IAC#4) CIRCUIT OPEN
PCM CONN (IAC #4) TERM DAMAGED, PUSH OUT, OR MISWIRED
PCM DEF (IAC#4)

TEST	ACTION	APPLICABILITY
1	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Visually inspect Connector. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 2	All
2	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of the IAC #4 Driver Circuit from the IAC Motor Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 3 No → Repair the open IAC Motor Driver Control Circuit. Perform Powertrain Verification Test VER-5A.	All
3	Ignition off. If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-0600 PCM FAILURE SPI COMMUNICATIONS

When Monitored and Set Condition:

P-0600 PCM FAILURE SPI COMMUNICATIONS

When Monitored: With the ignition key on.

Set Condition: Internal Bus Communication failure between processors.

POSSIBLE CAUSES
PCM FAILURE SPI COMMUNICATIONS

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running. With the DRB, read Trouble Codes. Is Trouble Code PCM FAILURE SPI COMMUNICATION present? Yes → Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A No → Test Complete.	All

Symptom:
P-0601 INTERNAL CONTROLLER FAILURE

When Monitored and Set Condition:

P-0601 INTERNAL CONTROLLER FAILURE

When Monitored: With the ignition key on.

Set Condition: Internal checksum for software failed, does not match calculated value.

POSSIBLE CAUSES
INTERNAL CONTROLLER FAILURE

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running. With the DRB, read Trouble Codes. Is Trouble Code INTERNAL CONTROLLER FAILURE present? Yes → Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A No → Test Complete.	All

Symptom:
P-0645 A/C CLUTCH RELAY CIRCUIT

When Monitored and Set Condition:

P-0645 A/C CLUTCH RELAY CIRCUIT

When Monitored: With the ignition key on and battery voltage greater than 10 volts.

Set Condition: An open or shorted condition is detected in the A/C clutch relay control circuit.

POSSIBLE CAUSES
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
AIR CONDITIONING CLUTCH RELAY DEFECTIVE
A/C CLUTCH RELAY CIRCUIT WITHOUT INTER DEFECT
A/C CLUTCH RELAY CIRCUIT WITHOUT OBSER DEFECT
A/C CLUTCH RELAY CONTROL CIRCUIT SHORT TO GROUND
AIR CONDITIONING CLUTCH RELAY CONTROL CIRCUIT OPEN
PCM DEF (A/C CLUTCH RELAY)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running Actuate the Air Conditioning Clutch Relay. Is the Air Conditioning Clutch Relay clicking? Yes → Go To 2 No → Go To 4	All
2	Ignition On, Engine Not Running Actuate the Air Conditioning Clutch Relay. Wiggle the Wiring Harness from the Relay to the PCM. Did the wiggling interrupt the clicking? Yes → Repair as necessary where wiggling caused the clicking to be interrupted. Perform Powertrain Verification Test VER-2A. No → Go To 3	All
3	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

P-0645 A/C CLUTCH RELAY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Remove the Air Conditioning Clutch Relay. **Note: Check connectors - Clean/repair as necessary.** Using a Voltmeter, measure the Fused Ignition Switch Output Circuit. Is the voltage above 10.0 volts? Yes → Go To 5 No → Repair the open Fused Ignition Switch Output Circuit. Perform Powertrain Verification Test VER-2A.	All
5	Ignition Off Remove the Air Conditioning Clutch Relay. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance between terminals C (85) and A (86) of the Air Conditioning Clutch Relay. Is the resistance below between 50 to 90 ohms? Yes → Go To 6 No → Replace the Air Conditioning Clutch Relay. Perform Powertrain Verification Test VER-2A.	All
6	Ignition Off Disconnect the PCM grey connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the A/C Clutch Control Circuit from the PCM connector to ground. Is the resistance below 5.0 ohms? Yes → Repair the Air Conditioning Clutch Relay Control Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 7	All
7	Ignition Off Disconnect the PCM grey connector. Remove the Air Conditioning Clutch Relay. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance of the Air Conditioning Clutch Relay Control Circuit from the relay to the PCM. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair open Air Conditioning Clutch Relay Control Circuit. Perform Powertrain Verification Test VER-2A.	All
8	Ignition Off If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-0703 BRAKE SWITCH STUCK PRESSED OR RELEASED

When Monitored and Set Condition:

P-0703 BRAKE SWITCH STUCK PRESSED OR RELEASED

When Monitored: With engine running. The PCM expects the signal to be high for 16 cycles while it monitors the brake switch signal during accel and decel modes.

Set Condition: After the vehicle speed increases, the PCM must accumulate 6 seconds while delta throttle voltage is above 0.02 volt. The count is reset to zero whenever the brake switch indicates a low signal.

POSSIBLE CAUSES
BRAKE SWITCH GROUND CIRCUIT OPEN
BRAKE SWITCH INTERNAL SHORT
BRAKE SWITCH SENSE CIRCUIT OPEN
BRAKE SWITCH SENSE CIRCUIT SHORT TO GROUND
PCM CONNECTOR OBSERVABLE DEFECT
PCM DEF (VOLTAGE HIGH)
PCM DEF (VOLTAGE LOW)

TEST	ACTION	APPLICABILITY
1	Ignition Off Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Key on. With a Voltmeter, measure the Brake Switch Sense Circuit at the Brake Switch Connector. Is the voltage above 9.0 volts? Yes → Go To 2 No → Go To 5	All
2	Ignition Off Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Brake Switch Ground Circuit at the Brake Switch Connector to ground. Is the resistance below 5.0 ohms? Yes → Go To 3 No → Repair the Brake Switch Ground Circuit. Perform Powertrain Verification Test VER-2A.	All

P-0703 BRAKE SWITCH STUCK PRESSED OR RELEASED — Continued

TEST	ACTION	APPLICABILITY
3	Ignition off. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on with engine not running. Monitor Brake Switch status on the DRB while performing the next step. Connect a jumper across the Brake Switch Circuit to Ground Circuit. Did the DRB change from ″pressed″ to ″released″? Yes → Replace or adjust the Brake Switch. Perform Powertrain Verification Test VER-2A. No → Go To 4	All
4	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
5	Ignition Off Disconnect the Powertrain Control Module. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Brake Switch Sense Circuit resistance from the PCM to the Brake Switch Connector. Is the resistance below 5.0 ohms? Yes → Go To 6 No → Repair the Brake Switch Sense Circuit for an open. Perform Powertrain Verification Test VER-2A.	All
6	Ignition Off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Is any terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 7	All
7	Ignition Off Disconnect the Powertrain Control Module. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Brake Switch Sense Circuit to a good ground. Is the resistance below 5.0 ohms? Yes → Repair the Brake Switch Sense Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 8	All

P-0703 BRAKE SWITCH STUCK PRESSED OR RELEASED — Continued

TEST	ACTION	APPLICABILITY
8	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-1195 SLOW 1/1 O2S DURING CATALYST MONITOR

When Monitored and Set Condition:

P-1195 SLOW 1/1 O2S DURING CATALYST MONITOR

When Monitored: With the engine running, coolant greater than 76 deg C (170 deg F), open throttle, steady to slight increasing vehicle speed > 28 Km/h (18 mph) < 88 Km/h (55 mph), with a light load on the engine, for a period no less than five minutes.

Set Condition: The upstream oxygen sensor signal voltage is switching from below 0.39 volt to above 0.6 volt and back fewer times than required.

POSSIBLE CAUSES
OXYGEN SENSOR GROUND CIRCUIT OPEN
1/1 OXYGEN SENSOR CONNECTOR OBSERVABLE DEFECT
1/1 OXYGEN SENSOR DEFECTIVE
ENGINE FLUID CONSUMPTION
EXHAUST SYSTEM LEAKING
PCM CONNECTOR OBSERVABLE DEFECT

TEST	ACTION	APPLICABILITY
1	Start Engine **Note: Check the Exhaust for excessive smoke caused by oil or coolant consumption.** Is there an oil or coolant consumption condition present? Yes → Repair engine mechanical as necessary, and replace Upstream O2 Sensor. Perform Powertrain Verification Test VER-5A. No → Go To 2	All
2	Start Engine Check the Exhaust System for leaks between Engine and Catalytic Converter. Is there any Exhaust leak? Yes → Repair or replace leaking Exhaust parts as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 3	All

P-1195 SLOW 1/1 O2S DURING CATALYST MONITOR — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Upstream Oxygen Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance from the O2 Sensor Ground Circuit to a good ground. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the open Sensor Ground Circuit to the Upstream Oxygen Sensor. Perform Powertrain Verification Test VER-5A.	All
4	Ignition Off Disconnect the Upstream Oxygen Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect the Connectors and Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair or replace as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect the Connector. Is the Connector condition OK? Yes → Go To 6 No → Repair as necessary. Perform Powertrain Verification Test VER-5A.	All
6	If there are no potential causes remaining, the Upstream Oxygen Sensor is assumed to be defective. View repair options. Repair Replace the Upstream Oxygen Sensor. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-1281 ENGINE IS COLD TOO LONG

When Monitored and Set Condition:

P-1281 ENGINE IS COLD TOO LONG

When Monitored: Ignition key on, engine not running. Ambient temperature greater than −11°C (-11°F) and coolant temperature greater than −7°C (19°F)

Set Condition: The engine does not warm to 79 degrees C (176 degrees F) while driving for 20 minutes after start.

POSSIBLE CAUSES
ENGINE COLD TOO LONG

TEST	ACTION	APPLICABILITY
1	Start Engine Drive vehicle under normal driving conditions for 20 minutes. With the DRB, read Engine Coolant Temperature. Did the engine warm to 79 degrees C (176 degrees F)? Yes → Test Complete. No → See pertinent service manual information for cooling system diagnostics.	All

Symptom:
P1282 FUEL PUMP RELAY CONTROL CIRCUIT

When Monitored and Set Condition:

P–1282 FUEL PUMP RELAY CONTROL CIRCUIT

When Monitored: With the ignition key on and battery voltage greater than 10 volts.

Set Condition: An open or shorted condition is detected in the fuel pump relay control circuit.

POSSIBLE CAUSES
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
FUEL PUMP RELAY DEFECTIVE
FUEL PUMP RELAY CONTROL CIRCUIT OPEN
FUEL PUMP RELAY CONTROL CIRCUIT SHORT TO GROUND
FUEL PUMP RELAY WIRING HARNESS INTER DEF
FUEL PUMP RELAY WIRING HARNESS OBS DEF
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, actuate the Fuel Pump Relay. Is the Fuel Pump Relay clicking? Yes → Go To 2 No → Go To 4	All
2	Ignition On, Engine Not Running With the DRB actuate the Fuel Pump Relay. Wiggle the Wiring Harness from the Relay to the PCM. Did the Fuel Pump Relay clicking stop or become erratic while wiggling the wires? Yes → Repair Circuit as necessary where wiggling caused the clicking to become erratic. Perform Powertrain Verification Test VER-2A. No → Go To 3	All
3	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

P1282 FUEL PUMP RELAY CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the Fuel Pump Relay. **Note: Check connectors - Clean/repair as necessary.** Ignition On, Engine Not Running Using a Voltmeter, measure the Fused Ignition Switch Output Circuit. Is the voltage above 10.0 volts? Yes → Go To 5 No → Repair the open Fused Ignition Switch Output Circuit. Perform Powertrain Verification Test VER-2A.	All
5	Ignition Off Disconnect the Fuel Pump Relay. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure across Terminals 85 and 86 of the Fuel Pump Relay for resistance. Is the resistance between 50 and 90 ohms? Yes → Go To 6 No → Replace Fuel Pump Relay. Perform Powertrain Verification Test VER-2A.	All
6	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Fuel Pump Relay. **Note: Check connectors - Clean/repair as necessary** Using an Ohmmeter, measure the Fuel Pump Relay Control Circuit for resistance. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open Fuel Pump Relay Control Circuit. Perform Powertrain Verification Test VER-2A.	All
7	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Fuel Pump Relay. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Fuel Pump Relay Control Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Fuel Pump Relay Control Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 8	All
8	Ignition off. If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-1294 TARGET IDLE NOT REACHED

When Monitored and Set Condition:

P-1294 TARGET IDLE NOT REACHED

When Monitored: Engine idling more than 2.8 seconds and coolant temp greater than 70 degrees C (160 degrees F). For an automatic transmission, in drive mode. There must not be a MAP Sensor or TP Sensor or speed sensor trouble code.

Set Condition: Engine idle is > 200 RPM above target idle speed or less than 100 RPM below target idle speed for 20 seconds. Two consecutive failures in a row will store this trouble code.

POSSIBLE CAUSES
ENG VACUUM HOSES AND COMPONENTS LEAKS
THROTTLE BODY DEFECTIVE
THROTTLE PLATE/LINKAGE NOT IN CORRECT POS
IAC WIRING HARNESS INTERMITTENT DEFECT
IAC WIRING HARNESS OBSERVABLE DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Does the engine exhibit a start and stall condition? Yes → Go To 2 No → Go To 4	All
2	Ignition Off Perform minimum air flow test that is described in the service information. Is the idle RPM within the range shown in the chart? Yes → Test Complete. No → Go To 3	All

P-1294 TARGET IDLE NOT REACHED — Continued

TEST	ACTION	APPLICABILITY
3	Ignition off. Remove the Throttle Body per service information procedure. **Note: Clean Throttle Body in a well ventilated area and wear rubber gloves.** While holding the Throttle open spray entire Throttle Body Bore with Mopar parts cleaner. Using a soft scuff pad, clean the Throttle Body Bore and Throttle Plate. Using compressed air, dry the Throttle Body and install Throttle Body on Manifold. Reconnect IAC Motor Connector and reset the IAC Motor Steps with the DRB. Start engine and let idle. With the DRB, actuate the minimum air flow. Is the idle RPM within the range shown in the chart? Refer to the Service Information. Yes → Test Complete. No → Replace the Throttle Body. Perform Powertrain Verification Test VER-5A.	All
4	Ignition Off Start engine, allow engine idle to stabilize for 60 seconds. With the DRB, read target idle and engine RPM. Is the engine RPM within +200/-100 RPM of target idle? Yes → Go To 5 No → Go To 8	All
5	Ignition Off Remove the IAC Motor from the housing. Turn Ignition on with Engine Not Running. With the DRB, actuate the IAC Stepper Motor. Wiggle the Wiring Harness from the IAC Motor to the PCM. Did the IAC stop operating at any time? Yes → Repair the Harness or Connectors as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 6	All
6	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 7	All
7	Ignition On, Engine Not Running Check Throttle Plate and Linkage for a binding condition. **The Throttle Linkage must be free and the Throttle Plate at the idle position.** Ensure Throttle Plate is fully closed and against its stop. Is the Throttle Plate and Linkage okay? Yes → Test Complete. No → Repair as necessary. Perform Powertrain Verification Test VER-5A.	All

P-1294 TARGET IDLE NOT REACHED — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Start engine, allow engine idle to stabilize for 60 seconds. With the engine running at idle, the DRB in Systems Test, perform the IAC wiggle test. The idle speed should raise and lower with the display. Does the RPM raise and lower correctly? Yes → Go To 9 No → Refer to symptom P-0505 IDLE AIR CONTROL MOTOR CIRCUITS in the DRIVEABILITY category.	All
9	Ignition Off Start engine, allow engine idle to stabilize for 60 seconds. Check engine Vacuum Hoses and Components for vacuum leaks. Ensure PCV Valve is the correct part and is operating correctly. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 10	All
10	Ignition Off Remove the IAC Motor from the housing. Turn Ignition on with Engine Not Running. With the DRB, actuate the IAC Stepper Motor. Wiggle the Wiring Harness from the IAC Motor to the PCM. Did the IAC stop operating at any time? Yes → Repair the Harness or Connectors as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 11	All
11	Ignition On, Engine Not Running Check Throttle Plate and Linkage for a binding condition. **The Throttle Linkage must be free and the Throttle Plate at the idle position.** Ensure Throttle Plate is fully closed and against its stop. Is the Throttle Plate and Linkage okay? Yes → Go To 12 No → Repair as necessary. Perform Powertrain Verification Test VER-5A.	All
12	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

Symptom:
P-1297 NO CHANGE IN MAP FROM START TO RUN

When Monitored and Set Condition:

P-1297 NO CHANGE IN MAP FROM START TO RUN

When Monitored: Engine is idling with a stable RPM (RPM fluctuation < 64 RPM) and the vehicle is not moving.

Set Condition: Too small a difference is seen between barometric pressure at ignition on and manifold vacuum.

POSSIBLE CAUSES
MAP SENSOR 5-VOLT SUPPLY CIRCUIT OPEN
MAP SENSOR WIRING HARNESS INTERMITTENT DEF
VACUUM PORTS RESTRICTED OR DEFECTIVE
MANIFOLD ABSOLUTE PRESSURE SENSOR RESTRICTED
MAP SENSOR DEFECTIVE (A)
MAP SENSOR DEFECTIVE (B)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read codes Is "MAP Sensor voltage too low" code set? Yes → Refer to symptom P-0107 MAP SENSOR VOLTAGE TOO LOW in the DRIVEABILITY category. No → Go To 2	All
2	With the DRB erase Codes. Ignition On, Engine Not Running Start engine and allow engine to idle for 30 seconds. With the DRB read codes. Does the DRB show "No change in MAP from start to run"? Yes → Go To 3 No → Go To 6	All
3	Ignition on, with engine not running. Disconnect MAP Sensor. **Note:Check connectors - clean/repair as necessary.** Ignition on, with engine not running. Using a Voltmeter, measure the MAP Sensor 5-Volt Supply Circuit at the MAP Sensor Connector. Is the voltage above 4.0 volts? Yes → Go To 4 No → Repair the open MAP Sensor 5-volt Supply Circuit. Perform Powertrain Verification Test VER-5A.	All

P-1297 NO CHANGE IN MAP FROM START TO RUN — Continued

TEST	ACTION	APPLICABILITY
4	Ignition off. Remove MAP Sensor and inspect for Vacuum restrictions. **Check connectors - Clean/repair as necessary.** Was there a restriction? Yes → Remove the restriction and reinstall the MAP Sensor Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	If there are no potential causes remaining, the MAP Sensor is assumed to be defective. View repair options. Repair Replace the MAP Sensor. Perform Powertrain Verification Test VER-5A.	All
6	Engine must be running. While monitoring the DRB display, snap the Throttle open and closed. Did the vacuum drop rapidly below 1.0″? Yes → Go To 7 No → Go To 8	All
7	Engine must be running. With the DRB,set the engine speed to 1500 RPM. With the engine RPM at 1500, read MAP sensor voltage. While monitoring the voltage, wiggle the wiring from the MAP Sensor to PCM. Did the engine stall or voltage become erratic? Yes → Repair the Wiring or Connector defective between the Map Sensor and the PCM. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All
8	Engine must be running. With the DRB,set the engine speed to 1500 RPM. With the engine RPM at 1500, read MAP sensor voltage. While monitoring the voltage, wiggle the wiring from the MAP Sensor to PCM. Did the engine stall or voltage become erratic? Yes → Repair the Wiring or Connector defective between the Map Sensor and the PCM. Perform Powertrain Verification Test VER-5A. No → Go To 9	All
9	Ignition Off Remove the MAP Sensor and inspect condition of Intake Manifold and MAP Sensor Vacuum Ports. **Check connectors - Clean/repair as necessary.** Is there a restriction or defect in the Vacuum Ports? Yes → Repair the restricted or defective Vacuum Ports. Perform Powertrain Verification Test VER-5A. No → Go To 10	All

P-1297 NO CHANGE IN MAP FROM START TO RUN — Continued

TEST	ACTION	APPLICABILITY
10	If there are no potential causes remaining, the MAP Sensor is assumed to be defective. View repair options. Repair Replace the MAP sensor. Perform Powertrain Verification Test VER-5A.	All

Symptom:
P-1388 AUTO SHUTDOWN RELAY CONTROL CIRCUIT

When Monitored and Set Condition:

P-1388 AUTO SHUTDOWN RELAY CONTROL CIRCUIT

When Monitored: With ignition key on and battery voltage greater than 10 volts.

Set Condition:

POSSIBLE CAUSES
FUSED B(+) CIRCUIT OPEN
AUTO SHUTDOWN RELAY RESISTANCE>=100.0 OHMS
ASD RELAY CONTROL CIRCUIT WIRING HARNESS INTER DEF
ASD RELAY CONTROL CIRCUIT WIRING HARNESS OBSER DEF
AUTO SHUTDOWN RELAY CONTROL CIRCUIT OPEN
AUTO SHUTDOWN RELAY CONTROL CIRCUIT SHORT TO GROUND
PCM DEFECTIVE (AUTO SHUTDOWN RELAY CONTROL CIRCUIT)

TEST	ACTION	APPLICABILITY
1	Ignition on, Engine Not Running **The ASD Relay is referred to as the Low Pressure Shutoff Relay in CNG applications.** With the DRB, actuate the Auto Shutdown Relay. Is the ASD Relay clicking? Yes → Go To 2 No → Go To 4	All
2	Engine running. Wiggle the Wiring Harness from the ASD Relay to the PCM. Did the engine die out when wiggling wires? Yes → Repair circuit as necessary where wiggling caused the engine to die out. Perform Powertrain Verification Test VER-2A. No → Go To 3	All
3	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

P-1388 AUTO SHUTDOWN RELAY CONTROL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Remove the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** Using a Voltmeter, measure the B(+) Circuit at ASD Relay Connector. Is the voltage above 10.0 volts? Yes → Go To 5 No → Repair the open Fused B(+) Circuit. Perform Powertrain Verification Test VER-2A.	All
5	Ignition off. Remove the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** Use an ohmmeter in the following step. Measure the resistance across Terminals A (86) and C (85) of the ASD Relay. Is the resistance between 50.0 and 90.0 ohms? Yes → Go To 6 No → Replace the ASD Relay. Perform Powertrain Verification Test VER-2A.	All
6	Ignition Off Remove the ASD Relay. **Check Connectors - clean/repair as necessary.** Disconnect the PCM Connector. **Check Connectors - clean/repair as necessary.** Use an ohmmeter in the following step. Using an ohmmeter, measure the resistance of the ASD Relay Control Circuit from the ASD Relay to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open ASD Relay Control Circuit. Perform Powertrain Verification Test VER-2A.	All
7	Ignition off. Remove the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the ASD Relay Control Ckt to ground.. Is the resistance below 5.0 ohms? Yes → Repair the ASD Relay Control Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 8	All
8	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-1389 NO ASD RELAY OUTPUT VOLTAGE AT PCM

When Monitored and Set Condition:

P-1389 NO ASD RELAY OUTPUT VOLTAGE AT PCM

When Monitored: With ignition key on and battery voltage greater than 10 volts.

Set Condition: Engine running and no ASD Relay Output Sense at PCM.

POSSIBLE CAUSES
FUSED B(+) CIRCUIT OPEN
ASD RELAY DEFECTIVE
ASD RELAY OUT CKT WIRING HARNESS OBSERVABLE DEFECT
ASD RELAY OUTPUT CIRCUIT OPEN (ENGINE STARTED)
ASD RELAY OUTPUT CKT OPEN (ENGINE DID NOT START)
ASD RLY OUT CKT WIRING HARNESS INTERMITTENT DEFECT
PCM DEFECTIVE (ENGINE DID NOT START)
PCM DEFECTIVE (ENGINE STARTED)

TEST	ACTION	APPLICABILITY
1	Ignition off. Is a Trouble Code also set for ″ASD Relay Control Circuit? Yes → Refer to symptom P-1388 AUTO SHUTDOWN RELAY CONTROL CIRCUIT in the DRIVEABILITY category. No → Go To 2	All
2	Ignition on with engine not running. With the DRB, read Trouble Codes. Attempt to start the engine and let idle. Is the Global Good Trip displayed and equal to 0? Yes → Go To 3 No → Go To 10	All
3	Ignition off. Attempt to start the engine. Did the engine start? Yes → Go To 4 No → Go To 6	All

P-1389 NO ASD RELAY OUTPUT VOLTAGE AT PCM — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Remove the Auto Shutdown Relay. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance of the ASD Relay Output Circuit from ASD Relay to the PCM Connector. Is the resistance above 5.0 ohms? Yes → Repair open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-2A. No → Go To 5	All
5	Ignition off. If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
6	Ignition Off Remove the Auto Shutdown Relay. **Note: Check connectors - Clean/repair as necessary.** Using a Voltmeter, measure the Fused B (+) Circuit at Relay Connector. Is the voltage above 10.0 volts? Yes → Go To 7 No → Repair the open Fused B(+) Circuit. (Check Engine Fuse in PDC) . Perform Powertrain Verification Test VER-2A.	All
7	Ignition Off Remove the Auto Shutdown Relay. **Note: Check connectors - Clean/repair as necessary.** Install a substitute Relay for the Auto Shutdown Relay. Attempt to start the Vehicle. Did the engine start? Yes → Replace the original Auto Shutdown Relay. Perform Powertrain Verification Test VER-2A. No → Go To 8	All
8	Ignition Off. Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Remove the Auto Shutdown Relay. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance of the ASD Relay Output Circuit from the Auto Shutdown Relay to the PCM. Is the resistance above 5.0 ohms? Yes → Repair open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-2A. No → Go To 9	All

P-1389 NO ASD RELAY OUTPUT VOLTAGE AT PCM — Continued

TEST	ACTION	APPLICABILITY
9	Ignition off. If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
10	Ignition off. Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 11	All
11	Start Engine. **Note: The Engine must be running before continuing test.** Wiggle Wiring Harness from ASD Relay to the Powertrain Control Module. With the DRB, read Trouble Codes. Did trouble code ″No ASD Relay Output Voltage at PCM″ reset? Yes → Repair as necessary where wiggling caused the Trouble Code to be set. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
P-1391 INTERMITTENT LOSS OF CMP OR CKP

When Monitored and Set Condition:

P-1391 INTERMITTENT LOSS OF CMP OR CKP

When Monitored: Engine running over 7 seconds.

Set Condition: When the expected cam signal level disagrees with the actual cam signal level.

POSSIBLE CAUSES
CKP SENSOR CKT WIRING HARNESS INTER DEF
CMP SENSOR SIGNAL CKT WIRING HARNESS INTER DEF
CAMSHAFT POSITION SENSOR DEFECTIVE
CAMSHAFT SPROCKET DEFECTIVE
CRANKSHAFT DEFECTIVE
CRANKSHAFT POSITION SENSOR DEFECTIVE
DISTRIBUTOR PULSE RING DEFECTIVE
FLYWHEEL DEFECTIVE
CAMSHAFT TARGET MAGNET DEFECTIVE
CAMSHAFT THRUST PLATES(S) NOT ATTACHED
CKP SENSOR CONNECTOR TERMINALS OBS DEF
CKP SENSOR CONNECTOR TERMINALS OBS DEFECT
PCM CONN TERMINALS OBS DEF (CKP SENSOR)
PCM CONN TERMINALS OBS DEF (CMP SENSOR)
CAMSHAFT/CYLINDER HEAD DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off. At the CMP Sensor, backprobe the CMP Sensor Signal Circuit with the Oscilloscope voltage measurement lead. Start the Engine and observe the CMP Sensor voltage pattern on the Oscilloscope. Are there any of the Camshaft Position Sensor Signals missing? Yes → Go To 2 No → Go To 6	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-1391 INTERMITTENT LOSS OF CMP OR CKP — Continued

TEST	ACTION	APPLICABILITY
2	Ignition Off. Disconnect the CMP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 3	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
3	Ignition Off. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 4	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
4	Ignition Off. Disconnect the CMP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Remove the Camshaft Position Sensor. Inspect the Camshaft Sprocket. See pertinent service information for instructions. Is the Camshaft Sprocket okay? Yes → Go To 5 No → Repair as necessary. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
5	Ignition Off. Disconnect the CMP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Remove the CMP Sensor. Inspect the Camshaft Thrust Plate(s). Are the Camshaft Thrust Plate(s) attached? Yes → Replace the Camshaft Position Sensor. Perform Powertrain Verification Test VER-5A. No → Repair or replace the Camshaft Thrust Plate(s) as necessary. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
6	Start Engine. At PCM, backprobe CMP Sensor Signal Circuit with Oscilloscope's voltage measurement lead. While observing the Oscilloscope pattern, wiggle CMP Sensor Circuit from Sensor to PCM. Were any signals missing when the wiggle test was conducted? Yes → Note where wiggling the Wires caused a missing CMP Sensor Signal. Repair Camshaft and Crankshaft Wiring Harness as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 7	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-1391 INTERMITTENT LOSS OF CMP OR CKP — Continued

TEST	ACTION	APPLICABILITY
7	Ignition Off. At the CKP Sensor, backprobe the CKP Sensor Signal Circuit with the Oscilloscope's voltage measurement lead. Start the Engine and observe the CKP Sensor voltage pattern on the Oscilloscope. Are any Crankshaft Position Sensor Signals missing? Yes → Go To 8 No → Go To 11	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
8	Ignition Off. Disconnect the CKP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 9	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
9	Ignition Off. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 10	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
10	Ignition Off Remove the Crankshaft Position (CKP) Sensor. Inspect the Slots in the Flywheel for debris or damage. Is the Flywheel damaged? Yes → Repair or replace as necessary. Perform Powertrain Verification Test VER-5A. No → Replace the Crankshaft Position Sensor. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
11	Start Engine. At PCM, backprobe CKP Sensor Signal Circuit with Oscilloscope's voltage measurement lead. While observing the Oscilloscope pattern, wiggle CKP Sensor Circuit from Sensor to PCM. Were any CKP Sensor Signals missing when the wiggle test was conducted? Yes → Note where wiggling the wires caused a missing CKP Sensor signal. Repair Camshaft and Crankshaft Wire Harness as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-1391 INTERMITTENT LOSS OF CMP OR CKP — Continued

TEST	ACTION	APPLICABILITY
12	Ignition Off. At the CMP Sensor, backprobe the CMP Sensor Signal Circuit with the Oscilloscope voltage measurement lead. Start the Engine and observe the CMP Sensor voltage pattern on the Oscilloscope. Are there any of the Camshaft Position Sensor Signals missing? Yes → Go To 13 No → Go To 16	ENGINE - 3.0L V6
13	Ignition Off. Disconnect the CMP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 14	ENGINE - 3.0L V6
14	Ignition Off. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 15	ENGINE - 3.0L V6
15	Ignition Off. Remove Distributor Cap and Rotor. Inspect the Pulse Ring for damage or misalignment. Is the Pulse Ring okay? Yes → Replace the Camshaft Position Sensor. Perform Powertrain Verification Test VER-5A. No → Repair or replace the Distributor Pulse Ring as necessary. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L V6
16	Start Engine. At PCM, backprobe CMP Sensor Signal Circuit with Oscilloscope's voltage measurement lead. While observing the Oscilloscope pattern, wiggle CMP Sensor Circuit from Sensor to PCM. Were any signals missing when the wiggle test was conducted? Yes → Note where wiggling the Wires caused a missing CMP Sensor Signal. Repair Camshaft and Crankshaft Wiring Harness as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 17	ENGINE - 3.0L V6

P-1391 INTERMITTENT LOSS OF CMP OR CKP — Continued

TEST	ACTION	APPLICABILITY
17	Ignition Off. At the CKP Sensor, backprobe the CKP Sensor Signal Circuit with the Oscilloscope's voltage measurement lead. Start the Engine and observe the CKP Sensor voltage pattern on the Oscilloscope. Are any Crankshaft Position Sensor Signals missing? Yes → Go To 18 No → Go To 21	ENGINE - 3.0L V6
18	Ignition Off. Disconnect the CKP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 19	ENGINE - 3.0L V6
19	Ignition Off. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 20	ENGINE - 3.0L V6
20	Ignition Off. Remove the Crankshaft Position (CKP) Sensor. Inspect the Slots in the Flywheel for debris or damage. Is the Flywheel damaged? Yes → Repair or replace as necessary. Perform Powertrain Verification Test VER-5A. No → Replace the Crankshaft Position Sensor. Perform Powertrain Verification Test VER-5A.	ENGINE - 3.0L V6
21	Start Engine. At PCM, backprobe CKP Sensor Signal Circuit with Oscilloscope's voltage measurement lead. While observing the Oscilloscope pattern, wiggle CKP Sensor Circuit from Sensor to PCM. Were any CKP Sensor Signals missing when the wiggle test was conducted? Yes → Note where wiggling the wires caused a missing CKP Sensor signal. Repair Camshaft and Crankshaft Wire Harness as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	ENGINE - 3.0L V6

P-1391 INTERMITTENT LOSS OF CMP OR CKP — Continued

TEST	ACTION	APPLICABILITY
22	Ignition Off. At the CMP Sensor, backprobe the CMP Sensor Signal Circuit with the Oscilloscope voltage measurement lead. Start the Engine and observe the CMP Sensor voltage pattern on the Oscilloscope. Are there any of the Camshaft Position Sensor Signals missing? Yes → Go To 23 No → Go To 27	ENGINE - 2.0L and 2.4L I-4 DOHC
23	Ignition Off. Disconnect the CMP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 24	ENGINE - 2.0L and 2.4L I-4 DOHC
24	Ignition Off. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 25	ENGINE - 2.0L and 2.4L I-4 DOHC
25	Ignition Off. Disconnect the CMP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Remove & inspect the CMP Sensor & Target Magnet for damage or misalignment. Is the Camshaft Target Magnet okay? Yes → Go To 26 No → Repair or replace Camshaft Target Magnet as necessary. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L and 2.4L I-4 DOHC
26	Ignition Off. Disconnect the CMP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Remove and inspect the CMP Sensor and Target Magnet for damage or misalignment. Check Camshaft endplay per pertinent service information. Is the Camshaft endplay within specs? Yes → Replace the Camshaft Position Sensor. Perform Powertrain Verification Test VER-5A. No → Repair or replace Camshaft/Cylinder Head as necessary. Perform Verification Test VER-5A.	ENGINE - 2.0L and 2.4L I-4 DOHC

P-1391 INTERMITTENT LOSS OF CMP OR CKP — Continued

TEST	ACTION	APPLICABILITY
27	Start Engine. At PCM, backprobe CMP Sensor Signal Circuit with Oscilloscope's voltage measurement lead. While observing the Oscilloscope pattern, wiggle CMP Sensor Circuit from Sensor to PCM. Were any signals missing when the wiggle test was conducted? Yes → Note where wiggling the Wires caused a missing CMP Sensor Signal. Repair Camshaft and Crankshaft Wiring Harness as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 28	ENGINE - 2.0L and 2.4L I-4 DOHC
28	Ignition Off. At the CKP Sensor, backprobe the CKP Sensor Signal Circuit with the Oscilloscope's voltage measurement lead. Start the Engine and observe the CKP Sensor voltage pattern on the Oscilloscope. Are any Crankshaft Position Sensor Signals missing? Yes → Go To 29 No → Test Complete.	ENGINE - 2.0L and 2.4L I-4 DOHC
29	Ignition Off. Disconnect the CKP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 30	ENGINE - 2.0L and 2.4L I-4 DOHC
30	Ignition Off. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair Terminal(s) for damage, pushout or miswiring. Perform Powertrain Verification Test VER-5A. No → Go To 31	ENGINE - 2.0L and 2.4L I-4 DOHC
31	Ignition Off. Remove the Crankshaft Position (CKP) Sensor. Inspect the Crankshaft notches for debris or damage. Are the Crankshaft notches damaged? Yes → Repair or replace the Crankshaft as necessary. Perform Powertrain Verification Test VER-5A. No → Replace the Crankshaft Position Sensor. Perform Powertrain Verification Test VER-5A.	ENGINE - 2.0L and 2.4L I-4 DOHC

Symptom:
P-1398 MISFIRE ADAPTIVE NUMERATOR AT LIMIT

When Monitored and Set Condition:

P-1398 MISFIRE ADAPTIVE NUMERATOR AT LIMIT

When Monitored: Under closed throttle decel; A/C off; engine coolant temp > 23 degrees C (75 degrees F); longer than 50 seconds after engine start. The speed at which the deceleration occurs must be sufficient for the given gear range, e.g., > 36 Km/h (36 mph) in first gear or > 104 Km/h (> 65) in high gear.

Set Condition: When one of the CKP Sensor target windows 15 degrees C (60 degrees F) has more than 2.86% variance from the reference window.

POSSIBLE CAUSES
CKP SENSOR CONNECTOR OBSERVABLE DEFECT
CKP SENSOR CONNECTOR OBSERVABLE DEFECT
CKP SENSOR DEFECTIVE
CKP SENSOR DEFECTIVE
CKP SENSOR NOT PROPERLY INSTALLED
CKP SENSOR NOT PROPERLY INSTALLED
NOTCHES IN CRANKSHAFT DEFECTIVE
SLOTS IN FLEXPLATE DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off. Disconnect the Crankshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Verification Test VER-2A. No → Go To 2	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
2	Ignition Off. Disconnect the Crankshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect the Crankshaft Position Sensor for proper Torque and installation. Is the Crankshaft Position Sensor properly installed? Yes → Go To 3 No → Properly install CKP Sensor. Perform Verification Test VER-2A.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

P-1398 MISFIRE ADAPTIVE NUMERATOR AT LIMIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off. Remove the CKP Sensor. Inspect the Slots in the Flexplate for debris, damage or excessive movement. Is there any debris, damage or excessive movement? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 4	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
4	If there are no potential causes remaining, the CKP Sensor is assumed to be defective. View repair options. Repair Replace the CKP Sensor. Perform Verification Test VER-2A.	ENGINE - 3.0L V6 and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
5	Ignition Off. Disconnect the Crankshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Verification Test VER-2A. No → Go To 6	ENGINE -2.0L and 2.4L I-4 DOHC
6	Ignition Off. Disconnect the Crankshaft Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect the Crankshaft Position Sensor for proper Torque and installation. Is the Crankshaft Position Sensor properly installed? Yes → Go To 7 No → Properly install CKP Sensor. Perform Verification Test VER-2A.	ENGINE -2.0L and 2.4L I-4 DOHC
7	Ignition Off. Remove the Crankshaft Position Sensor. Inspect the notches in the Crankshaft for debris, damage or excessive movement. Is there any debris, damage or excessive movement? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 8	ENGINE -2.0L and 2.4L I-4 DOHC
8	If there are no potential causes remaining, the CKP Sensor is assumed to be defective. View repair options. Repair Replace the CKP Sensor. Perform Verification Test VER-2A.	ENGINE -2.0L and 2.4L I-4 DOHC

Symptom:
P-1486 EVAP LEAK MONITOR PINCHED HOSE FOUND

When Monitored and Set Condition:

P-1486 EVAP LEAK MONITOR PINCHED HOSE FOUND

When Monitored: Amb temp bet 4 deg C (40deg F) & 32 deg C (90deg F), & coolant w/in –12 deg C (10deg F) of amb. If PCM suspects pinch, no fault until runs evap purge flow mon. Purge flow monitored w/eng temp >76 deg C (170deg F), engine in closed loop, idle 2 min, no low fuel, MAP <15.7 in. merc, & baro alt <8000 ft.

Set Condition: LDP must pass stricter evap system test first. No air flow through the evaporative system is detected by the evap monitor.

POSSIBLE CAUSES
FUEL TANK TO EVAP CANISTER HOSE PINCHED
LDP PRESSURE HOSE BLOCKAGE
PURGE SOLENOID TO EVAP CANISTER HOSE PINCHED
LEAK DETECTION PUMP BLOCKAGE
EVAPORATIVE CANISTER BLOCKAGE LDP SIDE
EVAPORATIVE CANISTER BLOCKAGE SOLENOID SIDE
EVAP LEAK MONITOR PINCHED HOSE DOES NOT REOCCUR

TEST	ACTION	APPLICABILITY
1	**NOTE: Replacing the Powertrain Control Module will not correct this problem.** With the DRB, read the DTCs. Is the GLOBAL GOOD TRIP counter displayed and equal to zero? Yes → Go To 3 No → Go To 2	All
2	At this time the Evap Leak Monitor Pinched Hose Found does not exist or is an intermittent problem. With the DRB, read the FREEZE FRAME. With this screen, attempt to duplicate the condition that has set this fault. While using FREEZE FRAME pay particular attention to the fault setting conditions, such as speed, temp, load, and map vacuum. Does the Evap Leak Monitor Pinched Hose Found reoccur? Yes → Go To 3 No → Evap Leak Monitor Pinched Hose Found no longer exists. Perform VERIFICATION TEST VER-6A.	All

P-1486 EVAP LEAK MONITOR PINCHED HOSE FOUND — Continued

TEST	ACTION	APPLICABILITY
3	To perform this test you will need Miller Tool Kit #6872A and #6922. **Caution: Refer to safety information.** Perform Evaporative System Pressure Pump Self Test that is specified on the tester cover. Connect the Evap Pressure Pump Supply to Gas Cap Adapter and install on vehicle. Start Engine. With the DRB, go to LDP SYSTEM TEST and follow instructions on the screen. Using Pressure Tool #6872A, set Pressure Hold to Open, and set Vent to Closed. Turn Pump Timer On. Allow Pressure Pump to build pressure up to at least 14″ H2O. Remove Vacuum Connector from Purge Solenoid. Did the pressure drop when the Vacuum Connector was removed? Yes → Go To 4 No → Go To 6	All
4	To perform this test you will need Miller Tool Kit #6872A and #6922. **Caution: Refer to safety information.** Perform Evaporative System Pressure Pump Self Test that is specified on the tester cover. Connect the Evap Pressure Pump Supply to Gas Cap Adapter and install on vehicle. Start Engine. With the DRB, go to LDP SYSTEM TEST and follow instructions on the screen. Using Pressure Tool #6872A, set Pressure Hold to Open, and set Vent to Closed. Turn Pump Timer On. Allow Pressure Pump to build pressure up to at least 14″ H2O. Disconnect Leak Detection Pump Pressure Hose from LDP. Did pressure drop when hose was disconnected? Yes → Replace the Leak Detection Pump. Perform VERIFICATION TEST VER-6A. No → Go To 5	All
5	Inspect the LDP Pressure Hose. Is the hose OK? Yes → Replace the Evaporative Canister. Perform VERIFICATION TEST VER-6A. No → Replace the LDP Pressure Hose. Perform VERIFICATION TEST VER-6A.	All

P-1486 EVAP LEAK MONITOR PINCHED HOSE FOUND — Continued

TEST	ACTION	APPLICABILITY
6	To perform this test you will need Miller Tool Kit #6872A and #6922. **Caution: Refer to safety information.** If disconnected, reconnect the Vacuum Connector at the Purge Solenoid. Perform Evaporative System Pressure Pump Self Test that is specified on the tester cover. Connect the Evap Pressure Pump Supply to Gas Cap Adapter and install on vehicle. Start Engine. With the DRB, go to LDP SYSTEM TEST and follow instructions on the screen. Using Pressure Tool #6872A, set Pressure Hold to Open, and set Vent to Closed. Turn Pump Timer On. Allow Pressure Pump to build pressure up to at least 14″ H2O. Remove hose at Evap Canister that goes to Purge Solenoid. Did pressure drop when hose was disconnected? Yes → Repair the pinched hose from the Purge Solenoid to the Evap Canister. Perform VERIFICATION TEST VER-6A. No → Go To 7	All
7	To perform this test you will need Miller Tool Kit #6872A and #6922. **Caution: Refer to safety information.** Perform Evaporative System Pressure Pump Self Test that is specified on the tester cover. Connect the Evap Pressure Pump Supply to Gas Cap Adapter and install on vehicle. Start Engine. With the DRB, go to LDP SYSTEM TEST and follow instructions on the screen. Using Pressure Tool #6872A, set Pressure Hold to Open, and set Vent to Closed. Turn Pump Timer On. Allow Pressure Pump to build pressure up to at least 14″ H2O. Remove hose at Evap Canister that goes to Fuel Tank. Did pressure drop when hose was disconnected? Yes → Replace the Evaporative Canister. Perform VERIFICATION TEST VER-6A. No → Repair the pinched hose from the Gas Tank to the Evap Canister. Perform VERIFICATION TEST VER-6A.	All

Symptom:
P-1491 RADIATOR FAN CONTROL RELAY CIRCUIT

When Monitored and Set Condition:

P-1491 RADIATOR FAN CONTROL RELAY CIRCUIT

When Monitored: With the ignition key on, battery voltage greater than 10 volts, and the PCM requests the fans to be turned on.

Set Condition: An open or shorted condition is detected in the radiator fan relay control circuit.

POSSIBLE CAUSES
FUSED B (+) CIRCUIT OPEN
RAD FAN RELAY OUTPUT CIRCUIT, 0 VOLTS TO BATTERY V
RADIATOR FAN RELAY GROUND CIRCUIT OPEN
RADIATOR FAN RELAY DEFECTIVE
RAD FAN RELAY CONTROL CIRCUIT SHORT TO GROUND
RADIATOR FAN MOTORS W/H INTERMITTENT DEFECT
RADIATOR FAN MOTORS W/H OBSERVABLE DEFECT
RADIATOR FAN RELAY CONTROL CIRCUIT OPEN
PCM DEFECTIVE (RADIATOR FAN MOTORS)

TEST	ACTION	APPLICABILITY
1	Ignition On With the DRB, actuate the Radiator Fan Relay. Are both of the Radiator Fan Motors cycling on and off? Yes → Go To 2 No → Go To 4	All
2	Ignition On With the DRB, actuate the Radiator Fan Relay. Wiggle the Wiring Harness from the Relay to the PCM. Did the wiggling interrupt the Radiator Fan Motor cycling? Yes → Repair as necessary where wiggling caused the cycling to be interrupted. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All

P-1491 RADIATOR FAN CONTROL RELAY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Ignition On With the DRB, actuate the Radiator Fan Relay. Using a voltmeter, the Fan Relay Output Circuit voltage at the Relay Connector. Does the voltage cycle from below 1.0 volt to Battery voltage? Yes → Repair or replace Radiator Fans or Relay to Fan Wiring as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 5	All
5	Ignition Off Disconnect the Radiator Fan Relay Connector. **Note: Check connectors - Clean/repair as necessary.** Turn key on. Using a Voltmeter, measure the Fused B(+) Circuit at Relay Connector. Is the voltage above 10.0 volts? Yes → Go To 6 No → Repair the open Fused B (+) Circuit (check Radiator Fan Fuse in PDC). Perform Powertrain Verification Test VER-5A.	All
6	Ignition Off Disconnect the Radiator Fan Relay Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Radiator Fan Relay Ground Circuit. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open Fan Relay Ground Circuit. Perform Powertrain Verification Test VER-5A.	All
7	Ignition Off Disconnect the Radiator Fan Relay Connector. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Radiator Fan Relay Control Circuit to a good ground. Is the resistance below 5.0 ohms? Yes → Repair the Radiator Fan Relay Control Circuit for a short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 8	All
8	Ignition Off Disconnect the Radiator Fan Relay Connector. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the Radiator Fan Relay Control Circuit from the Relay to the PCM. Is the resistance below 5.0 ohms? Yes → Go To 9 No → Repair the open Radiator Fan Relay Control Circuit. Perform Powertrain Verification Test VER-5A.	All

P-1491 RADIATOR FAN CONTROL RELAY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
9	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire to the Radiator Fan Relay Control Circuit at the PCM. Turn the ignition on. Momentarily connect the other end of the jumper wire to a good ground. Did the Radiator Fans actuate? Yes → Go To 10 No → Replace the Radiator Fan Relay. Perform Powertrain Verification Test VER-5A.	All
10	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-5A.	All

Symptom:

P-1494 LEAK DETECTION PUMP PRESSURE SWITCH

When Monitored and Set Condition:

P-1494 LEAK DETECTION PUMP PRESSURE SWITCH

When Monitored: Immediately after a cold start, with ambient temperature between 4 deg C (40 deg F) and 32 deg C (90 deg F) and coolant temperature within –12 deg C (10 deg F) of ambient temperature.

Set Condition: The state of the switch does not change when the solenoid is energized.

POSSIBLE CAUSES
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
LDP PRESSURE SWITCH CIRCUIT SHORTED TO GROUND
LDP SWITCH SENSE CIRCUIT OPEN
LDP DEFECTIVE
LDP WIRING HARNESS INTERMITTENT DEFECT
LDP WIRING HARNESS OBSERVABLE DEFECT
LDP VACUUM HOSE LEAKING OR OBSTRUCTED
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Start the engine and allow the engine to idle. With the DRB, perform the Leak Detect Pump Test. Select 1 to Pump. Press the down arrow on the DRB several times. The LEAK DETECT PUMP SW state should change from Open (UP) to CLOSED (DN). Did the Leak Detect Pump Switch state change as described? Yes → Go To 2 No → Go To 4	All

P-1494 LEAK DETECTION PUMP PRESSURE SWITCH — Continued

TEST	ACTION	APPLICABILITY
2	Ignition on, engine not running With the DRB, read DTCs and Freeze Frame Data and record. With the DRB, Clear DTCs. Start the engine and allow the engine to idle. With the DRB, perform the LDP Monitor test. Wiggle the wiring harness and connectors from the LDP connector to the PCM connector while the monitor is running. **Note: Be careful of the engine's moving parts.** With the DRB, Read DTCs. Does the P-1494 Leak Detection Pump Sw or Mechanical Fault DTC return during the wiggle test? Yes → Repair the wiring harness or connector as necessary. Perform Powertrain Verification Test VER-5A. No → Go To 3	All
3	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	All
4	Ignition Off Disconnect the LDP Connector. **Note: Check connectors - Clean/repair as necessary.** Engine off, key on. Using a voltmeter, probe the Fused Ignition Switch Output Circuit. Is the voltage above 10.0 volts? Yes → Go To 5 No → Repair the open Fused Ignition Switch Output Circuit. Perform Powertrain Verification Test VER-5A.	All
5	Ignition Off Disconnect the Engine Vacuum Supply Hose at the LDP. Install a Vacuum Gauge to Engine Vacuum Supply Hose at the LDP. Start engine and read Vacuum Gauge. Does Vacuum Gauge read within 1 inch of engine vacuum? Yes → Go To 6 No → Repair leak or obstruction in Vacuum Hose. Perform Powertrain Verification Test VER-5A.	All

P-1494 LEAK DETECTION PUMP PRESSURE SWITCH — Continued

<table>
<tr><th>TEST</th><th>ACTION</th><th>APPLICABILITY</th></tr>
<tr><td>6</td><td>Ignition Off
Disconnect the LDP Connector.
Note: Check connectors - Clean/repair as necessary.
Disconnect the PCM.
Note: Check connectors - Clean/repair as necessary.
Using an Ohmmeter, measure the resistance of the LDP Pressure Switch Sense Circuit from the PCM Connector to a good ground.
Is the resistance below 5.0 ohms?

Yes → Repair the LDP Pressure Switch Sense Circuit for a short to ground.
Perform Powertrain Verification Test VER-5A.

No → Go To 7</td><td>All</td></tr>
<tr><td>7</td><td>Ignition Off
Disconnect the LDP Connector.
Note: Check connectors - Clean/repair as necessary.
Disconnect the PCM.
Note: Check connectors - Clean/repair as necessary.
Using an Ohmmeter, measure the resistance of the LDP Pressure Switch Sense Circuit from the PCM Connector to the LDP Connector.
Is the resistance below 5.0 ohms?

Yes → Go To 8

No → Repair the open LDP Switch Sense Circuit.
Perform Powertrain Verification Test VER-5A.</td><td>All</td></tr>
<tr><td>8</td><td>Ignition Off
Disconnect the Engine Vacuum Supply Hose at the LDP.
Disconnect the PCM.
Note: Check connectors - Clean/repair as necessary.
Key on.
With voltmeter connected to LDP switch sense circuit at PCM connector, ground the LDP solenoid control circuit. Then while applying vacuum to LDP with a hand vacuum pump, observe voltmeter.
Did the voltage change?

Yes → Go To 9

No → Replace the LDP.
Perform Powertrain Verification Test VER-5A.</td><td>All</td></tr>
<tr><td>9</td><td>Ignition Off
If there are no potential causes remaining, the PCM is assumed to be defective.
View repair options.

Repair
Replace the PCM.
Perform Powertrain Verification Test VER-5A.</td><td>All</td></tr>
</table>

Symptom:
P-1495 LEAK DETECTION PUMP SOLENOID CIRCUIT

When Monitored and Set Condition:

P-1495 LEAK DETECTION PUMP SOLENOID CIRCUIT

When Monitored: Immediately after a cold start, with ambient temperature between 4 deg C (40 deg F) and 32 deg C (90 deg F) and coolant temperature within –12 deg C (10 deg F) of ambient temperature.

Set Condition: The state of the solenoid does not change.

POSSIBLE CAUSES
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
LDP DEFECTIVE
LDP SOLENOID CKT WIRING HARNESS INTERMITTENT DEF
LDP SOLENOID CKT WIRING HARNESS OBSERVABLE DEFECT
LDP SOLENOID CONTROL CIRCUIT OPEN
LDP SOLENOID CONTROL CIRCUIT SHORT TO GROUND
PCM DEFECTIVE
NO POSSIBLE CAUSES REMAINING

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, actuate the LDP Pump Solenoid. Is it clicking? Yes → Go To 2 No → Go To 5	All
2	Ignition On, Engine Not Running. With the DRB, actuate the LDP Solenoid. While monitoring the LDP Switch state, wiggle Wiring Harness from the LDP Solenoid to PCM. Did the LDP Switch state ever change from up to down when wiggled? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-6A. No → Go To 3	All
3	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-6A. No → Go To 4	All

P-1495 LEAK DETECTION PUMP SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Check the freeze frame data to determine the conditions when code was set. Attempt duplication of 'freeze frame' conditions for added diagnostics. If there are no other possible causes remaining there is assumed to be an "intermittent" problem with a Wiring Harness Connector or Wire. View repair options. Repair Visually inspect related Wire Harness Connectors and Harnesses. Look for broken, bent, pushed out, or corroded terminals and for chafed, pierced, or partiallly broken wire, respectively. Refer to any hotlines or technical service bulletins that apply.	All
5	Ignition Off Disconnect the LDP Solenoid. **Note: Check connectors - Clean/repair as necessary.** Key on. Using a Voltmeter, measure the voltage of the Fused Ignition Switch Output Circuit at the Solenoid Connector. Is the voltage above 10.0 volts? Yes → Go To 6 No → Repair the open Fused Ignition Switch Output Circuit. Perform Powertrain Verification Test VER-6A.	All
6	Ignition Off Disconnect the LDP Solenoid. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the LDP Solenoid Control Circuit at the PCM Connector to ground. Is the resistance below 5.0 ohms? Yes → Repair the LDP Solenoid Circuit for a short to ground. Perform Powertrain Verification Test VER-6A. No → Go To 7	All
7	Ignition Off Disconnect the LDP Solenoid. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the resistance of the LDP Solenoid Control Circuit from the PCM Connector to the LDP Connector. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair the open LDP Solenoid Control Circuit. Perform Powertrain Verification Test VER-6A.	All

P-1495 LEAK DETECTION PUMP SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Key on. With a Voltmeter, measure voltage of the LDP Solenoid Control Circuit at the PCM Connector. Is the voltage above 10.0 volts? Yes → Go To 9 No → Replace the LDP. Perform Powertrain Verification Test VER-6A.	All
9	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-6A.	All

Symptom:
P-1496 5 VOLT SUPPLY OUTPUT TOO LOW

When Monitored and Set Condition:

P-1496 5 VOLT SUPPLY OUTPUT TOO LOW

When Monitored: With the ignition on.

Set Condition: The 5-volt supply to the sensors is below 3.5 volts for 4 seconds.

POSSIBLE CAUSES
5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND
5-VOLT SUPPLY WIRING HARNESS INTER DEF
A/C PRESSURE SENSOR DEFECTIVE
MAP SENSOR DEFECTIVE
THROTTLE POSITION SENSOR DEFECTIVE
PCM DEF (5 VOLT SUPPLY CIRCUIT)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running Disconnect the Throttle Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary** With a voltmeter, probe the 5-Volt Supply Ckt at the TP Sensor harness connector. **Note: Reconnect TPS Connector after measurement.** Is the voltage reading below 4.5 volts? Yes → Go To 2 No → Go To 6	All
2	Ignition On, Engine Not Running. Disconnect the Throttle Position Sensor Connector. Disconnect the A/C Pressure Sensor. **Note: Check connectors - Clean/repair as necessary.** With a voltmeter, probe the TP Sensor 5-Volt Supply Circuit to the TP Sensor. Is the 5-Volt Supply Circuit voltage above 4.0 volts? Yes → Replace the A/C Pressure Sensor. Perform Powertrain Verificaton Test VER-2A. No → Go To 3	All
3	Ignition On, Engine Not Running Disconnect the Throttle Position Sensor Connector. Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** With the voltmeter, probe the TP Sensor 5-Volt Supply Circuit to the TP Sensor. Is the 5-Volt Supply Circuit voltage above 4.0 volts? Yes → Replace the Map Sensor. Perform Powertrain Verification Test VER-2A. No → Go To 4	All

P-1496 5 VOLT SUPPLY OUTPUT TOO LOW — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the Throttle Position Sensor Connector. Disconnect the MAP Sensor Electrical Connector. Disconnect the A/C Sensor Connector. Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** With the ohmmeter, probe the 5-volt supply circuit at the TPS Connector. Is the resistance below 5.0 ohms? Yes → Repair the 5-volt Supply Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 5	All
5	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
6	Ignition On, Engine Not Running Disconnect the MAP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** With the voltmeter, probe the 5-Volt Supply Ckt at the MAP Sensor Connector. Is the voltage reading below 4.5 volts? Yes → Replace the TPS. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All
7	Ignition On, Engine Not Running Disconnect the MAP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** With the DRB in voltmeter mode, probe the 5-volt supply circuit voltage at the MAP Sensor Connector. Wiggle all connectors and wiring to all sensors (MAP, A/C PRESS, TPS). While you wiggle the connectors and wiring to all sensors monitor the 5.0 volt supply circuit voltage. Was there any voltage change? Yes → Repair the harness or connector that caused the voltage change. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
P-1598 A/C PRESSURE SENSOR VOLTS TOO HIGH

When Monitored and Set Condition:

P-1598 A/C PRESSURE SENSOR VOLTS TOO HIGH

When Monitored: With the ignition on, the engine running, and the A/C relay energized.

Set Condition: The A/C pressure sensor signal at PCM cavity 42 goes above 4.9 volts.

POSSIBLE CAUSES
AIR CONDITIONING PRESSURE SENSOR GROUND CIRCUIT OPEN
AIR CONDITIONING PRESSURE SENSOR DEFECTIVE
A/C PRESS SENSOR CONN AND WIRING HARN INTER DAMAGE
A/C PRESSURE SENSOR CONNECTOR AND HARNESS OBSERVABLE DEFECT
A/C PRESSURE SENSOR SIGNAL CIRCUIT OPEN
A/C PRESSURE SENSOR SIGNAL SHORT TO VOLTAGE
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the A/C Pressure Sensor voltage. Is the A/C Pressure Sensor voltage above 4.6 volts? Yes → Go To 2 No → Go To 7	All
2	Ignition Off Disconnect the A/C Pressure Sensor. **Note: Check connectors - Clean/repair as necessary.** Turn ignition on. Using a Voltmeter, measure voltage of the A/C Pressure Signal Circuit to ground. Is the voltage above 6.0 volts? Yes → Repair A/C Pressure Sensor Signal shorted to voltage. Perform Powertrain Verification Test VER-2A. No → Go To 3	All

P-1598 A/C PRESSURE SENSOR VOLTS TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the A/C Pressure Sensor. **Note: Check connectors - Clean/repair as necessary.** Connect a Jumper Wire between the A/C Pressure Sensor Signal Circuit and Sensor Ground Circuit. Ignition on with engine not running. With the DRB, read the A/C Pressure Sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the A/C Pressure Sensor. Perform Powertrain Verification Test VER-2A. No → Go To 4	All
4	Ignition Off Disconnect the A/C Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a Jumper Wire between the A/C Pressure Sensor Signal Circuit and Engine Ground. Ignition on, engine not running. With the the DRB, read the A/C Pressure Sensor voltage. Is the voltage below 1.0 volt? Yes → Repair the open Sensor Ground Circuit. Perform Powertrain Verification Test VER-2A. No → Go To 5	All
5	Ignition Off. Disconnect the A/C Pressure Sensor. **Note: Check connectors - Clean/repair as necessary.** Disconnect the PCM. Using an Ohmmeter, measure the A/C Pressure Sensor Signal Circuit from the PCM to the Sensor. Is the resistance below 5.0 ohms? Yes → Go To 6 No → Repair the open A/C Presure Sensor Circuit. Perform Powertrain Verification Test VER-2A.	All
6	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
7	Ignition On, Engine Not Running. With the DRB, read the A/C Pressure Sensor voltage. Using the schematic as a guide, wiggle the A/C Pressure Sensor Connector and Harness. Monitor the DRB display. Was there any A/C Pressure Sensor voltage change? Yes → Repair the Harness or Connector that caused the voltage to change. Perform Powertrain Verification Test VER-2A. No → Go To 8	All

P-1598 A/C PRESSURE SENSOR VOLTS TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
P-1599 A/C PRESSURE SENSOR VOLTS TOO LOW

When Monitored and Set Condition:

P-1599 A/C PRESSURE SENSOR VOLTS TOO LOW

When Monitored: With the ignition switch on, the engine running , and the A/C relay energized.

Set Condition: The A/C pressure sensor signal voltage at PCM cavity 42 goes below 0.5 volt, or the voltage is below .059 volt.

POSSIBLE CAUSES
A/C PRESSURE SENSOR 5-VOLT SUPPLY CKT OPEN
A/C PRESS SEN CONN AND WIRING HARN OBSERVABLE DEF
A/C PRESSURE SEN SIG CKT SHORTED TO SEN GND CKT
A/C PRESSURE SENSOR CONN AND WIRING HARN INTER DEF
A/C PRESSURE SENSOR SIGNAL CKT SHORTED TO GND
A/C PRESSURE SENSOR DEFECTIVE
PCM DEF (A/C PRESSURE SEN)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read the A/C Pressure Sensor voltage. Is the A/C Pressure Sensor voltage below 0.2 volt? Yes → Go To 2 No → Go To 7	All
2	Ignition Off Disconnect the A/C Pressure Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on with engine not running. Using a Voltmeter, measure the 5-Volt Supply Circuit. Is the A/C Pressure Sensor 5-volt Supply Circuit above 4.9 volts? Yes → Go To 3 No → Repair the open 5-Volt Supply Circuit. Perform Powertrain Verification Test VER-2A.	All

P-1599 A/C PRESSURE SENSOR VOLTS TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the A/C Pressure Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Ignition on with engine not running. With the DRB , read the A/C Pressure Sensor voltage. Is the A/C Pressure Sensor voltage above 4.5 volts? Yes → Replace the A/C Pressure Sensor. Perform Powertrain Verification Test VER-2A. No → Go To 4	All
4	Ignition Off Disconnect the Powertrain Control Module. Disconnect the A/C Pressure Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter ,test the resistance between the A/C Pressure Sensor Signal Circuit and Sensor Ground Circuit. Is the resistance below 5.0 ohms? Yes → Repair the Sensor Signal Circuit shorted to the Sensor Ground Circuit. Perform Powertrain Verification Test VER-2A. No → Go To 5	All
5	Ignition Off Disconnect the Powertrain Control Module. Disconnect the A/C Pressure Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the A/C Pressure Sensor Signal Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 6	All
6	Ignition off. If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A.	All
7	Ignition Off Using the schematic as a guide, inspect the wiring and connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 8	All

P-1599 A/C PRESSURE SENSOR VOLTS TOO LOW — Continued

TEST	ACTION	APPLICABILITY
8	Ignition On, Engine Not Running Use the Schematic as a guide, wiggle A/C Pressure Sensor Connector and Harness. Monitor the DRB display. Was there an A/C Pressure Sensor voltage change? Yes → Repair the Harness or Connector that caused the voltage to change. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
P-1695 NO CCD MESSAGE FROM BODY CONTROLLER

When Monitored and Set Condition:

P-1695 NO CCD MESSAGE FROM BODY CONTROLLER

When Monitored: Anytime the engine is running.

Set Condition: No CCD messages are received from the BCM for 30 seconds.

POSSIBLE CAUSES
CCD BUS (+) CIRCUIT OPEN
CCD BUS (-) CIRCUIT OPEN
WIRING HARNESS OBSERVABLE DEFECT
BCM ″NO RESPONSE″
PCM DEF (NO CCD MSG)

TEST	ACTION	APPLICABILITY
1	Ignition on with engine not running. Erase trouble codes. Start engine and allow to run for 1 minute. With the DRB, read trouble codes. Does display show ″No CCD messages from Body Control Module″ and a start run counter of zero? Yes → Go To 2 No → Go To 6	All
2	Ignition off. Disconnect the PCM Connectors. Disconnect the BCM Connectors. **Note: Check Connectors - clean/repair as necessary.** Using an ohmmeter, measure the CCD Bus (+) Circuit from the PCM to the BCM. Is the resistance below 5.0 ohms? Yes → Go To 3 No → Repair the open CCD Bus (+) Ckt between BCM and PCM. Perform Verification Test VER-2A.	All
3	Ignition off. Disconnect the PCM Connectors. Disconnect the BCM Connectors. **Note: Check Connectors - clean/repair as necessary.** Using an ohmmeter, measure the CCD (-) Circuit for resistance from PCM to the BCM. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the open CCD Bus (-) Ckt between BCM and PCM. Perform Verification Test VER-2A.	All

P-1695 NO CCD MESSAGE FROM BODY CONTROLLER — Continued

TEST	ACTION	APPLICABILITY
4	Ignition on with engine not running. With the DRB, select BCM. Does the DRB display show "No response"? Yes → Replace the BCM. Perform Verification Test VER-2A. No → Go To 5	All
5	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Verification Test VER-2A.	All
6	Ignition off. Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Verification Test VER-2A. No → Test Complete.	All

Symptom List:

P-1696 PCM FAILURE EEPROM WRITE DENIED
P-1697 PCM FAILURE SRI MILE NOT STORED

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P-1696 PCM FAILURE EEPROM WRITE DENIED.

POSSIBLE CAUSES
POWERTRAIN CONTROL MODULE DEFECTIVE ″WRITE REFUSED″
SRI MEMORY / INSTRUMENT PANEL ODO MILEAGE SAME
SRI MEMORY ″SRI MILEAGE INVALID″
SRI MEMORY NEEDS UPDATING
PCM DEFECTIVE ″WRITE FAILURE″

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. With the DRB, perform the SRI Memory Test. Does the DRB display ″Write Refused″? Yes → Go To 2 No → Go To 4	All
2	Ignition on, engine not running. With the DRB, perform the SRI Memory Test. Does the DRB display ″Write Failure?″ Yes → Replace the Powertrain Control Module. Perform Verification Test VER-2A. No → Go To 3	All
3	Ignition on, engine not running. With the DRB, perform the SRI Memory Test. **Note: Retest the SRI Memory two more times when necessary.** Did the trouble code ″Write Refused″ return? Yes → Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All
4	Ignition on, engine not running. With the DRB, perform the SRI Memory Test. Does the DRB display ″SRI Mileage Invalid?″ Yes → Update the mileage and retest the SRI Memory. Perform Powertrain Verification Test VER-2A. No → Go To 5	All

P-1696 PCM FAILURE EEPROM WRITE DENIED — Continued

TEST	ACTION	APPLICABILITY
5	Ignition on, engine not running. With the DRB, perform the SRI Memory Test. Does the DRB display "Write Failure?" Yes → Replace the Powertrain Control Module. Perform Verification Test VER-2A. No → Go To 6	All
6	Ignition on, engine not running. Compare SRI mileage stored value to the Instrument Panel Odometer mileage. Is the mileage the same? Yes → Retest the SRI Memory. Perform Powertrain Verification Test VER-2A. No → Go To 7	All
7	Ignition off. If there are no potential causes remaining, the SRI Memory is assumed to be in need of updating. View repair options. Repair Update the mileage and retest the SRI Memory. Perform Powertrain Verification Test VER-2A.	All

Symptom:
P-1698 NO CCD MESSAGES FROM TCM

When Monitored and Set Condition:

P-1698 NO CCD MESSAGES FROM TCM

When Monitored: With the engine running.

Set Condition: No CCD messages are received from the TCM for 10 seconds.

POSSIBLE CAUSES
DRB DOES NOT SHOW BUS OPERATIONAL
CCD WIRING HARNESS OBSERVABLE DEFECT
CCD BUS (+) CIRCUIT OPEN BETWEEN PCM AND TCM
CCD BUS (-) CIRCUIT OPEN BETWEEN PCM AND TCM
PCM DEFECTIVE (NO CCD MESSAGE)
TCM DEFECTIVE (NO CCD MESSAGE)

TEST	ACTION	APPLICABILITY
1	Ignition On With the DRB, select ″Transmission″. **Note: The CCD Bus test is automatic.** Does the DRB show ″Bus Operational″? Yes → Go To 2 No → Go to the appropriate symptom group for body diagnostics.	All
2	Ignition Off With the DRB, select ″Engine″ module. With the DRB erase trouble codes. Raise all four wheels off the ground and properly support the vehicle. **Caution: Keep clear of rotating wheels in the next step.** Start the engine. Place the Shift Lever in Drive and allow the wheels to rotate for 1 minute. Step on the brakes, put the Shift Lever back in Park. With the DRB read Trouble Codes. Does display show ″No CCD Message from TCM″ and the start run counter equal to zero? Yes → Go To 3 No → Go To 7	All

P-1698 NO CCD MESSAGES FROM TCM — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the PCM Connectors. Disconnect the TCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the CCD Bus (+) Circuit between the PCM and TCM Connectors. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the open CCD Bus (+) Circuit between PCM and TCM. Perform Powertrain Verification Test VER-2A.	All
4	Ignition Off Disconnect the PCM Connectors. Disconnect the TCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the CCD Bus (-) Circuit between the PCM and TCM Connectors. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open CCD Bus (-) Circuit between the PCM and TCM. Perform Powertrain Verification Test VER-2A.	All
5	Key On Using the DRB under ″Transmission″ select ″41TE″. Does the DRB display show ″No Response″? Yes → Replace the Transmission Control Module. Perform Powertrain Verification Test VER-2A. No → Go To 6	All
6	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
7	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
CHECKING 5 VOLT SUPPLY CIRCUIT

POSSIBLE CAUSES
5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND
5-VOLT SUPPLY WIRING HARNESS INTER DEF
A/C PRESSURE SENSOR DEFECTIVE
MAP SENSOR DEFECTIVE
THROTTLE POSITION SENSOR DEFECTIVE
PCM DEF (5 VOLT SUPPLY CIRCUIT)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running Disconnect the Throttle Position Sensor Connector. **Note: Check connectors - Clean/repair as necessary** With a voltmeter, probe the 5-Volt Supply Ckt at the TP Sensor harness connector. Is the voltage reading below 4.5 volts? Yes → Go To 2 No → Go To 6	All
2	Ignition On, Engine Not Running. Disconnect the Throttle Position Sensor Connector. Disconnect the A/C Pressure Sensor. **Note: Check connectors - Clean/repair as necessary.** With a voltmeter, probe the TP Sensor 5-Volt Supply Circuit to the TP Sensor. Is the 5-Volt Supply Circuit voltage above 4.0 volts? Yes → Replace the A/C Pressure Sensor. Perform Powertrain Verificaton Test VER-2A. No → Go To 3	All
3	Ignition On, Engine Not Running Disconnect the Throttle Position Sensor Connector. Disconnect the MAP Sensor Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** With the voltmeter, probe the TP Sensor 5-Volt Supply Circuit to the TP Sensor. Is the 5-Volt Supply Circuit voltage above 4.0 volts? Yes → Replace the Map Sensor. Perform Powertrain Verification Test VER-2A. No → Go To 4	All

CHECKING 5 VOLT SUPPLY CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the Throttle Position Sensor Connector. Disconnect the MAP Sensor Electrical Connector. Disconnect the A/C Sensor Connector. Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** With the ohmmeter, probe the 5-volt supply circuit at the TPS Connector. Is the resistance below 5.0 ohms? Yes → Repair the 5-volt Supply Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 5	All
5	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-2A.	All
6	Ignition On, Engine Not Running Disconnect the MAP Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** With the voltmeter, probe the 5-Volt Supply Ckt at the MAP Sensor Connector. Is the voltage reading below 4.5 volts? Yes → Replace the TPS. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
* CHECKING EGR SYSTEM

POSSIBLE CAUSES
VACUUM LINE TO EGR SOLENOID RESTRICTION OR LEAK
VACUUM NIPPLE AT THROTTLE BODY PLUGGED
EGR VALVE ASSEMBLY DEFECTIVE
EGR VALVE ASSEMBLY DOES NOT HOLD VACUUM
EGR VALVE ASSEMBLY TONE CHANGED
EGR VALVE ASSEMBLY VACUUM <= 3 INCHES
PASSAGES BETWEEN EGR VALVE AND INTAKE CLOSED

TEST	ACTION	APPLICABILITY
1	Ignition Off Disconnect the Vacuum Supply Hose at the EGR Solenoid. Connect a vacuum gauge to the disconnected Vacuum Supply Hose. Start the Engine. Was the vacuum above 10″ at idle? Yes → Go To 2 No → Go To 10	All
2	Ignition Off Connect Back Pressure Hose to transducer. Connect a hand pump to the EGR Valve Nipple. Start the Engine. Slowly apply vacuum to the EGR Valve, watch for Engine speed to drop. Did the Engine speed drop? Yes → Go To 3 No → Go To 6	All
3	Ignition Off Adjust a shop air source to 20 PSI and connect to Backpressure Tube at base of EGR Valve. While opening and closing the throttle, listen for a tone change. Did the tone change? Yes → Replace the EGR Valve Assembly. Perform Verification Test VER-2A. No → Go To 4	All
4	Ignition Off Connect a hand pump to the EGR Valve Nipple. Apply 10 inches of vacuum and hold for 30 seconds. Did the Vacuum hold for 30 seconds? Yes → Go To 5 No → Replace the EGR Valve Assembly. Perform Verification Test VER-2A.	All

* CHECKING EGR SYSTEM — Continued

TEST	ACTION	APPLICABILITY
5	Engine Running Disconnect the EGR Valve Hose from the EGR Valve. Connect the vacuum gauge to the disconnected EGR Valve Hose. While watching the gauge, unplug EGR Solenoid Electrical Connector. Is the Vacuum over 3 inches at this time? Yes → Test Complete. No → Replace the EGR Valve Assembly. Perform Verification Test VER-2A.	All
6	Ignition Off Adjust a shop air source to 20 PSI and connect to Backpressure Tube at base of EGR Valve. While opening and closing the throttle, listen for a tone change. Did the tone change? Yes → Replace the EGR Valve Assembly. Perform Verification Test VER-2A. No → Go To 7	All
7	Engine Running Disconnect the EGR Valve Hose from the EGR Valve. Connect the vacuum gauge to the disconnected EGR Valve Hose. While watching the gauge, unplug EGR Solenoid Electrical Connector. Is the Vacuum over 3 inches at this time? Yes → Go To 8 No → Replace the EGR Valve Assembly. Perform Verification Test VER-2A.	All
8	Ignition Off Remove the EGR Valve Assembly and inspect passages from Valve to Intake Manifold. Were passages open between EGR Valve and intake? Yes → Go To 9 No → Repair the EGR Passages as necessary. Perform Verification Test VER-2A.	All
9	Ignition Off If there are no potential causes remaining, the EGR Valve Assembly is assumed to be defective. View repair options. Repair Replace the EGR Valve Assembly. Perform Verification Test VER-2A.	All
10	Ignition Off Disconnect the EGR Vacuum Supply Hose at the Intake Manifold. Connect a vacuum gauge to the Intake Manifold Nipple. Read the vacuum gauge at idle. Was the vacuum above 10″ at idle? Yes → Repair the restriction or leak in the vacuum line to EGR Solenoid. Perform Verification Test VER-2A. No → Go To 11	All

* CHECKING EGR SYSTEM — Continued

TEST	ACTION	APPLICABILITY
11	Ignition Off If there are no potential causes remaining, the vacuum nipple at the throttle body is assumed to be plugged. View repair options. Repair Repair the plugged Vacuum Nipple at the Throttle Body. Perform Verification Test VER-2A.	All

Symptom:
* CHECKING ENGINE VACUUM

TEST	ACTION	APPLICABILITY
1	Ignition Off Connect a Vacuum Gauge to a Vacuum Source on the Engine. Start the Engine and allow it to idle. **Note: The normal vacuum reading will vary according to the altitude.** While monitoring the vacuum gauge, snap the throttle open a few times. Refer to vacuum gauge specifications in support material. Observe the Vacuum Gauge reading at idle. Is the Vacuum Gauge reading between 13 inches and 22 inches steady? Yes → Test Complete. No → Refer to symptom * CHECKING THE ENGINE MECHANICAL SYSTEMS in the DRIVEABILITY category.	All

Symptom:
* CHECKING EVAPORATIVE EMISSION SYSTEM

POSSIBLE CAUSES
EVAP PURGE SOLENOID DEFECTIVE
EVAP PURGE SOLENOID DEFECTIVE
EVAPORATIVE CANISTER DEFECTIVE
EVAPORATIVE EMISSION VACUUM HOSE OBSERVABLE DEFECT
VACUUM LINE OBSERVABLE DEFECT
VACUUM LINE PLUGGED
VACUUM LINE PLUGGED
TEST PASSED

TEST	ACTION	APPLICABILITY
1	Ignition Off **Note: Carefully inspect all Vacuum Hoses for proper routing and for pinched or plugged Hoses from the engine to the PPS to the Gas Tank.** Are all the Vacuum Hoses OK? Yes → Go To 2 No → Repair the Vacuum Hoses as necessary. Perform Powertrain Verification Test VER-2A.	All
2	Ignition Off Start the engine and allow it to reach normal operating temperature 76 deg C (170 deg. F). Turn ignition off. Disconnect the Purge Vacuum Hose at the Solenoid that goes to the Canister. Start the engine. **Note: There should be no flow through the Solenoid from 1 to 2 minutes.** Is the PPS allowing vacuum through the Solenoid within 1 minute? Yes → Go To 3 No → Go To 6	All
3	Ignition Off Inspect the line from the PPS to the Canister. Is the line disconnected, ripped or cut? Yes → Repair the Line and replace the Purge Solenoid. Perform Powertrain Verification Test VER-2A. No → Go To 4	All
4	Ignition Off Remove the Purge Solenoid and tap the ports against a clean solid surface. Did any foreign material fall out? Yes → Go To 5 No → Replace the Evap Purge Solenoid. Perform Powertrain Verification Test VER-6A.	All

* CHECKING EVAPORATIVE EMISSION SYSTEM — Continued

TEST	ACTION	APPLICABILITY
5	If there are no potential causes remaining, the Vacuum Line is assumed to be defective. View repair options. Repair Clean out the Line and replace the PPS and Canister. Perform Powertrain Verification Test VER-2A.	All
6	Ignition Off Disconnect the Purge Vacuum Hose at the Solenoid that goes to the Canister. **Note: In the next steps, do not use more that five PSI.** Attempt to blow air through the Vacuum Line that goes to the canister. Does the Canister and Vacuum Line allow air to pass? Yes → Purge Solenoid and hoses OK. Test passed. No → Go To 7	All
7	Ignition Off Start the engine and allow it to reach normal operating temperature 76 deg C (170 deg F). Turn ignition off. Disconnect the Purge Vacuum Hose at the Solenoid that goes to the Canister. Start the engine. **Note: After 90 seconds, the Purge Solenoid will allow vacuum to cycle intermittently at a steady rate.** Is the Evap Solenoid allowing vacuum to cycle through intermittently at a steady rate? Yes → Go To 8 No → Replace the Purge Solenoid. Perform Powertrain Verification Test VER-6A.	All
8	Ignition Off **Note: In the next steps, do not use more than five psi.** Disconnect the Purge Vacuum Hose at the Solenoid that goes to the Canister. Disconnect the Vacuum Line at the Canister that goes to the EVAP Solenoid. Attempt to blow air through the Vacuum Line that goes to the Canister. Does the Vacuum Line allow air to pass? Yes → Go To 9 No → Repair or replace the Vacuum Line. Perform Powertrain Verification Test VER-2A.	All
9	If there are no potential causes remaining, the Evaporative Canister is assumed to be defective. View repair options. Repair Replace the Evaporative Canister. Perform Powertrain Verification Test VER-2A.	All

Symptom:
* CHECKING FOR OXYGEN SENSOR SWITCHING

POSSIBLE CAUSES
O2 SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
ENGINE VACUUM ABNORMAL
FUEL DELIVERY SYSTEM DEFECTIVE
O2 SENSOR DEFECTIVE
AIR INLET SYSTEM RESTRICTED

TEST	ACTION	APPLICABILITY
1	Engine Running **Note: the Engine must be running and at normal operating temperature.** **Note: The Downstream O2 Sensor should switch slower than the Upstream O2 Sensor.** With the DRB, read the O2 Sensor voltages for 10 seconds or more. Are the O2 Sensor voltages switching normally? Yes → Test Complete. No → Go To 2	All
2	Engine Running **Note: The Engine must be running and at normal operating temperature.** **Note: The Downstream O2 Sensor should switch slower than the Upstream O2 Sensor.** With the DRB, read the O2 Sensor voltages for 10 seconds or more. Is the Upstream O2 Sensor locked ″LEAN″? Yes → Go To 3 No → Go To 9	All
3	Ignition On, Engine Not Running With the DRB, read the O2 Sensor Signal voltages. Is the voltage below 0.10 volts for the Upstream or Downstream O2 Sensor? Yes → Go To 4 No → Go To 7	All
4	Engine Running Allow the Engine to idle. Inspect the Engine for any abnormal vacuum conditions. Are there any abnormal vacuum conditions? Yes → Repair abnormal Engine Vacuum condition as required. Perform Powertrain Verification Test VER-2A. No → Go To 5	All

* CHECKING FOR OXYGEN SENSOR SWITCHING — Continued

TEST	ACTION	APPLICABILITY
5	Ignition Off Disconnect the Upstream or Downstream O2 Sensor Connector that the voltage is below 0.10 volts. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the O2 Sensor Signal Circuit and a good ground. Is the resistance below 5.0 ohms? Yes → Repair the O2 Sensor Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-2A. No → Go To 6	All
6	If there are no potential causes remaining, the Upstream or Downstream O2 Sensor is assumed to be defective. View repair options. Repair Replace the Upstream or Downstream O2 Sensor that was below 0.10 volts. Perform Powertrain Verification Test VER-2A.	All
7	Engine Running Allow the Engine to idle. Inspect the Engine for any abnormal vacuum conditions. Are there any abnormal vacuum conditions? Yes → Repair abnormal Engine Vacuum condition as required. Perform Powertrain Verification Test VER-2A. No → Go To 8	All
8	Engine Running With the DRB, reset the Adaptive Fuel Memory. **Note: The engine must be running and at normal operating temperature.** **Note: The Downstream O2 Sensor should switch slower than the Upstream O2 Sensor.** With the DRB, read the O2 Sensor voltages for 10 seconds or more. Are the O2 Sensor voltages switching normally? Yes → Test Complete. No → Refer to symptom * CHECKING THE ENGINE MECHANICAL SYSTEMS in the DRIVEABILITY category.	All
9	Ignition Off Install a Fuel Pressure Gauge to the Fuel Line. Use special tools if necessary. Turn ignition on. With the DRB, actuate the ASD Fuel System Test. Allow Fuel Pressure to stabilize. With the DRB, stop Fuel System Test. Monitor the Pressure Gauge for 1 minute. Is the Fuel Pressure below 10 psi? Yes → If Fuel Pump and Lines are OK, replace leaking Injector(s) as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 10	All

* CHECKING FOR OXYGEN SENSOR SWITCHING — Continued

TEST	ACTION	APPLICABILITY
10	Ignition Off Inspect the Air Filter and Inlet Ducts for restriction(s). Were there any restrictions? Yes → Repair or replace the Air Inlet System as necessary. Perform Powertrain Verification Test VER-2A. No → Refer to symptom * CHECKING THE ENGINE MECHANICAL SYSTEMS in the DRIVEABILITY category.	All

Symptom:
* CHECKING FUEL DELIVERY

POSSIBLE CAUSES
FUEL LINE RESTRICTED
FUEL FILTER DEFECTIVE
FUEL LINE RESTRICTED
FUEL PRESSURE REGULATOR DEFECTIVE
FUEL PUMP/REGULATOR ASSEMBLY DEFECTIVE
FUEL RETURN LINE DEFECTIVE
FUEL PUMP/REGULATOR ASSEMBLY DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the Fuel Pressure. Connect a Fuel Pressure Gauge to test port. Ignition On, Engine Not Running With the DRB, actuate Fuel System. Fuel Pressure should be 43 to 53 psi. Fuel Pressure should be 43 to 53 psi. Is the Fuel Pressure within the specification? Yes → Go To 2 No → Go To 5	ENGINE - 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.8L V6
2	Ignition Off **Note: Make sure the Gear Lever is in neutral, and the Park Brakes engaged.** Start the engine. Monitor the Fuel Pressure Gauge in the next step. While monitoring the pressure, momentarily snap Throttle wide open raising RPM to above 3000. Did the fuel pressure drop below 35 psi at all? Yes → Go To 3 No → Test Complete.	All
3	Ignition Off Inspect the Chassis Fuel Supply Line to the engine for a kink or restriction. Is the line kinked or restricted? Yes → Release the fuel pressure. Repair the Fuel Line as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 4	All

* CHECKING FUEL DELIVERY — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the fuel pressure. Remove the Fuel Pressure Gauge from the Fuel Rail. Adjust a shop air hose to 40 psi. Remove the Fuel Filter. Using shop air, inspect the Fuel Filter passage by attempting to blow air through inlet. Is the Fuel Filter restricted? Yes → Replace the Fuel Filter. Perform Powertrain Verification Test VER-2A. No → Replace the Fuel Pump and Regulator Assembly. Perform Powertrain Verification Test VER-2A.	All
5	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release the Fuel Pressure. Connect a Fuel Pressure Gauge to test port. Ignition On, Engine Not Running. With the DRB, actuate Fuel System. Fuel Pressure should be 43 to 53 psi for Gasoline Engines and 50 to 60 psi for Flexible Fuel Vehicle. Record the Fuel Pressure reading. Is the Fuel Pressure above the specification? Yes → Go To 6 No → Go To 8	ENGINE - 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.8L V6
6	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the fuel pressure. Remove the Fuel Pressure Gauge from the Fuel Rail. Remove the Fuel Return Line between the Fuel Tank and Filter. Adjust a shop air hose to 40 psi. Using shop air, inspect the Fuel Line by attempting to blow air through it. Is the Fuel Return Line restricted? Yes → Replace the Fuel Return Line. Perform Powertrain Verification Test VER-2A. No → Go To 7	All
7	If there are no potential causes remaining, the Fuel Pressure Regulator is assumed to be defective. View repair options. Repair Replace the Fuel Pressure Regulator. Perform Powertrain Verification Test VER-2A.	All

* CHECKING FUEL DELIVERY — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Inspect the Chassis Fuel Supply Line to engine for a kink or restriction. Is the Line kinked or restricted? Yes → Release the Fuel Pressure. Repair the Fuel Line as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 9	ENGINE - 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.8L V6
9	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the fuel pressure. Connect a Fuel Pressure Adapter and Gauge to Supply Line between Tank/Filter. Turn ignition on. With the DRB, actuate the Fuel System test. Is the Fuel Pressure at least 5 psi higher than previously recorded pressure? Yes → Release the Fuel Pressure. Replace the Fuel Filter. Perform Powertrain Verification Test VER-2A. No → Go To 10	ENGINE - 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.8L V6
10	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the fuel pressure. Connect a Fuel Pressure Adapter and Gauge to Supply Line between Tank/Filter. Turn ignition on. With the DRB, actuate the Fuel System test. Is Fuel Pressure at least 5 psi higher than previously recorded pressure? Yes → Test Complete. No → Release the Fuel Pressure. Replace the Fuel Pump and Regulator Assembly. Perform Powertrain Verification Test VER-2A.	ENGINE - 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.8L V6
11	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Relieve the Fuel Pressure. Tee-in Fuel Pressure Gauge into the Fuel Supply Hose using Tool #6433. Turn ignition on. With the DRB, actuate the ASD Fuel System test. Is the Fuel Pressure between 43 and 53 psi? Yes → Go To 12 No → Go To 15	ENGINE - 3.0L V6
12	Ignition Off **Note: Make sure the Gear Lever is in neutral, and the Park Brakes engaged.** Start the engine. Monitor the Fuel Pressure Gauge in the next step. While monitoring the pressure, momentarily snap Throttle wide open raising RPM to above 3000. Did the fuel pressure drop below 35 psi at all? Yes → Go To 13 No → Test Complete.	All

* CHECKING FUEL DELIVERY — Continued

TEST	ACTION	APPLICABILITY
13	Ignition Off Inspect the Chassis Fuel Supply Line to the engine for a kink or restriction. Is the line kinked or restricted? Yes → Release the fuel pressure. Repair the Fuel Line as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 14	All
14	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the fuel pressure. Remove the Fuel Pressure Gauge from the Fuel Rail. Adjust a shop air hose to 40 psi. Remove the Fuel Filter. Using shop air, inspect the Fuel Filter passage by attempting to blow air through inlet. Is the Fuel Filter restricted? Yes → Replace the Fuel Filter. Perform Powertrain Verification Test VER-2A. No → Replace the Fuel Pump and Regulator Assembly. Perform Powertrain Verification Test VER-2A.	All
15	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Relieve the Fuel Pressure. Tee-in Fuel Pressure Gauge into the Fuel Supply Hose using Tool #6433. Turn Ignition On. With the DRB, actuate the ASD Fuel System test. Record the Fuel Pressure reading. Is the Fuel Pressure above 53 psi? Yes → Go To 16 No → Go To 18	ENGINE - 3.0L V6
16	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the fuel pressure. Remove the Fuel Pressure Gauge from the Fuel Rail. Remove the Fuel Return Line between the Fuel Tank and Filter. Adjust a shop air hose to 40 psi. Using shop air, inspect the Fuel Line by attempting to blow air through it. Is the Fuel Return Line restricted? Yes → Replace the Fuel Return Line. Perform Powertrain Verification Test VER-2A. No → Go To 17	All
17	If there are no potential causes remaining, the Fuel Pressure Regulator is assumed to be defective. View repair options. Repair Replace the Fuel Pressure Regulator. Perform Powertrain Verification Test VER-2A.	All

* CHECKING FUEL DELIVERY — Continued

TEST	ACTION	APPLICABILITY
18	Ignition Off Inspect the Chassis Fuel Supply Line to engine for a kink or restriction. Is the Fuel Line kinked or restricted? Yes → Release the Fuel Pressure. Repair the Fuel Line as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 19	ENGINE - 3.0L V6
19	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the fuel pressure. Install Fuel Pressure Gauge between Fuel Tank and Fuel Filter. Key on. With the DRB, actuate the ASD Fuel System test. Is fuel pressure at least 5 psi higher than the previously recorded pressure? Yes → Release the Fuel Pressure. Replace the Fuel Filter. Perform Powertrain Verification Test VER-2A. No → Go To 20	ENGINE - 3.0L V6
20	Ignition Off **Warning: The Fuel System must be opened and may be under high pressure.** Release the fuel pressure. Install Fuel Pressure Gauge between Fuel Tank and Fuel Filter. Key on. With the DRB, actuate the ASD Fuel System test. Is fuel pressure at least 5 psi higher than the previously recorded pressure? Yes → Test Complete. No → Release the Fuel Pressure. Replace the Fuel Pump and Regulator Assembly. Perform Powertrain Verification Test VER-2A.	ENGINE - 3.0L V6

Symptom:
* CHECKING IDLE AIR CONTROL MOTOR

POSSIBLE CAUSES
ENGINE SPEED WITHIN TOLERANCE
IAC MOTOR CONNECTOR OBSERVABLE DEFECT
ENGINE HAS VACUUM LEAKS
IAC MOTOR DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Engine Running With the DRB in actuator tests, set the engine speed to 1400 RPM and then to 900 RPM. Did the engine RPM go from 1400 RPM to 900 RPM? Yes → With the DRB, stop all tests, test complete. No → Go To 2	All
2	Engine Running Inspect the engine for any vacuum leak(s). Is there any vacuum leaks? Yes → Repair Vacuum Leak(s) as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 3	All
3	Turn the ignition off. Disconnect the IAC motor harness connector. Start the engine and allow it to idle. Using a test light connected to ground, probe the IAC Driver #1 circuit. Repeat the above test for the remaining IAC Driver circuits. Did the test light turn on and off at any time for each IAC driver circuit? Yes → Go To 4 No → Go To 5	All
4	Turn the ignition off. Disconnect the IAC motor harness connector. Start the engine and allow it to idle. Using a test light connected to battery positive, probe the IAC Driver #1 circuit. Repeat the above test for the remaining IAC Driver circuits. Did the test light turn on and off at any time for each IAC driver circuit? Yes → Go To 6 No → Go To 8	All

* CHECKING IDLE AIR CONTROL MOTOR — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition on. Disconnect the IAC motor harness connector. Disconnect the PCM harness connector. Measure the resistance of the IAC motor driver circuit(s) that indicated no test light illumination. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair the open IAC motor driver circuit(s). Perform Powertrain Verification Test VER-2A.	All
6	Ignition Off Disconnect the IAC Motor Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect all Terminals. Are there any Terminals damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-2A. No → Go To 7	All
7	If there are no potential causes remaining, the IAC Motor is assumed to be defective. Repair Replace the Idle Air Control Motor. Perform Powertrain Verification Test VER-2A.	All
8	If there are no possible causes remaining, replace PCM. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A.	All

Symptom:
* CHECKING INTAKE AIR TEMPERATURE SENSOR

POSSIBLE CAUSES
INTAKE AIR TEMPERATURE SENSOR DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running **Do not allow more than 5 minutes delay between next 2 steps.** With the DRB, read the Intake Air Temperature Sensor and record the reading. Turn Ignition off. Remove the IAT Sensor, then proceed to next step. Using a Temperature Probe, quickly measure intake temperature inside IAT Sensor opening. Is the IAT Sensor within –12 degrees C (10 degrees F) of the probe reading? Yes → Test Complete. No → Replace the Intake Air Temperature Sensor. Perform Verification Test VER-2A.	ENGINE - 2.0L and 2.4L I-4 DOHC

Symptom:
* CHECKING MAP SENSOR CALIBRATION

POSSIBLE CAUSES
MAP SENSOR DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Tee-in a Vacuum Gauge to a Manifold Vacuum source. Start the engine. Allow engine to idle. **Note: If engine will not idle, maintain a constant RPM above idle.** Using the DRB, read MAP Sensor Vacuum. Is the reading within 1 inch of the teed-in Vacuum Gauge? Yes → Go To 2 No → Replace the MAP Sensor. Perform Verification Test VER-2A.	All
2	Ignition Off Disconnect the MAP Sensor Harness Connector. Ignition On. Using a voltmeter, measure the 5–volt supply circuit. Is the voltage above 4.0 volts? Yes → Test Complete. No → Repair the open 5–volt supply circuit. Perform Verification Test VER-2A.	All

Symptom:
* CHECKING MINIMUM IDLE AIR FLOW

POSSIBLE CAUSES
MINIMUM AIR FLOW IS WITHIN ACCEPTABLE RANGE
THROTTLE BODY DEFECTIVE (MIN AIR FLOW OUT OF RANGE)

TEST	ACTION	APPLICABILITY
1	Start the engine and allow it to reach operating temperature. Perform the Minimum Air Flow test as described in service information. Is idle RPM within the range shown in the chart? Yes → Throttle Body minimum air flow is set correctly. No → Go To 2	All
2	Ignition Off Remove Throttle Body per service information. **Note: Clean Throttle Body in a well ventilated area and wear rubber gloves.** While holding the Throttle open, spray entire Throttle Body Bore with Mopar parts cleaner. Using a soft scuff pad, clean the Throttle Body Bore and Throttle Plate. Using compressed air, dry the Throttle Body and install Throttle Body on manifold. Start the engine and allow it to reach operating temperature. With the DRB, enter System Test and perform the Minimum Air Flow Test. Is the idle RPM within the range shown in the chart? Yes → Test Complete. No → Replace Throttle Body. Perform Verification Test VER-2A.	All

Symptom:
* CHECKING OXYGEN SENSOR HEATER

POSSIBLE CAUSES
1/2 O2 SENSOR VOLTAGE BTWN 0.4 V & 0.6 V
1/1 O2 SENSOR DEFECTIVE
1/2 O2 SENSOR DEFECTIVE
ASD RELAY OUTPUT CIRCUIT OPEN (1/1 O2 SEN)
ASD RELAY OUTPUT CIRCUIT OPEN (1/2 O2 SEN)
HEATER GROUND CIRCUIT OPEN (1/1 O2 SEN)
HEATER GROUND CIRCUIT OPEN (1/2 O2 SEN)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, actuate the ASD O2 Sensor Heater test. Wait two minutes for O2 Sensor voltage to stabilize. Read the Upstream O2 Sensor voltage. Is the voltage of the Upstream O2 Sensor between 0.4 and 0.6 volts? Yes → Go To 2 No → Go To 5	All
2	**Note: The O2 Sensor voltage staying between 0.4 V and 0.6 V indicates a problem with that Sensor Circuit.** Ignition Off Disconnect the Upstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Turn key on. With the DRB, actuate the O2 Sensor Heater test. Using a Voltmeter, measure the ASD Relay Output Circuit at Sensor Connector. Is the voltage above 10.0 volts? Yes → Go To 3 No → Repair the open ASD Relay Output Circuit from O2 sensor connector back to splice. Perform Powertrain Verification Test VER-2A.	All
3	Ignition Off Disconnect the Upstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the Heater Ground Circuit and a good ground. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the open Heater Ground Circuit to the Upstream O2 Sensor. Perform Powertrain Verification Test VER-2A.	All

* CHECKING OXYGEN SENSOR HEATER — Continued

TEST	ACTION	APPLICABILITY
4	If there are no potential causes remaining, the Upstream O2 Sensor is assumed to be defective. View repair options. Repair Replace the Upstream O2 Sensor. Perform Powertrain Verification Test VER-2A.	All
5	Ignition Off Turn key on. With the DRB, actuate the O2 Sensor Heater test. Wait two minutes for O2 Sensor voltage to stabilize. With the DRB, read the Downstream O2 Sensor voltage. Is the voltage of the Downstream O2 Sensor between 0.4 and 0.6 volts? Yes → Go To 6 No → Test complete.	All
6	**Note: The O2 Sensor voltage staying between 0.4 and 0.6 V indicates a problem with that Sensor Circuit.** Ignition Off Disconnect the Downstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Turn key on. With the DRB, actuate the O2 Sensor Heater test. Using a Voltmeter, measure the ASD Relay Output Circuit in Sensor Connector. Is the voltage above 10.0 volts? Yes → Go To 7 No → Repair the open ASD Relay Output Circuit from O2 Sensor Connector back to splice. Perform Powertrain Verification Test VER-2A.	All
7	Ignition Off Disconnect the Downstream O2 Sensor Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance between the Heater Ground Circuit and a good ground. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair the open Heater Ground Circuit to the Downstream O2 Sensor. Perform Powertrain Verification Test VER-2A.	All
8	If there are no potential causes remaining, the Downstream O2 Sensor is assumed to be defective. View repair options. Repair Replace the Downstream O2 Sensor. Perform Powertrain Verification Test VER-2A.	All

Symptom:
* CHECKING PARK/NEUTRAL POSITION SWITCH

POSSIBLE CAUSES
DISPLAY SHOWS ″P/N″ AND ″D/R″
TRANSMISSION RANGE SENSOR DEFECTIVE
PARK/NEUTRAL POSITION SWITCH SENSE CIRCUIT OPEN
PARK/NEUTRAL SWITCH SENSE CIRCUIT SHORT TO GROUND
PCM DEF (P/N POSN SW)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read Park/Neutral Position Switch state. While moving the gear selector through all gear positions, watch DRB display. Does the display show ″P/N″ and ″D/R″? Yes → Park/Neutral Position Switch normal, test pass. No → Go To 2	All
2	Ignition Off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Measure the resistance between the Park/Neutral Position Switch Sense Circuit at the Powertrain Control Module Connector and ground. While moving gear selector through all gear positions, watch the ohmmeter. Did the display stay below 5.0 ohms at all times? Yes → Go To 3 No → Go To 5	All
3	Ignition Off Disconnect the negative Battery cable. Disconnect the Powertrain Control Module. Disconnect the Transmission Control Module. Measure the resistance between the Park/Neutral Position Switch Sense Circuit at the PCM harness connector and ground. Ignition On. Move the gear selector through all gear positions. Did the ohmmeter display above 5.0 ohms to below 5.0 ohms? Yes → Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A. No → Go To 4	All

* CHECKING PARK/NEUTRAL POSITION SWITCH — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the Powertrain Control Module. Disconnect the Transmission Range Sensor. **Note: Check connectors - Clean/repair as necessary.** Measure the resistance between the Park/Neutral Position Switch Sense Circuit at the Powertrain Control Module Connector and ground. While moving gear selector through all gear positions, watch the ohmmeter. Did the display still remain below 5.0 ohms? Yes → Repair P/N Switch Sense Ckt for a short to ground. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All
5	Ignition Off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Measure the resistance between the Park/Neutral Position Switch Sense Circuit at the Powertrain Control Module Connector and ground. While moving gear selector through all gear positions, watch the ohmmeter. Did the display switch from below 5.0 ohms to above 5.0 ohms? Yes → Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A. No → Go To 6	All
6	Ignition Off Disconnect the Powertrain Control Module. Disconnect the Transmission Range Sensor (TRS) Connector. **Note: Check connectors - Clean/repair as necessary.** Measure the resistance of the Park/Neutral Position Switch Sense Circuit from the PCM Connector to the TRS Connector. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair open P/N Position Switch Sense Ckt. Perform Powertrain Verification Test VER-2A.	All
7	If there are no potential causes remaining, the Transmission Range Sensor or the P/N Switch is assumed to be defective. View repair options. Repair Replace the Transmission Range Sensor or P/N Switch. Perform Powertrain Verification Test VER-2A.	All

Symptom:
* CHECKING PCM POWER AND GROUND CIRCUITS

POSSIBLE CAUSES
OPEN PCM GROUND CIRCUIT AT CAVITY 10
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
OPEN PCM GROUND CIRCUIT AT CAVITY 50

TEST	ACTION	APPLICABILITY
1	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the ground circuits at cavities 10 and 50. Is the resistance below 5.0 ohms? Yes → Go To 2 No → Repair the open ground circuit(s). Perform Verification Test VER-2A.	All
2	Ignition Off Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Turn Ignition on. With a Voltmeter, measure the Fused Ignition Switch Output Circuit cavity 20. Is the voltage above 10.0 volts? Yes → Go To 3 No → Repair the open Fused Ignition Switch Output Circuit. Perform Verification Test VER-2A.	All
3	Ignition Off Disconnect the Powertrain Control Module Connector. **Note: Check connectors - Clean/repair as necessary.** Turn Ignition on. Using a voltmeter, probe the fused B (+) circuit 46. Is the voltage above 10.0 volts? Yes → Test Complete. No → Repair the open fused B (+) circuit. Perform Verification Test VER-2A.	All

Symptom:
* CHECKING SECONDARY IGNITION

POSSIBLE CAUSES
SECONDARY IGNITION OUT OF SPECIFICATION
IGNITION COIL DEFECTIVE
SECONDARY IGNITION SYSTEM DEFECTIVE (WATER TEST)

TEST	ACTION	APPLICABILITY
1	Ignition Off. Connect a suitable Engine Analyzer to the Engine. Start Engine. Allow Engine to idle. **Note: If the Engine will not idle, maintain a constant RPM above idle.** **Note: Set the Scope to read, display or parade pattern.** Follow the equipment manufacturer's procedure for pattern analysis. Is the secondary ignition pattern ok? Yes → Go To 2 No → Repair the indicated component in the Secondary Ignition System. Perform Powertrain Verification Test VER-2A.	All
2	Ignition Off Connect a suitable Engine Analyzer to the engine. Start the Engine and allow it to idle. **Note: If the engine will not idle, maintain a constant RPM above idle.** **Set scope to read display or parade pattern.** Follow the equipment manufacturer's procedure for pattern analysis. **Note: Do not spray the Inductive Pickup.** With a spray bottle, spray the Ignition Cables with water and monitor Ignition Pattern. Did the Ignition Pattern change? Yes → Repair the indicated component in the Secondary Ignition System. Perform Powertrain Verification Test VER-2A. No → Go To 3	All
3	Ignition Off Connect a suitable Engine Analyzer to the engine. Start the engine and allow it to idle. **Note: If the engine will not idle, maintain a constant RPM above idle.** **Note: Set the scope to read display or parade pattern.** Follow the equipment manufacturer's procedure for pattern analysis. Momentarily remove and reinstall the Spark Plug Wires. While disconnecting each wire, observe the secondary KV line. Is the open circuit Secondary voltage at least 25KV? Yes → Test Complete. No → Replace the Ignition Coil. Perform Powertrain Verification Test VER-2A.	All

Symptom:
* CHECKING THE ENGINE MECHANICAL SYSTEMS

POSSIBLE CAUSES
CHECKING ENGINE MECHANICAL SYSTEMS

TEST	ACTION	APPLICABILITY
1	At this point in the diagnostic test procedure, you have determined that all of the engine electrical systems are operating as designed; therefore, they are not the cause of the driveability problem. The following additional items should be checked as possible mechanical causes of the problem: ENGINE VACUUM - must be at least 13 inches in neutral ENGINE VALVE TIMING - must be within specifications ENGINE COMPRESSION - must be within specifications CAMSHAFT LOBES - check for abnormal wear CRANK SENSOR PICK-UP - check crankshaft slots for debris/deterioration ENGINE EXHAUST SYSTEM - must be free of any restrictions ENGINE PCV SYSTEM - must flow freely ENGINE DRIVE SPROCKETS - must be properly positioned 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 **Note: If you came to this test from the oxygen sensor, and the rich or lean condition is not caused by one of the first items above, replace the powertrain control module and perform TEST VER-2A (Road Test Verification).** Always look for any Technical Service Bulletins that may relate to the problem. Did you come from an Oxygen Sensor rich or lean condition test? Yes → Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-2A. No → Test Complete.	All

Symptom:
* CHECKING THROTTLE POSITION SENSOR CALIBRATION

POSSIBLE CAUSES
TPS VOLTAGE CHANGE NOT A SMOOTH TRANSITION
TPS VOLTAGE ABOVE 1.5 V WITH THROTTLE CLOSED
THROTTLE CABLE AND BODY BINDING OR RESTRICTED
TPS VOLTAGE BELOW 3.4 V AT WIDE OPEN THROTTLE

TEST	ACTION	APPLICABILITY
1	Ignition Off Check the Throttle Cable and Body for binding or restrictions. **Note: Also check Speed Control Cable if equipped.** Is there any binding or restriction? Yes → Repair as necessary. Perform Verification Test VER-2A. No → Go To 2	All
2	Ignition On, Engine Not Running While slowly opening the Throttle from closed to wide open, monitor the Throttle Position Sensor voltage at the DRB. Was the voltage change a smooth transition? Yes → Go To 3 No → Replace Throttle Position Sensor. Perform Verification Test VER-2A.	All
3	Ignition On, Engine Not Running With the DRB, read the Throttle Position Sensor voltage. **Note: Throttle must be fully closed and against the Throttle Stop.** Is the voltage 1.5 V or less with the Throttle closed? Yes → Go To 4 No → Replace Throttle Position Sensor. Perform Verification Test VER-2A.	All
4	Was the maximum voltage at least 3.4 volts at wide open Throttle? Yes → Test Complete. No → Replace Throttle Position Sensor. Perform Verification Test VER-2A.	All

Symptom:
* CHECKING THE A/C PRESSURE SENSOR SIGNAL

POSSIBLE CAUSES
A/C PRESSURE SENSOR 5-VOLT SUPPLY CIRCUIT OPEN
HIGH RESISTANCE IN THE A/C PRESSURE SENSOR SIGNAL CKT

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. Using the DRB, read the trouble codes. Are any A/C Pressure sensor trouble codes set? Yes → Go to the A/C Pressure sensor trouble code. No → Go To 2	All
2	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Turn the ignition on. Using a voltmeter, measure the A/C Pressure Sensor 5–volt supply circuit. Is the voltage above 4.8 volts? Yes → Go To 3 No → Repair the open in the A/C Pressure Sensor 5–volt supply circuit. Perform Powertrain Verification Test VER-2A.	All
3	Turn the ignition on. Using the DRB, monitor the A/C Pressure voltage. Disconnect the A/C Pressure Sensor harness connector. Is the voltage above 4.8 volts? Yes → Test Complete. No → Repair the high resistance in the A/C Pressure Sensor Signal circuit. Perform Powertrain Verification Test VER-2A.	All

Symptom List:

P-1595 SPEED CONTROL SOLENOID CIRCUITS
P-1683 SPEED CONTROL POWER RELAY OR S/C 12V DRIVER

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P-1595 SPEED CONTROL SOLENOID CIRCUITS.

When Monitored and Set Condition:

P-1595 SPEED CONTROL SOLENOID CIRCUITS

When Monitored: Speed control on, vehicle speed > 25 mph, RPM < 5440, brake not applied. For an automatic transmission, in drive mode. For a manual transmission, the clutch not depressed.

Set Condition: The powertrain control module (PCM) actuates the vacuum and vent solenoid but they do not respond.

P-1683 SPEED CONTROL POWER RELAY OR S/C 12V DRIVER

When Monitored: Speed control on, vehicle speed > 25 mph, RPM < 5440, brake not applied. For an automatic transmission, in drive mode. For a manual transmission, the clutch not depressed.

Set Condition: The powertrain control module (PCM) actuates the vacuum and vent solenoids but they do not respond.

POSSIBLE CAUSES
S/C BRAKE SWITCH OUTPUT CIRCUIT OPEN
S/C BRAKE SWITCH OUTPUT CIRCUIT SHORTED TO GROUND
S/C VACUUM SOLENOID CONTROL CIRCUIT OPEN
S/C VENT SOLENOID CONTROL CIRCUIT OPEN
SPEED CONTROL POWER SUPPLY CIRCUIT OPEN
SPEED CONTROL SERVO GROUND CIRCUIT OPEN
BRAKE SWITCH DEFECTIVE
SPEED CONTROL SERVO DEFECTIVE
PCM DEFECTIVE (SC SOLENOID CIRCUIT)
PCM DEFECTIVE (SPEED CONTROL P/S CIRCUIT)
BRAKE SWITCH NEEDS TO BE ADJUSTED

P-1595 SPEED CONTROL SOLENOID CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
1	Ignition Off **Note: A misadjusted Brake Switch can cause this code to set.** Does the Brake Switch need to be adjusted? Yes → Adjust Brake Switch as necessary. No → Go To 2	All
2	Ignition Off Disconnect the Speed Control Servo 4-Way Connector. **Note: Check connectors - Clean/repair as necessary.** **Note: Ensure the Brake pedal is not depressed during the following steps.** Engine off. Ignition key on and S/C On/Off Switch ON. Using a Voltmeter, measure the voltage of the S/C Brake Switch Output Circuit at Speed Control Servo Connector. Is the voltage above 10.0 volts? Yes → Go To 3 No → Go To 10	All
3	Ignition off. Disconnect the Speed Control Servo Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of the Gnd Circuit at Servo Connector. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the open Ground Circuit. Perform Powertrain Verification Test VER-4A.	All
4	Ignition off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** **Note: Ensure the Brake pedal is not depressed during the following steps.** With an ohmmeter, test the resistance from the S/C Power Supply Circuit to the S/C Vent Solenoid at PCM. Is the resistance between 35 ohms and 55 ohms? Yes → Go To 5 No → Go To 7	All
5	Ignition off Disconnect Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** **Note: Ensure the Brake Pedal is not depressed during the following steps.** With an ohmmeter, test the resistance from the S/C Power Supply Circuit to the S/C Vacuum Solenoid Control at PCM. Is the resistance between 35 ohms and 55 ohms? Yes → Go To 6 No → Go To 7	All

P-1595 SPEED CONTROL SOLENOID CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
6	Ignition off. If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-4A.	All
7	Ignition off. Disconnect the Powertrain Control Module. Disconnect Speed Control Servo 4-way Connector. **Note: Check connectors - Clean/repair as necessary.** With an ohmmeter, test the resistance of the SC Vacuum Solenoid Control Circuit from the PCM to the Servo Connector. Is the resistance below 5.0 ohms? Yes → Go To 8 No → Repair the open Speed Control Vacuum Solenoid Control Circuit. Perform Powertrain Verification Test VER-4A.	All
8	Ignition off. Disconnect the PCM. Disconnect Speed Control Servo 4-way Connector. **Note: Check connectors - Clean/repair as necessary.** With an ohmmeter, test the resistance of the S/C Vent Solenoid Control Circuit from the PCM to the Servo Connector. Is the resistance below 5.0 ohms? Yes → Go To 9 No → Repair the open Speed Control Vent Solenoid Control Circuit. Perform Powertrain Verification Test VER-4A.	All
9	Ignition off. If there are no potential causes remaining, the Speed Control Servo is assumed to be defective. View repair options. Repair Replace the Speed Control Servo. Perform Powertrain Verification Test VER-4A.	All
10	Ignition off. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Key and S/C On. Using a Voltmeter, probe Speed Control Power Supply Ckt at the Brake Sw Connector. Is the voltage above 10.0 volts? Yes → Go To 11 No → Go To 14	All

P-1595 SPEED CONTROL SOLENOID CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
11	Ignition Off Disconnect the Speed Control Servo 4-Way Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the S/C Brake Switch Output Circuit from the Servo Connector to ground. Is the resistance below 5.0 ohms? Yes → Repair shorted S/C Brake Switch Output Circuit. Perform Verification TEST VER-4A No → Go To 12	All
12	Ignition Off Disconnect the Speed Control Servo 4-Way Connector. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the resistance of the S/C Brake Switch Output Circuit. Is the resistance below 5.0 ohms? Yes → Go To 13 No → Repair the open S/C Brake Switch Output. Perform Powertrain Verification Test VER-4A	All
13	If there are no potential causes remaining, the Brake Switch is assumed to be defective. View repair options. Repair Replace the Brake Switch. Perform Powertrain Verification Test VER-4A.	All
14	Ignition Off Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the S/C Brake Switch Output Circuit from the Brake Switch Connector to ground. Is the resistance below 5.0 ohms? Yes → Repair shorted S/C Brake Switch Output Circuit. Perform Verification TEST VER-4A No → Go To 15	All
15	Ignition off. Disconnect the Powertrain Control Module. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** With an ohmmeter, test resistance of the Speed Control Power Supply Ckt. Is the resistance below 5.0 ohms? Yes → Go To 16 No → Repair the open Speed Control Power Supply Circuit. Perform Powertrain Verification Test VER-4A.	All

P-1595 SPEED CONTROL SOLENOID CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
16	Ignition off. If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-4A.	All

Symptom:
SPEED CONTROL BRAKE SWITCH OUTPUT

POSSIBLE CAUSES
GROUND CIRCUIT OPEN
PCM CONNECTOR OBSERVABLE DEFECT
BRAKE SWITCH DEFECTIVE
BRAKE SWITCH SENSE CIRCUIT OPEN
BRAKE SWITCH SENSE CIRCUIT SHORTED TO GROUND
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Key on. Using a Voltmeter, measure the voltage of the Brake Switch Sense at the Brake Switch Connector. Is the voltage above 10 volts? Yes → Go To 2 No → Go To 3	All
2	Ignition Off Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper between the Brake Switch Sense and Brake Switch Ground CKT. With the DRB, read the Brake Switch input status. Does the DRB show Brake SW ″Released″? Yes → Replace the Brake Switch. Perform Powertrain Verification Test VER-4A No → Repair the open Brake Switch Ground CKT. Perform Powertrain Verification Test VER-4A.	All
3	Ignition Off Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-4A. No → Go To 4	All

SPEED CONTROL BRAKE SWITCH OUTPUT — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the Brake Switch Connector. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the Brake Switch Sense Circuit from Brake Switch to PCM. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open Brake Switch Sense Circuit. Perform Powertrain Verification Test VER-4A.	All
5	Ignition Off Disconnect the Brake Switch Connector. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance of Brake Switch Sense Circuit from the Brake Switch Connector to ground. Is the resistance below 5.0 ohms? Yes → Repair the Brake Switch Sense Circuit, shorted to ground. Perform Powertrain Verification Test VER-4A. No → Go To 6	All
6	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the PCM. Perform Powertrain Verification Test VER-4A.	All

Symptom:
SPEED CONTROL DENIED MESSAGE

TEST	ACTION	APPLICABILITY
1	At this time the S/C switch and servo functions appear to operate properly. Using the DRB, monitor the speed control ″cutout″ status. Road test the vehicle at speeds over 30mph and attempt to set the speed control. The following items will not allow the speed control to set. The last or most recent cause for speed control not to set is indicated by the ″Denied″ status. If ON/OFF Denied message is indicated, the Powertrain Control Module does not see an ″ON″ signal from the switch at cavity 41. If SPEED Denied message is indicated, the vehicle speed as seen by the Powertrain Control Module at cavity 66 is not greater than 36 mph. If RPM Denied message is indicated, the engine rpm is excessively high. If BRAKE Denied message is indicated, the Brake Switch Sense Circuit is open indicating to the PCM that the Brakes are applied. The Sense Circuit, cavity 62 of the PCM, is grounded through the Brake Pedal Switch when the Brakes are released. If P/N Denied message is indicated, Park/Neutral Switch Sense Circuit is grounded indicating to PCM that transmission is not in gear. The Sense Circuit, cavity 76 of PCM, is grounded through the Park/Neutral Switch when transmission is in park or neutral. If RPM/SPD Denied message is indicated, the PCM senses excessive engine rpm for a given vehicle speed. If SOL FLT Denied message is indicated, the Powertrain Control Module senses a Servo Solenoid Circuit trouble code that is maturing or set in memory. Test Complete.	All

Symptom:
SPEED CONTROL ON/OFF SWITCH

POSSIBLE CAUSES
CLOCKSPRING DEFECTIVE
PCM DEFECTIVE (SPEED CONTROL ON/OFF/SET SWITCH)
SPEED CONTROL GROUND CIRCUIT TO SWITCH OPEN
SPEED CONTROL ON/OFF SWITCH DEFECTIVE
SPEED CONTROL ON/OFF SWITCH SIGNAL CIRCUIT OPEN
SPEED CONTROL ON/OFF SWITCH SIGNAL CIRCUIT SHORT TO GROUND
SPEED CONTROL ON/OFF SWITCH TERMINAL DAMAGED

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. **With the DRBIII, monitor the Speed Control Switch inputs.** While observing the display, press the Speed Control “ON” switch. Does the DRBIII show S/C on/off “ON”? Yes → Test Complete. Perform Powertrain Verification Test VER-4A. No → Go To 2	All
2	Ignition Off Disconnect the Speed Control On/Off and Set Switch. **Note: Check connectors - Clean/repair as necessary.** Is any terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-4A. No → Go To 3	All
3	Ignition Off Disconnect the Speed Control On/Off and Set Switch. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the S/C Ground Circuit at the S/C ON/OFF, SET Switch Connector. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the open Speed Control Ground Circuit to Switch. Perform Powertrain Verification Test VER-4A.	All

SPEED CONTROL ON/OFF SWITCH — Continued

TEST	ACTION	APPLICABILITY
4	Ignition Off Disconnect the Speed Control On/Off and Set Switch. **Note: Check connectors - Clean/repair as necessary.** Connect a jumper wire across the S/C Sw Signal Circuit to Ground Circuit. Ignition On, Engine Not Running. With the DRBIII, read the S/C Switch voltage. Does the DRBIII display 0.00 volts? Yes → Replace the S/C ON/OFF and SET Switch. Perform Powertrain Verification Test VER-4A. No → Go To 5	All
5	Ignition Off Disconnect the Speed Control On/Off and Set Switch. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the resistance of the S/C Switch Signal at the S/C ON/OFF, SET Switch Connector to ground. Is the resistance below 5.0 ohms? Yes → Repair the Speed Control Switch Signal Circuit for a short to ground. Perform Powertrain Verification Test VER-4A. No → Go To 6	All
6	Ignition Off Disconnect the Powertrain Control Module. Disconnect the Clockspring 4–way to I/P Harness. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, test the S/C Switch Signal Circuit, Clockspring to PCM. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open Speed Control Switch Signal Circuit. Perform Powertrain Verification Test VER-4A.	All
7	Ignition Off Disconnect the Speed Control On/Off and set Switch. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the S/C Switch Signal Ckt, Switch to PCM. Is the resistance below 5.0 ohms? Yes → Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-4A. No → Go To 8	All
8	If there are no potential causes remaining, the Clockspring is assumed to be defective. View repair options. Repair Replace the Clockspring. Perform Powertrain Verification Test VER-4A.	All

Symptom:
* CHECKING SPEED CONTROL OPERATION

POSSIBLE CAUSES
BRAKE SWITCH DEFECTIVE
GROUND CIRCUIT OPEN
S/C BRAKE SWITCH OUTPUT CIRCUIT SHORTED TO GROUND
SPEED CONTROL BRAKE SWITCH OUTPUT SUPPLY CKT OPEN
SPEED CONTROL ON/OFF/SET SWITCH DEFECTIVE
SPEED CONTROL POWER SUPPLY CIRCUIT OPEN
SPEED CONTROL POWER SUPPLY CIRCUIT SHORTED/GROUND
SPEED CONTROL SERVO CONNECTOR OBSERVABLE DEFECT
SPEED CONTROL SWITCH DEFECTIVE
CLOCK SPRING DEFECTIVE
SPEED CONTROL SERVO DEFECTIVE
SPEED CONTROL THROTTLE CABLE DEFECTIVE
SPEED CONTROL VACUUM SUPPLY LEAKS OR RESTRICTED
PCM DEFECTIVE (SPEED CONTROL OPERATION)
VACUUM RESERVOIR DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, monitor the Speed Control Switch inputs. While observing display, press the Speed Control ON/OFF switch. Does the DRB show S/C ON/OFF switch ″ON″? Yes → Go To 2 No → Refer to symptom SPEED CONTROL ON/OFF SWITCH in the SPEED CONTROL category.	All
2	Ignition On, Engine Not Running Press the S/C ON/OFF button to select S/C “ON.” With the DRB, monitor the Speed Control Switch inputs. While observing the DRB, press the ACCEL/RESUME/CANCEL and DECEL switches several times. Do all of the Switches toggle correctly between pressed and released? Yes → Go To 3 No → Go To 25	All

* CHECKING SPEED CONTROL OPERATION — Continued

TEST	ACTION	APPLICABILITY
3	Ignition On, Engine Not Running Press the S/C ON/OFF button to select S/C “ON.” With the DRB, monitor the Speed Control Switch inputs. While observing display, press the Set Switch several times. Does the DRB show the Set Switch pressed and released? Yes → Go To 4 No → Replace the Speed Control On/Off/Set Switch. Perform Powertrain Verification Test VER-4A.	All
4	Ignition On, Engine Not Running With the DRB, monitor the Speed Control Switch inputs. While observing display, press the Brake Pedal several times. Does the DRB show Brake Switch Status change between pressed and released? Yes → Go To 5 No → Refer to symptom SPEED CONTROL BRAKE SWITCH OUTPUT in the SPEED CONTROL category.	All
5	Ignition On, Engine Not Running With the DRB, monitor the Speed Control Switch inputs. While observing the display, move the Gear Selector to Drive. Does the DRB show the Park/Neutral Switch in D/R? Yes → Go To 6 No → Refer to symptom CHECKING PARK/NEUTRAL POS SWITCH in the SPEED CONTROL category.	All
6	Ignition Off Disconnect the Speed Control Servo Connector. **Note: Check connectors - Clean/repair as necessary.** Turn the Ignition on and the S/C on. Using a Voltmeter measure voltage of the S/C Brake Switch Output Ckt at Servo Conn. Is the voltage above 10 volts? Yes → Go To 7 No → Go To 14	All
7	Ignition Off Start engine, allow to idle 1 minute. Turn Engine off, (Ignition on). With the DRB, actuate the Speed Control Servo Solenoids. Does the Throttle open and close? Yes → Refer to symptom SPEED CONTROL DENIED MESSAGE in the SPEED CONTROL category. No → Go To 8	All
8	Ignition Off Inspect the Speed Control Throttle Cable. Is the Cable disconnected or damaged? Yes → Repair as necessary. Perform Powertrain Verification Test VER-4A. No → Go To 9	All

* CHECKING SPEED CONTROL OPERATION — Continued

TEST	ACTION	APPLICABILITY
9	Ignition Off Disconnect the Vacuum Supply to the Speed Control Servo. Attach a Vacuum Gauge to the disconnected hose. Start engine. Does the Vacuum Gauge read Manifold Vacuum? Yes → Go To 10 No → Repair the Vacuum Supply for a leak or restriction. Perform Powertrain Verification Test VER-4A.	All
10	Ignition Off Disconnect the Speed Control Servo Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter measure the Ground Circuit from Servo Connector to gnd. Is the resistance below 5.0 ohms? Yes → Go To 11 No → Repair the open Ground Circuit. Perform Powertrain Verification Test VER-4A.	All
11	Ignition Off Disconnect the Speed Control Servo Connector. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-4A. No → Go To 12	All
12	Disconnect the vacuum supply from the Speed Control Servo. Attach a vacuum gauge to the vacuum hose. Start the Engine, allow to idle for 1 minute. Turn engine off. Observe Vacuum Gauge for 10 seconds. Does the Vacuum hold for at least 10 seconds? Yes → Go To 13 No → Replace the Vacuum Reservoir. Perform Powertrain Verification Test VER-4A.	All
13	If there are no potential causes remaining, the S/C Servo is assumed to be defective. View repair options. Repair Replace the Speed Control Servo. Perform Powertrain Verification Test VER-4A.	All
14	Ignition Off Disconnect the Speed Control Servo Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter measure the Ground Circuit from Servo Connector to gnd. Is the resistance below 5.0 ohms? Yes → Go To 15 No → Repair the open Ground Circuit. Perform Powertrain Verification Test VER-4A.	All

* CHECKING SPEED CONTROL OPERATION — Continued

TEST	ACTION	APPLICABILITY
15	Ignition Off Disconnect the Speed Control Servo Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance from the S/C Brake Switch Output Circuit to ground. Is the resistance below 5.0 ohms? Yes → Go To 16 No → Go To 19	All
16	Ignition Off Disconnect the Speed Control Servo Connector. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-4A. No → Go To 17	All
17	Ignition Off Disconnect the Speed Control Servo Connector. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance from the S/C Brake Switch Output Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the S/C Brake Switch Output Circuit from Brake Sw to Servo for a short to ground. Perform Powertrain Verification Test VER-4A. No → Go To 18	All
18	Ignition Off Disconnect the Speed Control Servo Connector. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure resistance from the S/C Brake Switch Output Circuit to ground. Is the resistance below 5.0 ohms? Yes → Test Complete. No → Repair the S/C Power Supply Circuit from PCM to Brake Sw for a short to ground. Perform Powertrain Verification Test VER-4A.	All
19	Ignition Off Disconnect the Speed Control Servo Connector. **Note: Check connectors - Clean/repair as necessary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-4A. No → Go To 20	All

* CHECKING SPEED CONTROL OPERATION — Continued

TEST	ACTION	APPLICABILITY
20	Ignition Off Disconnect the Speed Control Servo Connector. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Key and S/C on. Using a Voltmeter measure the voltage of S/C Power Supply Ckt at Brake Switch Conn. Is the voltage above 10.0 volts? Yes → Go To 21 No → Go To 23	All
21	Ignition Off Disconnect the Speed Control Servo Connector. Disconnect the Brake Switch Connector. **Note: Check connectors - Clean/repair as necessary.** Use an Ohmmeter in the following step. Measure the S/C Brake Switch Output Ckt from the Brake Switch Conn to Servo. Is the resistance below 5.0 ohms? Yes → Go To 22 No → Repair the open S/C Brake Switch Output Supply Circuit. Perform Powertrain Verification Test VER-4A.	All
22	If there are no potential causes remaining, the Brake Switch is assumed to be defective. View repair options. Repair Replace the Brake Switch. Perform Powertrain Verification Test VER-4 A.	All
23	Ignition Off Disconnect the Brake Switch Connector. Disconnect the PCM. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, test the resistance of the S/C Power Supply Circuit, PCM to Brake Switch. Is the resistance below 5.0 ohms? Yes → Go To 24 No → Repair the open S/C Power Supply Circuit PCM to Brake Switch. Perform Powertrain Verification Test VER-4 A.	All
24	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-4A.	All

* CHECKING SPEED CONTROL OPERATION — Continued

TEST	ACTION	APPLICABILITY
25	Ignition On. With the DRB Select "Inputs/Outputs", monitor the S/C Switch. Press and hold each switch to see change in the parameter. Does the parameter change for each switch? Yes → Go To 26 No → Replace the S/C Switch. Perform Powertrain Verification Test VER-4A.	All
26	Ignition On, Engine Not Running With the DRB, monitor the Speed Control Switch inputs. While observing display, press the Set Switch several times. Does the DRB show the Set Switch pressed and released? Yes → Go To 27 No → Replace the Speed Control On/Off/Set Switch. Perform Powertrain Verification Test VER-4A.	All
27	If there are no potential causes remaining, the Clock Spring is assumed to be defective. View repair options. Repair Replace Clock Spring. Perform Powertrain Verification Test VER-4A.	All

Symptom:
* "NO RESPONSE" CONDITION

POSSIBLE CAUSES
IGNITION NOT ON
DIAGNOSTIC READ-OUT BOX ADAPTER CABLE DEFECTIVE
FUEL PUMP DEFECTIVE
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
PCM GROUNDS OPEN
FUEL PUMP RELAY OUT CKT INTERMITTENT SHORT TO GRND
FUEL PUMP RELAY OUTPUT CIRCUIT SHORT TO GROUND
SCI RECEIVE CIRCUIT OPEN
SCI RECEIVE CIRCUIT SHORT TO GROUND
SCI TRANSMIT CIRCUIT OPEN
SCI TRANSMIT CIRCUIT SHORTED TO GROUND
FUSED B(+) CIRCUIT OPEN BETWEEN FUSE AND BATTERY
DIAGNOSTIC READ-OUT BOX DEFECTIVE
PCM DEFECTIVE (NO RESPONSE)
FUSED B(+) CIRCUIT OPEN BETWEEN FUSE AND PCM
FUSED B(+) CIRCUIT SHORT TO GROUND

TEST	ACTION	APPLICABILITY
1	Attempt to start vehicle. Does the vehicle start? Yes → Go To 2 No → Go To 12	All
2	Was the Ignition on when the "No Response" message was displayed? Yes → Go To 3 No → Turn the ignition on to get a response.	All
3	Ignition off. Using an Ohmmeter, measure the DLC ground circuit (terminals 4 and 5) to ground. Is the resistance below 5.0 ohms for each measurement? Yes → Go To 4 No → Repair the open ground circuit(s). Perform Powertrain Verification Test VER-1A.	All

* "NO RESPONSE" CONDITION — Continued

TEST	ACTION	APPLICABILITY
4	Ignition off. Disconnect the Powertrain Control Module. **Note: Check the connectors-Clean/repair as necessary.** Using an ohmmeter, test the SCI Receive Wire from the PCM to DLC for resistance. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open SCI Recieve Circuit. Perform Powertrain Verification Test VER-1A.	All
5	Ignition Off. Disconnect the Powertrain Control Module. **Note: Check the connectors-Clean/repair as necessary.** Using an ohmmeter, test the SCI Recieve Wire from the DLC for resistance to ground. Is the resistance below 5.0 ohms? Yes → Repair the short to ground in the SCI Receive Circuit. Perform Powertrain Verification Test VER-1A. No → Go To 6	All
6	Ignition Off. Disconnect the Powertrain Control Module. **Note: Check the connectors-Clean/repair as necessary.** Using an ohmmeter, test the SCI Transmit Wire from the PCM to DLC for resistance. Is the resistance below 5.0 ohms? Yes → Go To 7 No → Repair the open SCI Transmit Circuit. Perform Powertrain Verification Test VER-1A.	All
7	Ignition Off. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, test the SCI Transmit Wire from the DLC for resistance to ground. Is the resistance below 5.0 ohms? Yes → Repair the short to ground in the SCI Transmit Circuit. Perform Powertrain Verification Test VER-1A. No → Go To 8	All
8	Ignition Off. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure the resistance between the SCI Transmit and the SCI Receive circuits at the DLC. Is the resistance below 5.0 ohms? Yes → Repair the SCI Transmit Circuit and the SCI Receive circuits shorted together. Perform Powertrain Verification Test VER-1A. No → Go To 9	All

* ″NO RESPONSE″ CONDITION — Continued

TEST	ACTION	APPLICABILITY
9	Ignition Off. Connect the DRB to a functional Data Link Connector on another vehicle. Turn the ignition on. With the DRB, attempt to read trouble codes. Did the DRB display "No Response"? Yes → Go To 10 No → Replace the initial vehicle's Powertrain Control Module. Perform Powertrain Verification Test VER-1A.	All
10	Ignition Off. Substitute another DRB Adapter Cable. Ignition on, Engine not running. With the DRB, attempt to read trouble codes. Did the DRB display "No Response"? Yes → Go To 11 No → Replace the DRB Adapter Cable. Perform Powertrain Verification Test VER-1A.	All
11	If there are no potential causes remaining, the Diagnostic Readout Box is assumed to be defective. View repair options. Repair Have the DRB repaired or replaced. Perform Powertrain Verification Test VER-1A.	All
12	Ignition Off. Disconnect the TP Sensor Connector. **Note: Check connector-Clean/repair as necessary.** Turn the ignition on. With a voltage, measure the Throttle Position Sensor 5–volt Supply circuit. Is the voltage above 6.0 volts? Yes → Repair the open grounds at the Powertrain Control Module Cavities 10 and 50. Perform the Powertrain Verification Test VER-1A No → Go To 13	All
13	Ignition Off. Disconnect the Powertrain Control Module. **Note: Check connector-Clean/repair as necessary.** Turn the ignition on. With a voltmeter, measure Fused Ignition Switch Output Circuit. Is the voltage above 10.0 volts? Yes → Go To 14 No → Repair the open Fused Ignition Switch Output Circuit (check Ignition Switch Fuse in PDC). Perform Powertrain Verification Test VER-1A.	All

* "NO RESPONSE" CONDITION — Continued

TEST	ACTION	APPLICABILITY
14	Ignition Off. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Turn the ignition on. With a voltmeter, mesure the Fused B(+) Curcuit. Is the voltage above 10.0 volts? Yes → Go To 15 No → Go To 16	All
15	If there are no potential causes remaining, replace the Powertrain Control Module. View repair options. Replace the Powertrain Control Module. Perform the Powertrain Verification Test VER-1A.	All
16	Remove Fuel Pump Fuse from the Power Distribution Center. Inspect the Fuse. Is the fuse OK? Yes → Go To 17 No → Go To 18	All
17	Ignition On. Remove the Fuel Pump Fuse from the PCM. With a voltmeter, measure the B(+) side of the Fuse Socket. Is the voltage above 10.0 volts? Yes → Repair the opem B(+) circuit between the Fuse and the PCM. Perform Powertrain Verification Test VER-1A. No → Repair the opem B(+) circuit between the Fuse and the battery. Perform Powertrain Verification Test VER-1A.	All
18	Ignition Off Disconnect the Fuel Pump Relay. Disconnect the Fuel Pump Electrical Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Fuel Pump Relay Output Circuit to ground. Is the resistance below 5.0 ohms? Yes → Repair the Fuel Pump Relay Output Circuit for a short to ground. Perform Powertrain Verification Test VER-1A. No → Go To 19	All
19	If there are no potential causes remaining, the Fuel Pump is assumed to be defective. View repair options. Repair Replace the Fuel Pump. Replace Fuel Pump Fuse. Perform Powertrain Verification Test VER-1A.	All

Symptom:
* CHECKING THE CAM AND CRANK SENSORS

POSSIBLE CAUSES
SECONDARY INDICATORS PRESENT

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running **Note: Address all trouble codes before continuing.** **Note: Ensure PCM Connectors are secure.** With the DRB, read the secondary indicators while cranking the engine. Were there any secondary indicators present while cranking the engine? Yes → Refer to Symptom list for further diagnostic test. No → Go To 2	All
2	Ignition On, Engine Not Running With the DRB in Input/Output display, monitor the current CMP and CKP states. Crank the engine for at least 15 seconds. Does the DRB show current CKP state ″present″ while cranking? Yes → Go To 3 No → Refer to symptom P-0340 NO CRANK REFERENCE SIGNAL AT PCM in the DRIVEABILITY category.	All
3	Ignition On, Engine Not Running With the DRB in Input/Output display, monitor the current CMP and CKP states. Crank the engine for at least 15 seconds. Does the DRB show current CMP state ″present″ while cranking? Yes → Refer to symptom * CHECKING THE SECONDARY IGNITION SYSTEM in the STARTING category. No → Refer to symptom P-0340 NO CAM SIGNAL AT PCM in the DRIVEABILITY category.	All

Symptom:
* CHECKING THE ENGINE MECHANICAL SYSTEMS

POSSIBLE CAUSES
ENGINE COMPRESSION OUT OF SPECIFICATION
VALVE TIMING OUT OF SPECIFICATION
POWERTRAIN CONTROL MODULE DEFECTIVE
CLEAN SPARK PLUGS
SPARK PLUG CABLES POSITIONED INCORRECTLY

TEST	ACTION	APPLICABILITY
1	Turn Ignition off. Inspect Spark Plug Cables for correct placement. Are all Spark Plug Cables positioned correctly? Yes → Go To 2 No → Reinstall Spark Plug Cables as necessary.	All
2	Turn Ignition off. Remove all Spark Plugs and inspect the tips for wet fuel. Are the Spark Plug tips wet? Yes → Clean the spark plugs. No → Go To 3	All
3	Turn Ignition off. Using service information procedures, check Engine compression. Is Engine compression within specifications? Yes → Go To 4 No → Repair the Engine as necessary. Perform Verification Test VER-1A.	All
4	Turn Ignition off. Using service information procedures, check Engine Valve timing. Is Valve timing within specifications? Yes → Go To 5 No → Repair Valve timing as necessary. Perform Verification Test VER-1A.	All
5	If there are no potential causes or DTCs remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-1A.	All

Symptom:

* CHECKING THE FUEL SYSTEM

POSSIBLE CAUSES
FUEL PUMP GROUND CIRCUIT OPEN
FUEL PUMP GROUND CIRCUIT OPEN
FUEL PUMP RELAY FUSED B(+) CIRCUIT OPEN
FUEL PUMP RELAY FUSED B(+) CIRCUIT OPEN
FUEL PUMP RELAY OUTPUT CIRCUIT OPEN
FUEL PUMP RELAY OUTPUT CIRCUIT OPEN
FUEL FILTER DEFECTIVE
FUEL FILTER DEFECTIVE
FUEL PUMP DEFECTIVE
FUEL PUMP DEFECTIVE
FUEL PUMP RELAY
FUEL PUMP RELAY
IN-TANK FUEL PRESSURE REGULATOR DEFECTIVE
IN-TANK FUEL PRESSURE REGULATOR DEFECTIVE
THROTTLE POSITION SENSOR DEFECTIVE
FUEL FILTER DEFECTIVE
FUEL FILTER DEFECTIVE
FUEL INLET STRAINER DEFECTIVE
FUEL INLET STRAINER DEFECTIVE
FUEL PUMP MODULE DEFECTIVE
FUEL PUMP MODULE DEFECTIVE
FUEL SUPPLY LINE DEFECTIVE
FUEL SUPPLY LINE DEFECTIVE
FUEL TUBE RESTRICTED
FUEL TUBE RESTRICTED
POWERTRAIN CONTROL MODULE DEFECTIVE
POWERTRAIN CONTROL MODULE DEFECTIVE
THROTTLE CABLES DEFECTIVE
THROTTLE CABLES DEFECTIVE
THROTTLE POSITION SENSOR DEFECTIVE

* CHECKING THE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
1	**Note: Ensure the SKIM has proper communication and that there are no SKIM DTC's present before continuing.** Ignition Off. Ensure the Throttle Cables are not holding the Throttle open. Is the Throttle held open? Yes → Repair condition that holds the Throttle Body open. Perform Powertrain Verification Test VER-1A. No → Go To 2	ENGINE - 3.0L V6
2	Ignition On, Engine Not Running With the DRB, actuate the Fuel System and check for Fuel Pump operation at the Fuel Tank. Is the Fuel Pump operating? Yes → Go To 3 No → Go To 13	ENGINE - 3.0L V6
3	Ignition On, Engine Not Running With DRB, read Throttle Position Sensor voltage. Is the voltage above 1.5 volts? Yes → Disconnect the TP Sensor Conn. Replace Throttle Position Sensor. Perform Powertrain Verification Test VER-1A. No → Go To 4	ENGINE - 3.0L V6
4	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Relieve Fuel pressure. Install a Fuel Pressure Gauge to the Fuel Rail. **Note: The Fuel Tank must be at least 1/4 full for the following tests.** Ignition On, Engine Not Running. With the DRB, actuate the Fuel System. Read the Fuel Pressure Gauge. Fuel pressure should be 43 to 53 psi for Gasoline. Is the Fuel pressure above the specification ? Yes → Go To 5 No → Go To 8	ENGINE - 3.0L V6
5	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release the Fuel pressure. Inspect Fuel Filter for a restriction. Is there a restriction? Yes → Replace the Fuel Filter. Perform Powertrain Verification Test VER-1A. No → Go To 6	ENGINE - 3.0L V6

* CHECKING THE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
6	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release the Fuel pressure. Inspect Fuel Filter for a restriction. Is there a restriction? Yes → Go To 7 No → Replace the Fuel Pressure Regulator. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6
7	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release the Fuel pressure. Inspect Fuel Return Tube for restriction between fuel Filter and Fuel Pump Module. Is there a restriction? Yes → Replace restricted Fuel Tube. Perform Powertrain Verification Test VER-1A. No → Test Complete.	ENGINE - 3.0L V6
8	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Relieve Fuel pressure. Tee-In a Fuel Pressure Gauge into the Fuel Hose using tool #6433. **Note: The Fuel Tank must be at least 1/4 full for the following tests.** Ignition On, Engine Not Running. With the DRB, actuate the Fuel System. Read the Fuel Pressure Gauge. Fuel pressure should be 43 to 53 psi for Gasoline. Is the Fuel pressure below the specification ? Yes → Go To 9 No → Test Complete.	ENGINE - 3.0L V6
9	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release Fuel pressure. Remove adapter 6631 and reinstall Fuel Line. Install adapter 6631 between Fuel Pump and Fuel Filter. Connect Fuel Pressure Gauge to adapter 6631. Key on. With the DRB, actuate Fuel System. Is the fuel pressure at least 2 psi higher than the previous reading? Yes → Replace the Fuel Filter. Perform Powertrain Verification Test VER-1A. No → Go To 10	ENGINE - 3.0L V6

* CHECKING THE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
10	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release Fuel pressure. Remove the Fuel Pump Module. Inspect the Fuel Pump Inlet Strainer. Is the Inlet Strainer plugged? Yes → Replace the Fuel Inlet Strainer. Perform Powertrain Verification Test VER-1A. No → Go To 11	ENGINE - 3.0L V6
11	Record the Fuel Pressure Gauge reading. Ignition key off. **Warning: The Fuel System must be opened and may be under high pressure.** Release Fuel pressure. Remove the Fuel Pressure Gauge. Remove Fuel Pressure Gauge Adapter 6433 and reconnect Fuel Line to Fuel Rail. Install adapter 6631 between Fuel Filter Outlet and Chassis Fuel Supply Tube. Connect Fuel Pressure Gauge to adapter 6631. Ignition On, Engine Not Running. With DRB, actuate the ASD Fuel System. Record the Fuel Pressure Gauge reading. Compare this reading with the previous reading. Is the fuel pressure at least 2 psi higher than the previous reading? Yes → Repair restriction in Chassis Fuel Supply Line between Fuel Filter and Fuel Rail. Perform Powertrain Verification Test VER-1A. No → Go To 12	ENGINE - 3.0L V6
12	If there are no potential causes remaining, the Fuel Pump Module is assumed to be defective. View repair options. Repair Replace Fuel Pump Module. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6
13	Ignition On, Engine Not Running With DRB, read Throttle Position Sensor voltage. Is the voltage above 1.5 volts? Yes → Disconnect the TP Sensor Conn. Replace Throttle Position Sensor. Perform Powertrain Verification Test VER-1A. No → Go To 14	ENGINE - 3.0L V6
14	Ignition Off. Disconnect the Fuel Pump Harness Connector. **Note: Check connectors - Clean/repair as necessary.** **Caution: It is critical that the Fuel Pump Connector has a clean and tight connection.** With an Ohmmeter, measure the Fuel Pump Ground Circuit. Is the resistance below 5.0 ohms? Yes → Go To 15 No → Repair the open Fuel Pump Ground Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6

* CHECKING THE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
15	Ignition Off. Disconnect the Fuel Pump Relay. **Check connectors - Clean/repair as necessary.** Ignition On , Engine Not Running. With a Voltmeter, measure the Fuel Pump Relay Fused B(+) Circuit. Is the voltage above 10.0 volts? Yes → Go To 16 No → Repair the open Fuel Pump Relay Fused B(+) Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6
16	Ignition Off. Disconnect the Fuel Pump Harness Connector. **Note; Check Connectors - clean/repair as necessary.** **Caution: It is critical that the Fuel Pump Connector has a clean and tight connection.** Ignition On, Engine Not Running. Actuate the ASD Fuel System test. With a Voltmeter, measure the Fuel Pump Relay Output Circuit. Is the voltage above 10.0 volts? Yes → Go To 17 No → Repair the open Fuel Pump Relay Output Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6
17	Ignition Off. Disconnect the Fuel Pump Relay. **Check connectors - Clean/repair as necessary.** Install a substitute Relay of the same part number for the Fuel Pump Relay. Attempt to start the Engine. Does the engine start? Yes → Replace the Fuel Pump Relay. Perform Powertrain Verification Test VER-1A. No → Go To 18	ENGINE - 3.0L V6
18	Ignition off. If there are no potential causes remaining, the Fuel Pump is assumed to be defective. View repair options. Repair Replace the Fuel Pump. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6
19	**Note: Ensure the SKIM has proper communication and that there are no SKIM DTC's present before continuing.** Ignition Off. Ensure the Throttle Cables are not holding the Throttle open. Is the Throttle held open? Yes → Repair condition that holds the Throttle Body open. No → Go To 20	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6

* CHECKING THE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
20	Ignition On, Engine Not Running With the DRB, actuate the Fuel System and check for Fuel Pump operation at the Fuel Tank. Is the Fuel Pump operating? Yes → Go To 21 No → Go To 30	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
21	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Relieve Fuel pressure. Install a Fuel Pressure Gauge to the Fuel Rail. **Note: The Fuel Tank must be at least 1/4 full for the following tests.** Ignition On, Engine Not Running. With the DRB, actuate the Fuel System. Read the Fuel Pressure Gauge. For 3.3 liter engines fuel pressure should be 50 to 60 psi, and for all other engines fuel pressure should be 43 to 53 psi. Is the Fuel pressure above the specification ? Yes → Go To 22 No → Go To 25	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
22	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release the Fuel pressure. Inspect Fuel Filter for a restriction. Is there a restriction? Yes → Replace the Fuel Filter. Perform Powertrain Verification Test VER-1A. No → Go To 23	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
23	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release the Fuel pressure. Inspect Fuel Filter for a restriction. Is there a restriction ? Yes → Go To 24 No → Replace the Fuel Pressure Regulator. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6

* CHECKING THE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
24	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release the Fuel pressure. Inspect Fuel Return Tube for restriction between fuel Filter and Fuel Pump Module. Is there a restriction ? Yes → Replace restricted Fuel Tube. Perform Powertrain Verification Test VER-1A. No → Test Complete.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
25	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Relieve Fuel pressure. Tee-In a Fuel Pressure Gauge into the Fuel Hose using tool #6433. **Note: The Fuel Tank must be at least 1/4 full for the following tests.** Ignition On, Engine Not Running. With the DRB, actuate the Fuel System. Read the Fuel Pressure Gauge. Fuel pressure should be 43 to 53 PSI for Gasoline, 50 to 60 PSI for (E85) Ethanol. Is the Fuel pressure below the specification ? Yes → Go To 26 No → Test Complete.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
26	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release Fuel pressure. Remove adapter 6631 and reinstall Fuel Line. Install adapter 6631 between Fuel Pump and Fuel Filter. Connect Fuel Pressure Gauge to adapter 6631. Key On. With the DRB, actuate Fuel System. Is the fuel pressure at least 2 psi higher than the previous reading? Yes → Replace the Fuel Filter. Perform Powertrain Verification Test VER-1A. No → Go To 27	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
27	Ignition Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release Fuel pressure. Remove the Fuel Pump Module. Inspect the Fuel Pump Inlet Strainer. Is the Inlet Strainer plugged? Yes → Replace the Fuel Inlet Strainer. Perform Powertrain Verification Test VER-1A. No → Go To 28	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6

* CHECKING THE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
28	Record the Fuel Pressure Gauge reading. Ignition Key Off. **Warning: The Fuel System must be opened and may be under high pressure.** Release Fuel pressure. Remove the Fuel Pressure Gauge. Install adapter 6631 between Fuel Filter Outlet and Chassis Fuel Supply Tube. Connect Fuel Pressure Gauge to adapter 6631. Ignition On, Engine Not Running. With DRB, actuate the ASD Fuel System. Record the Fuel Pressure Gauge reading. Compare this reading with the previous reading. Is the fuel pressure at least 2 psi higher than the previous reading? Yes → Repair restriction in Chassis Fuel Supply Line between Fuel Filter and Fuel Rail. Perform Powertrain Verification Test VER-1A. No → Go To 29	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
29	If there are no potential causes remaining, the Fuel Pump Module is assumed to be defective. View repair options. Repair Replace Fuel Pump Module. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
30	Ignition Off. Disconnect the Fuel Pump Harness Connector. **Note: Check connectors - Clean/repair as necessary.** **Caution: It is critical that the Fuel Pump Connector has a clean and tight connection.** With an Ohmmeter, measure the Fuel Pump Ground Circuit. Is the resistance below 5.0 ohms? Yes → Go To 31 No → Repair the open Fuel Pump Ground Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
31	Ignition Off. Disconnect the Fuel Pump Relay. **Check connectors - Clean/repair as necessary.** Ignition On , Engine Not Running. With a Voltmeter, measure the Fuel Pump Relay Fused B(+) Circuit. Is the voltage above 10.0 volts? Yes → Go To 32 No → Repair the open Fuel Pump Relay Fused B(+) Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6

* CHECKING THE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
32	Ignition Off. Disconnect the Fuel Pump Harness Connector. **Note; Check connectors - Clean/repair as necessary.** **Caution: It is critical that the Fuel Pump Connector has a clean and tight connection.** Ignition On, Engine Not Running. Actuate the ASD Fuel System test. With a Voltmeter, measure the Fuel Pump Relay Output Circuit. Is the voltage above 10.0 volts? Yes → Go To 33 No → Repair the open Fuel Pump Relay Output Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
33	Ignition Off. Disconnect the Fuel Pump Relay. **Check connectors - Clean/repair as necessary.** Install a substitute Relay of the same part number for the Fuel Pump Relay. Attempt to start the Engine. Does the Engine start? Yes → Replace the Fuel Pump Relay. Perform Powertrain Verification Test VER-1A. No → Go To 34	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6
34	Ignition Off. If there are no potential causes remaining, the Fuel Pump is assumed to be defective. View repair options. Repair Replace the Fuel Pump. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 FFV and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6

Symptom:
* CHECKING THE IDLE AIR CONTROL MOTOR

POSSIBLE CAUSES
ENGINE NOT START AND STAY RUNNING
IAC MOTOR DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Ignition Off Hold the Engine Throttle 1/4 of the way down. Attempt to start the Engine. Does the Engine start and stay running? Yes → Go To 2 No → Refer to Symptom list for further diagnostic tests.	All
2	Ignition Off Remove the IAC Motor. Turn key on. With the DRB in Actuator Tests, actuate the IAC Stepper Motor. Observe the Pintle of the IAC Motor. Is the IAC Motor Pintle moving in and out? Yes → Test Complete. No → Note: Ensure there are no IAC Motor related Trouble Codes Before Making the following repair. Replace the IAC motor. Perform Powertrain Verification Test VER-1A.	All

Symptom:

* CHECKING THE SECONDARY IGNITION SYSTEM

POSSIBLE CAUSES
GOOD SPARK AT SPARK PLUG #1
AUTO SHUTDOWN RELAY OUTPUT CIRCUIT OPEN
AUTO SHUTDOWN RELAY OUTPUT CIRCUIT OPEN
COIL SECONDARY CABLE DEFECTIVE
FUSED B(+) CIRCUIT OPEN
FUSED B(+) CIRCUIT OPEN
IGNITION COIL CONNECTOR OBSERVABLE DEFECT
IGNITION COIL CONNECTOR OBSERVABLE DEFECT
IGNITION COIL DEFECTIVE
IGNITION COIL SECONDARY CABLE #1 DEFECTIVE
IGNITION COIL SECONDARY CABLE #4 DEFECTIVE
SECONDARY IGNITION COMPONENT(S) DEFECTIVE
SPARK PLUG CABLE #1 DEFECTIVE
AUTO SHUTDOWN RELAY DEFECTIVE
AUTO SHUTDOWN RELAY DEFECTIVE
IGNITION COIL DEFECTIVE
IGNITION COIL DEFECTIVE (RESISTANCE OUT OF RANGE)
SPARK PLUG #1 OR #4 DEFECTIVE
GOOD SPARK AT SPARK PLUG #1
GOOD SPARK AT SPARK PLUG #1

TEST	ACTION	APPLICABILITY
1	Ignition Off. Disconnect the Spark Plug Cable at Spark Plug #1. Connect the Cable to a Spark Tester. Connect the Spark Tester to a good Ground. **Warning: Ensure that there are no Fuel or Fuel vapors present in or near the Engine compartment before continuing with the test.** While cranking the Engine for 10 seconds, watch for spark. Is there good spark? Yes → Refer to Symptom list for further diagnostic tests. No → Go To 2	ENGINE - 3.0L V6

* CHECKING THE SECONDARY IGNITION SYSTEM — Continued

TEST	ACTION	APPLICABILITY
2	Ignition Off. Remove the Coil Secondary Cable from the Distributor. Hold the Cable within 1/4 ″ of a good Ground. **Caution: Engine Controller damage may occur if more than 1/4″.** While cranking the Engine for 10 seconds, watch for spark. **Note: Consider 1 or 2 sparks as a No Spark condition.** Is there good spark? Yes → Repair the Secondary Ignition: Distributor Cap, Rotor, Cables. Perform Verification TEST VER-1A No → Go To 3	ENGINE - 3.0L V6
3	Ignition Off Remove the Coil Secondary Cable. With an Ohmmeter, test the Coil Secondary Cable for resistance. Is the resistance above 15 Kohms? Yes → Replace the Coil Secondary Cable. Perform Verification TEST VER-1A No → Go To 4	ENGINE - 3.0L V6
4	Ignition Off. Remove the Distributor Cap. While cranking the Engine, watch for the Rotor to turn. Did the Rotor turn when the Engine was cranked? Yes → Go To 5 No → Go To 14	ENGINE - 3.0L V6
5	Ignition Off. Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Key On With the DRB, actuate Ignition Coil. With a Voltmeter, measure the ASD Output Circuit. Is the voltage above 10 volts? Yes → Go To 6 No → Go To 11	ENGINE - 3.0L V6
6	Ignition Off. Disconnect Ignition Coil Connector. **Note: Check connectors - Clean/repair as necesary.** Using an Ohmmeter, measure each Ignition Coil Primary Circuit for resistance. Is the resistance below 2.0 ohms for each measurement? Yes → Go To 7 No → Replace the Ignition Coil. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6

* CHECKING THE SECONDARY IGNITION SYSTEM — Continued

TEST	ACTION	APPLICABILITY
7	Ignition Off. Disconnect Ignition Coil Connector. **Note: Check connectors - Clean/repair as necesary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-1A. No → Go To 8	ENGINE - 3.0L V6
8	Ignition Off Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, test the resistance of the Ignition Coil Driver Circuit. Is the resistance below 5.0 ohms? Yes → Go To 9 No → Repair the open Ignition Coil Driver Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6
9	Ignition Off. Disconnect Ignition Coil Connector. **Note: Check connectors - Clean/repair as necesary.** Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Ignition Coil Driver Circuit at the PCM Conn. to Ground. Is the resistance below 5.0 ohms? Yes → Repair the Ignition Coil Driver Circuit for a short to ground. Perform Powertrain Verification Test VER-1A. No → Go To 10	ENGINE - 3.0L V6
10	Ignition off. If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powetrain Verification Test VER-1A.	ENGINE - 3.0L V6
11	Ignition Off. Disconnect Ignition Coil Connector. **Note: Check connectors - Clean/repair as necesary.** Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform Powertrain Verification Test VER-1A. No → Go To 12	ENGINE - 3.0L V6

* CHECKING THE SECONDARY IGNITION SYSTEM — Continued

TEST	ACTION	APPLICABILITY
12	Ignition Off. Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** Using a Jumper Wire connect the ASD Relay Output Circuit to Ground at the Ignition Coil Connector. With an Ohmmeter mesaure the ASD Output Circuit for resistance to Ground at the Relay. Is the resistance below 5.0 ohms? Yes → Go To 13 No → Repair open ASD Relay Output Circuit. Perform Powetrain Verification Test VER-1A.	ENGINE - 3.0L V6
13	Ignition Off. Disconnect the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** Ignition On, Engine Not Running. With a Voltmeter, measure the Fused B(+) Circuit cavity B in ASD Relay Connector. Is the voltage above 10 volts? Yes → Replace the Auto Shutdown Relay. Perform Powertrain Verification Test VER-1A. No → Repair open Fused B+. Perform Verification TEST VER-1A	ENGINE - 3.0L V6
14	Ignition Off. Remove the Distributor Cap. Is the Distributor Rotor loose? Yes → Repair loose Distributor Rotor as necessary. Perform Verification TEST VER-1A No → Go To 15	ENGINE - 3.0L V6
15	If there are no potential causes remaining, the Distributor Drive System is assumed to be defective. View repair options. Repair Repair the Distributor Drive System. Perform Powertrain Verification Test VER-1A.	ENGINE - 3.0L V6
16	Ignition Off. Disconnect the Spark Plug Cable at Spark Plug #1. Connect the Cable to a Spark Tester. Connect the Spark Tester to a good Ground. **Warning: Ensure that there are no Fuel or Fuel vapors present in or near the Engine compartment before continuing with the test.** While cranking the Engine for 10 seconds, watch for spark. Is there good spark? Yes → Refer to Symptom list for further diagnostic tests. No → Go To 17	ENGINE - 2.0L and 2.4L I-4 DOHC

* CHECKING THE SECONDARY IGNITION SYSTEM — Continued

TEST	ACTION	APPLICABILITY
17	Ignition Off. Disconnect the Spark Plug Cable at Spark Plug #2. Connect the other end of the Cable to a Spark Tester. Connect the Spark Tester to a good Ground. **Ensure that there are no fuel or fuel vapors present in or near the Engine Compartment before continuing with the test.** While cranking the Engine for 10 seconds, watch for spark. Is there good spark? Yes → Go To 18 No → Go To 22	ENGINE - 2.0L and 2.4L I-4 DOHC
18	Ignition Off. Disconnect Ignition Coil Secondary Cables #1 and #4 from the Ignition Coil Terminals. **Note: Check connectors - Clean/repair as necessary.** With Ohmmeter, test the resistance between Coil Terminals #1 and #4. Is the resistance between 10.9 and 14.7 K ohms? Yes → Go To 19 No → Replace the Ignition Coil. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L and 2.4L I-4 DOHC
19	Ignition Off. Disconnect Ignition Coil Secondary Cable #1 from the Ignition Coil Terminal. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Ignition Coil Secondary Cable at Spark Plug #1. **Note: Check connectors - Clean/repair as necessary.** With Ohmmeter, test the resistance of Ignition Coil Secondary Cable #1. Is the resistance below 15 K ohms? Yes → Go To 20 No → Replace Ignition Coil Secondary Cable #1. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L and 2.4L I-4 DOHC
20	Ignition Off. Disconnect Ignition Coil Secondary Cable #4 from the Ignition Coil Terminal. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Ignition Coil Secondary Cable at Spark Plug #4. **Note: Check connectors - Clean/repair as necessary.** With Ohmmeter, test the resistance of Ignition Coil Secondary Cable #4. Is the resistance below 15 K ohms? Yes → Go To 21 No → Replace Ignition Coil Secondary Cable #4. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L and 2.4L I-4 DOHC

* CHECKING THE SECONDARY IGNITION SYSTEM — Continued

TEST	ACTION	APPLICABILITY
21	Ignition Off. Disconnect the Ignition Coil Secondary Cable at Spark Plug #1. **Note: Check connectors - Clean/repair as necessary.** Disconnect the Ignition Coil Secondary Cable at Spark Plug #4. **Note: Check connectors - Clean/repair as necessary.** **Note: Either Spark Plug #1 or #4 will not produce a good spark.** Remove Spark Plugs #1 and #4. Inspect and determine which Spark Plug needs replacement. View repair options. Repair Replace the Spark Plug that will not produce a spark. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L and 2.4L I-4 DOHC
22	Ignition Off. Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair Terminal(s) for damage, pushout, or miswiring. Perform Powertrain Verification Test VER-1A. No → Go To 23	ENGINE - 2.0L and 2.4L I-4 DOHC
23	Ignition On, Engine Not Running. With the DRB, actuate Ignition Coil #1. With a Voltmeter, measure the ASD Relay Output Circuit. Is the voltage above 10 volts? Yes → Replace Ignition Coil. Perform Powertrain Verification Test VER-1A. No → Go To 24	ENGINE - 2.0L and 2.4L I-4 DOHC
24	Ignition Off. Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** Using a Jumper Wire connect the ASD Relay Output Circuit to Ground at the Ignition Coil Connector. With an Ohmmeter, measure the ASD Relay Output Circuit for resistance to ground at the Relay. Is the resistance below 5.0 ohms? Yes → Go To 25 No → Repair open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L and 2.4L I-4 DOHC
25	Ignition Off. Disconnect the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** With a Voltmeter, measure the Fused B(+) Circuit, cavity B in ASD Relay Connector. Is the Voltage above 10 volts? Yes → Replace the Auto Shutdown Relay. Perform Verification Test VER-1A No → Repair open Fused B(+). Perform Verification TEST VER-1A	ENGINE - 2.0L and 2.4L I-4 DOHC

* CHECKING THE SECONDARY IGNITION SYSTEM — Continued

TEST	ACTION	APPLICABILITY
26	Ignition Off. Disconnect the Spark Plug Cable at Spark Plug #1. Connect the Cable to a Spark Tester. Connect the Spark Tester to a good Ground. **Warning: Ensure that there are no Fuel or Fuel vapors present in or near the Engine compartment before continuing with the test.** While cranking the Engine for 10 seconds, watch for spark. Is there good spark? Yes → Refer to Symptom list for further diagnostic tests. No → Go To 27	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
27	Ignition Off. Disconnect the Spark Plug Cable at Spark Plug #2. Connect the other end of the Cable to a Spark Tester. Connect the Spark Tester to a good Ground. **Ensure that there are no fuel or fuel vapors present in or near the Engine Compartment before continuing with the test.** While cranking the Engine for 10 seconds, watch for spark. Is there good spark? Yes → Go To 28 No → Go To 29	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
28	Ignition Off. Disconnect the Spark Plug Cable at Spark Plug #2. Connect the other end of the Cable to a Spark Tester. Connect the Spark Tester to a good Ground. **Ensure that there are no fuel or fuel vapors present in or near the Engine Compartment before continuing with the test.** While cranking the Engine for 10 seconds, watch for spark. Is there good spark? Yes → Replace Spark Plug Cable that was initially used to test for spark. Perform Powertrain Verification Test VER-1A. No → Test Complete.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
29	Ignition Off. Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Inspect Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair Terminal(s) for damage, pushout, or miswiring. Perform Powertrain Verification Test VER-1A. No → Go To 30	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

* CHECKING THE SECONDARY IGNITION SYSTEM — Continued

TEST	ACTION	APPLICABILITY
30	Ignition On, Engine Not Running. With the DRB, actuate Ignition Coil #1. With a Voltmeter, measure the ASD Relay Output Circuit. Is the voltage above 10 volts? Yes → Replace Ignition Coil. Perform Powertrain Verification Test VER-1A. No → Go To 31	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
31	Ignition Off. Disconnect the Ignition Coil Connector. **Note: Check connectors - Clean/repair as necessary.** Disconnect the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** Using a Jumper Wire connect the ASD Relay Output Circuit to Ground at the Ignition Coil Connector. With an Ohmmeter, measure the ASD Relay Output Circuit for resistance to ground at the Relay. Is the resistance below 5.0 ohms? Yes → Go To 32 No → Repair open ASD Relay Output Circuit. Perform Powertrain Verification Test VER-1A.	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV
32	Ignition Off. Disconnect the ASD Relay. **Note: Check connectors - Clean/repair as necessary.** With a Voltmeter, measure the Fused B(+) Circuit, cavity B in ASD Relay Connector. Is the Voltage above 10 volts? Yes → Replace the Auto Shutdown Relay. Perform Verification Test VER-1A No → Repair open Fused B(+). Perform Verification TEST VER-1A	ENGINE - 2.0L, 2.4L I-4 DOHC and/or ENGINE - 3.3L V6 and/or ENGINE - 3.8L V6 and/or ENGINE - 3.3L V6 FFV

Symptom:
* NO CRANK CONDITION

POSSIBLE CAUSES
BATTERY CIRCUIT RESISTANCE TOO HIGH
FUSED B(+) CIRCUIT OPEN
STARTER RELAY CONTROL CIRCUIT OPEN
STARTER RELAY OUTPUT CIRCUIT OPEN
CRANKSHAFT NOT ABLE TO ROTATE
STARTER MOTOR DEFECTIVE
PCM DEFECTIVE (NO CRANK CONDITION)
STARTER RELAY DEFECTIVE (RESISTANCE <=100 OHMS)
STARTER RELAY DEFECTIVE (RESISTANCE ABOVE 100 OHMS)
IGNITION SWITCH OUTPUT CIRCUIT OPEN
PARK/NEUTRAL SWITCH DEFECTIVE

TEST	ACTION	APPLICABILITY
1	**Note: Ensure the SKIM has proper communication and that there are no SKIM DTC's present before continuing.** Ignition Off. Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** **Warning: The Transmission must be in Park and the Parking Brake must be on for the next step.** **Warning: The engine may be cranked in the next step. Keep away from moving parts.** Briefly connect a jumper wire between Starter Relay Output and Fused B(+) Circuits. Did the Starter Motor crank the Engine? Yes → Go To 2 No → Go To 9	All
2	Ignition Off. Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** With a Voltmeter, measure the Fused B(+) Circuit. Is the voltage above 11.6 volts? Yes → Go To 3 No → Repair open Fused B(+) Circuit. (check Ignition Switch Fuse in PDC). Perform Powertrain Verification Test VER-1A.	All

* NO CRANK CONDITION — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off. Ensure the Transmission is in Park. With the DRB, read the Park/Neutral Position Switch. Does the Switch show Park? Yes → Go To 4 No → Repair Park/Neutral Switch. Perform Powertrain Verification Test VER-1A.	All
4	Ignition Off. Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, test the Starter Relay Terminals for resistance. Is the resistance above 100 ohms? Yes → Replace the Starter Relay. Perform Powertrain Verification Test VER-1A. No → Go To 5	All
5	Ignition Off Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** With a voltmeter, probe Ignition Switch Output Circuit. While attempting to crank the engine, read the Voltmeter. Is the voltage above 10 volts? Yes → Go To 6 No → Repair the open Ignition Switch Output (Start) Circuit. Perform Powertrain Verification Test VER-1A.	All
6	Ignition Off. Disconnect the Starter Relay Connector. Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** With an ohmmeter, test the Starter Relay Control Circuit for resistance. Is the resistance above 5.0 ohms? Yes → Repair the open Starter Relay Control Circuit. Perform Powertrain Verification Test VER-1A. No → Go To 7	All
7	Ignition Off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** **Warning: The Transmission must be in park and the Parking Brake must be on for the next step.** **Warning: The Engine may be cranked in the next step. Keep away form moving Engine parts.** Connect a jumper wire between the Starter Relay Control Circuit and ground. Briefly turn the Ignition to the crank position and then release. Did the Engine crank? yes Go To 8 no Replace the Starter Relay. Perform Powertrain Verification Test VER-1A.	All

* NO CRANK CONDITION — Continued

TEST	ACTION	APPLICABILITY
8	If there are no potential causes remaining, the Powertrain Control Module is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-1A.	All
9	Ignition Off. Ensure the Transmission is in Park. With the DRB, read the Park/Neutral Position Switch. Does the Switch show Park? Yes → Go To 10 No → Repair Park/Neutral Switch. Perform Powertrain Verification Test VER-1A.	All
10	Ignition Off Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** **Warning: The Engine may be cranked in the next step. Keep away from moving parts.** **Warning: The engine may be cranked in the next step. Keep away from moving parts.** Briefly connect a jumper wire between Starter Relay Output and Fused B(+) Circuits. Did the Starter Solenoid click when the jumper wire was connected? Yes → Go To 11 No → Go To 15	All
11	Ignition Off Check the Battery Cables for high resistance. (Use Service Manual procedure.) Did either Battery Circuit have a voltage drop greater than 0.2 volt? Yes → Repair the Battery Circuit for high resistance. Perform Powertrain Verification Test VER-1A. No → Go To 12	All
12	Ignition Off Attempt to manually rotate the Crankshaft 360 degrees. Is the Crankshaft able to rotate 360 degrees? Yes → Go To 13 No → Repair the Engine mechanical problem as necessary. Perform Powertrain Verification Test VER-1A.	All
13	Ignition Off. Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** With a Voltmeter, measure the Fused B(+) Circuit. Is the voltage above 11.6 volts? Yes → Go To 14 No → Repair open Fused B(+) Circuit. (check Ignition Switch Fuse in PDC). Perform Powertrain Verification Test VER-1A.	All

* NO CRANK CONDITION — Continued

TEST	ACTION	APPLICABILITY
14	Ignition Off. Disconnect Starter Relay Output Wire from the Starter Solenoid. Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure Starter Relay Output Circuit. Is the resistance below 5.0 ohms? Yes → Go To 19 No → Repair open Starter Relay Output Circuit. Perform Powertrain Verification Test VER-1A.	All
15	Ignition Off Check the Battery Cables for high resistance. (Use Service Manual procedure.) Did either Battery Circuit have a voltage drop greater than 0.2 volt? Yes → Repair the Battery Circuit for high resistance. Perform Powertrain Verification Test VER-1A. No → Go To 16	All
16	Ignition Off Attempt to manually rotate the Crankshaft 360 degrees. Is the Crankshaft able to rotate 360 degrees? Yes → Go To 17 No → Repair the Engine mechanical problem as necessary. Perform Powertrain Verification Test VER-1A.	All
17	Ignition Off. Disconnect Starter Relay Output Wire from the Starter Solenoid. Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** Using an ohmmeter, measure Starter Relay Output Circuit. Is the resistance below 5.0 ohms? Yes → Go To 18 No → Repair open Starter Relay Output Circuit. Perform Powertrain Verification Test VER-1A.	All
18	Ignition Off. Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** With a Voltmeter, measure the Fused B(+) Circuit. Is the voltage above 11.6 volts? Yes → Go To 19 No → Repair open Fused B(+) Circuit. (check Ignition Switch Fuse in PDC). Perform Powertrain Verification Test VER-1A.	All

* NO CRANK CONDITION — Continued

TEST	ACTION	APPLICABILITY
19	Ignition Off Disconnect the Starter Relay Connector. **Note: Check connectors - Clean/repair as necessary.** With a voltmeter, probe Ignition Switch Output Circuit. While attempting to crank the engine, read the Voltmeter. Is the voltage above 10 volts? Yes → Go To 20 No → Repair the open Ignition Switch Output (Start) Circuit. Perform Powertrain Verification Test VER-1A.	All
20	If there are no potential causes remaining, the Starter Motor is assumed to be defective. View repair options. Repair Replace the Starter Motor. Perform Powertrain Verification Test VER-1A.	All

Symptom:
* START AND STALL CONDITION

TEST	ACTION	APPLICABILITY
1	**Note: Ensure the SKIM has proper communication and that there are no SKIM DTC's present before continuing.** At this point in the diagnostic test procedure, it is assumed that all of the engine electrical systems are operating as designed and are not the cause of a start and stall, or a no start problem. The following additional items should be checked as possible mechanical problems. Any one of these items can produce a start and stall, or no start condition; none can be overlooked as a possible cause. 1. ENGINE VALVE TIMING - must be within specifications 2. ENGINE COMPRESSION - must be within specifications 3. ENGINE EXHAUST SYSTEM - must be free of any restrictions 4. ENGINE PCV SYSTEM - must flow freely 5. FUEL - must be free of contamination 6. ENGINE SECONDARY IGNITION CHECK - must exhibit a normal scope pattern 7. THROTTLE BODY - must be free of any coking conditions. 8. IDLE AIR CONTROL MOTOR - passages must be free of any debris or carbon. Always look for any Technical Service Bulletins that may relate to this condition. Test Complete.	All

Symptom:
P-0740 TORQUE CONV CLUTCH, NO RPM DROP AT LOCKUP

When Monitored and Set Condition:

P-0740 TORQUE CONV CLUTCH, NO RPM DROP AT LOCKUP

When Monitored: Continuously when no matured or maturing Trouble Code and throttle position >10% and constant for 4.4 seconds before TCC engagement requested: No TCC solenoid circuit, any cam/crank-related code, VSS, any TPS-related code and Battery voltage >11.0

Set Condition: Torque Converter malfunctions that are detected are the FTC not locking up properly when desired, and the torque converter not unlocking properly when desired. 3 consecutive test failures over one trip will store the code. 2 bad trips will set the code.

POSSIBLE CAUSES
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
DIFF, SHAFT, OR GEARS DEFECTIVE
TCC SOL DEFECTIVE
TORQUE CONVERTER ASSEMBLY DEF OR TCC SOL STUCK
TRANSMISSION FLUID DIRTY OR LEVEL LOW
VEHICLE CONFIGURATION NON-STANDARD

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 2 No → Test Complete.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
2	Ignition Off At the ″Cooler In″ port put a 0 to 300 PSI gauge using a ″T″. Ensure line is long enough to reach in driver's side of vehicle so gauge can be monitored while driving. Road test vehicle. Gear select in drive. While monitoring DRB, achieve 50 MPH. While doing this, notice the gauge will read around 15 PSI until lockup is achieved in 3rd gear. If the TCC Solenoid is operating properly, the gauge pressure will fluctuate when lockup is achieved. Did gauge fluctuate? Yes → Go To 3 No → Refer to service instructions for proper service procedure on Torque Converter Assembly or stuck TCC Solenoid and repair as necessary. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH

P-0740 TORQUE CONV CLUTCH, NO RPM DROP AT LOCKUP — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Check Transmission Fluid level and ensure it is clear of any debris. Is the Transmission Fluid okay? Yes → Go To 4 No → Repair as necessary. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
4	Ignition Off Disconnect the TCC Solenoid connector. **Note: Check connectors - Clean/repair as necessary.** Turn key on. Use a Voltmeter in the following step. Using a Voltmeter, measure the Fused Ignition Switch Output Circuit at Solenoid Connector. Is the voltage above 10.0 volts? Yes → Go To 5 No → Repair the open Fused Ignition Switch Output Circuit. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
5	Ignition Off Disconnect the TCC Solenoid connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure across the Solenoid for resistance. Was resistance between 30.0 and 50.0 ohms? Yes → Go To 6 No → Replace TCC Solenoid. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
6	Drive Vehicle Maintain 50 MPH per DRB. Wait 10 seconds in lockup. Record Engine RPM. Was engine RPM 2200 +/- 50 RPM? Yes → Go To 7 No → Inspect Differential, Output Shaft, or Gear Box. Refer to service instructions for proper diagnosis. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
7	Ignition Off Remove VSS. **Note: Check connectors - Clean/repair as necessary.** Inspect sensor and gear for damage, also improper wheel size. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH

Symptom:
P-0743 TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT

When Monitored and Set Condition:

P-0743 TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT

When Monitored: With the ignition key on.

Set Condition: An open or shorted condition is detected in the Torque Converter Clutch Solenoid Control Circuit.

POSSIBLE CAUSES
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
TORQUE CONVERTER CLUTCH SOLENOID DEFECTIVE
TCC SOLENOID CIRCUIT W/H INTERMITTENT DEFECT
TCC SOLENOID CIRCUIT W/H OBSERVABLE DEFECT
TCC SOLENOID CONTROL CIRCUIT OPEN
TCC SOLENOID CONTROL CIRCUIT SHORT TO GROUND
PCM DEFECTIVE (TCC SOLENOID CONTROL CIRCUIT)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running With the DRB, read codes. Is the Global Good Trip displayed and equal to 0? Yes → Go To 2 No → Go To 7	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
2	Ignition Off Disconnect the TCC Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Key on. With the Voltmeter, probe the voltage of the Fused Ignition Switch Output Circuit at Solenoid Connector. Is the voltage above 10.0 volts? Yes → Go To 3 No → Repair the open Fused Ignition Switch Output Circuit.. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH

P-0743 TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off Disconnect the Powertrain Control Module. **Note: Check connectors - Clean/repair as necessary.** Key on. With the voltmeter, probe the TCC Solenoid Control Circuit at the PCM connector. Is the voltage above 10.0 volts? Yes → Go To 4 No → Replace the TCC Solenoid. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
4	Ignition Off Disconnect the Powertrain Control Module Connector. Disconnect the TCC Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure the TCC Solenoid Control Circuit from the TCC Solenoid Connector to the PCM Connector. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Repair the open TCC Solenoid Control Circuit. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
5	Ignition Off Disconnect the Powertrain Control Module Connector. Disconnect the TCC Solenoid Connector. **Note: Check connectors - Clean/repair as necessary.** With the DRB in ohmmeter mode, measure between the TCC Solenoid Control Circuit and ground. Is the resistance below 5.0 ohms? Yes → Repair the TCC Solenoid Control Circuit short to ground. Perform Powertrain Verification Test VER-5A. No → Go To 6	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
6	If there are no potential causes remaining, the PCM is assumed to be defective. View repair options. Repair Replace the Powertrain Control Module. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
7	Ignition On, Engine Not Running With the DRB, erase codes. Turn ignition off for 10 seconds, then turn ignition on. With the DRB actuate the TCC Solenoid. With the DRB, read codes. Wiggle Wiring Harness from the Solenoid to PCM. Does the TCC Solenoid Control Circuit code return? Yes → Repair as necessary where wiggling caused problem to appear. Perform Powertrain Verification Test VER-5A. No → Go To 8	TRANSMISSION - AUTOMATIC 3-SPD, 31TH

P-0743 TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH

Symptom:
P-1899 PARK/NEUTRAL SWITCH STUCK IN PARK OR IN GEAR

When Monitored and Set Condition:

P-1899 PARK/NEUTRAL SWITCH STUCK IN PARK OR IN GEAR

When Monitored: With the transmission in Park, Neutral, or Drive and not in limp-in mode.

Set Condition: This code is set if the PCM detects an incorrect Park/Neutral switch state for a given mode of vehicle operation in two consecutive failures.

POSSIBLE CAUSES
P/N SWITCH SENSE CIRCUIT OPEN
PARK/NEUTRAL SWITCH SENSE CIRCUIT OPEN
PARK/NEUTRAL SWITCH SENSE CIRCUIT SHORT TO GROUND
PARK/NEUTRAL SWITCH SENSE CIRCUIT SHORT TO GROUND
PARK/NEUTRAL SWITCH WIRING HARNESS OBSERVABLE DEFECT
PARK/NEUTRAL SWITCH WIRING HARNESS OBSERVABLE DEFECT
PARK/NEUTRAL SWITCH DEFECTIVE
TRS DEFECTIVE
PCM DEF (P/N SWITCH)
PCM DEF (P/N SWITCH)

TEST	ACTION	APPLICABILITY
1	Ignition On, Engine Not Running. With the DRB, read Park/Neutral Switch input state. While moving gear selector in and out of Park and Reverse, watch DRB Display. Did the display show ″P/N and D/R″? Yes → Go To 2 No → Go To 3	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
2	Ignition Off. Inspect the Wiring and Connector relating to Park/Neutral Position Switch. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH

P-1899 PARK/NEUTRAL SWITCH STUCK IN PARK OR IN GEAR — Continued

TEST	ACTION	APPLICABILITY
3	Ignition Off. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the Park/Neutral Switch Sense Circuit at the PCM Connector and Ground. While moving Gear Selector between Park and Reverse, watch Ohmmeter display. Did the display switch from below 5.0 ohms to above 5.0 ohms? Yes → Replace the PCM. Perform Powertrain Verification Test VER-5A. No → Go To 4	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
4	Ignition Off. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the Park/Neutral Switch Sense Circuit at the PCM Connector and Ground. While moving gear selector between Park and Reverse, watch Ohmmeter display. Did the display stay below 5.0 ohms at all times? Yes → Repair the P/N Switch Sense Circuit for a short to Ground. Perform Powertrain Verification Test VER-5A. No → Go To 5	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
5	Ignition Off. Disconnect the PCM. Disconnect the Park/Neutral Position Switch Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Park/Neutral Switch Sense Circuit from the PCM to the Switch. Is the resistance below 5.0 ohms? Yes → Go To 6 No → Repair open P/N Switch Sense Circuit. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
6	If there are no potential causes remaining, the P/N Position Switch is assumed to be defective. View repair options. Repair Replace the Park/Neutral Position Switch. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 3-SPD, 31TH
7	Ignition On, Engine Not Running. With the DRB, read Park/Neutral Switch input state. While moving gear selector in and out of Park and Reverse, watch DRB Display. Did the display show ″P/N and D/R″? Yes → Go To 8 No → Go To 9	TRANSMISSION - AUTOMATIC 4-SPD, 41TE and/or TRANSMISSION - AUTOSTICK

P-1899 PARK/NEUTRAL SWITCH STUCK IN PARK OR IN GEAR — Continued

TEST	ACTION	APPLICABILITY
8	Ignition Off. Inspect the Wiring and Connector relating to Park/Neutral Position Switch. Were any problems found? Yes → Repair as necessary. Perform Powertrain Verification Test VER-5A. No → Test Complete.	TRANSMISSION - AUTOMATIC 4-SPD, 41TE and/or TRANSMISSION - AUTOSTICK
9	Ignition Off. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the Park/Neutral Switch Sense Circuit at the PCM Connector and Ground. While moving Gear Selector between Park and Reverse, watch Ohmmeter display. Did the display switch from below 5.0 ohms to above 5.0 ohms? Yes → Replace the PCM. Perform Powertrain Verification Test VER-5A. No → Go To 10	TRANSMISSION - AUTOMATIC 4-SPD, 41TE and/or TRANSMISSION - AUTOSTICK
10	Ignition Off. Disconnect the PCM Connector. **Note: Check connectors - Clean/repair as necessary.** Using an Ohmmeter, measure between the Park/Neutral Switch Sense Circuit at the PCM Connector and Ground. While moving gear selector between Park and Reverse, watch Ohmmeter display. Did the display stay below 5.0 ohms at all times? Yes → Repair the P/N Switch Sense Circuit for a short to Ground. Perform Powertrain Verification Test VER-5A. No → Go To 11	TRANSMISSION - AUTOMATIC 4-SPD, 41TE and/or TRANSMISSION - AUTOSTICK
11	Ignition Off. Disconnect the PCM. Disconnect the Transmission Range Sensor (TRS) Connector. **Note: Check connectors - Clean/repair as necessary.** With an Ohmmeter, measure the Park/Neutral Switch Sense Circuit from the PCM to the TRS. Is the resistance below 5.0 ohms? Yes → Go To 12 No → Repair open Park/Neutral Switch Sense Circuit. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 4-SPD, 41TE and/or TRANSMISSION - AUTOSTICK
12	If there are no potential causes remaining, the Transmission Range Sensor is assumed to be defective. View repair options. Repair Replace the TRS. Perform Powertrain Verification Test VER-5A.	TRANSMISSION - AUTOMATIC 4-SPD, 41TE and/or TRANSMISSION - AUTOSTICK

Symptom List:

ANTENNA FAILURE
COP FAILURE
EEPROM FAILURE
INTERNAL FAULTS
RAM FAILURE
SERIAL LINK INTERNAL
STACK OVERFLOW FAILURE

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be ANTENNA FAILURE.

When Monitored and Set Condition:

EEPROM FAILURE

When Monitored: At ignition ON and during the SKIM programming process, which programs SKIM's PIN the VIN, country code or additional keys.

Set Condition: This condition is set when an error occurs during programming the SKIM's EEPROM. The other condition that causes this code to mature is an EEPROM I2C link failure.

POSSIBLE CAUSES
SKIM INTERNAL DTC FAILURE

TEST	ACTION	APPLICABILITY
1	**Note: This trouble code indicates an internal SKIM fault.** With the DRBIII®, read and record SKIM DTC's and then erase SKIM DTC's Perform several key cycles, leaving the key on for a minimum of 30 seconds per cycle. With the DRBIII®, read SKIM trouble codes. Did the SKIM Internal DTC return? Yes → Replace the Sentry Key Immobilizer Module. Perform the Powertrain Verification Test VER-7A. No → Test Complete.	All

Symptom List:

PCM STATUS FAILURE
ROLLING CODE 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: This condition is monitored at ignition ON and continuously during an ignition ON cycle.

Set Condition: This condition exists when a PCM STATUS bus message was not received from the PCM. Note: Failure maturity time is 20 seconds.

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 a PCM reset.

Set Condition: This condition exists when a PCM STATUS message is not received by the SKIM within 3.5 seconds of transmitting what the SKIM believes to be a ’key code’ message to the PCM. the ’key code’ sent by the SKIM may or may not be valid in this case.

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 a PCM reset, or during ’Secret Key’ transfers to the PCM.

Set Condition: This condition is set when the SKIM does not receive an expected bus message transmission acknowledgement from the PCM after 3 transmit attempts.

POSSIBLE CAUSES
INTERMITTENT WIRING HARNESS PROBLEM
WIRING HARNESS INSPECTION
SKIM/PCM DEFECTIVE

PCM STATUS FAILURE — Continued

TEST	ACTION	APPLICABILITY
1	Using the DRB, erase the codes. Turn ingition off. Wait 10 seconds. Turn ignition on. Using the DRB, read the codes. Does the DRB display the code that was previously erased? Yes → Go To 2 No → Go To 4	All
2	Turn ignition off. **Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.** **Note: Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.** **Note: Refer to any Technical Service Bulletins (TSB) that may apply.** Were any problems found? Yes → Repair as necessary. Perform the Powertrain Verification Test VER-7A. No → Go To 3	All
3	Replace the Sentry Key Immobilizer Module. Using the DRB, erase the codes. Drive vehicle. Perform several key cycles. Does the code appear? Yes → Replace the Powertrain Control Module. Perform the Powertrain Verification Test VER-7A. No → Test Complete.	All
4	Turn ignition off. **Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.** **Note: Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.** **Note: Refer to any Technical Service Bulletins (TSB) that may apply.** Were any problems found? Yes → Repair wiring harness/connectors as necessary. Perform the Powertrain Verification Test VER-7A. No → Test Complete.	All

Symptom List:

TRANSPONDER (CYCLIC REDUNDANCY CHECK) CRC FAILURE
TRANSPONDER COMMUNICATION FAILURE
TRANSPONDER ID MISMATCH
TRANSPONDER RESPONSE MISMATCH

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be TRANSPONDER (CYCLIC REDUNDANCY CHECK) CRC FAILURE.

When Monitored and Set Condition:

TRANSPONDER (CYCLIC REDUNDANCY CHECK) CRS FAILURE

When Monitored: At ignition ON and during Key Programming Mode.

Set Condition: This condition exists when 5 consecutive transponder signal transmissions are sent to the SKIM with the correct message format but with invalid data.

TRANSPONDER COMMINICATION FAILURE

When Monitored: At ignition ON and during Key Programming Mode.

Set Condition: This condition exists when an invalid message format is received from the transponder after 5 consecutive transponder read attempts.

TRANSPONDER ID MISMATCH

When Monitored: At ignition ON and during Key Programming Mode.

Set Condition: This condition exists when the transponder ID read by the SKIM does not match any of those transponder ID's stored in the SKIM's memory.

TRANSPONDER RESPONSE MISMATCH

When Monitored: At ignition ON and during Key Programming Mode.

Set Condition: This condition exists when the transponder's secret algorithm result fails to match the SKIM's result.

POSSIBLE CAUSES
INTERMITTENT WIRING HARNESS PROBLEM
SKIM/KEY DEFECTIVE

TRANSPONDER (CYCLIC REDUNDANCY CHECK) CRC FAILURE — Continued

TEST	ACTION	APPLICABILITY
1	Using the DRB, erase the codes. Turn ingition off. Wait 10 seconds. Turn ignition on. Using the DRB, read the codes. Does the DRB display the code that was previously erased? Yes → Go To 2 No → Go To 4	All
2	Using the DRB, attempt to reprogram the ignition key to the SKIM Module. Using the DRB, erase the codes. Turn ignition off. Wait 10 seconds. Turn ignition on. Using the DRB, read the codes. Does the code appear? Yes → Go To 3. No → Test Complete.	All
3	Replace the ignition key with a new key. Using the DRB, program the new ignition key to the SKIM Module. Using the DRB, erase the codes. Turn ignition off. Wait 10 seconds. Turn ignition on. Using the DRB, read the codes. Does the code appear? Yes → Replace the Sentry Key Immobilizer Module. Perform the Powertrain Verification Test VER-7A. No → Test Complete.	All
4	Turn ignition off. **Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially borken wires.** **Note: Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.** **Note: Refer to any Technical Service Bulletins (TSB) that may apply.** Were any problems found? Yes → Repair wiring harness/connectors as necessary. Perform the Powertrain Verification Test VER-7A. No → Test Complete.	All

Symptom List:
VIN MISMATCH

When Monitored and Set Condition:

VIN MISMATCH

When Monitored: Monitored continuously during the engine RUN cycle.

Set Condition: This condition exists when the VIN received from the PCM does not match the VIN stored in the SKIM'S EEPROM. Note: Failure maturity time may take up to 3 minutes.

POSSIBLE CAUSES
INTERMITTENT WIRING HARNESS PROBLEM
SKIM DEFECTIVE
PCM DEFECTIVE

TEST	ACTION	APPLICABILITY
1	Using the DRB, erase the codes. Turn ingition off. Wait 10 seconds. Turn ignition on. Using the DRB, read the codes. Does the DRB display the code that was previously erased? Yes → Go To 2 No → Go To 3	All
2	**Note: Ensure that a VIN has been programmed into the PCM. If a VIN is not displayed, attempt to program the PCM with the vehicle VIN before continuing.** Turn ignition on. Using the DRB, select "Engine" system from the main menu. Display and record the Vehicle Identification Number (VIN). Does the VIN recorded from the PCM match the VIN of the vehicle? Yes → Replace the Sentry Key Immobilizer Module. Perform the Powertrain Verification Test VER-7A. No → Replace the Powertrain Control Module (PCM). Program the correct VIN into the new PCM and retest. Perform the Powertrain Verification Test VER-7A.	All

VIN MISMATCH — Continued

TEST	ACTION	APPLICABILITY
3	Turn ignition off. **Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.** **Note: Visually inspect the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.** **Note: Refer to any Technical Service Bulletins (TSB) that may apply.** Were any problems found? Yes → Repair wiring harness/connectors as necessary. Perform the Powertrain Verification Test VER-7A. No → Test Complete.	All

Verification Tests

VERIFICATION TEST VER-1A	APPLICABILITY
No Start Verification Use this test to verify that a No Start condition has been repaired and that the vehicle can be returned to the customer. **Note: If the Powertrain Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and the SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting. Refer to GENERAL INFORMATION section for programming information for the PCM, SKIM and the Transponder (ignition key).** 1. Inspect the vehicle to ensure that all components related to the repair are connected properly. 2. Inspect the engine oil for fuel contamination. Replace the oil and filter as necessary 3. Attempt to start the engine. 4. If the No Start condition is still present, refer to the symptom list and perform diagnostic testing as necessary. Refer to any Technical Service Bulletins that may apply. 5. Run the engine for one warm-up cycle to verify proper operation. With the DRBIII®, confirm that no DTC's are present and that all components are functioning properly. 6. If DTC's are present, refer to the symptom list and perform diagnostic testing as necessary.	ALL

VERIFICATION TEST VER-2A	APPLICABILITY
Non-OBDII Verification Use this test to verify that a non-OBDII symptom has been repaired and that the vehicle can be returned to the customer. A non-OBDII symptom is a comprehensive component related symptom that is not the result of a failed OBDII major monitor. **Note: If the Powertrain Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and the SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting. Refer to GENERAL INFORMATION section for programming information for the PCM, SKIM and the Transponder (ignition key).** 1. Inspect the vehicle to ensure that all components related to the repair are connected properly. 2. With the DRBIII®, Clear DTC's and Reset Memory (all engine values). 3. Run the engine for one warm-up cycle to verify proper operation. 4. Road test the vehicle. Use all accessories that may be related to this repair. With the DRBIII®, confirm that no DTC's are present and that all components are functioning properly. 6. If this test is being performed after a No Trouble Code test, verify that the symptom is no longer present. If the symptom is still present, or any other symptom or DTC is present, refer to the symptom list for further diagnostic testing procedures. Check for any Technical Service Bulletins that may apply. 7. If there are no DTC's present and all components are functioning properly, repair is complete.	ALL

Verification Tests — Continued

VERIFICATION TEST VER-3A	APPLICABILITY
Charging System Verification Use this test to verify that the Charging System symptom has been repaired and that the vehicle can be returned to the customer. **Note: If the Powertrain Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and the SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting. Refer to GENERAL INFORMATION section for programming information for the PCM, SKIM and the Transponder (ignition key).** 1. Inspect the vehicle to ensure that all components related to the repair are connected properly. 2. With the DRBIII®, Clear DTC's. 3. Perform generator output test. Refer to the appropriate service information as necessary. 4. Start the engine and set engine speed to 2000 RPM for at least thirty seconds. 5. Turn the ignition OFF. 6. Turn the ignition ON, with the engine not running. 7. With the DRBIII®, Read the DTC's. If the DTC returns, or any other symptom or DTC is present, refer to the symptom list for further diagnostic testing procedures. Check for any Technical Service Bulletins that may apply. 8. If there are no DTC's present and all components are functioning properly, the repair is complete.	All

Verification Tests — Continued

VERIFICATION TEST VER-4A	APPLICABILITY
Speed Control Verification Use this test to verify that the Speed Control symptom has been repaired and that the vehicle can be returned to the customer. **Note: If the Powertrain Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and the SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting. Refer to GENERAL INFORMATION section for programming information for the PCM, SKIM and the Transponder (ignition key).** 1. Inspect the vehicle to ensure that all components related to the repair are connected properly. 2. With the DRBIII®, Clear DTC's. 3. Road test the vehicle at a speed above 35 MPH. 4. Turn the Speed Control ON. 5. Press and release the Set switch. Verify that the speed control engages. 6. With the Speed Control engaged: A. Press and hold the ACCEL switch. Verify that the speed increases. B. Press and hold the SET (or DECEL) switch. Verify that the vehicle speed decreases. C. Press and release the CANCEL switch. Verify that the Speed Control disengages. D. Allow the vehicle speed to drop below 25 MPH. Press and release the RESUME switch. Verify that the previously set vehicle speed is attained. E. Using caution, press and release the brake pedal. Verify that the Speed Control disengages. F. Increase vehicle speed by at least 10 MPH. Press and release the SET switch. Verify the Speed Control maintains this speed. G. Press and release the ON/OFF switch (turn the Speed Control OFF.) Verify that the Speed Control disengages. If any or all of these functions are not operating properly, refer to the symptom list for the appropriate diagnostic testing procedures. 7. With the DRBIII®, Read DTC's. If the DTC returns, or any other symptom or DTC is present, refer to the symptom list for further diagnostic testing procedures. Check for any Technical Service Bulletins that may apply. 8. If there are no DTC's present and all components are functioning properly, the repair is complete.	All

Verification Tests — Continued

VERIFICATION TEST VER-5A	APPLICABILITY
OBDII Road Test Verification Use this test to verify that the OBDII symptom has been repaired and that the vehicle can be returned to the customer. The proper way to verify that an OBDII DTC has been repaired is to allow the PCM to run and pass the appropriate OBDII monitor(s). **Note: If the Powertrain Control Module has been changed and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and the SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting. Refer to GENERAL INFORMATION section for programming information for the PCM, SKIM and the Transponder (ignition key).** 1. Inspect the vehicle to ensure that all components related to the repair are connected properly. 2. If any other DTC is present, refer to the symptom list for further diagnostic testing procedures. 3. With the DRBIII®, Clear DTC's. 4. In order for an OBDII monitor to run, certain pre-test conditions must be met. Refer to the applicable OBDII monitor pre-test screen on the DRBIII® for monitor enabling conditions. 5. Operate the vehicle within the enabling conditions and allow the applicable monitor to run. While the monitor is running, the OBDII monitor screen on the DRBIII® will display "IN PROGRESS" and the DRBIII® will beep. After the monitor is complete, view the results. Refer to the appropriate service information as necessary. A monitor may have to fail more than once in order to set a DTC. If the monitor fails, or the DTC returns, or any other symptom or DTC is present, refer to the symptom list for further diagnostic testing procedures. Check for any Technical Service Bulletins that may apply. If there are no DTC's present and all components are functioning properly, the repair is complete.	ALL

Powertrain Verification Test VER-5A2	APPLICABILITY
Fuel System Lean/Rich or Misfire Verification Use this test to verify that the Fuel System Lean, Fuel System Rich, or Misfire symptom has been repaired and that the vehicle can be returned to the customer. **NOTE: If the Powertrain Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and the SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret KEY data must be updated to enable starting. Refer to GENERAL INFORMATION section for programming information for the PCM, SKIM and the Transponder (ignition key).** 1. Inspect the vehicle to ensure that all components related to the repair are connected properly. 2. If any other DTC is present, refer to the symptom list for further diagnostic testing procedures. 3. With the DRBIII®, monitor the Similar Conditions Window and attempt to duplicate the conditions that the vehicle was operating at when the DTC was set. If the conditions can be duplicated, the Good Trip counter will change to one or more. 4. If the DTC resets, or the OBDII monitor fails after running, or if any other symptom or DTC is present, return to the symptom list and perform the appropriate diagnostic testing procedures. Check for any Technical Service Bulletins that may apply. 5. If the monitor runs and the Good Trip Counter changes to one or more, the condition is no longer present. If there are no DTCs and all components are functioning properly, the repair is complete.	ALL

Verification Tests — Continued

Powertrain Verification Test VER-5A3	APPLICABILITY
OBDII Monitor Verification Use this test to verify that the OBDII monitor symptom has been repaired and that the vehicle can be returned to the customer. **NOTE: If the Powertrain Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and the SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting. Refer to GENERAL INFORMATION section for programming information for the PCM, SKIM and the Transponder (ignition key).** 1. Inspect the vehicle to ensure that all components related to the repair are connected properly. 2. If any other DTC is present, refer to the symptom list for further diagnostic testing procedures. 3. With the DRBIII®, monitor the pre-test enabling conditions. Operate the vehicle within the enabling conditions and allow the applicable monitor to run. 4. If the DTC resets, or the OBDII monitor fails after running, or if any other symptom or DTC is present, return to the symptom list and perform the appropriate diagnostic testing procedurs. Refer to any Technical Service Bulletins that may apply. 5. If the monitor runs and the Good Trip Counter changes to one or more, the condition is no longer present. 6. If there are no DTCs and all components are functioning properly, the repair is complete.	All

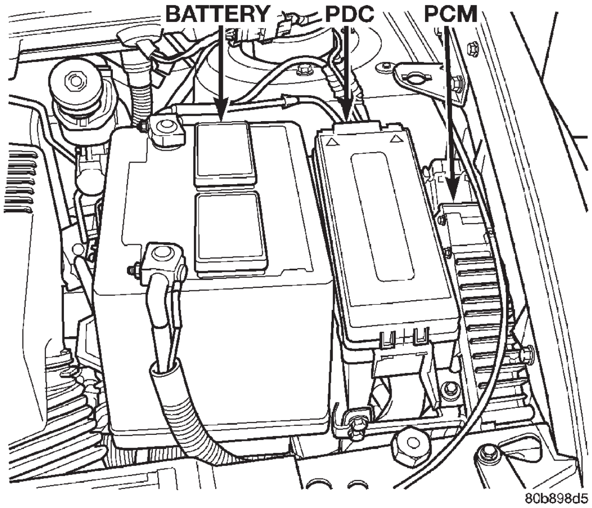
Powertrain Verification Test VER-6A	APPLICABILITY
LDP Monitor Verification Use this test to verify that the LDP monitor symptom has been repaired and that the vehicle can be returned to the customer. **NOTE: If the Powertrain Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and the SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting. Refer to GENERAL INFORMATION section for programming information for the PCM, SKIM and Transponder (ignition key).** 1. Inspect the vehicle to ensure that all components are related to the repair are connected properly. 2. If any other DTC is present, refer to the symptom list for futher diagnostic testing procedures. 3. With the DRBIII®, perform the LDP Monitor Test. Follow the instructions on the DRBIII® screen. 4. If the DTC resets, or the OBDII monitor fails after running, or if any other symptom or DTC is present, return to the symptom list and perform the appropriate diagnostic testing procedures. Refer to any Technical Service Bulletins that mat apply. 5. If the monitor runs and test does not fail, the condition is no longer present. 6. If there are no DTCs and all components are functioning properly, the repair is complete.	All

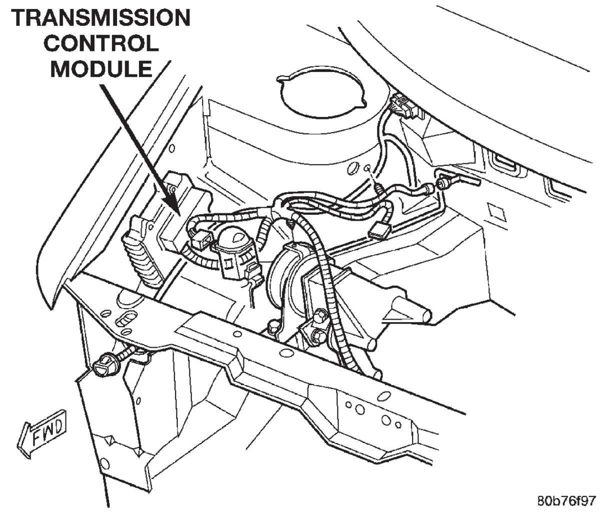
Verification Tests — Continued

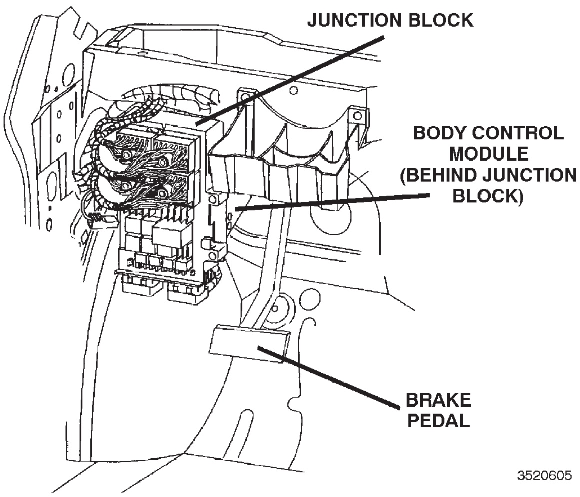
Powertrain Verification Test VER-7A	APPLICABILITY
SKIS Verfication Use this test to verify that SKIM system symptom has been repaired and that the vehicle can be returned to the customer. **Note: If the Powertrain Control Module has been replaced and the correct VIN and mileage have not been programmed, a DTC will be set in the ABS, Airbag and SKIM modules. In addition, if the vehicle is equipped with a Sentry Key Immobilizer Module (SKIM), Secret Key data must be updated to enable starting. Refer to GENERAL INFORMATION section for programmig information for the PCM, SKIM and the Transponder (ignition key).** 1.Inspect the vehicle to ensure that all components related to the repair are connected properly. 2. Inspect the engine oil for fuel contamination. Replace the oil and filter as necessary. 3. Start the engine. 4. Run the engine for one warm-up cycle to verify proper operation. With the DRBIII®, confirm that no DTCs are present and that all components are functioning properly. If the DTC is still present refer to any Technical Service Bulletins that may apply. 5. If a different DTC(s) is present, refer to the symtom list and perform diagnostic testing as necessary. If there are no DTCs present and all components are functioning correctly, repair is now complete.	All

8.0 COMPONENT LOCATIONS

8.1 CONTROL MODULES AND PDC







8.2 CONTROLS & SOLENOIDS

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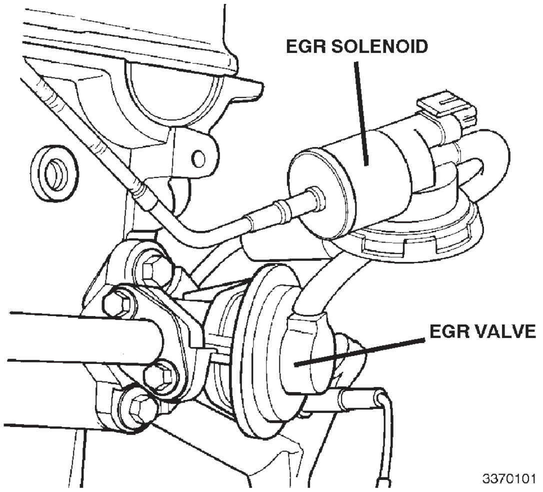
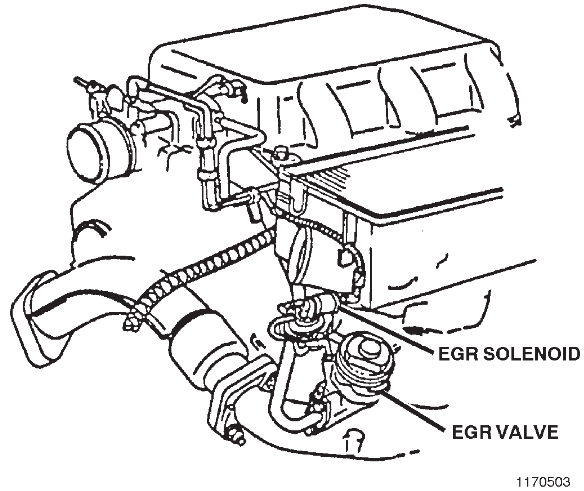
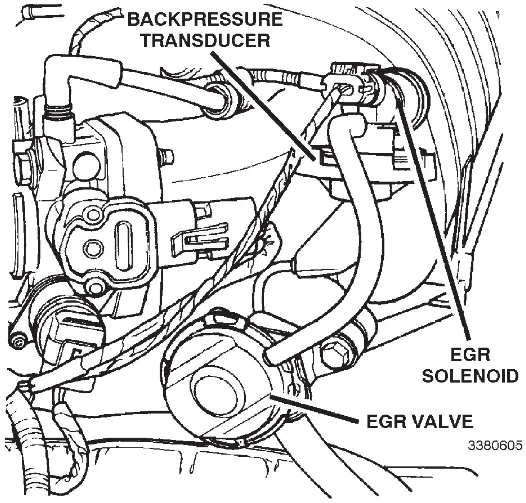


3.0L



8.2 CONTROLS & SOLENOIDS (Continued)

3.3L AND 3.8L



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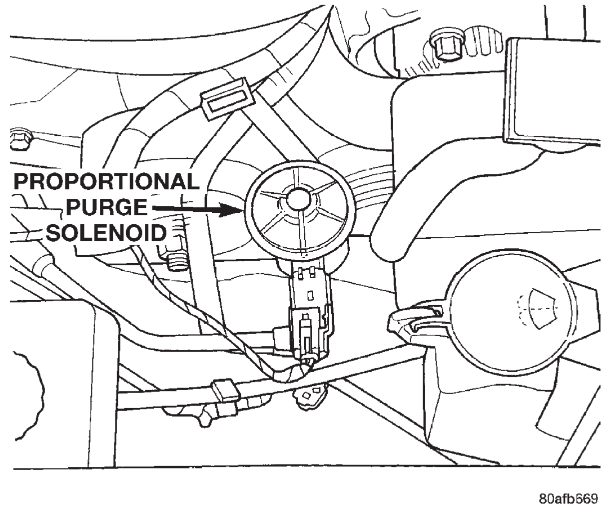

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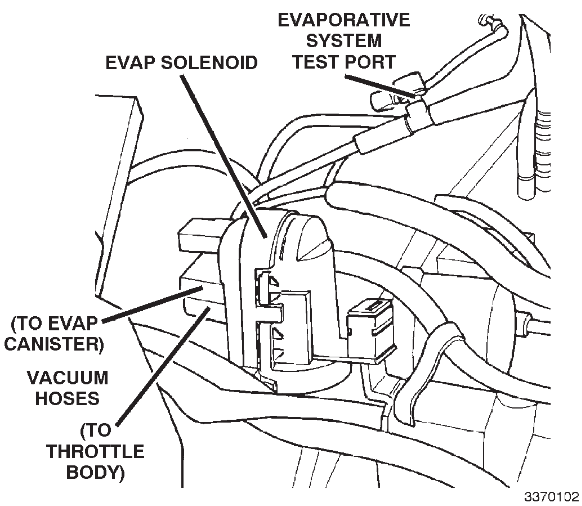

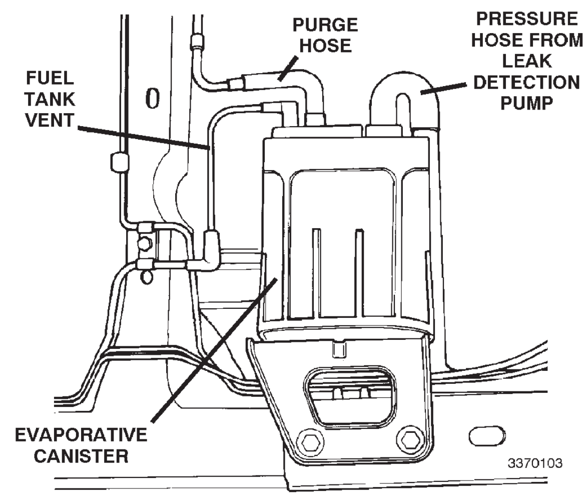

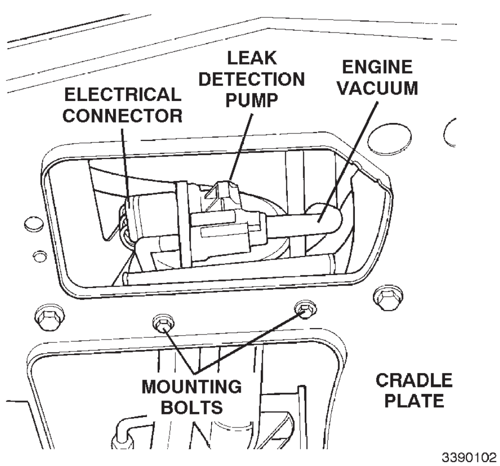

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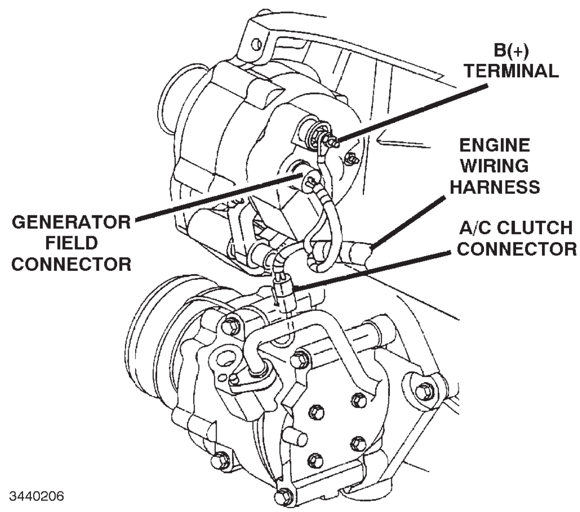

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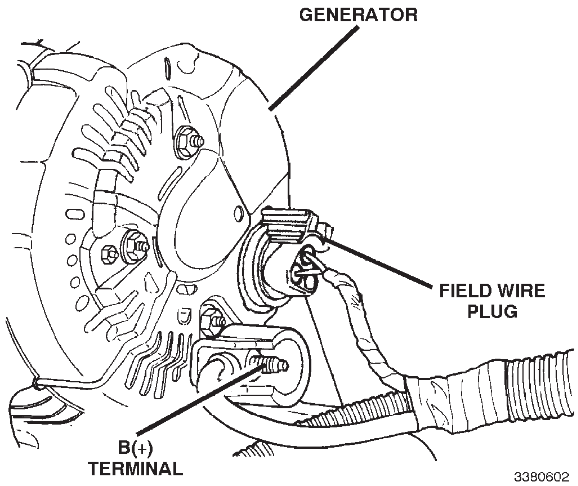

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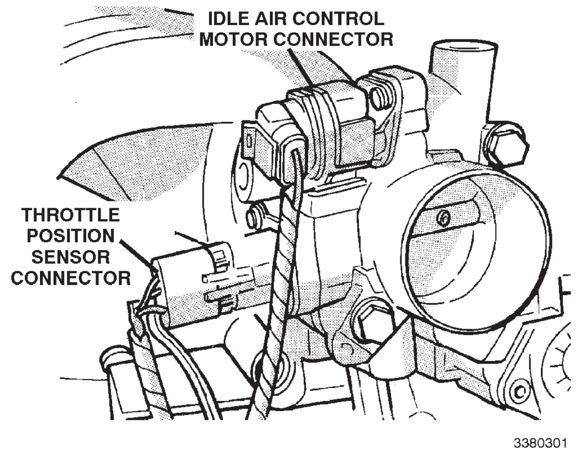

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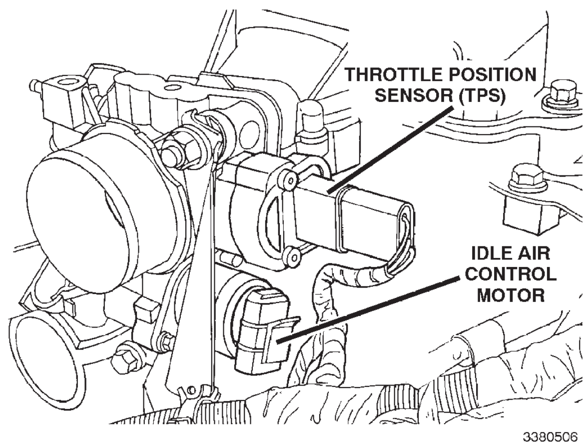

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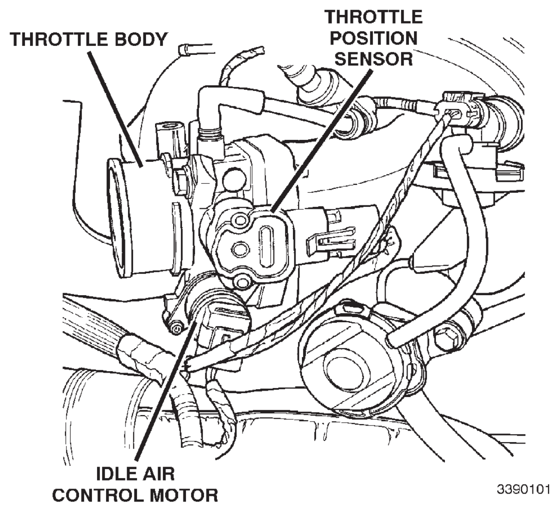

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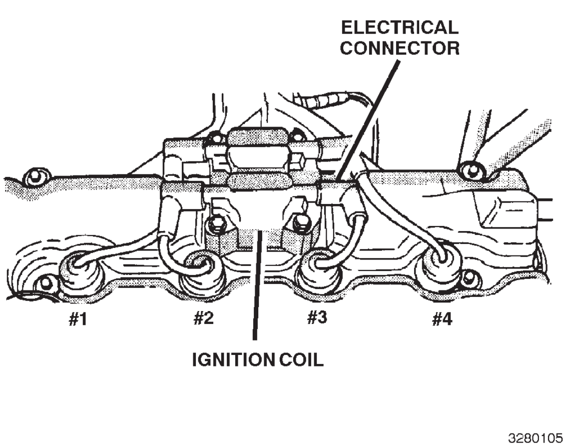
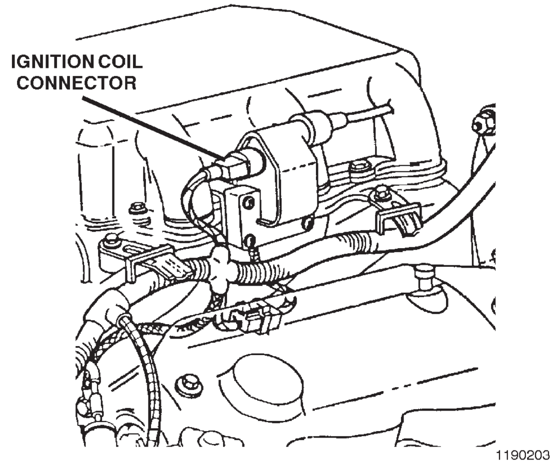
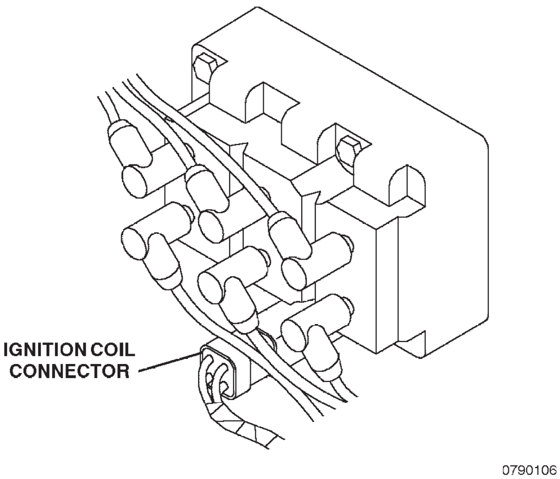


3.0L



8.2 CONTROLS & SOLENOIDS (Continued)

3.3L AND 3.8L



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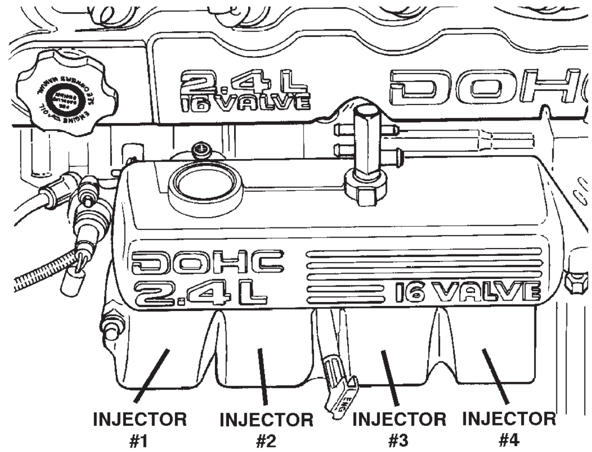
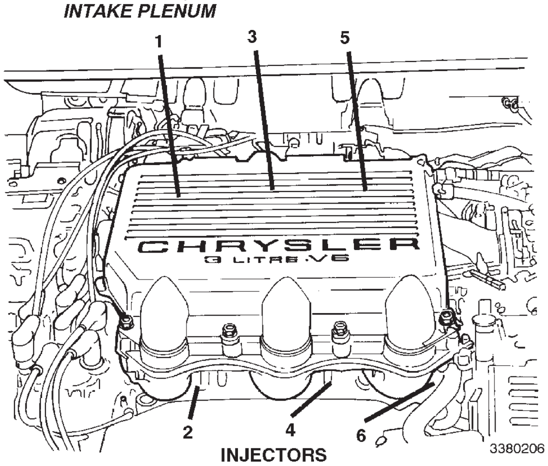


NOTE: THE INJECTORS ARE LOCATED UNDER THE PLENUM.

3.0L

NOTE: INJECTORS 1,3 AND 5 ARE LOCATED UNDER THE INTAKE PLENUM



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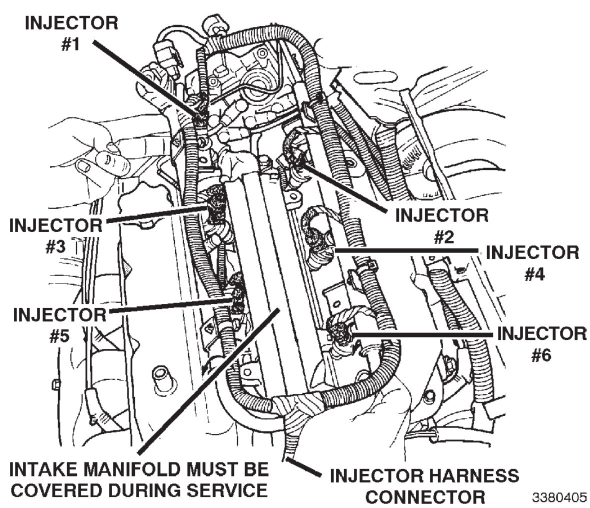
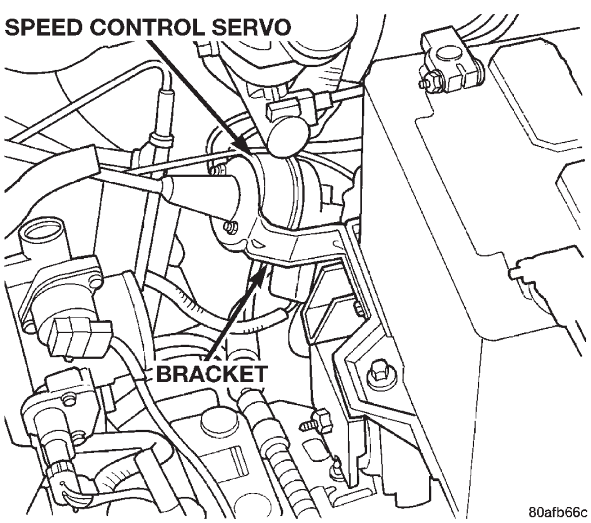
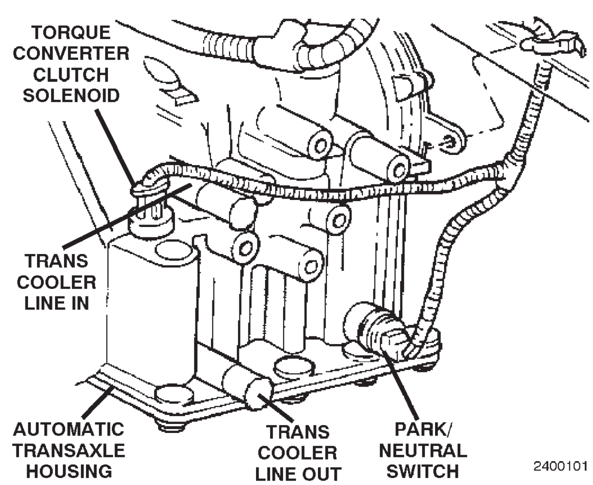
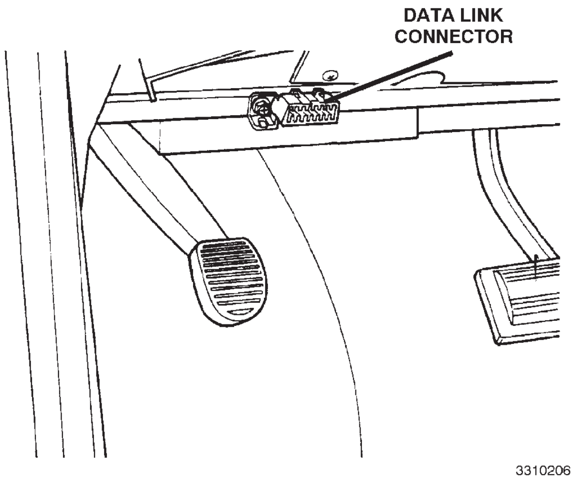




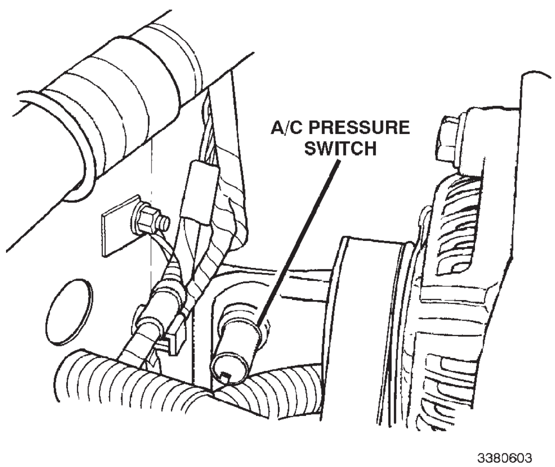
31TH TRANS



8.3 DATA LINK CONNECTOR



8.4 SENSORS



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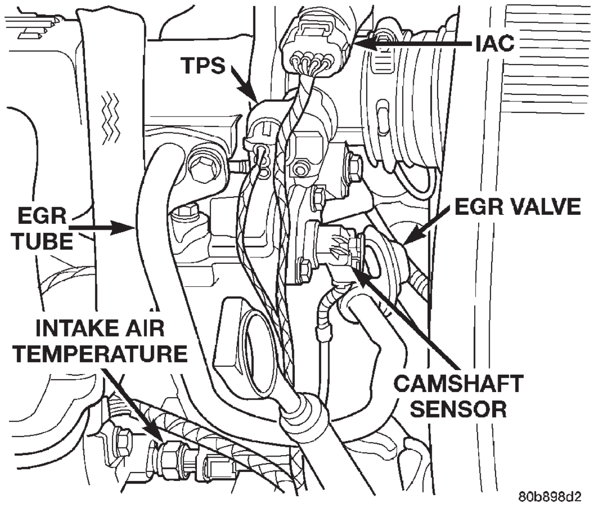

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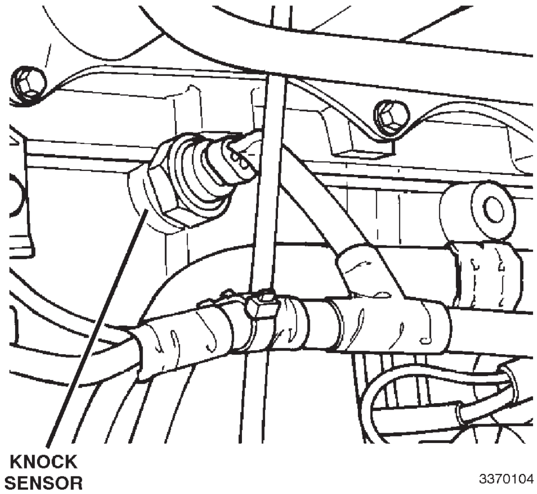

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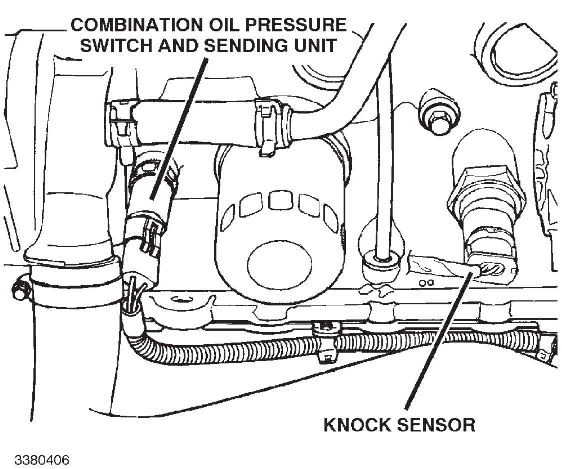
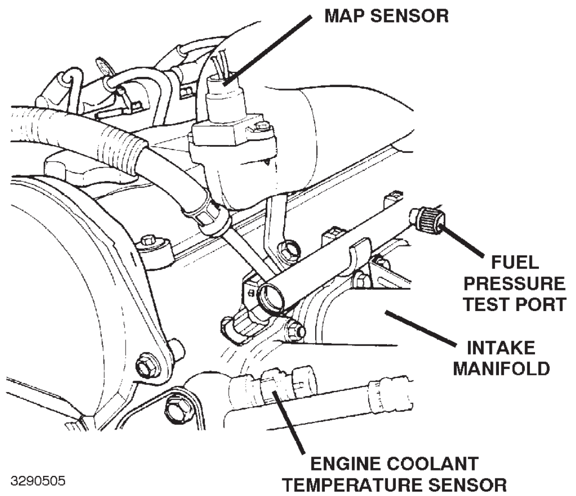


8.4 SENSORS (Continued)

2.0L AND 2.4L



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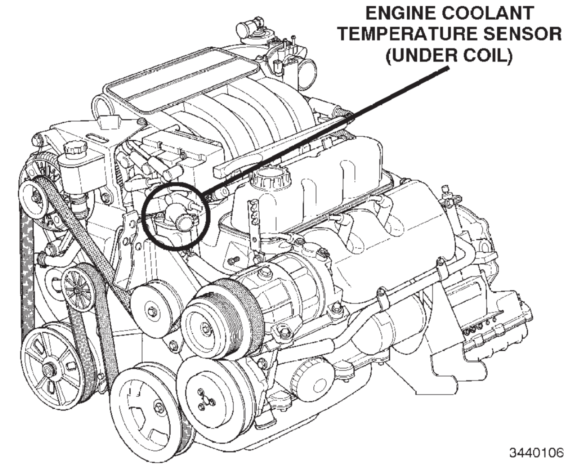

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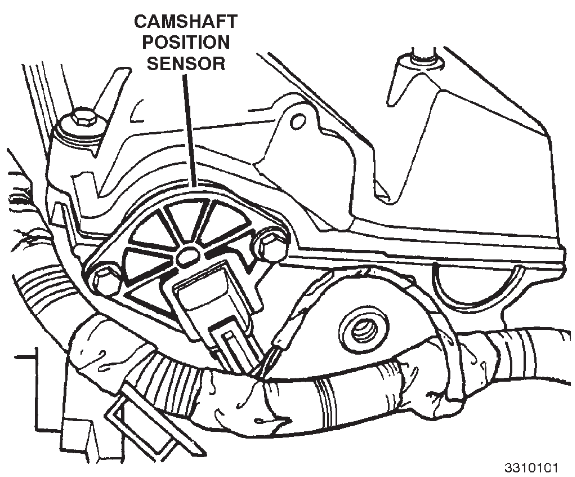

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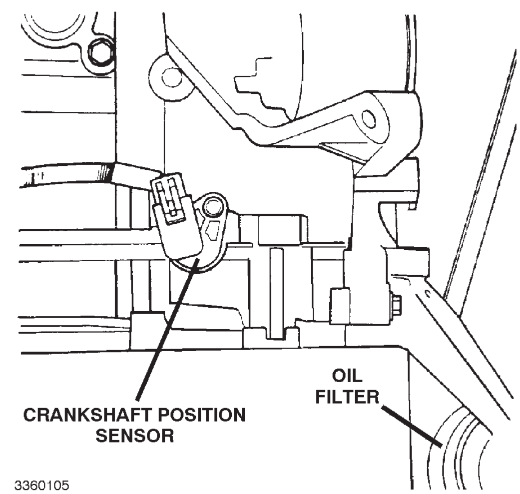
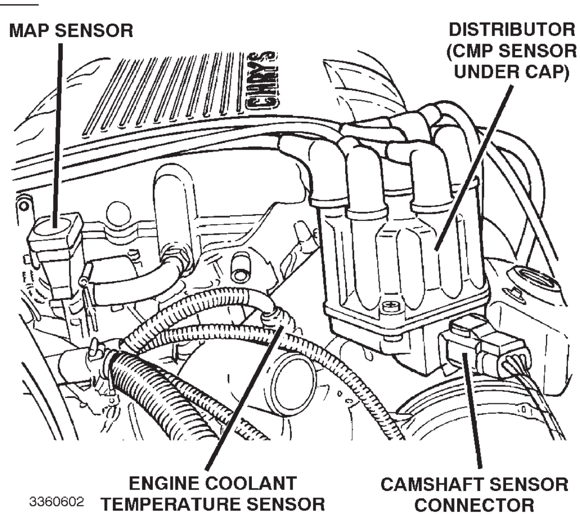


3.0L



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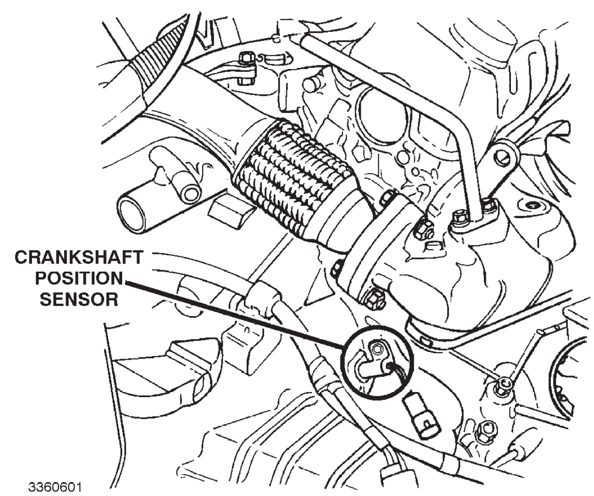

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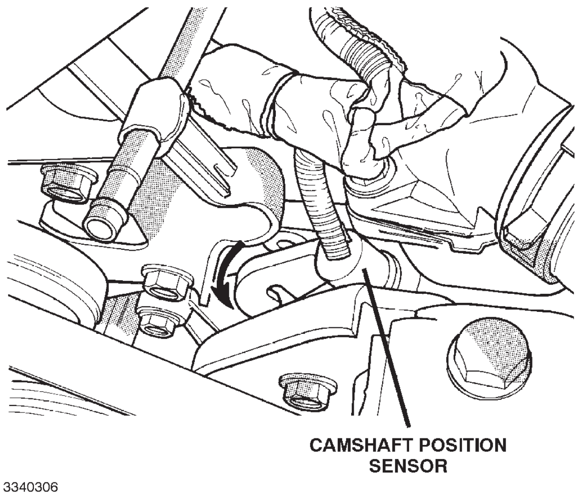

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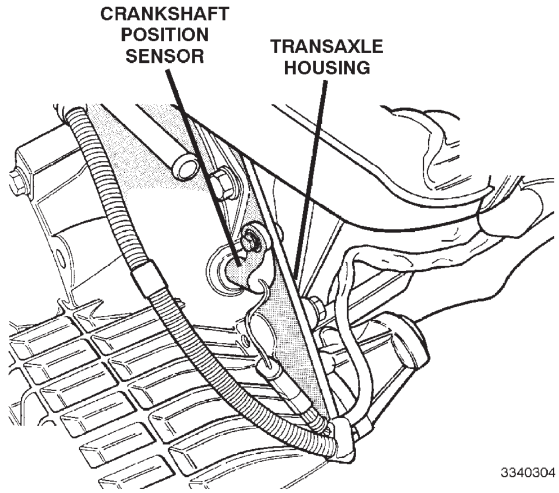

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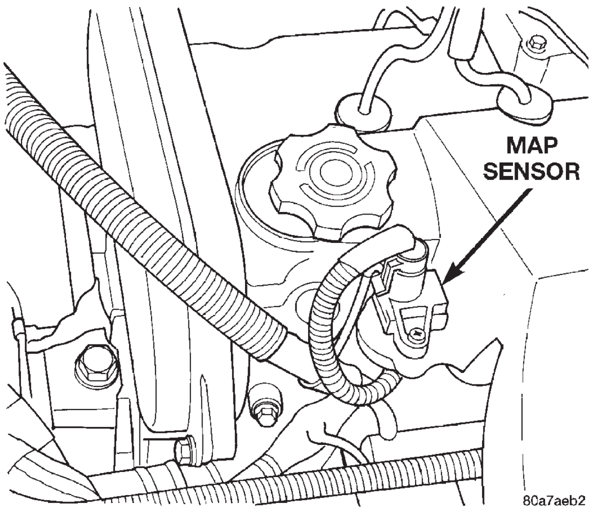
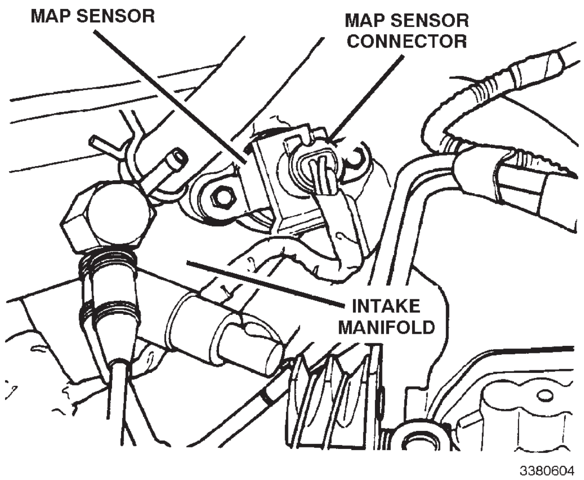


3.3L and 3.8L



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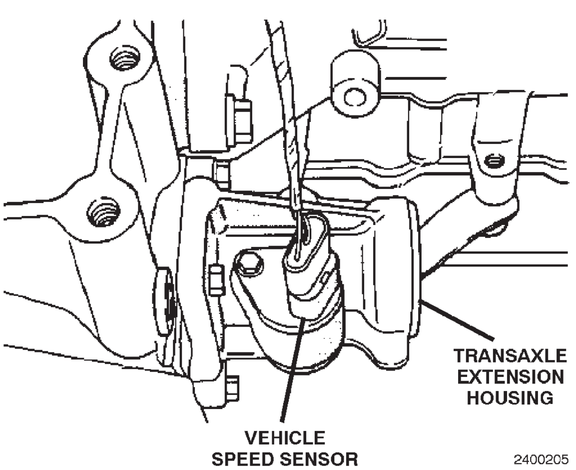
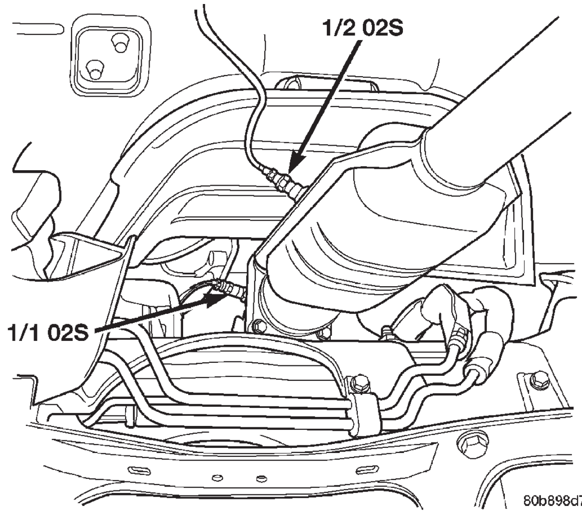
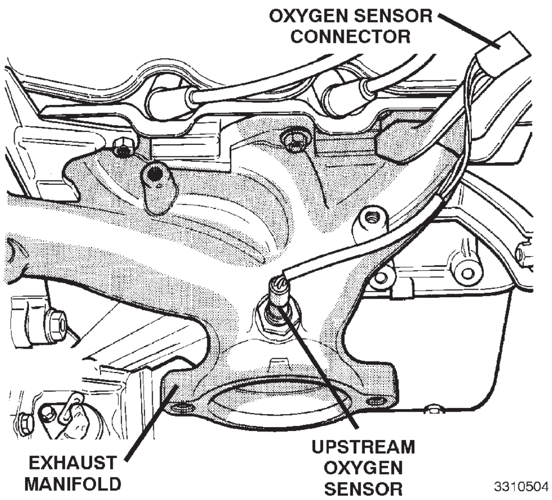


2.0L AND 2.4L 1/1 & 1/2

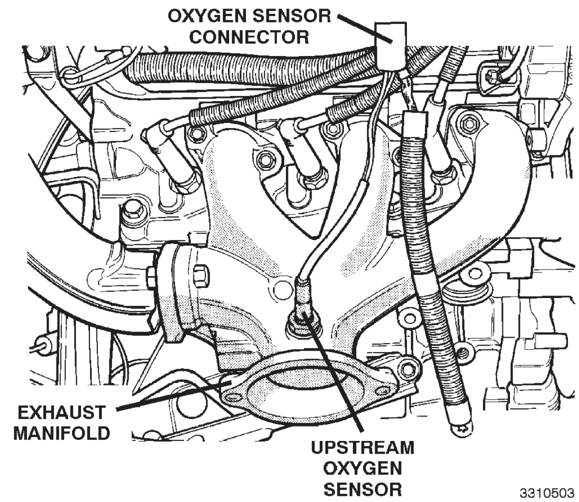


8.4 SENSORS (Continued)

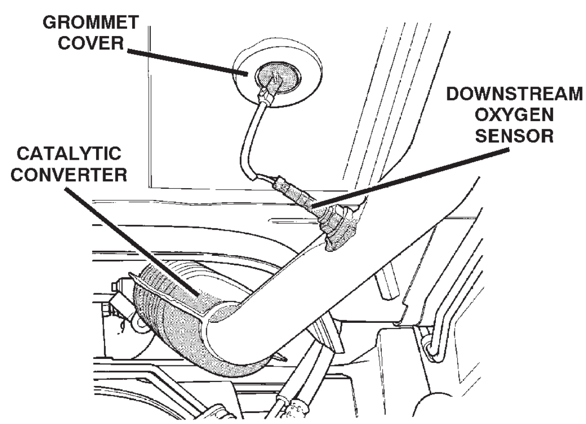
3.0L 1/1



3.3L AND 3.8L 1/1



3.0L, 3.3L, AND 3.8L 1/2

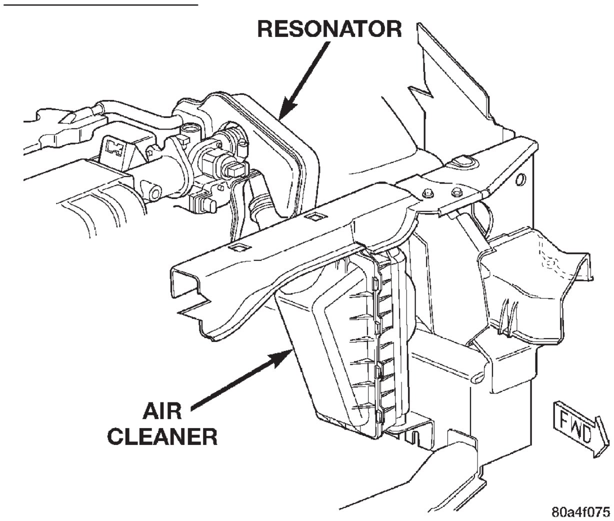


NOTE: THE OXYGEN SENSOR CONNECTOR CAN BE EXPOSED BY REMOVING THE GROMMET COVER.

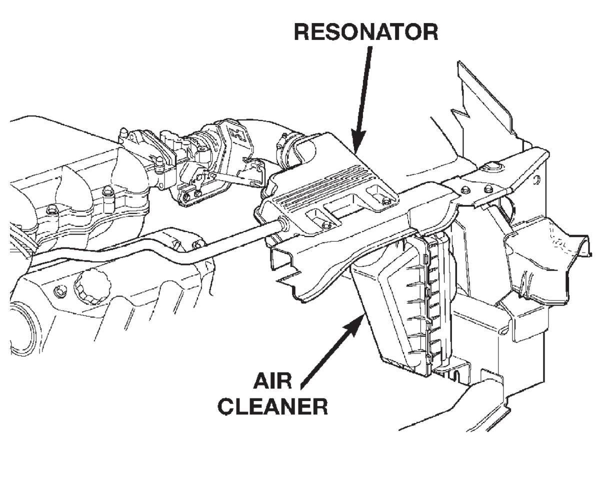
3310506

8.5 FUEL SYSTEM

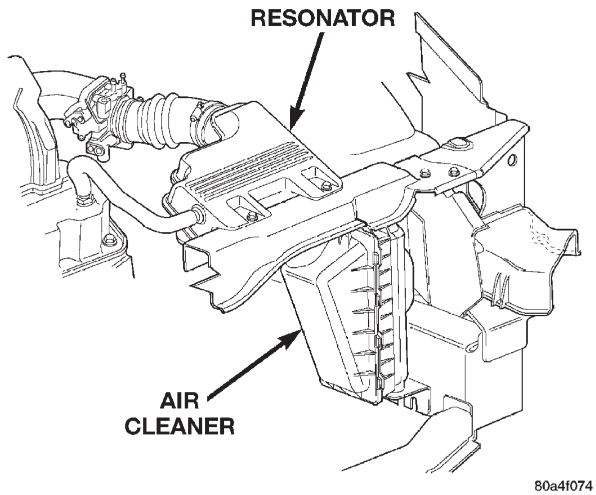
2.0L AND 2.4L

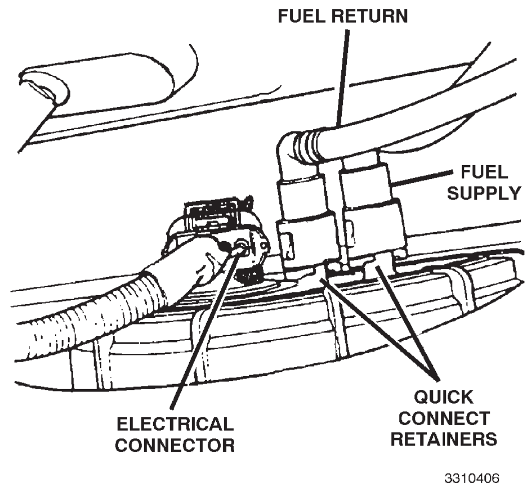


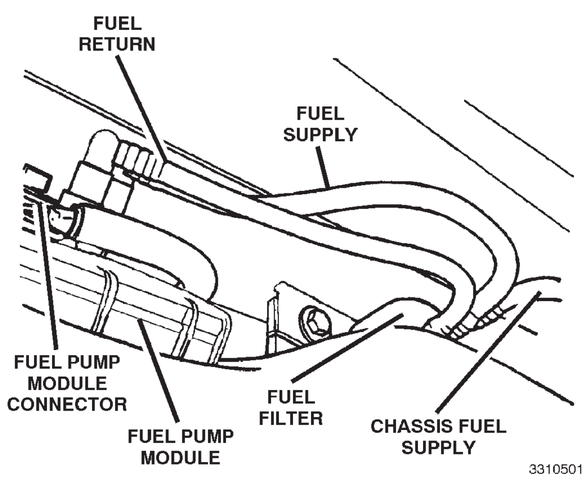
3.0L

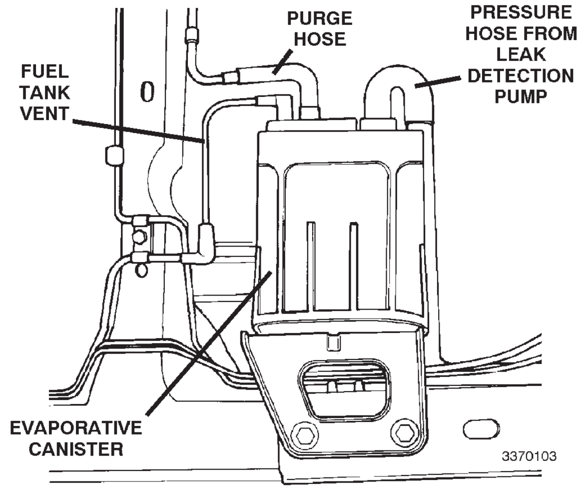


3.3L AND 3.8L

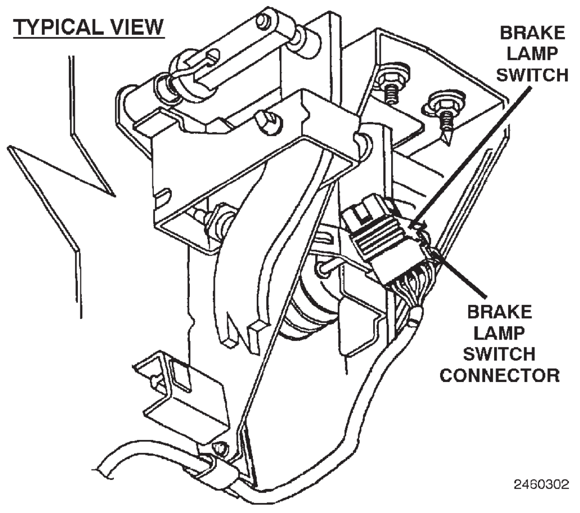


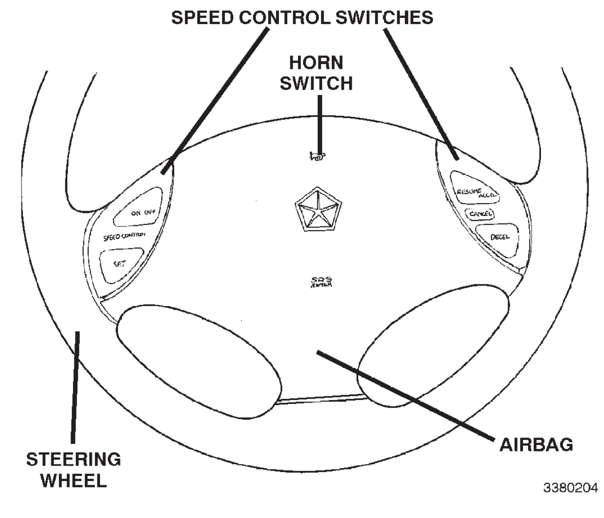






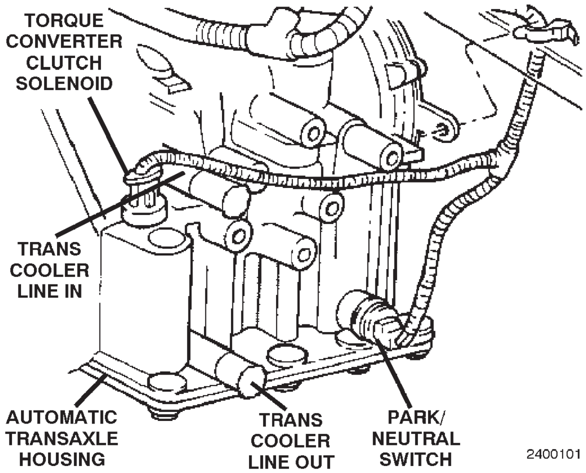
8.6 SWITCHES



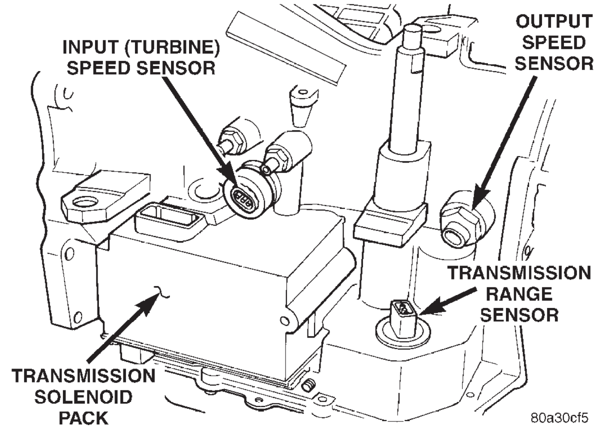


8.6 SWITCHES (Continued)

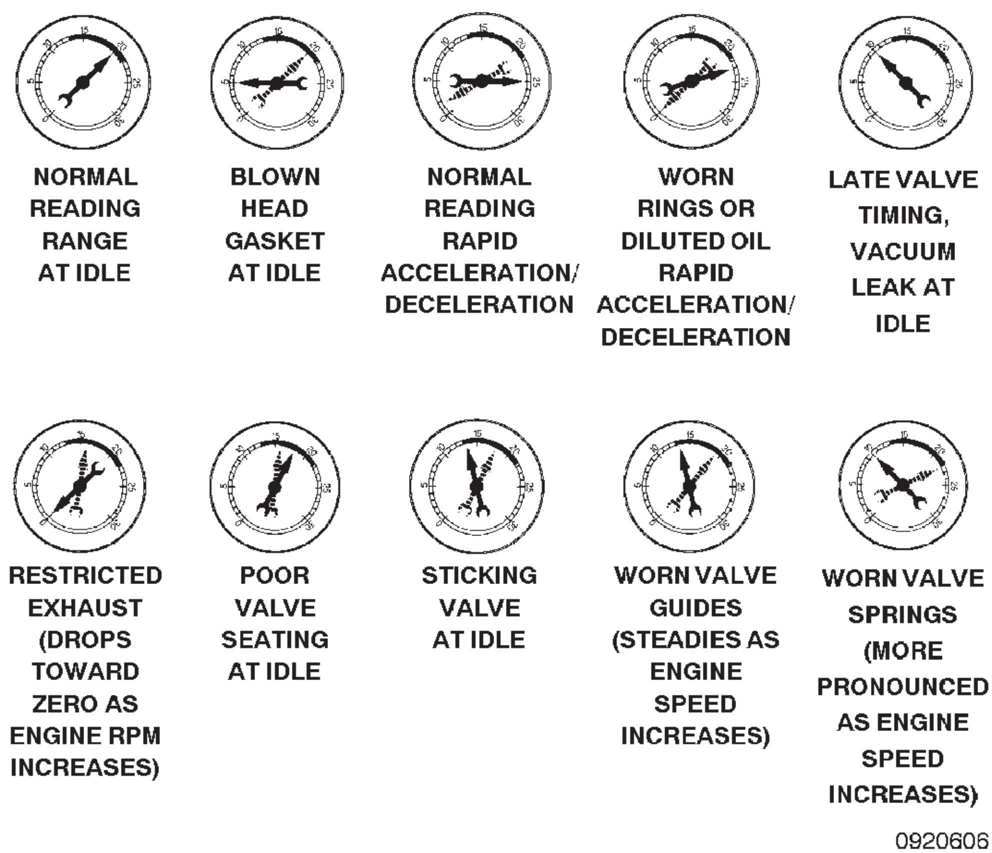
31TH TRANS



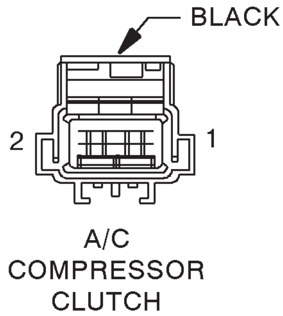
41TE TRANS



8.7 SPECIFICATIONS

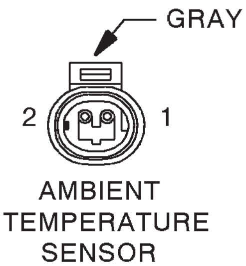


9.0 CONNECTOR PINOUTS



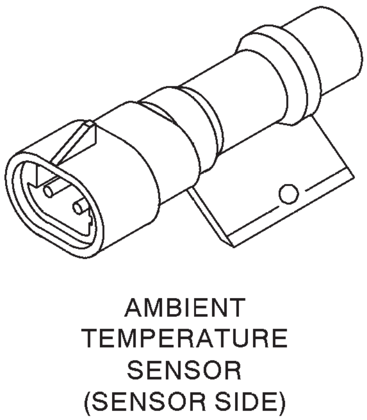
A/C COMPRESSOR CLUTCH - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	C3 18DB/BK	A/C CLUTCH COMPRESSOR RELAY OUTPUT
2	Z1 18BK	GROUND



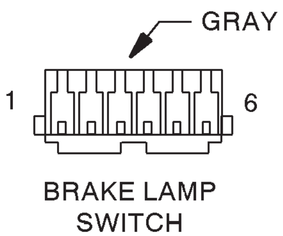
AMBIENT TEMPERATURE SENSOR - GRAY 2 WAY

CAV	CIRCUIT	FUNCTION
1	G31 20VT/LG	AMBIENT TEMPERATURE SENSOR SIGNAL
2	G32 20BK/LB	SENSOR GROUND



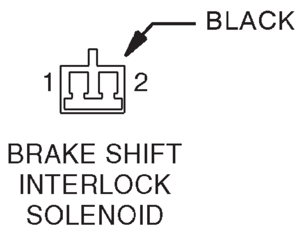
AMBIENT TEMPERATURE SENSOR (SENSOR SIDE) 2 WAY

CAV	CIRCUIT	FUNCTION
1	-	AMBIENT TEMPERATURE SENSOR SIGNAL
2	-	SENSOR GROUND



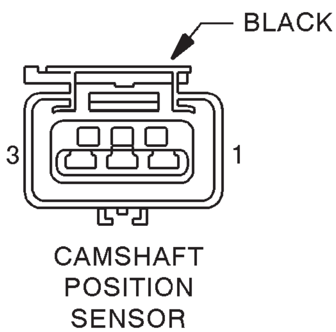
BRAKE LAMP SWITCH - GRAY 6 WAY

CAV	CIRCUIT	FUNCTION
1	K29 20WT/PK	BRAKE SWITCH SENSE
2	Z1 20BK	GROUND
3	V32 20YL/RD	SPEED CONTROL ON/OFF SWITCH SENSE
4	V30 20DB/RD	SPEED CONTROL BRAKE SWITCH OUTPUT
5	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
6	F32 18PK/DB	FUSED B(+)



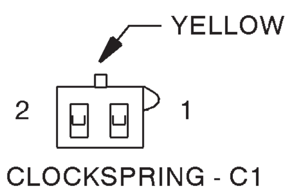
BRAKE SHIFT INTERLOCK SOLENOID (EXCEPT BUILT-UP EXPORT) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K29 20WT/PK	RED BRAKE WARNING LAMP DRIVER
2	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)



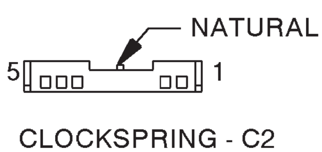
CAMSHAFT POSITION SENSOR - BLACK 3-WAY

CAV	CIRCUIT	FUNCTION
1	K7 18OR	8V SUPPLY
2	K4 18BK/LB	SENSOR GROUND
3	K44 18TN/YL	CAMSHAFT POSITION SENSOR SIGNAL



CLOCKSPRING C1 - YELLOW 2 WAY

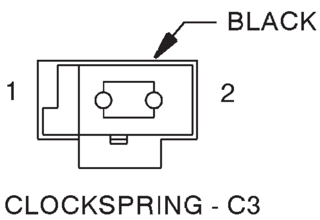
CAV	CIRCUIT	FUNCTION
1	R43 18BK/LB	DRIVER AIRBAG LINE 1
2	R45 18DG/LB	DRIVER AIRBAG LINE 2



CLOCKSPRING C2 - NATURAL 5 WAY

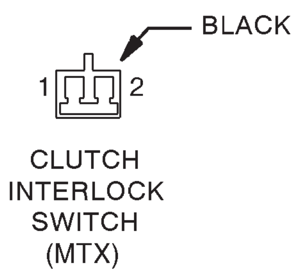
CAV	CIRCUIT	FUNCTION
1	X3 20BK/RD	HORN RELAY CONTROL SENSE
2	X10 20RD/WT (RADIO REMOTE CONTROL)	RADIO MUX
3	Z2 20BK/LG (SPEED CONTROL)	GROUND
4	V37 20RD/LG (SPEED CONTROL	SPEED CONTROL SWITCH SIGNAL
5	X20 20RD/BK (RADIO REMOTE CONTROL)	RADIO CONTROL MUX

CONNECTOR PINOUTS



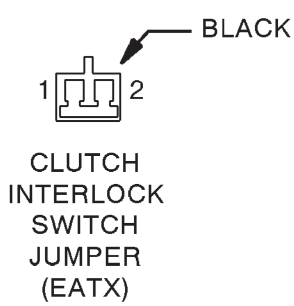
CLOCKSPRING C3 - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	X10 20RD/DB	RADIO MUX
2	X20 20RD/BK	RADIO CONTROL MUX



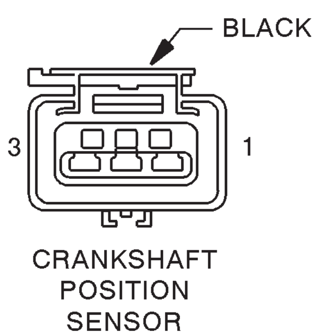
CLUTCH INTERLOCK SWITCH (MTX) - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	F45 20YL/RD (RHD)	IGNITION SWITCH OUTPUT (START)
1	F45 20YL (LHD)	IGNITION SWITCH OUTPUT (START)
2	T141 20YL/RD	IGNITION SWITCH OUTPUT (START)



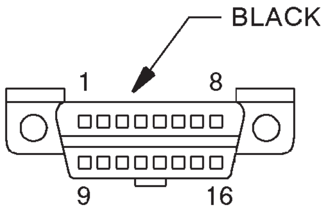
CLUTCH INTERLOCK SWITCH JUMPER (EATX) - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	T141 20YL/RD (RHD)	IGNITION SWITCH OUTPUT (START)
1	T141 20YL (LHD)	IGNITION SWITCH OUTPUT (START)
2	T141 20YL/RD (RHD)	IGNITION SWITCH OUTPUT (START)
2	T141 20YL (LHD)	IGNITION SWITCH OUTPUT (START)



CRANKSHAFT POSITION SENSOR - BLACK 3 WAY

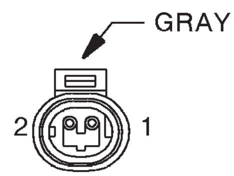
CAV	CIRCUIT	FUNCTION
1	K7 18OR	8V SUPPLY
2	K4 18BK/LB	SENSOR GROUND
3	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL



DATA LINK CONNECTOR

DATA LINK CONNECTOR - BLACK 16 WAY

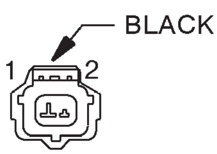
CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	D1 20VT/BR	CCD BUS (+)
4	Z2 20BK/LG	GROUND
5	Z11 20BK/WT	GROUND
6	D20 20LG	SCI RECEIVE
7	D21 20PK	SCI TRANSMIT
8	-	-
9	-	-
10	-	-
11	D2 20WT/BK	CCD BUS (-)
12	-	-
13	-	-
14	D6 20PK/LB	SCI RECEIVE
15	-	-
16	M1 20PK	FUSED B(+)



EGR SOLENOID

EGR SOLENOID - GRAY 2 WAY

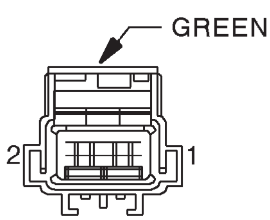
CAV	CIRCUIT	FUNCTION
1	K35 18GY/YL	EGR SOLENOID CONTROL
2	F87 18WT/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)



ENGINE COOLANT TEMPERATURE SENSOR

ENGINE COOLANT TEMPERATURE SENSOR - BLACK 2 WAY

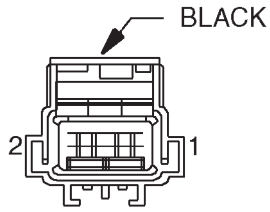
CAV	CIRCUIT	FUNCTION
1	K4 18BK/LB	SENSOR GROUND
2	K2 18TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL



ENGINE OIL PRESSURE SWITCH

ENGINE OIL PRESSURE SWITCH - GREEN 2 WAY

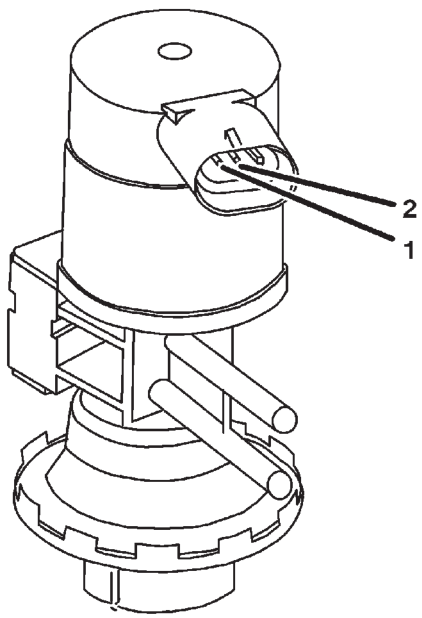
CAV	CIRCUIT	FUNCTION
1	G6 16GY	ENGINE OIL PRESSURE SWITCH SENSE
2	-	-



EVAP/PURGE SOLENOID

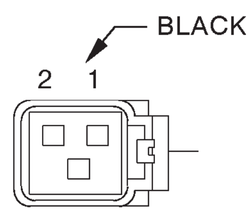
EVAP/PURGE SOLENOID - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	K52 18PK/BK	PROPORTIONAL PURGE SOLENOID CONTROL
2	K70 18VT/RD	PWM PURGE SENSE



DUTY CYCLE EVAP/PURGE SOLENOID

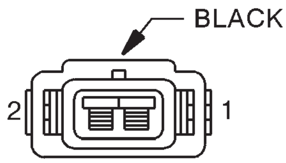
CAV	CIRCUIT	FUNCTION
1	-	EVAPORATIVE EMISSION SOLENOID CONTROL
2	-	EVAPORATIVE SOLENOID SENSE



FUEL INJECTOR NO. 1 (2.0L/2.4L)

FUEL INJECTOR NO. 1 (2.0L/2.4L) - BLACK 2 WAY

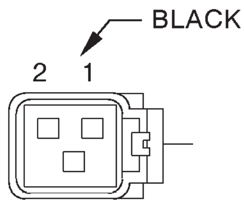
CAV	CIRCUIT	FUNCTION
1	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER
2	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT



FUEL INJECTOR NO. 1 (3.3L/3.8L)

FUEL INJECTOR NO. 1 (3.3L/3.8L) - BLACK 2 WAY

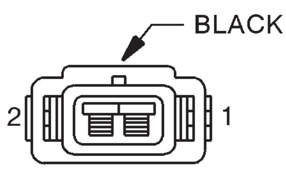
CAV	CIRCUIT	FUNCTION
1	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER



FUEL INJECTOR NO. 2 (2.0L/2.4L)

FUEL INJECTOR NO. 2 (2.OL/2.4L) - BLACK 2 WAY

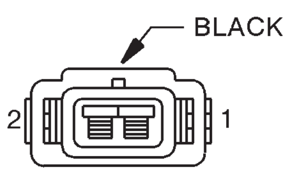
CAV	CIRCUIT	FUNCTION
1	K12 18TN/WT	FUEL INJECTOR NO. 2 DRIVER
2	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT



FUEL INJECTOR NO. 2 (3.3L/3.8L)

FUEL INJECTOR NO. 2 (3.3L/3.8L) - BLACK 2 WAY

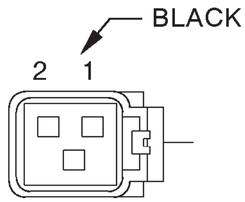
CAV	CIRCUIT	FUNCTION
1	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K12 18TN/WT	FUEL INJECTOR NO. 2 DRIVER



FUEL INJECTOR NO. 3 (3.3L/3.8L)

FUEL INJECTOR NO. 3 (3.3L/3.8L)- BLACK 2 WAY

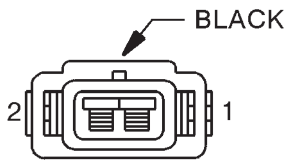
CAV	CIRCUIT	FUNCTION
1	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K13 18YL/WT	FUEL INJECTOR NO. 2 DRIVER



FUEL INJECTOR
NO. 3
(2.0L/2.4L)

FUEL INJECTOR NO. 3 (2.0L/2.4L) - BLACK 2 WAY

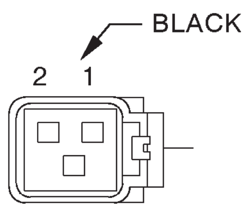
CAV	CIRCUIT	FUNCTION
1	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER
2	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT



FUEL INJECTOR
NO. 4
(3.3L/3.8L)

FUEL INJECTOR NO. 4 (3.3L/3.8L) - BLACK 2 WAY

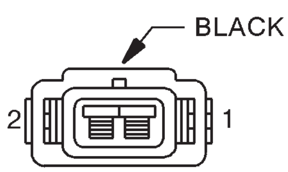
CAV	CIRCUIT	FUNCTION
1	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
1	K14 18LB/BR	FUEL INJECTOR NO. 2 DRIVER



FUEL INJECTOR
NO. 4
(2.0L/2.4L)

FUEL INJECTOR NO. 4 (2.0L/2.4L) - BLACK 2 WAY

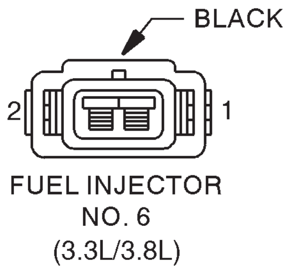
CAV	CIRCUIT	FUNCTION
1	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER
2	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT



FUEL INJECTOR
NO. 5
(3.3L/3.8L)

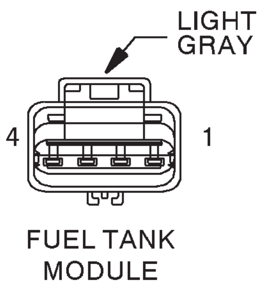
FUEL INJECTOR NO. 5 (3.3L/3.8L) - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K38 18GY	FUEL INJECTOR NO. 5 DRIVER



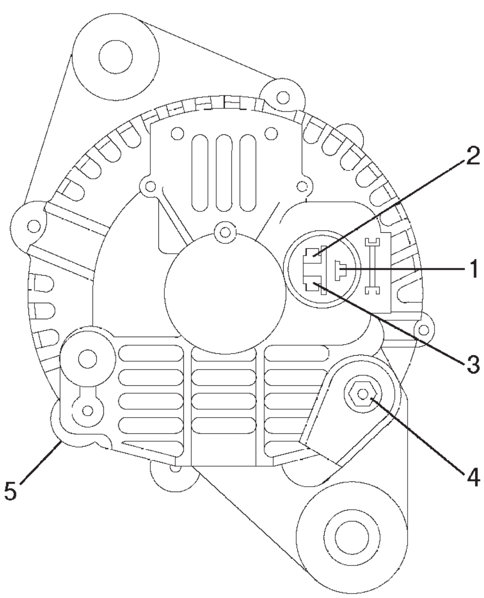
FUEL INJECTOR NO. 6 (3.3L/3.8L) - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K58 18BR/DB	FUEL INJECTOR NO. 6 DRIVER



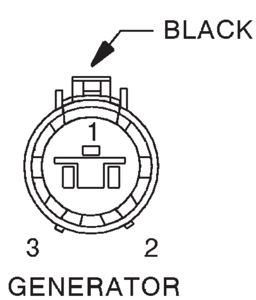
FUEL TANK MODULE - LIGHT GRAY 4 WAY

CAV	CIRCUIT	FUNCTION
1	Z1 14BK	GROUND
2	-	-
3	G4 18DB	FUEL LEVEL SENSOR SIGNAL
4	A141 16DG/WT	FUEL PUMP RELAY OUTPUT



GENERATOR (GENERATOR SIDE)

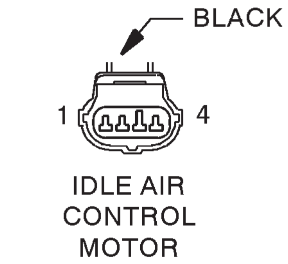
CAV	CIRCUIT	FUNCTION
1	-	ASD RELAY OUTPUT
2	-	GENERATOR FIELD DRIVER
3	-	-
4	-	B(+)
5	-	CASE GROUND



GENERATOR - BLACK 3 WAY

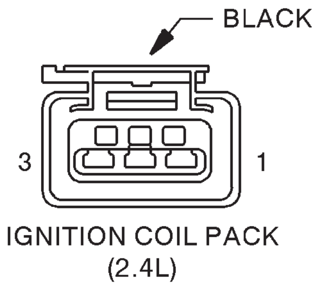
CAV	CIRCUIT	FUNCTION
1	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K20 18DG	GENERATOR FIELD DRIVER (+)
3	-	-

CONNECTOR PINOUTS



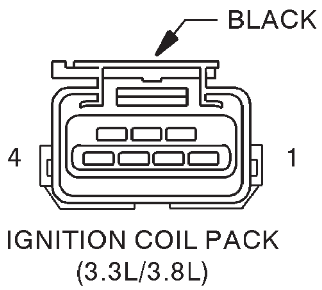
IDLE AIR CONTROL MOTOR - BLACK 4 WAY

CAV	CIRCUIT	FUNCTION
1	K59 18VT/BK	IDLE AIR CONTROL NO. 4 DRIVER
2	K40 18BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
3	K60 18YL/BK	IDLE AIR CONTROL NO. 2 DRIVER
4	K39 18GY/RD	IDLE AIR CONTROL NO. 1 DRIVER



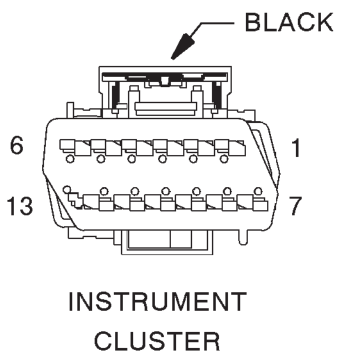
IGNITION COIL PACK (2.0L/2.4L) - BLACK 3 WAY

CAV	CIRCUIT	FUNCTION
1	K17 18DG/TN	IGNITION COIL NO. 2 DRIVER
2	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
3	K19 18GY/RD	IGNITION COIL NO. 1 DRIVER



IGNITION COIL PACK (3.3L/3.8L) - BLACK 4 WAY

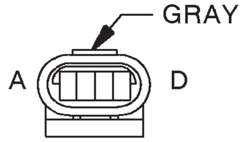
CAV	CIRCUIT	FUNCTION
1	K17 18DB/TN (3.3L)	IGNITION COIL NO 2 DRIVER
1	K18 18RD/YL (3.8L)	IGNITION COIL NO 3 DRIVER
2	A142 18DG/OR (3.3L)	AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K19 18GY/RD (3.8L)	IGNITION COIL NO 1 DRIVER
3	A142 18DG/OR (3.8L)	AUTOMATIC SHUT DOWN RELAY OUTPUT
3	K19 18GY/RD (3.3L)	IGNITION COIL NO 1 DRIVER
4	K17 18DB/TN (3.8L)	IGNITION COIL NO 2 DRIVER
4	K18 18RD/YL (3.3L)	IGNITION COIL NO 3 DRIVER



INSTRUMENT CLUSTER - BLACK 13 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	M1 20PK	FUSED B(+)
3	-	-
4	-	-
5	-	-
6	E2 20OR	PANEL LAMPS FEED
7	Z2 20BK/LG	GROUND
8	-	-
9	D2 20WT/BK	CCD BUS (-)
10	D1 20VT/BR	CCD BUS (+)
11	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
12	-	-
13	Z1 20BK	GROUND

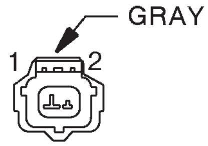
C O N N E C T O R P I N O U T S



INTAKE AIR TEMPERATURE/MANIFOLD ABSOLUTE PRESSURE SENSOR (2.0L)

INTAKE AIR TEMPERATURE/MANIFOLD ABSOLUTE PRESSURE SENSOR (2.0L) - GRAY 4 WAY

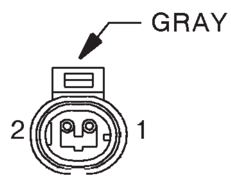
CAV	CIRCUIT	FUNCTION
A	K4 18BK/LB	SENSOR GROUND
B	K21 18BK/RD	INTAKE AIR TEMPERATURE SIGNAL
C	K6 18VT/WT	5V SUPPLY
D	K1 18DG/RD	MAP SENSOR SIGNAL



INTAKE AIR TEMPERATURE SENSOR (2.4L)

INTAKE AIR TEMPERATURE SENSOR (2.4L) - GRAY 2 WAY

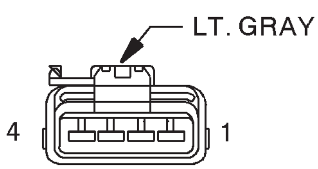
CAV	CIRCUIT	FUNCTION
1	K4 18BK/LB	SENSOR GROUND
2	K21 18BK/RD	INTAKE AIR TEMPERATURE SIGNAL



KNOCK SENSOR

KNOCK SENSOR - GRAY 2 WAY

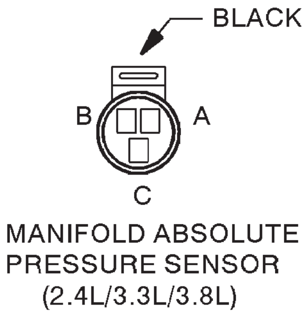
CAV	CIRCUIT	FUNCTION
1	K42 18DB/LG	KNOCK SENSOR SIGNAL
2	K4 18BK/LB	SENSOR GROUND



LEAK DETECTION PUMP

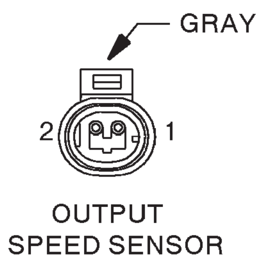
LEAK DETECTION PUMP - LT. GRAY 4 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	F87 18WT/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	K106 18WT/DG	LEAK DETECTION PUMP SOLENOID CONTROL
4	K107 18YL/BK	LEAK DETECTION PUMP SWITCH SENSE



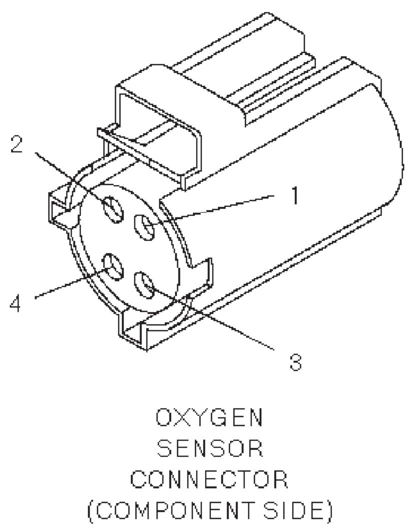
MANIFOLD ABSOLUTE PRESSURE SENSOR (2.4L/3.3L/3.8L) - BLACK 3 WAY

CAV	CIRCUIT	FUNCTION
A	K4 18BK/LB	SENSOR GROUND
B	K6 18VT/WT	5V SUPPLY
C	K1 18DG/RD	MAP SENSOR SIGNAL



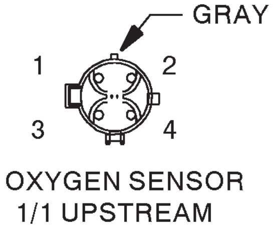
OUTPUT SPEED SENSOR - GRAY 2 WAY

CAV	CIRCUIT	FUNCTION
1	T13 18DB/BK	SPEED SENSOR GROUND
2	T14 18LG/WT	OUTPUT SPEED SENSOR SIGNAL



OXYGEN SENSOR (SENSOR SIDE)

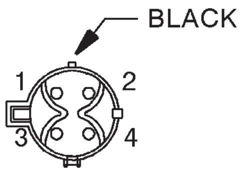
CAV	CIRCUIT	FUNCTION
1	-	GROUND
2	-	AUTOMATIC SHUT DOWN RELAY OUTPUT
3	-	OXYGEN SENSOR GROUND
4	-	OXYGEN SENSOR SIGNAL



OXYGEN SENSOR 1/1 UPSTREAM - GRAY 4 WAY

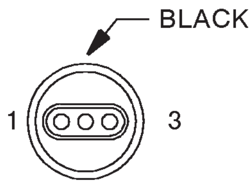
CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
3	K127 18BK/OR	OXYGEN SENSOR GROUND
4	K41 18BK/DG	OXYGEN SENSOR 1/1 SIGNAL

CONNECTOR PINOUTS



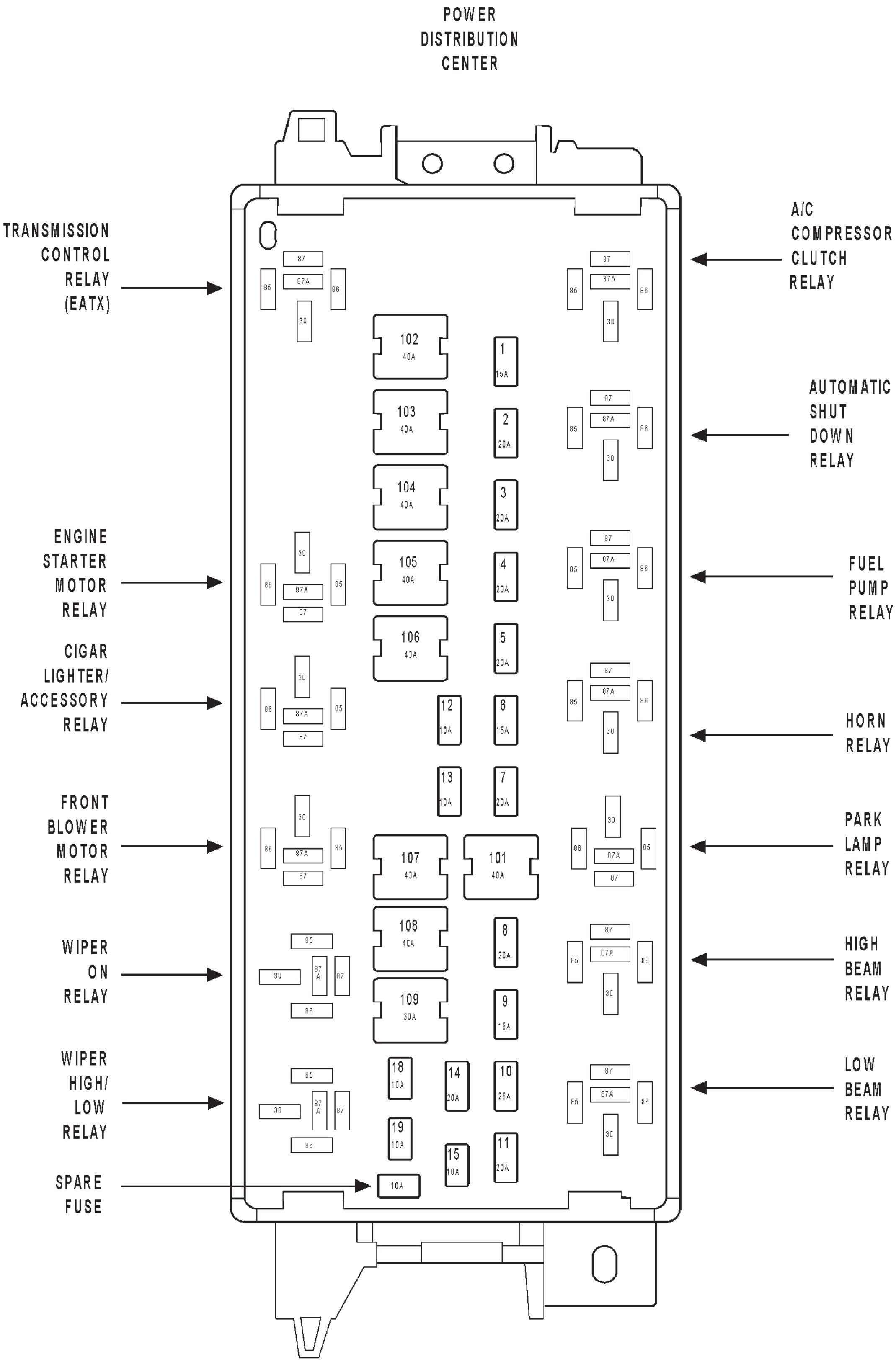
OXYGEN SENSOR 1/2 DOWNSTREAM - BLACK 4 WAY

CAV	CIRCUIT	FUNCTION
1	Z12 20BK	GROUND
2	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
3	K127 20BK/LB	OXYGEN SENSOR GROUND
4	K141 20TN/WT	OXYGEN SENSOR 1/2 SIGNAL



PARK/NEUTRAL POSITION SWITCH (ATX) - BLACK 3 WAY

CAV	CIRCUIT	FUNCTION
1	L1 18VT/BK	BACK-UP LAMP FEED
2	T41 18BK/WT	PARK/NEUTRAL POSITION SWITCH SENSE
3	F20 18WT	FUSED IGNITION SWITCH OUTPUT (RUN)



CONNECTOR PINOUTS

FUSES

FUSE NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
1	15A	INTERNAL	A0 6RD
2	20A (GAS/EATX)	INTERNAL	A0 6RD
3	20A	INTERNAL	A0 6RD
4	10A	INTERNAL	A0 6RD
5	10A	INTERNAL	A0 6RD
6	15A	F41 20PK/VT	A0 6RD
7	20A	INTERNAL	A0 6RD
8	20A	L43 18VT	INTERNAL
9	15A	L44 20VT/RD	INTERNAL
10	25A	A20 12RD/DB	A0 6RD
11	20A	F32 18PK/DB	A0 6RD
12	10A	A22 12BK/OR	F23 18DB/YL
13	10A	F14 18LG/YL	INTERNAL
14	20A	L9 18BK/VT	A0 6RD
15	10A	M1 20PK	A0 6RD
16	-	SPARE	A0 6RD
17	-	SPARE	A0 6RD
18	10A	L33 20RD	INTERNAL
19	10A	L34 20RD/OR	A0 6RD
19	10A	L34 20RD/OR	A0 6RD
101	40A	INTERNAL	A0 6RD
102	40A	A10 12RD/DG	A0 6RD
103	40A	A2 12PK/BK	A0 6RD
104	40A	A1 12RD	A0 6RD
105	40A (DIESEL)	A17 12RD/BK	A0 6RD
106	40A	A16 12GY	A0 6RD
107	40A	INTERNAL	A0 6RD
108	40A	A4 12BK/RD	A0 6RD
109	30A	INTERNAL	A0 6RD

A/C COMPRESSOR CLUTCH RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	C13 18DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL (GAS)
85	C13 20DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL (DIESEL)
86	F87 18WT/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN) (GAS)
86	A142 18DG/OR	DIESEL POWER RELAY OUTPUT (DIESEL)
87	C3 18DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
87A	-	-

AUTOMATIC SHUT DOWN RELAY (GAS)

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	K51 18DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
86	A0 6RD	B(+)
87	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
87A	-	-

CIGAR LIGHTER/ACCESSORY RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	Z1 18BK	GROUND
86	F1 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
87	F30 16RD	CIGAR LIGHTER/ACCESSORY RELAY OUTPUT
87A	-	-

DIESEL POWER RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	K51 20DB/YL	DIESEL POWER RELAY CONTROL
86	A0 6RD	FUSED B(+)
87	A142 18DG/OR	DIESEL POWER RELAY OUTPUT
87A	-	-

ENGINE STARTER MOTOR RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	K90 18TN	SMART START RELAY CONTROL
86	F45 20YL/RD (EATX)	FUSED IGNITION SWITCH OUTPUT (START)
86	T141 20YL/RD (MTX)	FUSED IGNITION SWITCH OUTPUT (START)
87	T40 12BR	STARTER RELAY OUTPUT
87A	-	-

FRONT BLOWER MOTOR RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	Z1 18BK	GROUND
86	F20 20WT	FUSED IGNITION SWITCH OUTPUT (RUN)
87	C71 12DB	BLOWER MOTOR DRIVER
87A	-	-

FUEL HEATER RELAY (DIESEL)

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	Z1 20BK	GROUND
86	INTERNAL	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
87	A141 16DG/WT	FUEL HEATER RELAY OUTPUT
87A	-	-

FUEL PUMP RELAY (GAS)

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	K31 18BR	FUEL PUMP RELAY CONTROL
86	F87 18WT/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
87	A141 16DG/WT	FUEL PUMP RELAY OUTPUT
87A	-	-

HIGH BEAM RELAY

CAV	CIRCUIT	FUNCTION
30	A0 6RD	B(+)
85	L324 20WT/LG	HIGH BEAM RELAY CONTROL
86	A0 6RD	B(+)
87	INTERNAL	HIGH BEAM RELAY OUTPUT
87A	-	-

HORN RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	X4 18GY/OR (RHD DIESEL)	HORN RELAY CONTROL
85	X4 20GY/OR (EXCEPT RHD DIESEL)	HORN RELAY CONTROL
86	A0 6RD	B(+)
87	X2 18DG/RD	HORN RELAY OUTPUT
87A	-	-

LOW BEAM RELAY

CAV	CIRCUIT	FUNCTION
30	A0 6RD	B(+)
85	L193 20OR/WT (CHRYSLER)	LOW BEAM RELAY CONTROL
85	L94 20OR/WT (EXCEPT CHRYSLER)	LOW BEAM RELAY CONTROL
86	A0 6RD	B(+)
87	INTERNAL	LOW BEAM RELAY OUTPUT
87A	-	-

PARK LAMP RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	L97 18VT	PARK LAMP RELAY CONTROL
86	INTERNAL	FUSED B(+)
87	L7 12BK/YL	PARK LAMP RELAY OUTPUT
87A	-	-

TRANSMISSION CONTROL RELAY (EATX)

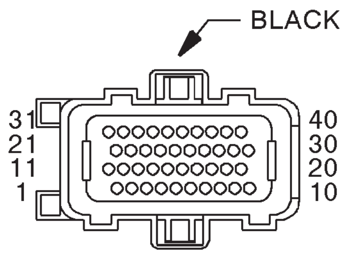
CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	Z16 18BK	GROUND
86	T15 18LG	TRANSMISSION CONTROL RELAY CONTROL
87	T16 18RD	TRANSMISSION CONTROL RELAY OUTPUT
87A	-	-

WIPER HIGH/LOW RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	WIPER RELAY OUTPUT
85	V16 20WT	WIPER HIGH/LOW RELAY CONTROL
86	INTERNAL	WIPER RELAY OUTPUT
87	V4 12RD/YL	WIPER HIGH/LOW RELAY HIGH SPEED OUTPUT
87A	V3 12BR/WT	HIGH/LOW WIPER RELAY LOW SPEED OUTPUT

WIPER ON RELAY

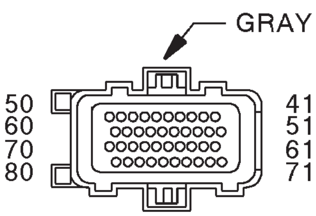
CAV	CIRCUIT	FUNCTION
30	INTERNAL	WIPER ON RELAY OUTPUT
85	V14 18RD/VT	WIPER ON/OFF RELAY CONTROL
86	INTERNAL	FUSED B(+)
87	INTERNAL	FUSED B(+)
87A	Z1 18BK	GROUND



POWERTRAIN CONTROL MODULE - C1

POWERTRAIN CONTROL MODULE C1 - BLACK 40 WAY

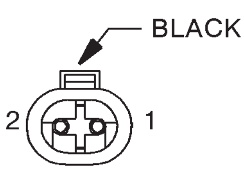
CAV	CIRCUIT	FUNCTION
1	-	-
2	K18 18RD/YL	IGNITION COIL NO. 3 DRIVER
3	K17 18DB/TN	IGNITION COIL NO. 2 DRIVER
4	-	-
5	V32 18YL/RD	SPEED CONTROL ON/OFF SWITCH SENSE
6	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
7	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER
8	K20 18DG	GENERATOR FIELD DRIVER (+)
9	-	-
10	Z12 18BK/TN	GROUND
11	K19 18GY/RD	IGNITION COIL NO. 1 DRIVER
12	-	-
13	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER
14	K58 18BR/DB	FUEL INJECTOR NO. 6 DRIVER
15	K38 18GY	FUEL INJECTOR NO. 5 DRIVER
16	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER
17	K12 18TN/WT	FUEL INJECTOR NO. 2 DRIVER
18	-	-
19	-	-
20	F87 18WT/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
21	-	-
22	G3 18BK/PK	SERVICE ENGINE SOON INDICATOR DRIVER
23	-	-
24	-	-
25	K42 18DB/LG	KNOCK SENSOR SIGNAL
26	K2 18TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
27	K127 18BK/OR	OXYGEN SENSOR GROUND
28	-	-
29	-	-
30	K41 18BK/DG	OXYGEN SENSOR 1/1 SIGNAL
31	K90 18TN (EXCEPT 3.0L)	SMART START RELAY CONTROL
32	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
33	K44 18TN/YL	CAMSHAFT POSITION SENSOR SIGNAL
34	-	-
35	K22 18OR/DB	THROTTLE POSITION SENSOR SIGNAL
36	K1 18DG/RD	MANIFOLD ABSOLUTE PRESSURE SENSOR SIGNAL
37	K21 18BK/RD (2.4L)	INTAKE AIR TEMPERATURE SIGNAL
38	C103 18DG/LB (EXCEPT 3.0L)	A/C SWITCH SIGNAL
39	-	-
40	K35 18GY/YL	EGR SOLENOID CONTROL



POWERTRAIN CONTROL MODULE - C2

POWERTRAIN CONTROL MODULE C2 - GRAY 40 WAY

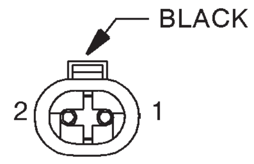
CAV	CIRCUIT	FUNCTION
41	V37 18RD/LG	SPEED CONTROL SWITCH SIGNAL
42	C18 18DB	A/C PRESSURE SIGNAL
43	K4 18BK/LB	SENSOR GROUND
44	K7 18OR	8V SUPPLY
45	-	-
46	A14 18RD/WT	FUSED B(+)
47	-	-
48	K40 18BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
49	K60 18L/BK	IDLE AIR CONTROL NO. 2 DRIVER
50	Z12 18BK/TN	GROUND
51	K141 18TN/WT	OXYGEN SENSOR 1/2 SIGNAL
52	-	-
53	-	-
54	-	-
55	-	-
56	V36 18TN.RD (EXCEPT 3.0L)	SPEED CONTROL VACUUM SOLENOID CONTROL
57	K39 18GY/RD	IDLE AIR CONTROL NO. 1 DRIVER
58	K59 18VT/BK	IDLE AIR CONTROL NO. 4 DRIVER
59	D1 18VT/BR	CCD BUS (+)
60	D2 18WT/BK	CCD BUS (-)
61	K6 18VT/WT	5V SUPPLY
62	K29 18WT/PK	BRAKE SWITCH SENSE
63	T10 18YL/DG (EATX)	TORQUE MANAGEMENT REQUEST SENSE
64	C13 18DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL
65	D21 18PK	SCI TRANSMIT
66	G7 18WT/OR	VEHICLE SPEED SENSOR SIGNAL
67	K51 18DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
68	K52 18PK/BK	DUTY CYCLE EVAP/PURGE SOLENOID CONTROL
69	-	-
70	K70 18VT/RD (EXCEPT 3.0L)	PULSE WIDTH MODULATED PURGE SENSE
71	-	-
72	K107 18DB/WT (3.3L/3.8L)	LEAK DETECTION PUMP SWITCH SENSE
72	K107 18YL/BK (2.4L ATX)	LEAK DETECTION PUMP SWITCH SENSE
73	K173 14LG/DB	RADIATOR FAN RELAY CONTROL
74	K31 18BR	FUEL PUMP RELAY CONTROL
75	D20 18LG	SCI RECEIVE
76	T41 18BK/WT (2.4L ATX)	TRS T41 SENSE
76	T41 18BR/YL (EATX)	TRS T41 SENSE
77	K106 18WT/DG (EXCEPT 3.0L)	LEAK DETECTION PUMP SOLENOID CONTROL
78	K54 18OR/BK (2.4L ATX)	TORQUE CONVERTER CLUTCH SOLENOID CONTROL
78	V36 18TN/RD (3.0L)	SPEED CONTROL VACUUM SOLENOID CONTROL
79	-	-
80	V35 18LG/RD	SPEED CONTROL VENT SOLENOID CONTROL



RADIATOR FAN NO. 1

RADIATOR FAN NO. 1 - BLACK 2 WAY

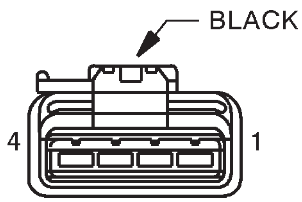
CAV	CIRCUIT	FUNCTION
1	C23 12DG	LOW SPEED RADIATOR FAN RELAY OUTPUT
2	Z1 12BK	GROUND



RADIATOR FAN NO. 2

RADIATOR FAN NO 2 - BLACK 2 WAY

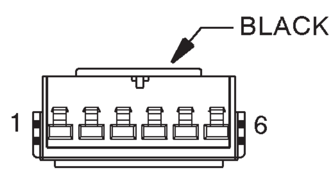
CAV	CIRCUIT	FUNCTION
1	C23 12DG	LOW SPEED RADIATOR FAN RELAY OUTPUT
2	Z1 12BK	GROUND



RADIATOR FAN RELAY

RADIATOR FAN RELAY - BLACK 4 WAY

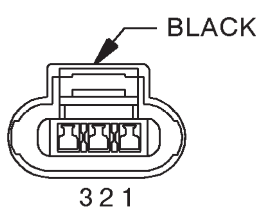
CAV	CIRCUIT	FUNCTION
1	Z1 14BK	GROUND
2	K173 14LG/DB	RADIATOR FAN RELAY CONTROL
3	C23 12DG	LOW SPEED RADIATOR FAN RELAY OUTPUT
4	A16 12GY	FUSED B(+)



SENTRY KEY IMMOBILIZER MODULE

SENTRY KEY IMMOBILIZER MODULE - BLACK 6 WAY

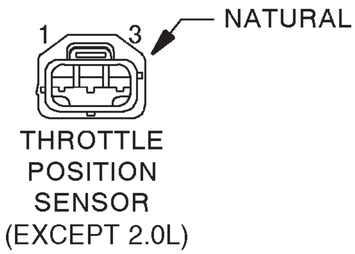
CAV	CIRCUIT	FUNCTION
1	F41 20PK/WT	FUSED B(+)
2	Z2 20BK	GROUND
3	F87 20WT/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
4	-	-
5	D2 20WT/BK	CCD BUS (-)
6	D1 20VT/BR	CCD BUS (+)



THROTTLE POSITION SENSOR (2.0L)

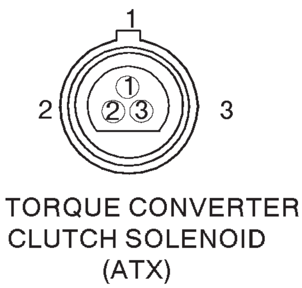
THROTTLE POSITION SENSOR (2.0L) - BLACK 3 WAY

CAV	CIRCUIT	FUNCTION
1	K4 18BK/LB	SENSOR GROUND
2	K22 18OR/DB	THROTTLE POSITION SENSOR SIGNAL
3	K6 18VT/WT	5V SUPPLY



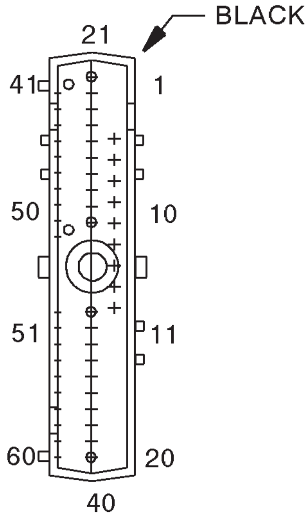
THROTTLE POSITION SENSOR (EXCEPT 2.0L) - NATURAL 3 WAY

CAV	CIRCUIT	FUNCTION
1	K4 18BK/LB	SENSOR GROUND
2	K22 18OR/DB	THROTTLE POSITION SENSOR SIGNAL
3	K6 18VT/WT	5V SUPPLY



TORQUE CONVERTER CLUTCH SOLENOID (ATX) - 3 WAY

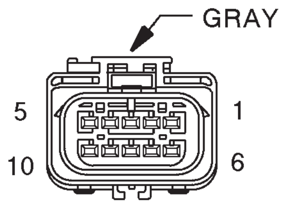
CAV	CIRCUIT	FUNCTION
1	-	-
2	F87 18WT/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	K54 18OR/BK	TORQUE CONVERTER CLUTCH SOLENOID CONTROL



TRANSMISSION CONTROL MODULE

TRANSMISSION CONTROL MODULE - BLACK 60 WAY

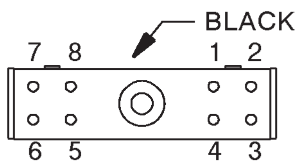
CAV	CIRCUIT	FUNCTION
1	T1 18LG/BK	TRS T1 SENSE
2	-	-
3	T3 18VT	TRS T3 SENSE
4	D2 18WT/BK	CCD BUS(-)
5	-	-
6	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
7	D21 18PK	SCI TRANSMIT
8	F45 18YL/RD	FUSED IGNITION SWITCH OUTPUT (START)
9	T9 18OR/BK	OVERDRIVE PRESSURE SWITCH SENSE
10	T10 18YL/DG	TORQUE MANAGEMENT REQUEST SENSE
11	F11 18RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
12	K22 18OR/DB	THROTTLE POSITION SENSOR SIGNAL
13	T13 18DB/BK	SPEED SENSOR GROUND
14	T14 18LG/WT	OUTPUT SPEED SENSOR SIGNAL
15	T15 18LG	TRANSMISSION CONTROL RELAY CONTROL
16	T16 18RD	TRANSMISSION CONTROL RELAY OUTPUT
17	T16 18RD	TRANSMISSION CONTROL RELAY OUTPUT
18	-	-
19	T19 18WT	2-4 SOLENOID CONTROL
20	T20 18LB	LOW/REVERSE SOLENOID CONTROL
21	-	-
22	-	-
23	-	-
24	-	-
25	-	-
26	-	-
27	-	-
28	-	-
29	-	-
30	-	-
31	-	-
32	-	-
33	-	-
34	-	-
35	-	-
36	-	-
37	-	-
38	-	-
39	-	-
40	-	-
41	T41 18BK/WT	TRS T41 SENSE
42	T42 18VT/WT	TRS T42 SENSE
43	D1 18VT/BR	CCD BUS (+)
44	-	-
45	-	-
46	D6 18BK/LB	SCI RECEIVE
47	T47 18YL/BK	2-4 PRESSURE SWITCH SENSE
48	-	-
49	-	-
50	T50 18DG	LOW/REVERSE PRESSURE SWITCH SENSE
51	K4 18BK/LB	SENSOR GROUND
52	T52 18RD/BK	INPUT SPEED SENSOR SIGNAL
53	Z14 16BK/YL	GROUND
54	T54 18VT/LG	TRANSMISSION TEMPERATURE SENSOR SIGNAL
55	T55 18OR/RD (3.3L/3.8L)	AUTOSTICK/OVERDRIVE OFF MUX INPUT
56	A5 18RD/DB	FUSED B(+)
57	Z13 16BK/RD	GROUND
58	G7 18WT/OR	VEHICLE SPEED SENSOR SIGNAL
59	T59 18PK	UNDERDRIVE SOLENOID CONTROL
60	T60 18BR	OVERDRIVE SOLENOID CONTROL



TRANSMISSION
RANGE SENSOR

TRANSMISSION RANGE SENSOR - GRAY 10 WAY

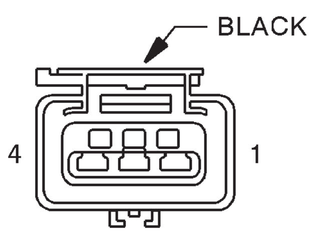
CAV	CIRCUIT	FUNCTION
1	F20 18WT	FUSED IGNITION SWITCH OUTPUT (RUN)
2	-	-
3	T13 18DB/BK	SPEED SENSOR GROUND
4	T54 18VT/LG	TRANSMISSION TEMPERATURE SENSOR SIGNAL
5	T41 18BK/WT	TRANSMISSION RANGE SENSOR T41 SENSE
6	L1 18VT/BK	BACK-UP LAMP FEED
7	T1 18LG/BK	TRS T1 SENSE
8	T3 18VT	TRS T3 SENSE
9	T42 18VT/WT	TRS T42 SENSE
10	T41 18BR/YL	TRS T41 SENSE



TRANSMISSION
SOLENOID/
PRESSURE SWITCH

TRANSMISSION SOLENOID/PRESSURE SWITCH - BLACK 8 WAY

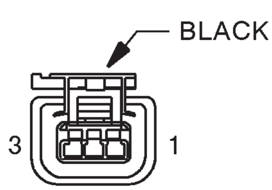
CAV	CIRCUIT	FUNCTION
1	T47 18YLBK	2-4 PRESSURE SWITCH SENSE
2	T50 18DG	LOW/REVERSE PRESSURE SWITCH SENSE
3	T9 18OR/BK	OVERDRIVE PRESSURE SWITCH SENSE
4	T16 18RD	TRANSMISSION CONTROL RELAY OUTPUT
5	T59 18PK	UNDERDRIVE SOLENOID CONTROL
6	T60 18BR	OVERDRIVE SOLENOID CONTROL
7	T20 18LB	LOW/REVERSE SOLENOID CONTROL
8	T19 18WT	2-4 SOLENOID CONTROL



VEHICLE SPEED
CONTROL SERVO

VEHICLE SPEED CONTROL SERVO - BLACK 4 WAY

CAV	CIRCUIT	FUNCTION
1	V36 18TN/RD	SPEED CONTROL VACUUM SOLENOID CONTROL
2	V35 18LG/RD	SPEED CONTROL VENT SOLENOID CONTROL
3	V30 18DB/RD	SPEED CONTROL BRAKE SWITCH OUTPUT
4	Z1 18BK	GROUND



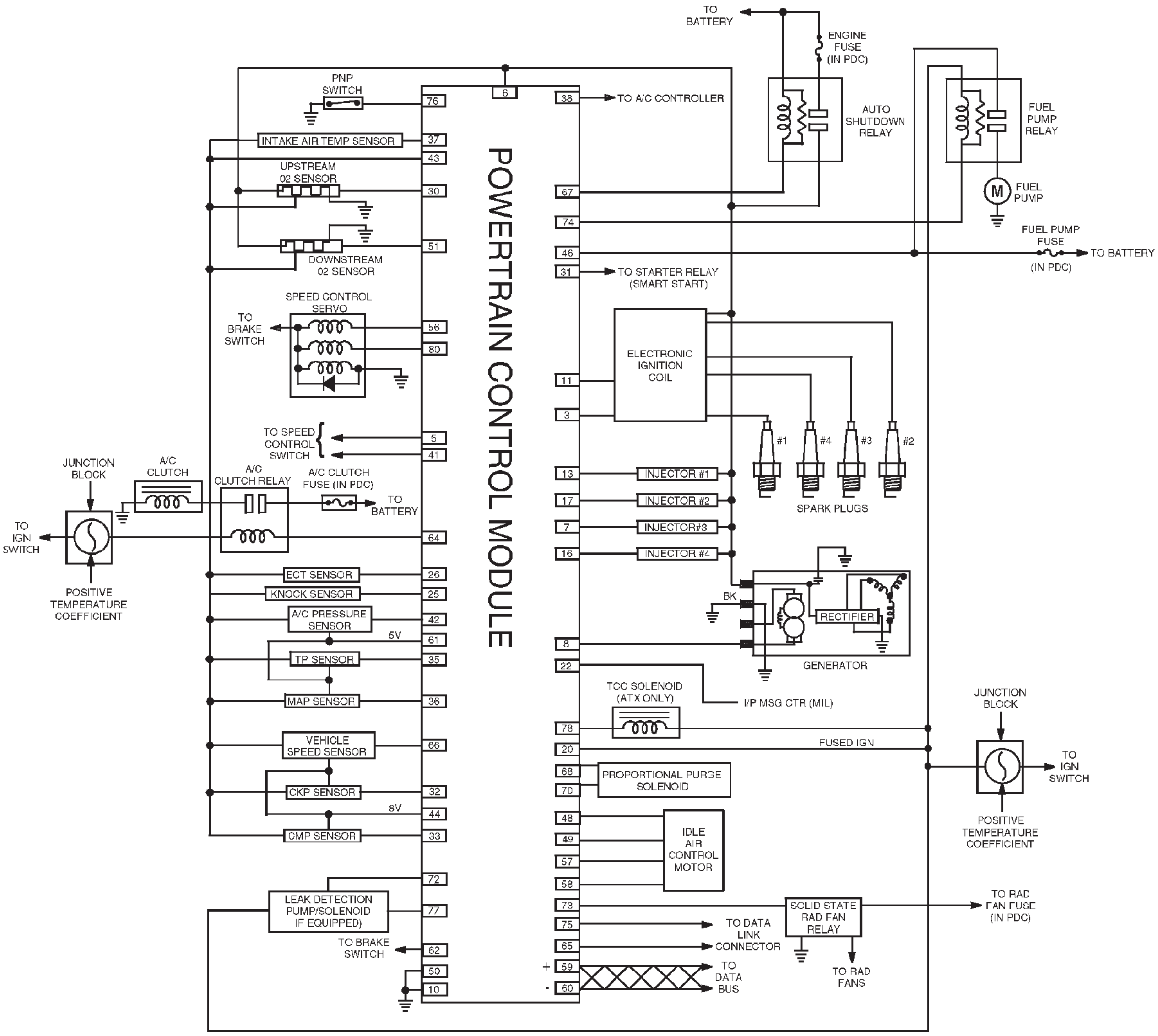
VEHICLE SPEED
SENSOR
(2.4L)

VEHICLE SPEED SENSOR (EXCEPT 3.3L/3.8L) - BLACK 3 WAY

CAV	CIRCUIT	FUNCTION
1	K7 18OR	8V SUPPLY (GAS)
1	F87 18WT/BK	8V SUPPLY (DIESEL)
2	K4 18BK/LB	SENSOR GROUND (GAS)
2	K4 20BK/LB	SENSOR GROUND (DIESEL)
3	G7 18WT/OR	VEHICLE SPEED SENSOR SIGNAL

10.0 SCHEMATIC DIAGRAMS

10.1 2000 GS 2.0L AND 2.4L ENGINES



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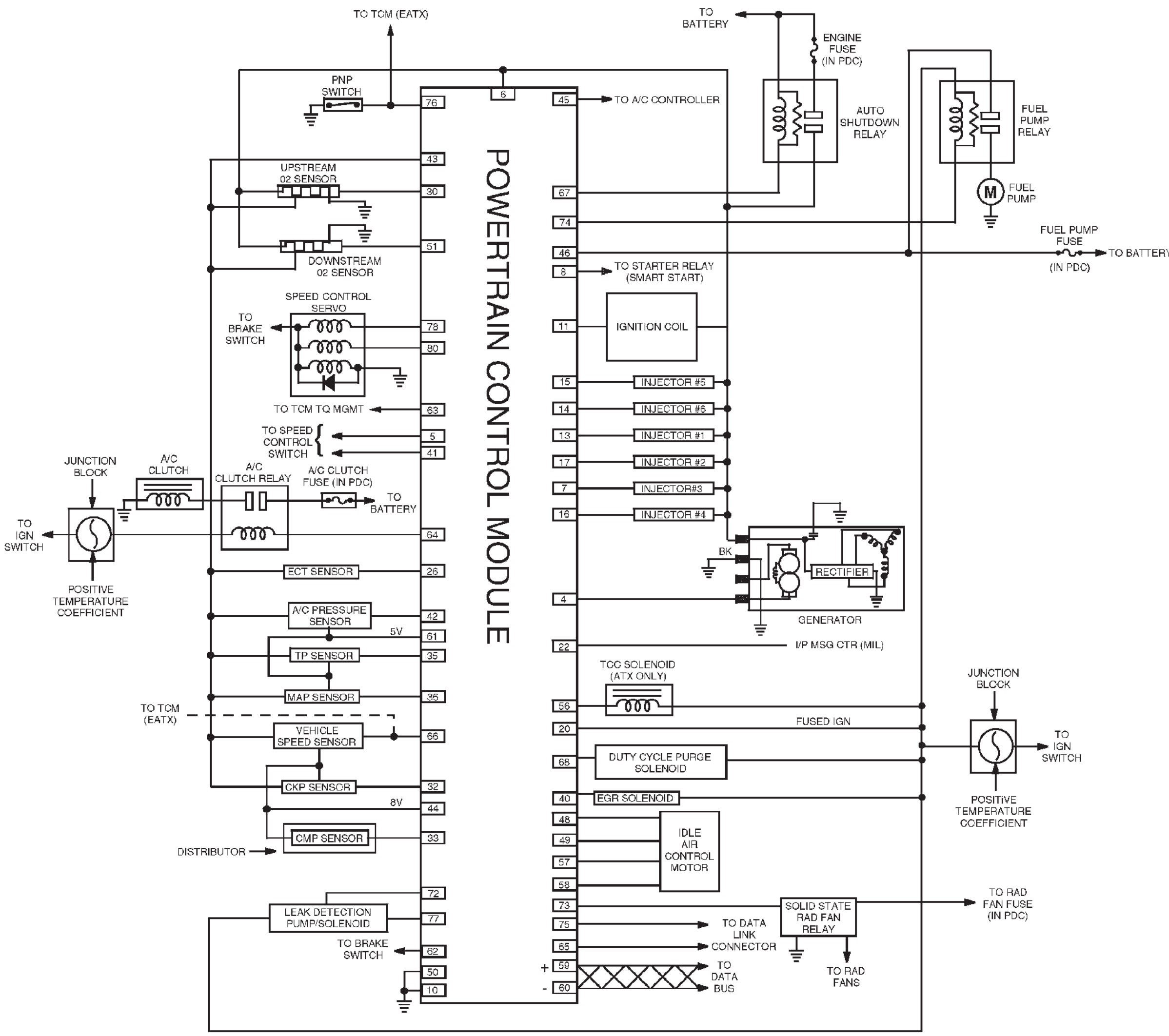
10.2 2000 GS 3.0L ENGINE



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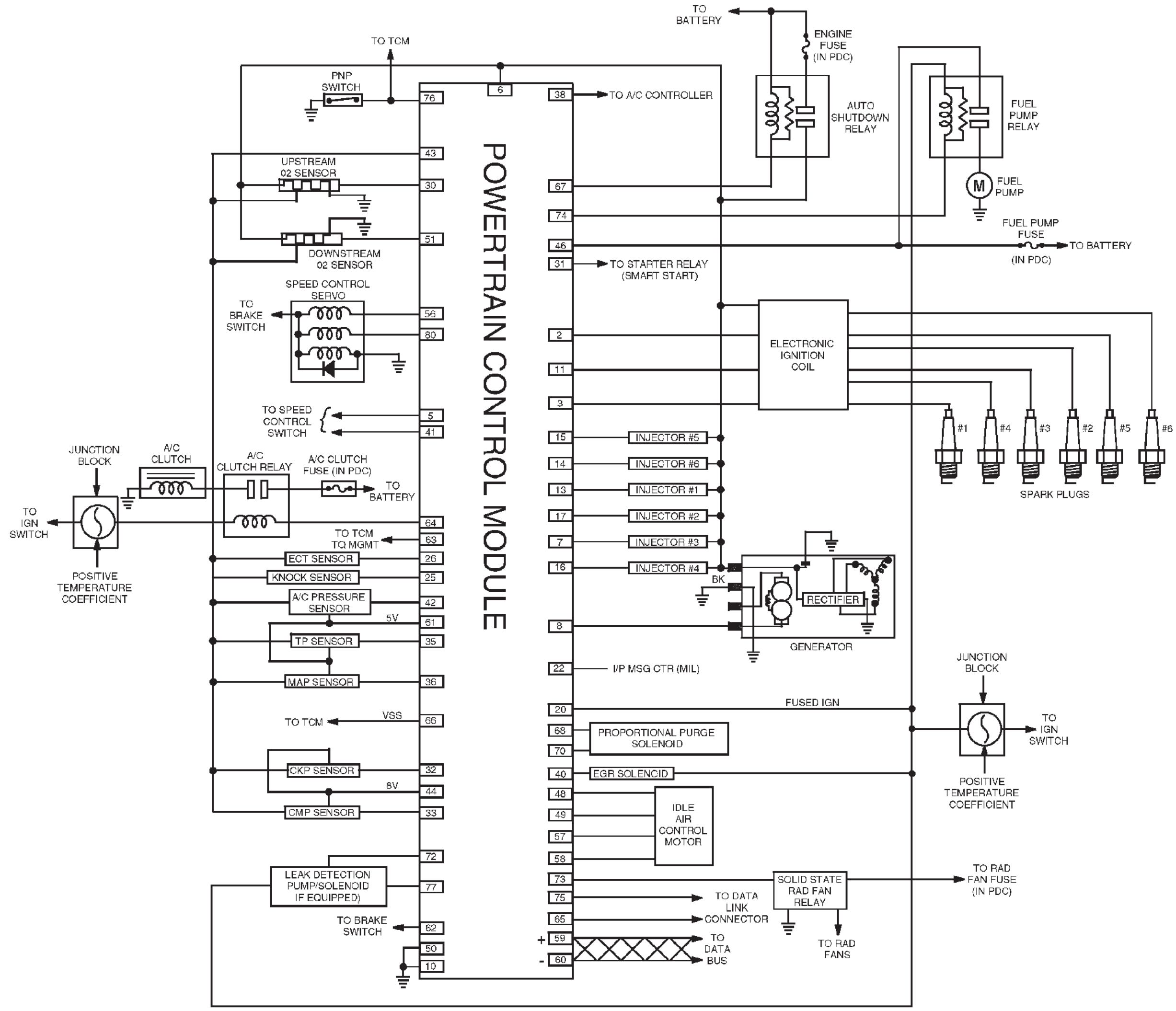
S C H E M A T I C S

10.3 2000 GS 3.3L AND 3.8L ENGINES



S C H E M A T I C S

NOTES

SCHEMATICS