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1.0 INTRODUCTION

The procedures contained in this manual include all the specifications, instructions and graphics needed to diagnose engine control module (ECM) and sentry key immobilizer system (SKIS) problems; they are no start, diagnostic trouble code (DTC), and no trouble code problems for the ECM. The diagnostics in this manual are based on the trouble condition or symptom being present at the time of diagnosis.

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

Diagnostic procedures change every year. New diagnostic systems may be added; carryover systems may be enhanced. IT IS RECOMMENDED THAT YOU REVIEW THE ENTIRE MANUAL TO BECOME FAMILIAR WITH ALL NEW AND CHANGED DIAGNOSTIC PROCEDURES.

This manual will cover all the necessary requirements to begin a logical diagnostic path for each problem. If there is a diagnostic trouble code (DTC) detected, go to the trouble code test. If there are no DTCs present, go to a no trouble code (*), symptom based test.

This book reflects many suggested changes from readers of past issues. 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 2005 KJ body vehicle equipped with the common rail diesel engine.

1.2 SIX-STEP TROUBLESHOOTING PROCEDURE

Diagnosis of the engine control module (ECM) and sentry key immobilizer system (SKIS) is done in six basic steps:

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

NOTE: All tests in this manual should be performed with the engine at operating temperature, unless specified within a particular test.

2.0 IDENTIFICATION OF SYSTEM

The ECM is located in the left side of the engine compartment between the left front headlamp and the power distribution center. The sentry key immobilizer module (SKIM) is located below the steering column behind the steering wheel.

3.0 SYSTEM DESCRIPTION AND FUNCTIONAL OPERATION

3.1 GENERAL DESCRIPTION

The 2.8L diesel engine system is equipped with the latest in technical advances. The on-board diagnostics incorporated in the engine control module and SKIM are intended to assist the field technician in repairing vehicle problems by the quickest means.

The engine system incorporates a common rail fuel delivery design. This design utilizes electronically controlled solenoid valve type fuel injectors. Each injector is controlled individually by the ECM. Injector timing and fuel quantity are controlled by the ECM based on inputs from the various sensors. The precision control of the injectors by the ECM helps to reduce the engine noise, odor and smoke.

3.2 FUNCTIONAL OPERATION

3.2.1 ECM ON-BOARD DIAGNOSTICS

The ECM has been programmed to monitor many different circuits of the diesel fuel injection system. This monitoring is called on-board diagnostics.

Certain criteria must be met for a trouble code to be entered into the ECM memory. The criteria may be a range of: engine rpm, engine temperature, time or other input signals to the ECM. If all of the criteria for monitoring a system or circuit are met, and a problem is sensed, then a DTC will be stored in the ECM memory.

It is possible that a DTC for a monitored circuit may not be entered into the ECM memory, even though a malfunction has occurred. This may happen when the monitoring criteria has not been met.

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

3.2.2 ECM OPERATING MODES

As input signals to the ECM change, the ECM adjusts its response to the output devices. For example, the ECM must calculate a different fuel quantity and fuel timing for engine idle condition than it would for a wide open throttle condition. There are several different modes of operation that determine how the ECM responds to the various input signals.

Ignition Switch On (Engine Off)

When the ignition switch is turned on, the ECM activates the glow plug relay for a time period that is determined by engine coolant temperature, atmospheric temperature and battery voltage. The ECM also activates the lift pump to prime the fuel system.

Engine Start-up Mode

The ECM uses the engine temperature sensor and the crankshaft position sensor (engine speed) inputs to determine fuel injection quantity.

Normal Driving Modes

Engine idle, warm-up, acceleration, deceleration and wide open throttle modes are controlled based on all of the sensor inputs to the ECM. The ECM uses these sensor inputs to adjust fuel quantity and fuel injector timing.

Limp-In Mode

If there is a fault detected with the accelerator pedal position sensor, the ECM will set the engine speed at 1100 RPM.

Overspeed Detection Mode

If the ECM detects engine RPM that exceeds 5200 RPM, the ECM will set a DTC in memory and illuminate the MIL until the DTC is cleared.

After-Run Mode

The ECM transfers RAM information to ROM and performs an Input/Output state check.

3.2.3 MONITORED CIRCUITS

The ECM is able to monitor and identify most driveability related trouble conditions. Some circuits are directly monitored through ECM feedback circuitry. In addition, the ECM monitors the voltage state of some circuits and compares those states with expected values. Other systems are monitored indirectly when the ECM conducts a rationality test to identify problems.

Although most subsystems of the engine control module are either directly or indirectly monitored, there may be occasions when diagnostic trouble codes are not immediately identified. For a trouble code to set, a specific set of conditions must occur and unless these conditions occur, a DTC will not set.

3.2.4 SKIS OVERIVEW

The sentry key immobilizer system (SKIS) is designed to prevent unauthorized vehicle operation. The system consists of a sentry key immobilizer module (SKIM), ignition key(s) equipped with a transponder chip and the ECM. When the ignition switch is turned on, the SKIM interrogates the ignition key. If the ignition key is Valid or Invalid, the SKIM sends a PCI Bus message to the ECM indicating ignition key status. Upon receiving this message the ECM will terminate engine operation or allow the engine to continue to operate.

3.2.5 SKIS ON-BOARD DIAGNOSTICS

The sentry key immobilizer module (SKIM) has been programmed to transmit and monitor many different coded messages as well as PCI Bus messages. This monitoring is called On-Board Diagnostics. Certain criteria must be met for a DTC to be entered into SKIM memory. The criteria may be a range of; input voltage, PCI 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 detected, a DTC will be stored in the SKIM memory.

3.2.6 SKIS OPERATION

When ignition power is supplied to the SKIM, the SKIM performs an internal self-test. After the self-test is complete, the SKIM energizes the antenna (this activates the transponder chip) and sends a challenge to the transponder chip. The transponder chip 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, ECM and all ignition key transponders.
Challenge - This is a random number that is generated by the SKIM at each ignition key cycle.

The secret key and challenge are the two variables used in the algorithm that produces the encrypted response message. The transponder uses the crypto algorithm to receive, decode and respond to the message sent by SKIM. After responding to the coded message, the transponder sends a transponder ID message to the SKIM. The SKIM compares the transponder ID message to the available valid key codes in SKIM memory (8 key maximum at any one time). After validating the ignition key, the SKIM sends a PCI Bus message called a seed request to the ECM, then waits for the ECM response. If the ECM does not respond, the SKIM will

send the seed request again. After twenty failed attempts, the SKIM will stop sending the seed request and store a trouble code in memory. If the ECM sends a seed response, the SKIM sends a valid/invalid key message to the ECM. This is an encrypted message that is generated using the following:

- VIN - Vehicle Identification Number.
- Seed - a random number that is generated by the ECM at each ignition key cycle.

The VIN and seed are two variables used in the rolling code algorithm that encrypts the valid/invalid key message. The ECM 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 message, the SKIM waits 3.5 seconds for an ECM status message from the ECM. If the ECM does not respond with a valid key message to the SKIM, a fault is detected and a code is stored.

The SKIS incorporates a warning lamp located in the instrument cluster. The SKIS lamp is actuated when the SKIM sends a PCI Bus message to the instrument cluster requesting the lamp on, off or flashing.

The SKIM will request lamp operation for the following:

– bulb check at ignition on

– to alert the vehicle operator to a SKIS malfunction

– when the SKIM is in customer key programming mode

For all faults except transponder faults the lamp remains on steady. In the event of a transponder fault the lamp will flash at a rate of 1Hz (once per second). If a fault is present, the lamp will remain on or flashing for the complete ignition cycle. If a fault is stored in SKIM memory which prevents the system from operating properly, the ECM will allow the engine to start and idle for 2 seconds then stall. This may occur up to six times. After the sixth attempt, the ECM disables fuel delivery until the fault is corrected.

3.3 FRONT CONTROL MODULE

The KJ diesel is equipped with a Gateway module, which is referred to as the Front Control Module (FCM). The FCM transfers messages between the Controller Area Network (CAN) bus and the Programmable Communication Interface (PCI) bus. The FCM receives inputs from various sensors/modules and communicates those values to the ECM over the CAN bus network. The CAN bus network on the KJ is for inter-module communication only. The CAN Bus network consists of the following modules:

- Antilock Brake Module
- Front Control Module
- Engine Control Module

Diagnosis is done using the DRBIII®. The DRBIII® utilizes the SCI Transmit circuit to communicate with the ECM. The FCM and the ABS module utilize the PCI bus to communicate with the DRBIII®. Communication between these modules is essential for proper vehicle operation. The FCM and ECM will set DTCs if a fault occurs within the bus network. Refer to the Communication section for all the communication related DTCs.

3.4 DIAGNOSTIC TROUBLE CODES

Each diagnostic trouble code (DTC) is diagnosed by following a specific procedure. The diagnostic test procedure contains step-by-step instruction for determining the cause of the DTC 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 diagnosis by reading the DTCs using the DRBIII®.

3.4.1 HARD CODE

A DTC that comes back within one cycle of the ignition key is a hard code. This means that the problem is current every time the ECM/SKIM checks that circuit or function. Procedures in this manual verify if the DTC is a hard code at the beginning of each test. When the fault is not a hard code, an intermittent test must be performed. NOTE: If the DRBIII® displays faults for multiple components (i.e. ECT, VSS, IAT sensors) identify and check the shared circuits for possible problems before continuing (i.e. sensor grounds or 5-volt supply circuits). Refer to the appropriate schematic to identify shared circuits.

3.4.2 INTERMITTENT CODE

A DTC that is not current every time the ECM/SKIM checks the circuit or function is an intermittent code. Most intermittent DTCs are caused by wiring or connector problems. Problems 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 the related wire harness connectors. Look for broken, bent, pushed out, or corroded terminals.
- Visually inspect the related wire harness. Look for chafed, pierced, or partially broken wire.
- Refer to hotlines or technical service bulletins that may apply.

NOTE: Electromagnetic (radio) interference can cause an intermittent system malfunction. This interference can interrupt communication between the ignition key transponder and the SKIM.

3.4.3 ECM DIAGNOSTIC TROUBLE CODES

IMPORTANT NOTE: Before replacing the ECM 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 ECM driver/control circuit failures are caused by internal failures to components (i.e. relays and solenoids) and shorted circuits (i.e. sensor pull-ups, drivers and ground circuits). These faults are difficult to detect when a double fault has occurred and only one DTC has set.

If the DRBIII® displays faults for multiple components (i.e. VSS, ECT, Batt Temp, etc.), identify and check the shared circuits for possible problems before continuing (i.e. sensor grounds or 5-volt supply circuits). Refer to the appropriate wiring diagrams to identify shared circuits.

P0045-BOOST PRESSURE SOLENOID EXCESSIVE CURRENT

P0045-BOOST PRESSURE SOLENOID OPEN CIRCUIT

P0047-BOOST PRESSURE SOLENOID SHORT TO GROUND

P0048-BOOST PRESSURE SOLENOID SHORT CIRCUIT

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO HIGH

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO LOW

P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW

P0088-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO HIGH

P0089-FUEL PRESSURE SOLENOID AFTERRUN PLAUSIBILITY

P0090-FUEL QUANTITY SOLENOID OPEN CIRCUIT

P0091-FUEL QUANTITY SOLENOID SHORT TO GROUND

P0092-FUEL QUANTITY SOLENOID SHORT CIRCUIT

P0100-MAF SENSOR SIGNAL VOLTAGE TOO HIGH

P0100-MAF SENSOR SIGNAL VOLTAGE TOO LOW

P0101-MAF SENSOR SIGNAL NEGATIVE DEVIATION

P0101-MAF SENSOR SIGNAL POSITIVE DEVIATION

P0105-INLET PRESSURE SENSOR SIGNAL PLAUSIBILITY

P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH

P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW

P0110-INTAKE AIR TEMP SENSOR SIGNAL VOLTAGE TOO HIGH

P0110-INTAKE AIR TEMP SENSOR SIGNAL VOLTAGE TOO LOW

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO HIGH

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO LOW

P0128-ENGINE COOLANT TEMP SENSOR ENGINE IS COLD TOO LONG

P0180-FUEL TEMPERATURE SENSOR SIGNAL VOLTAGE TOO HIGH

P0180-FUEL TEMPERATURE SENSOR SIGNAL VOLTAGE TOO LOW

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO HIGH

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO LOW

P0191-FUEL PRESS SENSOR AFTERRUN NEGATIVE PLAUSIBILITY

P0191-FUEL PRESS SENSOR AFTERRUN POSITIVE PLAUSIBILITY

P0201-CYLINDER 1-INJECTOR CIRCUIT CURRENT DECREASE

P0201-CYLINDER 1-INJECTOR CIRCUIT LOAD DROP

P0201-CYLINDER 1-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE

P0201-CYLINDER 1-INJECTOR CIRCUIT OVERCURRENT LOW SIDE

P0202-CYLINDER 2-INJECTOR CIRCUIT CURRENT DECREASE

P0202-CYLINDER 2-INJECTOR CIRCUIT LOAD DROP

P0202-CYLINDER 2-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE

P0202-CYLINDER 2-INJECTOR CIRCUIT OVERCURRENT LOW SIDE

P0203-CYLINDER 3-INJECTOR CIRCUIT CURRENT DECREASE

P0203-CYLINDER 3-INJECTOR CIRCUIT LOAD DROP

P0203-CYLINDER 3-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE

P0203-CYLINDER 3-INJECTOR CIRCUIT OVERCURRENT LOW SIDE

P0204-CYLINDER 4-INJECTOR CIRCUIT CURRENT DECREASE

P0204-CYLINDER 4-INJECTOR CIRCUIT LOAD DROP

P0204-CYLINDER 4-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE

P0204-CYLINDER 4-INJECTOR CIRCUIT OVERCURRENT LOW SIDE

P0234-BOOST PRESSURE SENSOR NEGATIVE DEVIATION
P0235-BOOST PRESSURE SENSOR PLAUSIBILITY
P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH
P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW
P0251-FUEL QUANTITY SOLENOID OPEN OR SHORT CIRCUIT
P0252-FUEL QUANTITY SOLENOID CIRCUIT MALFUNCTION
P0253-FUEL QUANTITY SOLENOID SHORT TO GROUND
P0254-FUEL QUANTITY SOLENOID SHORT CIRCUIT
P0299-BOOST PRESSURE SENSOR POSITIVE DEVIATION
P0300-MISFIRE DETECTED
P0300-MISFIRE DETECTED
P0300-MISFIRE DETECTED
P0300-MISFIRE DETECTED
P0301-MISFIRE DETECTED CYLINDER #1
P0302-MISFIRE DETECTED CYLINDER #2
P0303-MISFIRE DETECTED CYLINDER #3
P0304-MISFIRE DETECTED CYLINDER #4
P0335-CRANKSHAFT POSITION SENSOR CIRCUIT INCORRECT OR MISSING SIGNAL
P0339-CRANKSHAFT POSITION SENSOR CIRCUIT INTERMITTENT INCORRECT OR MISSING SIGNAL
P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL
P0340-CAMSHAFT POSITION SENSOR CIRCUIT SIGNAL PLAUSIBILITY
P0344-CAMSHAFT POSITION SENSOR CIRCUIT INTERMITTENT MISSING SIGNAL
P0344-CAMSHAFT POSITION SENSOR CIRCUIT INTERMITTENT SIGNAL PLAUSIBILITY
P0402-EGR SOLENOID CIRCUIT POSITIVE DEVIATION
P0403-EGR SOLENOID CIRCUIT EXCESSIVE CURRENT
P0403-EGR SOLENOID CIRCUIT NEGATIVE DEVIATION
P0403-EGR SOLENOID CIRCUIT OPEN CIRCUIT
P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO HIGH
P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW
P0480-FAN 1 CONTROL CIRCUIT EXCESSIVE CURRENT
P0480-FAN 1 CONTROL CIRCUIT OPEN CIRCUIT
P0480-FAN 1 CONTROL CIRCUIT SHORT CIRCUIT
P0480-FAN 1 CONTROL CIRCUIT SHORT TO GROUND
P0481-FAN 2 CONTROL CIRCUIT EXCESSIVE CURRENT
P0481-FAN 2 CONTROL CIRCUIT OPEN CIRCUIT
P0481-FAN 2 CONTROL CIRCUIT SHORT CIRCUIT
P0481-FAN 2 CONTROL CIRCUIT SHORT TO GROUND
P0489-EGR SOLENOID CIRCUIT SHORT TO GROUND
P0490-EGR SOLENOID CIRCUIT SHORT CIRCUIT
P0501-VEHICLE SPEED SENSOR PLAUSIBILITY
P0504-BRAKE SWITCH SIGNAL CIRCUITS PLAUSIBILITY WITH REDUNDANT CONTACT
P0513-SKIM SYSTEM INVALID KEY CODE RECEIVED
P0513-SKIM SYSTEM READ ACCESS TO EEPROM FAILURE
P0513-SKIM SYSTEM SKIS ERROR
P0513-SKIM SYSTEM WRITE ACCESS TO EEPROM FAILURE
P0520-OIL PRESS SENSOR CIRCUIT MALF PLAUSIBILITY
P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO HIGH
P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO LOW
P0530-A/C PRESSURE SENSOR CIRCUIT PLAUSIBILITY
P0530-A/C PRESSURE SENSOR CIRCUIT SIGNAL VOLTAGE TOO HIGH
P0530-A/C PRESSURE SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW
P0560-ECM VOLTAGE TOO HIGH
P0560-ECM VOLTAGE TOO LOW
P0564-S/C SWITCH #1 SIGNAL CIRCUIT PLAUSIBILITY
P0564-S/C SWITCH #1 SIGNAL CIRCUIT SIGNAL VOLTAGE TOO HIGH
P0564-S/C SWITCH #1 SIGNAL CIRCUIT SIGNAL VOLTAGE TOO LOW
P0564-S/C SWITCH #1 SIGNAL CIRCUIT STUCK SWITCH
P0585-S/C SWITCH PLAUSIBILITY BETWEEN SWITCH #1 AND #2
P0589-S/C SWITCH #2 SIGNAL CIRCUIT PLAUSIBILITY
P0589-S/C SWITCH #2 SIGNAL CIRCUIT SIGNAL VOLTAGE TOO HIGH
P0589-S/C SWITCH #2 SIGNAL CIRCUIT SIGNAL VOLTAGE TOO LOW
P0589-S/C SWITCH #2 SIGNAL CIRCUIT STUCK SWITCH
P0600-ECM COMMUNICATION ERROR

P0602-ECM INVALID CODE WORD
P0606-ECM CHECKSUM ERROR
P0606-ECM DEVIATION ERROR
P0607-ECM INTERNAL ERROR
P0610-AUTOMATIC TRANSMISSION CODED AS MANUAL TRANSMISSION
P0610-MANUAL TRANSMISSION CODED AS AUTOMATIC TRANSMISSION
P0611-CAPACITOR VOLTAGE 1
P0611-CAPACITOR VOLTAGE 1
P0611-CAPACITOR VOLTAGE 1
P0611-CAPACITOR VOLTAGE 1
P0615-STARTER RELAY CIRCUIT EXCESSIVE CURRENT
P0615-STARTER RELAY CIRCUIT OPEN CIRCUIT
P0616-STARTER RELAY CIRCUIT SHORT TO GROUND
P0617-STARTER RELAY CIRCUIT SHORT CIRCUIT
P0641-SENSOR SUPPLY 1 VOLTAGE TOO HIGH
P0641-SENSOR SUPPLY 1 VOLTAGE TOO LOW
P0645-A/C CLUTCH RELAY CIRCUIT EXCESSIVE CURRENT
P0645-A/C CLUTCH RELAY CIRCUIT OPEN CIRCUIT
P0645-A/C CLUTCH RELAY CIRCUIT SHORT CIRCUIT
P0645-A/C CLUTCH RELAY CIRCUIT SHORT TO GROUND
P0651-SENSOR SUPPLY 2 VOLTAGE TOO HIGH
P0651-SENSOR SUPPLY 2 VOLTAGE TOO LOW
P0670-GLOW PLUG CONTROLLER CIRCUIT MALFUNCTION
P0671-GLOW PLUG 1 PLUG FAILURE
P0671-GLOW PLUG 1 SHORT CIRCUIT
P0672-GLOW PLUG 2 PLUG FAILURE
P0672-GLOW PLUG 2 SHORT CIRCUIT
P0673-GLOW PLUG 3 PLUG FAILURE
P0673-GLOW PLUG 3 SHORT CIRCUIT
P0674-GLOW PLUG 4 PLUG FAILURE
P0674-GLOW PLUG 4 SHORT CIRCUIT
P0683-GLOW PLUG MODULE SIGNAL CIRCUIT MALFUNCTION
P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO EARLY
P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO LATE
P0686-ECM VOLTAGE ERROR LOW
P0687-ECM VOLTAGE ERROR HIGH
P0697-SENSOR SUPPLY 3 VOLTAGE TOO LOW
P0697-SENSOR SUPPLY 3 VOLTAGE TOO HIGH
P0700-TCM DTC
P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY
P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY 2
P0836-TRANSFER CASE POSITION SENSOR SIGNAL VOLTAGE TOO HIGH
P0836-TRANSFER CASE POSITION SENSOR SIGNAL VOLTAGE TOO LOW
P0864-TCM TORQUE REDUCTION SIGNAL ERROR
P0864-TCM TORQUE REDUCTION SIGNAL ERROR
P0864-TCM TORQUE REDUCTION SIGNAL ERROR
P0864-TCM TORQUE REDUCTION SIGNAL ERROR
P1101-ACM CRASH SIGNAL RECEIVED
P1102-VISCOUS/CABIN HEATER RELAY EXCESSIVE CURRENT
P1102-VISCOUS/CABIN HEATER RELAY OPEN CIRCUIT
P1102-VISCOUS/CABIN HEATER RELAY SHORT CIRCUIT
P1102-VISCOUS/CABIN HEATER RELAY SHORT TO GROUND
P1131-GLOW PLUG MODULE VOLTAGE SUPPLY
P1132-GLOW PLUG MODULE INTERNAL FAULT
P1135-GLOW PLUG MODULE CONTROL CIRCUIT EXCESSIVE CURRENT
P1135-GLOW PLUG MODULE CONTROL CIRCUIT OPEN CIRCUIT
P1135-GLOW PLUG MODULE CONTROL CIRCUIT SHORTED TO GROUND
P1135-GLOW PLUG MODULE CONTROL CIRCUIT SHORTED TO VOLTAGE
P1136-ECM RECOVERY
P1142-FUEL PRESSURE SOLENOID OPEN CIRCUIT
P1142-FUEL PRESSURE SOLENOID PLAUSIBILITY
P1142-FUEL PRESSURE SOLENOID SHORT CIRCUIT
P1143-FUEL RAIL PRESSURE MALFUNCTION POSITIVE PRESSURE DEVIATION
P1144-FUEL RAIL PRESSURE MALFUNCTION POSITIVE VOLUME DEVIATION
P1145-FUEL RAIL PRESSURE MALFUNCTION NEGATIVE PRESSURE DEVIATION
P1148-FUEL RAIL PRESSURE MALFUNCTION PRESSURE DROP IN OVERRUN
P1151-FUEL RAIL PRESSURE MALFUNCTION MAXIMUM POSITIVE DEVIATION
P1152-FUEL RAIL PRESSURE MALFUNCTION POSITIVE DEV FUEL PRESS SOL SETPOINT

P1153-FUEL RAIL PRESSURE MALFUNCTION NEGATIVE DEV FUEL PRESS SOL SETPOINT
P1154-FUEL RAIL PRESSURE MALFUNCTION RAIL PRESSURE IS TOO LOW
P1155-FUEL RAIL PRESSURE MALFUNCTION RAIL PRESSURE IS TOO HIGH
P1156-FUEL RAIL PRESSURE MALFUNCTION PLAUSIBILITY
P1159-IMPROPER START ATTEMPT
P1160-IGN VOLTAGE
P1160-IGNITION VOLTAGE
P1167-CAPACITOR VOLTAGE 1
P1167-CAPACITOR VOLTAGE 1
P1167-CAPACITOR VOLTAGE 1
P1167-CAPACITOR VOLTAGE 1
P1168-ECM COMMUNICATION ERROR
P1169-ECM A/D CONVERTER ERROR
P1169-ECM A/D CONVERTER ERROR
P1169-ECM A/D CONVERTER ERROR
P1169-ECM A/D CONVERTER ERROR
P1250-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT
P1251-VACUUM RESERVOIR SOLENOID SHORT TO GROUND
P1252-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT
P2101-EGR AIR FLOW CONTROL VALVE EXCESSIVE CURRENT
P2101-EGR AIR FLOW CONTROL VALVE OPEN CKT
P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY
P2120-ACC PEDAL POSITION SENSOR 1 CKT SIGNAL VOLTAGE TOO HIGH
P2120-ACC PEDAL POSITION SENSOR 1 CKT SIGNAL VOLTAGE TOO LOW
P2125-ACC PEDAL POSITION SENSOR 2 CIRCUIT PLAUSIBILITY
P2125-ACC PEDAL POSITION SENSOR 2 CKT SIGNAL VOLTAGE TOO HIGH
P2125-ACC PEDAL POSITION SENSOR 2 CKT SIGNAL VOLTAGE TOO LOW
P2141-EGR AIR FLOW CONTROL VALVE SHORT TO GROUND
P2142-EGR AIR FLOW CONTROL VALVE SHORT CIRCUIT
P2147-INJECTOR BANK 1 OPEN CIRCUIT
P2148-INJECTOR BANK 1 SHORT CIRCUIT
P2150-INJECTOR BANK 2 OPEN CIRCUIT
P2151-INJECTOR BANK 2 SHORT CIRCUIT
P2226-BAROMETRIC PRESSURE CIRCUIT SIGNAL VOLTAGE TOO HIGH
P2226-BAROMETRIC PRESSURE CIRCUIT SIGNAL VOLTAGE TOO LOW
P2226-BAROMETRIC PRESSURE SENSOR ERROR
P2226-BAROMETRIC PRESSURE SENSOR ERROR
P2294-FUEL PRESSURE SOLENOID OPEN CIRCUIT
P2295-FUEL PRESSURE SOLENOID SHORT TO GROUND
P2296-FUEL PRESSURE SOLENOID SHORT CIRCUIT
P2525-VACUUM RESERVOIR SOLENOID EXCESSIVE CURRENT
P2525-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT
P2527-VACUUM RESERVOIR SOLENOID SHORT TO GROUND
P2528-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT

3.4.4 SKIM DIAGNOSTIC TROUBLE CODES

ANTENNA FAILURE
COP FAILURE
EEPROM FAILURE
INTERNAL FAULT
PCM STATUS FAILURE
RAM FAILURE
ROLLING CODE FAILURE
SERIAL LINK EXTERNAL FAULT
SERIAL LINK INTERNAL FAULT
STACK OVERFLOW FAILURE
TRANSPONDER COMMUNICATION FAILURE
TRANSPONDER CRC (CYCLIC REDUNDANCY CHECK) FAILURE
TRANSPONDER ID MISMATCH
TRANSPONDER RESPONSE MISMATCH
VIN MISMATCH

3.4.5 COMMUNICATION DIAGNOSTIC TROUBLE CODES

CAN C BUS PERFORMANCE (FCM) (DIESEL ONLY)
GATEWAY INTERNAL (FCM) (DIESEL ONLY)
J1850 BUS PERFORMANCE (FCM) (DIESEL ONLY)
LOST COMMUNICATION WITH ABS (FCM) (DIESEL ONLY)
LOST COMMUNICATION WITH BCM (FCM) (DIESEL ONLY)
LOST COMMUNICATION WITH CLUSTER (FCM) (DIESEL ONLY)
LOST COMMUNICATION WITH ECM (FCM) (DIESEL ONLY)
LOST COMMUNICATION WITH SKREEM (FCM) (DIESEL ONLY)
LOST COMMUNICATION WITH TCM (FCM) (DIESEL ONLY)
*CHECKING THE CAN C BUS CIRCUITS (DIESEL ONLY)
*NO RESPONSE FROM ECM (DIESEL ONLY)

*NO RESPONSE FROM FRONT CONTROL MODULE (DIESEL ONLY)

*NO RESPONSE FROM SENTRY KEY IMMOBILIZER MODULE

*NO RESPONSE FROM TRANSMISSION CONTROL MODULE (DIESEL ONLY)

3.4.6 HANDLING NO TROUBLE CODE PROBLEMS

After reading Section 3.0 (System Description and Functional Operation), you should have a better understanding of the theory and operation of the on-board diagnostics and how this relates to the diagnosis of a vehicle that may have a driveability-related symptom or complaint. When there are no trouble codes present, refer to the no trouble code (*) tests.

3.4.7 FUEL INJECTOR CLASSIFICATION

The fuel injectors used in this common rail injection engine are manufactured with various tolerances. Each fuel injector is classified based on its particular tolerance range. This injector classification is programmed into the ECM. The ECM incorporates different fuel timing and fuel quantity maps for each type of injector class. In doing this, the ECM is able to improve fuel injector control to enhance engine performance and reduce emissions outputs. Injector classification programming is performed using the DRBIII® whenever a fuel injector is replaced.

3.5 USING THE DRBIII®

Refer to the DRBIII® user's guide for instructions and assistance with reading the DTCs, erasing the DTCs, lab scope usage and other DRBIII® functions.

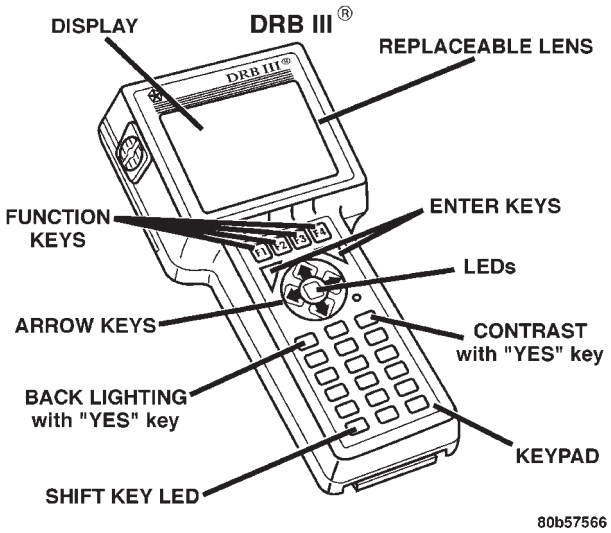
3.5.1 DRBIII® DOES NOT POWER UP

If the LEDs 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 at data link connector cavity 16. A minimum of 11.0 volts is required to adequately power the DRBIII®. Check for proper ground connection at data link connector cavities 4 and 5.

If all connections are proper between the DRBIII® and the vehicle or other devices, and the vehicle battery is fully charged, an inoperative DRBIII® may be the result of a faulty cable or vehicle wiring. For a blank screen, refer to the appropriate diagnostic 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: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS. FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.

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

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

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

When diagnosing a powertrain system problem, it is important to follow approved procedures where applicable. These procedures can be found in the service manual. 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 as an 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 DRBIII® MULTIMETER IS DANGEROUS. IT CAN EXPOSE YOU TO SERIOUS OR POSSIBLY FATAL INJURY. CAREFULLY READ AND UNDERSTAND THE CAUTIONS AND 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, tip 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 Measure 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 10 amp fuse or circuit breaker.
- Use the low current shunt to measure circuits up to 10 amps. Use the high current shunt to measure circuits exceeding 10 amps.
- 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.

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 hang the DRBIII® from the rear view mirror. Do not attempt to read the DRBIII® while driving. Have an assistant available to operate the DRBIII®.

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 circuit integrity at any control module, use the terminal side (not the wire end) of the harness connector. Do not probe through the insulation; this will damage it and eventually cause it to fail because of corrosion.

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

5.0 REQUIRED TOOLS AND EQUIPMENT

DRBIII® (diagnostic read-out box) scan tool
vacuum gauge
ammeter
ohmmeter
jumper wires and probes
oscilloscope

6.0 GLOSSARY OF TERMS

AAT	ambient air temp (sensor)
ABS	anti-lock brake system
A/C	air conditioning
APP	accelerator pedal position (sensor)
ASD	auto shutdown
backfire, popback	fuel ignites in either the intake or the exhaust system
BCM	body control module
BP	boost pressure (sensor)
CKP	crankshaft 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
detonation, spark knock	a mild to severe ping, especially under loaded engine conditions
ECM	engine control module
ECT	engine coolant temperature (sensor)
EGR	exhaust gas recirculation (solenoid/valve)
FCM	front control module
hard start	the engine takes longer than usual to start, even though it is able to crank at normal speed.
IAT	intake air temperature (sensor)
lack of power, sluggish	the engine power output has been reduced
MAF	mass air flow (sensor)
MIL	malfunction indicator lamp
ms	millisecond(s)
PDC	power distribution center
poor fuel economy	there is significantly less fuel mileage than other vehicles of the same design and configuration
runs rough/ unstable idle	the engine runs unevenly at idle causing the engine to shake if it is severe enough
S/C	speed control
SKIM	sentry key immobilizer module
SKIS	sentry key immobilizer system
start and stall	The engine starts but immediately dies (stalls)
surge	engine rpm fluctuation without corresponding change in accelerator pedal position
SRC	signal range check
TCM	transmission control module (EATX)
WIF	water in fuel (sensor)
VSS	vehicle speed sensor

7.0

DIAGNOSTIC INFORMATION AND PROCEDURES

Symptom List:

CAN C BUS PERFORMANCE (FCM) (DIESEL ONLY)
***CHECKING THE CAN C BUS CIRCUITS (DIESEL ONLY)**

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be CAN C BUS PERFORMANCE (FCM) (DIESEL ONLY).

When Monitored and Set Condition:

CAN C BUS PERFORMANCE (FCM) (DIESEL ONLY)

When Monitored: With the ignition on.

Set Condition: The Front Control Module has detected a fault in the CAN C Bus circuitry.

POSSIBLE CAUSES
CAN C BUS(+) SHORT TO CAN C BUS (-)
CAN C BUS (+) AND/OR CAN C BUS (-) CIRCUIT OPEN
CAN C BUS (+) AND/OR CAN C BUS (-) CIRCUIT SHORT TO GROUND
CAN C BUS (+) AND/OR CAN C BUS (-) CIRCUIT SHORT TO VOLTAGE
CAN C BUS (+) AND/OR CAN C BUS (-) CIRCUIT SHORT TO OTHER CIRCUITS
ABS - CAN BUS CIRCUIT
ECM - TERMINATING RESISTOR
FCM - TERMINATING RESISTOR

TEST	ACTION	APPLICABILITY
1	Turn the ignition off and wait 1 minute. Disconnect the FCM harness connector. Disconnect the ECM harness connectors. Disconnect the ABS harness connector. Measure the resistance of both the CAN C Bus (+) circuit and the CAN C Bus (-) circuit between the FCM harness connector and both the ECM harness connector and the ABS harness connector. Is the resistance above 5.0 ohms on either Bus circuit? Yes → Repair the CAN C Bus (+) and/or CAN C Bus (-) circuit for an open. Perform BODY VERIFICATION TEST - VER 1. No → Go To 2	All

CAN C BUS PERFORMANCE (FCM) (DIESEL ONLY) — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off and wait 1 minute. Gain access to the FCM harness connector. **NOTE: Ensure the ABS, FCM and ECM harness connectors are connected.** While backprobing, measure the resistance between ground and both the CAN C Bus (+) circuit and the CAN C Bus (-) circuit. Is the resistance below 5.0 ohms on either Bus circuit? Yes → Disconnect each module one at a time. Replace module that when disconnected the short to ground condition was eliminated. If the short to ground condition is still present with all the CAN modules disconnected, repair the circuit for a short to ground. Perform BODY VERIFICATION TEST - VER 1. No → Go To 3	All
3	Turn the ignition off and wait 1 minute. Gain access to the FCM harness connector. **NOTE: Ensure the ABS, FCM and ECM harness connectors are connected.** Turn the ignition on. While backprobing, measure the voltage between ground and both the CAN C Bus (+) circuit and the CAN C Bus (-) circuit. Is the voltage above 5.0 volts on either Bus circuit? Yes → Disconnect each module one at a time. Replace module that when disconnected the short to voltage condition was eliminated. If the short to voltage condition is still present with all the CAN modules disconnected, repair the ckt for a short to voltage. Perform BODY VERIFICATION TEST - VER 1. No → Go To 4	All
4	Turn the ignition off and wait 1 minute. Disconnect the ABS harness connector. Disconnect the ECM harness connectors. Disconnect the FCM harness connector. Measure the resistance between the CAN C Bus (+) circuit and the CAN C Bus (-) circuit. Is the resistance below 5.0 ohms? Yes → Repair the short between the CAN C Bus (+) circuit and the CAN C Bus (-) circuit. Perform BODY VERIFICATION TEST - VER 1. No → Go To 5	All
5	Turn the ignition off and wait 1 minute. Disconnect the FCM harness connector. Disconnect the ECM harness connectors. Disconnect the ABS harness connector. Measure the resistance of both the CAN C Bus (+) circuit and the CAN C Bus (-) circuit to all other circuits in each of the CAN C bus modules (ECM, ABS and FCM) Is the resistance below 5.0 ohms between any other circuit? Yes → Repair the CAN C Bus (+) and/or CAN C Bus (-) circuit for a short to other circuits. Perform BODY VERIFICATION TEST - VER 1. No → Go To 6	All

CAN C BUS PERFORMANCE (FCM) (DIESEL ONLY) — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off and wait 1 minute. Disconnect the ABS harness connector. **NOTE: Make sure both the ECM and the FCM harness connectors are connected before taking this measurement.** Measure the resistance between the CAN C Bus (+) circuit and the CAN C Bus (-) circuit in the ABS harness connector. Is the resistance 60.0 ohms, ± 3.0 ohms? Yes → Replace the ABS Control Module in accordance with the service information. Perform BODY VERIFICATION TEST - VER 1. No → Go To 7	All
7	Turn the ignition off and wait 1 minute. Disconnect the FCM harness connector. **NOTE: Make sure the ECM harness connectors are connected before taking this measurement.** Measure the resistance between the CAN C Bus (+) circuit and the CAN C Bus (-) circuit in the FCM harness connector. Is the resistance 120 ohms, ± 2.0 ohms? Yes → Replace the Front Control Module in accordance with the service information. Perform BODY VERIFICATION TEST - VER 1. No → Replace the Engine Control Module in accordance with the service information. Perform BODY VERIFICATION TEST - VER 1.	All

Symptom:
GATEWAY INTERNAL (FCM) (DIESEL ONLY)

When Monitored and Set Condition:

GATEWAY INTERNAL (FCM) (DIESEL ONLY)

When Monitored: With the ignition on.

Set Condition: The DTC will set if the FCM detects an internal failure.

POSSIBLE CAUSES
FCM INTERNAL FAILURE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, erase FCM DTC's. Turn the ignition off then turn the ignition on. With the DRB, read FCM DTC's. Did this DTC reset? Yes → Replace the Front Control Module in accordance with the service information. Perform BODY VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
J1850 BUS PERFORMANCE (FCM) (DIESEL ONLY)

When Monitored and Set Condition:

J1850 BUS PERFORMANCE (FCM) (DIESEL ONLY)

When Monitored: With the ignition in run, and the IOD fuse installed.

Set Condition: The FCM has detected a fault with the PCI Bus (J1850) circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: For this code to be active, the DRBIII® will not be able to communicate with any modules on the vehicle (except the ECM).** **NOTE: Clear the code. If this code continues to set and the DRBIII® can still communicate with the module, it will be necessary to replace the module.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, wiggle the wiring harnesses. This is to try and duplicate the complete bus failure condition. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform BODY VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
LOST COMMUNICATION WITH ABS (FCM) (DIESEL ONLY)

When Monitored and Set Condition:

LOST COMMUNICATION WITH ABS (FCM) (DIESEL ONLY)

When Monitored: With the ignition in run, and the IOD fuse installed.

Set Condition: The FCM does not receive any messages from the ABS.

POSSIBLE CAUSES
ATTEMPT TO COMMUNICATE WITH THE ABS
CHECK FOR ACTIVE DTC STATUS
CAN C BUS (+) CIRCUIT OPEN
CAN C BUS (-) CIRCUIT OPEN
ANTILOCK BRAKE MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, attempt to communicate with the ABS. Was the DRB able to I/D or communicate with the module? Yes → Go To 2 No → Refer to the Communication category for the related symptom(s). Perform ABS VERIFICATION TEST - VER 1.	All
2	With the DRB, erase DTC's. Start the engine and wait approximately 1 minute. With the DRB, read DTC's. Did this DTC reset? Yes → Go To 3 No → No problem found at this time. Using the wiring diagrams as a guide, visually check the CAN Bus circuits for chafed, pierced, pinched, and partially broken wires and the wiring harness connectors for proper connection. Repair as necessary. Perform ABS VERIFICATION TEST - VER 1.	All
3	Turn the ignition off and wait 1 minute. Disconnect the FCM harness connector. Disconnect the ABS harness connector. Measure the resistance of the CAN C Bus (+) circuit between the FCM harness connector and the ABS harness connector. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the CAN C Bus (+) circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All

LOST COMMUNICATION WITH ABS (FCM) (DIESEL ONLY) — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off and wait 1 minute. Disconnect the FCM harness connector. Disconnect the ABS harness connector. Measure the resistance of the CAN C Bus (-) circuit between the FCM harness connector and the ABS harness connector. Is the resistance below 5.0 ohms? Yes → Replace the Antilock Brake Module in accordance with the service information. Perform ABS VERIFICATION TEST - VER 1. No → Repair the CAN C Bus (-) circuit for an open. Perform ABS VERIFICATION TEST - VER 1.	All

Symptom:
LOST COMMUNICATION WITH BCM (FCM) (DIESEL ONLY)

When Monitored and Set Condition:

LOST COMMUNICATION WITH BCM (FCM) (DIESEL ONLY)

When Monitored: With the ignition in run, and the IOD fuse installed.

Set Condition: The FCM does not receive any messages from the Body Control Module (BCM).

POSSIBLE CAUSES
ATTEMPT TO COMMUNICATE WITH THE BODY CONTROL MODULE
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, attempt to communicate with the Body Control Module. Was the DRB able to I/D or communicate with the BCM? Yes → Go To 2 No → Refer to the Communication category for the related symptom(s). Perform BODY VERIFICATION TEST - VER 1.	All
2	With the DRB, erase DTC's. Turn the ignition on and wait approximately 1 minute. With the DRB, read DTC's. Did this DTC reset? Yes → Replace the Front Control Module in accordance with the service information. Perform BODY VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
LOST COMMUNICATION WITH CLUSTER (FCM) (DIESEL ONLY)

When Monitored and Set Condition:

LOST COMMUNICATION WITH CLUSTER (FCM) (DIESEL ONLY)

When Monitored: With the ignition in run, and the IOD fuse installed.

Set Condition: The FCM does not receive any messages from the Cluster.

POSSIBLE CAUSES
ATTEMPT TO COMMUNICATE WITH THE CLUSTER
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, attempt to communicate with the Cluster. Was the DRB able to I/D or communicate with the Cluster? Yes → Go To 2 No → Refer to the Communication category for the related symptom(s). Perform BODY VERIFICATION TEST - VER 1.	All
2	With the DRB, erase DTC's. Turn the ignition on and wait approximately 1 minute. With the DRB, read DTC's. Did this DTC reset? Yes → Replace the Front Control Module in accordance with the service information. Perform BODY VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:
LOST COMMUNICATION WITH ECM (FCM) (DIESEL ONLY)

When Monitored and Set Condition:

LOST COMMUNICATION WITH ECM (FCM) (DIESEL ONLY)

When Monitored: With the ignition in run, and the IOD fuse installed.

Set Condition: The FCM does not receive any messages from the ECM.

POSSIBLE CAUSES
ATTEMPT TO COMMUNICATE WITH THE ECM
CHECK FOR ACTIVE DTC STATUS
CAN C BUS (+) CIRCUIT OPEN
CAN C BUS (-) CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, attempt to communicate with the ECM. Was the DRB able to I/D or communicate with the module? Yes → Go To 2 No → Refer to the Communication category for the related symptom(s). Perform ROAD TEST VERIFICATION - VER-2.	All
2	With the DRB, erase DTC's. Start the engine and wait approximately 1 minute. With the DRB, read DTC's. Did this DTC reset? Yes → Go To 3 No → No problem found at this time. Using the wiring diagrams as a guide, visually check the CAN Bus circuits for chafed, pierced, pinched, and partially broken wires and the wiring harness connectors for proper connection. Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off and wait 1 minute. Disconnect the FCM harness connector. Disconnect the ECM C2 harness connector. Measure the resistance of the CAN C Bus (+) circuit between the FCM harness connector and the ECM harness connector. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the CAN C Bus (+) circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

LOST COMMUNICATION WITH ECM (FCM) (DIESEL ONLY) — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off and wait 1 minute. Disconnect the FCM harness connector. Disconnect the ECM C2 harness connector. Measure the resistance of the CAN C Bus (-) circuit between the FCM harness connector and the ECM harness connector. Is the resistance below 5.0 ohms? Yes → Replace the Engine Control Module in accordance with the service information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the CAN C Bus (-) circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:
LOST COMMUNICATION WITH SKREEM (FCM) (DIESEL ONLY)

When Monitored and Set Condition:

LOST COMMUNICATION WITH SKREEM (FCM) (DIESEL ONLY)

When Monitored: With the ignition in run, and the IOD fuse installed.

Set Condition: The FCM does not receive any messages from the SKREEM (SKIM).

POSSIBLE CAUSES
ATTEMPT TO COMMUNICATE WITH THE SKREEM (SKIM)
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, attempt to communicate with the SKREEM (SKIM). Was the DRB able to I/D or communicate with the module? Yes → Go To 2 No → Refer to the Communication category for the related symptom(s). Perform BODY VERIFICATION TEST - VER 1.	All
2	With the DRB, erase DTC's. Turn the ignition on and wait approximately 1 minute. With the DRB, read DTC's. Did this DTC reset? Yes → Replace the Front Control Module in accordance with the service information. Perform BODY VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:

LOST COMMUNICATION WITH TCM (FCM) (DIESEL ONLY)

When Monitored and Set Condition:

LOST COMMUNICATION WITH TCM (FCM) (DIESEL ONLY)

When Monitored: With the ignition in run, and the IOD fuse installed.

Set Condition: The FCM does not receive any messages from the Transmission Control Module (TCM).

POSSIBLE CAUSES
ATTEMPT TO COMMUNICATE WITH THE TRANSMISSION CONTROL MODULE
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, attempt to communicate with the Transmission Control Module. Was the DRB able to I/D or communicate with the TCM? Yes → Go To 2 No → Refer to the Communication category for the related symptom(s). Perform BODY VERIFICATION TEST - VER 1.	All
2	With the DRB, erase DTC's. Turn the ignition on and wait approximately 1 minute. With the DRB, read DTC's. Did this DTC reset? Yes → Replace the Front Control Module in accordance with the service information. Perform BODY VERIFICATION TEST - VER 1. No → Test Complete.	All

Symptom:

***NO RESPONSE FROM ECM (DIESEL ONLY)**

POSSIBLE CAUSES
CHECK ECM POWERS AND GROUNDS
FRONT CONTROL MODULE
SCI TRANSMIT CIRCUIT SHORTED TO VOLTAGE
TRANSMISSION CONTROL MODULE
ANTILOCK BRAKE MODULE
SCI TRANSMIT CIRCUIT SHORTED TO GROUND
SCI TRANSMIT CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Perform the symptom Checking ECM Power and Ground Circuits in the Driveability category. Did the vehicle pass this test? Yes → Go To 2 No → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All
2	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the DRB from the DLC. Measure the resistance between ground and the SCI Transmit circuit. Is the resistance below 5.0 ohms? Yes → Go To 3 No → Go To 6	All
3	Turn the ignition off. Disconnect the TCM harness connector (if equipped). **NOTE: If vehicle is not equipped with a TCM, answer yes to the question.** Measure the resistance between ground and the SCI Transmit circuit. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Replace the Transmission Control Module in accordance with the service information. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the FCM harness connector. Measure the resistance between ground and the SCI Transmit circuit. Is the resistance below 5.0 ohms? Yes → Go To 5 No → Replace the Front Control Module in accordance with the service information. Perform ROAD TEST VERIFICATION - VER-2.	All

*NO RESPONSE FROM ECM (DIESEL ONLY) — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Disconnect the Antilock Brake Module harness connector (if equipped). **NOTE: If vehicle is not equipped with antilock brakes, answer yes to the question.** Measure the resistance between ground and the SCI Transmit circuit. Is the resistance below 5.0 ohms? Yes → Repair the SCI Transmit circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the Antilock Brake Module in accordance with the service information. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the DRB from the DLC. Disconnect the ECM harness connectors. Disconnect the TCM harness connector (if equipped). Disconnect the Antilock Brake Module harness connector (if equipped). Turn the ignition on. Measure the voltage of the SCI Transmit circuit at the DLC (cav 7). Is the voltage above 1.0 volt? Yes → Repair the SCI Transmit circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 7	All
7	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the DRB from the DLC. Measure the resistance of the SCI Transmit circuit between the ECM connector and the DLC. Is the resistance below 5.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the SCI Transmit circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

***NO RESPONSE FROM FRONT CONTROL MODULE (DIESEL ONLY)**

POSSIBLE CAUSES
ATTEMPT TO COMMUNICATE WITH THE BCM AND ECM
GROUND CIRCUIT OPEN
FUSED ASD RELAY OUTPUT CIRCUIT OPEN
OPEN PCI BUS CIRCUIT
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, attempt to communicate with the BCM. With the DRBIII®, attempt to communicate with the ECM. Was the DRBIII® able to I/D or communicate with the BCM and the ECM? Yes → Go To 2 No → Refer to the symptom list for problems related to no communication with the BCM or the ECM. Perform BODY VERIFICATION TEST - VER 1.	All
2	Turn the ignition off. Disconnect the Front Control Module harness connector. Using a 12-volt test light connected to 12-volts, probe the ground circuit. Is the test light illuminated? Yes → Go To 3 No → Repair the ground circuit for an open. Perform BODY VERIFICATION TEST - VER 1.	All
3	Turn the ignition off. Disconnect the Front Control Module harness connector. Turn the ignition on. Using a 12-volt test light connected to ground, probe the Fused ASD Relay Output circuit. Is the test light illuminated? Yes → Go To 4 No → Repair the Fused ASD Relay Output circuit for an open. Perform BODY VERIFICATION TEST - VER 1.	All

*NO RESPONSE FROM FRONT CONTROL MODULE (DIESEL ONLY) — Continued

TEST	ACTION	APPLICABILITY
4	**Note: Ensure there is PCI Bus communication with other modules on the vehicle before proceeding. If not, refer to the symptom list from the menu and repair as necessary.** Disconnect the Front Control Module harness connector. Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes. Connect the scope input cable to the channel one connector on the DRB. Attach the red and black leads and the cable to probe adapter to the scope input cable. With the DRBIII® select Pep Module Tools. Select lab scope. Select Live Data. Select 12 volt square wave. Press F2 for Scope. Press F2 and use the down arrow to set voltage range to 20 volts. Press F2 again when complete. Connect the Black lead to the chassis ground. Connect the Red lead to the PCI Bus circuit in the FCM connector. Turn the ignition on. Observe the voltage display on the DRB Lab Scope. Does the voltage pulse from 0 to approximately 7.5 volts? Yes → Replace the Front Control Module in accordance with the Service Information. Perform BODY VERIFICATION TEST - VER 1. No → Repair the PCI Bus circuit for an open. Perform BODY VERIFICATION TEST - VER 1.	All

Symptom:

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

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

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

*NO RESPONSE FROM SENTRY KEY IMMOBILIZER MODULE — Continued

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

Symptom:

***NO RESPONSE FROM TRANSMISSION CONTROL MODULE (DIESEL ONLY)**

POSSIBLE CAUSES
NO RESPONSE FROM TRANSMISSION CONTROL MODULE
FUSED IGNITION SWITCH OUTPUT (RUN/ST) CIRCUIT OPEN
FUSED IGNITION SWITCH OUTPUT (START) CIRCUIT OPEN
FUSED IGNITION SWITCH OUTPUT (START) CIRCUIT SHORT
FUSED B(+) CIRCUIT OPEN
GROUND CIRCUIT(S) OPEN
OPEN PCI BUS CIRCUIT
TRANSMISSION CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Ignition on, engine not running. **Note: As soon as one or more module communicates with the DRB, answer the question.** With the DRB, attempt to communicate with the Airbag Control Module. With the DRB, attempt to communicate with the Instrument Cluster. Was the DRB able to I/D or establish communications with either of the modules? Yes → Go To 2 No → Refer to the Body Communication category and perform the symptom PCI Bus Communication Failure. Perform 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.	All
2	Turn the ignition off to the lock position. Disconnect the TCM harness connector. Ignition on, engine not running. Using a 12-volt test light connected to ground, check the Fused Ignition Switch Output (Run/St) circuit. **NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.** Does the test light illuminate brightly? Yes → Go To 3 No → Repair the Fused Ignition Switch Output (Run/St) circuit for an open. Refer to the wiring diagrams location in the Service Information. Perform 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.	All

*NO RESPONSE FROM TRANSMISSION CONTROL MODULE (DIESEL ONLY) — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off to the lock position. Disconnect the TCM harness connector. Remove the starter relay from the PDC. Using a 12-volt test light connected to ground, check the Fused Ignition Switch Output (Start) circuit. **NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.** Observe the test light while momentarily turning the ignition switch to the Start position. Does the test light illuminate brightly? Yes → Go To 4 No → Repair the Fused Ignition Switch Output (Start) circuit for an open. Refer to the wiring diagrams located in the Service Information. Perform 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.	All
4	Turn the ignition off to the lock position. Disconnect the TCM harness connector. With a voltmeter in the millivolt scale, measure the voltage of the Fused Ignition Switch Output (Start) circuit. **NOTE: A no response condition can exist if voltage is present on this circuit with the ignition switch in any position except for the Start position.** **NOTE: Voltage up to .080 millivolts can cause this condition.** **NOTE: Check for after market components that could cause this condition.** Perform this step with the Ignition Switch in every position except for the Start position. Is any voltage present? Yes → Repair the Fused Ignition Switch Output (Start) circuit for a short to voltage. Refer to the wiring diagrams located in the Service Information. Perform 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1. No → Go To 5 **Note: Reinstall the original Starter Relay.**	All
5	Turn the ignition off. Disconnect the TCM harness connector. Using a 12-volt test light connected to ground, check the Fused B(+) circuit. **NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.** Does the test light illuminate brightly? Yes → Go To 6 No → Repair the Fused B(+) circuit for an open. Refer to the wiring diagrams located in the Service Information. Perform 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.	All

*NO RESPONSE FROM TRANSMISSION CONTROL MODULE (DIESEL ONLY) — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off to the lock position. Disconnect the TCM harness connector. Using a 12-volt test light connected to 12-volts, check each ground circuit in the TCM harness connector. **NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.** Does the test light illuminate brightly at all the ground circuits? Yes → Go To 7 No → Repair the Ground circuit(s) for an open. Check the main ground connection to engine block and/or chassis. Refer to the wiring diagrams located in the Service Information. Perform 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.	All
7	**Note: Ensure there is PCI Bus communication with other modules on the vehicle before proceeding. If not, refer to the symptom list from the menu and repair as necessary.** Disconnect the TCM harness connector. Use Scope input cable CH7058, Cable to Probe adapter CH7062, and the red and black test probes. Connect the scope input cable to the channel one connector on the DRB. Attach the red and black leads and the cable to probe adapter to the scope input cable. With the DRBIII® select Pep Module Tools. Select lab scope. Select Live Data. Select 12 volt square wave. Press F2 for Scope. Press F2 and use the down arrow to set voltage range to 20 volts. Press F2 again when complete. Connect the Black lead to the chassis ground. Connect the Red lead to the PCI Bus circuit in the TCM connector. Turn the ignition on. Observe the voltage display on the DRB Lab Scope. Does the voltage pulse from 0 to approximately 7.5 volts? Yes → Replace the Transmission Control Module in accordance with the service information. Perform 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1. No → Repair the PCI Bus circuit for an open. Perform 45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1.	All

Symptom:
*PCI BUS COMMUNICATION FAILURE

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

TEST	ACTION	APPLICABILITY
1	**Note: Determine which modules this vehicle is equipped with before beginning.** **Note: When attempting to communicate with any of the modules on this vehicle, the DRB will display 1 of 2 different communication errors: a NO RESPONSE message or a BUS +/- SIGNALS OPEN message.** Turn the ignition on. Using the DRB, attempt to communicate with the following control modules: Airbag Control Module Body Control Module MIC (INSTRUMENT CLUSTER) Was the DRBIII® able to communicate with one or more Module(s)? Yes → Go To 2 No → Go To 3	All
2	Turn the 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: If the DRB can not communicate with a single module, refer to the category list for the related symptom.** Were any problems found? Yes → Repair wiring harness/connectors as necessary. Perform BODY VERIFICATION TEST - VER 1. No → Test Complete.	All
3	Turn the ignition off. Disconnect the BCM C1 harness connector. Disconnect the DRB from the Data Link Connector (DLC). Disconnect the negative battery cable. Measure the resistance of the PCI Bus circuit between the Data Link Connector (DLC) and the BCM harness connector. Is the resistance below 5.0 ohms? Yes → Go To 4 No → Repair the PCI Bus circuit for an open. Perform BODY VERIFICATION TEST - VER 1.	All

*PCI BUS COMMUNICATION FAILURE — Continued

TEST	ACTION	APPLICABILITY
4	**NOTE: Reconnect the BCM harness connector and the negative battery cable.** Turn the ignition on. Measure the voltage of the PCI Bus circuit at the Data Link Connector (DLC). Is the voltage above 7.0 volts? Yes → Go To 5 No → Go To 6	All
5	Turn the ignition off. Using a voltmeter, connect one end to the PCI Bus circuit at the DLC, and the other end to ground. **Note: When performing the next step turn the ignition off (wait one minute) before disconnecting any module. When the module is disconnected turn the ignition on to check for a short to voltage.** Turn the ignition on. While monitoring the voltmeter, disconnect each module the vehicle is equipped with one at a time. Is the voltage steadily above 7.0 volts with all the modules disconnected? Yes → Repair the PCI Bus circuit for a short to voltage. Perform BODY VERIFICATION TEST - VER 1. No → Replace the module that when disconnected the short to voltage was eliminated. Perform BODY VERIFICATION TEST - VER 1.	All
6	Turn the ignition off. Disconnect the negative battery cable. Using a ohmmeter, connect one end to the PCI Bus circuit at the DLC, and the other end to ground. While monitoring the ohmmeter, disconnect each module the vehicle is equipped with one at a time. **NOTE: Total bus resistance to ground thru all of the modules is typically between 350 to 1000 ohms. The more modules on the bus, the lower the total bus resistance will be.** Is the resistance below 150.0 ohms with all the modules disconnected? Yes → Repair the PCI Bus circuit for a short to ground. Perform BODY VERIFICATION TEST - VER 1. No → Replace the module that when disconnected the short to ground was eliminated. Perform BODY VERIFICATION TEST - VER 1.	All

Symptom:
B10B3-VISCOUS/CABIN HEATER CONTROL SHORT CIRCUIT

POSSIBLE CAUSES
INTERMITTENT CONDITION
VISCOUS/CABIN HEATER RELAY
VISCOUS/CABIN HEATER RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, actuate the Viscous/Cabin Heater Relay. Does the relay cycle on and off during the actuation? Yes → Go To 2 No → Go To 3	All
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Install a substitute relay in place of the Viscous/Cabin Heater Relay. Turn the ignition on. With the DRB, actuate the Viscous/Cabin Heater Relay. Does the relay cycle on and off during the actuation? Yes → Replace the Viscous/Cabin Heater Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All

B10B3-VISCOUS/CABIN HEATER CONTROL SHORT CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the ECM harness connectors. Remove the Viscous/Cabin Heater Relay from the PDC. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Viscous/Cabin Heater Relay Control circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Viscous/Cabin Heater Relay Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

B10B3-VISCOUS/CABIN HEATER RELAY CONTROL OPEN CIRCUIT

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
VISCOUS/CABIN HEATER RLY
VISCOUS/CABIN HEATER RELAY CONTROL CIRCUIT SHORTED TO GROUND
VISCOUS/CABIN HEATER RELAY CONTROL CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, actuate the Viscous/Cabin Heater Relay. Does the relay cycle on and off during the actuation? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Remove the Viscous/Cabin Heater Relay from the PDC. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit. Did the test light illuminate brightly? Yes → Go To 3 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Install a substitute relay in place of the Viscous/Cabin Heater Relay Turn the ignition on. With the DRB, actuate the Viscous/Cabin Heater Relay. Does the relay cycle on and off during the actuation? Yes → Replace the Viscous/Cabin Heater Relay Fan Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All

B10B3-VISCOUS/CABIN HEATER RELAY CONTROL OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Remove the Viscous/Cabin Heater Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance between ground and the Viscous/Cabin Heater Relay Control circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the Viscous/Cabin Heater Relay Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Remove the Viscous/Cabin Heater Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance of the Viscous/Cabin Heater Relay Control circuit. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Viscous/Cabin Heater Relay Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0045-BOOST PRESSURE SOLENOID EXCESSIVE CURRENT
P0048-BOOST PRESSURE SOLENOID SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0045-BOOST PRESSURE SOLENOID EXCESSIVE CURRENT.

When Monitored and Set Condition:

P0045-BOOST PRESSURE SOLENOID EXCESSIVE CURRENT

When Monitored: With the ignition on and the ECM Boost Pressure Solenoid command on.

Set Condition: The ECM detects excessive current on the Boost Pressure Solenoid Control circuit.

P0048-BOOST PRESSURE SOLENOID SHORT CIRCUIT

When Monitored: With the ignition on and the ECM Boost Pressure Solenoid command on.

Set Condition: The ECM detects excessive current on the Boost Pressure Solenoid Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
BOOST PRESSURE SOLENOID
BP SOLENOID CONTROL SHORTED TO VOLTAGE
ENGINE CONTROL MODULE - INTERNAL SHORT TO VOLTAGE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 4	All

P0045-BOOST PRESSURE SOLENOID EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the BP Solenoid harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the BP Solenoid Control circuit. Is the voltage below 1.0 volt? Yes → Go To 3 No → Repair the BP Solenoid Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect the BP Solenoid harness connector. Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs. Does the DRB display P0045 BOOST PRESSURE SOLENOID OPEN CIRCUIT? Yes → Replace the Boost Pressure Solenoid. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
4	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0045-BOOST PRESSURE SOLENOID OPEN CIRCUIT
P0047-BOOST PRESSURE SOLENOID SHORT TO GROUND

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0045-BOOST PRESSURE SOLENOID OPEN CIRCUIT.

When Monitored and Set Condition:

P0045-BOOST PRESSURE SOLENOID OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Boost Pressure Solenoid command off.

Set Condition: The ECM does not detect voltage on the Boost Pressure Solenoid Control circuit.

P0047-BOOST PRESSURE SOLENOID SHORT TO GROUND

When Monitored: With the ignition on and the ECM Boost Pressure Solenoid command off.

Set Condition: The ECM does not detect voltage on the Boost Pressure Solenoid Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
BP SOLENOID CONTROL CIRCUIT SHORTED TO GROUND
BP SOLENOID CONTROL CIRCUIT OPEN
BOOST PRESSURE SOLENOID
ENGINE CONTROL MODULE

P0045-BOOST PRESSURE SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 7	All
2	**NOTE: An open ASD power supply to the ECM will cause multiple DTC's including this DTC to set.** **NOTE: Check the ECM for other DTC's. If other DTC's are set with this DTC refer to the symptom list and perform the CHECKING THE ECM POWER AND GROUND CIRCUITS test before continuing.** If the ECM power and ground circuits are functioning properly continue with this test. Yes → Go To 3	All
3	Turn the ignition off. Disconnect the BP Solenoid harness connector. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit at the BP Solenoid harness connector. Does the test light illuminate brightly? Yes → Go To 4 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the BP Solenoid harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the BP Solenoid Control circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the BP Solenoid Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the BP Solenoid harness connector. Disconnect the ECM harness connectors. Measure the resistance of the BP Solenoid Control circuit. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the BP Solenoid Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0045-BOOST PRESSURE SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Install a substitute BP Solenoid in place of the vehicle's BP Solenoid. **NOTE: Ensure the ECM and BP Solenoid harness connectors are connected.** Turn the ignition on. With the DRB, check for this DTC to set again. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the Boost Pressure Solenoid. Perform ROAD TEST VERIFICATION - VER-2.	All
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time.The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Ambient Air Temperature Sensor signal is above 4.82 volts.

POSSIBLE CAUSES
INTERMITTENT CONDITION
AMBIENT AIR TEMP SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
AMBIENT AIR TEMP SENSOR GROUND CIRCUIT OPEN
AMBIENT AIR TEMP SENSOR SIGNAL CIRCUIT OPEN
AMBIENT TEMPERATURE SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off for 10 seconds. Turn the ignition on. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the Ambient Air Temperature Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Ambient Air Temperature Sensor Signal circuit. Is the voltage below 1.0 volt? Yes → Go To 3 No → Repair the Ambient Air Temperature Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. **NOTE: Remove the jumper wire.**	All
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Ambient Air Temperature Sensor harness connector. Measure the resistance of the Ambient Air Temperature Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 4 No → Repair the Ambient Air Temperature Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Ambient Temperature Sensor harness connector. Connect a jumper wire between the Ambient Temperature Sensor Signal and Sensor Ground circuits in the Ambient Temperature Sensor harness connector. Turn the ignition on. Monitor the DRB for ECM DTCs. Does the DRB display P0070 AMB TEMP. SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW? Yes → Replace the Ambient Temperature Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Disconnect the Ambient temperature Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit between the ECM harness connector and the Ambient Temperature Sensor harness connector. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Ambient Air Temperature Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Ambient Air Temperature Sensor signal is below 0.068 volt.

POSSIBLE CAUSES
INTERMITTENT CONDITION
AMBIENT AIR TEMP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
AMBIENT AIR TEMP SENSOR SIGNAL CIRCUIT SHORTED TO SENSOR GROUND
AMBINET TEMPERATURE SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs for at least 2 minutes. Did this DTC set again? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. Disconnect the Ambient Temperature Sensor harness connector. Turn the ignition on. Monitor the DRB for ECM DTCs for at least 2 minutes. Does the DRB display P0070 AMB TEMP SENSOR SIGNAL VOLTAGE TOO HIGH? Yes → Replace the Ambient Temperature Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0070-AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Ambient Air Temperature Sensor harness connector. Measure the resistance between ground and the Ambient Air Temperature Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Ambient Air Temperature Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Ambient Air temperature Sensor harness connector. Measure the resistance between the Ambient Air Temperature Sensor Signal circuit and the Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Ambient Air Temperature Sensor Signal circuit for a short to the Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW
P0088-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO HIGH
P0089-FUEL PRESSURE SOLENOID AFTER-RUN PLAUSIBILITY
P1143-FUEL RAIL PRESSURE MALFUNCTION POSITIVE PRESSURE DEVIATION
P1144-FUEL RAIL PRESSURE MALFUNCTION POSITIVE VOLUME DEVIATION
P1145-FUEL RAIL PRESSURE MALFUNCTION NEGATIVE PRESSURE DEVIATION
P1148-FUEL RAIL PRESSURE MALFUNCTION PRESSURE DROP IN OVERRUN
P1151-FUEL RAIL PRESSURE MALFUNCTION MAXIMUM POSITIVE DEVIATION
P1152-FUEL RAIL PRESSURE MALFUNCTION POSITIVE DEV FUEL PRESS SOL SETPOINT
P1153-FUEL RAIL PRESSURE MALFUNCTION NEGATIVE DEV FUEL PRESS SOL SETPOINT
P1154-FUEL RAIL PRESSURE MALFUNCTION RAIL PRESSURE IS TOO LOW
P1155-FUEL RAIL PRESSURE MALFUNCTION RAIL PRESSURE IS TOO HIGH
P1156-FUEL RAIL PRESSURE MALFUNCTION PLAUSIBILITY

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW.

When Monitored and Set Condition:

P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW

When Monitored: With the engine running.

Set Condition: The ECM determines that the fuel rail pressure is too low for a given engine speed.

P0088-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The fuel rail pressure sensor indicates fuel pressure above 23,000 PSI with the engine running.

P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW — Continued

P0089-FUEL PRESSURE SOLENOID AFTER-RUN PLAUSIBILITY

When Monitored: With the engine running.

Set Condition: The ECM determines that the fuel rail pressure is too low for a given engine speed.

P1155-FUEL RAIL PRESSURE MALFUNCTION RAIL PRESSURE IS TOO HIGH

When Monitored: With the engine running.

Set Condition: Fuel rail pressure exceeds 1700 bar.

POSSIBLE CAUSES
AIR IN FUEL SYSTEM
CHECKING FOR OTHER DTC'S
CHECKING THE FUEL DELIVERY SYSTEM
CHECKING THE FUEL DELIVERY SYSTEM
FUEL INJECTOR(S)
FUEL PRESSURE SOLENOID
FUEL PRESSURE SOLENOID
FUEL PRESSURE SOLENOID
FUEL PUMP
FUEL PUMP
FUEL SYSTEM CONTAMINATION
FUEL SYSTEM LEAK
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS.** **WARNING: FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.** Turn the ignition on. With the DRBIII®, read the ECM DTCs. Are there any other DTCs present? Yes → Refer to symptom list for problems related to the DTC other than this DTC. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All

P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
2	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB III® at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: Refer to the Service Information and perform the Air Bleed Procedure before continuing diagnosis.** Turn the ignition on. With the DRBIII®, erase the ECM DTCs. **NOTE: Driving the vehicle up and down steep hills or rapid cornering with a low fuel level can cause this DTC to set. Verify with customer if Low Fuel Light was illuminated when fault occurred.** Test drive the vehicle under various load and speed conditions to attempt to duplicate the fault. With the DRBIII®, read the ECM DTCs. Does the DRBIII® display this DTC? Yes → Go To 3 No → Go To 14	All
3	Turn the ignition off. **WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS.** **WARNING: FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.** Inspect the entire fuel system for leakage. Is there any evidence of leakage? Yes → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All

P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
4	**NOTE: Mixing any other fuels such as gasoline or kerosine can cause this DTC to set.** Turn the ignition off. **WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS.** **WARNING: FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.** Inspect the fuel system for contamination. Is the fuel contaminated? Yes → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Attempt to start the engine. Does the engine start and idle? Yes → Go To 6 No → Go To 11	All
6	Start the engine. With the DRBIII® in Sensors, compare the Fuel Pressure Setpoint with the Actual Fuel Pressure readings. **NOTE: If there is air in the fuel system, the Actual Fuel Pressure will oscillate above and below the Fuel Pressure Setpoint.** Does Actual Fuel Pressure oscillate above and below the Fuel Pressure Setpoint? Yes → Refer to the Service Information to purge air from the fuel system. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 7	All
7	Start the engine. With the DRBIII® in Sensors, compare the Fuel Pressure Setpoint with the Actual Fuel Pressure readings. **NOTE: A sticking Fuel Pressure Solenoid is indicated by Actual Fuel Pressure gradually dropping below the Fuel Pressure Setpoint then suddenly increasing (spiking) above the Fuel Pressure Setpoint.** Does Actual Fuel Pressure gradually decrease then suddenly increase (spike) above the Fuel Pressure Yes → Replace the Fuel Pressure Solenoid in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 8	All

P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
8	Refer to the appropriate Service Information and refer to Diagnosis and Testing Fuel Delivery System table. **NOTE: The following is a list of problems that can cause fuel pressure to deviate from specification: restricted fuel filter or fuel lines, failed fuel pressure solenoid, air in fuel system, failed fuel sending unit, contaminated fuel, faulty injector.** Were there any problems with the Fuel Delivery System? Yes → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 9	All
9	**NOTE: An injector that sticks open can cause this DTC. A sticking injector will cause the engine to missfire and emit excessive black smoke from the exhaust system.** Start and idle the engine. Does the engine exhibit the symptoms described in the above note? Yes → Using the Service Information, remove and inspect the Fuel Injectors for signs of damage or debris that may cause the injector to stick. Sticking injectors may cause the combustion chamber to become black and oil soaked. Replace Injector(s) as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 10	All
10	Turn the ignition off. Replace the Fuel Pressure Solenoid in accordance with the Service Information. Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Attempt to start and test drive the vehicle. With the DRBIII®, read the ECM DTCs. Does the ECM display this DTC? Yes → Replace the Fuel Pump in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
11	Refer to the appropriate Service Information and refer to Diagnosis and Testing Fuel Delivery System table. **NOTE: The following is a list of problems that can cause fuel pressure to deviate from specification: restricted fuel filter or fuel lines, failed fuel pressure solenoid, air in fuel system, failed fuel sending unit, contaminated fuel, faulty injector.** Were there any problems with the Fuel Delivery System? Yes → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 12	All

P0087-FUEL RAIL PRESSURE MALFUNCTION PRESSURE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
12	Turn the ignition off. Replace the Fuel Pressure Solenoid in accordance with the Service Information. Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Attempt to start and test drive the vehicle. With the DRBIII®, read the ECM DTCs. Does the ECM display this DTC? Yes → Go To 13 No → Test Complete.	All
13	Turn the ignition off. Replace the Fuel Quantity Solenoid in accordance with the Service Information. Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Attempt to start and test drive the vehicle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace the Fuel Pump in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
14	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB III® parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0090-FUEL QUANTITY SOLENOID OPEN CIRCUIT
P0091-FUEL QUANTITY SOLENOID SHORT TO GROUND
P0092-FUEL QUANTITY SOLENOID SHORT CIRCUIT
P0251-FUEL QUANTITY SOLENOID OPEN OR SHORT CIRCUIT
P0252-FUEL QUANTITY SOLENOIDCIRCUIT MALFUNCTION
P0253-FUEL QUANTITY SOLENOID SHORT TO GROUND
P0254-FUEL QUANTITY SOLENOID SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0090-FUEL QUANTITY SOLENOID OPEN CIRCUIT.

When Monitored and Set Condition:

P0090-FUEL QUANTITY SOLENOID OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Fuel Quantity Solenoid command off.

Set Condition: The ECM detects an open in the Fuel Quantity Solenoid circuit.

P0091-FUEL QUANTITY SOLENOID SHORT TO GROUND

When Monitored: With the ignition on and the ECM Fuel Quantity Solenoid command off.

Set Condition: The ECM detects a short to ground in the Fuel Quantity Solenoid circuit.

P0092-FUEL QUANTITY SOLENOID SHORT CIRCUIT

When Monitored: With the engine running and the ECM Fuel Quantity Solenoid command on.

Set Condition: The ECM detects excessive current on the Fuel Quantity Solenoid Control circuit.

P0251-FUEL QUANTITY SOLENOID OPEN OR SHORT CIRCUIT

When Monitored: With the ignition on.

Set Condition: The ECM detects an open or short in the Fuel Quantity Solenoid circuit(s).

P0252-FUEL QUANTITY SOLENOIDCIRCUIT MALFUNCTION

When Monitored: With the engine running.

Set Condition: The ECM detects a malfunction with the Fuel Quantity Solenoid.

P0253-FUEL QUANTITY SOLENOID SHORT TO GROUND

When Monitored: With the ignition on.

Set Condition: The ECM detects a short to ground in the Fuel Quantity Solenoid circuit(s).

P0090-FUEL QUANTITY SOLENOID OPEN CIRCUIT — Continued

P0254-FUEL QUANTITY SOLENOID SHORT CIRCUIT

When Monitored: With the ignition on.

Set Condition: The ECM detects a short in the Fuel Quantity Solenoid circuit(s).

POSSIBLE CAUSES
FUEL QUANTITY SOLENOID CIRCUIT(S) SHORTED TO GROUND
FUEL QUANTITY SOLENOID CIRCUIT(S) SHORTED TO VOLTAGE
FUEL QUANTITY SOLENOID CIRCUIT(S) SHORTED TOGETHER
FUEL QUANTITY SOLENOID OPEN CIRCUIT(S)
INTERMITTENT CONDITION
FUEL QUANTITY SOLENOID
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 8	All
2	**NOTE: An open ASD power supply to the ECM will cause multiple DTC's including this DTC to set.** **NOTE: Check the ECM for other DTC's. If other DTC's are set with this DTC refer to the symptom list and perform the CHECKING THE ECM POWER AND GROUND CIRCUITS test before continuing.** If the ECM power and ground circuits are functioning properly continue with this test. Yes → Go To 3	All
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Quantity Solenoid harness connector. Measure the resistance of each of the Fuel Quantity Solenoid circuits between the ECM harness connector and the Fuel Quantity Solenoid harness connector. Is the resistance below 10.0 ohms for each measurement? Yes → Go To 4 No → Repair the circuit(s) that measured above 10.0 ohms for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0090-FUEL QUANTITY SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Quantity Solenoid harness connector. Measure the resistance between ground and each of the Fuel Quantity Solenoid circuits. Is the resistance above 1000 ohms for each measurement? Yes → Go To 5 No → Repair the circuit(s) that measured below 1000 ohms for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Quantity Solenoid harness connector. Measure the resistance between the Fuel Quantity Solenoid circuits. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the Fuel Quantity Solenoid circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Quantity Solenoid harness connector. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage each of the Fuel Quantity Solenoid circuits. Is the voltage below 1.0 volt for each measurement? Yes → Go To 7 No → Repair the circuit(s) that measured above 1.0 volts for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

P0090-FUEL QUANTITY SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
7	Turn the ignition off. Disconnect the Fuel Quantity Solenoid harness connector. Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs. **NOTE: The DRB should display P0090-FUEL QUANTITY SOLENOID OPEN CIRCUIT.** Turn the ignition off. Connect a jumper wire between cavity 1 and cavity 2 of the Fuel Quantity Solenoid harness connector. Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs. **NOTE: The DRB should display P0092-FUEL QUANTITY SOLENOID SHORT CIRCUIT.** Does the DRB display the appropriate DTC for each condition? Yes → Replace the Fuel Quantity Solenoid in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
8	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0100-MAF SENSOR SIGNAL VOLTAGE TOO HIGH
P0100-MAF SENSOR SIGNAL VOLTAGE TOO LOW

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0100-MAF SENSOR SIGNAL VOLTAGE TOO HIGH.

When Monitored and Set Condition:

P0100-MAF SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored: Engine speed is between 500 and 5000 rpm.

Set Condition: The Mass Air Flow Sensor signal is above 800 kg/h for 0.5 seconds.

P0100-MAF SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored: Engine speed is between 500 and 5000 rpm.

Set Condition: The Mass Air Flow Sensor signal is below 15 kg/h for 0.5 seconds.

POSSIBLE CAUSES
ASD RELAY OUTPUT CIRCUIT OPEN
ECM - 5-VOLT SUPPLY CIRCUIT
MAF SENSOR GROUND OPEN
MASS AIRFLOW SENSOR
INTERMITTENT CONDITION
MAF SENSOR 5 VOLT SUPPLY CIRCUIT OPEN
MAF SENSOR SIGNAL CIRCUIT OPEN
MAF SENSOR 5 VOLT SUPPLY CIRCUIT SHORTED TO THE MAF SENSOR GROUND CIRCUIT
MAF SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
ECM SENSOR GROUND CIRCUIT OPEN
MAF SENSOR 5 VOLT SUPPLY CIRCUIT SHORTED TO GROUND
MAF SENSOR SIGNAL CIRCUIT SHORTED TO THE MAF SENSOR GROUND CIRCUIT
MAF SENSOR 5 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE
MAF SENSOR CIRCUIT SHORTED TO VOLTAGE
ECM - MAF SENSOR SIGNAL CIRCUIT

P0100-MAF SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **NOTE: Inspect the turbocharger inlet tube between the MAF Sensor and the turbocharger for damage, restriction or poor connection. Any of these conditions can cause a MAF Plausibility DTC.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Test drive the vehicle. With the DRBIII®, read the ECM DTCs. Does the DRB III display a Mass Air Flow Sensor DTC? Yes → Go To 2 No → Go To 15	All
2	**NOTE: A malfunctioning EGR system can cause this DTC to set. Refer to symptom Checking the EGR System in the Driveability category to check EGR system operation.** Turn the ignition off. Disconnect the MAF Sensor harness connector. Turn the ignition on. Measure the voltage of the MAF Sensor 5 Volt Supply circuit in MAF Sensor harness connector. Is the voltage between 4.8 and 5.2 volts? Yes → Go To 3 No → Go To 11	All
3	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the MAF Sensor Signal circuit. Is the voltage above 1.0 volt? Yes → Repair the MAF Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the MAF Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the MAF Sensor Signal circuit for an open Perform ROAD TEST VERIFICATION - VER-2.	All

P0100-MAF SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the MAF Sensor Signal circuit. Is the resistance below 1000 ohms? Yes → Repair the MAF Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All
6	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the MAF Sensor Signal circuit and the MAF Sensor Ground circuit at of the MAF Sensor harness connector. Is the resistance below 1000 ohms? Yes → Repair the MAF Sensor Signal for a short to MAF Sensor Ground . Perform ROAD TEST VERIFICATION - VER-2. No → Go To 7	All
7	Turn the ignition off. Disconnect the MAF Sensor harness connector. Connect a jumper wire between MAF Sensor Signal circuit and the 5-volt supply circuit at the MAF Sensor harness connector . Turn the ignition on. With the DRBIII, read the MAF VOLTS. Does the DRBIII display between 4.0 and 5.5 volts? Yes → Go To 8 No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
8	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the MAF Sensor Ground circuit between the MAF Sensor and the ECM. Is the resistance below 10.0 ohms? Yes → Go To 9 No → Repair the MAF Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
9	Turn the ignition off. Disconnect the MAF Sensor harness connector. Turn the ignition on. Measure the voltage between the 5-volt Supply circuit and the MAF Sensor Ground circuit at the MAF Sensor harness connector. Is the voltage above 4.5 volts? Yes → Go To 10 No → Replace and program the ECM in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0100-MAF SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
10	Turn the ignition off. Disconnect the MAF Sensor harness connector. Turn the ignition on. With the DRBIII®, actuate the ASD Relay. Measure the voltage of the 12-volt Supply circuit at the MAF Sensor harness connector Is the voltage above 10.0 volts? Yes → Replace the MAF Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
11	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the MAF Sensor 5 Volt Supply circuit. Is the resistance below 10.0 ohms? Yes → Go To 12 No → Repair the MAF Sensor 5 Volt Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
12	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the MAF Sensor 5 Volt Supply circuit and the MAF Sensor Ground circuit at the MAF Sensor harness connector. Is the resistance above 1000 ohms? Yes → Go To 13 No → Repair the MAF Sensor 5 Volt Supply circuit for a short to the MAF Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
13	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the MAF Sensor 5 Volt Supply circuit at the MAF harness connector. Is the resistance below 1000 ohms? Yes → Repair the MAF Sensor 5 Volt Supply circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 14	All

P0100-MAF SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
14	Turn the ignition off. Disconnect the MAF Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the MAF Sensor 5 Volt Supply circuit in the ECM harness connector. Is the voltage above 1.0 volt? Yes → Repair the MAF Sensor 5 Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
15	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0101-MAF SENSOR SIGNAL NEGATIVE DEVIATION
P0101-MAF SENSOR SIGNAL POSITIVE DEVIATION

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0101-MAF SENSOR SIGNAL NEGATIVE DEVIATION.

When Monitored and Set Condition:

P0101-MAF SENSOR SIGNAL NEGATIVE DEVIATION

When Monitored: Engine temperature between 59.9°C and 99.9°C. Intake Air Temperature reading is steady. Atmospheric pressure below 1500 hpa. Boost pressure is between 750 hpa and 2400 hpa.

Set Condition: The MAF Sensor reading is below the calibrated map value for more than 2.0 seconds.

P0101-MAF SENSOR SIGNAL POSITIVE DEVIATION

When Monitored: Engine temperature between 59.9°C and 99.9°C. Intake Air Temperature reading is steady. Atmospheric pressure below 1500 hpa. Boost pressure is between 750 hpa and 2400 hpa.

Set Condition: The MAF Sensor reading is above the calibrated map value for more than 2.0 seconds.

POSSIBLE CAUSES
AIR FILTER
AIR RESTRICTION
CHECKING FOR AIR LEAKS
MASS AIRFLOW SENSOR
INTERMITTENT CONDITION

P0101-MAF SENSOR SIGNAL NEGATIVE DEVIATION — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **NOTE: Inspect all air intake and turbocharger related tubes for damage, restriction or poor connection. Any of these conditions can cause a this DTC to set.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Test drive the vehicle. With the DRBIII®, read the ECM DTCs. Does the DRB III display a Mass Air Flow Sensor DTC? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. Remove and inspect the Air Filter for soiling or excessive dirt and debris which may cause air flow restriction. Were any of these problems found? Yes → Replace the Air Filter element. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	**NOTE: Inspect all air intake and turbocharger related tubes for damage, restriction or poor connection. Any of these conditions can cause a this DTC to set.** **NOTE: Inspect the exhaust system and related tubes for damage, restriction or poor connection. Any of these conditions can cause a this DTC to set.** Turn the ignition off. Inspect the intake system, exhaust system and related tubes and connections. Were any problems found? Yes → Repair or replace as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Remove the Inlet Pressure Sensor. Connect smoke machine 84-04 to the Inlet Pressure Sensor port in the intake duct and begin injecting smoke into the intake system. Observe all intake system components for evidence of smoke leakage. Is there evidence of smoke leakage? Yes → Repair or replace as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the MAF Sensor. Perform ROAD TEST VERIFICATION - VER-2.	All

P0101-MAF SENSOR SIGNAL NEGATIVE DEVIATION — Continued

TEST	ACTION	APPLICABILITY
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0105-INLET PRESSURE SENSOR SIGNAL PLAUSIBILITY

When Monitored and Set Condition:

P0105-INLET PRESSURE SENSOR SIGNAL PLAUSIBILITY

When Monitored: With the ignition on. No other IAT DTC's present in the ECM. Engine speed below 800 rpm.

Set Condition: The difference between the Inlet Pressure Sensor signal and the Atmospheric Pressure Sensor signal is 3500 hpa for 5.0 seconds.

POSSIBLE CAUSES
AIR FILTER
AIR RESTRICTION
INTERMITTENT CONDITION
HIGH RESISTANCE IN THE INLET PRESSURE SENSOR SIGNAL CIRCUIT
HIGH RESISTANCE IN THE INLET PRESSURE SENSOR GROUND CIRCUIT
HIGH RESISTANCE IN THE INLET PRESSURE SENSOR 5-VOLT SUPPLY CIRCUIT
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off, wait 30 seconds. Test drive the vehicle. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off. Remove and inspect the Air Filter for soiling or excessive dirt and debris which may cause air flow restriction. Were any of these problems found? Yes → Replace the Air Filter element. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0105-INLET PRESSURE SENSOR SIGNAL PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
3	**NOTE: Inspect all air intake and turbocharger related tubes for damage, restriction or poor connection. Any of these conditions can cause a this DTC to set.** Turn the ignition off. Inspect all air intake and turbocharger related tubes and connections. were any problems found? Yes → Repair or replace as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Inlet Pressure Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Inlet Pressure Sensor Signal circuit for high resistance. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Inlet Pressure Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the Inlet Pressure Sensor Ground circuit for high resistance. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Inlet Pressure Sensor 5-volt Supply circuit. Is the resistance below 10.0 ohms? Yes → Replace the Inlet Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Inlet Pressure Sensor 5 Volt Supply circuit for high resistance. Perform ROAD TEST VERIFICATION - VER-2.	All

P0105-INLET PRESSURE SENSOR SIGNAL PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Inlet Pressure Sensor signal is above 4.75 volts for 2.0 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
INLET PRESSURE SENSOR GROUND CIRCUIT SHORTED TO VOLTAGE
INLET PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
INLET PRESSURE SENSOR GROUND CIRCUIT OPEN
INLET PRESSURE SENSOR
ENGINE CONTROL MODULE (INTERNAL)
ENGINE CONTROL MODULE (SENSOR SIGNAL SHORTED TO VOLTAGE)

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: Ensure all turbocharger inlet and outlet tubes are connected properly, without damage and restriction before continuing with this test.** Turn the ignition on. With the DRB, erase ECM DTCs. Cycle the ignition key on and off several times, leaving the key on for at least 10 seconds at a time. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Turn the ignition on. Measure the voltage between ground and the Inlet Pressure Sensor Signal circuit. Is the voltage above 1.0 volt? Yes → Go To 3 No → Go To 4	All

P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage between ground and the Inlet Pressure Sensor Signal circuit. Is the voltage above 1.0 volt? Yes → Repair the Inlet Pressure Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage between ground and the Inlet Pressure Sensor Ground circuit. Is the voltage above 1.0 volt? Yes → Repair the Inlet Pressure Sensor Ground circuit for a short to voltage. Note: The ECM will need to be checked for proper operation before the repair is completed. A short to voltage on a ground circuit can damage the ECM. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Inlet Pressure Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the Inlet Pressure Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. **NOTE: Ensure all harness connectors are connected.** Turn the ignition on. Measure the voltage of the Inlet Pressure Sensor Signal circuit by back probing ECM harness connector. Is the voltage above 4.85 volts? Yes → Replace the Inlet Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Inlet Pressure Sensor signal is below 0.25 volt for 2.0 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
INLET PRESSURE SENSOR 5 VOLT SUPPLY
INLET PRESSURE SENSOR
INLET PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
INLET PRESSURE SENSOR SIGNAL AND GROUND CIRCUITS SHORTED TOGETHER
ENGINE CONTROL MODULE
INLET PRESSURE SENSOR SIGNAL CIRCUIT OPEN

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: Ensure all turbocharger inlet and outlet tubes are connected properly, without damage and restriction before continuing with this test.** Turn the ignition on. With the DRB, erase ECM DTCs. Cycle the ignition key on and off several times, leaving the key on for at least 10 seconds at a time. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Turn the ignition on. Measure the voltage between ground and the Inlet Pressure Sensor 5 Volt Supply circuit. Is the voltage above 4.8 volts? Yes → Go To 3 No → Repair the Inlet Pressure Sensor 5 Volt Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Inlet Pressure Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 4 No → Repair the Inlet Pressure Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the Inlet Pressure Sensor Signal circuit and Inlet Pressure Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the Inlet Pressure Sensor Signal circuit for a short to the Inlet Pressure Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Inlet Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the Inlet Pressure Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Turn the ignition on. Connect a jumper wire between the Inlet Pressure Sensor Signal and Inlet Pressure Sensor 5 Volt Supply circuits. With the DRB, read the Inlet Pressure Sensor voltage. Is the voltage above 4.5 volts? Yes → Replace the Inlet Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0105-INLET PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0110-INTAKE AIR TEMP SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0110-INTAKE AIR TEMP SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Intake Air Temperature Sensor signal is above 4.95 volts.

POSSIBLE CAUSES
INTERMITTENT CONDITION
INTAKE AIR TEMP SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND CIRCUIT OPEN
INTAKE AIR TEMP SENSOR SIGNAL CIRCUIT OPEN
BOOST PRESSURE/IAT SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off for 10 seconds. Turn the ignition on. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the IAT Sensor Signal circuit. Is the voltage below 1.0 volt? Yes → Go To 3 No → Repair the Intake Air Temperature Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. **NOTE: Remove the jumper wire.**	All

P0110-INTAKE AIR TEMP SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Boost Pressure/IAT Sensor harness connector. Measure the resistance of the Intake Air Temperature Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 4 No → Repair the Intake Air Temperature Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Connect a jumper wire between the IAT Sensor Signal and Sensor Ground circuits in the Boost Pressure/IAT Sensor harness connector. Turn the ignition on. Monitor the DRB for ECM DTCs. Does the DRB display P0110 INTAKE AIR TEMP. SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW? Yes → Replace the Boost Pressure/Intake Air Temperature Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit between the ECM harness connector and the Boost Pressure Sensor harness connector. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0110-INTAKE AIR TEMP SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0110-INTAKE AIR TEMP SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Intake Air Temperature Sensor signal is below 0.45 volt.

POSSIBLE CAUSES
INTERMITTENT CONDITION
INTAKE AIR TEMP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
INTAKE AIR TEMP SENSOR SIGNAL CIRCUIT SHORTED TO SENSOR GROUND
BOOST PRESSURE/IAT SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs for at least 2 minutes. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Turn the ignition on. Monitor the DRB for ECM DTCs for at least 2 minutes. Does the DRB display P0110 INTAKE AIR TEMP SIGNAL VOLTAGE TOO HIGH? Yes → Replace the Boost Pressure/Intake Air Temperature Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0110-INTAKE AIR TEMP SENSOR SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Boost Pressure/IAT Sensor harness connector. Measure the resistance between ground and the Intake Air Temperature Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Intake Air Temperature Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Boost Pressure/IAT Sensor harness connector. Measure the resistance between the Intake Air Temperature Sensor Signal circuit and the Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the Intake Air Temperature Sensor Signal circuit for a short to the Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
5	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Engine Coolant Temperature Sensor signal is above 4.95 volts.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ECM ECT SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND CIRCUIT OPEN
ECT SENSOR
ECT SENSOR SIGNAL CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If multiple DTCs are present, the most likely cause is a 5-Volt Supply or Sensor Ground circuit shorted to voltage or ground. Refer to the Service Information Wiring section for circuits that would affect multiple DTCs.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, monitor the Engine Coolant Temperature (ECT) Sensor voltage. Is the ECT Sensor voltage above 4.8 volts? Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off. Disconnect the ECT Sensor harness connector. Turn the ignition on. Measure the voltage on the ECT Sensor Signal circuit. Is the voltage above 5.5 volts? Yes → Repair the ECT Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECT Sensor harness connector. Connect a jumper wire between the ECT Sensor harness connector cavities. Turn the ignition on. With the DRB, read the ECT Sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the ECT Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the ECT Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the ECT Sensor harness connector. Measure the resistance of the ECT Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the ECT Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Engine Coolant Temperature Sensor signal is below 0.12 volt.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ECT SENSOR
ECT SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
ECT SENSOR SIGNAL AND GROUND CIRCUITS SHORTED TOGETHER
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, monitor the Engine Coolant Temperature (ECT) Sensor voltage. Is the ECT Sensor voltage below 0.25 volt? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the ECT Sensor harness connector. Turn the ignition on. With the DRB, read the ECT Sensor voltage. Is the voltage above 4.0 volts? Yes → Replace the ECT Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0115-ENGINE COOLANT TEMP SENSOR SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the ECT Sensor harness connector. Measure the resistance between ground and the ECT Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the ECT Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the ECT Sensor harness connector. Measure the resistance between the ECT Sensor Signal circuit and Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the ECT Sensor Signal and Ground circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2.	All
5	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0128-ENGINE COOLANT TEMP SENSOR ENGINE IS COLD TOO LONG

When Monitored and Set Condition:

P0128-ENGINE COOLANT TEMP SENSOR ENGINE IS COLD TOO LONG

When Monitored: With the engine running and engine temperature is below 39.9°C.

Set Condition:

POSSIBLE CAUSES
ENGINE COLD TOO LONG

TEST	ACTION	APPLICABILITY
1	**Note: The best way to diagnose this DTC is to allow the vehicle to remain outside overnight in order to have a completely cold soaked engine.** **Note: Extremely cold outside ambient temperatures may cause this DTC to set.** Verify that the coolant level is correct. Start the engine. With the DRBIII®, set the engine RPM to 1500 and allow the engine to warm up for 10-15 minutes. With the DRBIII®, monitor the Engine Coolant Temperature value during the warm up cycle. Make sure the transition of temperature change is smooth. Did the engine temperature reach a minimum of 80° C (176° F)? Yes → Test Complete. No → Refer to the Service Information for cooling system performance diagnosis. The most probable cause is a Thermostat problem. Also, refer to any related TSBs. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

P0180-FUEL TEMPERATURE SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0180-FUEL TEMPERATURE SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Fuel Temperature Sensor signal is above 4.95 volts for 0.5 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
FUEL TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND CIRCUIT OPEN
FUEL TEMPERATURE SENSOR
FUEL TEMPERATURE SENSOR SIGNAL CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If multiple DTCs are present, the most likely cause is a 5-Volt Supply or Sensor Ground circuit shorted to voltage or ground. Refer to the Service Information Wiring section for circuits that would affect multiple DTCs.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, monitor the Fuel Temperature Sensor voltage. Is the Fuel Temperature Sensor voltage above 4.80 volts? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the Fuel Temperature Sensor harness connector. Turn the ignition on. Measure the voltage on the Fuel Temperature Sensor Signal circuit. Is the voltage above 5.5 volts? Yes → Repair the Fuel Temperature Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0180-FUEL TEMPERATURE SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Fuel Temperature Sensor harness connector. Connect a jumper wire between the Fuel Temperature Sensor harness connector cavities. Turn the ignition on. With the DRB, read the Fuel Temperature Sensor voltage. Is the voltage below 1.0 volt? Yes → Replace the Fuel Temperature Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the Fuel Temperature Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Fuel Temperature Sensor harness connector. Measure the resistance of the Fuel Temperature Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Fuel Temperature Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0180-FUEL TEMPERATURE SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0180-FUEL TEMPERATURE SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Fuel Temperature Sensor signal is below 0.12 volt for 0.5 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
FUEL TEMPERATURE SENSOR
FUEL TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
FUEL TEMPERATURE SENSOR SIGNAL AND GROUND CIRCUITS SHORTED TOGETHER
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, monitor the Fuel Temperature Sensor voltage. Is the Fuel Temperature Sensor voltage below 0.20 volt? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. Disconnect the Fuel Temperature Sensor harness connector. Turn the ignition on. With the DRB, read the Fuel Temperature Sensor voltage. Is the voltage above 4.0 volts? Yes → Replace the Fuel Temperature Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0180-FUEL TEMPERATURE SENSOR SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Temperature Sensor harness connector. Measure the resistance between ground and the Fuel temperature Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Fuel Temperature Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Temperature Sensor harness connector. Measure the resistance between the Fuel Temperature Sensor Signal circuit and Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Fuel Temperature Sensor Signal and Ground circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2.	All
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Fuel Rail Pressure Sensor signal voltage is above 4.8 volts.

POSSIBLE CAUSES
ECM - FUEL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
ECM - FUEL PRESSURE SENSOR SIGNAL OPEN
FUEL PRESSURE SENSOR SIGNAL CIRCUIT OPEN
FUEL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND CIRCUIT OPEN
INTERMITTENT CONDITION
FUEL PRESSURE SENSOR 5-VOLT SUPPLY CIRCUIT OPEN
FUEL PRESSURE SENSOR GROUND CIRCUIT SHORTED TO VOLTAGE
FUEL PRESSURE SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**WARNING: THE FUEL INJECTION PUMP SUPPLIES HIGH-PRESSURE FUEL TO EACH INDIVIDUAL INJECTOR THROUGH HIGH-PRESSURE FUEL LINES. FUEL UNDER HIGH PRESSURE CAN PENETRATE SKIN AND CAUSE PERSONAL INJURY. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING.** **NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Cycle the ignition key on and off several times, leaving the key on for at least 10 seconds at a time. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 10	All

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Turn the ignition on. Measure the voltage of the Fuel Pressure Sensor Signal circuit. Select the appropriate voltage reading. Voltage is above 5.5 volts. Go To 3 Voltage is between 4.7 and 5.4 volts. Go To 4 Voltage is below 4.7 volts. Go To 9	All
3	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Fuel Pressure Sensor Signal circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Fuel Pressure Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Fuel Pressure Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Fuel Pressure Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Fuel Pressure Sensor 5-Volt Supply circuit. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the Fuel Pressure Sensor 5-volt Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Fuel Pressure Sensor Ground circuit at the Fuel Pressure Sensor and ECM harness connectors. Is the voltage above 1.0 volt at either connector? Yes → Repair the Fuel Pressure Sensor Ground circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 7 **NOTE: If the Fuel Pressure Sensor Ground circuit had a short to voltage on it, the ECM could be damaged. Retest the Fuel Pressure Sensor circuit.**	All
7	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Connect a jumper wire between the Fuel Pressure Sensor Signal circuit and the Fuel Pressure Sensor Ground circuit in the Fuel Pressure Sensor harness connector. Turn the ignition on and monitor the DRB for DTCs. Is DTC P0190 FUEL PRESS SENSOR CIRCUIT MALF SIGNAL VOLTAGE TOO LOW present? Yes → Replace the Fuel Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 8	All
8	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
9	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Fuel Pressure Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Fuel Pressure Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
10	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Fuel Rail Pressure Sensor signal voltage is below 0.2 volt.

POSSIBLE CAUSES
FUEL PRESSURE SENSOR
INTERMITTENT CONDITION
FUEL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
FUEL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO SENSOR GROUND
ECM - FUEL PRESSURE SENSOR SIGNAL SHORTED TO GROUND

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **WARNING: THE FUEL INJECTION PUMP SUPPLIES HIGH-PRESSURE FUEL TO EACH INDIVIDUAL INJECTOR THROUGH HIGH-PRESSURE FUEL LINES. FUEL UNDER HIGH PRESSURE CAN PENETRATE SKIN AND CAUSE PERSONAL INJURY. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Cycle the ignition key on and off several times, leaving the key on for at least 10 seconds at a time. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Turn the ignition on. Measure the voltage of the Fuel Pressure Sensor Signal circuit. Is the voltage between 4.7 and 5.3 volts? Yes → Replace the Fuel Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0190-FUEL PRESS SENSOR SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Fuel Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Fuel Pressure Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the Fuel Pressure Sensor Ground circuit and the Fuel Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the Fuel Pressure Sensor Signal circuit for a short to the Fuel Pressure Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
5	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0191-FUEL PRESS SENSOR AFTERRUN NEGATIVE PLAUSIBILITY

P0191-FUEL PRESS SENSOR AFTERRUN POSITIVE PLAUSIBILITY

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0191-FUEL PRESS SENSOR AFTERRUN NEGATIVE PLAUSIBILITY.

When Monitored and Set Condition:

P0191-FUEL PRESS SENSOR AFTERRUN NEGATIVE PLAUSIBILITY

When Monitored: At ignition shut off during Afterrun.

Set Condition: The Fuel Pressure Sensor signal is below 0.415 volt for 1.0 second.

P0191-FUEL PRESS SENSOR AFTERRUN POSITIVE PLAUSIBILITY

When Monitored: At ignition shut off during Afterrun.

Set Condition: The Fuel Pressure Sensor signal is above 0.615 volt for 1.0 second.

POSSIBLE CAUSES
FUEL PRESSURE SENSOR
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: This code can be caused by an intermittent problem in the wiring and connectors to the Fuel Pressure Sensor. Inspect the Fuel Pressure Sensor harness connector and associated wiring for signs of poor terminal contact.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace the Fuel Pressure Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All

P0191-FUEL PRESS SENSOR AFTERRUN NEGATIVE PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0201-CYLINDER 1-INJECTOR CIRCUIT CURRENT DECREASE
P0201-CYLINDER 1-INJECTOR CIRCUIT LOAD DROP
P0201-CYLINDER 1-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE
P0201-CYLINDER 1-INJECTOR CIRCUIT OVERCURRENT LOW SIDE
P0202-CYLINDER 2-INJECTOR CIRCUIT CURRENT DECREASE
P0202-CYLINDER 2-INJECTOR CIRCUIT LOAD DROP
P0202-CYLINDER 2-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE
P0202-CYLINDER 2-INJECTOR CIRCUIT OVERCURRENT LOW SIDE
P0203-CYLINDER 3-INJECTOR CIRCUIT CURRENT DECREASE
P0203-CYLINDER 3-INJECTOR CIRCUIT LOAD DROP
P0203-CYLINDER 3-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE
P0203-CYLINDER 3-INJECTOR CIRCUIT OVERCURRENT LOW SIDE
P0204-CYLINDER 4-INJECTOR CIRCUIT CURRENT DECREASE
P0204-CYLINDER 4-INJECTOR CIRCUIT LOAD DROP
P0204-CYLINDER 4-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE
P0204-CYLINDER 4-INJECTOR CIRCUIT OVERCURRENT LOW SIDE
P2147-INJECTOR BANK 1 OPEN CIRCUIT
P2148-INJECTOR BANK 1 SHORT CIRCUIT
P2150-INJECTOR BANK 2 OPEN CIRCUIT
P2151-INJECTOR BANK 2 SHORT CIRCUIT

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

When Monitored and Set Condition:

P0201-CYLINDER 1-INJECTOR CIRCUIT CURRENT DECREASE

When Monitored: With the engine running.

Set Condition: The ECM detects an incorrect rate of current decrease after injection occurs.

P0201-CYLINDER 1-INJECTOR CIRCUIT CURRENT DECREASE — Continued

P0201-CYLINDER 1-INJECTOR CIRCUIT LOAD DROP

When Monitored: With the engine running.

Set Condition: The ECM detects insufficient current through the injector driver when commanded on.

P0201-CYLINDER 1-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE

When Monitored: With the engine running.

Set Condition: The ECM detects excessive current on the high-side driver circuit.

P0201-CYLINDER 1-INJECTOR CIRCUIT OVERCURRENT LOW SIDE

When Monitored: With the engine running.

Set Condition: The ECM detects excessive current on the injector low-side driver circuit.

P0202-CYLINDER 2-INJECTOR CIRCUIT CURRENT DECREASE

When Monitored: With the engine running.

Set Condition: The ECM detects an incorrect rate of current decrease after injection occurs.

P0202-CYLINDER 2-INJECTOR CIRCUIT LOAD DROP

When Monitored: With the engine running.

Set Condition: The ECM detects insufficient current through the injector driver when commanded on.

P0202-CYLINDER 2-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE

When Monitored: With the engine running.

Set Condition: The ECM detects excessive current on the high-side driver circuit.

P0202-CYLINDER 2-INJECTOR CIRCUIT OVERCURRENT LOW SIDE

When Monitored: With the engine running.

Set Condition: The ECM detects excessive current on the injector low-side driver circuit.

P0203-CYLINDER 3-INJECTOR CIRCUIT CURRENT DECREASE

When Monitored: With the engine running.

Set Condition: The ECM detects an incorrect rate of current decrease after injection occurs.

P0203-CYLINDER 3-INJECTOR CIRCUIT LOAD DROP

When Monitored: With the engine running.

Set Condition: The ECM detects insufficient current through the injector driver when commanded on.

P0201-CYLINDER 1-INJECTOR CIRCUIT CURRENT DECREASE — Continued

P0203-CYLINDER 3-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE

When Monitored: With the engine running.

Set Condition: The ECM detects excessive current on the high-side driver circuit.

P0203-CYLINDER 3-INJECTOR CIRCUIT OVERCURRENT LOW SIDE

When Monitored: With the engine running.

Set Condition: The ECM detects excessive current on the injector low-side driver circuit.

P0204-CYLINDER 4-INJECTOR CIRCUIT CURRENT DECREASE

When Monitored: With the engine running.

Set Condition: The ECM detects an incorrect rate of current decrease after injection occurs.

P0204-CYLINDER 4-INJECTOR CIRCUIT LOAD DROP

When Monitored: With the engine running.

Set Condition: The ECM detects insufficient current through the injector driver when commanded on.

P0204-CYLINDER 4-INJECTOR CIRCUIT OVERCURRENT HIGH SIDE

When Monitored: With the engine running.

Set Condition: The ECM detects excessive current on the high-side driver circuit.

P0204-CYLINDER 4-INJECTOR CIRCUIT OVERCURRENT LOW SIDE

When Monitored: With the engine running.

Set Condition: The ECM detects excessive current on the injector low-side driver circuit.

POSSIBLE CAUSES
ENGINE CONTROL MODULE
INTERMITTENT CONDITION
FUEL INJECTOR CONTROL CIRCUIT SHORTED TO VOLTAGE
FUEL INJECTOR CONTROL CIRCUIT SHORTED TO GROUND
FUEL INJECTOR CIRCUITS SHORTED TOGETHER
FUEL INJECTOR CONTROL CIRCUIT OPEN
FUEL INJECTOR

P0201-CYLINDER 1-INJECTOR CIRCUIT CURRENT DECREASE — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Attempt to start the engine and test drive the vehicle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 8	All
2	**NOTE: An open ASD power supply to the ECM will cause multiple DTC's including this DTC to set.** **NOTE: Check the ECM for other DTC's. If other DTC's are set with this DTC refer to the symptom list and perform the CHECKING THE ECM POWER AND GROUND CIRCUITS test before continuing.** If the ECM power and ground circuits are functioning properly continue with this test. Yes → Go To 3	All
3	Turn the ignition off. Disconnect all of the Cylinder Fuel Injector harness connectors. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of each Fuel Injector High-Side Control circuit. Measure the voltage of each Fuel Injector Low-Side Control circuit. Is the voltage above 1.0 volt for any of the measurements? Yes → Repair the appropriate Fuel Injector Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect all of the Fuel Injector harness connectors. Measure the resistance between ground and each Fuel Injector High-Side Control circuits. Measure the resistance between ground and each Fuel Injector Low-Side Control circuits. Is the resistance below 1000 ohms for any of the measurements? Yes → Repair the Fuel Injector Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All

P0201-CYLINDER 1-INJECTOR CIRCUIT CURRENT DECREASE — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect all of the Cylinder Fuel Injector harness connectors. Measure the resistance between each of the Fuel Injector High-Side Control circuits and the Fuel Injector Low-Side Control circuits. Is the resistance below 1000 ohms for any of the measurements? Yes → Repair the Fuel Injector circuits that measured below 1000 ohms for a short together. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All
6	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect all of the Cylinder Fuel Injector harness connectors. Measure the resistance of each Fuel Injector High-Side and Low-Side Control circuits between its respective injector harness connector and the ECM harness connector. Is the resistance below 10.0 ohms for each measurement? Yes → Go To 7 No → Repair the appropriate Fuel Injector Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
7	Turn the ignition off. Replace the appropriate Cylinder Fuel Injector (as indicated by the DTC) in accordance with the Service Information. With the DRBIII®, erase the ECM DTCs. Test drive the vehicle. With the DRBIII®, read the ECM DTCs. Does the DRBIII® display this DTC? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → The repair is complete. Perform ROAD TEST VERIFICATION - VER-2.	All
8	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0234-BOOST PRESSURE SENSOR NEGATIVE DEVIATION
P0299-BOOST PRESSURE SENSOR POSITIVE DEVIATION

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0234-BOOST PRESSURE SENSOR NEGATIVE DEVIATION.

When Monitored and Set Condition:

P0234-BOOST PRESSURE SENSOR NEGATIVE DEVIATION

When Monitored: With the engine running.

Set Condition: Actual boost pressure differs from the boost pressure setpoint by more than 1000 hpa.

P0299-BOOST PRESSURE SENSOR POSITIVE DEVIATION

When Monitored: With the engine running.

Set Condition: Actual boost pressure differs from the boost pressure setpoint by more than 1000 hpa.

POSSIBLE CAUSES
AIR FILTER
AIR RESTRICTION
CHECKING FOR AIR LEAKS
CHECKING THE BOOST CONTROL VACUUM SUPPLY
BOOST PRESSURE ACTUATOR
TURBOCHARGER

P0234-BOOST PRESSURE SENSOR NEGATIVE DEVIATION — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: Ensure all turbocharger inlet and outlet tubes are connected properly, without damage and restriction before continuing with this test.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Test drive the vehicle. Monitor the DRBIII® for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Test Complete.	All
2	Turn the ignition off. Remove and inspect the Air Filter for soiling or excessive dirt and debris which may cause air flow restriction. Were any of these problems found? Yes → Replace the Air Filter element. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	**NOTE: Inspect all air intake and turbocharger related tubes for damage, restriction or poor connection. Any of these conditions can cause a this DTC to set.** Turn the ignition off. Inspect all air intake and turbocharger related tubes and connections. Were any problems found? Yes → Repair or replace as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Refer to symptom Checking The Boost Control Vacuum Supply to check the turbocharger vacuum supply system. Were any problems found? Yes → Repair as necessary Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Remove the Inlet Pressure Sensor. Connect smoke machine 84-04 to the Inlet Pressure Sensor port in the intake duct and begin injecting smoke into the intake system. Observe all intake system components for evidence of smoke leakage. Is there evidence of smoke leakage? Yes → Repair or replace as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All

P0234-BOOST PRESSURE SENSOR NEGATIVE DEVIATION — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Replace the Boost Pressure Actuator in accordance with the Service Information. **NOTE: Ensure the ECM and Boost Pressure Actuator harness connectors are connected.** Test drive the vehicle. With the DRB, check for this DTC to set again. Did this DTC set again? Yes → Replace the Turbocharger assembly in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the Boost Pressure Actuator. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

P0235-BOOST PRESSURE SENSOR PLAUSIBILITY

When Monitored and Set Condition:

P0235-BOOST PRESSURE SENSOR PLAUSIBILITY

When Monitored: With the engine speed below 850 rpm. No other Boost Pressure Sensor DTC's. No Atmospheric Pressure Sensor DTC's.

Set Condition: The Boost Pressure Sensor signal differs from the Atmospheric Pressure Sensor signal by 150 hpa or greater for at least 2.0 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
HIGH RESISTANCE IN THE BOOST PRESSURE SENSOR SIGNAL CIRCUIT
HIGH RESISTANCE IN THE BOOST PRESSURE SENSOR GROUND CIRCUIT
HIGH RESISTANCE IN THE BOOST PRESSURE SENSOR 5-VOLT SUPPLY CIRCUIT
BOOST PRESSURE/INTAKE AIR TEMPERATURE SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641 or P0651 is present with this DTC, diagnose DTCs P0641 and P0651 before diagnosing this DTC.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off, wait 30 seconds, then start and idle the engine for at least 30 seconds. **NOTE: Engine idle speed must be below 870 RPM.** With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All

P0235-BOOST PRESSURE SENSOR PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Boost Pressure Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 3 No → Repair the Boost Pressure Sensor Signal circuit for high resistance. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 4 No → Repair the Boost Pressure Sensor Ground circuit for high resistance. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Boost Pressure Sensor 5-Volt Supply circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Boost Pressure Sensor 5-Volt Supply circuit for high resistance. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Replace the Boost Pressure/Intake Air Temperature Sensor. Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle, pausing several times to cycle the ignition. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → The repair is complete. Perform ROAD TEST VERIFICATION - VER-2.	All

P0235-BOOST PRESSURE SENSOR PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Boost Pressure Sensor signal voltage is above 4.79 volts for 0.5 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
BOOST PRESSURE SENSOR GROUND CIRCUIT SHORTED TO VOLTAGE
BOOST PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
BOOST PRESSURE SENSOR GROUND CIRCUIT OPEN
BOOST PRESSURE SENSOR
POOR CONNECTOR TERMINAL CONTACT
ENGINE CONTROL MODULE (INTERNAL)
ENGINE CONTROL MODULE (SENSOR SIGNAL SHORTED TO VOLTAGE)

TEST	ACTION	APPLICABILITY
1	**NOTE: If a P0234 or P0299 DTC is present with this DTC, diagnose P0234 or P0299 DTC before continuing.** **NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: Ensure all turbocharger inlet and outlet tubes are connected properly, without damage and restriction before continuing with this test. Also ensure the wastegate actuator and actuator rod are attached and functioning properly.** Turn the ignition on. With the DRB, erase ECM DTCs. Cycle the ignition key on and off several times, leaving the key on for at least 10 seconds at a time. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 8	All

P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the Boost Pressure Sensor harness connector. Turn the ignition on. Measure the voltage between ground and the Boost Pressure Sensor Signal circuit. Is the voltage above 1.0 volt? Yes → Go To 3 No → Go To 4	All
3	Turn the ignition off. Disconnect the Boost Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage between ground and the Boost Pressure Sensor Signal circuit. Is the voltage above 1.0 volt? Yes → Repair the Boost Pressure Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Boost Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage between ground and the Boost Pressure Sensor Ground circuit. Is the voltage above 1.0 volt? Yes → Repair the Boost Pressure Sensor Ground circuit for a short to voltage. Note: The ECM will need to be checked for proper operation before the repair is completed. A short to voltage on a ground circuit can damage the ECM. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5 **NOTE: If the Sensor Ground circuit had a short to voltage on it, the ECM could be damaged. Retest the Fuel Pressure Sensor circuit.**	All
5	Turn the ignition off. Disconnect the Boost Pressure Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the Boost Pressure Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. **NOTE: Ensure all harness connectors are connected.** Turn the ignition on. Measure the voltage of the Boost Pressure Sensor Signal circuit by back probing ECM harness connector C1, cavity 63. Is the voltage above 4.85 volts? Yes → Replace the Boost Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 7	All
7	Turn the ignition on. With the DRB, read ECM DTCs. With the DRBIII®, erase ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Ensure good terminal contact between the Boost Pressure Sensor harness connector and the sensor. The repair is complete. Perform ROAD TEST VERIFICATION - VER-2.	All
8	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Boost Pressure Sensor signal voltage is below 0.29 volt for 0.5 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
BOOST PRESSURE SENSOR 5-VOLT SUPPLY CIRCUIT OPEN
BOOST PRESSURE/INTAKE AIR TEMPERATURE SENSOR
BOOST PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
BOOST PRESSURE SENSOR SIGNAL AND GROUND CIRCUITS SHORTED TOGETHER
BOOST PRESSURE SENSOR SIGNAL CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** Turn the ignition on. With the DRB, read the Boost Pressure Sensor voltage. Is the voltage below 0.2 volt? Yes → Go To 2 No → Go To 8	All
2	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Turn the ignition on. Measure the voltage between ground and the Boost Pressure Sensor 5-Volt Supply circuit. Is the voltage above 4.9 volts? Yes → Go To 3 No → Repair the Boost Pressure Sensor 5-Volt Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Turn the ignition on. Connect a jumper wire between the Boost Pressure Sensor Signal and Boost Pressure Sensor 5-Volt Supply circuits. With the DRB, read the Boost Pressure Sensor voltage. Is the Boost Pressure Sensor voltage above 4.5 volts? Yes → Replace the Boost Pressure/Intake Air Temperature Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Boost Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the Boost Pressure Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the Boost Pressure Sensor Signal circuit and Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the Boost Pressure Sensor Signal circuit for a short to the Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the Boost Pressure/IAT Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Boost Pressure Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 7 No → Repair the Boost Pressure Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
7	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0235-BOOST PRESSURE SENSOR SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
8	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0300-MISFIRE DETECTED
P0300-MISFIRE DETECTED
P0300-MISFIRE DETECTED
P0300-MISFIRE DETECTED

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

When Monitored and Set Condition:

P0300-MISFIRE DETECTED

When Monitored: With the engine running.

Set Condition: The ECM detects multiple misfires from one or more cylinders.

P0300-MISFIRE DETECTED

When Monitored: With the engine running.

Set Condition: The ECM detects multiple misfires from one or more cylinders.

P0300-MISFIRE DETECTED

When Monitored: With the engine running.

Set Condition: The ECM detects multiple misfires from one or more cylinders.

P0300-MISFIRE DETECTED

When Monitored: With the engine running.

Set Condition: The ECM detects multiple misfires from one or more cylinders.

POSSIBLE CAUSES
ENGINE COMPRESSION
FUEL INJECTOR QUANTITY
INJECTOR LEAKAGE
INTERMITTENT CONDITION

P0300-MISFIRE DETECTED — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** With the DRBIII®, erase ECM DTCs. Test drive the vehicle and attempt to duplicate the problem. With the DRB, read ECM DTC's. Did this DTC set again? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. With the DRBIII®, perform the Cylinder Compression Test. Is the cylinder compression within specification for all cylinders? Yes → Go To 3 No → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. With the DRBIII®, perform the Injector Quantity Test. Is the Injector Quantity within specification for all cylinders? Yes → Go To 4 No → Repair or replace as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Perform the INJECTOR LEAKAGE TEST in accordance with the Service Information. Were any problems found? Yes → Repair or replace as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

P0300-MISFIRE DETECTED — Continued

TEST	ACTION	APPLICABILITY
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0301-MISFIRE DETECTED CYLINDER #1
P0302-MISFIRE DETECTED CYLINDER #2
P0303-MISFIRE DETECTED CYLINDER #3
P0304-MISFIRE DETECTED CYLINDER #4

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0301-MISFIRE DETECTED CYLINDER #1.

When Monitored and Set Condition:

P0301-MISFIRE DETECTED CYLINDER #1

When Monitored: With the engine running.

Set Condition: The ECM detects multiple misfires from cylinder #1.

P0302-MISFIRE DETECTED CYLINDER #2

When Monitored: With the engine running.

Set Condition: The ECM detects multiple misfires from cylinder #2.

P0303-MISFIRE DETECTED CYLINDER #3

When Monitored: With the engine running.

Set Condition: The ECM detects multiple misfires from cylinder #3.

P0304-MISFIRE DETECTED CYLINDER #4

When Monitored: With the engine running.

Set Condition: The ECM detects multiple misfires from cylinder #4.

POSSIBLE CAUSES
ENGINE COMPRESSION
FUEL INJECTOR QUANTITY
INJECTOR LEAKAGE
INTERMITTENT CONDITION

P0301-MISFIRE DETECTED CYLINDER #1 — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** With the DRBIII®, erase ECM DTCs. Test drive the vehicle and attempt to duplicate the problem. With the DRB, read ECM DTC's. Did this DTC set again? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. With the DRBIII®, perform the Cylinder Compression Test. Is the cylinder compression within specification for all cylinders? Yes → Go To 3 No → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. With the DRBIII®, perform the Injector Quantity Test. Is the Injector Quantity within specification for all cylinders? Yes → Go To 4 No → Repair or replace as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Perform the INJECTOR LEAKAGE TEST in accordance with the Service Information. Were any problems found? Yes → Repair or replace as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

P0301-MISFIRE DETECTED CYLINDER #1 — Continued

TEST	ACTION	APPLICABILITY
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0335-CRANKSHAFT POSITION SENSOR CIRCUIT INCORRECT OR MISSING SIGNAL
P0339-CRANKSHFT POSITION SENSOR CIRCUIT INTERMITTENT INCORRECT OR MISSING SIGNAL

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0335-CRANKSHAFT POSITION SENSOR CIRCUIT INCORRECT OR MISSING SIGNAL.

When Monitored and Set Condition:

P0335-CRANKSHAFT POSITION SENSOR CIRCUIT INCORRECT OR MISSING SIGNAL

When Monitored: With the engine speed between 20 and 6000 rpm.

Set Condition: The ECM does not receive a Crankshaft Position Sensor signal or receives an incorrect signal.

P0339-CRANKSHFT POSITION SENSOR CIRCUIT INTERMITTENT INCORRECT OR MISSING SIGNAL

When Monitored: With the engine speed between 20 and 6000 rpm.

Set Condition: The ECM intermittently does not receive a Crankshaft Position Sensor signal or intermittently receives an incorrect signal.

POSSIBLE CAUSES
CRANKSHAFT POSITION SENSOR
ENGINE CONTROL MODULE
INTERMITTENT CONDITION
CRANKSHAFT POSITION SENSOR SIGNAL CIRCUIT(S) SHORTED TO GROUND
CKP SENSOR CIRCUITS SHORTED TOGETHER
CKP SENSOR SIGNAL CIRCUITS OPEN
CKP SENSOR SIGNAL CIRCUIT(S) SHORTED TO VOLTAGE

P0335-CRANKSHAFT POSITION SENSOR CIRCUIT INCORRECT OR MISSING SIGNAL — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Attempt to start the engine. Did the engine start? Yes → Go To 2 No → Go To 3	All
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Disconnect the CKP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and both of the CKP Sensor Signal circuits. Is the resistance above 1000 ohms for both measurements? Yes → Go To 4 No → Repair the CKP Sensor Signal circuit(s) for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the CKP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the CKP Sensor Signal circuits. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the CKP Sensor Signal circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2.	All

P0335-CRANKSHAFT POSITION SENSOR CIRCUIT INCORRECT OR MISSING SIGNAL — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Disconnect the CKP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of CKP Sensor Signal circuits. Is the resistance below 10.0 ohms for both measurements? Yes → Go To 6 No → Repair the CKP Sensor Signal circuit(s) for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the CKP Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of both CKP Sensor Signal circuits. Is the voltage below 1.0 volt for both measurements? Yes → Go To 7 No → Repair the CKP Sensor Signal circuit(s) for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
7	Turn the ignition off. Using the DRB lab scope, backprobe both of the CKP Sensor Signal circuits at the ECM harness connector. **NOTE: Refer to Charts and Graphs to view a correct CKP Sensor signal.** Start the engine, if the engine will not start, crank the engine for several seconds while monitoring the DRB. Does the DRB display a steady clean CKP Signal pattern for each circuit? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the Crankshaft Position Sensor. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL
P0340-CAMSHAFT POSITION SENSOR CIRCUIT SIGNAL PLAUSIBILITY
P0344-CAMSHAFT POSITION SENSOR CIRCUIT INTERMITTENT MISSING SIGNAL
P0344-CAMSHAFT POSITION SENSOR CIRCUIT INTERMITTENT SIGNAL PLAUSIBILITY

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL.

When Monitored and Set Condition:

P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL

When Monitored: With the engine speed between 20 and 6000 rpm.

Set Condition: The ECM does not receive a Camshaft Position Sensor signal.

P0340-CAMSHAFT POSITION SENSOR CIRCUIT SIGNAL PLAUSIBILITY

When Monitored: With the engine speed between 20 and 6000 rpm.

Set Condition: The ECM receives an incorrect Camshaft Position Sensor signal.

P0344-CAMSHAFT POSITION SENSOR CIRCUIT INTERMITTENT MISSING SIGNAL

When Monitored: With the engine speed between 20 and 6000 rpm.

Set Condition: The ECM intermittently does not receive a Camshaft Position Sensor signal.

P0344-CAMSHAFT POSITION SENSOR CIRCUIT INTERMITTENT SIGNAL PLAUSIBILITY

When Monitored: With the engine speed between 20 and 6000 rpm.

Set Condition: The ECM intermittently receives an incorrect Camshaft Position Sensor signal.

POSSIBLE CAUSES
5-VOLT SUPPLY CIRCUIT OPEN
CAMSHAFT POSITION SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
CHECKING 5-VOLT SUPPLY CIRCUIT
DAMAGED CMP SENSOR OR CAMSHAFT
ECM

P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL — Continued

POSSIBLE CAUSES
ECM
ECM - CAMSHAFT POSITION SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND CIRCUIT OPEN
INTERMITTENT CONDITION
CMP SENSOR SIGNAL CIRCUIT OPEN
5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND
CMP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
CMASHAFT POSITION SENSOR
ECM SENSOR GROUND CIRCUIT OPEN
5-VOLT SUPPLY CIRCUIT SHORTED TO THE SENSOR GROUND CIRCUIT
CMP SENSOR SIGNAL CIRCUIT SHORTED TO THE SENSOR GROUND CIRCUIT

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **NOTE: The Timing Belt/Chain must be correctly installed and operational before diagnosis can be made. Refer to the Service Information to ensure the timing belt is properly installed.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Attempt to start the engine cranking the engine for at least 7 seconds. With the DRBIII®, read the ECM DTCs. Does the DRBIII® display this DTC? Yes → Go To 3 No → Go To 2	All
2	Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Test drive the vehicle. With the DRBIII®, read the ECM DTCs. Does the DRBIII® display this DTC? Yes → Go To 3 No → Go To 16	All

P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Camshaft Position Sensor harness connector. Turn the ignition on. Measure the voltage of the CMP Sensor Signal circuit. Select the appropriate voltage reading. Voltage is above 5.4 volts. Go To 4 Voltage is between 4.7 and 5.4 volts. Go To 5 Voltage is below 4.7 volts. Go To 13	All
4	Turn the ignition off. Disconnect the Camshaft Position Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the CMP Position Sensor Signal circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Camshaft Position Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the Camshaft Position Sensor harness connector. Turn the ignition on. Measure the voltage of the CMP Sensor 5-Volt Supply circuit. Select the appropriate voltage reading. Voltage is above 5.4 volts. Repair the CMP 5-Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. Voltage is between 4.7 and 5.4 volts. Go To 6 Voltage is below 4.7 volts. Go To 10	All
6	Turn the ignition off. Disconnect the CMP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit between the CMP Sensor harness connector and the ECM harness connector. Is the resistance below 10.0 ohms? Yes → Go To 7 No → Repair the Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL — Continued

TEST	ACTION	APPLICABILITY
7	Turn the ignition on. Disconnect the ECT Sensor harness connector. Disconnect the Camshaft Position Sensor harness connector. Connect one end of a jumper wire to the ECT Sensor signal circuit in the ECT Sensor harness connector. Connect the other end of the jumper wire to the Sensor Ground circuit in the Camshaft Position Sensor harness connector. With the DRBIII® in Engine, Sensors, read the Engine Coolant Temp volts. Is the voltage below 0.5 volt? Yes → Go To 8 No → Replace and program the ECM in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
8	Turn the ignition off. Remove the CMP Sensor. Inspect the CMP Sensor for conditions such as loose mounting screws, damage, or cracks. Inspect the camshaft for conditions such as damage, debris or cracked teeth. Is there any evidence of these conditions? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 9	All
9	Turn the ignition off. With the DRBIII® lab scope lead, backprobe the CMP Signal circuit. While observing the DRBIII® display, crank the engine. **NOTE: The DRBIII® should display a digital signal (square wave) similar to that shown in Charts and Graphs.** Does the DRBIII® display an uninterrupted digital signal (square wave)? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the Camshaft Position Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
10	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the CMP Sensor harness connector. Measure the resistance of the 5-Volt Supply circuit between the ECM harness connector and the CMP Sensor harness connector. Is the resistance below 10.0 ohms? Yes → Go To 11 No → Repair the 5-Volt Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL — Continued

TEST	ACTION	APPLICABILITY
11	Turn the ignition off. Disconnect the CMP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the CMP Sensor 5-Volt Supply circuit. Is the resistance above 1000 ohms? Yes → Go To 12 No → Repair the CMP Sensor 5-Volt Supply circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
12	Turn the ignition off. Disconnect the CMP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the CMP Sensor 5-Volt Supply circuit and the Sensor Ground circuit at the CMP Sensor harness connector. Is the resistance above 1000 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the CMP Sensor 5-Volt Supply and Sensor Ground circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2.	All
13	Turn the ignition off. Disconnect the CMP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the CMP Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 14 No → Repair the CMP Sensor Signal circuit for an open Perform ROAD TEST VERIFICATION - VER-2.	All
14	Turn the ignition off. Disconnect the CMP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the CMP Sensor Signal circuit. Is the resistance below 1000 ohms? Yes → Repair the CMP Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 15	All
15	Turn the ignition off. Disconnect the CMP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the CMP Sensor Signal circuit and the Sensor Ground circuit at the CMP Sensor harness connector. Is the resistance below 1000 ohms? Yes → Repair the CMP Sensor Signal and Sensor Ground circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0340-CAMSHAFT POSITION SENSOR CIRCUIT MISSING SIGNAL — Continued

TEST	ACTION	APPLICABILITY
16	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Remove the CMP Sensor and the CKP Sensor, checking for loose mounting screws and debris on the sensor magnets that can corrupt the sensor signal. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0402-EGR SOLENOID CIRCUIT NEGATIVE DEVIATION
P0402-EGR SOLENOID CIRCUIT POSITIVE DEVIATION

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0402-EGR SOLENOID CIRCUIT NEGATIVE DEVIATION.

When Monitored and Set Condition:

P0402-EGR SOLENOID CIRCUIT NEGATIVE DEVIATION

When Monitored: With the engine running.

Set Condition: The ECM detects EGR flow is less than the requested flow.

P0402-EGR SOLENOID CIRCUIT POSITIVE DEVIATION

When Monitored: With the engine running.

Set Condition: The ECM detects EGR flow is greater than the requested flow.

POSSIBLE CAUSES
AIR FILTER
AIR RESTRICTION
CHECKING FOR AIR LEAKS
EGR VALVE
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle and monitor the DRB for ECM DTCs. **NOTE: If there are any Mass Air Flow DTC's, diagnose the MAF DTC's before continuing EGR diagnostics.** Did this DTC set again? Yes → Go To 2 No → Go To 7	All

P0402-EGR SOLENOID CIRCUIT NEGATIVE DEVIATION — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Remove and inspect the Air Filter for soiling or excessive dirt and debris which may cause air flow restriction. Were any of these problems found? Yes → Replace the Air Filter element. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	**NOTE: Inspect all air intake and turbocharger related tubes for damage, restriction or poor connection. Any of these conditions can cause a this DTC to set.** **NOTE: Inspect the exhaust system and related tubes for damage, restriction or poor connection. Any of these conditions can cause a this DTC to set.** Turn the ignition off. Inspect the intake system, exhaust system and related tubes and connections. Were any problems found? Yes → Repair or replace as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	**NOTE: Inspect the complete exhaust system for restriction. Restrictions in the exhaust system can cause improper EGR flow. Repair as necessary** Allow the engine to idle until the engine reaches operating temperature. While back probing, measure the MAF Sensor Signal circuit at the MAF Sensor harness connector. With the DRBIII®, perform the EGR Actuator with the engine idling. **NOTE: The MAF reading should change by at least 0.23 volts during EGR actuation** Note the MAF readings. Does the MAF reading switch a minimum of 0.23 volt during EGR actuation? Yes → Go To 5 No → Go To 6	All
5	Allow the engine to idle until the engine reaches operating temperature. While back probing, measure the MAF Sensor Signal circuit at the MAF Sensor harness connector. With the DRBIII®, perform the EGR Actuator with the engine speed at 1000 rpm. **NOTE: The MAF reading should change by at least 0.30 volts during EGR actuation** Note the MAF readings. Does the MAF reading switch a minimum of 0.30 volt during EGR actuation? Yes → Test Complete. No → Go To 6	All

P0402-EGR SOLENOID CIRCUIT NEGATIVE DEVIATION — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Remove the Inlet Pressure Sensor. Connect smoke machine 84-04 to the Inlet Pressure Sensor port in the intake duct and begin injecting smoke into the intake system. Observe all intake system components for evidence of smoke leakage. Is there evidence of smoke leakage? Yes → Repair or replace as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the EGR Valve. Perform ROAD TEST VERIFICATION - VER-2.	All
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0403-EGR SOLENOID CIRCUIT EXCESSIVE CURRENT
P0490-EGR SOLENOID CIRCUIT SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0403-EGR SOLENOID CIRCUIT EXCESSIVE CURRENT.

When Monitored and Set Condition:

P0403-EGR SOLENOID CIRCUIT EXCESSIVE CURRENT

When Monitored: With the ignition on and the ECM EGR Solenoid command on.

Set Condition: The ECM detects excessive current on the EGR Solenoid Control circuit.

P0490-EGR SOLENOID CIRCUIT SHORT CIRCUIT

When Monitored: With the ignition on and the ECM EGR Solenoid command on.

Set Condition: The ECM detects excessive current on the EGR Solenoid Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
EGR SOLENOID
EGR SOLENOID CONTROL SHORTED TO VOLTAGE
ENGINE CONTROL MODULE - INTERNAL SHORT TO VOLTAGE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle and monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 4	All

P0403-EGR SOLENOID CIRCUIT EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the EGR Solenoid harness connector. Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs. Does the DRB display P0403 EGR OPEN CIRCUIT? Yes → Replace the EGR Solenoid. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	Turn the ignition off. Disconnect the EGR Solenoid harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the EGR Solenoid Control circuit. Is the voltage below 0.5 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the EGR Solenoid Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
4	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0403-EGR SOLENOID CIRCUIT OPEN CIRCUIT
P0489-EGR SOLENOID CIRCUIT SHORT TO GROUND

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0403-EGR SOLENOID CIRCUIT OPEN CIRCUIT.

When Monitored and Set Condition:

P0403-EGR SOLENOID CIRCUIT OPEN CIRCUIT

When Monitored: With the ignition on and the ECM EGR Solenoid command off.

Set Condition: The ECM does not detect voltage on the EGR Solenoid Control circuit.

P0489-EGR SOLENOID CIRCUIT SHORT TO GROUND

When Monitored: With the ignition on and the ECM EGR Solenoid command off.

Set Condition: The ECM does not detect voltage on the EGR Solenoid Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
EGR SOLENOID CONTROL CIRCUIT SHORTED TO GROUND
EGR SOLENOID CONTROL CIRCUIT OPEN
EGR SOLENOID
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Perform several ignition cycles, turning the ignition off for at least 10 seconds between each ignition cycle. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 7	All

P0403-EGR SOLENOID CIRCUIT OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
2	**NOTE: An open ASD power supply to the ECM will cause multiple DTC's including this DTC to set.** **NOTE: Check the ECM for other DTC's. If other DTC's are set with this DTC refer to the symptom list and perform the CHECKING THE ECM POWER AND GROUND CIRCUITS test before continuing.** If the ECM power and ground circuits are functioning properly continue with this test. Yes → Go To 3	All
3	Turn the ignition off. Disconnect the EGR Solenoid harness connector. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit. Does the test light illuminate brightly? Yes → Go To 4 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the EGR Solenoid harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the EGR Solenoid Control circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the EGR Solenoid Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the EGR Solenoid harness connector. Disconnect the ECM harness connectors. Measure the resistance of the EGR Solenoid Control circuit. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the EGR Solenoid Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Install a substitute EGR Solenoid in place of the vehicle's EGR Solenoid. **NOTE: Ensure the ECM and EGR Solenoid harness connectors are connected.** Turn the ignition on. With the DRB, check for this DTC to set again. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the EGR Solenoid. Perform ROAD TEST VERIFICATION - VER-2.	All

P0403-EGR SOLENOID CIRCUIT OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Fuel Level Sensor signal voltage is above 4.51 volts for 0.6 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
FUEL LEVEL SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
FUEL LEVEL SENSOR SIGNAL CIRCUIT OPEN
FUEL LEVEL SENSOR GROUND CIRCUIT OPEN
FUEL LEVEL SENSOR
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off, wait 10 seconds, then turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Fuel Level Sensor harness connector. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Fuel Level Sensor Signal circuit. Is the voltage below 0.5 volt? Yes → Go To 3 No → Repair the Fuel Level Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Fuel Level Sensor harness connector. Measure the resistance of the Fuel Level Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 4 No → Repair the Fuel Level Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Fuel Level Sensor harness connector. Measure the resistance of the Fuel Level Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Fuel Level Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the Fuel Level Sensor harness connector. Turn the ignition on. With the DRB, read and record the Fuel Level Sensor voltage. **NOTE: The Fuel Level Sensor voltage should be 5.0 ± 0.3 volts with the sensor harness connector disconnected.** Connect a jumper wire across the Fuel Level Sensor harness connector. With the DRB, read the Fuel Level Sensor voltage. **NOTE: The Fuel Level Sensor voltage should be less then 1.0 volt with the jumper wire connected.** Are the voltage readings the expected voltages? Yes → Replace the Fuel Level Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Fuel Level Sensor signal voltage is below 0.19 volt for 0.6 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
FUEL LEVEL SENSOR
FUEL LEVEL SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
FUEL LEVEL SENSOR SIGNAL AND GROUND CIRCUITS SHORTED TOGETHER
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off, wait 10 seconds, then turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. Disconnect the Fuel Level Sensor harness connector. Turn the ignition on. With the DRB, read the Fuel Level Sensor voltage. Is the voltage above 4.8 volts? Yes → Replace the Fuel Level Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0460-FUEL LEVEL SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Fuel Level Sensor harness connector. Measure the resistance between ground and the Fuel Level Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Fuel Level Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Fuel Level Sensor harness connector. Measure the resistance between the Fuel Level Sensor Signal circuit and Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Fuel Level Sensor Signal and Ground circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2.	All
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0480-FAN 1 CONTROL CIRCUIT EXCESSIVE CURRENT
P0480-FAN 1 CONTROL CIRCUIT SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0480-FAN 1 CONTROL CIRCUIT EXCESSIVE CURRENT.

When Monitored and Set Condition:

P0480-FAN 1 CONTROL CIRCUIT EXCESSIVE CURRENT

When Monitored: With the ignition on.

Set Condition: The ECM detects excessive current on the Low Speed Rad Fan Relay Control circuit.

P0480-FAN 1 CONTROL CIRCUIT SHORT CIRCUIT

When Monitored: With the ignition on and the ECM Low Speed Rad Fan Relay command on.

Set Condition: The ECM detects excessive current on the Low Speed Rad Fan Relay Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
LOW SPEED RADIATOR FAN RELAY
LOW SPEED RADIATOR FAN CONTROL CIRCUIT SHORTED TO VOLTAGE
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, actuate the Low Speed Radiator Fan Relay. Does the Radiator Fan cycle on and off? Yes → Go To 2 No → Go To 3	All

P0480-FAN 1 CONTROL CIRCUIT EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Install a substitute relay in place of the Low Speed Radiator Fan Relay. Turn the ignition on. With the DRB, actuate the Low Speed Radiator Fan Relay. Does the Radiator Fan cycle on and off? Yes → Replace the Low Speed Radiator Fan Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Remove the Low Speed Radiator Fan Relay from the PDC. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Low Speed Radiator Fan Control circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Low Speed Radiator Fan Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P0480-FAN 1 CONTROL CIRCUIT OPEN CIRCUIT
P0480-FAN 1 CONTROL CIRCUIT SHORT TO GROUND

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0480-FAN 1 CONTROL CIRCUIT OPEN CIRCUIT.

When Monitored and Set Condition:

P0480-FAN 1 CONTROL CIRCUIT OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Low Speed Rad Fan Relay command off.

Set Condition: The ECM does not detect voltage on the Low Speed Rad Fan Relay Control circuit.

P0480-FAN 1 CONTROL CIRCUIT SHORT TO GROUND

When Monitored: With the ignition on and the ECM Low Speed Rad Fan Relay command off.

Set Condition: The ECM does not detect voltage on the Low Speed Rad Fan Relay Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
LOW SPEED RADIATOR FAN RELAY
LOW SPEED RADIATOR FAN CONTROL CIRCUIT SHORTED TO GROUND
LOW SPEED RADIATOR FAN CONTROL CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, actuate the Low Speed Radiator Fan Relay. Does the Radiator Fan cycle on and off? Yes → Go To 2 No → Go To 3	All

P0480-FAN 1 CONTROL CIRCUIT OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Remove the Low Speed Radiator Fan Relay from the PDC. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit. Did the test light illuminate brightly? Yes → Go To 4 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Install a substitute relay in place of the Low Speed Radiator Fan Relay. Turn the ignition on. With the DRB, actuate the Low Speed Rad Fan Relay. Does the Radiator Fan cycle on and off? Yes → Replace the Low Speed Radiator Fan Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Remove the Low Speed Radiator Fan Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance between ground and the Low Speed Radiator Fan Control circuit. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the Low Speed Radiator Fan Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All

P0480-FAN 1 CONTROL CIRCUIT OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Remove the Low Speed Radiator Fan Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance of the Low Speed Radiator Fan Control circuit. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Low Speed Radiator Fan Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P0481-FAN 2 CONTROL CIRCUIT EXCESSIVE CURRENT
P0481-FAN 2 CONTROL CIRCUIT SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0481-FAN 2 CONTROL CIRCUIT EXCESSIVE CURRENT.

When Monitored and Set Condition:

P0481-FAN 2 CONTROL CIRCUIT EXCESSIVE CURRENT

When Monitored: With the ignition on and the ECM High Speed Rad Fan Relay command on.

Set Condition: The ECM detects excessive current on the High Speed Rad Fan Relay Control circuit.

P0481-FAN 2 CONTROL CIRCUIT SHORT CIRCUIT

When Monitored: With the ignition on and the ECM High Speed Rad Fan Relay command on.

Set Condition: The ECM detects excessive current on the High Speed Rad Fan Relay Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
HIGH SPEED RADIATOR FAN RELAY
HIGH SPEED RADIATOR FAN CONTROL CIRCUIT SHORTED TO VOLTAGE
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, actuate the High Speed Radiator Fan Relay. Does the Radiator Fan cycle on and off? Yes → Go To 2 No → Go To 3	All

P0481-FAN 2 CONTROL CIRCUIT EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Install a substitute relay in place of the High Speed Radiator Fan Relay. Turn the ignition on. With the DRB, actuate the High Speed Radiator Fan Relay. Does the Radiator Fan cycle on and off? Yes → Replace High Speed Radiator Fan Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Remove the High Speed Radiator Fan Relay from the PDC. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the High Speed Radiator Fan Control circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the High Speed Radiator Fan Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P0481-FAN 2 CONTROL CIRCUIT OPEN CIRCUIT
P0481-FAN 2 CONTROL CIRCUIT SHORT TO GROUND

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0481-FAN 2 CONTROL CIRCUIT OPEN CIRCUIT.

When Monitored and Set Condition:

P0481-FAN 2 CONTROL CIRCUIT OPEN CIRCUIT

When Monitored: With the ignition on and the ECM High Speed Rad Fan Relay command off.

Set Condition: The ECM does not detect voltage on the High Speed Rad Fan Relay Control circuit.

P0481-FAN 2 CONTROL CIRCUIT SHORT TO GROUND

When Monitored: With the ignition on and the ECM High Speed Rad Fan Relay command off.

Set Condition: The ECM does not detect voltage on the High Speed Rad Fan Relay Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
HIGH SPEED RADIATOR FAN RELAY
HIGH SPEED RADIATOR FAN CONTROL CIRCUIT SHORTED TO GROUND
HIGH SPEED RADIATOR FAN CONTROL CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, actuate the High Speed Radiator Fan Relay. Does the Radiator Fan cycle on and off? Yes → Go To 2 No → Go To 3	All

P0481-FAN 2 CONTROL CIRCUIT OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Remove the High Speed Radiator Fan Relay from the PDC. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit. Did the test light illuminate brightly? Yes → Go To 4 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Install a substitute relay in place of the High Speed Radiator Fan Relay. Turn the ignition on. With the DRB, actuate the High Speed Fan Relay. Does the Radiator Fan cycle on and off? Yes → Replace the High Speed Radiator Fan Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Remove the High Speed Radiator Fan Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance between ground and the High Speed Radiator Fan Control circuit. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the High Speed Radiator Fan Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All

P0481-FAN 2 CONTROL CIRCUIT OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Disconnect the High Speed Radiator Fan Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance of the High Speed Radiator Fan Control circuit. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the High Speed Radiator Fan Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:
P0501-VEHICLE SPEED SENSOR PLAUSIBILITY

When Monitored and Set Condition:

P0501-VEHICLE SPEED SENSOR PLAUSIBILITY

When Monitored: Engine temperature above 10.0°C. Battery voltage above 11.0 volts Transmission in drive gear. Brake Switch off (brakes not applied). Varying engine speed and load (indicating vehicle motion).

Set Condition: The vehicle speed message to the ECM indicates 0 mph when the ECM monitoring condition indicate that vehicle speed should be above 0 mph.

POSSIBLE CAUSES
INTERMITTENT CONDITION
CHECK FOR RELATED CONTROLLER ANTILOCK BRAKES DTCS
CHECK FOR RELATED TRANSMISSION CONTROL MODULE DTCS
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM displays multiple CAN Bus related DTC's, check the CAN Bus circuits at the ECM harness connector for proper connection before continuing with this test.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle. With the DRB, read the ECM DTC's. Does the DRB display this DTC? Yes → Go To 2 No → Go To 4	All
2	Turn the ignition on. With the DRB, check for Controller Antilock Brakes DTCs. **NOTE: The ECM Receives vehicle speed messages via CAB Bus from the ABS module. An interruption on the CAN Bus can cause this fault to set.** Are any related CAB DTCs present? Yes → Refer to symptom list for problems related to CAB DTCs before continuing. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0501-VEHICLE SPEED SENSOR PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
3	**NOTE: The TCM Receives vehicle speed messages via CAB Bus from the ABS module. An interruption on the CAN Bus can cause this fault to set.** Turn the ignition on. With the DRB, check the TCM for DTCs. Are any ABS CAN Bus Message or Vehicle Speed related TCM DTCs present? Yes → Replace the CAB in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
4	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0504-BRAKE SWITCH SIGNAL CIRCUITS PLAUSIBILITY WITH REDUNDANT CONTACT

When Monitored and Set Condition:

P0504-BRAKE SWITCH SIGNAL CIRCUITS PLAUSIBILITY WITH REDUNDANT CONTACT

When Monitored: With the ignition on.

Set Condition: The Primary Brake Switch Signal and Secondary Brake Switch Signal inputs to the ECM do not agree.

POSSIBLE CAUSES
INTERMITTENT CONDITION
BRAKE LAMP SWITCH - SENSE CKT OPEN
BRAKE LAMP SWITCH FUSED B+ CIRCUIT OPEN
BRAKE SWITCH SENSE CIRCUIT SHORTED TO GROUND
BRAKE LAMP SWITCH - OUTPUT OPEN
BRAKE SWITCH SENSE CIRCUIT OPEN
BRAKE SWITCH SENSE GROUND CIRCUIT OPEN
BRAKE LAMP SWITCH OUTPUT CIRCUIT SHORTED TO VOLTAGE
BRAKE LAMP SWITCH OUTPUT CIRCUIT OPEN
ENGINE CONTROL MODULE - BRAKE SWITCH SENSE
ENGINE CONTROL MODULE - INTERNAL
ENGINE CONTROL MODULE - PRIMARY BRAKE SIGNAL

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. While observing the PRIMARY BRAKE SWITCH status on the DRB display, press and release the brake pedal several times. Does the DRB display PRIMARY BRAKE SWITCH: PRESSED and RELEASED for the appropriate pedal position? Yes → Go To 2 No → Go To 11	All

P0504-BRAKE SWITCH SIGNAL CIRCUITS PLAUSIBILITY WITH REDUNDANT CONTACT — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition on. While observing the SECONDARY BRAKE SWITCH status on the DRB display, press and release the brake pedal several times. Does the DRB display SECONDARY BRAKE SWITCH: PRESSED and RELEASED for the appropriate pedal position Yes → Go To 3 No → Go To 4	All
3	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
4	Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Turn the ignition on. Measure the voltage between the Brake Switch Sense circuit and ground. Is the voltage above 9.0 volts? Yes → Go To 5 No → Go To 8	All
5	Disconnect the Brake Lamp Switch harness connector. Turn the ignition on. While monitoring the SECONDARY BRAKE SWITCH status with the DRB, connect a jumper wire between ground and the Secondary Brake Switch Sense circuit. Does the DRB display change from PRESSED to RELEASED? Yes → Adjust or replace the Brake Lamp Switch in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All

P0504-BRAKE SWITCH SIGNAL CIRCUITS PLAUSIBILITY WITH REDUNDANT CONTACT — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Measure the resistance between ground and the Secondary Brake Switch Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 7 No → Repair the Brake Switch Sense Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
7	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
8	Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Brake Switch Sense circuit. Is the resistance above 1000 ohms? Yes → Go To 9 No → Repair the Brake Switch Sense circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
9	Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Brake Switch Sense circuit. Is the resistance below 10.0 ohms? Yes → Go To 10 No → Repair the Brake Switch Sense circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
10	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
11	Disconnect the Brake Lamp Switch harness connector. Using a 12-volt test light connected to ground, check the Fused B+ circuit. Does the test light illuminate brightly? Yes → Go To 12 No → Repair the Brake Lamp Switch Fused B+ circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0504-BRAKE SWITCH SIGNAL CIRCUITS PLAUSIBILITY WITH REDUNDANT CONTACT — Continued

TEST	ACTION	APPLICABILITY
12	Disconnect the Brake Lamp Switch harness connector. Turn the ignition on. While monitoring the PRIM BRAKE SWITCH status with the DRB, connect a jumper wire between the Brake Lamp Switch Output circuit and the Fused B(+) circuit. Does the DRB display change from RELEASED to PRESSED? Yes → Adjust or replace the Brake Lamp Switch in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 13	All
13	Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage between the Brake Lamp Switch Output circuit and ground. Is the voltage above 1.0 volt? Yes → Repair the Brake Lamp Switch Output circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 14	All
14	Turn the ignition off. Disconnect the Brake Lamp Switch harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Brake Lamp Switch Output circuit. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Brake Lamp Switch Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P0513-SKIM SYSTEM INVALID KEY CODE RECEIVED
P0513-SKIM SYSTEM READ ACCESS TO EEPROM FAILURE
P0513-SKIM SYSTEM SKIS ERROR
P0513-SKIM SYSTEM WRITE ACCESS TO EEPROM FAILURE

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0513-SKIM SYSTEM INVALID KEY CODE RECEIVED.

When Monitored and Set Condition:

P0513-SKIM SYSTEM READ ACCESS TO EEPROM FAILURE

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal EEPROM fault.

P0513-SKIM SYSTEM SKIS ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal mismatch of the secret key code when performing an internal EEPROM check.

P0513-SKIM SYSTEM WRITE ACCESS TO EEPROM FAILURE

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal EEPROM fault.

POSSIBLE CAUSES
SKIM
INTERMITTENT CONDITION
CHECK FOR SKIM COMMUNICATION AND DTCS
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, check for Sentry Key Immobilizer Module communication and DTCs. Are any SKIS problems or DTCs present? Yes → Refer to symptom list for problems related to SKIM Communication and DTCs before continuing. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All

P0513-SKIM SYSTEM INVALID KEY CODE RECEIVED — Continued

TEST	ACTION	APPLICABILITY
2	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Turn the ignition on and off several times pausing 10 seconds between each key cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Go To 3 No → Go To 4	All
3	Replace and program the SKIM in accordance with the Service Information. Turn the ignition on. With the DRBIII®, erase ECM DTCs. Turn the ignition on and off several times pausing for 10 seconds between key cycles. With the DRBIII®, read ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → The test is complete. Perform ROAD TEST VERIFICATION - VER-2.	All
4	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0520- OIL PRESS SENSOR CIRCUIT MALF PLAUSIBILITY

When Monitored and Set Condition:

P0520- OIL PRESS SENSOR CIRCUIT MALF PLAUSIBILITY

When Monitored: At engine start-up.

Set Condition: The oil pressure signal is below the lower limit for 8 seconds after engine start-up.

POSSIBLE CAUSES
5-VOLT SUPPLY CIRCUIT OPEN
FCM - OIL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
FCM - OIL PRESSURE SENSOR SIGNAL SHORT TO GROUND
MECHANICAL PROBLEM
OIL PRESSURE SENSOR FAILURE
OIL PRESSURE SENSOR SIGNAL CIRCUIT OPEN
OIL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
OIL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO SENSOR GROUND
OIL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND CIRCUIT OPEN
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641 or P0651 is present with this DTC, diagnose DTCs P0641 and P0651 before diagnosing this DTC.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Start the engine several times, letting the engine run for at least 30 seconds at a time. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 10	All

P0520- OIL PRESS SENSOR CIRCUIT MALF PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
2	Refer to the Service Information and perform the Oil Pressure Test. Is the oil pressure within specification? Yes → Go To 3 No → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect the Oil Pressure Sensor harness connector. Turn the ignition on. Measure the voltage of the Oil Pressure Sensor Signal circuit. Select the appropriate voltage reading. Voltage is above 5.5 volts. Go To 4 Voltage is between 4.7 and 5.4 volts. Go To 5 Voltage is below 4.7 volts. Go To 7	All
4	Turn the ignition off. Disconnect the Oil Pressure Sensor harness connector. Disconnect the FCM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Oil Pressure Sensor Signal circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Oil Pressure Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance of the 5-Volt Supply circuit between the FCM harness connector and the Oil Pressure Sensor harness connector. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the 5-Volt Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0520- OIL PRESS SENSOR CIRCUIT MALF PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance of the Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Replace the Oil Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
7	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance of the Oil Pressure Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 8 No → Repair the Oil Pressure Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
8	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance between ground and the Oil Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 9 No → Repair the Oil Pressure Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
9	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance between Sensor Ground and the Oil Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Oil Pressure Sensor Signal circuit for a short to the Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All

P0520- OIL PRESS SENSOR CIRCUIT MALF PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
10	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO HIGH

When Monitored: With the engine running.

Set Condition: The Oil Pressure Sensor signal is above 4.8 volts for 0.5 seconds.

POSSIBLE CAUSES
ENGINE OIL PRESSURE SENSOR
FCM - OIL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
FCM - OIL PRESSURE SENSOR SIGNAL OPEN
OIL PRESSURE SENSOR SIGNAL CIRCUIT OPEN
OIL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND CIRCUIT OPEN
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Start the engine several times, letting the engine run for at least 30 seconds at a time. With the DRBIII®, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All

P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the Oil Pressure Sensor harness connector. Turn the ignition on. Measure the voltage of the Oil Pressure Sensor Signal circuit. Select the appropriate voltage reading. Voltage is above 5.5 volts. Go To 3 Voltage is between 4.7 and 5.4 volts. Go To 4 Voltage is below 4.7 volts. Go To 5	All
3	Turn the ignition off. Disconnect the Oil Pressure Sensor harness connector. Disconnect the FCM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Oil Pressure Sensor Signal circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Oil Pressure Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance of the Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Replace the Engine Oil Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance of the Oil Pressure Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Oil Pressure Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO LOW

When Monitored and Set Condition:

P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO LOW

When Monitored: With the engine running.

Set Condition: The Oil Pressure Sensor signal is below 0.19 volt for 0.5 seconds.

POSSIBLE CAUSES
ENGINE OIL PRESSURE SENSOR
FCM - OIL PRESSURE SENSOR SIGNAL SHORT TO GROUND
OIL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
OIL PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO SENSOR GROUND
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turing the ignition off for at least 10 seconds at a time. With the DRBIII®, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. Disconnect the Oil Pressure Sensor harness connector. Measure the voltage of the Oil Pressure Sensor Signal circuit. Is the voltage between 4.7 and 5.3 volts? Yes → Replace the Engine Oil Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0520-OIL PRESS SENSOR CKT MALF SIGNAL VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance between ground and the Oil Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Oil Pressure Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Oil Pressure Sensor harness connector. Measure the resistance between Sensor Ground and the Oil Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Oil Pressure Sensor Signal circuit for a short to Sensor Ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0530-A/C PRESSURE SENSOR CIRCUIT PLAUSIBILITY
P0530-A/C PRESSURE SENSOR CIRCUIT SIGNAL VOLTAGE TOO HIGH
P0530-A/C PRESSURE SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0530-A/C PRESSURE SENSOR CIRCUIT PLAUSIBILITY.

When Monitored and Set Condition:

P0530-A/C PRESSURE SENSOR CIRCUIT PLAUSIBILITY

When Monitored: With the ignition on.

Set Condition: An error occurs with the A/C Pressure CAN Bus message from the Front Control Module to the Engine Control Module.

P0530-A/C PRESSURE SENSOR CIRCUIT SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The A/C Pressure Sensor signal is above 4.74 volts for 0.6 seconds.

P0530-A/C PRESSURE SENSOR CIRCUIT SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The A/C Pressure Sensor signal is below 0.06 volt for 0.6 seconds.

POSSIBLE CAUSES
INTERMITTENT CONDITION
A/C PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO 5-VOLT SUPPLY CIRCUIT
A/C PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
A/C PRESSURE SENSOR GROUND CIRCUIT SHORTED TO VOLTAGE
5-VOLT SUPPLY CIRCUIT OPEN
A/C PRESSURE SENSOR
A/C PRESSURE SENSOR SIGNAL CIRCUIT OPEN
SENSOR GROUND CIRCUIT OPEN
A/C PRESSURE SENSOR
A/C PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
A/C PRESSURE SENSOR SIGNAL CIRCUIT SHORTED TO SENSOR GROUND CIRCUIT
FCM - 5-VOLT SUPPLY CIRCUIT

P0530-A/C PRESSURE SENSOR CIRCUIT PLAUSIBILITY — Continued

POSSIBLE CAUSES
FCM - A/C PRESSURE SENSOR SIGNAL
FCM - SIGNAL VOLTAGE HIGH

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: Ensure the A/C refrigerant System is properly charged per the Service Information.** Start the engine. With the DRBIII®, read the A/C Pressure Sensor voltage. Select the choice that best reflects the DRBIII® reading. Above 4.6 volts Go To 2 Between 0.7 and 4.6 volts Go To 9 Below 0.7 volt Go To 10	All
2	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Disconnect the FCM harness connector. Measure the resistance between the A/C Pressure Sensor Signal circuit and the 5-Volt Supply circuit in the A/C Pressure Sensor harness connector. Is the resistance above 1000 ohms? Yes → Go To 3 No → Repair the A/C Pressure Sensor Signal circuit for a short to the 5-Volt Supply circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Disconnect the FCM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Sensor Ground circuit at the A/C Pressure Sensor and FCM harness connectors. Is the voltage above 1.0 volt at either connector? Yes → Repair the A/C Pressure Sensor Ground circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4 **NOTE: If the Sensor Ground circuit had a short to voltage on it, the FCM may have been damaged. Retest the A/C Pressure Sensor circuit.**	All

P0530-A/C PRESSURE SENSOR CIRCUIT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Disconnect the FCM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the A/C Pressure Sensor Signal circuit in the A/C Pressure Sensor harness connector. Is the voltage above 5.5 volts? Yes → Repair the A/C Pressure Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Connect a jumper wire between the A/C Pressure Sensor Signal circuit and the Sensor Ground circuit. With the DRBIII®, monitor the A/C Pressure Sensor voltage. Turn the ignition on. Is the voltage below 1.0 volt? Yes → Replace the A/C Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All
6	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Disconnect the FCM harness connector. Measure the resistance of the A/C Pressure Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 7 No → Repair the A/C Pressure Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
7	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Measure the resistance between ground and the Sensor Ground circuit. Is the resistance below 30 ohms? Yes → Go To 8 No → Repair the Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
8	If there are no possible causes remaining, view repair. Repair Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0530-A/C PRESSURE SENSOR CIRCUIT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
9	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
10	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Turn the ignition on. Measure the voltage of the 5-Volt Supply circuit in the A/C Pressure Sensor harness connector. Is the voltage between 4.5 and 5.5 volts? Yes → Go To 11 No → Go To 15	All
11	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Turn the ignition on. With the DRBIII®, monitor the A/C Pressure Sensor voltage. Is the voltage above 0.7 volt? Yes → Replace the A/C Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 12	All
12	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Disconnect the FCM harness connectors. Measure the resistance between ground and the A/C Pressure Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 13 No → Repair the A/C Pressure Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All

P0530-A/C PRESSURE SENSOR CIRCUIT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
13	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Disconnect the FCM harness connectors. Measure the resistance between the A/C Pressure Sensor Signal circuit and the Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Go To 14 No → Repair the A/C Pressure Sensor Signal circuit for a short to the Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
14	If there are no possible causes remaining, view repair. Repair Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
15	Turn the ignition off. Disconnect the A/C Pressure Sensor harness connector. Disconnect the FCM harness connectors. Measure the resistance of the 5-Volt Supply circuit. Is the resistance below 10.0 ohms? Yes → Go To 16 No → Repair the 5-Volt Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
16	If there are no possible causes remaining, view repair. Repair Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P0560-ECM VOLTAGE TOO HIGH
P0560-ECM VOLTAGE TOO LOW

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0560-ECM VOLTAGE TOO HIGH.

When Monitored and Set Condition:

P0560-ECM VOLTAGE TOO HIGH

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

Set Condition:

P0560-ECM VOLTAGE TOO LOW

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

Set Condition:

POSSIBLE CAUSES
CHECKING ECM POWER AND GROUNDS
ECM
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. **NOTE: This DTC may be caused by a charging system problem. Refer to the Service Information and verify proper charging system operation before continuing.** Test drive the vehicle. Turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 3	All

P0560-ECM VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
2	Refer to the symptom list and perform the Checking the ECM Power and Ground test. Were any problem found with the ECM powers and grounds? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
3	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0564-S/C SWITCH #1 SIGNAL CIRCUIT PLAUSIBILITY
P0564-S/C SWITCH #1 SIGNAL CIRCUIT SIGNAL VOLTAGE TOO HIGH
P0564-S/C SWITCH #1 SIGNAL CIRCUIT SIGNAL VOLTAGE TOO LOW
P0564-S/C SWITCH #1 SIGNAL CIRCUIT STUCK SWITCH

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0564-S/C SWITCH #1 SIGNAL CIRCUIT PLAUSIBILITY.

POSSIBLE CAUSES
ECM - S/C SIGNAL CIRCUIT OPEN
ECM - S/C SIGNAL CIRCUIT SHORTED TO VOLTAGE
ECM - SENSOR GROUND OPEN
S/C SWITCH SIGNAL CIRCUIT OPEN
S/C SWITCH SIGNAL CIRCUIT OPEN
S/C SWITCH SIGNAL CIRCUIT SHORT TO GROUND
S/C SWITCH SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND OPEN
SPEED CONTROL SWITCHES

P0564-S/C SWITCH #1 SIGNAL CIRCUIT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition off. Disconnect the harness connectors from both S/C Switches. Turn the ignition on. Measure the voltage of the S/C Switch #1 Signal circuit at both S/C Switch harness connectors. Select the appropriate voltage reading. 4.5 to 5.5 volts at both connectors. Go To 2 4.5 to 5.5 volts at only one connector. Repair the S/C Switch Signal circuit that measured below 4.5 volts for an open. Perform SPEED CONTROL VERIFICATION - VER-4. Below 4.5 volts at both connectors. Go To 4 Above 5.5 volts for either measurement. Go To 6	All
2	Turn the ignition off. Disconnect both S/C Switch harness connectors. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit between each S/C Switch harness connector and the ECM harness connector. Is the resistance below 10.0 ohms for each measurement? Yes → Go To 3 No → Repair the Sensor Ground circuit for an open. Perform SPEED CONTROL VERIFICATION - VER-4.	All
3	Turn the ignition off. Disconnect one of the S/C Switch harness connectors. With the DRBIII® in Sensors, read the S/C Switch Voltage. While monitoring the DRB, connect a jumper wire between the S/C Switch #1 Signal circuit and the Sensor Ground circuit in the S/C Switch harness connector. Does the DRB display below 0.1 volt with the jumper wire connected? Yes → Replace the Speed Control Switches. Perform SPEED CONTROL VERIFICATION - VER-4. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform SPEED CONTROL VERIFICATION - VER-4.	All

P0564-S/C SWITCH #1 SIGNAL CIRCUIT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect both S/C Switch harness connectors. Disconnect the ECM harness connectors. Measure the resistance between the S/C Switch #1 Signal circuit between both S/C Switch harness connectors and the ECM harness connector. Is the resistance below 10.0 ohms for both measurements? Yes → Go To 5 No → Repair the S/C Switch #1 Signal circuit that measured above 10.0 ohms for an open. Perform SPEED CONTROL VERIFICATION - VER-4.	All
5	Turn the ignition off. Disconnect both S/C Switch harness connectors. Disconnect the ECM harness connectors. Measure the resistance between ground and the S/C Switch #1 Signal circuit. Is the resistance above 1000 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform SPEED CONTROL VERIFICATION - VER-4. No → Repair the S/C Switch #1 Signal circuit for a short to ground. Perform SPEED CONTROL VERIFICATION - VER-4.	All
6	Turn the ignition off. Disconnect both S/C Switch harness connectors. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the S/C Switch #1 Signal circuit. Is the voltage above 1.0 volt? Yes → Repair the S/C Switch #1 Signal circuit for a short to voltage. Perform SPEED CONTROL VERIFICATION - VER-4. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform SPEED CONTROL VERIFICATION - VER-4.	All

Symptom:

P0585-S/C SWITCH PLAUSIBILITY BETWEEN SWITCH #1 AND #2

When Monitored and Set Condition:

P0585-S/C SWITCH PLAUSIBILITY BETWEEN SWITCH #1 AND #2

When Monitored: With the ignition on.

Set Condition: The ECM detects a discrepency between S/C Switch #1 and S/C Switch #2 signals.

POSSIBLE CAUSES
INTERMITTENT CONDITION
HIGH RESISTANCE IN THE S/C SWITCH SIGNAL CIRCUIT
HIGH RESISTANCE IN THE S/C SWITCH GROUND CIRCUIT
S/C SWITCHES
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle and activate the Speed Control. At some point during the test drive, press each of the S/C Switch buttons. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. Disconnect the S/C Switch harness connectors. Disconnect the ECM harness connectors. Measure the resistance of the S/C Switch #1 Signal circuit and the S/C Switch #2 Signal circuit between each S/C Switch harness connector and the ECM harness connector. Is the resistance below 10.0 ohms for each measurement? Yes → Go To 3 No → Repair the S/C Switch Signal circuit(s) for high resistance. Perform SPEED CONTROL VERIFICATION - VER-4.	All

P0585-S/C SWITCH PLAUSIBILITY BETWEEN SWITCH #1 AND #2 — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the S/C Switch harness connectors. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit between each S/C Switch harness connector and the ECM harness connector. Is the resistance below 10.0 ohms for both measurements? Yes → Go To 4 No → Repair the S/C Switch Ground circuit for high resistance. Perform SPEED CONTROL VERIFICATION - VER-4.	All
4	Turn the ignition off. Replace the S/C Switches. Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle and activate the Speed Control. At some point during the test drive, press each of the S/C Switch buttons. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform SPEED CONTROL VERIFICATION - VER-4. No → The repair is complete. Perform SPEED CONTROL VERIFICATION - VER-4.	All
5—	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform SPEED CONTROL VERIFICATION - VER-4. No → Test Complete.	All

Symptom List:

P0589-S/C SWITCH #2 SIGNAL CIRCUIT PLAUSIBILITY
P0589-S/C SWITCH #2 SIGNAL CIRCUIT SIGNAL VOLTAGE TOO HIGH
P0589-S/C SWITCH #2 SIGNAL CIRCUIT SIGNAL VOLTAGE TOO LOW
P0589-S/C SWITCH #2 SIGNAL CIRCUIT STUCK SWITCH

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0589-S/C SWITCH #2 SIGNAL CIRCUIT PLAUSIBILITY.

POSSIBLE CAUSES
ECM - S/C SIGNAL CIRCUIT OPEN
ECM - S/C SIGNAL CIRCUIT SHORTED TO VOLTAGE
ECM - SENSOR GROUND OPEN
S/C SWITCH SIGNAL CIRCUIT OPEN
S/C SWITCH SIGNAL CIRCUIT OPEN
S/C SWITCH SIGNAL CIRCUIT SHORT TO GROUND
S/C SWITCH SIGNAL CIRCUIT SHORTED TO VOLTAGE
S/C SWITCH SIGNAL CIRCUIT SHORTED TO VOLTAGE
SENSOR GROUND OPEN
SPEED CONTROL SWITCHES

P0589-S/C SWITCH #2 SIGNAL CIRCUIT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition off. Disconnect the harness connectors from both S/C Switches. Turn the ignition on. Measure the voltage of the S/C Switch #2 Signal circuit at both S/C Switch harness connectors. Select the appropriate voltage reading. 4.5 to 5.5 volts at both connectors. Go To 2 4.5 to 5.5 volts at only one connector. Repair the S/C Switch Signal circuit that measured below 4.5 volts for an open. Perform SPEED CONTROL VERIFICATION - VER-4. Below 4.5 volts at both connectors. Go To 4 Above 5.5 volts for either measurement. Go To 6	All
2	Turn the ignition off. Disconnect both S/C Switch harness connectors. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit between each S/C Switch harness connector and the ECM harness connector. Is the resistance below 10.0 ohms for each measurement? Yes → Go To 3 No → Repair the Sensor Ground circuit for an open. Perform SPEED CONTROL VERIFICATION - VER-4.	All
3	Turn the ignition off. Disconnect one of the S/C Switch harness connectors. With the DRBIII® in Sensors, read the S/C Switch Voltage. While monitoring the DRB, connect a jumper wire between the S/C Switch #2 Signal circuit and the Sensor Ground circuit in the S/C Switch harness connector. Does the DRB display below 0.1 volt with the jumper wire connected? Yes → Replace the Speed Control Switches. Perform SPEED CONTROL VERIFICATION - VER-4. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform SPEED CONTROL VERIFICATION - VER-4.	All

P0589-S/C SWITCH #2 SIGNAL CIRCUIT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Disconnect both S/C Switch harness connectors. Disconnect the ECM harness connectors. Measure the resistance between the S/C Switch #2 Signal circuit between both S/C Switch harness connectors and the ECM harness connector. Is the resistance below 10.0 ohms for both measurements? Yes → Go To 5 No → Repair the S/C Switch #2 Signal circuit that measured above 10.0 ohms for an open. Perform SPEED CONTROL VERIFICATION - VER-4.	All
5	Turn the ignition off. Disconnect both S/C Switch harness connectors. Disconnect the ECM harness connectors. Measure the resistance between ground and the S/C Switch #2 Signal circuit. Is the resistance above 1000 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform SPEED CONTROL VERIFICATION - VER-4. No → Repair the S/C Switch #2 Signal circuit for a short to ground. Perform SPEED CONTROL VERIFICATION - VER-4.	All
6	Turn the ignition off. Disconnect both S/C Switch harness connectors. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the S/C Switch #2 Signal circuit. Is the voltage above 1.0 volt? Yes → Repair the S/C Switch #2 Signal circuit for a short to voltage. Perform SPEED CONTROL VERIFICATION - VER-4. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform SPEED CONTROL VERIFICATION - VER-4.	All

Symptom List:

P0600-ECM COMMUNICATION ERROR
P0602-ECM INVALID CODE WORD
P0606-ECM CHECKSUM ERROR
P0606-ECM DEVIATION ERROR
P0607-ECM INTERNAL ERROR
P0611-CAPACITOR VOLTAGE 1
P0611-CAPACITOR VOLTAGE 1
P0611-CAPACITOR VOLTAGE 1
P0611-CAPACITOR VOLTAGE 1
P0686-ECM VOLTAGE ERROR LOW
P0687-ECM VOLTAGE ERROR HIGH
P1136-ECM RECOVERY
P1168-ECM COMMUNICATION ERROR
P1169-ECM A/D CONVERTER ERROR
P1169-ECM A/D CONVERTER ERROR
P1169-ECM A/D CONVERTER ERROR
P1169-ECM A/D CONVERTER ERROR
P2226-BAROMETRIC PRESSURE CIRCUIT SIGNAL VOLTAGE TOO HIGH
P2226-BAROMETRIC PRESSURE CIRCUIT SIGNAL VOLTAGE TOO LOW
P2226-BAROMETRIC PRESSURE SENSOR ERROR
P2226-BAROMETRIC PRESSURE SENSOR ERROR

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0600-ECM COMMUNICATION ERROR.

When Monitored and Set Condition:

P0600-ECM COMMUNICATION ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P0602-ECM INVALID CODE WORD

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P0606-ECM CHECKSUM ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P0600-ECM COMMUNICATION ERROR — Continued

P0606-ECM DEVIATION ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P0607-ECM INTERNAL ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P0611-CAPACITOR VOLTAGE 1

When Monitored: With the engine running. During every 180° of engine rotation.

Set Condition: The ECM determines that the capacitor voltage is greater than 100 volts.

P0611-CAPACITOR VOLTAGE 1

When Monitored: With the engine running. During every 180° of engine rotation.

Set Condition: The ECM determines that the capacitor voltage is greater than 100 volts.

P0611-CAPACITOR VOLTAGE 1

When Monitored: With the engine running. During every 180° of engine rotation.

Set Condition: The ECM determines that the capacitor voltage is greater than 100 volts.

P0611-CAPACITOR VOLTAGE 1

When Monitored: With the engine running. During every 180° of engine rotation.

Set Condition: The ECM determines that the capacitor voltage is greater than 100 volts.

P1168-ECM COMMUNICATION ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P1169-ECM A/D CONVERTER ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P1169-ECM A/D CONVERTER ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P1169-ECM A/D CONVERTER ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P0600-ECM COMMUNICATION ERROR — Continued

P1169-ECM A/D CONVERTER ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

P2226-BAROMETRIC PRESSURE CIRCUIT SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Barometric Pressure Sensor Signal is above 4.86 volts.

P2226-BAROMETRIC PRESSURE CIRCUIT SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Barometric Pressure Sensor Signal is above 4.86 volts.

P2226-BAROMETRIC PRESSURE SENSOR ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure

P2226-BAROMETRIC PRESSURE SENSOR ERROR

When Monitored: With the ignition on.

Set Condition: The ECM detects an internal failure.

POSSIBLE CAUSES
ENGINE CONTROL MODULE
INTERMITTENT CONDITION

P0600-ECM COMMUNICATION ERROR — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: This code can be caused by an intermittent problem in the wiring and connectors to the Engine Control Module. Inspect the Engine Control Module harness connector and associated wiring for signs of poor terminal contact.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0610-AUTOMATIC TRANSMISSION CODED AS MANUAL TRANSMISSION
P0610-MANUAL TRANSMISSION CODED AS AUTOMATIC TRANSMISSION

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0610-AUTOMATIC TRANSMISSION CODED AS MANUAL TRANSMISSION.

When Monitored and Set Condition:

P0610-AUTOMATIC TRANSMISSION CODED AS MANUAL TRANSMISSION

When Monitored: With the ignition on.

Set Condition: The ECM detects an automatic transmission when it has been programmed for a manual transmission.

P0610-MANUAL TRANSMISSION CODED AS AUTOMATIC TRANSMISSION

When Monitored: With the ignition on.

Set Condition: The ECM detects a manual transmission when it has been programmed for an automatic transmission.

POSSIBLE CAUSES
ENGINE CONTROL MODULE
VERIFY ECM PROGRAMMING

TEST	ACTION	APPLICABILITY
1	Turn the Ignition on. With the DRBIII®, erase the ECM DTCs. With the DRBIII®, verify that the ECM is properly coded for the options and components that the vehicle is equipped with. **NOTE: Reprogram the ECM with correct information if necessary.** Start and idle the engine. With the DRBIII®, read ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test complete. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P0615-STARTER RELAY CIRCUIT EXCESSIVE CURRENT
P0615-STARTER RELAY CIRCUIT OPEN CIRCUIT
P0616-STARTER RELAY CIRCUIT SHORT TO GROUND
P0617-STARTER RELAY CIRCUIT SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0615-STARTER RELAY CIRCUIT EXCESSIVE CURRENT.

When Monitored and Set Condition:

P0615-STARTER RELAY CIRCUIT EXCESSIVE CURRENT

When Monitored: With the ignition on and the ECM Starter Relay command on.

Set Condition: The ECM detects excessive current on the Starter Relay Control circuit.

P0615-STARTER RELAY CIRCUIT OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Starter Relay command off.

Set Condition: The ECM does not detect voltage on the Starter Relay Control circuit.

P0616-STARTER RELAY CIRCUIT SHORT TO GROUND

When Monitored: With the ignition on and the ECM Starter Relay command off.

Set Condition: The ECM does not detect voltage on the Starter Relay Control circuit.

P0617-STARTER RELAY CIRCUIT SHORT CIRCUIT

When Monitored: With the ignition on and the ECM Starter Relay command on.

Set Condition: The ECM detects excessive current on the Starter Relay Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
STARTER RELAY
IGNITION SWITCH START OUTPUT OPEN
STARTER RELAY CONTROL CIRCUIT OPEN
STARTER RELAY CONTROL CIRCUIT SHORTED TO GROUND
STARTER RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE
ENGINE CONTROL MODULE

P0615-STARTER RELAY CIRCUIT EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Attempt to start the engine several times, pausing for at least 10 seconds between each attempt. Turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off. Install a substitute relay in place of the Starter Relay. Turn the ignition on. With the DRBIII®, erase DTCs. Attempt to start the engine several times, pausing for at least 10 seconds between each attempt. Turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 3 No → Replace the Starter Relay. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Remove the Starter Relay from the PDC. Disconnect the ECM harness connectors. Turn the Ignition Switch to the Start position. Using a 12-volt test light connected to ground, check the Ignition Switch Start Output circuit at the Starter Relay connector in the PDC. Using a 12-volt test light connected to ground, check the Ignition Switch Start Output circuit at the ECM C2 harness connector cavity 22. Does the test light illuminate brightly for both circuit checks? Yes → Go To 4 No → Repair the Ignition Switch Start Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Remove the Starter Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance of the Starter Relay Control circuit between the ECM harness connector and the PDC connector. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Starter Relay Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0615-STARTER RELAY CIRCUIT EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Remove the Starter Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance between ground and the Starter Relay Control circuit. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the Starter Relay Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Remove the Starter Relay. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Starter Relay Control circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Starter Relay Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0641-SENSOR SUPPLY 1 VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0641-SENSOR SUPPLY 1 VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The ECM detects a short to voltage on the Sensor Supply #1 circuit which supplies 5-volts to the CMP Sensor and the APP Sensor #1.

POSSIBLE CAUSES
WIRING INSPECTION
APP SENSOR #1 5 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE
CMP SENSOR 5 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off for 10 seconds. Turn the ignition on. Monitor the DRB for ECM DTCs. Did this DTC reset? Yes → Go To 2 No → Go To 4	All
2	Turn the ignition off. Disconnect the Accelerator Pedal Position Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Accelerator Pedal Position Sensor #1 5-Volt Supply circuit. Is the voltage below 1.0 volt? Yes → Go To 3 No → Repair the APP #1 5-Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. **NOTE: Remove the jumper wire and reinstall the ASD Relay.**	All

P0641-SENSOR SUPPLY 1 VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Camshaft Position Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Camshaft Position Sensor 5-Volt Supply circuit. Is the voltage below 1.0 volt? Yes → Go To 4 No → Repair the CMP Sensor 5-Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. **NOTE: Remove the jumper wire and reinstall the ASD Relay.**	All
4	Turn the ignition off. Inspect the CMP Sensor 5-Volt supply circuit between the CMP harness connector and the ECM harness connector for possible shorts to other circuits. Inspect the APP Sensor #1 5-Volt supply circuit between the APP Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Were any problems found? Yes → Repair shorted circuit as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:
P0641-SENSOR SUPPLY 1 VOLTAGE TOO LOW

When Monitored and Set Condition:

P0641-SENSOR SUPPLY 1 VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The ECM detects low voltage on the Sensor Supply #1 circuit which supplies 5-volts to the CMP Sensor and the APP Sensor #1.

POSSIBLE CAUSES
WIRING INSPECTION
INTERMITTENT CONDITION
5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND
ACCELERATOR PEDAL POSITION SENSOR
CAMSHAFT POSITION SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Monitor the DRBIII® for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the CMP Sensor harness connector. Turn the ignition on. Measure the voltage of the CMP Sensor 5-Volt Supply circuit. Is the voltage above 4.6 volts? Yes → Replace the Camshaft Position Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0641-SENSOR SUPPLY 1 VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Ensure all connectors are reconnected. Turn the ignition off. Disconnect the APP Sensor harness connector. Turn the ignition on. Measure the voltage of the APP Sensor #1 5-Volt Supply circuit. Is the voltage above 4.6 volts? Yes → Replace the Accelerator Pedal Position Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the CMP Sensor harness connector. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the CMP Sensor 5-Volt Supply circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the 5-Volt Supply circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Inspect the CMP Sensor 5-Volt supply circuit between the CMP harness connector and the ECM harness connector for possible shorts to other circuits. Inspect the APP Sensor #1 5-Volt supply circuit between the APP Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Were any problems found? Yes → Repair shorted circuit as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0645-A/C CLUTCH RELAY CIRCUIT EXCESSIVE CURRENT
P0645-A/C CLUTCH RELAY CIRCUIT SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0645-A/C CLUTCH RELAY CIRCUIT EXCESSIVE CURRENT.

When Monitored and Set Condition:

P0645-A/C CLUTCH RELAY CIRCUIT EXCESSIVE CURRENT

When Monitored: With the ignition on and the ECM A/C Clutch Relay command on.

Set Condition: The ECM detects excessive current on the A/C Clutch Relay Control circuit.

P0645-A/C CLUTCH RELAY CIRCUIT SHORT CIRCUIT

When Monitored: With the ignition on and the ECM A/C Clutch Relay command on.

Set Condition: The ECM detects excessive current on the A/C Clutch Relay Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
A/C CLUTCH RELAY
A/C CLUTCH RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE
ECM

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, actuate the A/C Clutch Relay. Is the A/C Clutch Relay clicking? Yes → Go To 2 No → Go To 3	All

P0645-A/C CLUTCH RELAY CIRCUIT EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Remove the A/C Clutch Relay from the PDC. Turn the ignition on. Using a 12-volt test light connected to 12-volts, probe the A/C Clutch Relay Control circuit in the PDC. With the DRBIII®, actuate the A/C Clutch Relay. Does the test light cycle on and off? Yes → Replace the A/C Clutch Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Remove the A/C Clutch Relay from the PDC. Disconnect the ECM harness connector. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the A/C Clutch Relay Control circuit. Is the voltage above 1.0 volt? Yes → Repair the A/C Clutch Relay Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P0645-A/C CLUTCH RELAY CIRCUIT OPEN CIRCUIT
P0645-A/C CLUTCH RELAY CIRCUIT SHORT TO GROUND

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0645-A/C CLUTCH RELAY CIRCUIT OPEN CIRCUIT.

When Monitored and Set Condition:

P0645-A/C CLUTCH RELAY CIRCUIT OPEN CIRCUIT

When Monitored: With the ignition on and the ECM A/C Clutch Relay command off.

Set Condition: The ECM does not detect voltage on the A/C Clutch Relay Control circuit.

P0645-A/C CLUTCH RELAY CIRCUIT SHORT TO GROUND

When Monitored: With the ignition on and the ECM A/C Clutch Relay command off.

Set Condition: The ECM does not detect voltage on the A/C Clutch Relay Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
FUSED ASD RELAY OUTPUT CIRCUIT OPEN
A/C CLUTCH RELAY
A/C CLUTCH RELAY CONTROL CKT OPEN
A/C CLUTCH RELAY CONTROL CIRCUIT SHORT TO GROUND
ECM

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, actuate the A/C Clutch Relay. Is the A/C Clutch Relay clicking? Yes → Go To 2 No → Go To 3	All

P0645-A/C CLUTCH RELAY CIRCUIT OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Remove the A/C Clutch Relay from the PDC. Turn the ignition on. Using a 12-volt test light connected to ground, probe the Fused ASD Relay Output circuit in the PDC. Does the test light illuminate? Yes → Go To 4 No → Repair the Fused ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Remove the A/C Clutch Relay from the PDC. Turn the ignition on. Using a 12-volt test light connected to 12-volts, probe the A/C Clutch Relay Control circuit in the PDC. With the DRBIII®, actuate the A/C Clutch Relay. Does the test light cycle on and off? Yes → Replace the A/C Clutch Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Remove the A/C Clutch Relay from the PDC. Disconnect the ECM harness connector. Measure the resistance of the A/C Clutch Relay Control circuit. Is the resistance below 10.0 ohms? Yes → Go To 6 No → Repair the A/C Clutch Relay Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0645-A/C CLUTCH RELAY CIRCUIT OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Remove the A/C Clutch Relay from the PDC. Disconnect the ECM harness connector. Measure the resistance between ground and the A/C Clutch Relay Control circuit. Is the resistance below 10.0 ohms? Yes → Repair the A/C Clutch Relay Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 7	All
7	If there are no possible causes remaining, view repair. Repair Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:
P0651-SENSOR SUPPLY 2 VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0651-SENSOR SUPPLY 2 VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The ECM detects a short to voltage on the Sensor Supply #2 circuit which supplies 5-volts to the MAF Sensor, Fuel Pressure Sensor and Boost Pressure Sensor.

POSSIBLE CAUSES
WIRING INSPECTION
INTERMITTENT CONDITION
BOOST PRESSURE SENSOR 5 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE
ENGINE CONTROL MODULE
FUEL PRESSURE SENSOR 5 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE
MAF SENSOR
MAF SENSOR 5 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off for 10 seconds. Turn the ignition on. Monitor the DRB for ECM DTCs. Did this DTC reset? Yes → Go To 2 No → Go To 7	All

P0651-SENSOR SUPPLY 2 VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Fuel Pressure Sensor 5-Volt Supply circuit. Is the voltage below 1.0 volt? Yes → Go To 3 No → Repair the Fuel Pressure Sensor 5-Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. **NOTE: Remove the jumper wire and reinstall the ASD Relay.**	All
3	Turn the ignition off. Disconnect the Boost Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Boost Pressure Sensor 5-Volt Supply circuit. Is the voltage below 1.0 volt? Yes → Go To 4 No → Repair the Boost Pressure Sensor 5-Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. **NOTE: Remove the jumper wire and reinstall the ASD Relay.**	All
4	Turn the ignition on. While back probing the MAF Sensor harness connector, measure the voltage of the MAF Sensor 5-Volt Supply circuit. Is the voltage below 5.5 volts? Yes → Go To 6 No → Go To 5	All
5	Turn the ignition off. Disconnect the MAF Sensor harness connector. Turn the ignition on. Measure the voltage on the MAF Sensor 5-Volt Supply circuit at the MAF Sensor harness connector. Is the voltage below 5.5 volt? Yes → Replace the MAF Sensor Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All

P0651-SENSOR SUPPLY 2 VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Inspect the Boost Pressure Sensor 5-Volt supply circuit between the Boost Pressure Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Inspect the Fuel Pressure Sensor 5-Volt supply circuit between the Fuel Pressure Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Inspect the MAF Sensor 5-Volt supply circuit between the MAF Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Were any problems found? Yes → Repair shorted circuit as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0651-SENSOR SUPPLY 2 VOLTAGE TOO LOW

When Monitored and Set Condition:

P0651-SENSOR SUPPLY 2 VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The ECM detects a low voltage on the Sensor Supply #2 circuit which supplies 5-volts to the MAF Sensor, Fuel Pressure Sensor and Boost Pressure Sensor.

POSSIBLE CAUSES
WIRING INSPECTION
INTERMITTENT CONDITION
5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND
BOOST PRESSURE SENSOR
FUEL PRESSURE SENSOR
MAF SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off for 10 seconds. Turn the ignition on. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off. Disconnect the MAF Sensor harness connector. Turn the ignition on. Measure the voltage of the MAF Sensor 5-Volt Supply circuit. Is the voltage above 4.6 volts? Yes → Replace the Mass Air Flow Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0651-SENSOR SUPPLY 2 VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Turn the ignition on. Measure the voltage of the Fuel Pressure Sensor 5-Volt Supply circuit. Is the voltage above 4.6 volts? Yes → Replace the Fuel Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Ensure all connectors are reconnected. Turn the ignition off. Disconnect the Boost Pressure Sensor harness connector. Turn the ignition on. Measure the voltage of the Boost Pressure Sensor 5-Volt Supply circuit. Is the voltage above 4.6 volts? Yes → Replace the Boost Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Disconnect the Boost Pressure Sensor harness connector. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the Mass Air Flow Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Mass Air Flow Sensor 5-Volt Supply circuit. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the 5-Volt Supply circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Inspect the Boost Pressure Sensor 5-Volt supply circuit between the Boost Pressure Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Inspect the Mass Air Flow Sensor 5-Volt supply circuit between the Mass Air Flow Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Inspect the Fuel Pressure Sensor 5-Volt supply circuit between the Fuel Pressure Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Were any problems found? Yes → Repair shorted circuit as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0651-SENSOR SUPPLY 2 VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
7	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0670-GLOW PLUG CONTROLLER CIRCUIT MALFUNCTION
P0683-GLOW PLUG MODULE SIGNAL CIRCUIT MALFUNCTION

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0670-GLOW PLUG CONTROLLER CIRCUIT MALFUNCTION.

POSSIBLE CAUSES
ENGINE CONTROL MODULE
GLOW PLUG MODULE
GLOW PLUG MODULE SIGNAL/CONTROL CIRCUIT OPEN
GLOW PLUG MODULE SIGNAL/CONTROL CIRCUIT SHORTED TO GROUND
GLOW PLUG MODULE SIGNAL/CONTROL CIRCUIT SHORTED TO VOLTAGE
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. Turn the ignition on and wait at least 90 seconds. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the Glow Plug Module harness connectors. Disconnect the ECM harness connectors. Measure the resistance of the Glow Plug Module Signal circuit. Measure the resistance of the Glow Plug Module Control circuit. Is the resistance below 10.0 ohms for both measurements? Yes → Go To 3 No → Repair the Glow Plug Module circuit(s) that measured above 10.0 ohms for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P0670-GLOW PLUG CONTROLLER CIRCUIT MALFUNCTION — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Glow Plug Module harness connectors. Disconnect the ECM harness connectors. Measure the resistance between ground and the Glow Plug Module Signal circuit. Measure the resistance between ground and the Glow Plug Module Control circuit. Is the resistance above 1000 ohms for both measurements? Yes → Go To 4 No → Repair the Glow Plug Module circuit(s) that measured below 1000 ohms for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Glow Plug Module harness connectors. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Measure the voltage of the Glow Plug Module Signal circuit. Measure the voltage of the Glow Plug Module Control circuit. Is the voltage below 1.0 volt for both measurements? Yes → Go To 5 No → Repair the Glow Plug Module circuit(s) that measured above 1.0 volt for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Replace the Glow Plug Module in accordance with the Service Information. Reconnect all connectors. Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

P0670-GLOW PLUG CONTROLLER CIRCUIT MALFUNCTION — Continued

TEST	ACTION	APPLICABILITY
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0671-GLOW PLUG 1 PLUG FAILURE
P0671-GLOW PLUG 1 SHORT CIRCUIT
P0672-GLOW PLUG 2 PLUG FAILURE
P0672-GLOW PLUG 2 SHORT CIRCUIT
P0673-GLOW PLUG 3 PLUG FAILURE
P0673-GLOW PLUG 3 SHORT CIRCUIT
P0674-GLOW PLUG 4 PLUG FAILURE
P0674-GLOW PLUG 4 SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0671-GLOW PLUG 1 PLUG FAILURE.

When Monitored and Set Condition:

P0671-GLOW PLUG 1 PLUG FAILURE

When Monitored: With the ignition on and the Glow Plug Module Glow Plug command on.

P0671-GLOW PLUG 1 SHORT CIRCUIT

When Monitored: With the ignition on and the Glow Plug Module Glow Plug command on.

Set Condition: The Glow Plug Module Detects excessive current on the Glow Plug No. 1 Output circuit.

P0672-GLOW PLUG 2 PLUG FAILURE

When Monitored: With the ignition on and the Glow Plug Module Glow Plug command on.

P0672-GLOW PLUG 2 SHORT CIRCUIT

When Monitored: With the ignition on and the Glow Plug Module Glow Plug command on.

Set Condition: The Glow Plug Module Detects excessive current on the Glow Plug No. 2 Output circuit.

P0673-GLOW PLUG 3 PLUG FAILURE

When Monitored: With the ignition on and the Glow Plug Module Glow Plug command on.

P0671-GLOW PLUG 1 PLUG FAILURE — Continued

P0673-GLOW PLUG 3 SHORT CIRCUIT

When Monitored: With the ignition on and the Glow Plug Module Glow Plug command on.

Set Condition: The Glow Plug Module Detects excessive current on the Glow Plug No. 3 Output circuit.

P0674-GLOW PLUG 4 PLUG FAILURE

When Monitored: With the ignition on and the Glow Plug Module Glow Plug command on.

P0674-GLOW PLUG 4 SHORT CIRCUIT

When Monitored: With the ignition on and the Glow Plug Module Glow Plug command on.

Set Condition: The Glow Plug Module Detects excessive current on the Glow Plug No. 4 Output circuit.

POSSIBLE CAUSES
GLOW PLUG
GLOW PLUG CONTROL CIRCUIT OPEN
GLOW PLUG CONTROL CIRCUIT SHORTED TO GROUND
GLOW PLUG CONTROL CIRCUIT SHORTED TO VOLTAGE
GLOW PLUG MODULE
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Perform several ignition cycles leaving the ignition on for at least 10 seconds then off for 10 seconds. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All

P0671-GLOW PLUG 1 PLUG FAILURE — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect each Glow Plug harness connector. Disconnect the Glow Plug Module harness connector. Measure the resistance of each Glow Plug Control circuit. Is the resistance below 10.0 ohms for each circuit? Yes → Go To 3 No → Repair the appropriate Glow Plug Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect each Glow Plug harness connector. Disconnect the Glow Plug Module harness connector. Measure the resistance between ground and each Glow Plug Control circuit. Is the resistance below 1000 ohms for any of the measurements? Yes → Repair the appropriate Glow Plug Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect each Glow Plug harness connector. Disconnect the Glow Plug Module harness connector. Turn the ignition on. Measure the voltage of each Glow Plug Control circuit. Is the voltage below 1.0 volt for each circuit? Yes → Go To 5 No → Repair the appropriate Glow Plug Control circuit for a short to voltage Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. With the DRBIII®, erase ECM DTCs. Refer to the Service Information and perform the Glow Plug Test on each Glow plug. Did each Glow Plug pass the test? Yes → Replace the Glow Plug Module. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the appropriate Glow Plug in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P0671-GLOW PLUG 1 PLUG FAILURE — Continued

TEST	ACTION	APPLICABILITY
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO EARLY

When Monitored and Set Condition:

P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO EARLY

When Monitored: During after-run.

Set Condition: The internal ECM timer determines that the ASD Relay has shut off before the AFTER-RUN mode of operation has been completed.

POSSIBLE CAUSES
CHECK FOR OTHER DTCS
INTERMITTENT CONDITION
SUBSTITUTE ASD RELAY
ASD RELAY CONTROL CIRCUIT OPEN INTERMITTENTLY
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, check for additional DTCs. Are other DTCs present? Yes → Refer to the Symptom List for diagnosis of the other DTCs before continuing. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All
2	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Perform several ignition key cycles, pausing for at least 10 seconds between each cycle. Turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 3 No → Go To 5	All

P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO EARLY — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Install a substitute relay in place of the ASD Relay. Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several ignition key cycles, pausing for at least 10 seconds between each cycle. Turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 4 No → Replace the ASD Relay. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Remove the ASD Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance of the ASD Relay Control circuit while wiggling the wiring harness and connectors between the ECM and the PDC. Was the resistance above 5.0 ohms at any time while wiggling the wiring harness and connectors? Yes → Repair the ASD Relay Control circuit for an intermittent open. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO LATE

When Monitored and Set Condition:

P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO LATE

When Monitored: During after-run.

Set Condition: The internal ECM timer determines that the ASD Relay remains on too long when AFTER-RUN mode of operation has been completed.

POSSIBLE CAUSES
CHECK FOR OTHER DTCS
INTERMITTENT CONDITION
SUBSTITUTE ASD RELAY
ASD RELAY CONTROL CIRCUIT SHORTED TO GROUND INTERMITTENTLY
ASD RELAY OUTPUT CIRCUIT SHORTED TO VOLTAGE
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, check for additional DTCs. Are other DTCs present? Yes → Refer to the Symptom List for diagnosis of the other DTCs before continuing. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All
2	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Perform several ignition key cycles, pausing for at least 10 seconds between each cycle. Turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 3 No → Go To 6	All

P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO LATE — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Install a substitute relay in place of the ASD Relay. Turn the ignition on. With the DRBIII®, erase DTCs. Perform several ignition key cycles, pausing for at least 10 seconds between each cycle. Turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 4 No → Replace the ASD Relay. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Remove the ASD Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance between ground and the ASD Relay Control circuit while wiggling the wiring harness and connectors. Was the resistance below 1000 ohms at any time while wiggling the wiring harness and connectors? Yes → Repair the ASD Relay Control circuit for an intermittent short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition off. Remove the ASD Relay from the PDC. Turn the ignition on. Measure the voltage of the ASD Relay Output circuit. Is the voltage below 0.5 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the ASD Relay Output circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

P0685-ASD RELAY CONTROL CIRCUIT SHUTS OFF TOO LATE — Continued

TEST	ACTION	APPLICABILITY
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0697-SENSOR SUPPLY 3 VOLTAGE TOO LOW

When Monitored and Set Condition:

P0697-SENSOR SUPPLY 3 VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The ECM detects low voltage on the Sensor Supply #3 circuit which supplies 5-volts to the Inlet Pressure Sensor and the APP Sensor #2.

POSSIBLE CAUSES
WIRING INSPECTION
INTERMITTENT CONDITION
5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND
ACCELERATOR PEDAL POSITION SENSOR
INLET PRESSURE SENSOR
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off for 10 seconds. Turn the ignition on. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Turn the ignition on. Measure the voltage of the Inlet Pressure Sensor 5-Volt Supply circuit. Is the voltage above 4.6 volts? Yes → Replace the Inlet Pressure Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P0697-SENSOR SUPPLY 3 VOLTAGE TOO LOW — Continued

TEST	ACTION	APPLICABILITY
3	Ensure all connectors are reconnected. Turn the ignition off. Disconnect the APP Sensor harness connector. Turn the ignition on. Measure the voltage of the APP Sensor #2 5-Volt Supply circuit. Is the voltage above 4.6 volts? Yes → Replace the Accelerator Pedal Position Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Inlet Pressure Sensor 5-Volt Supply circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the 5-Volt Supply circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Inspect the Inlet Pressure Sensor 5-Volt supply circuit between the Inlet Pressure Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Inspect the APP Sensor #1 5-Volt supply circuit between the APP Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Were any problems found? Yes → Repair shorted circuit as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P0697-SENSOR SUPPLY 3 VOLTAGE TOO HIGH

When Monitored and Set Condition:

P0697-SENSOR SUPPLY 3 VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The ECM detects a short to voltage on the Sensor Supply #3 circuit which supplies 5-volts to the Inlet Pressure Sensor and the APP Sensor #2.

POSSIBLE CAUSES
WIRING INSPECTION
INTERMITTENT CONDITION
APP SENSOR #2 5 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE
ENGINE CONTROL MODULE
INLET PRESSURE SENSOR 5 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off for 10 seconds. Turn the ignition on. Monitor the DRB for ECM DTCs. Did this DTC reset? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. Disconnect the Accelerator Pedal Position Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Accelerator Pedal Position Sensor #2 5-Volt Supply circuit. Is the voltage below 1.0 volt? Yes → Go To 3 No → Repair the APP #2 5-Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. **NOTE: Remove the jumper wire and reinstall the ASD Relay.**	All

P0697-SENSOR SUPPLY 3 VOLTAGE TOO HIGH — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Inlet Pressure Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Inlet Pressure Sensor 5-Volt Supply circuit. Is the voltage below 1.0 volt? Yes → Go To 4 No → Repair the Inlet Pressure Sensor 5-Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. **NOTE: Remove the jumper wire and reinstall the ASD Relay.**	All
4	Turn the ignition off. Inspect the Inlet Pressure Sensor 5-Volt supply circuit between the Inlet Pressure Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Inspect the APP Sensor #2 5-Volt supply circuit between the APP Sensor harness connector and the ECM harness connector for possible shorts to other circuits. Were any problems found? Yes → Repair shorted circuit as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

P0700-TCM DTC

When Monitored and Set Condition:

P0700-TCM DTC

When Monitored: With the ignition on.

Set Condition: The ECM recieves a CAN Bus message indicating the presence of a DTC in the TCM.

POSSIBLE CAUSES
VERIFY CURRENT DTC

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: This code was set in the ECM by the Transmission Control Module to indicate a transmission fault. Diagnosis of transmission faults should be done using the Transmission Diagnostic Information.** **NOTE: When repairs have been completed, the ECM and TCM must have codes cleared.** Turn the ignition on. With the DRBIII®, erase ECM DTCs only. With the DRBIII®, read ECM DTCs. Are there any TCM DTCs present in the ECM? Yes → Refer to Transmission Diagnostic Information for the related symptom(s). No → Test Complete.	All

Symptom List:

P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY
P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY 2
P0836-TRANSFER CASE POSITION SENSOR SIGNAL VOLTAGE TOO HIGH
P0836-TRANSFER CASE POSITION SENSOR SIGNAL VOLTAGE TOO LOW

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY.

When Monitored and Set Condition:

P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY

When Monitored: With the ignition on. No other T-Case Position Sensor DTC's present.

Set Condition: The ECM detects a voltage signal from the transfer case switch that does not fall into a valid switch position voltage range.

P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY 2

When Monitored: With the ignition on. No other T-Case Position Sensor DTC's present.

Set Condition: The ECM detects a voltage signal from the transfer case switch that does not fall into a valid switch position voltage range.

P0836-TRANSFER CASE POSITION SENSOR SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Transfer Case Position Sensor signal is above 4.8 volts for 0.5 seconds.

P0836-TRANSFER CASE POSITION SENSOR SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Transfer Case Position Sensor signal is below 0.14 volt for 0.5 seconds.

POSSIBLE CAUSES
TRANSFER CASE POSITION SENSOR
INTERMITTENT WIRING AND CONNECTORS
TRANSFER CASE POSITION SENSOR SIGNAL CIRCUIT OPEN
TRANSFER CASE POSITION SENSOR SIGNAL CIRCUIT SHORT TO GROUND
TRANSFER CASE POSITION SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE
TRANSFER CASE POSITION SENSOR SIGNAL CIRCUIT SHORT TO SENSOR GROUND CIRCUIT

P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY — Continued

POSSIBLE CAUSES
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: The vehicle speedometer must be operational for the result of this test to be valid.** With the DRBIII®, record and erase DTCs. Start the engine and cycle the Transfer Case through all positions. With the DRBIII®, read the ECM DTCs. Does the DRBIII® display this DTC? Yes → Go To 2 No → Go To 7	All
2	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transfer Case Position Sensor harness connector. Remove the ASD Relay. Connect a jumper wire between cavities 30 and 87 of the ASD Relay connector in the PDC. Turn the ignition on. Measure the voltage of the Transfer Case Position Sensor Signal circuit. Is the voltage above 1.0 volt? Yes → Repair the Transfer Case Position Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transfer Case Position Sensor harness connector. Measure the resistance of the Transfer Case Position Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 4 No → Repair the Transfer Case Position Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transfer Case Position Sensor harness connector. Measure the resistance between ground and the Transfer Case Position Sensor Signal circuit. Is the resistance below 1000.0 ohms? Yes → Repair the Transfer Case Position Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All

P0836-TRANSFER CASE POSITION SENSOR PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off to the lock position. Disconnect the ECM harness connectors. Disconnect the Transfer Case Position Sensor harness connector. Measure the resistance between the Transfer Case Position Sensor circuit and the Sensor Ground circuit. Is the resistance below 1000.0 ohms? Yes → Repair the Transfer Case Position Sensor Signal circuit for a short to the Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All
6	Turn the ignition on. With the DRBIII® read the T-case Sensor Observe the T-case volts on the DRB while moving the transfer case selector lever in each of the transfer case positions. **NOTE: When shifting the transfer case selector to each position, the Sensor voltage should result in the following voltages: 2WD 2.64 - 2.80, 4WD Part Time 1.96 - 2.12, 4WD Full Time 1.39 - 1.55, Neutral 0.80 - 0.96, 4WD Low 0.21 - 0.37,** Does each position provide the correct voltage? Yes → Replace and program the ECM in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the Transfer Case Position Sensor. Perform ROAD TEST VERIFICATION - VER-2.	All
7	The conditions necessary to set this DTC are not present at this time. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit. Wiggle the wiring while checking for shorts and open circuits. Were there any problems found? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P0864-TCM TORQUE REDUCTION SIGNAL ERROR
P0864-TCM TORQUE REDUCTION SIGNAL ERROR
P0864-TCM TORQUE REDUCTION SIGNAL ERROR
P0864-TCM TORQUE REDUCTION SIGNAL ERROR

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P0864-TCM TORQUE REDUCTION SIGNAL ERROR.

POSSIBLE CAUSES
ENGINE CONTROL MODULE
TORQUE MANAGEMENT REQUEST SIGNAL CIRCUIT OPEN
TORQUE MANAGEMENT REQUEST SIGNAL CIRCUIT SHORTED TO GROUND
TORQUE MANAGEMENT REQUEST SIGNAL CIRCUIT SHORTED TO VOLTAGE
TRANSMISSION CONTROL MODULE
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the TCM harness connectors. Turn the ignition on. Measure the voltage of the Torque Management Request Signal circuit at the TCM harness connector. While monitoring the voltmeter wiggle the Torque Management Signal wiring and connectors between the ECM and TCM harness connectors. Is the voltage steady between 4.5 and 5.5 volts while wiggling the wiring and connectors? Yes → Go To 2 No → Go To 4	All

P0864-TCM TORQUE REDUCTION SIGNAL ERROR — Continued

TEST	ACTION	APPLICABILITY
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	Turn the ignition off. Reconnect all connectors. Turn the ignition on. With the DRBIII®, erase ECM DTCs. Test drive the vehicle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace and program the Transmission Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
4	Turn the ignition off. Disconnect the TCM harness connectors. Disconnect the ECM harness connectors. Measure the resistance of the Torque Management Request Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Torque Management Request Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the TCM harness connectors. Disconnect the ECM harness connectors. Measure the resistance between ground and the Torque Management Request Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the Torque Management Request Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All

P0864-TCM TORQUE REDUCTION SIGNAL ERROR — Continued

TEST	ACTION	APPLICABILITY
6	Turn the ignition off. Disconnect the TCM harness connectors. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Measure the voltage of the Torque Management Request Signal circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Torque Management Request Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:
P1101-ACM CRASH SIGNAL RECIEVED

POSSIBLE CAUSES
CLEAR DTC

TEST	ACTION	APPLICABILITY
1	**NOTE: This DTC indicates that the vehicle safety system has deployed the airbag(s).** Turn the ignition on. With the DRBIII®, erase ECM DTCs. **NOTE: If this DTC sets again inspect the ACM Signal circuit between the ECM harness connector and the ACM harness connector for an intermittent short to ground.** View repair. Yes → Test complete. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P1102-VISCOUS/CABIN HEATER RELAY EXCESSIVE CURRENT
P1102-VISCOUS/CABIN HEATER RELAY OPEN CIRCUIT
P1102-VISCOUS/CABIN HEATER RELAY SHORT CIRCUIT
P1102-VISCOUS/CABIN HEATER RELAY SHORT TO GROUND

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1102-VISCOUS/CABIN HEATER RELAY EXCESSIVE CURRENT.

When Monitored and Set Condition:

P1102-VISCOUS/CABIN HEATER RELAY EXCESSIVE CURRENT

When Monitored: With the ignition on and the ECM Viscous/Cabin Heater Relay command on.

Set Condition: The ECM detects excessive current on the Viscous/Cabin Heater Relay Control circuit.

P1102-VISCOUS/CABIN HEATER RELAY OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Viscous/Cabin Heater Relay command off.

Set Condition: The ECM does not detect voltage on the Viscous/Cabin Heater Relay Control circuit.

P1102-VISCOUS/CABIN HEATER RELAY SHORT CIRCUIT

When Monitored: With the ignition on and the ECM Viscous/Cabin Heater Relay command on.

Set Condition: The ECM detects excessive current on the Viscous/Cabin Heater Relay Control circuit.

P1102-VISCOUS/CABIN HEATER RELAY SHORT TO GROUND

When Monitored: With the ignition on and the ECM Viscous/Cabin Heater Relay command off.

Set Condition: The ECM does not detect voltage on the Viscous/Cabin Heater Relay Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
CABIN HEATER RELAY
CABIN HEATER RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE

P1102-VISCOUS/CABIN HEATER RELAY EXCESSIVE CURRENT — Continued

POSSIBLE CAUSES
CABIN HEATER RELAY CONTROL CIRCUIT SHORTED TO GROUND
CABIN HEATER RELAY CONTROL CIRCUIT OPEN
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRBIII®, actuate the Viscous/Cabin Heater Relay. Is the Cabin Heater Relay clicking? Yes → Go To 2 No → Go To 3	All
2	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
3	Turn the ignition off. Disconnect the Cabin Heater Relay from the PDC. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit at the Cabin Heater Relay connector in the PDC. Does the test light illuminate brightly? Yes → Go To 4 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P1102-VISCOUS/CABIN HEATER RELAY EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Install a substitute relay in place of the Cabin Heater Relay. Turn the ignition on. With the DRB, actuate the Viscous/Cabin Heater Relay for at least 20 seconds. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 5 No → Replace the Cabin Heater Relay. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the ECM harness connectors. Remove the Cabin Heater Relay. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector in the PDC. Turn the ignition on. Measure the voltage on the Cabin Heater Relay Control circuit. Is the voltage above 1.0 volt? Yes → Repair the Cabin Heater Relay Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All
6	Turn the ignition off. Remove the Cabin Heater Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance between ground and the Cabin Heater Relay Control circuit. Is the resistance above 1000 ohms? Yes → Go To 7 No → Repair the Cabin Heater Relay Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
7	Turn the ignition off. Remove the Cabin Heater Relay from the PDC. Disconnect the ECM harness connectors. Measure the resistance of the Cabin Heater Relay Control circuit. Is the resistance below 10.0 ohms? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Cabin Heater Relay Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P1131-GLOW PLUG MODULE VOLTAGE SUPPLY
P1132-GLOW PLUG MODULE INTERNAL FAULT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1131-GLOW PLUG MODULE VOLTAGE SUPPLY.

POSSIBLE CAUSES
BATTERY SUPPLY CIRCUIT OPEN
GROUND CIRCUIT OPEN
INTERMITTENT CONDITION
GLOW PLUG CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off for 10 seconds. Turn the ignition on. Monitor the DRB for ECM DTCs. Repeat this test several times. Did this DTC set again? Yes → Go To 2 No → Go To 4	All
2	Turn the ignition off. Disconnect the Glow Plug Control Module harness connector. Using a 12-volt test light connected to 12-volts, check the Ground circuit at the Glow Plug Control Module harness connector. Does the test light illuminate brightly? Yes → Go To 3 No → Repair the Glow Plug Control Module Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P1131-GLOW PLUG MODULE VOLTAGE SUPPLY — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Glow Plug Control Module harness connector. Using a 12-volt test light connected to ground, check the Battery Supply circuit at the Glow Plug Control Module harness connector. Does the test light illuminate brightly? Yes → Replace the Glow Plug Control Module. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Glow Plug Control Module Battery Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P1135-GLOW PLUG MODULE CONTROL CIRCUIT EXCESSIVE CURRENT
P1135-GLOW PLUG MODULE CONTROL CIRCUIT OPEN CIRCUIT
P1135-GLOW PLUG MODULE CONTROL CIRCUIT SHORTED TO GROUND
P1135-GLOW PLUG MODULE CONTROL CIRCUIT SHORTED TO VOLTAGE

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1135-GLOW PLUG MODULE CONTROL CIRCUIT EXCESSIVE CURRENT.

POSSIBLE CAUSES
ENGINE CONTROL MODULE
GLOW PLUG MODULE
GLOW PLUG MODULE CONTROL CIRCUIT OPEN
GLOW PLUG MODULE CONTROL CIRCUIT SHORTED TO GROUND
GLOW PLUG MODULE CONTROL CIRCUIT SHORTED TO VOLTAGE
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. Turn the ignition on and wait at least 90 seconds. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the Glow Plug Module harness connectors. Disconnect the ECM harness connectors. Measure the resistance of the Glow Plug Module Control circuit. Is the resistance below 10.0 ohms? Yes → Go To 3 No → Repair the Glow Plug Module Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P1135-GLOW PLUG MODULE CONTROL CIRCUIT EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the Glow Plug Module harness connectors. Disconnect the ECM harness connectors. Measure the resistance between ground and the Glow Plug Module Control circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Glow Plug Module Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Glow Plug Module harness connectors. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Measure the voltage of the Glow Plug Module Control circuit. Is the voltage below 1.0 volt? Yes → Go To 5 No → Repair the Glow Plug Module Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Replace the Glow Plug Module in accordance with the Service Information. Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P1140-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT
P1140-VACUUM RESERVOIR SOLENOID SHORT TO GROUND
P2525-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT
P2527-VACUUM RESERVOIR SOLENOID SHORT TO GROUND

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1140-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT.

When Monitored and Set Condition:

P1140-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command off.

Set Condition: The ECM does not detect voltage on the Vacuum Reservoir Solenoid Control circuit.

P1140-VACUUM RESERVOIR SOLENOID SHORT TO GROUND

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command off.

Set Condition: The ECM does not detect voltage on the Vacuum Reservoir Solenoid Control circuit.

P2525-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command off.

Set Condition: The ECM does not detect voltage on the Vacuum Reservoir Solenoid Control circuit.

P2527-VACUUM RESERVOIR SOLENOID SHORT TO GROUND

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command off.

Set Condition: The ECM does not detect voltage on the Vacuum Reservoir Solenoid Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
VR SOLENOID CONTROL CIRCUIT SHORTED TO GROUND
VR SOLENOID CONTROL CIRCUIT OPEN

P1140-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT — Continued

POSSIBLE CAUSES
VACUUM RESERVOIR SOLENOID
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Start the engine several times, turning the ignition off for at least 10 seconds between engine run cycles. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit at the Vacuum Reservoir Solenoid harness connector. Does the test light illuminate brightly? Yes → Go To 3 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Vacuum Reservoir Solenoid Control circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Vacuum Reservoir Solenoid Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Vacuum Reservoir Solenoid Control circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Vacuum reservoir Solenoid Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P1140-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Install a substitute Vacuum Reservoir Solenoid in place of the vehicle's Vacuum Reservoir Solenoid. **NOTE: Ensure the ECM and Vacuum Reservoir Solenoid harness connectors are connected.** Turn the ignition on. With the DRB, check for this DTC to set again. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the Vacuum Reservoir Solenoid. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time.The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P1140-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT
P2525-VACUUM RESERVOIR SOLENOID EXCESSIVE CURRENT
P2528-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1140-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT.

When Monitored and Set Condition:

P1140-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command on.

Set Condition: The ECM detects excessive current on the Vacuum Reservoir Solenoid Control circuit.

P2525-VACUUM RESERVOIR SOLENOID EXCESSIVE CURRENT

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command on.

Set Condition: The ECM detects excessive current on the Vacuum Reservoir Solenoid Control circuit.

P2528-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command on.

Set Condition: The ECM detects excessive current on the Vacuum Reservoir Solenoid Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
VACUUM RESERVOIR SOLENOID
VR SOLENOID CONTROL SHORTED TO VOLTAGE
ENGINE CONTROL MODULE - INTERNAL SHORT TO VOLTAGE

P1140-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Start the engine several times, turning the ignition off for at least 10 seconds between engine run cycles. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 4	All
2	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Vacuum Reservoir Solenoid Control circuit. Is the voltage below 1.0 volt? Yes → Go To 3 No → Repair the Vacuum Reservoir Solenoid Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs. Does the DRB display P1250 VACUUM RESERVOIR SOLENOID OPEN CIRCUIT? Yes → Replace the Vacuum Reservoir Solenoid. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P1140-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
4	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P1142-FUEL PRESSURE SOLENOID OPEN CIRCUIT
P1142-FUEL PRESSURE SOLENOID PLAUSIBILITY
P1142-FUEL PRESSURE SOLENOID SHORT CIRCUIT
P2294-FUEL PRESSURE SOLENOID OPEN CIRCUIT
P2295-FUEL PRESSURE SOLENOID SHORT TO GROUND
P2296-FUEL PRESSURE SOLENOID SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1142-FUEL PRESSURE SOLENOID OPEN CIRCUIT.

When Monitored and Set Condition:

P1142-FUEL PRESSURE SOLENOID OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Fuel Pressure Solenoid command off.

Set Condition: The ECM does not detect voltage on the Fuel Pressure Solenoid Control circuit.

P1142-FUEL PRESSURE SOLENOID SHORT CIRCUIT

When Monitored: With the ignition on and the ECM Fuel Pressure Solenoid command on.

Set Condition: The ECM detects excessive current on the Fuel Pressure Solenoid Control circuit.

P2294-FUEL PRESSURE SOLENOID OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Fuel Pressure Solenoid command off.

Set Condition: The ECM detects an open in the Fuel Pressure Solenoid circuit.

P2295-FUEL PRESSURE SOLENOID SHORT TO GROUND

When Monitored: With the ignition on and the ECM Fuel Pressure Solenoid command off.

Set Condition: The ECM detects a short to ground in the Fuel Pressure Solenoid circuit.

P2296-FUEL PRESSURE SOLENOID SHORT CIRCUIT

When Monitored: With the engine running and the ECM Fuel Pressure Solenoid command on.

Set Condition: The ECM detects excessive current on the Fuel Pressure Solenoid Control circuit.

P1142-FUEL PRESSURE SOLENOID OPEN CIRCUIT — Continued

POSSIBLE CAUSES
FUEL PRESSURE SOLENOID CIRCUIT(S) SHORTED TO GROUND
FUEL PRESSURE SOLENOID CIRCUIT(S) SHORTED TO VOLTAGE
FUEL PRESSURE SOLENOID CIRCUIT(S) SHORTED TOGETHER
FUEL PRESSURE SOLENOID OPEN CIRCUIT(S)
INTERMITTENT CONDITION
FUEL PRESSURE SOLENOID
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS.** **WARNING: FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.** Turn the ignition on. With the DRB, erase ECM DTCs. Start the engine several times, turning the ignition off for at least 30 seconds between each run cycle. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 8	All
2	**NOTE: An open ASD power supply to the ECM will cause multiple DTC's including this DTC to set.** **NOTE: Check the ECM for other DTC's. If other DTC's are set with this DTC refer to the symptom list and perform the CHECKING THE ECM POWER AND GROUND CIRCUITS test before continuing.** If the ECM power and ground circuits are functioning properly continue with this test. Yes → Go To 3	All

P1142-FUEL PRESSURE SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Pressure Solenoid harness connector. Measure the resistance of each of the Fuel Pressure Solenoid circuits between the ECM harness connector and the Fuel Pressure Solenoid harness connector. Is the resistance below 10.0 ohms for each measurement? Yes → Go To 4 No → Repair the circuit(s) that measured above 10.0 ohms for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Pressure Solenoid harness connector. Measure the resistance between ground and each of the Fuel Pressure Solenoid circuits. Is the resistance above 1000 ohms for each measurement? Yes → Go To 5 No → Repair the circuit(s) that measured below 1000 ohms for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Pressure Solenoid harness connector. Measure the resistance between the Fuel Pressure Solenoid circuits. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the Fuel Pressure Solenoid circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the ECM harness connectors. Disconnect the Fuel Pressure Solenoid harness connector. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage each of the Fuel Pressure Solenoid circuits. Is the voltage below 1.0 volt for each measurement? Yes → Go To 7 No → Repair the circuit(s) that measured above 1.0 volts for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

P1142-FUEL PRESSURE SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
7	Turn the ignition off. Disconnect the Fuel Pressure Solenoid harness connector. Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs. **NOTE: The DRB should display P2294-FUEL PRESSURE SOLENOID OPEN CIRCUIT.** Turn the ignition off. Connect a jumper wire between cavity 1 and cavity 2 of the Fuel Pressure Solenoid harness connector. Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs. **NOTE: The DRB should display P2296-FUEL PRESSURE SOLENOID SHORT CIRCUIT.** Does the DRB display the appropriate DTC for each condition? Yes → Replace the Fuel Pressure Solenoid in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
8	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time.The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P1159-IMPROPER START ATTEMPT

When Monitored and Set Condition:

P1159-IMPROPER START ATTEMPT

When Monitored: Vehicle speed is below 3 km/h.

Set Condition: The ECM detects engine speed above 100 rpm without activating the starter relay control.

POSSIBLE CAUSES
VERIFY ACTIVE DTC
ENGINE CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: This DTC indicates that engine rotation has occurred without an ignition switch Start input. This can occurred when an attempt to start the vehicle using a push start method.** **NOTE: Consult with the customer to determine if a push start has been attempted.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test complete. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

P1160-IGN VOLTAGE
P1160-IGNITION VOLTAGE

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1160-IGN VOLTAGE.

POSSIBLE CAUSES
CHECK THE ECM POWER AND GROUNDS
ENGINE CONTROL MODULE
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 3	All
2	Refer to symptom Checking the ECM Power and Grounds. Are the ECM Power and Ground circuits o.k.? Yes → Replace the ECM in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All
3	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P1167-CAPACITOR VOLTAGE 1
P1167-CAPACITOR VOLTAGE 1
P1167-CAPACITOR VOLTAGE 1
P1167-CAPACITOR VOLTAGE 1

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1167-CAPACITOR VOLTAGE 1.

When Monitored and Set Condition:

P1167-CAPACITOR VOLTAGE 1

When Monitored: With the engine cranking or running.

Set Condition: The ECM detects a capacitor voltage problem during injector actuation.

P1167-CAPACITOR VOLTAGE 1

When Monitored: With the engine cranking or running.

Set Condition: The ECM detects a capacitor voltage problem during injector actuation.

P1167-CAPACITOR VOLTAGE 1

When Monitored: With the engine cranking or running.

Set Condition: The ECM detects a capacitor voltage problem during injector actuation.

P1167-CAPACITOR VOLTAGE 1

When Monitored: With the engine cranking or running.

Set Condition: The ECM detects a capacitor voltage problem during injector actuation.

POSSIBLE CAUSES
CHECKING FOR INJECTOR CODES
ENGINE CONTROL MODULE
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read the ECM DTCs. Does the DRB display any Injector Cylinder DTC? Yes → Repair Fuel Injector related DTC's before continuing. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All

P1167-CAPACITOR VOLTAGE 1 — Continued

TEST	ACTION	APPLICABILITY
2	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: This DTC indicates an internal ECM problem.** Turn the ignition on. With the DRBIII®, erase ECM DTCs. Perform several engine run cycles, turning the ignition off for at least 20 seconds between each engine run cycle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P1250-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT
P1251-VACUUM RESERVOIR SOLENOID SHORT TO GROUND
P1252-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P1250-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT.

When Monitored and Set Condition:

P1250-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command off.

Set Condition: The ECM does not detect voltage on the Vacuum Reservoir Solenoid Control circuit.

P1251-VACUUM RESERVOIR SOLENOID SHORT TO GROUND

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command off.

Set Condition: The ECM does not detect voltage on the Vacuum Reservoir Solenoid Control circuit.

P1252-VACUUM RESERVOIR SOLENOID SHORT CIRCUIT

When Monitored: With the ignition on and the ECM Vacuum Reservoir Solenoid command on.

Set Condition: The ECM detects excessive current on the Vacuum Reservoir Solenoid Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
VACUUM RESERVOIR SOLENOID CONTROL SHORTED TO VOLTAGE
VACUUM RESERVOIR SOLENOID CONTROL CIRCUIT SHORTED TO GROUND
VACUUM RESERVOIR SOLENOID CONTROL CIRCUIT OPEN
VACUUM RESERVOIR SOLENOID
ENGINE CONTROL MODULE

P1250-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Perform several ignition cycles, turning the ignition off for at least 10 seconds between each ignition cycle. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 8	All
2	**NOTE: An open ASD power supply to the ECM will cause multiple DTC's including this DTC to set.** **NOTE: Check the ECM for other DTC's. If other DTC's are set with this DTC refer to the symptom list and perform the CHECKING THE ECM POWER AND GROUND CIRCUITS test before continuing.** If the ECM power and ground circuits are functioning properly continue with this test. Yes → Go To 3	All
3	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit. Does the test light illuminate brightly? Yes → Go To 4 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Vacuum Reservoir Solenoid Control circuit. Is the voltage below 1.0 volt? Yes → Go To 5 No → Repair the Vacuum Reservoir Solenoid Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

P1250-VACUUM RESERVOIR SOLENOID OPEN CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Vacuum Reservoir Solenoid Control circuit. Is the resistance above 1000 ohms? Yes → Go To 6 No → Repair the Vacuum Reservoir Solenoid Control circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the Vacuum Reservoir Solenoid harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Vacuum Reservoir Solenoid Control circuit. Is the resistance below 10.0 ohms? Yes → Go To 7 No → Repair the Vacuum Reservoir Solenoid Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
7	Turn the ignition off. Install a substitute Vacuum Reservoir Solenoid in place of the vehicle's Vacuum reservoir Solenoid. **NOTE: Ensure the ECM and Vacuum Reservoir Solenoid harness connectors are connected.** Turn the ignition on. With the DRB, check for this DTC to set again. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the Vacuum Reservoir Solenoid. Perform ROAD TEST VERIFICATION - VER-2.	All
8	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time.The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P2101-EGR AIR FLOW CONTROL VALVE EXCESSIVE CURRENT
P2142-EGR AIR FLOW CONTROL VALVE SHORT CIRCUIT

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P2101-EGR AIR FLOW CONTROL VALVE EXCESSIVE CURRENT.

When Monitored and Set Condition:

P2101-EGR AIR FLOW CONTROL VALVE EXCESSIVE CURRENT

When Monitored: With the ignition on and the ECM EGR Air Flow Control Valve command on.

Set Condition: The ECM detects excessive current on the EGR Air Flow Control Valve Control circuit.

P2142-EGR AIR FLOW CONTROL VALVE SHORT CIRCUIT

When Monitored: With the ignition on and the ECM EGR Air Flow Control Valve command on.

Set Condition: The ECM detects excessive current on the EGR Air Flow Control Valve Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
EGR AIR FLOW CONTROL VALVE
EGR AIR FLOW CONTROL VALVE CONTROL SHORTED TO VOLTAGE
ENGINE CONTROL MODULE - INTERNAL SHORT TO VOLTAGE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle and monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 4	All

P2101-EGR AIR FLOW CONTROL VALVE EXCESSIVE CURRENT — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. Disconnect the EGR Air Flow Control Valve harness connector. Turn the ignition on. With the DRB, erase ECM DTCs. Monitor the DRB for ECM DTCs. Does the DRB display P1140 EGR AIR FLOW CONTROL VALVE OPEN CIRCUIT? Yes → Replace the EGR Air Flow Control Valve. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	Turn the ignition off. Disconnect the EGR Air Flow Control Valve harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the EGR Air Flow Control Valve Control circuit. Is the voltage below 1.0 volt? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the EGR Air Flow Control Valve Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All
4	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P2101-EGR AIR FLOW CONTROL VALVE OPEN CKT
P2141-EGR AIR FLOW CONTROL VALVE SHORT TO GROUND

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P2101-EGR AIR FLOW CONTROL VALVE OPEN CKT.

When Monitored and Set Condition:

P2101-EGR AIR FLOW CONTROL VALVE OPEN CKT

When Monitored: With the ignition on and the ECM EGR Air Flow Control Valve command off.

Set Condition: The ECM does not detect voltage on the EGR Air Flow Control Valve Control circuit.

P2141-EGR AIR FLOW CONTROL VALVE SHORT TO GROUND

When Monitored: With the ignition on and the ECM EGR Air Flow Control Valve command off.

Set Condition: The ECM does not detect voltage on the EGR Air Flow Control Valve Control circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
ASD RELAY OUTPUT CIRCUIT OPEN
EGR AIR FLOW CONTROL VALVE CIRCUIT SHORTED TO GROUND
EGR AIR FLOW CONTROL VALVE CIRCUIT OPEN
EGR AIR FLOW CONTROL VALVE
ENGINE CONTROL MODULE

P2101-EGR AIR FLOW CONTROL VALVE OPEN CKT — Continued

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Test drive the vehicle. Monitor the DRB for ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the EGR Air Flow Control Valve harness connector. Turn the ignition on. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit. Does the test light illuminate brightly? Yes → Go To 3 No → Repair the ASD Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect the EGR Air Flow Control Valve harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the EGR Air Flow Control Valve Control circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the EGR Air Flow Control Valve circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the EGR Air Flow Control Valve harness connector. Disconnect the ECM harness connectors. Measure the resistance of the EGR Air Flow Control Valve Control circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the EGR Air Flow Control Valve Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P2101-EGR AIR FLOW CONTROL VALVE OPEN CKT — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Install a substitute EGR Air Flow Control Valve in place of the vehicle's EGR Air Flow Control Valve. **NOTE: Ensure the ECM and EGR Air Flow Control Valve harness connectors are connected.** Turn the ignition on. With the DRB, check for this DTC to set again. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace the EGR Air Flow Control Valve. Perform ROAD TEST VERIFICATION - VER-2.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time.The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom List:

P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY
P2120-ACC PEDAL POSITION SENSOR 1 CKT SIGNAL VOLTAGE TOO HIGH
P2120-ACC PEDAL POSITION SENSOR 1 CKT SIGNAL VOLTAGE TOO LOW
P2125-ACC PEDAL POSITION SENSOR 2 CIRCUIT PLAUSIBILITY
P2125-ACC PEDAL POSITION SENSOR 2 CKT SIGNAL VOLTAGE TOO HIGH
P2125-ACC PEDAL POSITION SENSOR 2 CKT SIGNAL VOLTAGE TOO LOW

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY.

When Monitored and Set Condition:

P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY

When Monitored: With the ignition on.

Set Condition: APP Sensor #1 and APP Sensor #2 signals do not agree.

P2120-ACC PEDAL POSITION SENSOR 1 CKT SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Accelerator Pedal Position Sensor #1 signal is above 4.8 volts.

P2120-ACC PEDAL POSITION SENSOR 1 CKT SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Accelerator Pedal Position Sensor #1 signal is below 0.29 volt.

P2125-ACC PEDAL POSITION SENSOR 2 CIRCUIT PLAUSIBILITY

When Monitored: With the ignition on.

Set Condition: APP Sensor #1 and APP Sensor #2 signals do not agree.

P2125-ACC PEDAL POSITION SENSOR 2 CKT SIGNAL VOLTAGE TOO HIGH

When Monitored: With the ignition on.

Set Condition: The Accelerator Pedal Position Sensor #2 signal is above 2.4 volts.

P2125-ACC PEDAL POSITION SENSOR 2 CKT SIGNAL VOLTAGE TOO LOW

When Monitored: With the ignition on.

Set Condition: The Accelerator Pedal Position Sensor #2 signal is below 0.15 volt.

P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY — Continued

POSSIBLE CAUSES
ACCELERATOR PEDAL POSITION SENSOR
ECM - APP SENSOR 1 5-VOLT SUPPLY CIRCUIT
SENSOR GROUND OPEN (APP SENSOR)
INTERMITTENT CONDITION
APP SENSOR 5-VOLT SUPPLY CIRCUIT OPEN
APP SENSOR SIGNAL CIRCUIT OPEN
APP SENSOR 5-VOLT SUPPLY CIRCUIT SHORTED TO SENSOR GROUND
APP SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
APP SENSOR 5-VOLT SUPPLY CIRCUIT SHORTED TO GROUND
VERIFY APP SENSOR OPERATION
APP SENSOR SIGNAL CIRCUIT SHORTED TO THE SENSOR GROUND CIRCUIT
APP SENSOR 5-VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE
ECM - SENSOR GROUND OPEN
APP SENSOR CIRCUIT SHORTED TO VOLTAGE
APP SENSOR GROUND CIRCUIT SHORTED TO VOLTAGE
ECM - APP SENSOR SIGNAL CIRCUIT

TEST	ACTION	APPLICABILITY
1	**NOTE: If DTC P0641, P0651 or P0697 is present with this DTC, diagnose DTCs P0641, P0651 or P0697 before diagnosing this DTC.** **NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** **NOTE: The APP Sensor is a device that contains 2 separate potentiometer type sensors. Each sensor has its own 5-volt supply circuit, sensor ground circuit and signal circuit. The APP Sensor no longer incorporates a low-idle switch.** **NOTE: The APP Sensor 2 signal should always be approximately 1/2 the voltage of the APP Sensor 1 signal.** Inspect the APP Sensor for proper travel from the rest position to the fully depressed position. Turn the ignition on. Using a voltmeter, backprobe the APP Sensor 1 and APP Sensor 2 Signal circuits at the APP Sensor harness connector with the accelerator pedal in the at rest position. Is the voltage between 0.42 and 0.51 volt for sensor 1 and 0.19 and 0.28 volt for sensor 2? Yes → Go To 2 No → Go To 5	All

P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition on. Fully depress the accelerator pedal. Using a voltmeter backprobe the APP Sensor harness connector and read the voltage for APP Sensor 1 and APP Sensor 2 Signal circuits. Is the voltage between 4.45 and 4.75 volts for #1 and 2.15 and 2.45 volts for #2? Yes → Go To 3 No → Go To 5	All
3	Turn the ignition on. With the DRB, read the APP Sensor 1 and APP Sensor 2 percentages (%). With the accelerator pedal in the idle position, slowly depress the accelerator pedal until the pedal is fully depressed. **NOTE: The percentage readings for APP Sensors 1 and 2 should increase smoothly as the pedal is depressed.** **NOTE: This test can also performed using a voltmeter by back probing each APP Sensor Signal circuit at the APP Sensor harness connector and observing the voltmeter for a smooth voltage change through the entire pedal travel.** Does the percentage (voltage) increase smoothly for both readings with the accelerator pedal travel? Yes → Go To 4 No → Replace the Accelerator Pedal Position Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
4	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running and at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set by slowly pressing and releasing the accelerator pedal several times. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
5	**NOTE: Perform the rest of this diagnostic procedure on the individual APP Sensor Potentiometer (1 or 2) that did not display the correct voltages in the previous test.** Turn the ignition off. Disconnect the APP Sensor harness connector. Turn the ignition on. Measure the voltage of the 5-Volt Supply circuit in the APP Sensor harness connector. Is the voltage between 4.7 and 5.3 volts? Yes → Go To 6 No → Go To 14	All
6	Turn the ignition off. Disconnect the APP Sensor harness connector. Connect a jumper wire between APP Sensor Signal circuit and the 5-volt supply circuit at the APP Sensor harness connector . With the DRB, read the PEDAL OUTPUT VOLTS. Does the DRB display between 4.0 and 5.5 volts? Yes → Go To 7 No → Go To 10	All
7	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the APP Sensor Ground circuit. Is the voltage above 1.0 volt? Yes → Repair the App Sensor Ground circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 8	All
8	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Sensor Ground circuit between the APP Sensor and the ECM. Is the resistance below 10.0 ohms? Yes → Go To 9 No → Repair the APP Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
9	Turn the ignition off. Disconnect the APP Sensor harness connector. Using a 12-volt test light connected to 12-volts, check the Sensor Ground circuit of the appropriate potentiometer. Does the test light illuminate brightly? Yes → Replace the Accelerator Pedal Position Sensor. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
10	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the APP Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 11 No → Repair the APP Sensor Signal circuit for an open Perform ROAD TEST VERIFICATION - VER-2.	All
11	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the APP Sensor Signal circuit. Is the resistance below 1000 ohms? Yes → Repair the APP Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 12	All
12	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the APP Sensor Signal circuit and the Sensor Ground circuit at the APP Sensor harness connector. Is the resistance below 1000 ohms? Yes → Repair the APP Sensor Signal and Sensor Ground circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 13	All
13	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the APP Sensor Signal circuit. Is the voltage above 1.0 volt? Yes → Repair the APP Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
14	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance of the Accelerator Pedal Position Sensor 5-volt Supply circuit. Is the resistance below 10.0 ohms? Yes → Go To 15 No → Repair the Accelerator Pedal Position Sensor 5-Volt Supply circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

P2120-ACC PEDAL POSITION SENSOR 1 CKT PLAUSIBILITY — Continued

TEST	ACTION	APPLICABILITY
15	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between the Accelerator Pedal Position Sensor 5-Volt Supply circuit and both Sensor Ground circuits in the APP Sensor harness connector. Is the resistance above 1000 ohms? Yes → Go To 16 No → Repair the 5-Volt Supply circuit for a short to the Sensor Ground circuit. Perform ROAD TEST VERIFICATION - VER-2.	All
16	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Measure the resistance between ground and the Accelerator Pedal Position Sensor 5-volt Supply circuit. Is the resistance below 1000 ohms? Yes → Repair the Accelerator Pedal Position Sensor 5-Volt Supply circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 17	All
17	Turn the ignition off. Disconnect the APP Sensor harness connector. Disconnect the ECM harness connectors. Remove the ASD Relay. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage of the Accelerator Pedal Position Sensor 5-Volt Supply circuit in the ECM harness connector. Is the voltage above 1.0 volt? Yes → Repair the Accelerator Pedal Position Sensor 5-Volt Supply circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

P2264-WATER IN FUEL VOLTAGE ABOVE UPPER LIMIT

When Monitored and Set Condition:

P2264-WATER IN FUEL VOLTAGE ABOVE UPPER LIMIT

When Monitored: With the ignition on.

Set Condition: The ECM detects high voltage on the Water In Fuel Sensor signal circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
WATER IN FUEL SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
WATER IN FUEL SENSOR SIGNAL CIRCUIT OPEN
WATER IN FUEL SENSOR GROUND CIRCUIT OPEN
WATER IN FUEL SENSOR
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off, wait 10 seconds, then turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 6	All
2	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Water In Fuel Sensor harness connector. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector. Turn the ignition on. Measure the voltage on the Water In Fuel Sensor Signal circuit. Is the voltage below 0.5 volt? Yes → Go To 3 No → Repair the Water In Fuel Sensor Signal circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2.	All

P2264-WATER IN FUEL VOLTAGE ABOVE UPPER LIMIT — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Water In Fuel Sensor harness connector. Measure the resistance of the Water In Fuel Sensor Signal circuit. Is the resistance below 10.0 ohms? Yes → Go To 4 No → Repair the Water In Fuel Sensor Signal circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Water In Fuel Sensor harness connector. Measure the resistance of the Water In Fuel Sensor Ground circuit. Is the resistance below 10.0 ohms? Yes → Go To 5 No → Repair the Water In Fuel Sensor Ground circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Turn the ignition off. Disconnect the Water In Fuel Sensor harness connector. Turn the ignition on. With the DRB, read and record the Water In Fuel Sensor voltage. **NOTE: The Water In Fuel Sensor voltage should be 5.0 ± 0.3 volts with the sensor harness connector disconnected.** Connect a jumper wire across the Water In Fuel Sensor harness connector. With the DRB, read the Water In Fuel Sensor voltage. **NOTE: The Water In Fuel Sensor voltage should be less then 0.5 volt with the jumper wire connected.** Is the Water In Fuel voltage less than 0.5 volt? Yes → Replace the Water In Fuel Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All

P2264-WATER IN FUEL VOLTAGE ABOVE UPPER LIMIT — Continued

TEST	ACTION	APPLICABILITY
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:
P2264-WATER IN FUEL VOLTAGE BELOW LOWER LIMIT

When Monitored and Set Condition:

P2264-WATER IN FUEL VOLTAGE BELOW LOWER LIMIT

When Monitored: With the ignition on.

Set Condition: The ECM detects low voltage on the Water In Fuel Sensor signal circuit.

POSSIBLE CAUSES
INTERMITTENT CONDITION
WATER IN FUEL SENSOR
WATER IN FUEL SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
WATER IN FUEL SENSOR SIGNAL AND GROUND CIRCUITS SHORTED TOGETHER
FRONT CONTROL MODULE

TEST	ACTION	APPLICABILITY
1	**NOTE: If the ECM detects and stores a DTC, the ECM also stores the engine/vehicle operating conditions under which the DTC was set. Some of these conditions are displayed on the DRB at the same time the DTC is displayed.** **NOTE: Before erasing stored DTCs, record these conditions. Attempting to duplicate these conditions may assist when checking for an active DTC.** Turn the ignition on. With the DRB, erase ECM DTCs. Turn the ignition off, wait 10 seconds, then turn the ignition on. With the DRB, read ECM DTCs. Did this DTC set again? Yes → Go To 2 No → Go To 5	All
2	Turn the ignition off. Disconnect the Water In Fuel Sensor harness connector. Turn the ignition on. With the DRB, read the Water In Fuel Sensor voltage. Is the voltage above 4.8 volts? Yes → Replace the Water In Fuel Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All

P2264-WATER IN FUEL VOLTAGE BELOW LOWER LIMIT — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Water In Fuel Sensor harness connector. Measure the resistance between ground and the Water In Fuel Sensor Signal circuit. Is the resistance above 1000 ohms? Yes → Go To 4 No → Repair the Water In Fuel Sensor Signal circuit for a short to ground. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the FCM harness connectors. Disconnect the Water In Fuel Sensor harness connector. Measure the resistance between the Water In Fuel Sensor Signal circuit and Sensor Ground circuit. Is the resistance above 1000 ohms? Yes → Replace and program the Front Control Module in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Repair the Water In Fuel Sensor Signal and Ground circuits for a short together. Perform ROAD TEST VERIFICATION - VER-2.	All
5	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** **NOTE: The conditions that set the DTC are not present at this time. The following list may help in identifying the intermittent condition.** With the engine running at normal operating temperature, monitor the DRB parameters related to the DTC while wiggling the wiring harness. Look for parameter values to change and/or a DTC to set. Review the DTC When Monitored and Set Conditions. If possible, try to duplicate the conditions under which the DTC was set. Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

*CHECKING THE ACCELERATOR PEDAL POSITION SENSOR CALIBRATION

POSSIBLE CAUSES
APP SENSOR
APP SENSOR IDLE VOLTAGE
APP SENSOR WIDE OPEN THROTTLE VOLTAGE

TEST	ACTION	APPLICABILITY
1	**NOTE: The APP Sensor is a device that contains 2 separate potentiometer type sensors. Each sensor has its own 5-volt supply circuit, sensor ground circuit and signal circuit.** **NOTE: The APP Sensor 2 signal should always be approximately 1/2 the voltage of the APP Sensor 1 signal.** Inspect the APP Sensor for proper travel from the rest position to the fully depressed position. Turn the ignition on. Using a voltmeter, backprobe the APP Sensor 1 and APP Sensor 2 Signal circuits at the APP Sensor harness connector with the accelerator pedal in the at rest position. Is the voltage between 0.42 and 0.51 volt for sensor 1 and 0.19 and 0.28 volt for sensor 2? Yes → Go To 2 No → Check the wiring and connectors related to the APP Sensor. If o.k., replace the APP Sensor. Perform ROAD TEST VERIFICATION - VER-2.	All
2	Turn the ignition on. While back probing, measure the voltage of the APP Sensor Signal 1 and APP Sensor Signal 2 circuits at the ECM. Monitor the voltmeter while slowly pressing the accelerator pedal completely down. Did the voltage for both sensors increase smoothly with pedal travel? Yes → Go To 3 No → Replace the Accelerator Pedal Position Sensor in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition on. Using a voltmeter backprobe the APP Sensor harness connector and read the voltage for APP Sensor 1 and APP Sensor 2 Signal circuits. Fully depress the accelerator pedal. Is the voltage between 4.45 and 4.75 volts for #1 and 2.15 and 2.45 volts for #2? Yes → Test Complete. No → Check the wiring and connectors related to the APP Sensor. If o.k., replace the APP Sensor. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:
*CHECKING THE BOOST PRESSURE VACUUM SUPPLY

POSSIBLE CAUSES
CHECK VAC SUPPLY TO BOOST PRESSURE ACTUATOR
CHECK VAC SUPPLY TO BOOST PRESSURE SOLENOID
CHECK VAC SUPPLY TO VACUUM RESERVOIR
CHECKING FOR CIRCUIT RELATED DTCS
VACUUM RESERVOIR/OUTPUT HOSE

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII® display the ECM DTC's. **NOTE: Circuit related DTC's refers to DTC's containing Shorts to Ground, Shorts to Voltage Open Circuits, Signal High and Signal Low DTC's.** Does the DRBIII® display any ECM circuit related DTC's? Yes → Refer to the appropriate DTC information and repair the circuit DTC before continuing. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All
2	Turn the ignition off. Disconnect the vacuum hose at the Vacuum Reservoir Solenoid port A connector. Connect a vacuum gauge to the disconnected hose. Start the engine. Observe the vacuum gauge reading. Does the vacuum gauge indicate steady vacuum above 25 inches? Yes → Go To 3 No → Go To 5	All
3	Turn the ignition off. Disconnect the vacuum hose at the Boost Pressure Solenoid port A connector. Connect a vacuum gauge to the disconnected hose. Start the engine. Observe and note the vacuum gauge reading. Observe and note the vacuum reading while turning the engine off. **NOTE: The vacuum reading should be above 25 inches at idle then drop to 0 after engine shut off.** Does the vacuum gauge indicate steady vacuum above 25 inches then drop to 0 at engine shut off? Yes → Go To 4 No → Check the vacuum hose between Vacuum Res Solenoid B port and Boost Pressure Solenoid A port for damage, restrictions or leaks. Replace as necessary. If Hose is o.k., replace the Vacuum Reservoir Solenoid. Perform ROAD TEST VERIFICATION - VER-2.	All

*CHECKING THE BOOST PRESSURE VACUUM SUPPLY — Continued

TEST	ACTION	APPLICABILITY
4	**NOTE: The engine temperature must be above 120°F for this test to be valid.** Turn the ignition off. Disconnect the vacuum hose at the Boost Pressure Actuator connector. Connect a vacuum gauge to the disconnected hose. Start the engine. Observe and note the vacuum gauge reading. Does the vacuum gauge indicate vacuum between 15 and 22 inches? Yes → Test Complete. No → Check the vacuum hose between Boost Pressure Solenoid B port and Boost Pressure Actuator for damage, restrictions or leaks. Replace as necessary. If Hose is o.k., replace the Boost Pressure Solenoid. Perform ROAD TEST VERIFICATION - VER-2.	All
5	Reconnect all vacuum hoses/lines. Turn the ignition off. Disconnect the vacuum hose at the Vacuum Reservoir port A connector. Connect a vacuum gauge to the disconnected hose. Start the engine. Observe the vacuum gauge reading. Does the vacuum gauge indicate steady vacuum above 25 inches? Yes → Check Vacuum Reservoir and Vacuum Reservoir Output Hose to Vacuum Reservoir Solenoid for damage, cracks, obstructions or other problems that may prevent proper vacuum supply to the Vacuum Reservoir Solenoid. Perform ROAD TEST VERIFICATION - VER-2. No → Check vacuum hoses from Vacuum Pump to the Vacuum Reservoir for leaks or blockage. Refer to the Service Information to check for proper Vacuum Pump operation. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

***CHECKING THE ECM POWER AND GROUND CIRCUITS**

POSSIBLE CAUSES
ASD RELAY CONTROL CIRCUIT OPEN
ASD RELAY OUTPUT CIRCUIT(S) OPEN
CHECKING THE ASD RELAY SYSTEM
ECM GROUND CIRCUIT(S) OPEN
FUSED ASD RELAY BATTERY SUPPLY CIRCUIT OPEN
FUSED IGNITION SWITCH (START) OUTPUT CIRCUIT OPEN
FUSED IGNITION SWITCH (START/RUN) OUTPUT CIRCUIT OPEN
SUBSTITUTE ASD RELAY
ASD RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the ECM harness connectors. Using a 12-volt test light connected to 12-volts, check each of the ECM ground circuits in ECM harness connector C2 cavities 2, 4 and 6. Did the test light illuminate for each cavity? Yes → Go To 2 No → Repair the ECM Ground circuit(s) for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
2	Turn the ignition off. Disconnect the ECM harness connectors. Turn the ignition to the Start position. Using a 12-volt test light connected to ground, check the Fused Ignition Switch (Start) Output circuit in ECM harness connector C2 cavity 22. Is the test light on? Yes → Go To 3 No → Repair the Fused Ignition Switch (Start) Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

*CHECKING THE ECM POWER AND GROUND CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
3	Turn the ignition off. Disconnect the ECM harness connectors. Turn the ignition to the Start position. Using a 12-volt test light connected to ground, check the Fused Ignition Switch (Start Run Output circuit in ECM harness connector C2 cavity 19. Turn the ignition to the Run position. Using a 12-volt test light connected to ground, check the Fused Ignition Switch (Start/Run) Output circuit in ECM harness connector C2 cavity 19. Is the test light on for both ignition switch positions? Yes → Go To 4 No → Repair the Fused Ignition Switch (Start/Run) Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
4	Turn the ignition off. Disconnect the ECM harness connectors. Connect a jumper wire between ground and the ASD Relay Control circuit in ECM C2 harness connector cavity 44. Turn the ignition on. Using a 12-volt test light connected to ground, check the Fused ASD Relay Output circuits at the ECM C2 harness connector cavities 1, 3 and 5. Does the test light illuminate brightly for each circuit? Yes → Test Complete. No → Go To 5	All
5	Turn the ignition off. Remove the ASD Relay from the PDC. Using a 12-volt test light connected to ground, check both Fused ASD Relay Battery Supply circuits in ASD Relay connector. Is the test light on? Yes → Go To 6 No → Repair the Fused ASD Relay Battery Supply circuit(s) for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	Turn the ignition off. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 in the ASD Relay connector. Using a 12-volt test light connected to ground, check the ASD Relay Output circuit in ECM harness connector C2 cavities 1, 3 and 5. Did the test light illuminate for each circuit? Yes → Go To 7 No → Repair the ASD Relay Output circuit(s) for an open. Perform ROAD TEST VERIFICATION - VER-2.	All

*CHECKING THE ECM POWER AND GROUND CIRCUITS — Continued

TEST	ACTION	APPLICABILITY
7	Turn the ignition off. Install a substitute relay in place of the ASD Relay. Disconnect the ECM harness connectors. Connect a jumper wire between ground and the ASD Relay Control circuit in ECM C2 harness connector cavity 44. Turn the ignition on. Using a 12-volt test light connected to ground, check the Fused ASD Relay Output circuits at the ECM C2 harness connector cavities 1, 3 and 5. Did the test light illuminate for each circuit? Yes → Replace the ASD Relay. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 8	All
8	Turn the ignition off. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Measure the resistance of the ASD Relay Control circuit between the PDC connector and the ECM harness connector. Is the resistance below 10.0 ohms? Yes → Go To 9 No → Repair the ASD Relay Control circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
9	Turn the ignition off. Disconnect the ECM harness connectors. Remove the ASD Relay from the PDC. Connect a jumper wire between cavity 30 and cavity 87 of the ASD Relay connector in the PDC. Turn the ignition on. Measure the voltage on the ASD Relay Control circuit. Is the voltage above 1.0 volt? Yes → Repair the ASD Relay Control circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

***CHECKING THE ENGINE COOLANT TEMPERATURE SENSOR CALIBRATION**

POSSIBLE CAUSES
ECT SENSOR - COLD
ECT SENSOR - HOT

TEST	ACTION	APPLICABILITY
1	**NOTE: The thermostat must be operating correctly for this test to be valid.** With the DRBIII® in Sensors, read and note the engine coolant temperature. Using a temperature probe, measure the engine block temperature near the ECT Sensor. **NOTE: The engine temperature should be below 50°C (120°F).** Are the readings within 7°C (13°F) of each other? Yes → Go To 2 No → Replace the Engine Coolant Temperature Sensor. Perform ROAD TEST VERIFICATION - VER-2.	All
2	**NOTE: The thermostat must be operating correctly for this test to be valid.** Start the engine and bring the engine to operating temperature (thermostat open). Turn the engine off and wait 10 minutes to allow the engine temperature to stabilize. Using a temperature probe, measure the engine block temperature near the ECT Sensor. With the DRBIII®, select Engine, then Sensors and read the engine coolant temperature. Are the readings within 7°C (13°F) of each other? Yes → Test Complete. No → Replace the Engine Coolant Temperature Sensor. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:
*CHECKING THE ENGINE MECHANICAL SYSTEMS

POSSIBLE CAUSES
CHECKING ENGINE MECHANICAL SYSTEMS

TEST	ACTION	APPLICABILITY
1	**NOTE: The following items should be checked as a possible cause of a Driveability or No-Start problem.** **WARNING: Do not attempt to remove or separate high pressure fuel line. Attempting to do so could result in severe bodily injury or death.** Engine Valve Timing - must be within specification Engine Compression - must be within specifications Camshaft Lobes - check for abnormal wear Camshaft Position Sensor - check the camshaft position sensor tooth for debris and deterioration Crankshaft Position Sensor - check the crankshaft tone wheel for debris and deterioration Engine Exhaust System - must be free of any restriction Engine Drive Sprocket - must be properly positioned Vacuum System - must operate properly and be free of any vacuum leaks Fuel - must have adequate supply and must be free of contamination (ie. debris, water and gasoline) Fuel Injectors - must not be plugged or restricted Fuel Lift Pump - must operate properly (where applicable) Fuel Injection Pump - must be producing the correct output volume and pressure Inspect the Fuel Lines, Fuel Filter and Fuel Pressure Relief Valve for signs of restriction and leaks **NOTE: Check for any Technical Service Bulletins that may relate to the problem.** Are there any problems evident? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All

Symptom:

*CHECKING THE FUEL PRESSURE SENSOR CIRCUITS

POSSIBLE CAUSES
OPEN CIRCUITS

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Fuel Pressure Sensor harness connector. Disconnect the ECM harness connectors. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Repair as necessary. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Repair as necessary. Measure the resistance of each of the three Fuel Pressure Sensor circuits between the ECM harness connector and the Fuel Pressure Sensor harness connector. Is the resistance below 10.0 ohms for each measurement? Yes → Test Complete. No → Repair open circuit(s) as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

*CHECKING THE FUEL PRESSURE SOLENOID CIRCUITS

POSSIBLE CAUSES
FUEL PRESSURE SOLENOID RESISTANCE
OPEN CIRCUITS

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Fuel Pressure Solenoid harness connector. Disconnect the ECM harness connectors. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Repair as necessary. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Repair as necessary. Measure the resistance of both Fuel Pressure Solenoid circuits between the ECM harness connector and the Fuel Pressure Solenoid harness connector. Is the resistance below 10.0 ohms for both measurements? Yes → Go To 2 No → Repair open circuit(s) as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All
2	Turn the ignition off. Disconnect the Fuel Pressure Solenoid harness connector. Measure the resistance of the Fuel Pressure Solenoid. Is the resistance between 3.5 and 5.5 ohms? Yes → Test Complete. No → Replace the Fuel Pressure Solenoid. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

*CHECKING THE FUEL QUANTITY SOLENOID CIRCUITS

POSSIBLE CAUSES
OPEN CIRCUITS

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. Disconnect the Fuel Quantity Solenoid harness connector. Disconnect the ECM harness connectors. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Repair as necessary. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Repair as necessary. Measure the resistance of both Fuel Quantity Solenoid circuits between the ECM harness connector and the Fuel Quantity Solenoid harness connector. Is the resistance below 10.0 ohms for both measurements? Yes → Test Complete. No → Repair open circuit(s) as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

CHECKING THE HIGH-SIDE FUEL SYSTEM
***CHECKING THE HIGH-SIDE FUEL PRESSURE**

Test Note: All symptoms listed above are diagnosed using the same tests. The title for the tests will be CHECKING THE HIGH-SIDE FUEL SYSTEM.

POSSIBLE CAUSES
AIR IN FUEL SYSTEM
DRB TESTS
FUEL PRESSURE SOLENOID
FUEL PRESSURE SOLENOID RETURN VOLUME TEST
FUEL PUMP
FUEL SYSTEM LEAK
INJECTOR RETURN VOLUME TEST

TEST	ACTION	APPLICABILITY
1	**NOTE: The Low/Supply Side Fuel System must be working properly for this test to be valid. Refer to the Service Information and Perform the Low/ Supply Side Fuel System Test before continuing.** Turn the ignition on. **NOTE: This test requires two people. One person to test drive the vehicle while a technician observes the DRB readings** With the DRBIII® in Sensors, read and compare the Fuel Pressure (PSI) with the Fuel Pressure Desired/Setpoint (PSI) while test driving the vehicle under various load conditions such as idle, hard acceleration, cruise and deceleration. **NOTE: The Fuel Pressure reading should follow (trail) closely to the Fuel Pressure Desired/Setpoint reading.** Does the Fuel Pressure reading follow closely to the Fuel Pressure Desired/Setpoint reading? Yes → Test Complete. No → Go To 2	All

CHECKING THE HIGH-SIDE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. **WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS.** **WARNING: FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.** Inspect the entire fuel system for leakage. Is there any evidence of leakage? Yes → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 3	All
3	Start the engine. With the DRBIII® in Sensors, compare the Fuel Pressure Setpoint with the Actual Fuel Pressure readings. **NOTE: If there is air in the fuel system, the Actual Fuel Pressure will oscillate above and below the Fuel Pressure Setpoint.** Does Actual Fuel Pressure oscillate above and below the Fuel Pressure Setpoint? Yes → Refer to the Service Information to purge air from the fuel system. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Start the engine. With the DRBIII® in Sensors, compare the Fuel Pressure Setpoint with the Actual Fuel Pressure readings. **NOTE: A sticking Fuel Pressure Solenoid is indicated by Actual Fuel Pressure gradually dropping below the Fuel Pressure Setpoint then suddenly increasing (spiking) above the Fuel Pressure Setpoint.** Does Actual Fuel Pressure gradually decrease then suddenly increase (spike) above the Fuel Pressure Yes → Replace the Fuel Pressure Solenoid in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 5	All
5	Turn the ignition on. With the DRB, select Engine, System Tests and perform the following tests: - Injector Fuel Correction Test. - Cylinder Balance test. - Compression Test. Were any problems found? Yes → Diagnose and/or repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All

CHECKING THE HIGH-SIDE FUEL SYSTEM — Continued

TEST	ACTION	APPLICABILITY
6	Refer the Service Information and perform the Injector Return Volume Test. Did the Injectors pass the Return Volume Test? Yes → Go To 7 No → Refer to the Service Information and replace injector(s) as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All
7	Refer the Service Information and perform the Fuel Pressure Solenoid Return Volume Test. Did the Fuel Pressure Solenoid pass the Return Volume Test? Yes → Replace the Fuel Pump in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Refer to the Service Information and replace the Fuel Pressure Solenoid. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:
*CHECKING THE SPEED CONTROL OPERATION

POSSIBLE CAUSES
BRAKE SWITCH SIGNAL
CHECKING CRUISE SWITCHES
CHECKING THE ECM FOR DTC'S
ENGINE CONTROL MODULE
VSS SIGNAL
INTERMITTENT CONDITION

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII®, read the ECM DTCs. Are there any ECM DTCs present? Yes → Refer to symptom list for problems related to the ECM DTC. Perform SPEED CONTROL VERIFICATION - VER-4. No → Go To 2	All
2	Start the engine. With the DRBIII® in Sensors, read the S/C Switch #1 volts. Observe the cruise switch volts on the DRBIII® while pressing and holding each cruise button separately. **NOTE: Pressing each cruise button should result in the following voltages: ON/OFF 0.78v - 0.98, SET 3.26 - 3.46v, RESUME/ACCEL 3.93 - 4.13v, CANCEL 1.67 - 1.87v, COAST 2.64 - 2.84v, No Button Pressed 4.44 - 4.64v** With the DRBIII®, read the S/C Switch #2 volts. Observe the cruise switch volts on the DRBIII® while pressing and holding each cruise button separately. **NOTE: Pressing each cruise button should result in the following voltages: ON/OFF 3.62 - 3.82v, SET 1.25 - 1.45v, RESUME/ACCEL 2.13 - 2.33v, CANCEL 2.93 - 3.13v, COAST 0.78 - 0.98v, No Button Pressed 4.44 - 4.64v** Does each switch provide the correct voltage? Yes → Go To 3 No → Check S/C Switch signal and Ground circuits. If o.k., replace the S/C Switches. Perform SPEED CONTROL VERIFICATION - VER-4.	All
3	**NOTE: Prior to testing the speed control operation, ensure the Learn Speed Control feature has been performed on the ECM.** Test drive the vehicle above 60 km/h (35 MPH). Attempt to Set the Speed Control. Does the Speed Control function properly? Yes → Test Complete. No → Go To 4	All

*CHECKING THE SPEED CONTROL OPERATION — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition on. With the DRBIII® in Sensors, read Vehicle Speed. Have an assistant drive the vehicle while you are observing the Vehicle Speed on the DRBIII®. While observing vehicle speed on the DRBIII®, note any rapid changes (signal dropouts) in the reading that do not correspond with actual vehicle speed. Is the DRBIII® displaying an accurate vehicle speed? Yes → Go To 5 No → Refer to symptom list for problems related to the Vehicle Speed Sensor. Perform SPEED CONTROL VERIFICATION - VER-4.	All
5	Turn the ignition on. With the DRBIII® in Inputs/Outputs, read the Primary and Secondary brake switch states while pressing and releasing the Brake Pedal several times. Did the DRBIII® indicate the correct brake pedal state when pressing and releasing the Brake Pedal? Yes → Go To 6 No → Refer to symptom list for problems related to Brake Switch Signal. Perform SPEED CONTROL VERIFICATION - VER-4.	All
6	**WARNING: WHEN THE ENGINE IS OPERATING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** Refer to any Technical Service Bulletins (TSB) that may apply. Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals. Were any of the above conditions present? Yes → Repair as necessary. Perform SPEED CONTROL VERIFICATION - VER-4. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform SPEED CONTROL VERIFICATION - VER-4.	All

Symptom:

*CHECKING THE TRANSFER CASE POSITION SENSOR

POSSIBLE CAUSES
CHECKING THE TRANSFER CASE POSITION SENSOR

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRBIII® read the T-case Sensor Observe the T-case volts on the DRB while moving the transfer case selector lever in each of the transfer case positions. **NOTE: When shifting the transfer case selector to each position, the Sensor voltage should result in the following voltages: 2WD 2.64 - 2.80, 4WD Part Time 1.96 - 2.12, 4WD Full Time 1.39 - 1.55, Neutral 0.80 - 0.96, 4WD Low 0.21 - 0.37,** Does each position provide the correct voltage? Yes → Test Complete. No → Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Transfer Case Position Sensor and the ECM. If wiring and connectors are ok, replace the Transfer Case Position Sensor. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

***CHECKING THE VISCOUS/CABIN HEATER RELAY**

POSSIBLE CAUSES
FUSED B+ CIRCUIT OPEN
CABIN HEATER RELAY OUTPUT CIRCUIT SHORTED TO VOLTAGE
CABIN HEATER RELAY OUTPUT CIRCUIT SHORTED TO GROUND
CABIN HEATER RELAY OUTPUT CIRCUIT OPEN
CABIN HEATER RELAY

TEST	ACTION	APPLICABILITY
1	Turn the ignition on. With the DRB, actuate the Viscous/Cabin Heater Relay. Is the Cabin Heater Relay clicking during the actuator test? Yes → Test Complete. No → Go To 2	All
2	**NOTE: If the Cabin Heater Relay fuse or fuselink is open, refer to the system schematics for all circuits that are powered by the Cabin Heater Relay fuse or fuselink to determine the cause of the blown fuse/fuselink.** Remove the Cabin Heater Relay. Using a 12-volt test light connected to ground, probe the Fused B+ circuit in the Cabin Heater Relay connector. Does the test light illuminate brightly? Yes → Go To 3 No → Repair the Fused B+ (Fuse/Fuselink) circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
3	Turn the ignition off. Disconnect the Cabin Heater harness connector. Remove the Cabin Heater Relay. Turn the ignition on. Measure the voltage on the Cabin Heater Relay Output circuit. Is the voltage above 1.0 volt? Yes → Repair the Cabin Heater Relay Output circuit for a short to voltage. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition off. Disconnect the Cabin Heater harness connector. Remove the Cabin Heater Relay. Measure the resistance between ground and the Cabin Heater Relay Output circuit. Is the resistance above 1000 ohms? Yes → Go To 5 No → Repair the Cabin Heater Relay Output circuit for a short to ground. Inspect the fuse or fuselink and replace as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All

*CHECKING THE VISCOUS/CABIN HEATER RELAY — Continued

TEST	ACTION	APPLICABILITY
5	Turn the ignition off. Disconnect the Cabin Heater harness connector. Remove the Cabin Heater Relay. Connect a jumper wire across Cabin Heater Relay connector cavities 30 and 87. Using a 12-volt test light connected to ground, check the Cabin Heater Relay Output circuit in the Cabin Heater harness connector. Does the test light illuminate brightly? Yes → Go To 6 No → Repair the Cabin Heater Relay Output circuit for an open. Perform ROAD TEST VERIFICATION - VER-2.	All
6	If there are no possible causes remaining, view repair. Repair Replace the Cabin Heater Relay. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom:

***ENGINE CRANKS BUT WILL NOT START**

POSSIBLE CAUSES
CAMSHAFT POSITION SENSOR SIGNAL PROBLEM
CRANKSHAFT POSITION SENSOR SIGNAL PROBLEM
ECM CODES PRESENT
ECT SENSOR
ENGINE CONTROL MODULE
ENGINE DRIVE BELT/CHAIN
FUEL SUPPLY CONTAMINATION
FUEL SYSTEM RESTRICTION
GLOW PLUGS
SKIM CODES PRESENT

TEST	ACTION	APPLICABILITY
1	**NOTE: The ECM must have proper power and ground connections for the following tests to be valid. Refer to Checking the ECM Power and Grounds in the symptom list.** Turn the ignition on. With the DRBIII®, read the ECM DTCs. Does the DRBIII® display any ECM DTCs? Yes → Refer to symptom list for problems related to ECM DTC. Perform NO START VERIFICATION - VER-1. No → Go To 2	All
2	Turn the ignition on. With the DRBIII®, read the SKIM DTCs. Does the DRBIII® display any SKIM DTCs? Yes → Refer to symptom list for problems related to SKIM DTC. Perform NO START VERIFICATION - VER-1. No → Go To 3	All
3	Using a temperature probe, check the vehicle temperature near the ECT Sensor. Turn the ignition on. With the DRBIII® in Sensors, read the ECT Sensor temperature. Compare the temperature probe reading with the DRBIII® reading. Are the two readings within 10°C of each other? Yes → Go To 4 No → Repair as necessary. Perform NO START VERIFICATION - VER-1.	All

*ENGINE CRANKS BUT WILL NOT START — Continued

TEST	ACTION	APPLICABILITY
4	**NOTE: Prior to performing this test, be sure to check the Glow Plug Relay operation. Refer to CHECKING GLOW PLUG OPERATION for the related symptom(s).** Refer to the Service Information and check the Glow Plugs for proper operation. Are the Glow Plugs operating properly? Yes → Go To 5 No → Repair as necessary. Perform NO START VERIFICATION - VER-1.	All
5	Inspect the fuel system lines for restrictions, leaks or other problems. **NOTE: Refer to the Service Information to ensure that the fuel system is properly primed. An unprimed system or excessive air in the supply system will cause a no-start condition.** Is there any evidence of problems? Yes → Repair as necessary. Perform NO START VERIFICATION - VER-1. No → Go To 6	All
6	Turn the ignition off. Attempt to start the engine, if the engine will not start, crank the engine for several seconds while monitoring the DRBIII®. With the DRBIII® in Sensors, read the Cam Position Sensor RPM. Does the DRBIII® display a steady CMP Sensor RPM approximately one half the speed of Engine RPM? Yes → Go To 7 No → Using the Service Information, check the wiring and connectors related to the CMP Sensor. If o.k., replace the CMP Sensor. Perform NO START VERIFICATION - VER-1.	All
7	Turn the ignition off. Attempt to start the engine, if the engine will not start, crank the engine for several seconds while monitoring the DRBIII®. With the DRBIII® in Sensors, read the Engine RPM. Does the DRBIII® display a steady CKP Sensor RPM approximately double the speed of the CMP RPM? Yes → Go To 8 No → Using the Service Information, check the wiring and connectors related to the CKP Sensor. If o.k., replace the CKP Sensor. Perform NO START VERIFICATION - VER-1.	All
8	Inspect the fuel supply for contamination. Is the fuel contaminated? Yes → Refer to the Service Information to remove and replace fuel throughout the fuel system. Perform NO START VERIFICATION - VER-1. No → Go To 9	All

*ENGINE CRANKS BUT WILL NOT START — Continued

TEST	ACTION	APPLICABILITY
9	Refer to the Service Information to ensure the Engine Drive Belt/Chain is installed correctly and the camshaft and crankshaft gears are timed correctly. Were any problems found? Yes → Repair as necessary. Perform NO START VERIFICATION - VER-1. No → Replace and program the Engine Control Module in accordance with the Service Information. Perform NO START VERIFICATION - VER-1.	All

Symptom:

***ENGINE WILL NOT CRANK**

POSSIBLE CAUSES
BATTERY CABLE HIGH RESISTANCE
BATTERY CABLES
CLUTCH INTERLOCK SWITCH
CLUTCH INTERLOCK SWITCH OUTPUT CIRCUIT
IGNITION SWITCH START OUTPUT CIRCUIT OPEN
MECHANICAL PROBLEM
OPEN FUSED BATTERY (+) CIRCUIT
OPEN IGNITION SWITCH START OUTPUT
P/N SWITCH
P/N SWITCH CIRCUIT OPEN
P/N SWITCH GROUND CIRCUIT OPEN
SKIM CODES PRESENT
STARTER MOTOR
STARTER RELAY
STARTER RELAY
STARTER RELAY GROUND CIRCUIT OPEN
STARTER RELAY OUTPUT CIRCUIT OPEN

TEST	ACTION	APPLICABILITY
1	Turn the ignition off. **NOTE: The battery must be fully charged before diagnosing a no crank condition.** Inspect the battery cables for corrosion, looseness or other problems. Is there evidence of problems? Yes → Repair as necessary. Perform NO START VERIFICATION - VER-1. No → Go To 2	All
2	Turn the ignition on. With the DRBIII®, read the SKIM DTCs. Does the DRBIII® display any SKIM DTCs? Yes → Refer to symptom list for problems related to SKIM. Perform NO START VERIFICATION - VER-1. No → Go To 3	All
3	Is the vehicle equipped with an automatic transmission? Yes → Go To 4 No → Go To 9	All

*ENGINE WILL NOT CRANK — Continued

TEST	ACTION	APPLICABILITY
4	Turn the ignition off. Remove the Starter Relay from the PDC. **WARNING: THE TRANSMISSION MUST BE IN PARK/NEUTRAL AND THE PARK BRAKE MUST BE SET FOR THIS TEST.** **WARNING: THE ENGINE MAY CRANK IN THE NEXT STEP. WHEN THE ENGINE IS CRANKING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** Momentarily jumper Starter Relay connector cavities 30 and 87 in the PDC connector. Did the engine crank? Yes → Go To 5 No → Go To 14	All
5	Turn the ignition off. Place the transmission in Park or Neutral. Remove the Starter Relay from the PDC. Using a 12-volt test light connected to ground, check the Ignition Switch Start Output circuit while turning the ignition switch to the START position. Does the test light illuminate with the ignition switch in the START position? Yes → Go To 6 No → Repair the Ignition Switch Start Output circuit for an open. Perform NO START VERIFICATION - VER-1.	All
6	Turn the ignition off. Remove the Starter Relay from the PDC. Install a substitute relay in place of the Starter Relay. Attempt to start the engine. Does the engine crank? Yes → Replace the Starter Relay. Perform NO START VERIFICATION - VER-1. No → Go To 7	All
7	Turn the ignition off. Disconnect the P/N Switch harness connector. Connect a jumper wire across the P/N Switch harness connector. Attempt to start the engine. Does the engine crank? Yes → Replace the Park/Neutral Switch in accordance with the Service Information. Perform NO START VERIFICATION - VER-1. No → Go To 8	All

*ENGINE WILL NOT CRANK — Continued

TEST	ACTION	APPLICABILITY
8	Turn the ignition off. Disconnect the P/N Switch harness connector. Using a 12-volt test light connected to 12-volts, check the Ground circuit at the P/N Switch harness connector. Does the test light illuminate brightly? Yes → Repair the P/N Switch Sense circuit for an open between the P/N Switch and the ECM harness connector. Perform NO START VERIFICATION - VER-1. No → Repair the P/N Switch Ground circuit for an open. Perform NO START VERIFICATION - VER-1.	All
9	Turn the ignition off. Remove the Starter Relay from the PDC. **WARNING: THE TRANSMISSION MUST BE IN NEUTRAL AND THE PARK BRAKE MUST BE SET FOR THIS TEST.** **WARNING: THE ENGINE MAY CRANK IN THE NEXT STEP. WHEN THE ENGINE IS CRANKING, DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR FAN. DO NOT WEAR LOOSE CLOTHING.** Momentarily jumper Starter Relay connector cavities 30 and 87 in the PDC connector. Did the engine crank? Yes → Go To 10 No → Go To 14	All
10	Remove the Starter Relay from the PDC. Using a 12-volt test light connected to ground, check the Ignition Switch Start Output circuit while fully depressing the clutch pedal and turning the ignition switch to the START position. Does the test light illuminate with the ignition switch in the START position? Yes → Go To 11 No → Go To 12	All
11	Turn the ignition off. Remove the Starter Relay from the PDC. Install a substitute relay in place of the Starter Relay. Attempt to start the engine. Does the engine crank? Yes → Replace the Starter Relay. Perform NO START VERIFICATION - VER-1. No → Repair the Starter Relay Ground Circuit for an open. Perform NO START VERIFICATION - VER-1.	All

*ENGINE WILL NOT CRANK — Continued

TEST	ACTION	APPLICABILITY
12	Turn the ignition off. Remove the Starter Relay from the PDC. Disconnect the Clutch Interlock Switch harness connector. Connect a jumper wire across the Clutch Interlock Switch harness connector. Using a 12-volt test light connected to ground, check the Ignition Switch Start Output circuit at the Starter Relay connector in the PDC and turning the ignition switch to the Start position. Does the test light illuminate with the ignition switch in the Start position? Yes → Replace the Clutch Interlock Switch. Perform NO START VERIFICATION - VER-1. No → Go To 13	All
13	Turn the ignition off. Disconnect the Clutch Interlock Switch harness connector. Remove the Starter Relay from the PDC. Measure the resistance of the Clutch Interlock Switch Output circuit between the PDC and the Clutch Interlock Switch harness connector. Is the resistance below 10.0 ohms? Yes → Repair the Ignition Switch Start Output circuit to the Clutch Interlock Switch. Perform NO START VERIFICATION - VER-1. No → Repair the Clutch Interlock Switch Output circuit for an open. Perform NO START VERIFICATION - VER-1.	All
14	Remove the Starter Relay from the PDC. Using a 12-volt test light connected to ground, check the Fused B+ circuit in the Starter Relay connector in the PDC. Is the test light on? Yes → Go To 15 No → Repair the Fused B(+) circuit for an open. Perform NO START VERIFICATION - VER-1.	All
15	Turn the ignition off. Remove the Starter Relay from the PDC. Disconnect the Starter Relay Output wire from the Starter Solenoid. Connect the Starter Relay Output wire (at the Starter) to ground. Using a 12-volt test light connected to 12-volts, check the Starter Relay Output circuit at the Starter Relay connector in the PDC. Does the test light illuminate brightly? Yes → Go To 16 No → Repair the Starter Relay Output circuit for an open. Perform NO START VERIFICATION - VER-1.	All
16	Using the Service Information, check the battery cables for high resistance. Did either battery cable have a voltage drop greater than 0.2 volts? Yes → Replace the battery cable(s). Perform NO START VERIFICATION - VER-1. No → Go To 17	All

*ENGINE WILL NOT CRANK — Continued

TEST	ACTION	APPLICABILITY
17	Turn the ignition off. Attempt to manually rotate the crankshaft 360°. Is the crankshaft able to rotate 360°? Yes → Replace the Starter Motor. Perform NO START VERIFICATION - VER-1. No → Repair the engine mechanical problem. Perform NO START VERIFICATION - VER-1.	All

Symptom:

***LACK OF ENGINE POWER**

POSSIBLE CAUSES
AIR IN FUEL SYSTEM
BOOST CONTROL VACUUM SUPPLY
CHECK FOR ECM DTCS
CHECKING ECM POWER AND GROUNDS
CHECKING FOR AIR LEAKS
CHECKING THE FUEL DELIVERY SYSTEM
DRB TESTS
ENGINE DRIVE BELT/CHAIN
FUEL INJECTOR(S)
FUEL PRESSURE SOLENOID
FUEL PRESSURE SOLENOID
FUEL PUMP
FUEL SYSTEM CONTAMINATION
FUEL SYSTEM LEAK
TURBOCHARGER

TEST	ACTION	APPLICABILITY
1	**WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS.** **WARNING: FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.** Turn the ignition on. With the DRBIII®, read the ECM DTCs. Are there any DTCs present? Yes → Refer to symptom list for problems related to this DTC. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 2	All

*LACK OF ENGINE POWER — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition on. **NOTE: This test requires two people. One person to test drive the vehicle while a technician observes the DRB readings** With the DRBIII® in Sensors, read and compare the Boost Pressure (PSI) with the Boost Pressure Desired/Setpoint (PSI) while test driving the vehicle under various load conditions such as idle, hard acceleration, cruise and deceleration. **NOTE: The Boost Pressure reading should follow (trail) closely to the Boost Pressure Desired/Setpoint reading.** Does the Boost Pressure reading follow closely to the Boost Pressure Desired/ Setpoint reading? Yes → Go To 3 No → Go To 15	All
3	Refer to the symptom list and perform the Checking the ECM Power and Ground test. Were any problem found with the ECM powers and grounds? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 4	All
4	Turn the ignition on. **NOTE: This test requires two people. One person to test drive the vehicle while a technician observes the DRB readings** With the DRBIII® in Sensors, read and compare the Fuel Pressure (PSI) with the Fuel Pressure Desired/Setpoint (PSI) while test driving the vehicle under various load conditions such as idle, hard acceleration, cruise and deceleration. **NOTE: The Fuel Pressure reading should follow (trail) closely to the Fuel Pressure Desired/Setpoint reading.** Does the Fuel Pressure reading follow closely to the Fuel Pressure Desired/Setpoint reading? Yes → Go To 5 No → Go To 7	All
5	Turn the ignition on. With the DRB, select Engine, System Tests and perform the following tests: - Injector Fuel Correction Test. - Cylinder Balance test. - Compression Test. Were any problems found? Yes → Diagnose and/or repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 6	All

*LACK OF ENGINE POWER — Continued

TEST	ACTION	APPLICABILITY
6	**NOTE: Mixing any other fuels such as gasoline or kerosine can cause this DTC to set.** Turn the ignition off. **WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS.** **WARNING: FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.** Inspect the fuel system for contamination. Is the fuel contaminated? Yes → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
7	Turn the ignition off. **WARNING: HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 23,200 PSI (1600 BAR). USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS.** **WARNING: FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE SKIN CAUSING PERSONAL INJURY OR DEATH. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING WHEN SERVICING FUEL SYSTEM.** Inspect the entire fuel system for leakage. Is there any evidence of leakage? Yes → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 8	All
8	Refer to the appropriate Service Information and refer to Diagnosis and Testing Fuel Delivery System table. **NOTE: The following is a list of problems that can cause fuel pressure to deviate from specification: restricted fuel filter or fuel lines, failed fuel pressure solenoid, air in fuel system, failed fuel sending unit, contaminated fuel, faulty injector.** Were there any problems with the Fuel Delivery System? Yes → Repair as necessary in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 9	All

*LACK OF ENGINE POWER — Continued

TEST	ACTION	APPLICABILITY
9	Start the engine. With the DRBIII® in Sensors, compare the Fuel Pressure Setpoint with the Actual Fuel Pressure readings. **NOTE: If there is air in the fuel system, the Actual Fuel Pressure will oscillate above and below the Fuel Pressure Setpoint.** Does Actual Fuel Pressure oscillate above and below the Fuel Pressure Setpoint? Yes → Refer to the Service Information to purge air from the fuel system. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 10	All
10	Start the engine. With the DRBIII® in Sensors, compare the Fuel Pressure Setpoint with the Actual Fuel Pressure readings. **NOTE: A sticking Fuel Pressure Solenoid is indicated by Actual Fuel Pressure gradually dropping below the Fuel Pressure Setpoint then suddenly increasing (spiking) above the Fuel Pressure Setpoint.** Does Actual Fuel Pressure gradually decrease then suddenly increase (spike) above the Fuel Pressure Yes → Replace the Fuel Pressure Solenoid in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 11	All
11	**NOTE: An injector that sticks open can cause this symptom. A sticking injector will cause the engine to miss fire and emit excessive black smoke from the exhaust system.** Start and idle the engine. Does the engine exhibit the symptoms described in the above note? Yes → Using the Service Information, remove and inspect the Fuel Injectors for signs of damage or debris that may cause the injector to stick. Sticking injectors may cause the combustion chamber to become black and oil soaked. Replace Injector(s) as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 12	All
12	Refer to the Service Information to ensure the Engine Drive Belt/Chain is installed correctly and the camshaft and crankshaft gears are timed correctly. Were any problems found? Yes → Repair as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 13	All
13	Turn the ignition off. Replace the Fuel Pressure Solenoid in accordance with the Service Information. Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Attempt to start and test drive the vehicle. With the DRBIII®, read the ECM DTCs. Does the ECM display this DTC? Yes → Go To 14 No → Test Complete.	All

*LACK OF ENGINE POWER — Continued

TEST	ACTION	APPLICABILITY
14	Turn the ignition off. Replace the Fuel Quantity Solenoid in accordance with the Service Information. Turn the ignition on. With the DRBIII®, erase the ECM DTCs. Attempt to start and test drive the vehicle. With the DRBIII®, read the ECM DTCs. Did this DTC set again? Yes → Replace the Fuel Pump in accordance with the Service Information. Perform ROAD TEST VERIFICATION - VER-2. No → Test Complete.	All
15	**NOTE: Inspect all air intake and turbocharger related tubes for damage, restriction or poor connection. Any of these conditions can cause a poor performance/lack of power symptom.** Turn the ignition off. Remove the Inlet Pressure Sensor. Connect smoke machine 84-04 to the Inlet Pressure Sensor port in the intake duct and begin injecting smoke into the intake system. Observe all intake system components for evidence of smoke leakage. Is there evidence of smoke leakage? Yes → Repair or replace as necessary. Perform ROAD TEST VERIFICATION - VER-2. No → Go To 16	All
16	Refer to symptom Checking The Boost Control Vacuum Supply in the Driveability category. Is the boost control vacuum supply system o.k.? Yes → Using the Service Information, replace the Turbocharger assembly. Perform ROAD TEST VERIFICATION - VER-2. No → Repair boost system vacuum supply as necessary. Perform ROAD TEST VERIFICATION - VER-2.	All

Symptom List:

ANTENNA FAILURE
COP FAILURE
EEPROM FAILURE
INTERNAL FAULT
RAM FAILURE
SERIAL LINK INTERNAL FAULT
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:

ANTENNA FAILURE

When Monitored: Every 250 milliseconds with the ignition on.

Set Condition: The SKIM's microcontroller determines that an antenna circuit fault has occurred for 2.0 consecutive seconds.

COP FAILURE

When Monitored: With the ignition on.

Set Condition: The COP timer is not reset by the micro controller every 65.5 milliseconds.

EEPROM FAILURE

When Monitored: With the ignition on.

Set Condition: When the value written to EEPROM memory does not equal the value read back after the write operation.

INTERNAL FAULT

When Monitored: With the ignition on.

Set Condition: The SKIM has detected a fault during an internal self test.

RAM FAILURE

When Monitored: With the ignition on.

Set Condition: The RAM fails a test that checks the RAM's ability to retain memory.

SERIAL LINK INTERNAL FAULT

When Monitored: With the ignition on.

Set Condition: The SKIM fails an internal communication self test.

STACK OVERFLOW FAILURE

When Monitored: With the ignition on.

Set Condition: The micro controller has exceeded its stack space limit.

ANTENNA FAILURE — Continued

POSSIBLE CAUSES
SKIM INTERNAL DTC FAILURE

TEST	ACTION	APPLICABILITY
1	**Note: This trouble code indicates an internal SKIM fault.** With the DRBIII®, read and record the SKIM DTCs and then erase the SKIM DTCs Perform 10 ignition key cycles, leaving the ignition key on for a minimum of 90 seconds per cycle. With the DRBIII® , read the SKIM DTCs. Did the same SKIM DTC return? Yes → Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information. Perform SKIS VERIFICATION. No → Test Complete.	All

Symptom List:

PCM STATUS FAILURE
SERIAL LINK EXTERNAL FAULT

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

When Monitored and Set Condition:

PCM STATUS FAILURE

When Monitored: With the ignition on.

Set Condition: This DTC exists when a PCM STATUS message was not received from the ECM for at least 20.0 consecutive seconds.

SERIAL LINK EXTERNAL FAULT

When Monitored: At ignition on, after ignition on during any rolling code handshake that occurs with the ECM due to a SKIM reset, or during SECRET KEY transfers to the ECM.

Set Condition: When the SKIM does not receive an expected BUS message transmission acknowledgement from the ECM after 3 transmit attempts.

POSSIBLE CAUSES
INTERMITTENT WIRING HARNESS PROBLEM
WIRING HARNESS INSPECTION
SKIM/ECM

TEST	ACTION	APPLICABILITY
1	**NOTE: Ensure that the ECM has proper power and ground connections and that the ECM can communicate with the DRBIII® before continuing.** With the DRBIII®, read and record the SKIM DTCs then erase the SKIM DTCs. Turn the ignition off. Wait 2 minutes. Turn the ignition on. With the DRBIII®, read the SKIM DTCs. Does the DRBIII® display the DTC that was previously erased? Yes → Go To 2 No → Go To 4	All

PCM STATUS FAILURE — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition off. **NOTE: Visually inspect the related wiring harness and CAN/PCI Bus (whichever applicable) circuits. Look for any chafed, pierced, pinched, or partially broken wires.** **NOTE: Visually inspect the related wiring 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 SKIS VERIFICATION. No → Go To 3	All
3	**NOTE: Before proceeding it will be necessary to obtain the SKIM PIN.** Turn the ignition on. With the DRBIII®, display and erase all ECM and SKIM DTCs. Perform 5 ignition key cycles, leaving the ignition key on for a minimum of 90 seconds per cycle. With the DRBIII®, read the SKIM DTCs. Did this DTC set again? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform SKIS VERIFICATION. No → Test Complete.	All
4	Turn the ignition off. **Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.** **NOTE: Visually inspect the related wiring 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 SKIS VERIFICATION. No → Test Complete.	All

Symptom List:

ROLLING CODE FAILURE
VIN MISMATCH

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

When Monitored and Set Condition:

ROLLING CODE FAILURE

When Monitored: At ignition on, after ignition on during any rolling code handshake that occurs with the ECM due to a SKIM or ECM reset.

Set Condition: When a PCM STATUS message with a Valid Key status is not received by the SKIM within 3.5 seconds of transmitting the last Valid Key Code message to the ECM.

VIN MISMATCH

When Monitored: With the ignition on.

Set Condition: When the VIN received from the ECM does not match the VIN stored in the SKIM's EEPROM.

POSSIBLE CAUSES
VERIFYING ECM VIN
REPLACE SKIM AND CHECK DTC'S
INTERMITTENT WIRING HARNESS PROBLEM
ECM

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, erase the SKIM DTCs. Turn the ignition off. Wait 10 seconds. Turn the ignition on and wait 2 minutes. With the DRBIII®, read the SKIM DTCs. Does the DRBIII® display the DTC that was previously erased? Yes → Go To 2 No → Go To 4	All

ROLLING CODE FAILURE — Continued

TEST	ACTION	APPLICABILITY
2	Turn the ignition on. With the DRBIII®, select Engine system from the main menu. Display and record the Vehicle Identification Number. **NOTE: Ensure that the correct VIN has been programmed into the ECM. If a VIN is not displayed, attempt to program the ECM with the correct vehicle VIN before continuing.** Does the VIN recorded from the ECM match the VIN of the vehicle? Yes → Go To 3 No → Replace and program the Engine Control Module in accordance with the Service Information. Perform SKIS VERIFICATION.	All
3	Turn the ignition off. Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information. Turn the ignition on. With the DRBIII®, display and clear all ECM and SKIM DTCs. Perform 5 ignition key cycles leaving the ignition key on for 90 seconds per cycle. With the DRBIII®, check for SKIM DTCs. Does the DRBIII® display the same DTC? Yes → Replace and program the Engine Control Module in accordance with the Service Information. Perform SKIS VERIFICATION. No → The repair is complete. Perform SKIS VERIFICATION.	All
4	Turn the ignition off. **Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.** **NOTE: Visually inspect the related wiring 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 SKIS VERIFICATION. No → Test Complete.	All

Symptom List:

TRANSPONDER COMMUNICATION FAILURE
TRANSPONDER CYCLIC REDUNDANCY CHECK (CRC) 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 COMMUNICATION FAILURE.

When Monitored and Set Condition:

TRANSPONDER COMMUNICATION FAILURE

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

Set Condition: When the SKIM does not receive a transponder response after 8 consecutive transponder read attempts within 2.0 seconds.

TRANSPONDER CYCLIC REDUNDANCY CHECK (CRC) FAILURE

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

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

TRANSPONDER ID MISMATCH

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

Set Condition: When the transponder ID read by the SKIM does not match any of the transponder ID's stored in the SKIM's memory.

TRANSPONDER RESPONSE MISMATCH

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

Set Condition: When the transponder's crypto algorithm result fails to match the SKIM's result due to incorrect secret key in the ignition key transponder.

POSSIBLE CAUSES
CHECKING MULTIPLE KEY OPERATION
SKIM
INTERMITTENT WIRING HARNESS PROBLEM
REPLACE IGNITION KEY

TRANSPONDER COMMUNICATION FAILURE — Continued

TEST	ACTION	APPLICABILITY
1	With the DRBIII®, read and record the SKIM DTCs. With the DRBIII®, erase the SKIM DTCs. **NOTE: Perform the following test several times to ensure the DTC is current.** Turn the ignition off. Wait 10 seconds. Turn the ignition on. With the DRBIII®, read the SKIM DTCs. Does the DRBIII® display the DTC that was previously erased? Yes → Go To 2 No → Go To 7	All
2	Are there multiple vehicle ignition keys available? Yes → Go To 3 No → Go To 4	All
3	**NOTE: Perform the following steps using one of the vehicle ignition keys. When finished, repeat the procedure using each of the other vehicle keys one at a time.** With the DRBIII®, erase the SKIM DTCs. Turn the ignition off. Wait 10 seconds. Turn the ignition on. With the DRBIII®, read the SKIM DTCs. Is the DTC present for all ignition keys? Yes → Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information. Perform SKIS VERIFICATION. No → Replace the ignition key(s) that cause the SKIM DTC. Perform SKIS VERIFICATION.	All
4	With the DRBIII®, attempt to reprogram the ignition key to the SKIM. With the DRBIII®, erase the SKIM DTCs. Wait 10 seconds. Turn the ignition on. With the DRBIII®, read the SKIM DTCs. Does the DTC set again? Yes → Go To 5 No → Test Complete.	All
5	Replace the ignition key with a new key. With the DRBIII®, program the new ignition key to the SKIM. With the DRBIII®, erase the SKIM DTCs. Turn the ignition off. Wait 10 seconds. Turn the ignition on. With the DRBIII®, read the SKIM DTCs. Does the DTC set again? Yes → Go To 6 No → Test Complete.	All

TRANSPONDER COMMUNICATION FAILURE — Continued

TEST	ACTION	APPLICABILITY
6	If there are no possible causes remaining, view repair. Repair Replace and program the Sentry Key Immobilizer Module in accordance with the Service Information. Perform SKIS VERIFICATION.	All
7	Turn the ignition off. **Note: Visually inspect the related wiring harness. Look for any chafed, pierced, pinched, or partially broken wires.** **NOTE: Visually inspect the related wiring 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 SKIS VERIFICATION. No → Test Complete.	All

Verification Tests

45RFE/545RFE TRANSMISSION VERIFICATION TEST - VER 1	APPLICABILITY
1. Connect the DRBIII® to the Data Link Connector. 2. Reconnect any disconnected components. 3. With the DRBIII®, erase DTC's. 4. With the DRBIII®, display Transmission Temperature. Start and run the engine until the Transmission Temperature is HOT above 43° Celsius 110° Fahrenheit. 5. Check the Transmission fluid and adjust if necessary. Refer to the Service Information for the Fluid Fill procedure. **6. NOTE: If the TCM has been replaced or if the transmission has been repaired or replaced it is necessary to perform the DRBIII® Quick Learn Procedure.** 7. Road test the vehicle. With the DRBIII®, monitor TPS. Make fifteen to twenty 1-2, 2-3, and 3-4 upshifts and (4 - 4 Prime for 545RFE only). 8. Perform these shifts from a standing start to 97 Km/h 60 MPH with a constant throttle opening of 20 to 25 degrees. 9. Below 40 Km/h 25 MPH, make five to eight wide open throttle kickdowns to 1st gear. Allow at least 5 seconds each in 2nd and 3rd gear between each kickdown. 10. Check for DTC's during the road test. **11. NOTE: Use the EATX OBDII task manager to run Good Trip time in each gear, this will confirm the repair and to ensure that the DTC has not re-matured.** 12. Perform the Battery Disconnect with the DRBIII®, this will clear the EATX EVENT DATA. Were any Trouble Codes set during the road test? Yes → Refer to the Symptom List for the appropriate diagnostic tests. No → Repair is complete.	All

ABS VERIFICATION TEST - VER 1	APPLICABILITY
1. Turn the ignition off. 2. Connect all previously disconnected components and connectors. 3. Ensure all accessories are turned off and the battery is fully charged. 4. Ensure that the Ignition is on, and with the DRBIII, erase all Diagnostic Trouble Codes from ALL modules. Start the engine and allow it to run for 2 minutes and fully operate the system that was malfunctioning. 5. Turn the ignition off and wait 5 seconds. Turn the ignition on and using the DRBIII®, read DTC's from ALL modules. 6. If any Diagnostic Trouble Codes are present, return to Symptom list and troubleshoot new or recurring symptom. **7. NOTE: For Sensor Signal and Pump Motor faults, the ABM must sense all 4 wheels at 25 km/h (15 mph) before it will extinguish the ABS Indicator.** 8. If there are no DTC's present after turning ignition on, road test the vehicle for at least 5 minutes. Perform several anti-lock braking stops. **9. Caution: Ensure braking capability is available before road testing.** 10. Again, with the DRBIII® read DTC's. If any DTC's are present, return to Symptom list. 11. If there are no Diagnostic Trouble Codes (DTC's) present, and the customer's concern can no longer be duplicated, the repair is complete. Are any DTC's present or is the original concern still present? Yes → Repair is not complete, refer to appropriate symptom. No → Repair is complete.	All

Verification Tests — Continued

BODY VERIFICATION TEST - VER 1	APPLICABILITY
1. Disconnect all jumper wires and reconnect all previously disconnected components and connectors. **2. NOTE: If the SKIM or PCM/ECM was replaced, refer to the service information for proper programming procedures.** 3. If the Instrument Cluster was replaced, use the DRBIII® to insure the proper warning indicators are configured. 4. If the Body Control Module was replaced, turn the ignition on for 15 seconds (to learn VIN). If the vehicle is equipped with VTSS, use the DRBIII® and enable VTSS. 5. Program tire size, country code, radio EQ setting and all RKE transmitters (if RKE Module was replaced) and other options as necessary. 6. (Export only) If the Intrusion Transceiver Module ITM was replaced, use the DRBIII® to enable ITM and Program Interior Type. 7. (Export only) If the Siren was replaced perform the DRBIII® Siren Replacement procedure. 8. Ensure all accessories are turned off and the battery is fully charged. 9. With the DRBIII®, record and erase all DTC's from ALL modules. Start and run the engine for 2 minutes. Operate all functions of the system that caused the original concern. 10. Turn the ignition off and wait 5 seconds. Turn the ignition on and using the DRBIII®, read DTC's from ALL modules. Are any DTC's present or is the original condition still present? Yes → Repair is not complete, refer to the appropriate symptom. No → Repair is complete.	All

NO START VERIFICATION - VER-1	APPLICABILITY
1. NOTE: IMPORTANT! If the Engine Control Module or Sentry Key Immobilizer Module has been replaced, ensure the programming procedure for the module has been performed in accordance with the Service Information. 2. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary. 3. Inspect the engine oil for contamination. If it is contaminated, change the oil and filter. 4. With the DRB, erase all diagnostic trouble codes (DTCs). 5. Turn the ignition off for at least 10 seconds. 6. Attempt to start the engine. 7. If the engine is unable to start, look for any Technical Service Bulletins (TSBs) that may relate to this condition. Return to the Symptom List if necessary. 8. If the engine starts and continues to run, the repair is now complete. Are any DTCs or symptoms remaining? Yes → Repair is not complete, refer to appropriate symptom. No → Repair is complete.	All

Verification Tests — Continued

ROAD TEST VERIFICATION - VER-2	APPLICABILITY
1. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary. 2. If this verification procedure is being performed after a non-DTC test, perform steps 3 and 4. If not, proceed to step 5. 3. Check to see if the initial symptom still exists. If there are no trouble codes and the symptom no longer exists, the repair was successful and testing is now complete. 4. If the initial or another symptom exists, the repair is not complete. Check all pertinent Technical Service Bulletins (TSBs) and return to the Symptom List if necessary. 5. For previously read DTCs that have not been dealt with, return to the Symptom List and follow the diagnostic path for that DTC; otherwise, continue. 6. If the Engine Control Module (ECM) has not been changed, perform steps 7 and 8, otherwise, continue with step 9. 7. With the DRB III®, erase all diagnostic trouble codes (DTCs), then disconnect the DRB III®. 8. Turn the ignition off for at least 10 seconds. 9. If equipped with a Transfer Case Position Switch, perform step 10, otherwise, continue with step 11. 10. With the ignition switch on, place the Transfer Case Shift Lever in each gear position, stopping for 15 seconds in each position. 11. Ensure no DTCs remain by performing steps 12 through 15. 12. Road test the vehicle. For some of the road test, go at least 64 km/h (40 MPH). If this test is for an A/C Relay Control Circuit, drive the vehicle for at least 5 minutes with the A/C on. 13. At some point, stop the vehicle and turn the engine off for at least 10 seconds, then restart the engine and continue. 14. Upon completion of the road test, turn the engine off and check for DTCs with the DRB III®. 15. If the repaired DTC has set again, the repair is not complete. Check for any pertinent Technical Service Bulletins (TSBs) and return to the Symptom List. If there are no DTCs, the repair was successful and is now complete. Are any DTCs or symptoms remaining? Yes → Repair is not complete, refer to appropriate symptom. No → Repair is complete.	All

SKIS VERIFICATION	APPLICABILITY
1. Reconnect all previously disconnected components and connectors. 2. Obtain the vehicle's unique Personal Identification Number (PIN) assigned to it's original SKIM. This number can be obtained from the vehicle's invoice or Chrysler's Customer Center (1-800-992-1997). **3. NOTE: When entering the PIN, care should be taken because the SKIM will only allow 3 consecutive attempts to enter the correct PIN. If 3 consecutive incorrect PINs are entered, the SKIM will Lock Out the DRB for 1 hour.** 4. To exit Lock Out mode, the ignition key must remain in the Run position continually for 1 hour. Turn off all accessories and connect a battery charger if necessary. 5. With the DRB, select Theft Alarm, SKIM and Miscellaneous. Then, select the desired procedure and follow the steps that will be displayed. 6. If the SKIM has been replaced, ensure all of the vehicle ignition keys are programmed to the new SKIM. **7. NOTE: Prior to returning vehicle to the customer, perform a module scan to be sure that all DTCs are erased. Erase any DTCs that are found.** 8. With the DRB, erase all DTCs. Perform 5 ignition key cycles leaving the key on for at least 90 seconds per cycle. 9. With the DRB, read the SKIM DTCs. Are there any SKIM DTCs? Yes → Repair is not complete, refer to appropriate symptom. No → Repair is complete.	All

Verification Tests — Continued

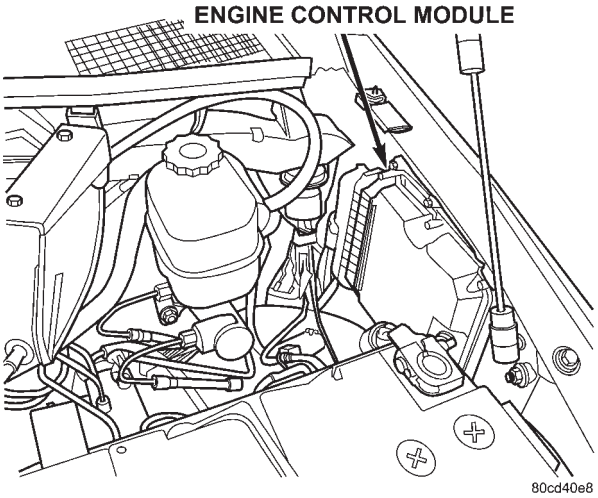
SKIS VERIFICATION	APPLICABILITY
1. Reconnect all previously disconnected components and connectors. 2. Obtain the vehicle's unique Personal Identification Number (PIN) assigned to its original SKIM. This number can be obtained from the vehicle's invoice. **3. NOTE: When entering the PIN, care should be taken because the SKIM will only allow 3 consecutive attempts to enter the correct PIN. If 3 consecutive incorrect PINs are entered, the SKIM will Lock Out the DRBIII® for 1 hour.** 4. To exit Lock Out mode, the ignition key must remain in the Run position continually for 1 hour. Turn off all accessories and connect a battery charger if necessary. 5. With the DRBIII®, select Theft Alarm, SKIM and Miscellaneous. Then select desired procedure and follow the steps that will be displayed. 6. If the SKIM has been replaced, ensure all of the vehicle ignition keys are programmed to the new SKIM. **7. NOTE: Prior to returning vehicle to the customer. Erase all ECM and SKIM DTCs.** 8. With the DRBIII® erase all DTCs. Perform 5 ignition key cycles leaving the key on for at least 90 seconds per cycle. 9. With the DRBIII®, read the SKIM DTCs. Are there any SKIM DTCs? Yes → Repair is not complete, refer to appropriate symptom. No → Repair is complete.	All

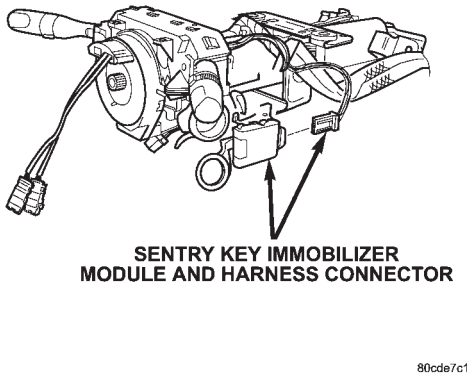
SPEED CONTROL VERIFICATION - VER-4	APPLICABILITY
1. Inspect the vehicle to ensure that all engine components are properly installed and connected. Reassemble and reconnect components as necessary. 2. With the DRB, erase all diagnostic trouble codes (DTCs). 3. Road test the vehicle at a speed above 60 km/h (35 MPH). 4. Turn the speed control ON/OFF switch on. 5. Depress and release the SET switch. If the speed control does not engage, the repair is not complete, continue with step 12. 6. Quickly depress and release the RESUME/ACCEL switch. If the vehicle speed does not increase by 3 km/h (2 MPH), the repair is not complete, continue with step 12. 7. Using caution, depress and release the brake pedal. If the speed control does not disengage, the repair is not complete, continue with step 12. 8. With the vehicle speed at least 60 km/h (35 MPH), depress the RESUME/ACCEL switch. If the speed control does not resume at the previously set speed, the repair is not complete, continue with step 12. 9. Hold down the COAST switch. If the vehicle does not decelerate, the repair is not complete, continue with step 12. 10. While still holding down the COAST switch, ensure the vehicle speed is at least 60 km/h (35 MPH) and release the COAST switch. If the vehicle does not adjust and set a new vehicle speed, the repair is not complete, continue with step 12. 11. With the speed control engaged, depress the ON/OFF switch. If the speed control does not disengage, the repair is not complete, continue with step 12. 12. If the vehicle did not successfully perform all of the previous steps, check for Technical Service Bulletins (TSBs) that pertain to this speed control problem and then, if necessary, return to the Symptom List. 13. If the vehicle successfully performed all of the previous steps, the speed control system is now functioning as designed. The repair is now complete. Are any DTCs or symptoms remaining? Yes → Repair is not complete, refer to appropriate symptom. No → Repair is complete.	All

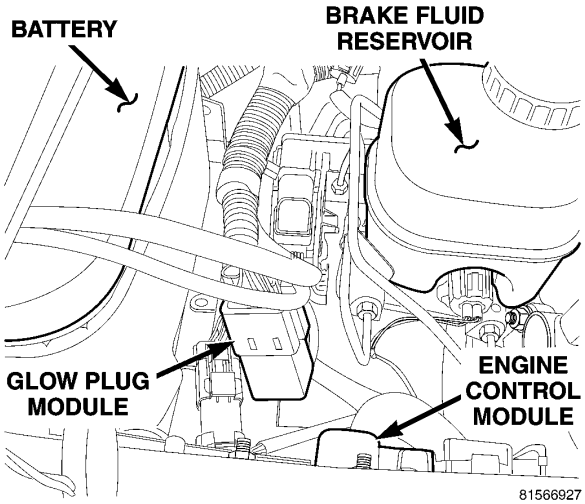
NOTES

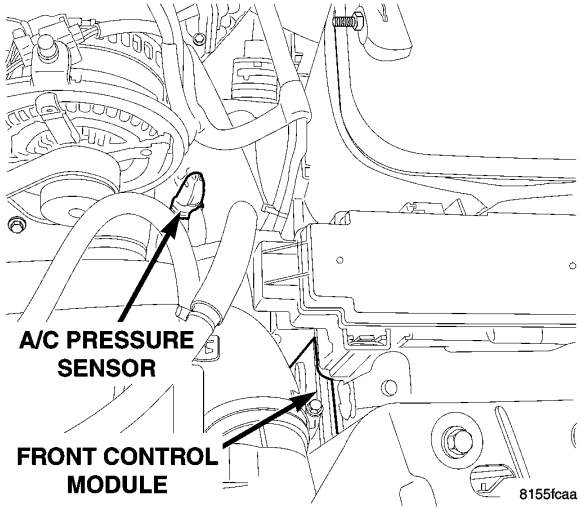
8.0 COMPONENT LOCATIONS

8.1 CONTROL MODULES

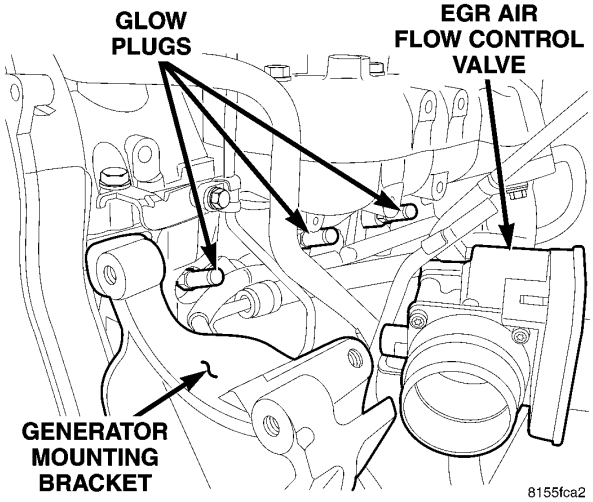


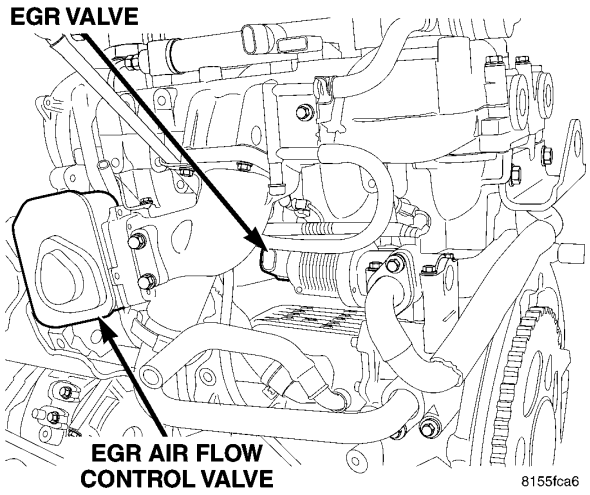




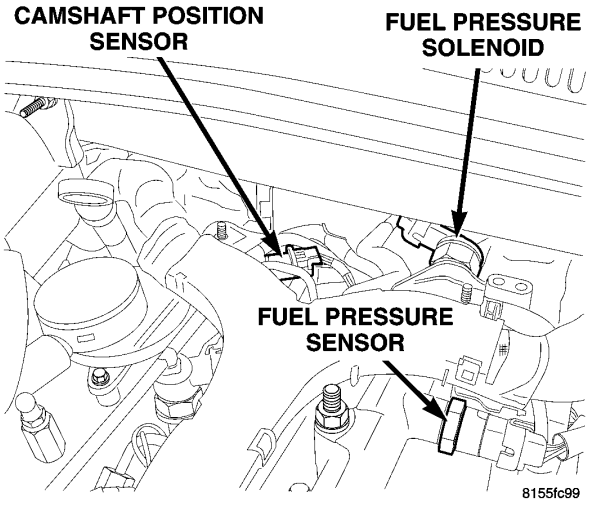


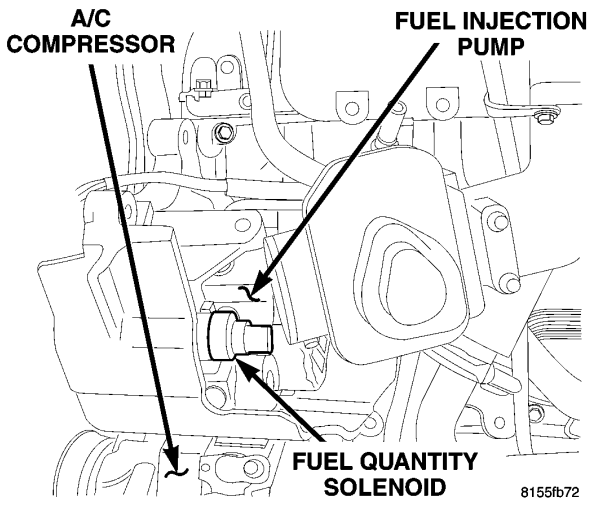
8.2 CONTROLS AND SOLENOIDS

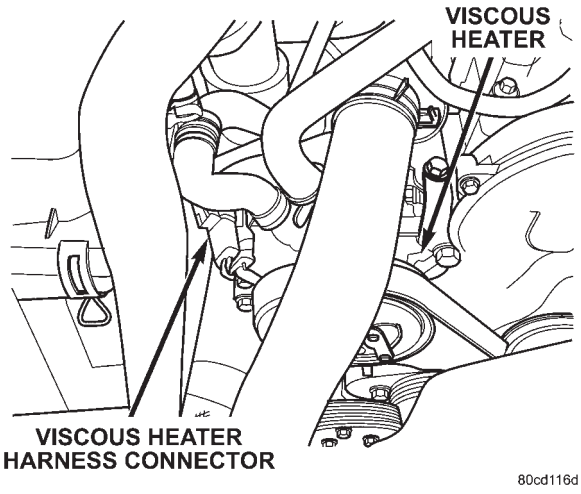


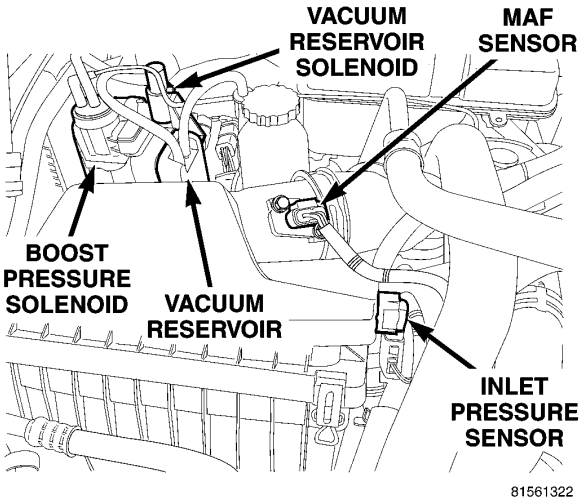


8.2 CONTROLS AND SOLENOIDS (Continued)

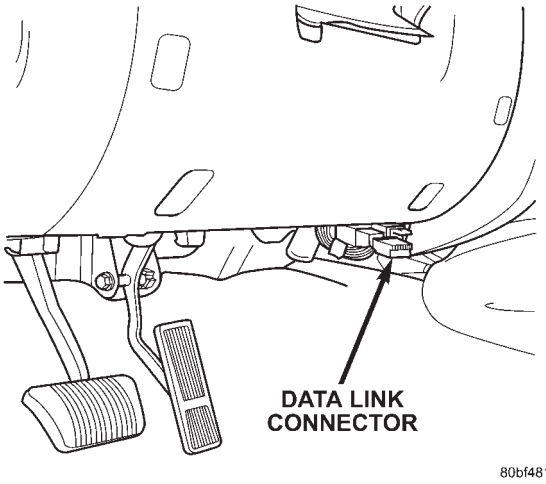




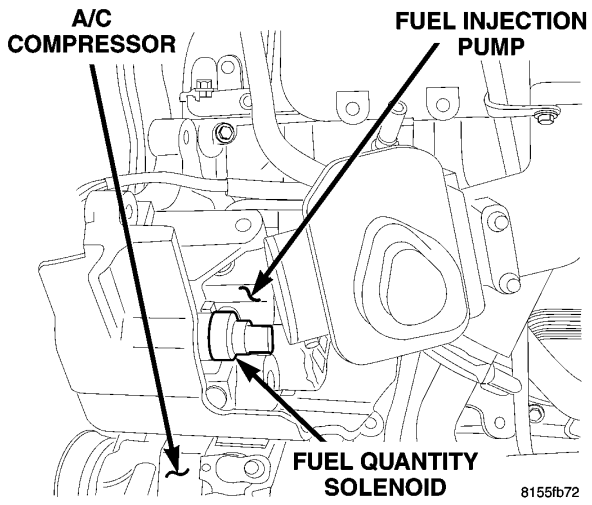


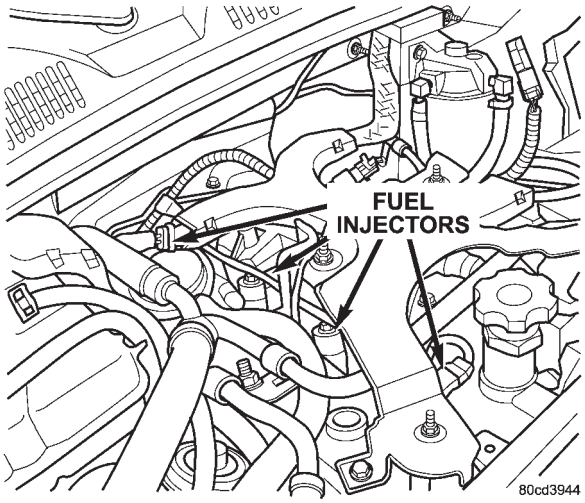


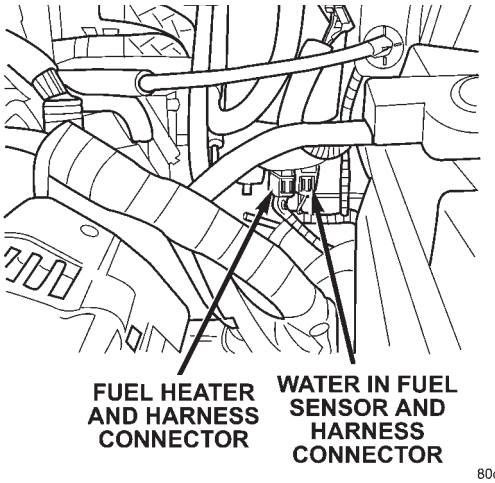
8.3 DATA LINK CONNECTOR



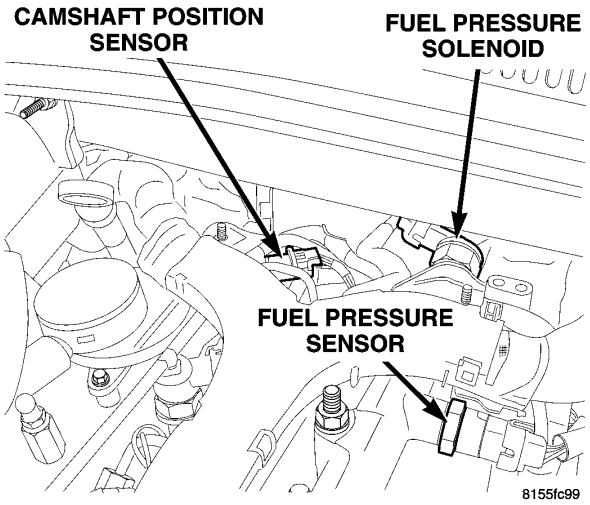
8.4 FUEL SYSTEM

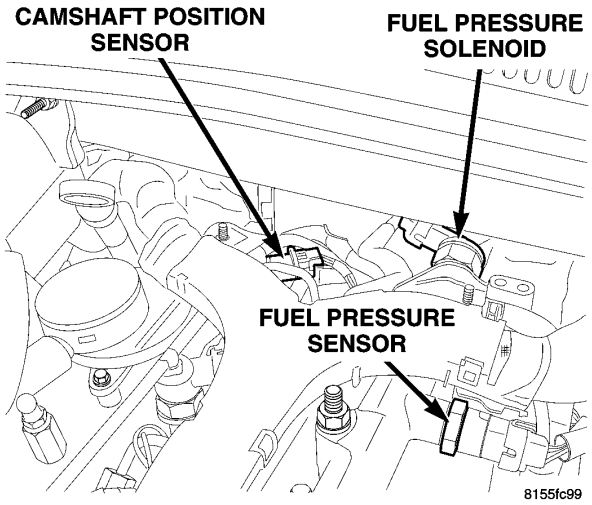




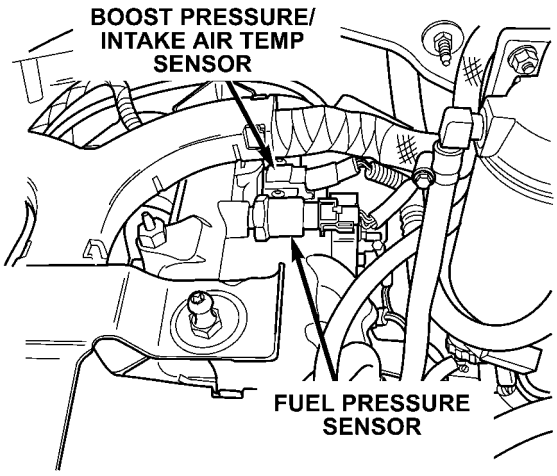


8.5 SENSORS





8.5 SENSORS (Continued)



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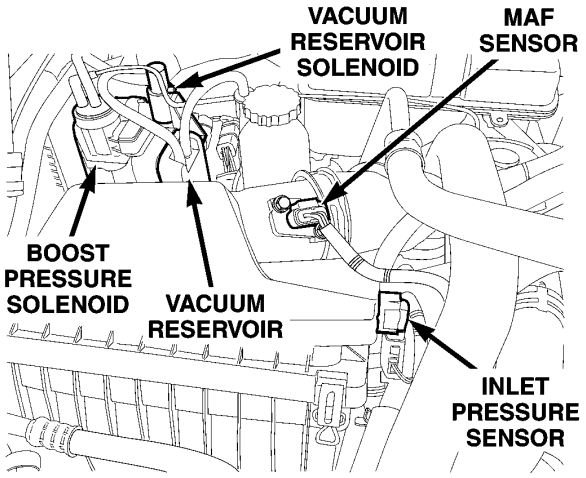

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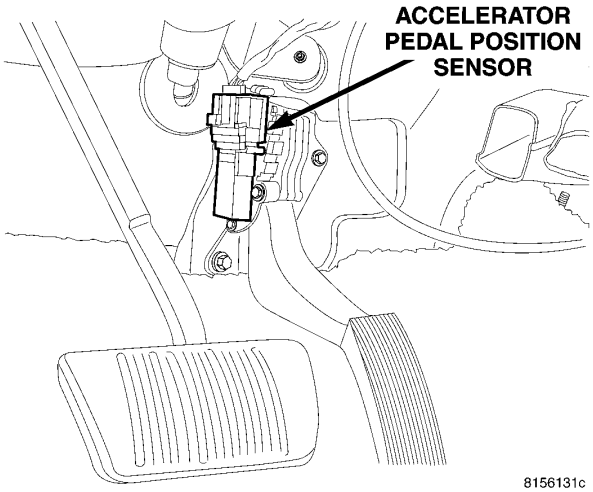

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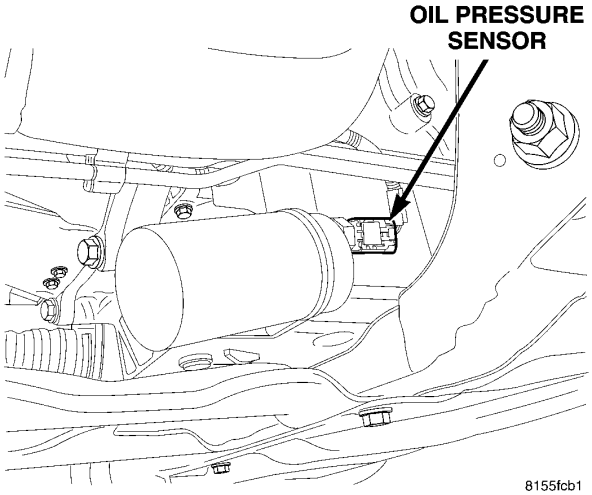

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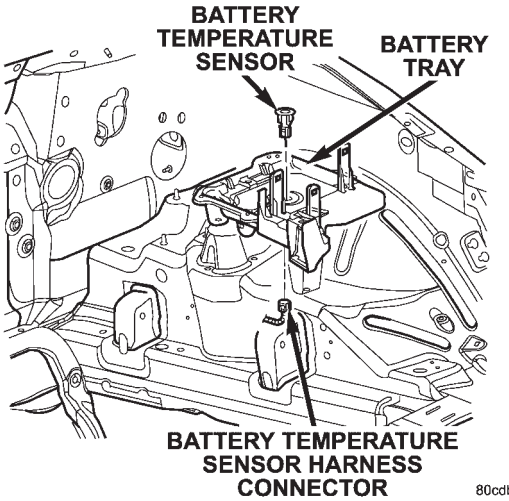

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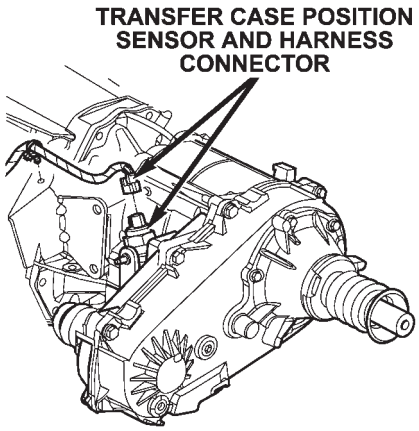

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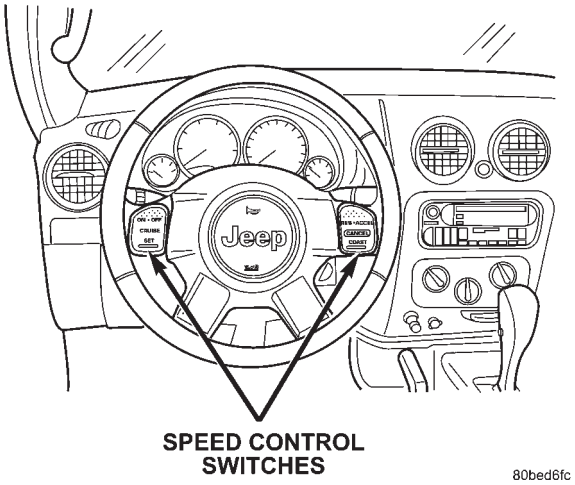
8.6 SWITCHES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SWITCHES
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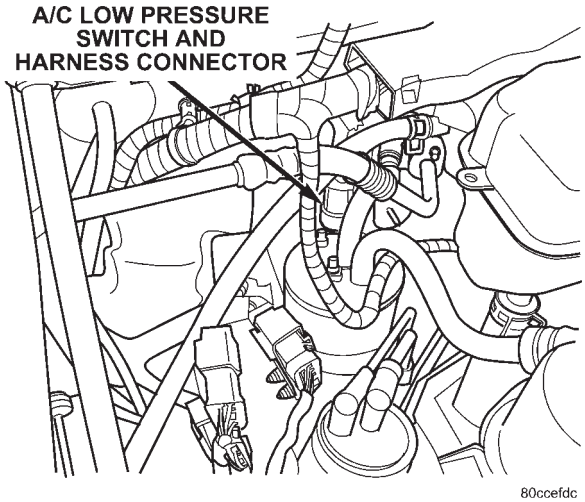
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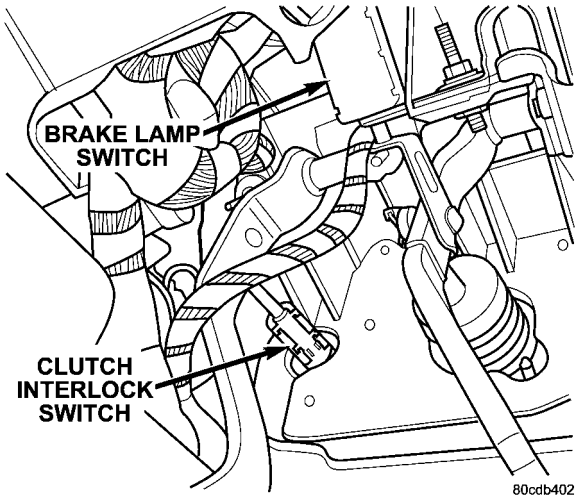
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CLUTCH
INTERLOCK
SWITCH
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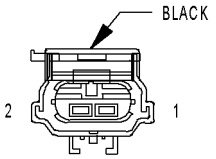
NOTES

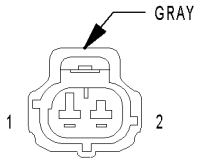
9.0 CONNECTOR PINOUTS



A/C COMPRESSOR CLUTCH

A/C COMPRESSOR CLUTCH - BLACK 2 WAY

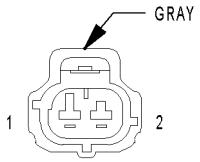
CAV	CIRCUIT	FUNCTION
1	C3 18DB/YL	A/C CLUTCH RELAY OUTPUT
2	Z939 18BK	GROUND



A/C HIGH PRESSURE SWITCH (DIESEL)

A/C HIGH PRESSURE SWITCH (DIESEL) - GRAY 2 WAY

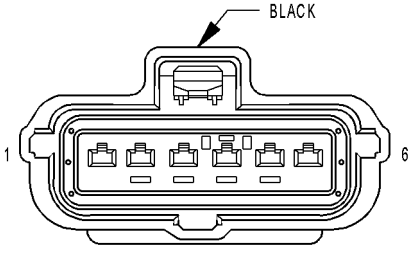
CAV	CIRCUIT	FUNCTION
1	C18 20DB	A/C PRESSURE SIGNAL
2	C21 18DB/OR	A/C LOW PRESSURE SWITCH SIGNAL



A/C LOW PRESSURE SWITCH

A/C LOW PRESSURE SWITCH - GRAY 2 WAY

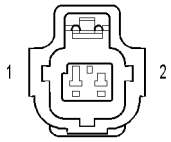
CAV	CIRCUIT	FUNCTION
1	C20 20DB/YL	A/C SWITCH SENSE
2	Z937 20BK (LHD)	GROUND
2	Z932 18BK (RHD)	GROUND



ACCELERATOR PEDAL POSITION SENSOR

ACCELERATOR PEDAL POSITION SENSOR (DIESEL) - BLACK 6 WAY

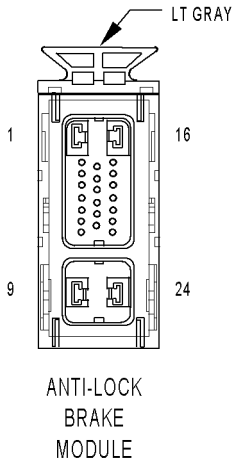
CAV	CIRCUIT	FUNCTION
1	K854 20VT/BR	ACCELERATOR PEDAL POSITION SENSOR 5 VOLT SUPPLY 2
2	K29 20 WT/BR	ACCELERATOR PEDAL POSITION SENSOR SIGNAL 2
3	K400 20BR/VT	ACCELERATOR PEDAL POSITION SENSOR GROUND 2
4	K167 20BR/YL	ACCELERATOR PEDAL POSITION SENSOR GROUND 1
5	K23 20BR/WT	ACCELERATOR PEDAL POSITION SENSOR SIGNAL 1
6	K852 20BR/VT	ACCELERATOR PEDAL POSITION SENSOR 5 VOLT SUPPLY 1



AMBIENT TEMPERATURE SENSOR

AMBIENT TEMPERATURE SENSOR - 2 WAY

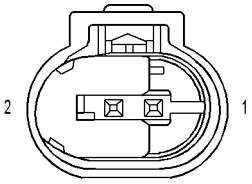
CAV	CIRCUIT	FUNCTION
1	G31 20VT/OR	AAT SIGNAL
2	K900 20DB/DG	SENSOR GROUND



ANTI-LOCK
BRAKE
MODULE

ANTI-LOCK BRAKE MODULE - 47 WAY

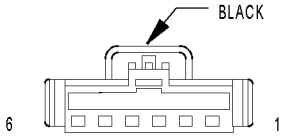
CAV	CIRCUIT	FUNCTION
1	A107 12TN/RD	FUSED B(+)
2	-	-
3	B22 18DG/YL (GAS)	VEHICLE SPEED SIGNAL
4	-	-
5	-	-
6	B15 20DG/WT (DIESEL)	SECONDARY BRAKE SWITCH SIGNAL
6	B15 20DG/WT (GAS)	BRAKE SWITCH NO. 1 SIGNAL
7	-	-
8	F22 20PK/TN	FUSED IGNITION SWITCH OUTPUT (RUN)
9	-	-
10	D21 20WT/GY (DIESEL)	SCI TRANSMIT (ECM)
10	D21 20WT/GY (GAS)	SCI TRANSMIT (PCM)
11	D25 20WT/VT (DIESEL)	PCI BUS
11	D25 18WT/VT (GAS)	PCI BUS
12	D65 20WT/LG (DIESEL)	CAN C BUS (+)
13	D64 20WT/LB (DIESEL)	CAN C BUS (-)
14	-	-
15	-	-
16	Z127 12BK/DG	GROUND
17	-	-
18	-	-
19	-	-
20	-	-
21	-	-
22	-	-
23	-	-
24	-	-
25	-	-
26		
27	-	-
28	-	-
29	-	-
30	-	-
31	-	-
32	A200 12RD/DG	FUSED B(+)
33	B6 18DG/WT	RIGHT FRONT WHEEL SPEED SENSOR SIGNAL
34	B7 18DG/VT	RIGHT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY
35	-	-
36	-	-
37	-	-
38	-	-
39	-	-
40	-	-
41	-	-
42	B1 18DG/DB	REAR WHEEL SPEED SENSOR SIGNAL
43	B2 18DG/LB	REAR WHEEL SPEED SENSOR 12 VOLT SUPPLY
44	-	-
45	B9 18DG/LG	LEFT FRONT WHEEL SPEED SENSOR 12 VOLT SUPPLY
46	B8 18DG/TN	LEFT FRONT WHEEL SPEED SENSOR SIGNAL
47	Z107 12BK/LB	GROUND



BOOST PRESSURE SOLENOID (DIESEL)

BOOST PRESSURE SOLENOID (DIESEL) - 2 WAY

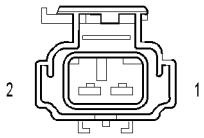
CAV	CIRCUIT	FUNCTION
1	K347 20BR/PK	FUSED ASD RELAY OUTPUT
2	X635 20BR/WT	BOOST PRESSURE SOLENOID CONTROL



BRAKE LAMP SWITCH

BRAKE LAMP SWITCH - BLACK 6 WAY

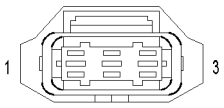
CAV	CIRCUIT	FUNCTION
1	A103 18GY/RD	FUSED B(+)
2	L50 18WT/TN (DIESEL)	PRIMARY BRAKE SWITCH SIGNAL
2	L50 18WT/TN (GAS)	BRAKE LAMP SWITCH OUTPUT
3	V30 20VT/WT	S/C BRAKE SWITCH OUTPUT
4	V32 20VT/YL	S/C POWER SUPPLY
5	Z940 20BK	GROUND
6	B15 20DG/WT (DIESEL)	SECONDARY BRAKE SWITCH SIGNAL
6	B15 20DG/WT (GAS)	BRAKE SWITCH NO. 1 SIGNAL



CABIN HEATER (DIESEL)

CABIN HEATER (DIESEL) - 2 WAY

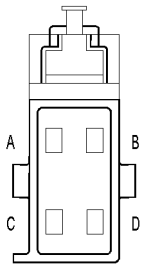
CAV	CIRCUIT	FUNCTION
1	A119 18RD/OR	CABIN HEATER RELAY OUTPUT
2	Z966 18BK	GROUND



CAMSHAFT POSITION SENSOR (DIESEL)

CAMSHAFT POSITION SENSOR (DIESEL) - 3 WAY

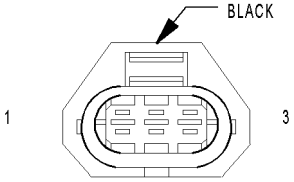
CAV	CIRCUIT	FUNCTION
1	K944 20BR/GY	CAMSHAFT POSITION SENSOR GROUND
2	K44 20DB/GY	CAMSHAFT POSITION SENSOR SIGNAL
3	F856 20YL/PK	CAMSHAFT POSITION SENSOR 5 VOLT SUPPLY



CLUTCH INTERLOCK/UPSTOP SWITCH (M/T)

CLUTCH INTERLOCK/UPSTOP SWITCH (M/T) - 4 WAY

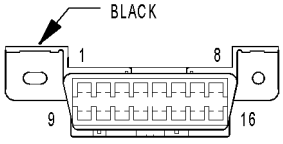
CAV	CIRCUIT	FUNCTION
1	T141 20YL/OR	CLUTCH INTERLOCK SWITCH SIGNAL
2	Z945 18BK	GROUND
3	T26 20DG/OR	CLUTCH UPSTOP SWITCH SIGNAL
4	Z945 18BK	GROUND



CRANKSHAFT POSITION SENSOR (DIESEL)

CRANKSHAFT POSITION SENSOR (DIESEL) - BLACK 3 WAY

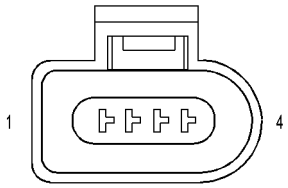
CAV	CIRCUIT	FUNCTION
1	K853 20DB/BR	CRANKSHAFT POSITION SENSOR SIGNAL NO. 2
2	K3 20BR/LB	CRANKSHAFT POSITION SENSOR SIGNAL NO. 1
3	-	-



DATA LINK CONNECTOR

DATA LINK CONNECTOR - BLACK 16 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 20WT/VT	PCI BUS
3	-	-
4	Z11 20BK/LG	GROUND
5	Z11 20BK/LG	GROUND
6	-	-
7	D21 20WT/GY (DIESEL)	SCI TRANSMIT (ECM)
7	D21 20WT/GY (GAS)	SCI TRANSMIT (PCM)
8	-	-
9	D16 20WT/OR	SCI RECEIVE (TCM)
10	-	-
11	-	-
12	D20 20WT/LG (DIESEL)	SCI RECEIVE (ECM)
12	D20 20WT/LG (GAS)	SCI RECEIVE (PCM)
13	-	-
14	-	-
15	D15 20BR/WT	SCI TRANSMIT (TCM)
16	A333 20WT/RD	FUSED B(+)



EGR AIR FLOW CONTROL VALVE (DIESEL)

EGR AIR FLOW CONTROL VALVE (DIESEL) - 4 WAY

CAV	CIRCUIT	FUNCTION
1	Z989 20BK	GROUND
2	K315 20BR/GY	EGR AIR FLOW CONTROL VALVE CONTROL
3	-	-
4	K347 20BR/PK	FUSED ASD RELAY OUTPUT

CONNECTOR NOT AVAILABLE

EGR SOLENOID (DIESEL) - 6 WAY

CAV	CIRCUIT	FUNCTION
1	K347 20BR/PK	FUSED ASD RELAY OUTPUT
2	-	-
3	-	-
4	-	-
5	K35 20DB/VT	EGR SOLENOID CONTROL
6	-	-

CONNECTOR NOT AVAILABLE

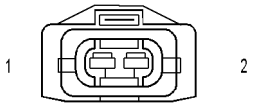
ENGINE CONTROL MODULE C1 (DIESEL) - 96 WAY

CAV	CIRCUIT	FUNCTION
1	K613 16GY/BR	FUEL INJECTOR NO. 1 LOW-SIDE CONTROL
2	K612 16YL/BR	FUEL INJECTOR NO. 2 LOW-SIDE CONTROL
3	-	-
4	K369 16BR/OR	FUEL PRESSURE SOLENOID SUPPLY
5	-	-
6	-	-
7	-	-
8	K156 20BR/YL	FUEL TEMPERATURE SENSOR SIGNAL
9	-	-
10	-	-
11	T10 20DG/LG (A/T)	TORQUE MANAGEMENT REQUEST SENSE
12	-	-
13	-	-
14	K944 20BR/GY	CAMSHAFT POSITION SENSOR GROUND
15	-	-
16	-	-
17	-	-
18	-	-
19	-	-
20	-	-
21	-	-
22	-	-
23	-	-
24	-	-
25	K611 16OR/BR	FUEL INJECTOR NO. 1 LOW-SIDE CONTROL
26	K614 16WT/BR	FUEL INJECTOR NO. 4 LOW-SIDE CONTROL
27	-	-
28	K366 16BR/LG	FUEL QUANTITY SOLENOID SUPPLY
29	-	-
30	V37 20VT	S/C SWITCH SIGNAL NO. 1
31	G31 20VT/OR	AAT SIGNAL
32	K960 20BR/LB	INLET PRESSURE SENSOR GROUND
33	-	-
34	K21 20BR/WT	IAT SENSOR SIGNAL
35	-	-
36	K668 20BR	INLET PRESSURE SENSOR 5 VOLT SUPPLY
37	F856 20YL/PK	CAMSHAFT POSITION SENSOR 5 VOLT SUPPLY
38	K44 20DB/GY	CAMSHAFT POSITION SENSOR SIGNAL
39	-	-
40	-	-
41	-	-
42	-	-
43	-	-
44	-	-
45	K132 20DB/LB	CABIN HEATER RELAY CONTROL
46	-	-
47	-	-
48	-	-
49	K12 16BR/DB	FUEL INJECTOR NO. 2 HIGH-SIDE CONTROL
50	-	-
51	K14 16BR/TN	FUEL INJECTOR NO. 4 HIGH-SIDE CONTROL
52	K370 16BR	FUEL PRESSURE SOLENOID CONTROL
53	-	-
54	V38 20VT/OR	S/C SWITCH SIGNAL NO. 2
55	-	-
56	-	-
57	K2 20VT/OR	ECT SENSOR SIGNAL
58	K68 20BR/LG	INLET PRESSURE SENSOR SIGNAL
59	K181 20BR/YL	FUEL PRESSURE SENSOR SIGNAL
60	K856 20BR/YL	BOOST PRESSURE SENSOR 5 VOLT SUPPLY
61	K957 20BR/OR	MASS AIR FLOW SENSOR GROUND
62	-	-
63	K37 20BR/OR	BOOST PRESSURE SENSOR SIGNAL
64	K811 20BR/OR	MASS AIR FLOW SENSOR 5 VOLT SUPPLY
65	K900 20DB/DG	SENSOR GROUND
66	-	-
67	-	-
68	K315 20BR/GY	EGR AIR FLOW CONTROL VALVE CONTROL
69	-	-
70	-	-
71	N112 20DB/OR	HIGH SPEED RAD FAN RELAY CONTROL
72	-	-
73	K13 16BR/LB	FUEL INJECTOR NO. 3 HIGH-SIDE CONTROL
74	K11 16BR/YL	FUEL INJECTOR NO. 1 HIGH-SIDE CONTROL
75	-	-
76	K646 16BR/YL	FUEL QUANTITY SOLENOID CONTROL
77	-	-
78	-	-
79	T26 20DG/OR	CLUTCH UPSTOP SWITCH SIGNAL
80	-	-
81	-	-
82	K77 20BR/WT	TRANSFER CASE POSITION SENSOR INPUT
83	K656 20GY/BR	SENSOR GROUND
84	K359 20YL/BR	FUEL PRESSURE SENSOR GROUND
85	K157 20BR/OR	MASS AIR FLOW 5 VOLT SUPPLY
86	K350 20BR/YL	FUEL PRESSURE SENSOR 5 VOLT SUPPLY
87	K853 20DB/BR	CRANKSHAFT POSITION SENSOR SIGNAL NO. 2
88	K3 20BR/LB	CRANKSHAFT POSITION SENSOR SIGNAL NO. 1
89	-	-
90	K35 20DB/VT	EGR SOLENOID CONTROL
91	N201 20DB/LG	LOW SPEED RAD FAN RELAY CONTROL
92	N117 20DB/WT	VACUUM RESERVOIR SOLENOID CONTROL
93	X635 20BR/WT	BOOST PRESSURE SOLENOID CONTROL
94	-	-
95	-	-
96	-	-

CONNECTOR NOT AVAILABLE

ENGINE CONTROL MODULE C2 (DIESEL) - 58 WAY

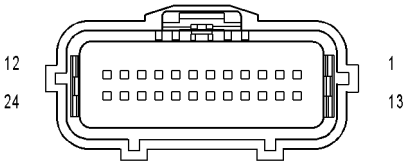
CAV	CIRCUIT	FUNCTION
1	K347 14BR/PK	FUSED ASD RELAY OUTPUT
2	Z131 14BK/DG	GROUND
3	K347 14BR/PK	FUSED ASD RELAY OUTPUT
4	Z131 14BK/DG	GROUND
5	K345 14BR/RD	FUSED ASD RELAY OUTPUT
6	Z131 14BK/DG	GROUND
7	-	-
8	C20 20DB/YL	A/C SWITCH SENSE
9	-	-
10	-	-
11	-	-
12	-	-
13	K29 20WT/BR	ACCELERATOR PEDAL POSITION SENSOR SIGNAL 2
14	K400 20BR/VT	ACCELERATOR PEDAL POSITION SENSOR GROUND 2
15	-	-
16	-	-
17	T41 20YL/DB (A/T)	TRS T41 SENSE (P/N)
17	T141 20YL/OR (M/T)	CLUTCH INTERLOCK SWITCH SIGNAL
18	K244 20BR/WT (A/T)	ENGINE RPM SIGNAL
19	F1 20PK/WT	FUSED IGNITION SWITCH OUTPUT (RUN-START)
20	-	-
21	-	-
22	F26 20PK/OR	FUSED IGNITION SWITCH OUTPUT (START)
23	-	-
24	K852 20BR/VT	ACCELERATOR PEDAL POSITION SENSOR 5 VOLT SUPPLY 1
25	K23 20BR/WT	ACCELERATOR PEDAL POSITION SENSOR SIGNAL 1
26	K167 20BR/YL	ACCELERATOR PEDAL POSITION SENSOR GROUND 1
27	-	-
28	-	-
29	K854 20VT/BR	ACCELERATOR PEDAL POSITION SENSOR 5 VOLT SUPPLY 2
30	-	-
31	D21 20WT/GY	SCI TRANSMIT (ECM)
32	L50 18WT/TN	PRIMARY BRAKE SWITCH SIGNAL
33	-	-
34	B15 20DG/WT	SECONDARY BRAKE SWITCH SIGNAL
35	-	-
36	-	-
37	-	-
38	-	-
39	-	-
40	C13 20LB/OR	A/C CLUTCH RELAY CONTROL
41	-	-
42	-	-
43	D330 20WT/BR	GLOW PLUG MODULE SIGNAL
44	K342 20BR/WT	ASD RELAY CONTROL
45	K391 20BR/YL	FUEL PUMP RELAY CONTROL
46	K330 20LB/BR	GLOW PLUG MODULE CONTROL
47	-	-
48	-	-
49	-	-
50	-	-
51	-	-
52	-	-
53	D65 20WT/LG	CAN C BUS (+)
54	D64 20WT/LB	CAN C BUS (-)
55	-	-
56	-	-
57	-	-
58	T752 20DG/OR	ENGINE STARTER MOTOR RELAY CONTROL



ENGINE COOLANT TEMPERATURE SENSOR (DIESEL)

ENGINE COOLANT TEMPERATURE SENSOR (DIESEL) - 2 WAY

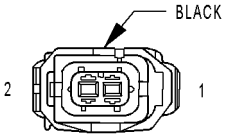
CAV	CIRCUIT	FUNCTION
1	K2 20VT/OR	ECT SENSOR SIGNAL
2	K900 20DB/DG	SENSOR GROUND



FRONT CONTROL MODULE

FRONT CONTROL MODULE (DIESEL) - 24 WAY

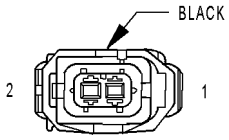
CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 18WT/VT	PCI BUS
3	-	-
4	-	-
5	D21 20WT/GY	SCI TRANSMIT (ECM)
6	-	-
7	K302 20BR/WT	ENGINE OIL PRESSURE SENSOR SIGNAL
8	D65 20WT/LG	CAN C BUS (+)
9	D64 20WT/LB	CAN C BUS (-)
10	K303 20BR/OR	WATER IN FUEL SENSOR SIGNAL
11	K305 20BR/LB	A/C PRESSURE SENSOR SIGNAL
12	-	-
13	K347 20BR/PK	FUSED ASD RELAY OUTPUT
14	K125 16BR/DG	GEN FIELD CONTROL
15	-	-
16	K301 20BR/LG	5 VOLT SUPPLY
17	K304 20BR/DB	FUEL LEVEL SENSOR SIGNAL
18	-	-
19	-	-
20	K300 20BR	SENSOR GROUND
21	-	-
22	K310 20BR/DG	A/C PRESSURE SENSOR GROUND
23	-	-
24	Z932 18BK	GROUND



FUEL INJECTOR NO. 1 (DIESEL)

FUEL INJECTOR NO. 1 (DIESEL) - BLACK 2 WAY

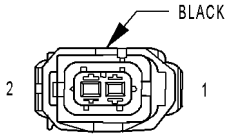
CAV	CIRCUIT	FUNCTION
1	K611 16OR/BR	FUEL INJECTOR NO. 1 LOW-SIDE CONTROL
2	K11 16BR/YL	FUEL INJECTOR NO. 1 HIGH-SIDE CONTROL



FUEL INJECTOR NO. 2 (DIESEL)

FUEL INJECTOR NO. 2 (DIESEL) - BLACK 2 WAY

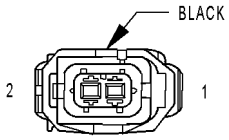
CAV	CIRCUIT	FUNCTION
1	K612 16YL/BR	FUEL INJECTOR NO. 2 LOW-SIDE CONTROL
2	K12 16BR/DB	FUEL INJECTOR NO. 2 HIGH-SIDE CONTROL



FUEL INJECTOR NO. 3 (DIESEL)

FUEL INJECTOR NO. 3 (DIESEL) - BLACK 2 WAY

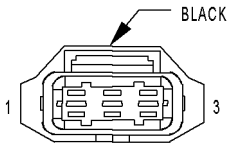
CAV	CIRCUIT	FUNCTION
1	K613 16GY/BR	FUEL INJECTOR NO. 3 LOW-SIDE CONTROL
2	K13 16BR/LB	FUEL INJECTOR NO. 3 HIGH-SIDE CONTROL



FUEL INJECTOR NO. 4 (DIESEL)

FUEL INJECTOR NO. 4 (DIESEL) - BLACK 2 WAY

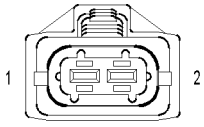
CAV	CIRCUIT	FUNCTION
1	K614 16WT/BR	FUEL INJECTOR NO. 4 LOW-SIDE CONTROL
2	K14 16BR/TN	FUEL INJECTOR NO. 4 HIGH-SIDE CONTROL



FUEL PRESSURE SENSOR (DIESEL)

FUEL PRESSURE SENSOR (DIESEL) - BLACK 3 WAY

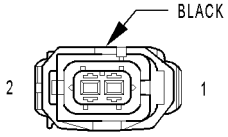
CAV	CIRCUIT	FUNCTION
1	K359 20YL/BR	FUEL PRESSURE SENSOR GROUND
2	K181 20BR/YL	FUEL PRESSURE SENSOR SIGNAL
3	K350 20BR/YL	FUEL PRESSURE SENSOR 5 VOLT SUPPLY



FUEL PRESSURE SOLENOID (DIESEL)

FUEL PRESSURE SOLENOID (DIESEL) - 2 WAY

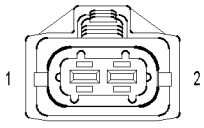
CAV	CIRCUIT	FUNCTION
1	K370 16BR	FUEL PRESSURE SOLENOID CONTROL
2	K369 16BR/OR	FUEL PRESSURE SOLENOID SUPPLY



FUEL QUANTITY SOLENOID (DIESEL)

FUEL QUANTITY SOLENOID (DIESEL) - BLACK 2 WAY

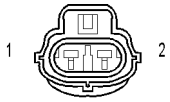
CAV	CIRCUIT	FUNCTION
1	K366 16BR/LG	FUEL QUANTITY SOLENOID SUPPLY
2	K646 16BR/YL	FUEL QUANTITY SOLENOID CONTROL



FUEL TEMPERATURE SENSOR (DIESEL)

FUEL TEMPERATURE SENSOR (DIESEL) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K900 20DB/DG	SENSOR GROUND
2	K156 20BR/YL	FUEL TEMPERATURE SENSOR SIGNAL



GENERATOR

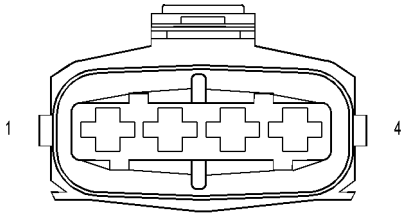
GENERATOR - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K125 16BR/DG	GEN FIELD CONTROL
2	Z932 18BK	GROUND

CONNECTOR NOT AVAILABLE

GLOW PLUG MODULE (DIESEL) - 11 WAY

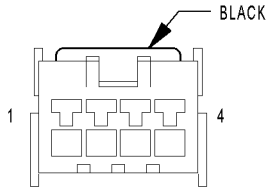
CAV	CIRCUIT	FUNCTION
1	A202 14RD/WT	GLOW PLUG NO. 1 CONTROL
2	A203 14RD/BR	GLOW PLUG NO. 2 CONTROL
3	A204 14RD/YL	GLOW PLUG NO. 3 CONTROL
4	A208 14RD/OR	GLOW PLUG NO. 4 CONTROL
5	-	-
6	K347 20BR/PK	FUSED ASD RELAY OUTPUT
7	Z133 18BK/LG	GROUND
8	-	-
9	D330 20WT/BR	GLOW PLUG MODULE SIGNAL
10	K330 20LB/BR	GLOW PLUG MODULE CONTROL
11	A2 10GY	FUSED B(+)



INTAKE AIR TEMPERATURE/ BOOST PRESSURE SENSOR (DIESEL)

INTAKE AIR TEMPERATURE/BOOST PRESSURE SENSOR (DIESEL) - 4 WAY

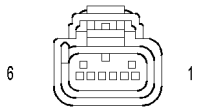
CAV	CIRCUIT	FUNCTION
1	K656 20GY/BR	SENSOR GROUND
2	K21 20BR/WT	IAT SENSOR SIGNAL
3	K856 20BR/YL	BOOST PRESSURE SENSOR 5 VOLT SUPPLY
4	K37 20BR/OR	BOOST PRESSURE SENSOR SIGNAL



LEFT SPEED CONTROL SWITCH (EXCEPT BASE)

LEFT SPEED CONTROL SWITCH (EXCEPT BASE) - BLACK 4 WAY

CAV	CIRCUIT	FUNCTION
1	V38 20VT/OR (DIESEL)	S/C SWITCH SIGNAL NO. 2
2	K900 20DB/DG	SENSOR GROUND
3	V37 20VT	S/C SWITCH SIGNAL NO. 1
4	-	-

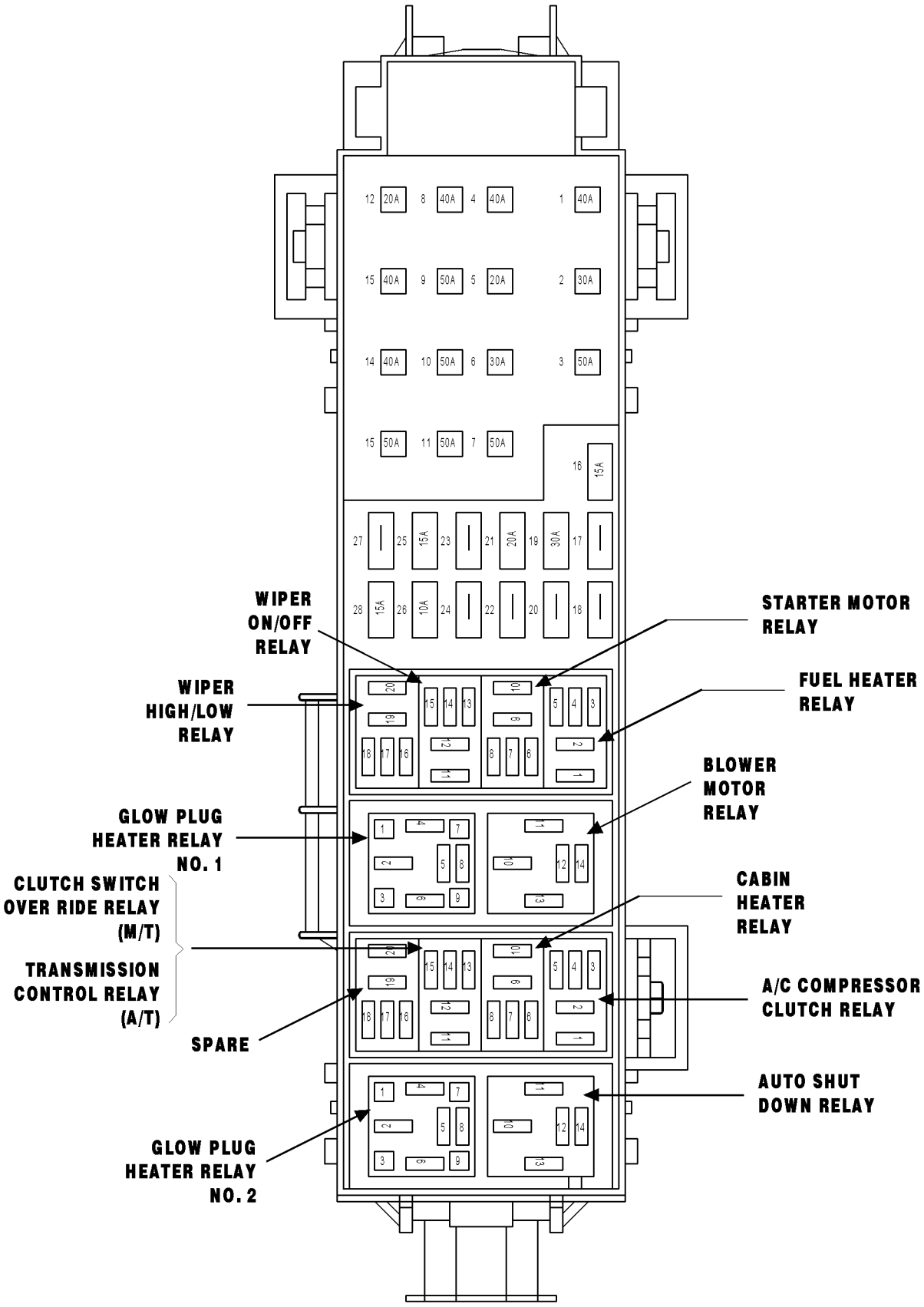


MASS AIR FLOW SENSOR (DIESEL)

MASS AIR FLOW SENSOR (DIESEL) - 6 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	K811 20BR/OR	MASS AIR FLOW SENSOR 5 VOLT SUPPLY
3	F1 20PK/WT	FUSED IGNITION SWITCH OUTPUT (RUN-START)
4	-	-
5	K957 20BR/OR	MASS AIR FLOW SENSOR GROUND
6	K157 20BR/OR	MASS AIR FLOW 5 VOLT SUPPLY

POWER DISTRIBUTION CENTER
DIESEL



FUSES (DIESEL)

FUSE NO.	AMPS	FUSED CIRCUIT	FUNCTION
1	40A	INTERNAL	FUSED B(+)
2	30A	INTERNAL	FUSED B(+)
3	50A	A912 10RD	FUSED B(+)
4	40A	A107 12TN/RD (ABS)	FUSED B(+)
5	20A	INTERNAL	FUSED B(+)
6	30A	INTERNAL	FUSED B(+)
7	50A	A911 10RD	FUSED B(+)
8	40A	A916 12RD	FUSED B(+)
9	50A	A901 10RD	FUSED B(+)
10	30A	A100 14RD/VT	FUSED B(+)
11	20A	INTERNAL	FUSED B(+)
12	30A	A904 14RD	FUSED B(+)
13	40A	A139 12RD/YL	FUSED B(+)
14	40A	A1 12RD	FUSED B(+)
15	50A	A12 10RD/BR	FUSED B(+)
16	15A	K347 20BR/PK	FUSED ASD RELAY OUTPUT
17	10A	A129 18RD/BR	FUSED B(+)
18	-	-	-
19	30A	A906 12RD	FUSED B(+)
20	-	-	-
21	20A	INTERNAL	FUSED B(+)
22	-	-	-
23	-	-	-
24	-	-	-
25	20A	A200 12RD/DG (ABS)	FUSED B(+)
26	25A	K345 16BR/RD	FUSED ASD RELAY OUTPUT
27	-	-	-
28	15A	INTERNAL	FUSED IGNITION SWITCH OUTPUT (START)

A/C COMPRESSOR CLUTCH RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	C13 20LB/OR	A/C CLUTCH RELAY CONTROL
86	K347 20BR/YL (DIESEL)	FUSED ASD RELAY OUTPUT
86	F1 20PK/WT (GAS)	FUSED IGNITION SWITCH OUTPUT (RUN-START)
87	C3 18DB/YL	A/C CLUTCH RELAY OUTPUT
87A	-	-

AUTO SHUT DOWN RELAY

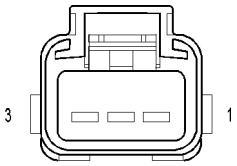
CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	K342 20BR/WT	ASD RELAY CONTROL
86	INTERNAL	FUSED B(+)
87	INTERNAL	ASD RELAY OUTPUT
87A	-	-

CABIN HEATER RELAY (DIESEL)

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	K132 20DB/LB	CABIN HEATER RELAY CONTROL
86	K347 20BR/YL	FUSED ASD RELAY OUTPUT
87	A119 18RD/OR	CABIN HEATER RELAY OUTPUT
87A	-	-

STARTER MOTOR RELAY

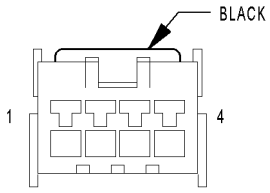
CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	T752 20DG/OR	ENGINE STARTER MOTOR RELAY CONTROL
86	INTERNAL	FUSED IGNITION SWITCH OUTPUT (START)
87	T750 12YL/GY	STARTER MOTOR RELAY OUTPUT
87A	-	-



RADIATOR FAN MOTOR

RADIATOR FAN MOTOR - 3 WAY

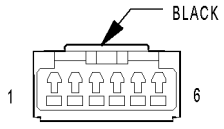
CAV	CIRCUIT	FUNCTION
1	N23 12DB/DG	LOW SPEED RAD FAN RELAY OUTPUT
2	Z937 12BK	GROUND
3	N24 12DG/DB	HIGH SPEED RAD FAN RELAY OUTPUT



RIGHT SPEED CONTROL SWITCH (EXCEPT BASE)

RIGHT SPEED CONTROL SWITCH (EXCEPT BASE) - BLACK 4 WAY

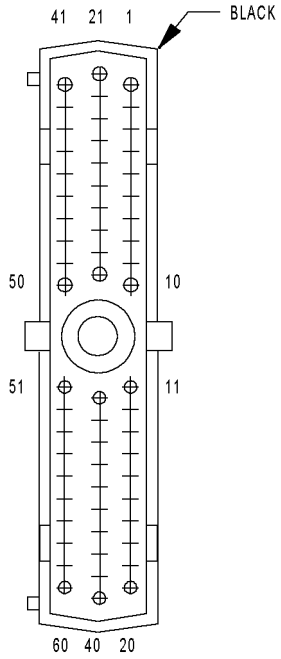
CAV	CIRCUIT	FUNCTION
1	V38 20VT/OR (DIESEL)	S/C SWITCH SIGNAL NO. 2
2	K900 20DB/DG	SENSOR GROUND
3	V37 20VT	S/C SWITCH SIGNAL NO. 1
4	-	-



SENTRY KEY IMMOBILIZER MODULE (EXCEPT BASE)

SENTRY KEY IMMOBILIZER MODULE (EXCEPT BASE) - BLACK 6 WAY

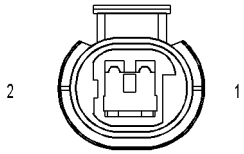
CAV	CIRCUIT	FUNCTION
1	D508 20WT/GY	COM-LIN TIRE PRESSURE MONITOR LAN
2	D25 20WT/VT	PCI BUS
3	-	-
4	F942 20PK/LG	FUSED IGNITION SWITCH OUTPUT (RUN-START)
5	Z120 20BK/WT	GROUND
6	A333 20WT/RD	FUSED B(+)



TRANSMISSION CONTROL MODULE (2.8L)

TRANSMISSION CONTROL MODULE (2.8L) - BLACK 60 WAY

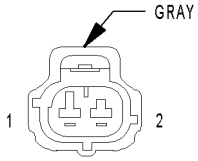
CAV	CIRCUIT	FUNCTION
1	T1 20DG/LB	TRS T1 SENSE
2	T4 20DG/LB	TRS T2 SENSE
3	T3 20DG/DB	TRS T3 SENSE
4	-	-
5	-	-
6	K244 20BR/WT	ENGINE RPM SIGNAL
7	D21 20WT/GY	SCI TRANSMIT (ECM)
8	F26 20PK/OR	FUSED IGNITION SWITCH OUTPUT (START)
9	T9 20DG/TN	OD PRESSURE SWITCH SENSE
10	T10 20DG/LG	TORQUE MANAGEMENT REQUEST SENSE
11	F1 20PK/WT	FUSED IGNITION SWITCH OUTPUT (RUN-START)
12	K23 20BR/WT	ACCELERATOR PEDAL POSITION SENSOR SIGNAL 1
13	T13 20DG/VT	SPEED SENSOR GROUND
14	T14 20DG/BR	OUTPUT SPEED SENSOR SIGNAL
15	T515 20YL/DB	TRANSMISSION CONTROL RELAY CONTROL
16	T16 16YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
17	T16 16YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
18	T118 20DG	PRESSURE CONTROL SOLENOID CONTROL
19	T219 20YL/LG	2C SOLENOID CONTROL
20	T20 18DG/WT	L/R SOLENOID CONTROL
21	-	-
22	-	-
23	-	-
24	-	-
25	-	-
26	-	-
27	-	-
28	-	-
29	T29 20YL/WT	UD PRESSURE SWITCH SENSE
30	T38 20YL/BR	LINE PRESSURE SENSOR SIGNAL
31	-	-
32	-	-
33	-	-
34	-	-
35	-	-
36	T16 16YL/OR	TRANSMISSION CONTROL RELAY OUTPUT
37	Z133 16BK/LG	GROUND
38	T39 20BR/YL	5 VOLT SUPPLY
39	Z133 16BK/LG	GROUND
40	T140 20YL/GY	MS SOLENOID CONTROL
41	T41 20YL/DB	TRS T41 SENSE (P/N)
42	T42 20DG/YL	TRS T42 SENSE
43	D25 20WT/VT	PCI BUS
44	-	-
45	-	-
46	D16 20WT/OR	SCI RECEIVE (ECM)
47	T147 20DG/YL	2C PRESSURE SWITCH SENSE
48	T48 20BR/YL	4C PRESSURE SWITCH SENSE
49	T6 20DG	TOW/HAUL OVERDRIVE OFF SWITCH SENSE
50	T50 20YL/TN	L/R PRESSURE SWITCH SENSE
51	K167 20BR/YL	ACCELERATOR PEDAL POSITION SENSOR GROUND 1
52	T52 20DG/WT	INPUT SPEED SENSOR SIGNAL
53	Z133 16BK/LG	GROUND
54	T54 20DG/OR	TRANSMISSION TEMPERATURE SENSOR SIGNAL
55	T59 18YL/LB	UD SOLENOID CONTROL
56	A903 16RD	FUSED B(+)
57	Z133 16BK/LG	GROUND
58	-	-
59	T159 20YL/DG	4C SOLENOID CONTROL
60	T60 18YL/GY	OD SOLENOID CONTROL



VACUUM RESERVOIR SOLENOID (DIESEL)

VACUUM RESERVOIR SOLENOID (DIESEL) - 2 WAY

CAV	CIRCUIT	FUNCTION
1	K347 20BR/PK	FUSED ASD RELAY OUTPUT
2	N117 20DB/WT	VACUUM RESERVOIR SOLENOID CONTROL



WATER IN FUEL SENSOR (DIESEL)

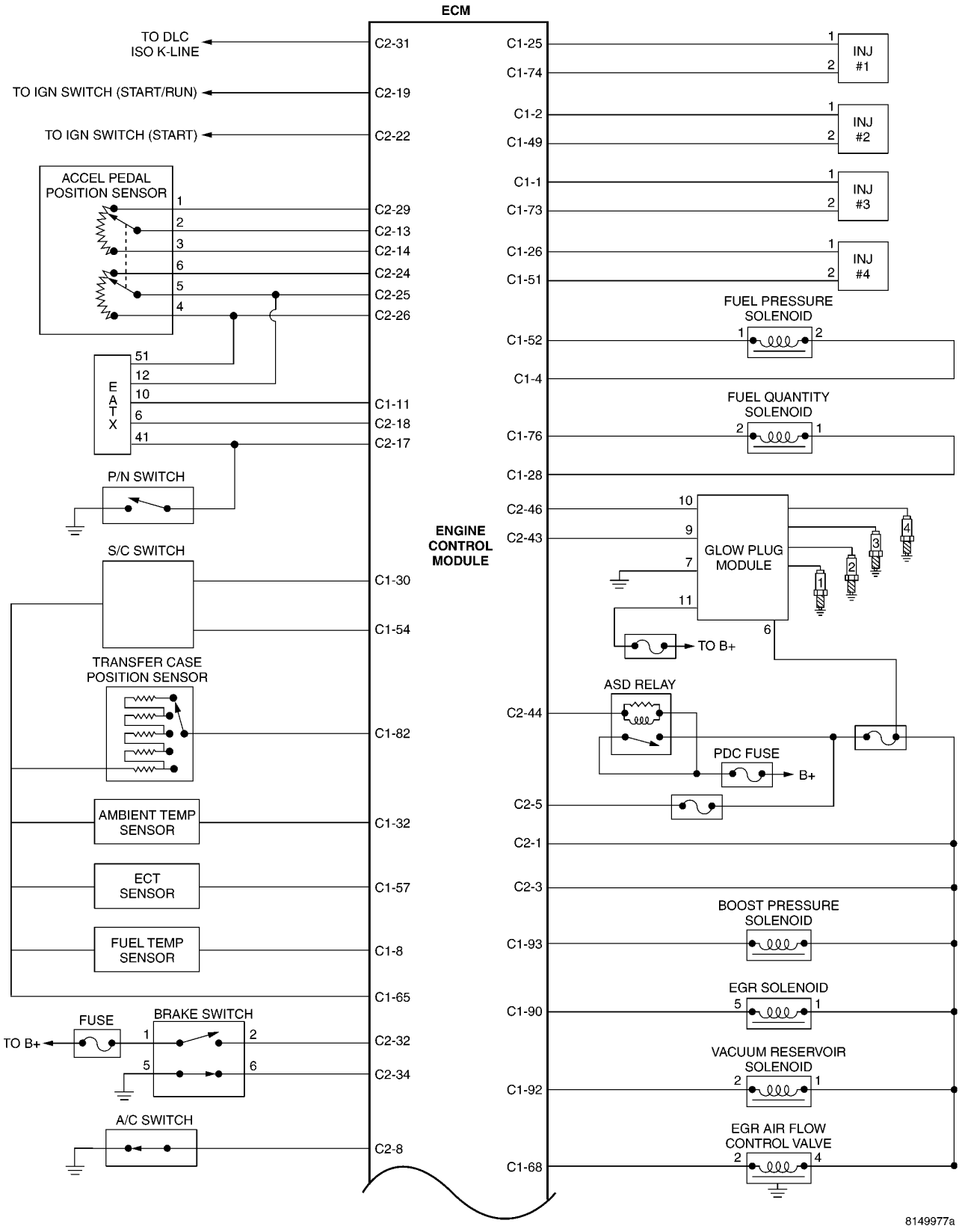
WATER IN FUEL SENSOR (DIESEL) - GRAY 2 WAY

CAV	CIRCUIT	FUNCTION
1	K303 20BR/OR	WATER IN FUEL SENSOR SIGNAL
2	K300 20BR	SENSOR GROUND

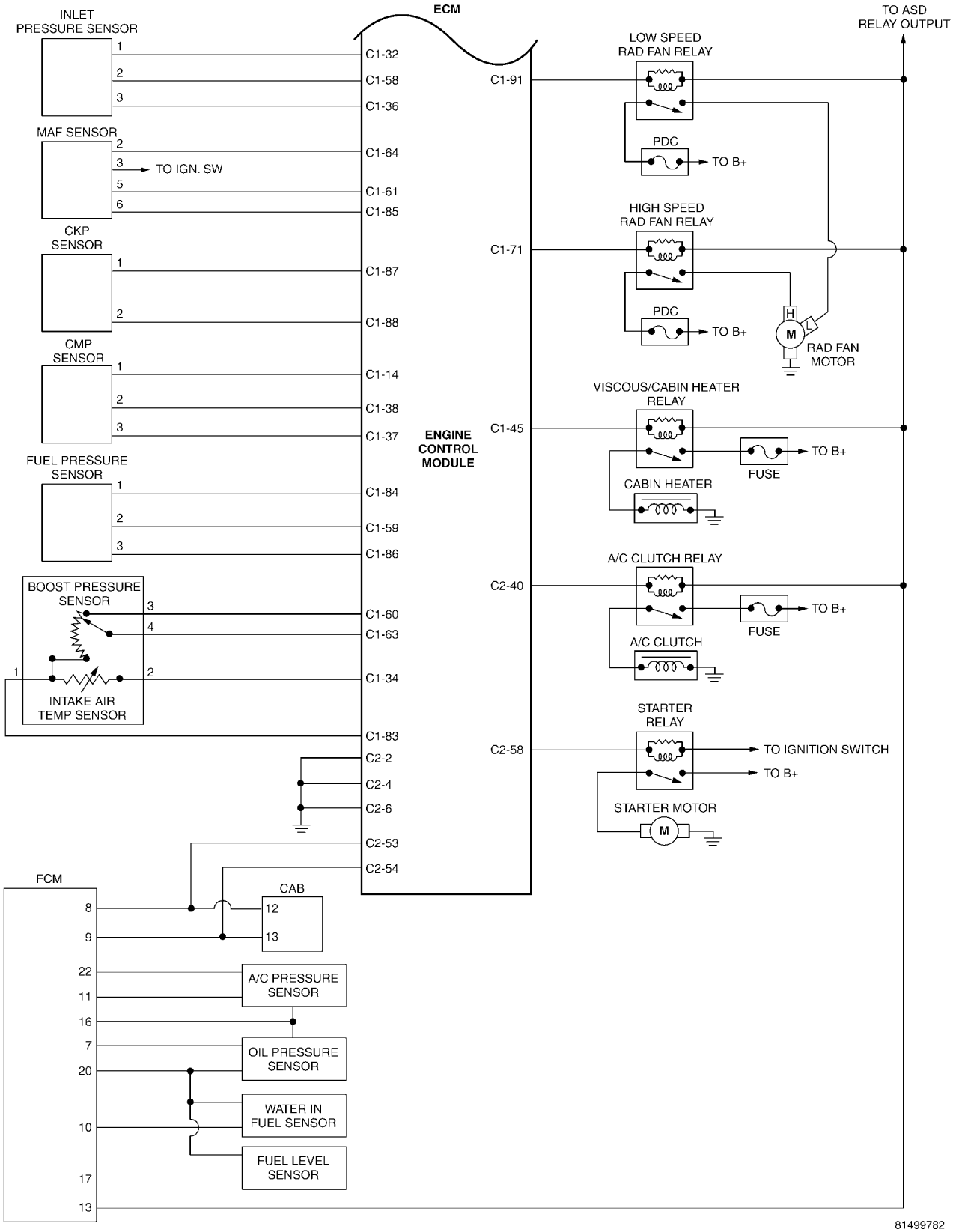
NOTES

10.0 SCHEMATIC DIAGRAMS

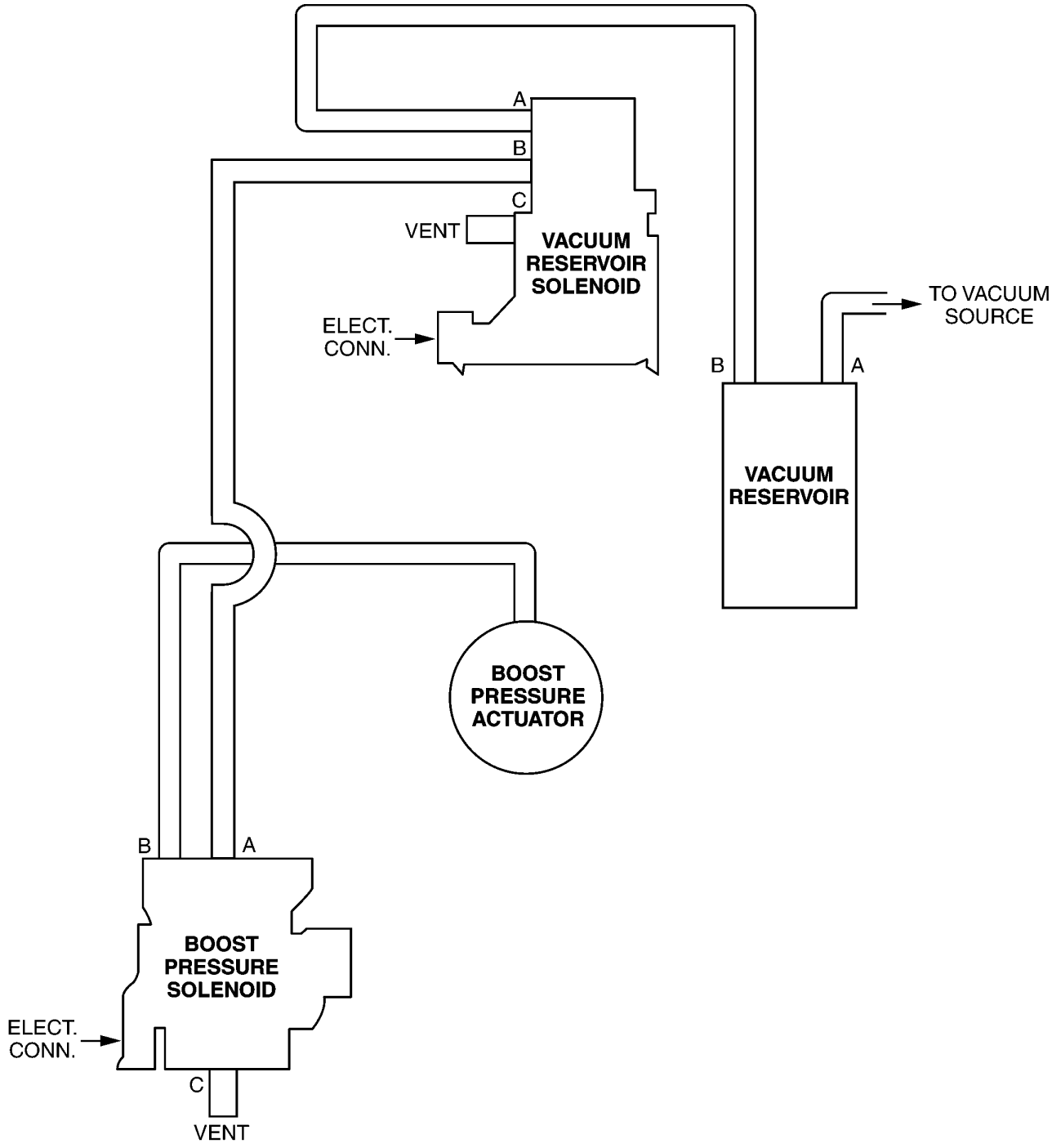
10.1 2005 KJ 2.8L TURBO DIESEL



10.2 2005 KJ 2.8L TURBO DIESEL



10.3 TURBO BOOST SYSTEM



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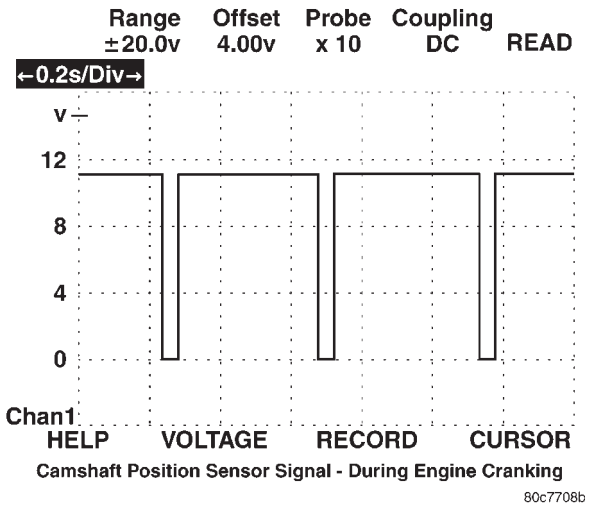
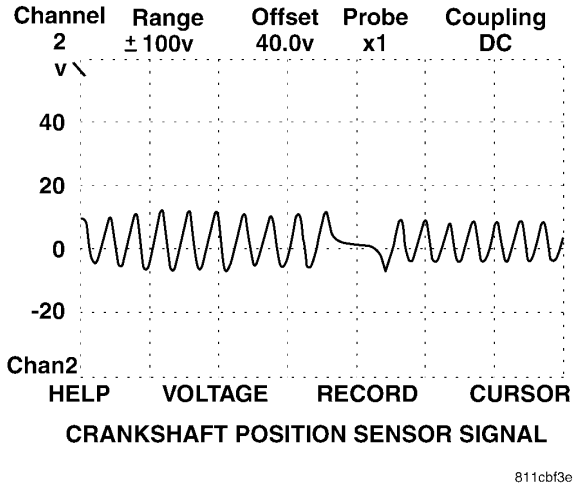
NOTES

11.0 CHARTS AND GRAPHS



Camshaft Position Sensor Signal - During Engine Cranking

80c7708b



CRANKSHAFT POSITION SENSOR SIGNAL

811cbf3e

TRANSFER CASE POSITION SWITCH VOLTAGE CHART

SWITCH POSITION	DRB VOLTAGE
2W	2.64 - 2.80
4-PART	1.96 - 2.12
4-FULL	1.39 - 1.55
N	0.80 - 0.96
4-LO	0.21 - 0.37

815679e5

S/C SWITCH VOLTAGE CHART

S/C SWITCH	SWITCH SIGNAL #1	SWITCH SIGNAL #2
ON/OFF	0.78 - 0.98	3.62 - 3.82
SET	3.26 - 3.46	1.25 - 1.45
RES/ACCEL	3.93 - 4.13	2.13 - 2.33
CANCEL	1.67 - 1.87	2.93 - 3.13
COAST	2.64 - 2.84	0.78 - 0.98
AT REST	4.44 - 4.64	4.44 - 4.64

815679b9

NOTES

DIAGNOSTIC TEST PROCEDURES — TELL US!

DaimlerChrysler Corporation is constantly working to provide the technician the best diagnostic manuals possible. Your comments and recommendations regarding the diagnostic manuals and procedures are appreciated.

To best understand your suggestion, please complete the form giving us as much detail as possible.

Model _____ **Year** _____ **Body Type** _____ **Engine** _____

Transmission _____ **Vehicle Mileage** _____ **MDH** _____

Diagnostic Procedure _____ **Book No.** _____ **Page** _____

Comments/recommendations (if necessary, draw sketch)

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