

2009 ENGINE PERFORMANCE**Driveability - Diesel - Non-DTC-Based Diagnostics - Journey****DIAGNOSIS AND TESTING****ENGINE CRANKS BUT WILL NOT START**

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
INTAKE SYSTEM RESTRICTION
ECM CODES PRESENT
ECT SENSOR
ENGINE CONTROL MODULE
ENGINE DRIVE CHAIN/BELT
FUEL SUPPLY CONTAMINATION
SUPPLY SIDE FUEL SYSTEM PRESSURE
FUEL SYSTEM RESTRICTION
GLOW PLUGS
SKREEM CODES PRESENT

Diagnostic Test**1. ECM CODES PRESENT**

NOTE: The ECM must have proper power and ground connections for the following tests to be valid. Refer to **CHECKING THE ECM POWER AND GROUND CIRCUITS** in the symptom list.

1. Turn the ignition on.
2. With the scan tool, read the ECM DTCs.

Does the scan tool display any ECM DTCs?

Yes

- Perform the appropriate ECM diagnostic procedure.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 2

2. SKREEM CODES PRESENT

1. With the scan tool, read the SKREEM DTCs.

Does the scan tool display any SKREEM DTCs?

Yes

- Perform the appropriate SKREEM DTC procedure. Refer to **DTC-Based Diagnostics/NODE, Wireless Ignition (WIN) - Diagnosis and Testing** .
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 3

3. CHECK FOR INTAKE SYSTEM RESTRICTIONS

1. Turn the ignition off.
2. Ensure vehicle has adequate fuel supply in fuel tank.
3. Inspect all air intake and turbocharger related hoses/tubes and connections.
4. Inspect the air filter for excessive dirt, soiling or other problems that may cause restricted air flow.

Were any problems found?

Yes

- Repair or replace as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 4

4. ECT SENSOR

1. Using a temperature probe, check the vehicle temperature near the ECT Sensor.
2. Turn the ignition on.
3. With the scan tool in Sensors, read the ECT Sensor temperature.
4. Compare the temperature probe reading with the scan tool reading.

Are the two readings within 10°C of each other?

Yes

- Go to step 5

No

- Repair as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

5. GLOW PLUGS

NOTE: Prior to performing this test, be sure to check the Glow Plug Module operation.

1. Refer to **Electrical - Ignition Control/Ignition Control/PLUG, Glow - Operation** and check the glow plugs for proper operation.

Are the glow plugs operating properly?

Yes

- Go to step 6

No

- Repair as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

6. FUEL SYSTEM RESTRICTION

1. Inspect the fuel system lines for restrictions, leaks or other problems.

NOTE: 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 the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 7

7. FUEL CONTAMINATION

1. Inspect the fuel supply for contamination.

Is the fuel contaminated?

Yes

- Refer to appropriate diagnostic service information to remove and replace fuel throughout the fuel system.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 8

8. SUPPLY SIDE FUEL SYSTEM PRESSURE

1. See **Diagnosis and Testing** and locate the procedure Checking the Fuel Supply System and test for proper Fuel pressure from the fuel tank to the high pressure Fuel Injection Pump.

Is the fuel pressure within specification?

Yes

- Go to step 9

No

- Repair as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

9. ENGINE DRIVE CHAINS

1. Ensure the Engine Drive Chains are installed correctly and the camshaft and crankshaft gears are timed correctly.

Were any problems found?

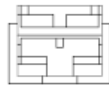
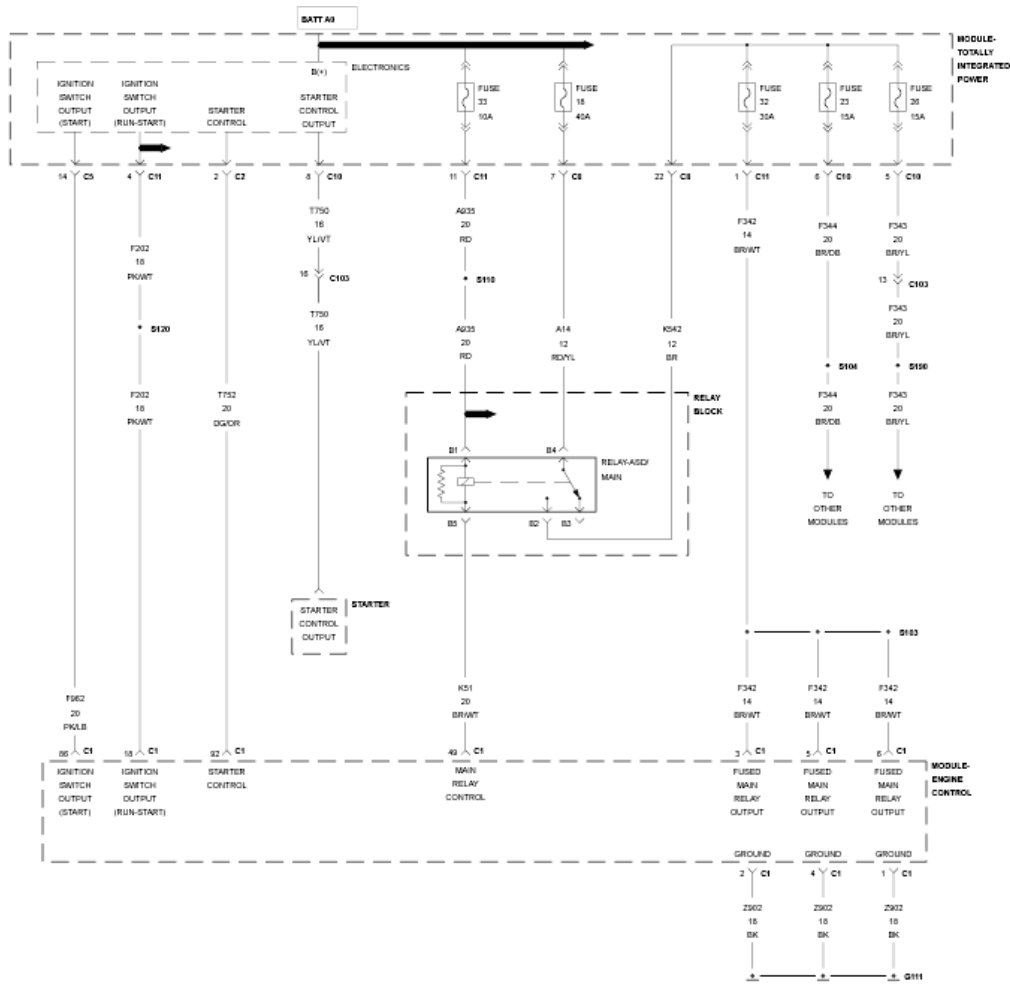
Yes

- Repair as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Replace and program the Engine Control Module in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

ENGINE WILL NOT CRANK



STARTER
(2.0L/2.4L/DIESEL)

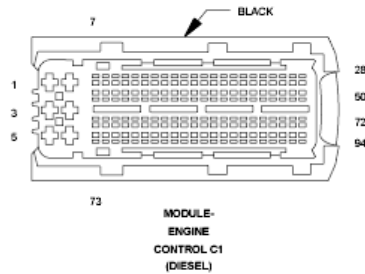


Fig. 1: ECM Power & Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes

BATTERY CABLES

LOW BATTERY/POOR BATTERY CONNECTION
CLUTCH INTERLOCK SWITCH INPUT
MECHANICAL PROBLEM
SKIM CODES PRESENT
STARTER MOTOR
TOTALLY INTEGRATED POWER MODULE
(T750) STARTER CONTROL OUTPUT CIRCUIT SHORT TO GROUND
(T750) STARTER CONTROL OUTPUT CIRCUIT OPEN

Diagnostic Test**1. BATTERY CABLES**

NOTE: Ensure there are no Active DTC's in the ECM or TIPM. If the ECM or TIPM have Active DTC's, repair these DTC's before continuing with No Crank diagnosis.

1. Turn the ignition off.

NOTE: The battery must be fully charged before diagnosing a no crank condition.

2. Inspect the battery cables for corrosion, looseness or other problems.

Is there evidence of problems?

Yes

- Repair as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 2

2. ECM POWER AND GROUND CIRCUITS

1. Refer to **CHECKING THE ECM POWER AND GROUND CIRCUITS** to check for proper ignition, battery and ground supply to the ECM.

Are the Ignition, Battery and Ground supply circuits functioning properly at the ECM?

Yes

- Go to step 3

- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Repair as necessary.

3. SKIM CODES PRESENT

1. Turn the ignition on.
2. With the scan tool, read the SKIM DTCs.

Does the scan tool display any SKIM DTCs?

Yes

- Refer to symptom list for problems related to SKIM.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 4

4. CHECKING STARTER OPERATION

NOTE: **The Starter Motor Fuse in the TIPM must not be open for this test to be valid. Check the condition of the Starter Motor Fuse in the TIPM. If the fuse is open, replace and attempt to crank the engine.**

1. Turn the ignition off.
2. Disconnect the (T750) Starter Control Output circuit at the Starter Motor.
3. With a 12-volt test light connected to ground, probe the (T750) Starter Control Output circuit.
4. Fully depress the clutch pedal.
5. While observing the test light, turn the ignition switch to the Crank/Start position.

Is the test light illuminated brightly?

Yes

- Go to step 5

No

- Go to step 6

5. MECHANICAL PROBLEM

1. Turn the ignition off.
2. Attempt to manually rotate the crankshaft 360°.

Is the crankshaft able to rotate 360°?

Yes

- Replace the Starter Motor.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Repair the engine mechanical problem.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. VERIFY CLUTCH SWITCH INPUTS

1. Turn the ignition on.
2. With the scan tool, read the Clutch Upstop Switch and Clutch Interlock Switch inputs while fully depressing and releasing the clutch pedal.

Does the input for both switched change state while fully depressing and releasing the clutch pedal?

Yes

- Go to step 7

No

- Refer to the appropriate diagnostic service information related to the Clutch Switch. Repair or replace Clutch Switch or Clutch Switch circuitry as necessary to correct Clutch Switch input to the ECM.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

7. (T750) STARTER CONTROL OUTPUT CIRCUIT OPEN

1. Turn the ignition off.
2. Disconnect the TIPM C8 harness connector.
3. Connect the (T750) Starter Control Output wire (at the Starter) to ground.
4. Using a 12-volt test light connected to 12-volts, check the (T750) Starter Relay Output circuit at the TIPM C8 harness connector.

Does the test light illuminate brightly?

Yes

- Go to step 8

No

- Repair the (T750) Starter Relay Output circuit for an open.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

8. (T750) STARTER CONTROL OUTPUT CIRCUIT SHORT TO GROUND

1. Measure the resistance between ground and the (T750) Starter Control Output circuit.

Is the resistance above 1000 ohms?

Yes

- Go to step 9

No

- Repair the (T750) Starter Control Output circuit for a short to ground.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

9. CHECK WIRING, CONNECTORS AND TERMINALS

1. Turn the ignition off.
2. Check the wiring, connectors and terminals associated with the Starter Relay, Main Relay and Clutch Switch circuits. Check for poor terminal contact, corrosion, spread terminals, improper connections or other problems that could cause an intermittent condition.

Were any problems found?

Yes

- Repair or replace wiring, connector or terminals as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Replace the TIPM in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

LACK OF ENGINE POWER

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
AIR IN FUEL SYSTEM INJECTOR QUANTITY ADJUSTMENT BRAKE SWITCH PROBLEM EGR SYSTEM PROBLEM BOOST PRESSURE PROBLEM LOW ENGINE COMPRESSION FUEL DELIVERY SYSTEM RESTRICTION ENGINE DRIVE BELT/CHAIN FUEL INJECTOR(S) FUEL INJECTION PUMP FUEL SYSTEM CONTAMINATION FUEL SYSTEM LEAK TURBOCHARGER

Diagnostic Test

1. CHECKING FOR ECM DTCS

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 (1600BAR). Use extreme caution when inspecting for high pressure fuel leaks. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: Fuel under this amount of pressure can penetrate skin causing possible serious or fatal injury. Inspect for high pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Failure to follow these instructions may result in possible serious or fatal injury.

1. Turn the ignition on.
2. With the scan tool, read the ECM DTCS.

Are there any DTCS present?

Yes

- Refer to symptom list for problems related to this DTC.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 2

2. CHECKING THE BRAKE SWITCH ADJUSTMENT

1. Refer to the appropriate diagnostic service information and check for proper Brake Switch adjustment.

Is the Brake Switch adjusted correctly?

Yes

- Go to step 3

No

- Adjust or replace the Brake Switch as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. EGR SYSTEM

1. Refer to the symptom list and perform the **CHECKING THE EGR SYSTEM** test.

Were any problems found during the EGR System test?

Yes

- Repair or replace as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 4

4. FUEL SYSTEM LEAK

1. 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 (1600BAR). Use extreme caution when inspecting for high pressure fuel leaks. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: Fuel under this amount of pressure can penetrate skin causing possible serious or fatal injury. Inspect for high pressure fuel leaks with a sheet of cardboard. Wear safety goggles and

adequate protective clothing when servicing fuel system. Failure to follow these instructions may result in possible serious or fatal injury.

2. Inspect the entire fuel system for leakage.

Is there any evidence of leakage?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 5

5. FUEL SYSTEM CONTAMINATION

NOTE: **Mixing any other fuels such as gasoline or kerosine can cause this symptom to occur.**

1. 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 (1600BAR). Use extreme caution when inspecting for high pressure fuel leaks. Failure to follow these instructions may result in possible serious or fatal injury.

WARNING: Fuel under this amount of pressure can penetrate skin causing possible serious or fatal injury. Inspect for high pressure fuel leaks with a sheet of cardboard. Wear safety goggles and adequate protective clothing when servicing fuel system. Failure to follow these instructions may result in possible serious or fatal injury.

2. Inspect the fuel system for contamination.

Is the fuel contaminated?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE.**

Powertrain Control (PCM) - Standard Procedure

No

- Go to step 6

6. CHECKING THE SUPPLY SIDE FUEL DELIVERY SYSTEM

1. Refer to the symptom Checking the Fuel Supply System and test for proper Fuel pressure from the fuel tank to the high pressure Fuel Injection Pump.

NOTE: The following is a list of problems that can cause fuel pressure to deviate from specification: restricted fuel filter or fuel lines, air in fuel system, failed fuel sending unit, contaminated fuel.

Were there any problems with the Fuel Delivery System?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 7

7. CHECKING BOOST PRESSURE

1. Turn the ignition on.

NOTE: This test requires two people. One person to test drive the vehicle while a technician observes the scan tool readings.

2. With the scan tool 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, and cruise.

NOTE: The Boost Pressure reading should directionally follow (trail) the Boost Pressure Desired/Setpoint reading.

Does the Boost Pressure reading follow the Boost Pressure Desired/Setpoint reading?

Yes

- Go to step 8

No

- Refer to the symptom **CHECKING THE BOOST PRESSURE SYSTEM.**

8. ENGINE COMPRESSION

1. Start and idle the engine.
2. With the scan tool, perform the Cylinder Compression Test.

Does the Cylinder Compression Test indicate low compression in any of the cylinders?

Yes

- Using the Service Information, repair the engine as necessary to regain proper cylinder compression.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 9

9. FUEL INJECTOR

NOTE: An injector that sticks open can cause this symptom. A sticking injector will cause the engine to misfire and emit excessive black smoke from the exhaust system.

1. Start and idle the engine.
2. With the scan tool, perform the Cylinder Fuel Quantity Correction Test.

NOTE: A problem injector will be indicated by a significant change in correction quantity as compared to the rest of the injectors.

Are any of the injectors displaying a significant amount of injection quantity correction?

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 the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 10

10. ENGINE DRIVE BELT/CHAIN

1. Refer to the appropriate ENGINE article 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 the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Test Complete.

CHECKING THE ACCELERATOR PEDAL POSITION SENSOR CALIBRATION

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
APP SENSOR 1
APP SENSOR 2

Diagnostic Test

1. APP SENSOR IDLE VOLTAGE

NOTE: If there are any Accelerator Pedal Position Sensor DTC's active in the ECM, diagnose DTC's before continuing this test.

NOTE: The APP Sensor is a device that contains two 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 1 signal should always be double the voltage of the APP Sensor 2 signal.

NOTE: Ensure the accelerator pedal is free from any restriction or binding before continuing.

1. Turn the ignition on.
2. With the scan tool, read the APP Sensor 1 and APP Sensor 2 Volts with the accelerator pedal in the at rest position.

Does the scan tool display between 0.79 and 0.95 volt for sensor 1 and 0.39 and 0.48 volt for sensor 2?

Yes

- Go to step 2

No

- Check the APP Sensor circuits for proper resistance. If o.k., replace the APP Sensor in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

2. APP SENSOR 1

1. While back probing, measure the voltage of the APP Sensor 1 Signal circuit at the ECM.
2. Monitor the voltmeter while slowly pressing the accelerator pedal completely down.

NOTE: APP signals are displayed in voltage and percentage on the scan tool. Although APP 1 voltage is double APP 2 voltage, the percentage display of APP 1 and APP 2 should be within 2.5% of each other during all phases of accelerator pedal travel.

Did the voltage increase smoothly with pedal travel?

Yes

- Go to step 3

No

- Replace the Accelerator Pedal Position Sensor in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. APP SENSOR 2

1. While back probing, measure the voltage of the APP Sensor 2 Signal circuit at the ECM.
2. Monitor the voltmeter while slowly pressing the accelerator pedal completely down.

NOTE: APP signals are displayed in voltage and percentage on the scan tool. Although APP 1 voltage is double APP 2 voltage, the percentage display of APP 1 and APP 2 should be equal during all phases of accelerator pedal travel.

Did the voltage increase smoothly with pedal travel?

Yes

- Go to step 4

No

- Replace the Accelerator Pedal Position Sensor in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. APP SENSOR WIDE OPEN THROTTLE VOLTAGE

1. Fully depress the accelerator pedal.
2. With the scan tool, read the voltage for APP Sensor 1 and APP Sensor 2.

Does the scan tool display between 4.28 and 4.70 volts for sensor 1 and 2.14 and 2.35 volts for sensor 2?

Yes

- Test Complete.

No

- Check the APP Sensor circuits for proper resistance. If o.k., replace the APP Sensor in accordance with the Service Information.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE BOOST PRESSURE SENSOR CALIBRATION

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
TURBOCHARGER BOOST PRESSURE SENSOR CALIBRATION

Diagnostic Test

1. BOOST PRESSURE SENSOR CALIBRATION

1. Turn the ignition on.
2. With the scan tool, read the Boost Pressure Voltage and Boost Pressure hpa.

NOTE: The Boost Pressure hpa and Intake/Inlet Air Pressure hpa readings should both match closely to the Atmospheric Pressure hpa reading. These readings will change depending on altitude.

Is the Boost Pressure hpa within 2% or the Atmospheric pressure hpa?

Yes

- Test Complete.

No

- Replace the Turbocharger Boost Pressure Sensor.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure**

CHECKING THE BOOST PRESSURE SYSTEM

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
TURBOCHARGER ASSEMBLY
BOOST PRESSURE ACTUATOR SUPPLY HOSE
BOOST PRESSURE ACTUATOR
INTAKE OR EXHAUST SYSTEM PROBLEM

Diagnostic Test

1. CHECKING THE BOOST PRESSURE ACTUATOR OPERATION

1. Turn the ignition off.
2. Disconnect the Valve Block vacuum hose connector.
3. Connect a vacuum pump to the Boost Pressure Actuator supply port of the disconnected Valve Block vacuum hose connector. This port is attached to the Gray colored vacuum tube at the Valve Block vacuum hose connector.
4. While standing at the right front of the vehicle (front of engine side), observe the position of the Boost Pressure Actuator armature.

NOTE: The armature should be in the 10 o'clock position with the ignition off (armature in rest position).

5. While observing the armature, apply 20 inches of vacuum.

NOTE: The armature should move counterclockwise from the 10 o'clock position to the 9 o'clock position.

Is the Boost Pressure Actuator operating from the 10 o'clock to the 9 o'clock position when 20 inches of vacuum is applied?

Yes

- Go to step 4

No

- Go to step 2

2. CHECKING THE BOOST PRESSURE ACTUATOR SUPPLY HOSE

1. Check the Gray colored vacuum hose between the Valve Block hose connector and the Boost Pressure Actuator for leaks, kinks, debris or other restrictions.

NOTE: Problems with this hose will cause incorrect vacuum to the Boost Pressure Actuator resulting in driveability problems.

Were any problems found?

Yes

- Repair or replace as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 3

3. CHECK FOR BOOST PRESSURE ACTUATOR LINKAGE PROBLEM

1. Disconnect the linkage from the Boost Pressure Actuator and inspect the linkage for foreign debris, binding or damage that could cause restricted movement.

Were any problems found?

Yes

- Repair or replace as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Refer to appropriate diagnostic service information and replace the Boost Pressure Actuator or Turbocharger Assembly as necessary.

4. CHECK FOR INTAKE AND EXHAUST SYSTEM RESTRICTIONS

1. Inspect the exhaust system for damaged components that could cause exhaust flow blockage.
2. Inspect all air intake, crankcase vent and turbocharger related hoses/tubes and connections for

damage, air leaks or blockage.

3. Inspect the air filter for excessive dirt, soiling or other problems that may cause restricted air flow.

Were any problems found?

Yes

- Repair or replace as necessary.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 5

5. CHECKING THE BOOST PRESSURE ACTUATOR OPERATION

NOTE: The engine temperature must be above 160°F for this test to be valid.

1. Turn the ignition off.
2. Disconnect the Valve Block vacuum hose connector.
3. Connect a vacuum pump to the Boost Pressure Actuator supply port of the disconnected Valve Block vacuum hose connector. This port is attached to the Gray colored vacuum tube at the valve Block vacuum hose connector.
4. Set the engine speed to 1,500 rpm.
5. With the scan tool, observe and note the Boost Pressure hpa reading.
6. While observing the scan tool, apply 15 inches of vacuum.

NOTE: The Boost Pressure hpa reading should increase more than 100 hpa as well as an audible engine tone change when 15 inches of vacuum is applied.

Does the Boost Pressure hpa reading increase more than 100 hpa when 15 inches of vacuum is applied?

Yes

- Test complete.

No

- Refer to appropriate diagnostic service information and replace the Turbocharger assembly.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE ENGINE COOLANT TEMPERATURE SENSOR CALIBRATION

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
ECT SENSOR - COLD ECT SENSOR - HOT

Diagnostic Test**1. ECT SENSOR - COLD**

NOTE: The thermostat must be operating correctly for this test to be valid.

1. With the scan tool in Sensors, read and note the engine coolant temperature.
2. 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 step 2

No

- Check the wiring and connectors associated with the ECT Sensor for corrosion, damage or other problems. Repair as necessary. If wiring and connectors are o.k., replace the Engine Coolant Temperature Sensor.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

2. ECT SENSOR - HOT

NOTE: The thermostat must be operating correctly for this test to be valid.

1. Start the engine and bring the engine to operating temperature (thermostat open).
2. Turn the engine off and wait 10 minutes to allow the engine temperature to stabilize.
3. Using a temperature probe, measure the engine block temperature near the ECT Sensor.
4. With the scan tool, 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

- Check the wiring and connectors associated with the ECT Sensor for corrosion, damage or other problems. Repair as necessary. If wiring and connectors are o.k., replace the Engine Coolant Temperature Sensor.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE EGR SYSTEM

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
VACUUM HOSES/TUBES
VACUUM SUPPLY SYSTEM
EGR VALVE
VALVE BLOCK ASSEMBLY

Diagnostic Test

1. CHECKING VACUUM AT EGR VALVE

NOTE: **Ensure there are no EGR hardwire/circuit related DTC's before continuing. Existing EGR circuit related faults will cause misdiagnosis during this test.**

1. Turn the ignition off.
2. Disconnect the EGR Valve vacuum supply hose.
3. Connect a vacuum gauge to the disconnected EGR Valve vacuum supply hose.
4. While observing the vacuum gauge, start and idle the engine

NOTE: **The vacuum reading should be above 16 inches for 2 minutes after engine start then drop to below 2 inches.**

Does the vacuum read above 16 inches for 2 minutes then drop to below 2 inches?

Yes

- Go to step 2

No

- Go to step 3

- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

2. EGR VALVE

INCHES OF VACUUM APPLIED TO EGR VALVE	MAF PER CYLINDER MG/HU
10	435 - 475
15	255 - 295
20	165 - 215

NOTE: The engine temperature must be above 160°F for this test to be valid.

1. Turn the ignition off.
2. Disconnect the vacuum supply hose from the EGR Valve.
3. Connect a vacuum pump to the EGR Valve vacuum port.
4. Start the engine.

NOTE: Engine must be idling in park.

5. Apply 10 inches, 15 inches and 20 inches of vacuum to the EGR Valve and note the MAF readings at each of the applied vacuum steps.

NOTE: An engine tone change should also be heard when 15 inches or more vacuum is applied to the EGR Valve.

6. Refer to the chart and compare each of the MAF readings for each of the applied vacuum steps

Are the MAF Per Cylinder mg/hu within the chart specifications for applied vacuum step?

Yes

- EGR system functioning properly. Test complete.

No

- Replace the EGR Valve.

3. CHECKING VACUUM AT VALVE BLOCK ASSEMBLY

1. Turn the ignition off.
2. Disconnect the Valve Block vacuum hose connector.
3. Connect a vacuum gauge to the vacuum supply port of the disconnected Valve Block vacuum hose connector. Vacuum supply is provided via the Blue colored vacuum tube at the valve Block vacuum hose connector.
4. While observing the vacuum gauge, start and idle the engine

NOTE: The vacuum reading should be above 22 inches with the engine idling.

Does the vacuum read above 22 inches with the engine idling?

Yes

- Go to step 4

No

- Repair vacuum supply system for insufficient vacuum.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. CHECKING THE AIR CLEANER VENT HOSE

1. Turn the ignition off.
2. Disconnect the Valve Block vacuum hose connector.
3. Check the Black colored vacuum hose between the Valve Block hose connector and the air cleaner for kinks, debris or other restrictions.

NOTE: Problems with this hose will cause incorrect vacuum to the EGR Valve resulting in driveability problems.

Were any problems found?

Yes

- Repair or replace as necessary.

No

- Go to step 5
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. CHECKING THE EGR VACUUM SUPPLY HOSE

1. Turn the ignition off.
2. Disconnect the Valve Block vacuum hose connector.
3. Check the Tan colored vacuum hose between the Valve Block hose connector and the EGR Valve for kinks, debris or other restrictions.

NOTE: Problems with this hose will cause incorrect vacuum to the EGR Valve resulting in driveability problems.

Were any problems found?

Yes

- Repair or replace as necessary.

No

- Replace the Valve Block Assembly.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE ENGINE MECHANICAL SYSTEMS

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
CHECKING ENGINE MECHANICAL SYSTEMS

Diagnostic Test

1. CHECKING ENGINE MECHANICAL

WARNING: Do not attempt to remove or separate high pressure fuel lines. Failure to follow these instructions may result in possible serious or fatal injury.

NOTE: The following items should be checked as a possible cause of a Driveability or No-Start problem:

- 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 Chains and Sprockets - 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 the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

No

- Test Complete.

CHECKING THE ECM POWER AND GROUND CIRCUITS

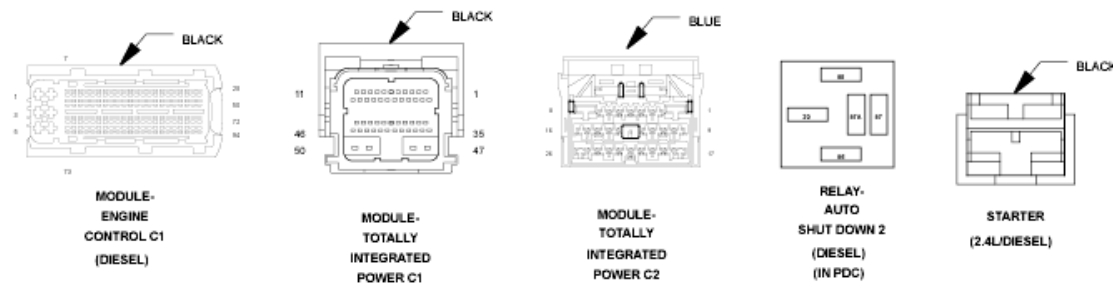
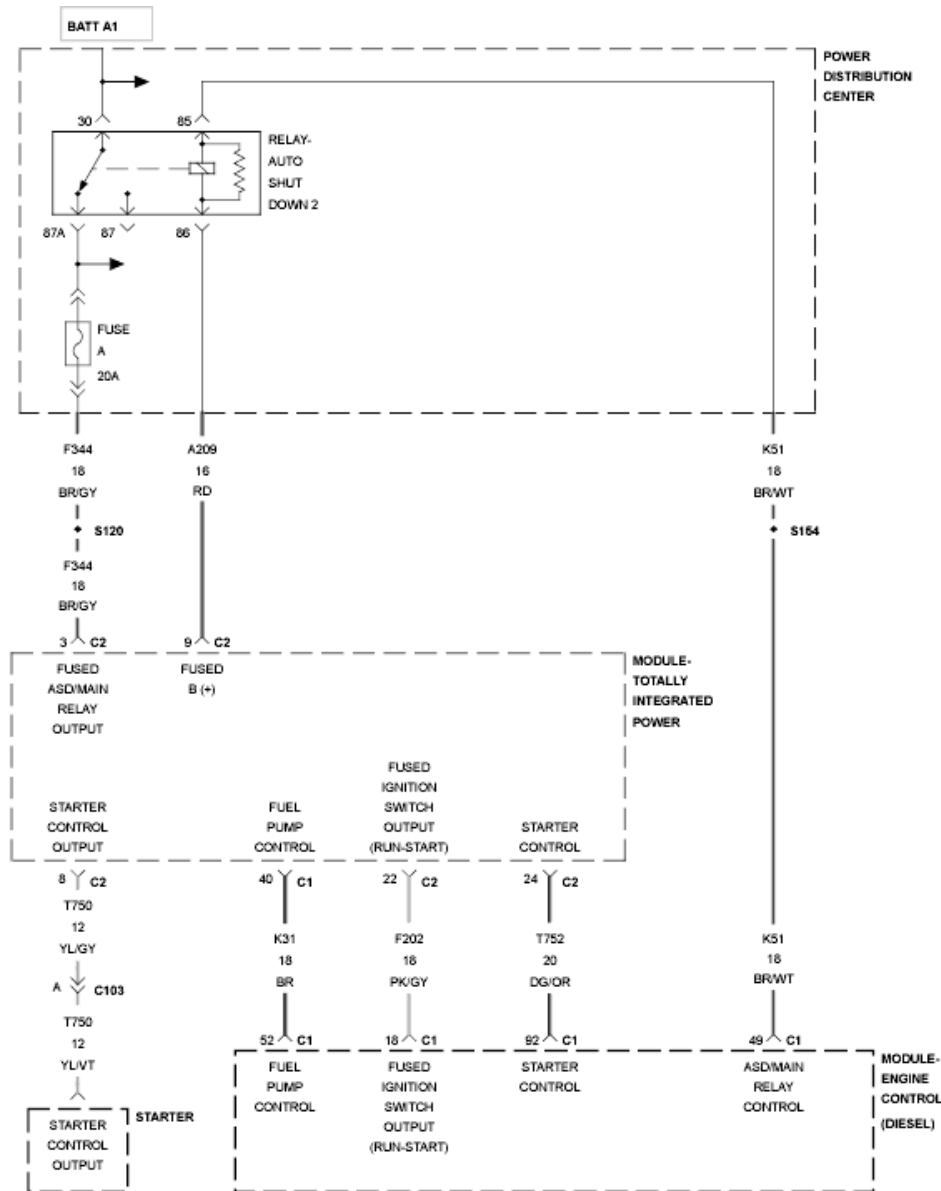


Fig. 2: ECM Power And Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS**.

Possible Causes

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

Diagnostic Test**1. ECM GROUND CIRCUIT(S) OPEN**

NOTE: Before CHECKING THE ECM POWER AND GROUND CIRCUITS, check the **Totally Integrated Power Module (TIPM)** for DTC's. Repair all TIPM ignition switch or power supply related DTC's before continuing with this test.

1. Turn the ignition off.
2. Disconnect the ECM harness connectors.
3. Using a 12-volt test light connected to 12-volts, check each of the ECM ground circuits in ECM harness connector C1 cavities 1, 2 and 4.

Did the test light illuminate for each cavity?

Yes

- Go To step 2

No

- Repair the ECM Ground circuit(s) for an open.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

2. FUSED IGNITION SWITCH START OUTPUT CIRCUIT OPEN

1. Turn the ignition to the Start position.
2. Using a 12-volt test light connected to ground, check the Fused Ignition Switch Start Output circuit in ECM harness connector C1 cavity 86.

Is the test light on?

Yes

- Go To step 3

No

- Repair the Fused Ignition Switch Start Output circuit for an open.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. FUSED IGNITION SWITCH START/RUN OUTPUT CIRCUIT OPEN

1. Turn the ignition to the Start position.
2. Using a 12-volt test light connected to ground, check the Fused Ignition Switch Start/Run Output circuit in ECM harness connector C1 cavity 18.
3. Turn the ignition to the Run position.
4. Using a 12-volt test light connected to ground, check the Fused Ignition Switch Start/Run Output circuit in ECM harness connector C1 cavity 18.

Is the test light on for both ignition switch positions?

Yes

- Go To step 4

No

- Repair the Fused Ignition Switch Start/Run Output circuit for an open.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. CHECKING THE MAIN RELAY SYSTEM

1. Turn the ignition off.
2. Connect a jumper wire between ground and the Main Relay Control circuit in ECM C1 harness connector cavity 49.
3. Turn the ignition on.
4. Using a 12-volt test light connected to ground, check the Fused Main Relay Output circuits at the ECM C1 harness connector cavities 3, 5 and 6.

Does the test light illuminate brightly for each circuit?

Yes

- Test Complete.

No

- Go To step 5

5. FUSED MAIN RELAY BATTERY SUPPLY CIRCUIT OPEN

1. Turn the ignition off.
2. Remove the Main Relay.
3. Using a 12-volt test light connected to ground, check both Fused Main Relay Battery Supply circuits in Main Relay connector.

Is the test light on?

Yes

- Go To step 6

No

- Repair the Fused Main Relay Battery Supply circuit(s) for an open.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. MAIN RELAY OUTPUT CIRCUIT OPEN

1. Connect a jumper wire between cavity B7 and cavity B9 in the Main Relay connector.
2. Using a 12-volt test light connected to ground, check the Main Relay Output circuit in ECM harness connector C1 cavities 3, 5 and 6.

Did the test light illuminate for each circuit?

Yes

- Go To step 7

No

- Repair the Main Relay Output circuit(s) for an open.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

7. MAIN RELAY

1. Turn the ignition off.
2. Install a known good relay in place of the Main Relay.
3. Connect a jumper wire between ground and the Main Relay Control circuit in ECM C1 harness connector cavity 49.
4. Turn the ignition on.
5. Using a 12-volt test light connected to ground, check the Fused Main Relay Output circuits at the ECM C1 harness connector cavities 3, 5 and 6.

Did the test light illuminate brightly for each circuit?

Yes

- Replace the Main Relay.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Repair the Main Relay Control circuit for an open or short to voltage.
- Perform the ECM Verification Test. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE FUEL DELIVERY SYSTEM

For complete wiring diagrams refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

This fuel system uses a low pressure Fuel Lift Pump inside the Fuel Tank to supply fuel to the Tandem Pump through the fuel filter. The Tandem Pump performs two functions. First, the Tandem Pump raises the fuel pressure and supplies the Fuel Injectors. Second, the Tandem Pump creates a vacuum supply which is used by the vacuum operated devices. The fuel return goes back through the Tandem Pump to the Fuel Filter where the fuel can take two different paths. A portion of the fuel will be directed back into the fuel supply inside the Fuel Filter. The remaining fuel will flow back to the Fuel Tank through the Fuel Cooler.

Possible Causes
FUEL SYSTEM LEAK
FUEL CONTAMINATION
FUEL LINE RESTRICTIONS
FUEL INJECTOR
FUEL LIFT PUMP
FUEL LIFT PUMP WIRING
TANDEM PUMP

Diagnostic Test**1. VISUAL INSPECTION**

NOTE: If there are any DTCs present for the Fuel Pressure Solenoid, Fuel Quantity Solenoid, Fuel Injectors, or Fuel Pump Control Circuit or relay, repair those DTCs before continuing with the Fuel Delivery System test.

NOTE: For best results, perform Fuel Delivery System test with vehicle at room temperature. Extreme cold temperatures can cause inaccurate results.

NOTE: Make sure that the vehicle has at least 1/8 of a tank of fuel before proceeding with this test.

1. Perform a visual inspection of the fuel system for any signs of a fuel leak.
2. Check the engine oil level.

NOTE: If the oil level is overfull and smells like fuel, a faulty Tandem Pump gasket may be causing fuel to leak into the crankcase.

Were any signs of a leak detected?

Yes

- **If there is a restriction in the fuel return line or fuel cooler, fuel will leak out at the weakest point in the system.** Make sure that the fuel return is not obstructed. If the fuel return is obstructed, repair the cause of the obstruction and recheck for a leak. If the fuel return is not obstructed, repair the leak and recheck the fuel system.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

No

- Go to step 2

2. CHECKING SENSOR VALUES WITH THE SCAN TOOL

1. Turn the ignition on. Engine not running.
2. With the scan tool, perform the following checks:
 - Check and compare the values of the Ambient Air Temperature Sensor, Coolant Temperature Sensor and Fuel Temperature Sensor with the key on. The values should read within approximately 10°C (18°F) of each other on a cold engine.
 - Check and compare the values of the Air Inlet Pressure Sensor, Boost Pressure Sensor and Exhaust Differential Pressure Sensor. The sensors should read approximately the same.
 - Check the cam/crank synchronization during cranking.

Are the cam and crank synchronized and the sensors reading normal?

Yes, and the engine is a no start:

- Go To 3

Yes, and the engine starts and runs:

- Go to step 6

No

- Repair as necessary.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure**.

3. CHECKING FUEL SUPPLY PRESSURE AT TANDEM PUMP (NO START)

NOTE: Due to the pressure pulses produced by the tandem pump during operation, a typical pressure can not be used. The DRBIII® should be used with the (blue) 500 psi pressure transducer to get an accurate pressure reading.

1. Turn the ignition off.
2. Connect the (blue) 500 psi pressure transducer adaptor to the Tandem Pump test port.
3. Connect the (blue) 500 psi pressure transducer to the DRBIII®.
4. Connect a DRBIII® to the vehicle to use as a pressure tester.
5. On the DRXIII screen, select PEP Module.
6. Select Pressure Test.
7. Select Live Data.
8. Turn the ignition on.
9. Observe the fuel pressure reading on the DRBIII®.

NOTE: Fuel pressure should read a minimum of 4psi (0.27 bar).

Is the fuel pressure reading a minimum of 4 psi (0.27 bar)?

Yes

- Go to step 4

No

- Go to step 11

4. CHECKING TANDEM PUMP OUTPUT (NO START)

NOTE: Make sure battery is fully charged for test to be accurate.

1. Crank the engine for 10 seconds.

NOTE: Fuel pressure should be a minimum of 14 psi (1.0 bar) or above.

Did the fuel pressure reach a minimum of 14 psi (1.0 bar) or above?

Yes

- Go to step 5

No

- Replace the Tandem Pump.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

5. CHECKING FUEL QUALITY/CONTAMINATION

1. Collect a fuel sample from the vehicle in a clean see through container.
2. Collect a fuel sample of fresh clean fuel in a clean see through container for reference.
3. Check the vehicle's fuel sample for the following:
 - Check the color of the fuel. Diesel fuel will generally be a yellow color.
 - Allow the fuel to settle and look for cloudiness indicating contamination.
 - Check the volatility of the fuel.
 - Look for a parting line in the fuel sample indicating another type of liquid mixed with the fuel.
 - Look for any signs of debris in the fuel sample.

Were any problems found?

Yes

- Refer to appropriate diagnostic service information to replace the fuel in the entire fuel system.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

No

- The fuel system is operating normally. Check for any Service Bulletins that may apply.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

6. SCAN TOOL TEST

Perform the following tests with the scan tool:

- Compression Test. The RPM drop in each cylinder should be approximately equal.
- Fuel Quantity Correction Test. Cylinder values should not exceed +4mm³ .

Were any of the cylinders out of range as compared to the others during the scan tool tests?

Yes

- Evaluate the results of the scan tool tests. If any of the cylinders are found to be performing poorly as compared to the others, check for engine mechanical issues on the suspect cylinder and repair as necessary. If a fuel injector is suspected,
- Go to step 7

No

- Go to step 8

7. CHECKING THE FUEL INJECTOR WIRING

1. Turn the ignition off.
2. Disconnect the Fuel Injector harness connector of the suspect injector.
3. Disconnect the Engine Control Module harness connector.
4. Using the wiring diagram as a guide, perform the following measurements:
 - Measure the resistance of the Fuel Injector High Side Control circuit between the Fuel Injector harness connector and the Engine Control Module harness connector.
 - Measure the resistance of the Fuel Injector Low Side Control circuit between the Fuel Injector harness connector and the Engine Control Module harness connector.

8. CHECKING FUEL SYSTEM PRESSURE

NOTE: Due to the pressure pulses produced by the tandem pump during operation, a typical pressure can not be used. The DRBIII® should be used with the (blue) 500 psi pressure transducer to get an accurate pressure reading.

1. Turn the ignition off.
2. Connect the (blue) 500 psi pressure transducer adaptor to the Tandem Pump test port.
3. Connect the (blue) 500 psi pressure transducer to the DRBIII®.
4. Connect a DRBIII® to the vehicle to use as a pressure tester.
5. On the DRXIII screen, select PEP Module.
6. Select Pressure Test.
7. Select Live Data.
8. While observing the DRBIII® start the engine, momentarily raise the engine speed to 4000 RPM.

NOTE: The fuel pressure reading should read between 160 psi (11 bar) to 240 psi (16.5 bar) @ 4000 RPM.

Does the fuel pressure read between 160 psi (11 bar) to 240 psi (16.5 bar)?

Yes - If the fuel pressure is above 240 psi (16.5 bar):

- The fuel return is restricted. Check for a restriction in the fuel return line or Fuel Cooler. If a restriction is found, repair as necessary. If no restriction is found, Replace the Tandem

Pump.

Yes - If the fuel pressure is between 160 psi (11 bar) to 240 psi (16.5 bar):

- Go to step 13

No

- Go to step 9

9. CHECKING FOR LEAKING INJECTOR O-RINGS

1. Clamp off the fuel return line.
2. Momentarily raise the engine speed to 4000 RPM.
3. Observe the fuel pressure reading on the DRBIII®.

NOTE: The fuel pressure reading should reach a minimum of 160 psi (11 bar).

Did the fuel pressure reading come up to specification?

Yes

- Replace the Fuel Injector O-rings.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

No

- Go to step 10

10. CHECKING FUEL SUPPLY PRESSURE AT TANDEM PUMP

1. Turn the ignition off.
2. Turn the ignition on.
3. Observe the fuel pressure reading on the DRBIII®.

NOTE: Fuel pressure should read approximately 4 psi (0.27 bar).

Is the fuel pressure reading approximately 4 psi (0.27 bar)?

Yes

- Replace the Tandem Pump.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

No

- Go to step 11

11. CHECKING FUEL SUPPLY PRESSURE AT FUEL FILTER INLET

1. Turn the ignition off.
2. Disconnect the fuel supply line at the Fuel Filter inlet.
3. Install a fuel pressure gauge inline between disconnected fuel supply line and the Fuel Filter.
4. Turn the ignition on.
5. Observe the fuel pressure reading on the DRBIII®.

NOTE: Fuel pressure should read approximately 4psi (0.27 bar).

Is the fuel pressure reading approximately 4psi (0.27 bar)?

Yes

- Check the fuel line for a restriction between the Fuel Filter and the Tandem Pump. If no restriction is found, replace the Fuel Filter.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure**.

No

- Go to step 12

12. CHECKING FUEL SUPPLY PRESSURE AT FUEL TANK

1. Turn the ignition off.
2. Disconnect the fuel pressure gauge from the Fuel Filter inlet.
3. Reconnect the Fuel Filter inlet supply line.
4. Disconnect the fuel supply line from the Fuel Lift Pump at the Fuel Tank.
5. Install a fuel pressure gauge inline between the disconnected fuel supply line and the Fuel Lift Pump.
6. Turn the ignition on.
7. Observe the fuel pressure reading on the DRBIII®.

NOTE: Fuel pressure should read approximately 4psi (0.27 bar).

Is the fuel pressure reading approximately 4psi (0.27 bar)?

Yes

- Repair the restriction in the fuel supply line between the Fuel Tank and the Fuel Filter.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE,**

Engine Control (ECM) - Standard Procedure .**No**

- Go to step 15

13. CHECKING FUEL LIFT PUMP OPERATION

1. Hold the engine speed at 4000 RPM.
2. Remove the Fuel Lift Pump fuse.
3. Observe the fuel pressure reading on the DRBIII®.

NOTE: **The fuel pressure reading should drop a minimum of 20 psi (1.4 bar) if the Fuel Lift Pump is operating properly.**

Did the fuel pressure reading drop a minimum of 20 psi (1.4 bar)?.

Yes

- Go to step 14

No

- Go to step 15

14. CHECKING FUEL QUALITY/CONTAMINATION

1. Collect a fuel sample from the vehicle in a clean see through container.
2. Collect a fuel sample of fresh clean fuel in a clean see through container for reference.
3. Check the vehicle's fuel sample for the following:
 - Check the color of the fuel. Diesel fuel will generally be a yellow color.
 - Allow the fuel to settle and look for cloudiness indicating contamination.
 - Check the volatility of the fuel.
 - Look for a parting line in the fuel sample indicating another type of liquid mixed with the fuel.
 - Look for any signs of debris in the fuel sample.

Were any problems found?

Yes

- Refer to appropriate diagnostic service information to replace the fuel in the entire fuel system.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure .**

No

- The fuel system is operating normally. Check for any Service Bulletins that may apply.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

15. CHECKING THE FUEL LIFT PUMP CIRCUITS

1. Turn the engine off.
2. Disconnect the Fuel Lift Pump Module harness connector.
3. Connect a 12-volt test light between the Fuel Lift Pump Control Output circuit and the Ground circuit at the Fuel Pump Module harness connector (body side).
4. Turn the ignition on.
5. With a scan tool, actuate the Fuel Lift Pump control to ON (100%).

NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

Is the test light illuminated and bright?

Yes

- Replace the Fuel Lift Pump.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

No

- Go to step 16

16. FUEL KLIFT PUMP OUTPUT CIRCUIT CHECK

1. With a scan tool, actuate the Fuel Lift Pump control to ON (100%).
2. Using a 12-volt test light connected to ground, check the Fuel Lift Pump Output circuit at the Fuel Lift Pump Module harness connector.

NOTE: **The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.**

Is the test light illuminated and bright?

Yes

- Repair the Fuel Lift Pump Ground circuit for an open circuit or high resistance.
- Perform the ECM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** .

No

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- Repair the Fuel Lift Pump Output circuit for an open or short to ground. If the Fuel Pump Output circuit is okay, replace the Totally Integrated Power Module.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .