

2009 ENGINE PERFORMANCE**Driveability - Gas - Non-DTC Diagnostics - Journey****DIAGNOSIS AND TESTING****CHECKING A NO CRANK CONDITION - NGC**

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

Diagnostic Test**1. NO CRANK CONDITION**

- NOTE:** Diagnose and repair DTC B2229-SKREEM Internal - SKIM Immobilizer before continuing.
- NOTE:** Diagnose and repair any Totally Integrated Power Module (TIPM) DTCs before continuing.
- NOTE:** Make sure the gear selector is in Park or Neutral.
- NOTE:** Insect all fuses for opens.
- NOTE:** The battery must be fully charged and in good condition. An undercharged battery may produce invalid test results.

1. Attempt to start the engine.

Does the starter turn the engine over?

Yes

- Test complete.

No

- Refer to **Electrical/Starting - Diagnosis and Testing** and perform the appropriate procedure.

CHECKING A NO CRANK CONDITION - GPEC

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

2009 Dodge Journey R/T

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Possible Causes

MECHANICAL CONDITION
BATTERY CIRCUIT RESISTANCE TOO HIGH
START ENABLE CIRCUITS
TRANSMISSION RANGE SENSOR
FUSED IGNITION SWITCH OUT (START)
CLUTCH INTERLOCK SWITCH SIGNAL CIRCUIT
CLUTCH INTERLOCK SWITCH GROUND CIRCUIT
CLUTCH INTERLOCK SWITCH
STARTER

Diagnostic Test

1. MECHANICAL CONDITION

NOTE: Diagnose and repair DTC B2229-SKREEM Internal - SKIM Immobilizer before continuing.

NOTE: Check and diagnose all the Totally Integrated Power Module (TIPM) DTC(s) before continuing.

NOTE: Ensure the Gear selector is in Park or Neutral.

NOTE: Inspect all fuses for opens.

NOTE: Verify the battery is fully charged and capable of passing a load test before continuing.

WARNING: Make sure the battery is disconnected, then wait two minutes before proceeding. Failure to do so may result in possible serious or fatal injury.

1. Turn the engine over by hand to make sure the engine is not seized.

Is the engine able to turn over?

Yes

- Go to step 2

No

- Repair the mechanical condition preventing the starter motor from cranking.

- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

2. EXCESSIVE RESISTANCE IN THE BATTERY CIRCUIT

1. Connect the battery cables.
2. Turn the ignition off.
3. Check the Battery Cables for excessive resistance using the service information procedure.

Did either Battery Cable have a voltage drop greater than 0.2 of a volt?

Yes

- Repair the excessive resistance in the Battery circuit.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 3

3. MANUAL TRANSMISSION

Is this vehicle equipped with a Manual transmission?

Yes

- Go to step 8

No

- Go to step 4

4. START ENABLE OPERATION (ATX)

1. Turn ignition on.
2. Using a scan tool, monitor the Ignition Start Switch Sense.
3. Turn the ignition switch to the crank position.

Does the Ignition Start Switch Sense state change from Low to High?

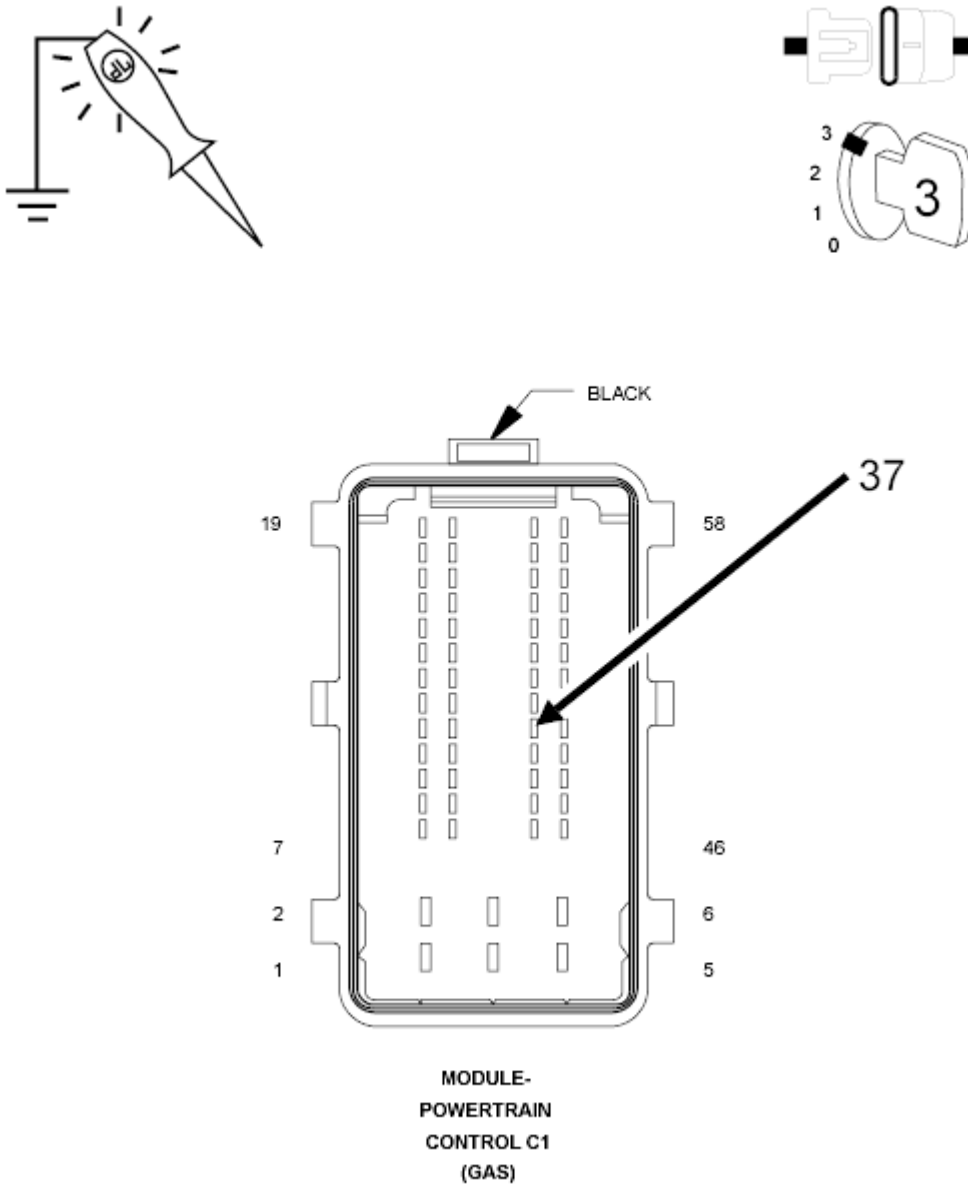
Yes

- Ensure the battery connection is clean and fastened tightly to the Starter. If OK, replace the Starter in accordance with the Service Information.

No

- Go to step 5

5. START ENABLE CIRCUIT (ATX)



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Fig. 1: Checking Start Enable Circuit (ATX)

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the PCM harness connector.
3. Using a 12-volt test light connected to ground, probe the Start Enable circuit in the PCM harness connector while holding the ignition key in the start position.

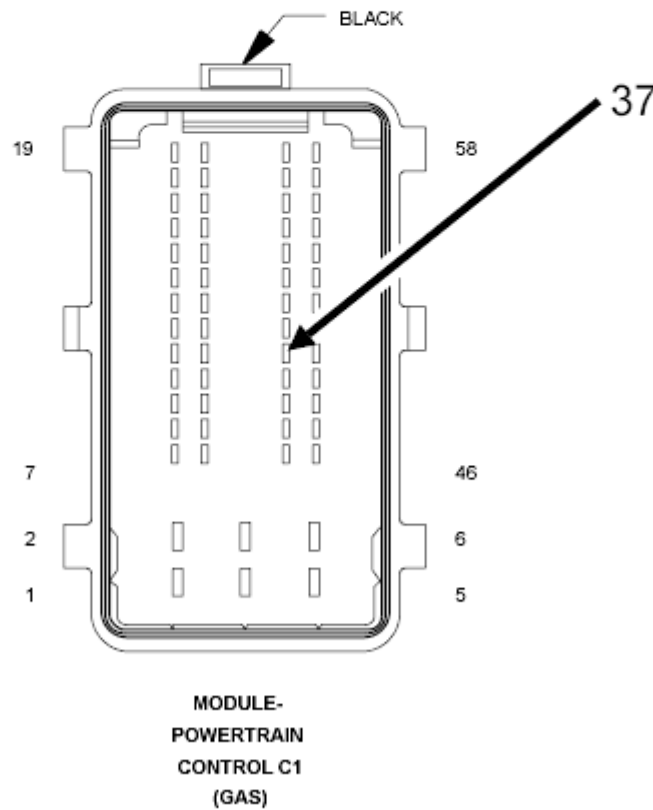
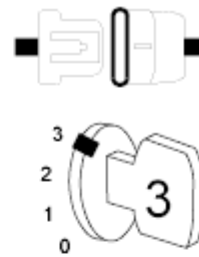
Does the test light illuminate brightly?

Yes

- Replace the PCM in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 6

6. TRANSMISSION RANGE SENSOR (ATX)

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Fig. 2: Checking Start Enable Circuit (ATX)**Courtesy of CHRYSLER LLC**

1. Turn the ignition off.
2. Test light still in the above position.
3. Disconnect the Transmission Range Sensor harness connector.
4. Using a jumper wire, connect one end to the Start Enable circuit and the other to the Fused Ignition Switch Output (Start) circuit in the Transmission Range Sensor harness connector.
5. Turn the ignition to the crank position.

Does the test light illuminate brightly?

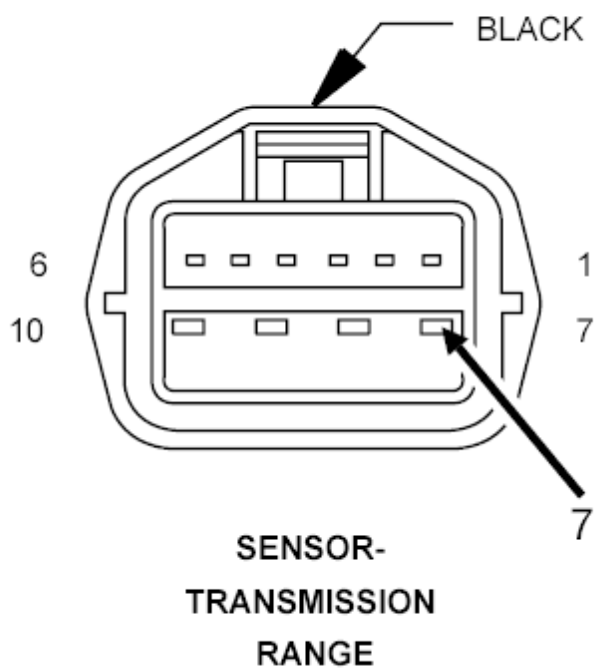
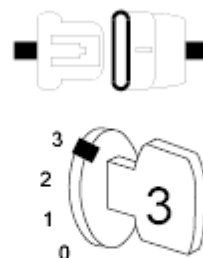
Yes

- Replace Transmission Range Sensor harness.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 7

7. FUSED IGNITION SWITCH OUTPUT (START) CIRCUIT (ATX)



107779

Fig. 3: Checking Fused Ignition Switch Output (Start) Circuit (ATX)

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Using a 12-volt test light connected to ground, probe the Fused Ignition Switch Output (Start) circuit in the Transmission Range sensor harness connector.
3. Turn the ignition to the crank position.

Does the test light illuminate brightly?

Yes

- Repair the Start Enable circuit.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Check the Fused Ignition Switch Output (Start) circuit for an open. If OK, replace the TIPM in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

8. START ENABLE OPERATION (MTX)

1. Turn ignition on.
2. Using a scan tool, monitor the Ignition Start Switch Sense.
3. Turn the ignition switch to the crank position.

Does the Ignition Start Switch Sense state change from Low to High?

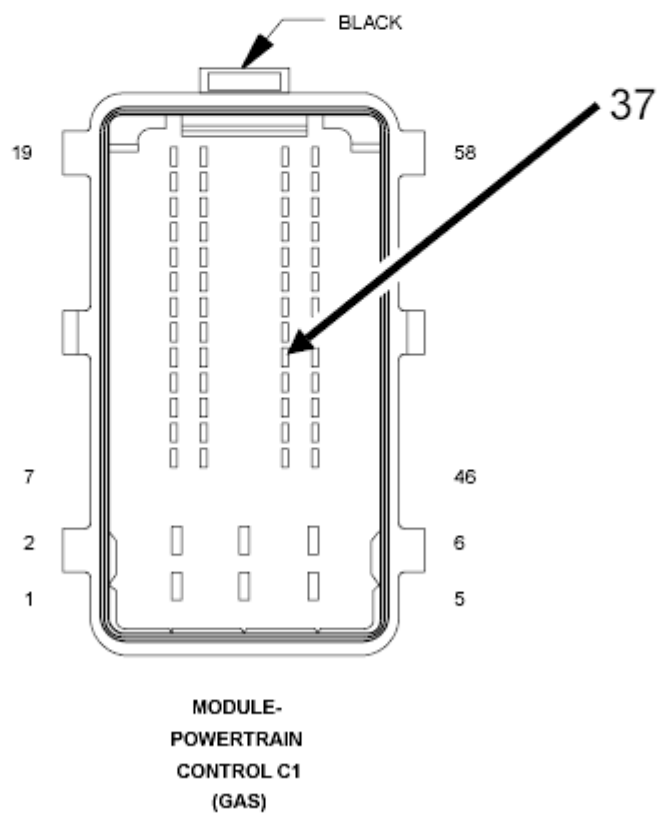
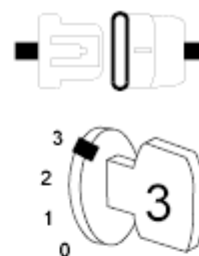
Yes

- Go to step 10

No

- Go to step 9

9. STATER ENABLE CIRCUIT (MTX)



107777

Fig. 4: Checking Start Enable Circuit (ATX)
 Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the PCM harness connector.
3. Using a 12-volt test light connected to ground, probe the Start Enable circuit in the PCM harness connector while holding the ignition key in the start position.

Does the test light illuminate brightly?

Yes

- Replace the PCM in accordance with the Service information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Check the Start Enable circuit. If OK, replace the TIPM in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

10. CLUTCH INTERLOCK OPERATION (MTX)

1. Turn ignition on.
2. Using a scan tool, monitor the Clutch Switch.
3. Press the Clutch in and out.

Does Clutch Switch display Released and then Pressed?

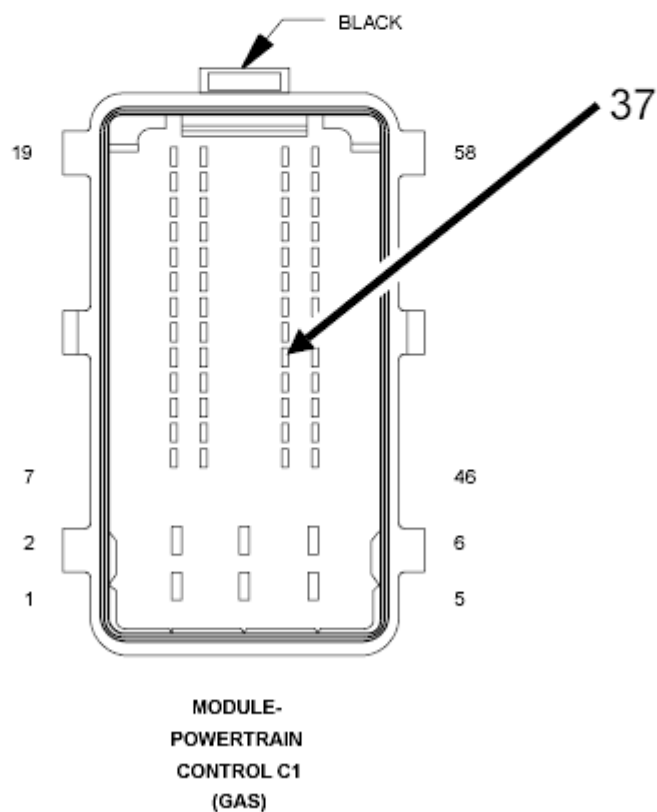
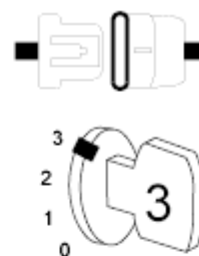
Yes

- Replace the Starter in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 11

11. CLUTCH INTERLOCK OPERATION (MTX)



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Fig. 5: Checking Start Enable Circuit (ATX)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the PCM harness connector.
3. Using a 12-volt test light connected to battery voltage, probe the Clutch interlock Signal circuit in the PCM harness connector while pressing the clutch pedal in.

Does the test light illuminate brightly?

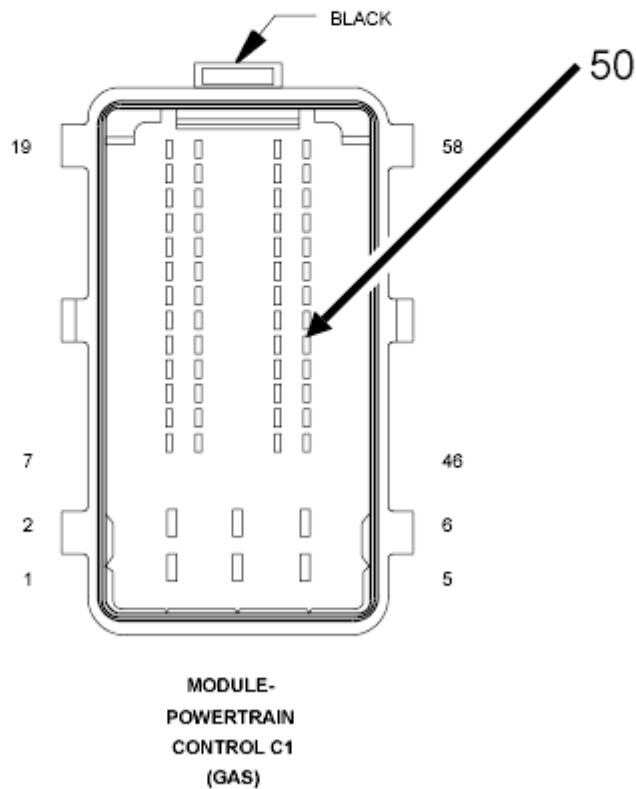
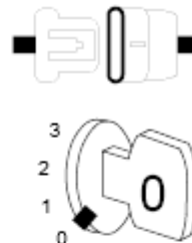
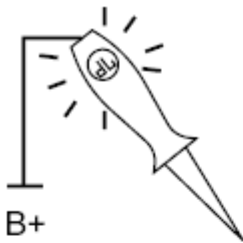
Yes

- Replace the PCM in accordance with the Service information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 12

12. CLUTCH INTERLOCK SWITCH (MTX)



107781

Fig. 6: Checking Clutch Interlock Signal Circuit
Courtesy of CHRYSLER LLC

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1. Turn the ignition off.
2. Test light still in the above position.
3. Disconnect the Clutch Interlock Switch harness connector.
4. Using a jumper wire, connect one end to the Clutch Interlock Switch Signal circuit and the other to the Clutch Interlock Switch ground circuit in the Clutch Interlock Switch harness connector.

Does the test light illuminate brightly?

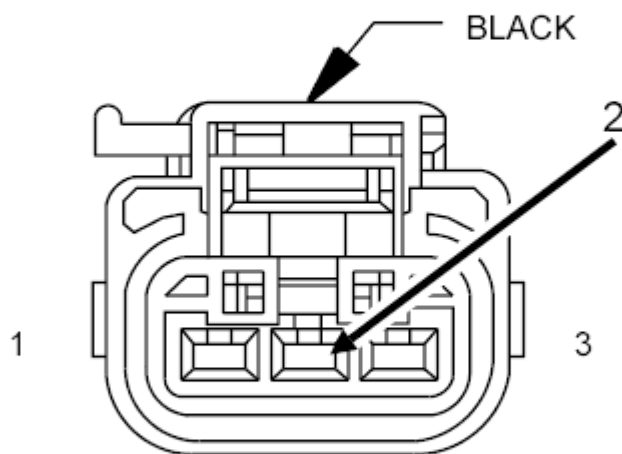
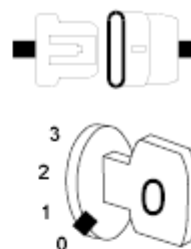
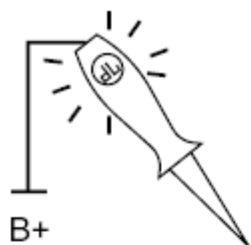
Yes

- Replace Clutch Interlock Switch.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 13

13. CLUTCH INTERLOCK OPERATION (MTX)



SWITCH-
CLUTCH
INTERLOCK
(MTX)

107783

Fig. 7: Checking Clutch Interlock Switch Ground Circuit
Courtesy of CHRYSLER LLC

1. Remove the jumper wire.
2. Using a 12-volt test light connected to battery voltage, probe the Clutch Interlock Switch ground circuit.

Does the test light illuminate brightly?

Yes

- Repair the Clutch Interlock Switch ground circuit.

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- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Repair the Clutch Interlock Switch signal circuit.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

CHECKING THE CHARGING SYSTEM OPERATION

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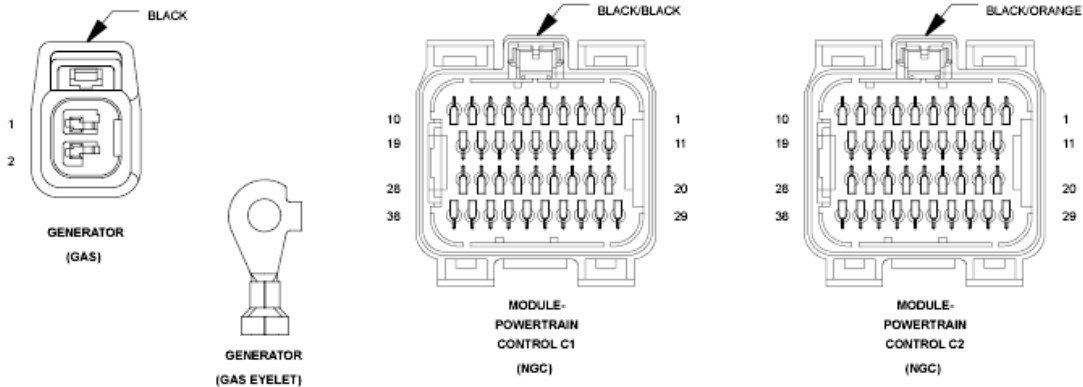
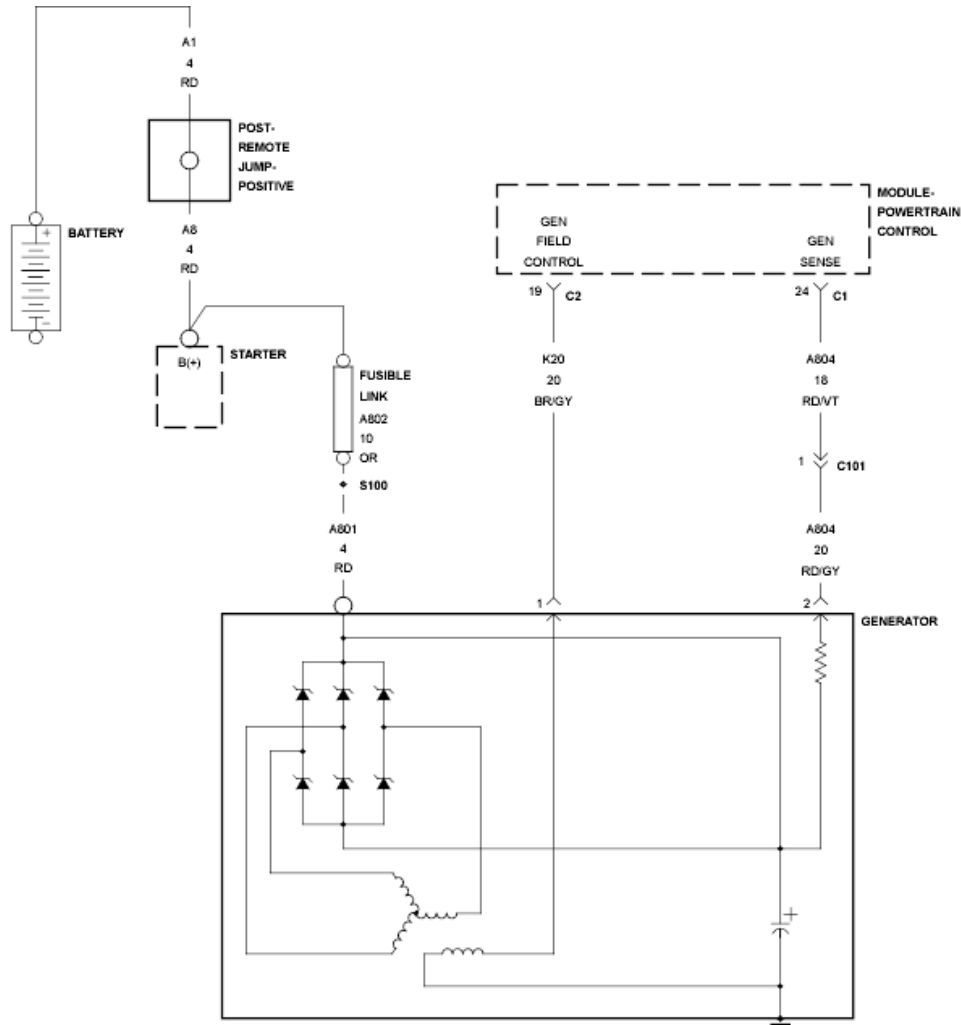


Fig. 8: Charging System Circuit Schematic
Courtesy of CHRYSLER LLC

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

Diagnostic Test**1. GENERATOR FULL FIELD TEST**

NOTE: Diagnose and repair any generator sense or field control circuit DTCs before proceeding with this test.

1. Start the engine and allow it to reach operating temperature.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

2. With the scan tool, perform the Generator Full Field test. Follow the instructions displayed on the scan tool.
3. Monitor the system (battery) voltage and the generator sense voltage on the scan tool while performing the test.

NOTE: With the engine running, the difference between the system (battery) voltage and the generator sense voltage should be below .2 volts.

NOTE: With the generator field fully actuated, the system (battery) voltage should be above 14.0 volts.

NOTE: With the generator field actuated off, the system (battery) voltage should be below 13.0 volts, and eventually drop as battery load is increased.

Did the system voltage change as described above during the Generator Full Field test?

Yes

- Test complete.

No

- Go to step 2

2. CHARGING SYSTEM INSPECTION

1. Inspect and test the battery in accordance with the Service Information.
2. Inspect the generator drive belt for proper alignment and adjustment.
3. Inspect the vehicle for aftermarket accessories that may exceed the generator system output.
4. Inspect the fuses in the TIPM. If an open fuse is found, use the wire diagram/schematics as a guide and inspect the wiring and connectors for a damaged or shorted circuit.

Were any problems found?

Yes

- Repair as necessary.

No

- Go to step 3

3. BATTERY POSITIVE (+) CIRCUIT HIGH RESISTANCE

NOTE: Make sure all testing equipment and cables are clear of any engine parts before starting the engine.

1. Start the engine.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

2. Measure the voltage between the B (+) Terminal at the Generator and the Battery Positive (+) Post.

Is the voltage below 0.4 volts?

Yes

- Go to step 4

No

- Repair the battery positive (+) circuit between the generator and battery for high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. GENERATOR CASE GROUND HIGH RESISTANCE

NOTE: Make sure all testing equipment and cables are clear of any engine parts before starting the engine.

1. Start the engine.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

2. Measure the voltage between the Generator case and the Battery Negative (-) post.

Is the voltage below 0.1 volt?

Yes

- Go to step 5

No

- Repair the Generator Case ground for high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. (A109) FUSED B(+) CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by probing the battery positive (+) terminal and the appropriate terminal(s) of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 volts?

Yes

- Go to step 6

No

- Repair the (A109) Fused B(+) circuit for high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. (A804) GENERATOR SENSE CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (A804) Generator Sense circuit at the Generator harness connector and probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 volts?

Yes

- Go to step 7

No

- Repair the (A804) Generator Sense circuit for high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

7. (K20) GEN FIELD CONTROL CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (K20) Gen Field Control circuit at the Generator harness connector and probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions

may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 volts?

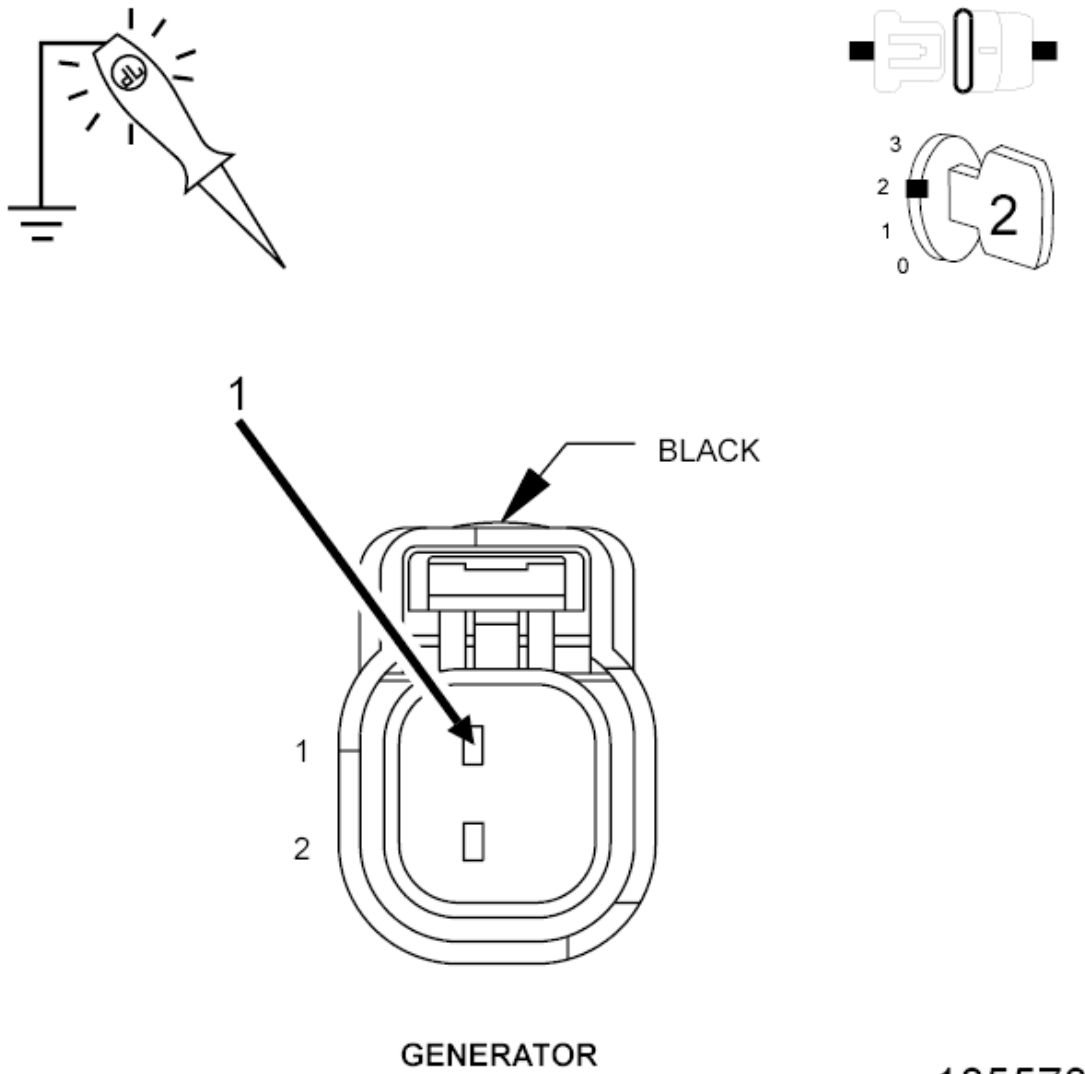
Yes

- Go to step 8

No

- Repair the (K20) Gen Field Control circuit for high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

8. **GENERATOR**



105573

Fig. 9: Checking Generator Field Control Circuit

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Generator harness connector.
3. Connect a 12 volt test light connected between ground and the (K20) Gen Field Control circuit in the Generator harness connector.
4. Turn the ignition on.
5. With the scan tool, actuate the Generator Field Control State to toggle.

NOTE: The test light should toggle on and off with the actuation.

NOTE: If a DTC is active, the actuation test may not be allowed by the PCM.

If may be necessary to clear DTCs before starting the actuation.

Does the test light illuminate on and off with the actuation?

Yes

- Replace the Generator in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 9

9. (K20) GEN FIELD CONTROL CIRCUIT SHORTED TO VOLTAGE

1. Turn the ignition off.
2. Disconnect the Powertrain Control Module (PCM) connector.
3. Turn the ignition on.
4. Measure the voltage of the (K20) Gen Field Control circuit in the Generator harness connector.

Is there any voltage present?

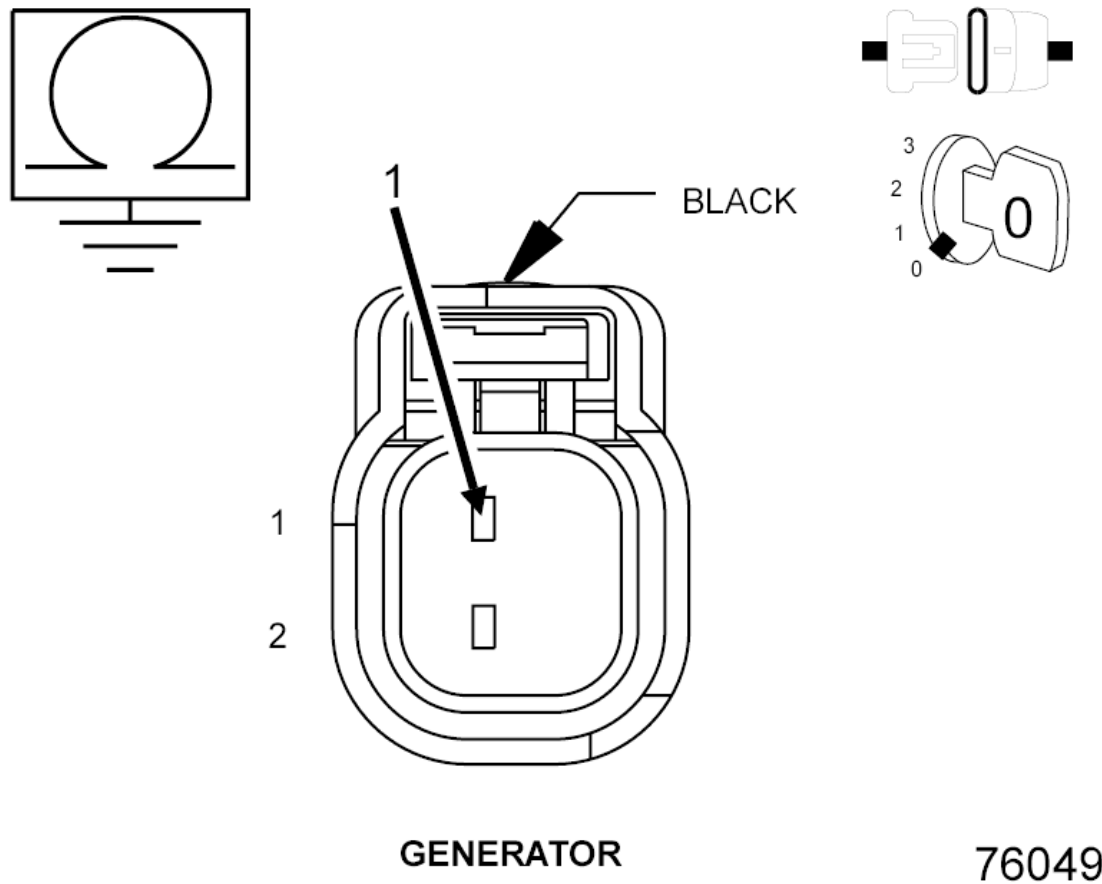
Yes

- Repair the (K20) Gen Field Control circuit for a short to voltage.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 10

10. (K20) GEN FIELD CONTROL CIRCUIT SHORTED TO GROUND



GENERATOR

76049

Fig. 10: Checking Generator Field Control Circuit For Short To Ground

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between ground and the (K20) Gen Field Control circuit in the Generator harness connector.

Is the resistance below 100 ohms?

Yes

- Repair the (K20) Gen Field Control circuit for a short to ground.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 11

11. (K20) GEN FIELD CONTROL CIRCUIT OPEN OR HIGH RESISTANCE

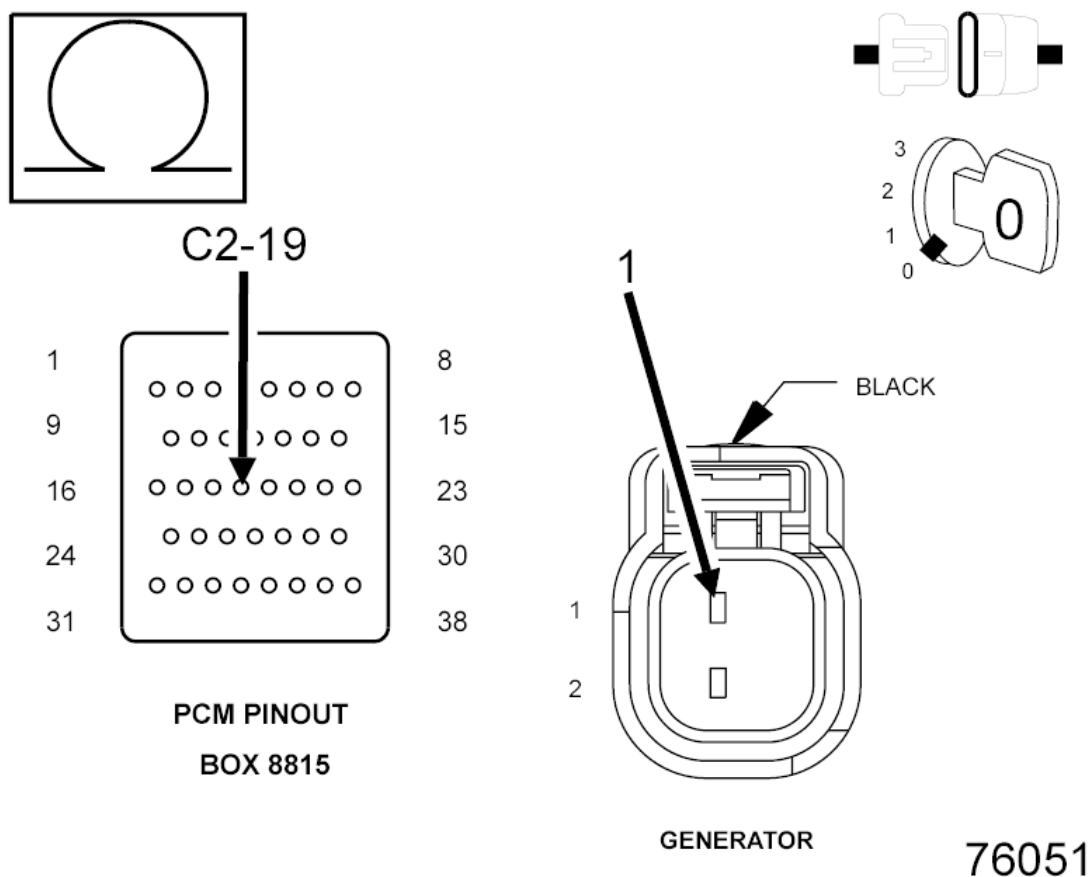


Fig. 11: Checking Generator Field Control Circuit For Open Or High Resistance

Courtesy of CHRYSLER LLC

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the (K20) Gen Field Control circuit between the Generator harness connector and the appropriate terminal of special tool #8815.

Is the resistance below 5.0 ohms?

Yes

- Go to step 12

No

- Repair the (K20) Gen Field Control circuit for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

12. CHECKING THE PCM POWER AND GROUND CIRCUITS

1. Perform the diagnostic procedure for **CHECKING THE PCM POWER AND GROUND CIRCUITS**.

Were any problems found?

Yes

- Repair the PCM power and ground circuit(s) as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 13

13. POWERTRAIN CONTROL MODULE (PCM)

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Generator and the Powertrain Control Module (PCM).
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Refer to any Technical Service Bulletins that may apply.

Were any problems found?

Yes

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

No

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

CHECKING THE COOLING FAN OPERATION



1. RADIATOR FAN HIGH RELAY OPERATION

NOTE: Diagnose and repair any Coolant Fan circuit or Temperature Sensor circuit DTCs before proceeding with this test.

1. Turn the ignition on.
2. With the scan tool, actuate the Radiator Fan High Relay.

Does the Cooling Fan operate?

Yes

- Go to step 2

No

- Go to step 3

2. RADIATOR FAN CONTROL RELAY OPERATION

1. With the scan tool, actuate the Radiator Fan Control Relay.

Does the Cooling Fan operate?

Yes

- Test complete.

No

- Go to step 8

3. RADIATOR FAN HIGH RELAY

1. Turn the ignition off.
2. Verify the Radiator Fan High Relay is installed properly and that the terminals are making a tight fit.
3. Remove the Radiator Fan High Relay and substitute it with a known good Relay.
4. Ignition on, engine not running.
5. With a scan tool, actuate the Radiator Fan High Relay.

Is the Cooling Fan operating?

Yes

- Replace the Radiator Fan High Relay.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Go to step 4

4. (Z904) GROUND CIRCUIT OPEN

1. Turn the ignition off.
2. Disconnect the Radiator Cooling Fan harness connector.
3. Using a 12-volt test light connected to voltage, check the (Z904) Ground circuit in the Cooling Fan 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

- Go to step 5

No

- Repair the (Z904) Ground circuit for an open or high resistance.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

5. RADIATOR COOLING FAN MODULE

1. Turn the ignition on.
2. Using a 12-volt test light connected to ground, check the (N24) Radiator Fan Relay Output circuit in the Radiator Cooling Fan harness connector.
3. With the scan tool, actuate the Radiator Fan High Relay.

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 Cooling Fan.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Go to step 6

6. (N24) RAD FAN CONTROL RELAY OUTPUT CIRCUIT OPEN OR HIGH RESISTANCE

1. Turn the ignition off.

2. Remove the Radiator Fan High Relay.
3. Turn the ignition on.
4. Using a 12-volt test light connected to voltage, check the (A16) Fused B+ circuit in the Radiator Fan High Relay 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 (N24) Rad Fan Control Relay Output circuit for an open or high resistance.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Go to step 7

7. (A16) FUSED B+ CIRCUIT OPEN OR HIGH RESISTANCE

1. Turn the ignition off.
2. Disconnect the C3 TIPM harness connector.
3. Measure the resistance in the (A16) Fused B+ circuit from the Radiator Fan High Relay harness connector to the Totally Integrated Power Module (TIPM) harness connector.

Is the resistance below 100 Ohms?

Yes

- Go to step 13

No

- Repair the (A16) Fused B+ circuit for an open or high resistance.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

8. RADIATOR FAN CONTROL RELAY

1. Turn the ignition off.
2. Verify the Radiator Fan Control Relay is installed properly and that the terminals are making a tight fit.
3. Remove the Radiator Fan Control Relay and substitute it with a known good Relay.
4. Ignition on, engine not running.
5. With a scan tool, actuate the Radiator Fan Control Relay.

Is the Cooling Fan operating?

Yes

- Replace the Radiator Fan Control Relay.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Go to step 9

9. RADIATOR COOLING FAN MODULE

1. Turn the ignition off.
2. Disconnect the Radiator Cooling Fan harness connector.
3. Turn the ignition on.
4. Using a 12-volt test light connected to ground, check the (N24) Radiator Fan Relay Output circuit in the Radiator Cooling Fan harness connector.
5. With the scan tool, actuate the Radiator Fan Control Relay.

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 Cooling Fan.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Go to step 10

10. RADIATOR FAN CONTROL RELAY OUTPUT

1. Turn the ignition off.
2. Disconnect the Radiator Fan Resistor harness connector.
3. Turn the ignition on.
4. Using a 12-volt test light connected to ground, check the (N23) Low Speed Fan Control Output circuit in the Radiator Fan Resistor harness connector.
5. With the scan tool, actuate the Radiator Fan Control Relay.

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

- Go to step 11

No

- Go to step 12

11. (N24) RAD FAN CONTROL RELAY OUTPUT OPEN OR HIGH RESISTANCE.

1. Turn the ignition off.
2. Measure the resistance in the (N24) Rad Fan Control Relay Output circuit from the Cooling Fan harness connector to the Radiator Fan Resistor harness connector.

Is the resistance below 100 Ohms?

Yes

- Replace the Radiator Fan Resistor in accordance with the Service Information.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure**.

No

- Repair the open or high resistance in the (N24) Rad Fan Control Relay Output circuit.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure**.

12. (N23) LOW SPEED RAD FAN CONTROL OUTPUT CIRCUIT OPEN OR HIGH RESISTANCE

1. Turn the ignition off.
2. Disconnect the C3 TIPM harness connector.
3. Measure the resistance in the (N23) Low Speed Rad Fan Control Output circuit from the Radiator Fan Resistor harness connector to the C3 TIPM harness connector.

Is the resistance below 100 Ohms?

Yes

- Go to step 13

No

- Repair the open or high resistance in the (N23) Low Speed Rad Fan Control Output circuit.

- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

13. TOTALLY INTEGRATED POWER MODULE (TIPM)

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Cooling Fan Module, TIPM and the Powertrain Control Module (PCM).
2. Look for any chafed, pierced, pinched or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the Cooling Fan Module, TIPM and Powertrain Control Module (PCM) connectors.
4. Perform any Technical Service Bulletins (TSBs) that may apply.

Were there any problems found?

Yes

- Repair as necessary.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Replace the Totally Integrated Power Module (TIPM) in accordance with the Service Information.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

CHECKING THE ENGINE COOLANT TEMPERATURE SENSOR OPERATION

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

Diagnostic Test**1. ENGINE COOLANT TEMPERATURE SENSOR WIRING OR CONNECTORS**

NOTE: Diagnose and repair any ECT circuit DTCs before proceeding with this test.

NOTE: Allow the engine to cool to ambient temperature before proceeding.

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Engine Coolant Temperature sensor(s) and the PCM.
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Turn the ignition on.

5. Monitor the scan tool data relative to the sensor(s) and wiggle test the wiring and connectors.
6. Look for the data to change or for a DTC to set during the wiggle test.

Were any problems found?

Yes

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

No

- Go to step 2

2. ENGINE COOLANT LEVEL AND CONDITION

WARNING: Make sure the engine cooling system is cool before removing the pressure cap or any hose. The cooling system is pressurized when hot. Failure to follow these instructions can result in possible serious or fatal injury.

1. Check the engine coolant level and the condition of the engine coolant. Refer to the appropriate Service Information.

Were any problems found?

Yes

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

No

- Go to step 3

3. THERMOSTAT

WARNING: Make sure the engine cooling system is cool before removing the pressure cap or any hose. The cooling system is pressurized when hot. Failure to follow these instructions can result in possible serious or fatal injury.

1. Using the appropriate service information, determine the proper opening temperature of the thermostat.

2. With the scan tool, read the Engine Coolant Temperature Sensor value. If the engine was allowed to cool completely, the value should be approximately equal to the ambient temperature.
3. Monitor the sensor value on the scan tool.
4. Start the engine.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

NOTE: The thermostat should not open until the engine reaches the temperature specified in the Service Information.

Were any problems found?

Yes

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

No

- Go to step 4

4. ENGINE COOLANT TEMPERATURE SENSOR

NOTE: Allow the engine to cool to ambient temperature before proceeding.

WARNING: Make sure the engine cooling system is cool before removing the pressure cap or any hose. The cooling system is pressurized when hot. Failure to follow these instructions can result in possible serious or fatal injury.

1. With the scan tool, read the Engine Coolant Temperature Sensor value. If the engine was allowed to cool completely, the value should be approximately equal to the ambient temperature.
2. Monitor the sensor value on the scan tool and the actual coolant temperature with a thermometer.
3. Start the engine.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

NOTE: The sensor value transition should be smooth as the engine reaches operating temperature. The thermometer reading and the coolant temperature value on the scan tool should remain relatively close.

Were any problems found?

Yes

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

No

- Test complete.

5. (K2) ECT SIGNAL CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (K2) ECT Signal circuit at the Engine Coolant Temperature Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 volts?

Yes

- Go to step 6

No

- Repair the (K2) ECT Signal circuit for excessive resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE,**

Powertrain Control (PCM) - Standard Procedure .**6. (K900) SENSOR GROUND CIRCUIT HIGH RESISTANCE**

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (K900) Sensor Ground circuit at the Engine Coolant Temperature Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 volts?

Yes

- Go to step 7

No

- Repair the (K900) Sensor Ground circuit for excessive resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure .**

7. ENGINE COOLANT TEMPERATURE SENSOR

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Engine Coolant Temperature Sensor and the Powertrain Control Module (PCM).
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Refer to any Technical Service Bulletins that may apply.

Were any problems found?

Yes

- Repair as necessary.

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

No

- Replace the Engine Coolant Temperature Sensor.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

CHECKING THE ENGINE MECHANICAL SYSTEM

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

Diagnostic Test

1. CHECKING THE ENGINE MECHANICAL SYSTEM

1. Turn the ignition off.
2. Check for any of the following conditions/mechanical problems:
 - AIR INDUCTION SYSTEM - must be free from leaks and restrictions
 - ENGINE VACUUM - must be at least 13 inches in neutral
 - ENGINE VALVE TIMING - must be within specifications
 - ENGINE COMPRESSION - must be within specifications
 - ENGINE EXHAUST SYSTEM - must be free from leaks and restrictions
 - ENGINE OIL - must be clean, at the proper level, free from contamination or fuel
 - ENGINE PCV SYSTEM - must flow freely
 - TORQUE CONVERTER STALL SPEED - must be within specifications
 - POWER BRAKE BOOSTER - no internal vacuum leaks
 - FUEL - must be free of contamination
 - FUEL INJECTOR - plugged or restricted injector(s); control wire not connected to the correct injector
 - CAM LOBES - must not be worn excessively
 - CYLINDER LEAKAGE TEST - must be within specifications
 - VALVE SPRINGS - cannot be weak or broken

CHECKING THE EVAPORATIVE SYSTEM FOR LEAKS

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

Diagnostic Test

1. EVAPORATIVE SYSTEM INSPECTION

1. Turn the ignition off.

2. Raise the vehicle as necessary in accordance with the Service Information.
3. Visually and physically inspect the entire Evaporative Emission System for any of the following conditions:
 - Holes or cracks
 - Loose seal points
 - Evidence of damaged components
 - Incorrect routing of hoses or tubes
 - Loose or missing fuel filler cap
 - Improper installation of the fuel filler cap
 - Damaged locking tabs on cap and/or fill tube
 - Damaged seal points on cap and/or fill tube
 - Fuel cap gasket seal missing or damaged

Were any problems found?

Yes

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

No

- Go to step 2

2. VERIFY EVAPORATIVE EMISSION LEAK

WARNING: Keep lit cigarettes, sparks, flames, and other ignition sources away from the test area to prevent the ignition of explosive gases. Keep the test area well ventilated. Failure to do so may result in possible serious or fatal injury.

1. Turn the ignition off.
2. To continue testing, you will need Evaporative Emission Leak Detector (EELD) 8404A.

NOTE: The fuel tank should have between 20% and 80% of fuel tank capacity to properly test the Evap system.

3. Connect the red power lead of EELD to the battery positive terminal and the black ground lead to battery negative terminal.
4. Block the vent hose of the Evap Canister.
5. Connect shop air to the EELD.
6. Set the smoke/air control switch to AIR.

7. Insert the tester's AIR supply tip (clear hose) into the .040 orifice on the tester's control panel.
8. Press the remote smoke/air start button.
9. Position the red flag on the air flow meter so it is aligned with the indicator ball.
10. When the calibration is complete, release the remote button. The EELD flow meter is now calibrated in liters per minute.
11. Install the service port adapter 8404-14 on the vehicle's service port (if equipped) or install the 8404-ADP into the filter line.
12. Connect the AIR supply hose from the EELD to the service port (if equipped) or to the 8404-ADP adapter.
13. Press the remote button to activate AIR flow.

NOTE: **Larger volume fuel tanks, lower fuel levels, or vehicles equipped with a Flow Management Valve may indicate high flow and will require four to five minutes to fill.**

14. Compare the flow meter indicator ball reading to the red flag.
15. ABOVE the red flag indicates a leak present.
16. BELOW the red flag indicates a sealed system.

Is the indicator ball above the red flag?

Yes

- Go to step 3

No

- Refer to the Freeze Frame data, if applicable. If the Freeze Frame data indicates that the vehicle was in motion when the DTC was set, verify that all hoses are connected properly.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

3. EVAPORATIVE EMISSION LEAK DETECTION

NOTE: **A thorough inspection of the Evap system hoses, tubes, and connections may save time in diagnosis. Look for physical damage or signs of wetness at connections. The strong smell of fuel vapors may aid diagnosis also.**

1. To continue testing, you will need Evaporative Emissions Leak Detector (EELD) 8404A.
2. Remove the AIR supply hose from the service port (if equipped) or from the adapter 8404-ADP.
3. Connect the SMOKE supply tip (black hose) to the service port (if equipped) or to the adapter 8404-ADP.
4. Set the smoke/air control switch to SMOKE.

NOTE: The flow meter indicator ball will not move in the smoke mode.

5. Press the remote smoke/air start button.

NOTE: Make sure that smoke has filled the Evap system by continuing to press the remote smoke/air start button, remove the vehicle fuel cap, and wait for the smoke to exit. Once smoke is detected, reinstall the fuel cap.

NOTE: For the best results, introduce smoke into the system for an additional 60 seconds and continue introducing smoke at 15 second intervals, as necessary.

6. While still holding the remote smoke/air start button, use the white light 8404-CLL to follow the Evap system path, and look for the source of the leak as indicated by exiting smoke.
7. If a leak is concealed from view (at the top of the fuel tank, for example), release the remote smoke/air start button, and use the ultraviolet (UV) black light 8404-UVL and the UV goggles 8404-20 to look for residual traces of dye that is left behind by the smoke.
8. The exiting smoke deposits a residual fluid that is either bright green or bright yellow when viewed with a UV light.

Were any problems found?

Yes

- Repair or replace the leaking component as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go To 4

4. CHECKING THE GAS CAP AND FUEL FILLER TUBE

1. Thoroughly check the gas cap and filler tube area for leaks.

Was a leak found at the gas cap or filler tube?

Yes

- Go to step 5

No

- Go to step 6

5. GAS CAP OR FUEL FILLER TUBE

1. Remove the SMOKE supply tip (black hose) from the service port (if equipped) or from the 8404-ADP adapter.
2. Install leak check adapter 8382 (1/4 turn cap) or fuel tank adapter 6922 (screw cap) and leak check adapter 8399 (secondary seal depressor) and repeat test 4.

Was a leak found at the gas cap adapter?

Yes

- Replace the fuel filler tube assembly.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Replace the gas cap.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

6. CHECKING FOR EVAPORATIVE SYSTEM LEAKS IN ZONE 1

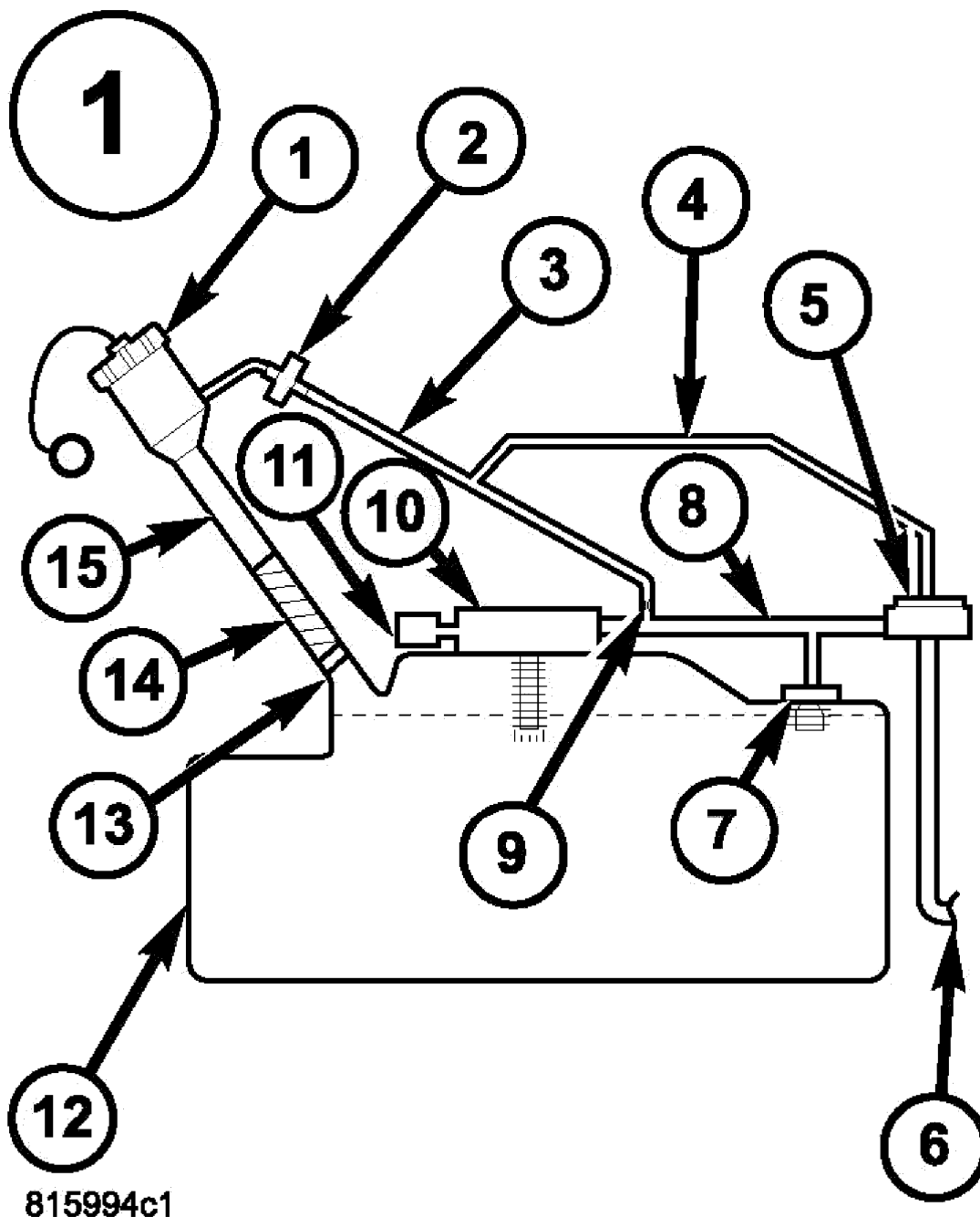


Fig. 13: Identifying EVAP System Zone 1

Courtesy of CHRYSLER LLC

NOTE: For testing purposes, the Evap System is divided into three zones. A leak from any of these zones can cause a DTC to set. The lists in the following steps below specify possible leak points in one of the specific zones.

1. Using the list below, check each of the components in Zone 1 of the evaporative system for leaks:
 - 1 Fuel Cap

2009 Dodge Journey R/T

2009 ENGINE PERFORMANCE Driveability - Gas - Non-DTC Diagnostics - Journey

- 2 Recirculation Check Valve
- 3 Vapor Recirculation Line
- 4 Signal Vapor Line for FVM
- 5 Flow Management Valve
- 6 Fuel Tank to Canister Vapor Line
- 7 Fuel Tank Vent (Check Valve)
- 8 Vapor Line to Canister
- 9 Flow Control Orifice
- 10 Control Valve
- 11 Liquid Trap
- 12 Fuel Tank
- 13 Check Valve
- 14 Fuel Fill Tube to Tank connector
- 15 Fuel Fill Tube
- Damaged or disconnected components

Were any problems found?

Yes

- Repair or replace the leaking component as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 7

7. CHECKING FOR EVAPORATIVE SYSTEM LEAKS IN ZONE 2

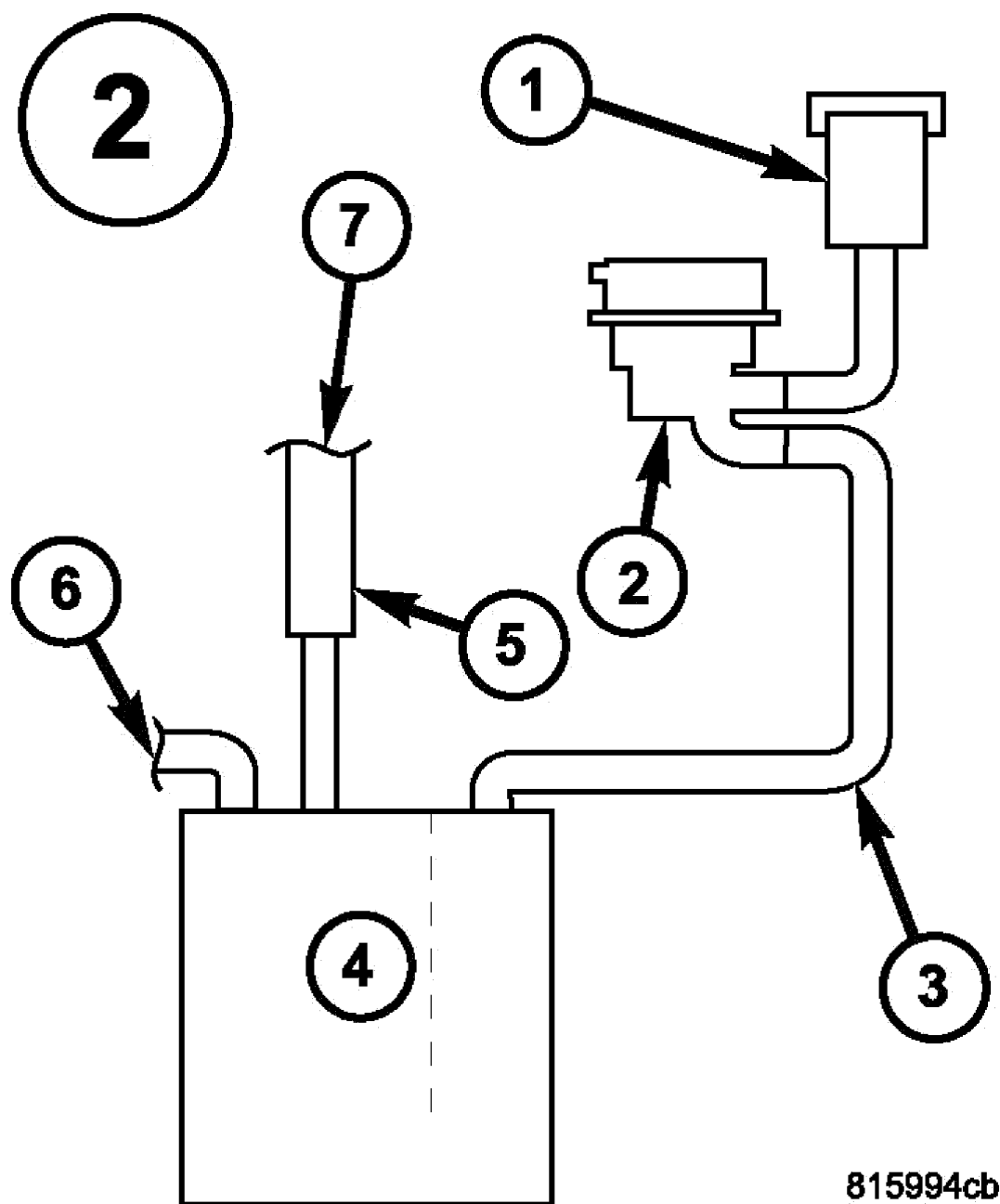


Fig. 14: Identifying EVAP System Zone 2
Courtesy of CHRYSLER LLC

NOTE: For testing purposes, the Evap System is divided into three zones. A leak from any of these zones can cause a DTC to set. The lists in the following steps below specify possible leak points in one of the specific zones.

1. Using the list below, check each of the components in Zone 2 of the evaporative system for leaks:
 - 1 Filter

2009 Dodge Journey R/T

2009 ENGINE PERFORMANCE Driveability - Gas - Non-DTC Diagnostics - Journey

- 2 ESIM Switch
- 3 Canister Vent Line
- 4 Evap Canister
- 5 Chassis Purge Valve
- 6 Fuel Tank to Canister Vapor Line connection
- 7 Evap Purge connection

Were any problems found?

Yes

- Repair or replace the leaking component as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 8

8. CHECKING FOR EVAPORATIVE SYSTEM LEAKS IN ZONE 3

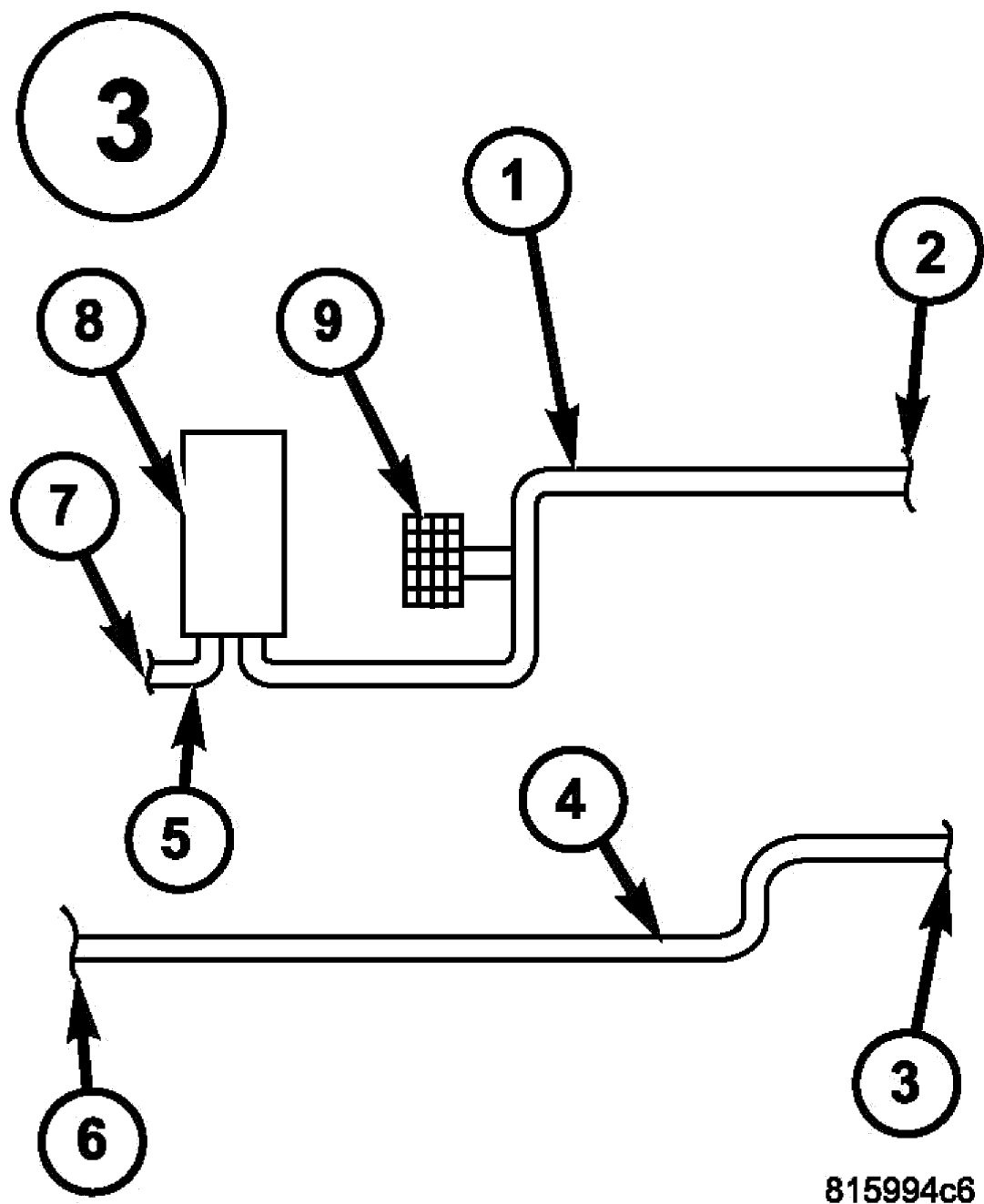


Fig. 15: Identifying EVAP System Zone 3

Courtesy of CHRYSLER LLC

NOTE: For testing purposes, the Evap System is divided into three zones. A leak from any of these zones can cause a DTC to set. The lists in the following steps below specify possible leak points in one of the specific zones.

1. Using the list below, check each of the components in Zone 3 of the evaporative system for leaks:
 - 1 Evap Purge Vacuum Line

- 2 Connection to Chassis Line
- 3 Connection to Canister
- 4 Chassis Purge Line
- 5 Evap Purge Vacuum Line
- 6 Connection to Evap Purge Harness
- 7 Chassis Evap Purge Line connection to Engine Vacuum
- 8 Evap Purge Valve
- 9 Service Port

Were any problems found?

Yes

- Repair or replace the leaking component as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Test complete.

CHECKING THE EXHAUST SYSTEM FOR LEAKS

Diagnostic Test

1. CHECKING THE EXHAUST SYSTEM FOR LEAKS

1. Turn the ignition off.
2. Raise the vehicle in accordance with the Service Information.

WARNING: The normal operating temperature of the exhaust system is very high. Never work around or attempt to service any part of the exhaust system until it has cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operating time

3. Connect Exhaust Cone 8404-EC or 8404-EC to Air Pressure Regulator (with hose) W-18-MIL-1146AS.

CAUTION: The air pressure must not exceed 27.6 kPa (4 psi), otherwise engine damage can occur.

4. Attach shop air to the air pressure regulator.

5. Adjust the Air Pressure Regulator to 27.6 kPa (4 psi).
6. Insert the exhaust cone into the vehicle tail pipe.
7. If the vehicle is equipped with dual exhaust. Use the 8404-ECT with equipped attached plug, plug one side of the dual exhaust pipe. Pressurize the other as described above.
8. Apply Mopar® Air Leak Detector PN 05191804AA (or an equivalent leak finder liquid) to the following areas:
 - All welded joints from the exhaust manifold to 152.4 mm (6 in.) behind the downstream O2 sensor
 - O2 sensor seal points
 - O2 sensor boss welds
 - Flange/joint connection(s)
 - Exhaust manifold to cylinder head connection(s)
 - EGR solenoid gasket base and tube seal points (if equipped)
9. Watch for the Mopar® Air Leak Detector PN 05191804AA (or the equivalent leak finder liquid) to bubble.
10. Use the following definitions to help determine if system or component repair/replacement is necessary:
 - **Type 1 Leak** is defined as a leak where very small foam like bubbles 1 mm (0.04 of an inch) or less appear. Any Type 1 or greater leaks found in welded joints, O2 sensor seal points or O2 sensor boss welds must be repaired or the component must be replaced.
 - **Type 2 Leak** is defined as a leak where larger bubbles pea size, 8 mm (0.3 of an inch) or greater appear. Any Type 2 or greater leaks found in flange or joint connections, exhaust manifold to cylinder head connections, or EGR gasket and tube seal points must be repaired or the components must be replaced.

Leak Location	Repair required if results at 4 psi reveal bubble size:
Welded joints	Type 1: 1 mm (0.04 in.) or greater
O2 Sensor seal points	Type 1: 1 mm (0.04 in.) or greater
O2 Sensor boss welds	Type 1: 1 mm (0.04 in.) or greater
Flange/joint connections	Type 2: 8 mm (0.31 in.) or greater
Exhaust Manifold to cylinder head connections	Type 2: 8 mm (0.31 in.) or greater
EGR gasket and tube seal points	Type 2: 8 mm (0.31 in.) or greater

11. If a leak is found that matches the above definition, repair or replace the component as necessary.
12. Once the repair is complete, repeat the procedure to verify that all leaks have been repaired.

Were any exhaust leaks found?

Yes

- Repair or replace the leaking exhaust parts as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Test complete.

CHECKING THE FUEL DELIVERY SYSTEM

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

Possible Causes
RESTRICTED FUEL SUPPLY LINE
FUEL PUMP INLET STRAINER PLUGGED
FUEL PUMP GROUND CIRCUIT
PLUGGED FUEL PUMP INLET
FUEL PUMP MODULE

Diagnostic Test

1. FUEL PUMP OPERATION

1. Ignition on, engine not running.
2. With a scan tool, actuate the Fuel System test.

NOTE: It may be necessary to use a mechanics stethoscope in the next step.

3. Listen for fuel pump operation at the fuel tank. The fuel pump should operate smoothly with no excessive noise. If the pump has excessive noise such as grinding, the pump should be replaced.

CAUTION: Stop All Actuations.

Does the Fuel Pump sound to be operate normally?

Yes

- Go to step 2

No

- Go to step 7

2. FUEL PRESSURE

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Install a fuel pressure gauge.
3. Ignition on, engine not running.
4. With the scan tool, actuate the Fuel Pump and observe the fuel pressure gauge.

NOTE: Fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

CAUTION: Stop All Actuations.

Choose a conclusion that best matches your fuel pressure reading.

Below Specification

- Go to step 3

Within Specification

- Test Complete.

Above Specification

- Replace the Fuel Pump Module in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. RESTRICTED FUEL SUPPLY LINE

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.

2. Raise vehicle on hoist, and disconnect the fuel pressure line at the fuel pump module.
3. Install special tool #6539 (5/16") or #6631(3/8") fuel line adapter and the fuel pressure gauge

between the fuel supply line and the fuel pump module.

4. Ignition on, engine not running.
5. With the scan tool, actuate the Fuel Pump and observe the fuel pressure gauge.

NOTE: Fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

CAUTION: Stop All Actuations.

Is the fuel pressure within specification now?

Yes

- Repair/replace fuel supply line as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 4

4. SADDLE FUEL TANK

Is the vehicle equipped with a saddle type fuel tank?

Yes

- Go to step 5

No

- Go to step 6

5. CHECKING FUEL TANK SIPHON HOSE AND FUEL LINE

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Gain access to the Fuel Pump Module and the Fuel Tank Module.
3. Inspect the following fuel components:
 - Fuel line and siphon hose between the Fuel Pump Module and the Fuel Tank Module. Look

for disconnected and/or damaged lines or hoses.

- Fuel Pressure Regulator not properly seated in the module.

Were the above items in good working condition?

Yes

- Go to step 6

No

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

6. CHECKING THE FUEL PUMP INLET

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Remove the Fuel Pump Module and Fuel Tank Module (if equipped), inspect the Fuel Inlet and the bottom of the fuel tank for debris that could cause the fuel pump inlet to be plugged.

Is the Fuel Pump Inlet plugged?

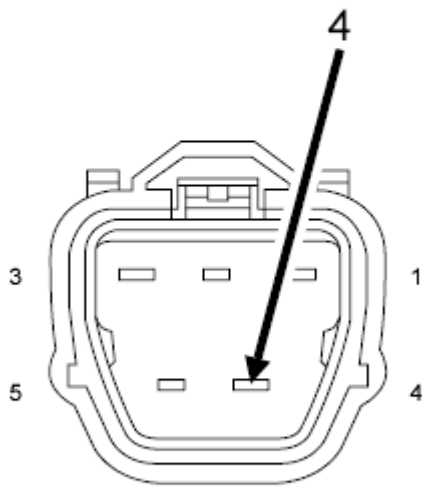
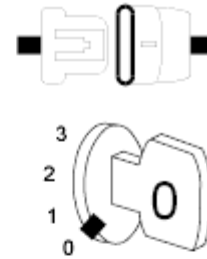
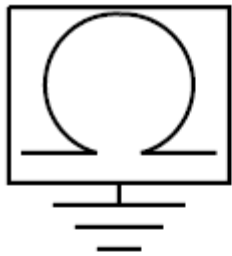
Yes

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

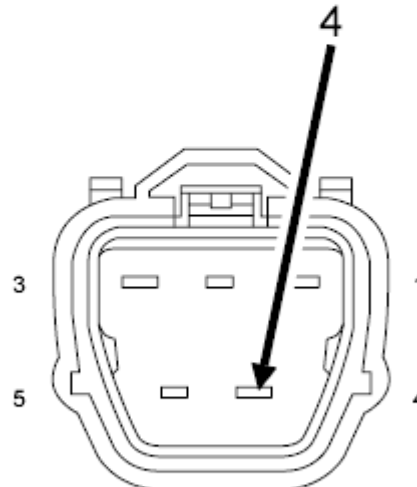
No

- Replace the Fuel Pump Module.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

7. FUEL PUMP MOTOR GROUND CIRCUIT



MODULE-
FUEL
PUMP C1
(AWD)



MODULE-
FUEL
PUMP
(FWD)

107739

Fig. 16: Checking Fuel Pump Motor Ground Circuit

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Fuel Pump Module harness connector.
3. Using a 12-volt test light to battery voltage, probe the Fuel Pump Motor Ground circuit in the Fuel 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.

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Does the test light illuminate brightly.

Yes

- Replace the Fuel Pump Module in accordance with the Service information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Repair the Fuel Pump Motor Ground circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

CHECKING THE IGNITION COIL OPERATION

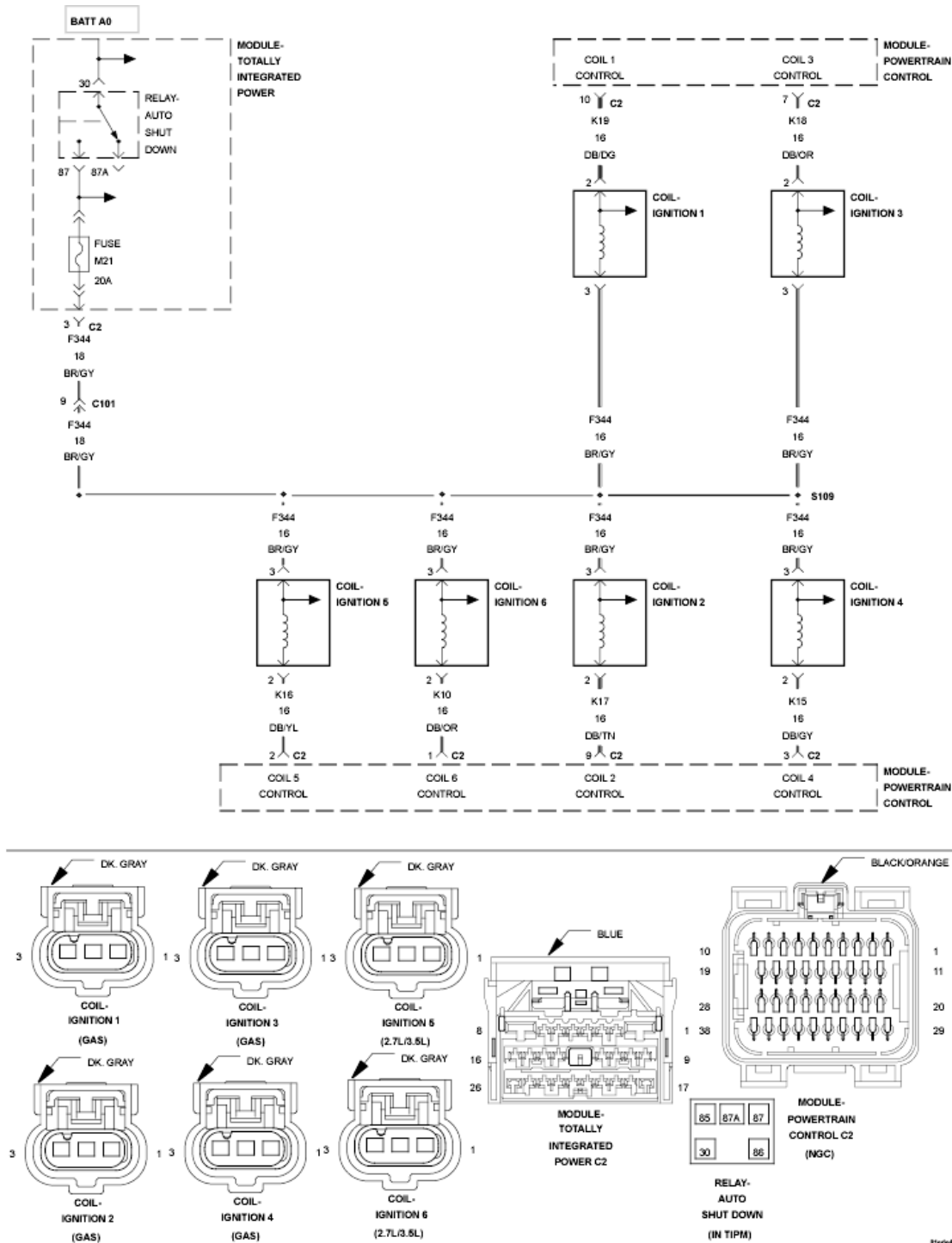


Fig. 17: Ignition Coil Circuit Schematic
Courtesy of CHRYSLER LLC

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

Diagnostic Test

1. IGNITION COIL WIRING OR CONNECTORS

NOTE: Diagnose and repair any ignition coil, CMP sensor, or CKP sensor DTCs before proceeding with this test.

1. Turn the ignition off.
2. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Ignition Coil for the cylinder being tested and the PCM.
3. Look for any chafed, pierced, pinched, or partially broken wires.
4. Look for broken, bent, pushed out or corroded terminals.

NOTE: If the vehicle is not equipped with the coil on plug ignition system, check the resistance of the ignition wire(s) before checking the cylinder with a spark tester. The resistance should be below 10k Ohms.

Were any problems found?

Yes

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

No

- Go to step 2

2. IGNITION COIL OPERATION

NOTE: Inspect the ignition coil for damage, carbon tracking on the coil or a damaged spark plug insulator boot. If a problem is found, replace the ignition coil.

NOTE: 6.1L coils must have a spark tester installed on both sides of the coil during the following test. During the test, each side of the coil should output a crisp blue spark that is able to jump the gap of the spark tester.

NOTE: On the 2.7 and 3.5 engines, cylinders 1, 3 and 5, it is necessary to remove the upper intake manifold to access the ignition coils. Once the ignition coil has been removed, the intake must be installed in order to crank the engine. Move the ignition coil harness connector through the slots in the upper intake and then connect the coil to the harness connector. Secure the upper intake to the lower intake in accordance with the Service Information.

1. Turn the ignition off.
2. If the vehicle is equipped with coil on plug ignition system, remove the ignition coil for the cylinder being tested.
3. Disconnect the fuel injector harness connector for the cylinder being tested.
4. For coil on plug ignition systems, install a spark tester(s) on the ignition coil, otherwise install the spark tester to the ignition wire.
5. While cranking the engine observe the spark coming from the spark tester.

NOTE: **A crisp blue spark that jumps the gap of the spark tester should be generated.**

Is good spark present?

Yes

- Go to step 7

No

- Go to step 3

3. MAIN/ASD RELAY OUTPUT CIRCUIT OPEN OR HIGH RESISTANCE

1. Turn the ignition off.
2. Disconnect the Ignition Coil harness connector.
3. Turn the ignition on.
4. With the scan tool, actuate the Main/ASD Relay to on.
5. Using a 12-volt test light connected to ground, check the Main/ASD Relay output circuit in the ignition coil 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 during the actuation?

Yes

- Go to step 4

No

- Repair the Main/ASD Relay output circuit for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

4. IGNITION COIL

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

1. Using a 12-volt test light connected to 12 volts, check the Ignition Coil control circuit for the cylinder being tested in the Ignition Coil harness connector.
2. Crank the engine for 5 seconds.

NOTE: The test light should blink each time the circuit is activated by the PCM.

Does the test light blink each time the circuit is activated by the PCM?

Yes

- Replace the Ignition Coil in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go To 5

5. IGNITION COIL CONTROL CIRCUIT OPEN OR HIGH RESISTANCE

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the Ignition Coil control circuit for the cylinder being tested between the Ignition Coil harness connector and the appropriate terminal of PCM Pinout Box 8815.

Is the resistance below 5.0 Ohms?

Yes

- Go To 6

No

- Repair the Ignition Coil control circuit for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

6. POWERTRAIN CONTROL MODULE (PCM)

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Ignition Coil for the cylinder being tested and the PCM.
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Perform any Technical Service Bulletins that may apply.

Were any problems found?

Yes

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

No

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

7. SPARK PLUG(S)

1. Turn the ignition off.
2. Remove the spark plug.

NOTE: **Vehicles equipped with 5.7L or 6.1L engines must have both spark plugs (per cylinder) removed and inspected to ensure proper operation.**

3. Inspect the spark plug for any of the following conditions:
 - Cracks or damage
 - Carbon tracking
 - Foreign material
 - Gap not within specification
 - Loose or broken electrode

NOTE: **Lightly tap the bottom of the spark plug on a solid surface. The electrode in the spark plug should not move.**

Were any problems found?

Yes

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- Replace the spark plug.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Test Complete.

CHECKING THE MAP SENSOR OPERATION

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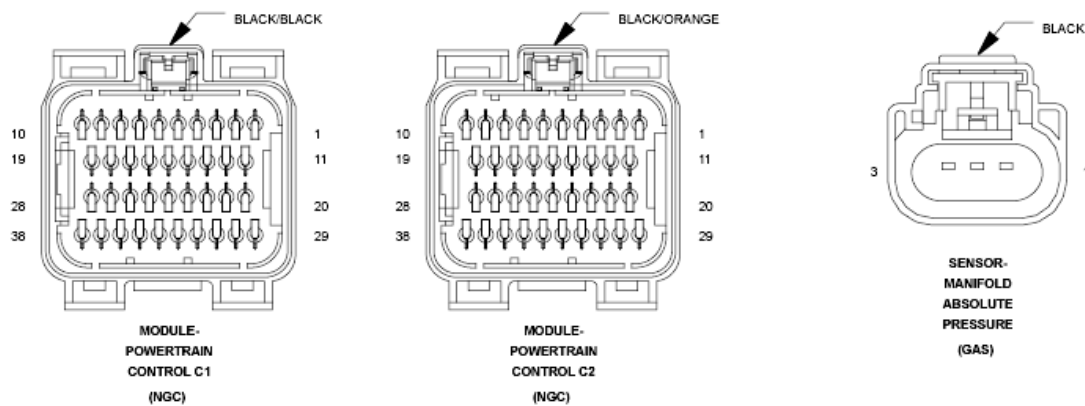
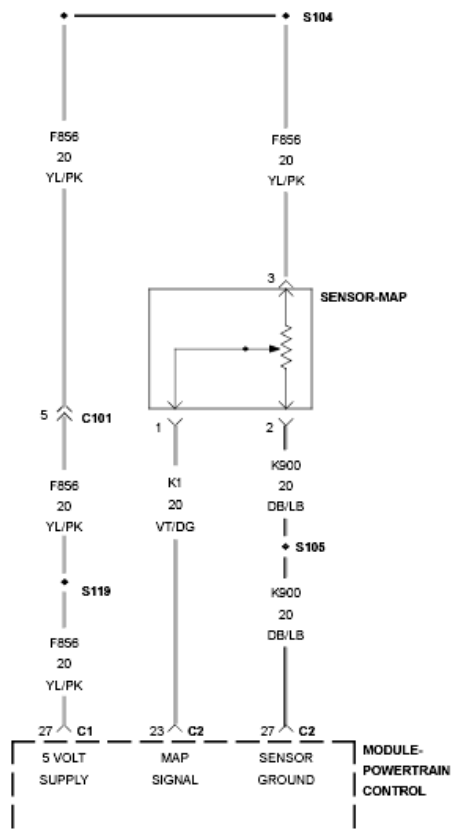


Fig. 18: Manifold Absolute Pressure Sensor Circuit Schematic
Courtesy of CHRYSLER LLC

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

Diagnostic Test

1. MAP SENSOR WIRING OR CONNECTORS

NOTE: Diagnose and repair any MAP Sensor circuit DTCs before proceeding with this test.

NOTE: Diagnose and repair any sensor supply or system voltage DTCs before proceeding with this test.

1. Turn the ignition off.
2. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the MAP Sensor and the PCM.
3. Look for any chafed, pierced, pinched, or partially broken wires.
4. Look for broken, bent, pushed out or corroded terminals.
5. Turn the ignition on.
6. Monitor the scan tool data relative to the sensor and wiggle test the wiring and connectors.
7. Look for the data to change or for a DTC to set during the wiggle test. If necessary, check each sensor circuit for high resistance or a shorted condition.

Were any problems found?

Yes

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

No

- Go to step 2

2. MAP VACUUM/BAROMETRIC PRESSURE

1. With a scan tool, read the Barometric Pressure.

NOTE: The Barometric Pressure should be approximately equal to the actual barometric pressure. If necessary, compare the Barometric Pressure value of the tested vehicle to the value of a known good vehicle of a similar make and model.

2. Connect a vacuum gauge to a manifold vacuum source.
3. Start the engine.

NOTE: If engine will not idle, maintain a constant RPM above idle.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

4. With the scan tool, read the MAP Sensor vacuum.

NOTE: The scan tool reading for MAP vacuum should be within 1" of the vacuum gauge reading.

Were any problems found?

Yes

- Go to step 4
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 3

3. MAP SENSOR VOLTAGE

1. With the scan tool, monitor the MAP Sensor signal voltage.
2. With the engine idling in neutral or park, snap the throttle.

NOTE: The MAP Sensor signal voltage should change from below 2.0 volts at idle to above 3.5 volts at wide open throttle.

Were any problems found?

Yes

- Go to step 4
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Test complete.

4. (F856) 5 VOLT SUPPLY CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in

poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (F856) 5 Volt Supply circuit at the MAP Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 volts?

Yes

- Go to step 5

No

- Repair the (F856) 5 Volt Supply circuit for excessive resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. (K1) MAP SIGNAL CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (K1) MAP Signal circuit at the MAP Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 volts?

Yes

- Go to step 6

No

- Repair the (K1) MAP Signal circuit for excessive resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. (K900) SENSOR GROUND CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (K900) Sensor Ground circuit at the MAP Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 volts?

Yes

- Go to step 7

No

- Repair the (K900) Sensor Ground circuit for excessive resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

7. MAP SENSOR

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the MAP Sensor and the Powertrain Control Module (PCM).

2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Refer to any Technical Service Bulletins that may apply.

Were any problems found?

Yes

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

No

- Replace the MAP Sensor.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE OXYGEN SENSOR OPERATION

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

Diagnostic Test

1. OXYGEN SENSOR, WIRING, OR CONNECTORS

NOTE: Diagnose and repair any O2 sensor or rationality DTCs before proceeding with this test.

NOTE: When performing this procedure as part of another diagnostic process, it may be necessary to repeat this test for all of the oxygen sensors on the vehicle.

1. Turn the ignition off.
2. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Oxygen sensor and the PCM.
3. Look for any chafed, pierced, pinched, or partially broken wires.
4. Look for broken, bent, pushed out or corroded terminals.
5. Turn the ignition on.
6. Monitor the scan tool data relative to the sensor and wiggle test the wiring and connectors.
7. Look for the data to change or for a DTC to set during the wiggle test. If necessary, check each sensor circuit for high resistance or a shorted condition.

Were any problems found?

Yes

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

No

- Go to step 2

2. OXYGEN SENSOR VOLTAGE

1. Start the engine and allow it to reach normal operating temperature.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

2. With a scan tool, monitor all O2 Sensor voltage readings.

Is the voltage switching between 2.5 and 3.4 volts for all O2 sensors?

Yes

- Go to step 3
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 4

3. O2 SENSOR HEATER OPERATION

1. Turn the ignition off.

NOTE: Wait a minimum of 10 minutes to allow the O2 Sensor to cool down before continuing the test. Allow the O2 Sensor voltage to stabilize at 5.0 volts.

2. Turn the ignition on.
3. With a scan tool, actuate the O2 Sensor heater.
4. With the scan tool, monitor O2 Sensor voltage for at least 2 minutes.

Does the voltage stay above 4.5 volts?

Yes

- Go to step 4
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Test complete.

4. O2 SENSOR

1. Turn the ignition off.

NOTE: Check for contaminants that may cause improper O2 Sensor operation, such as contaminated fuel, unapproved silicone, or evidence of oil or coolant.

2. Disconnect the O2 Sensor harness connector.
3. Turn the ignition on.
4. With a scan tool, monitor the O2 Sensor voltage.

NOTE: The voltage should be approximately 5.0 volts with the connector disconnected.

5. Connect a jumper wire between the signal circuit and the return circuit in the O2 Sensor harness connector.

NOTE: The voltage should drop from 5.0 volts to 2.5 volts with the jumper wire in place.

Is the O2 Sensor voltage displayed on the scan tool as described?

Yes

- Replace the O2 Sensor.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 5

5. O2 SENSOR SIGNAL CIRCUIT

1. Using the wiring diagram/schematic as a guide, inspect the O2 Sensor Signal circuit and connectors between the O2 sensor and the PCM.

2. Check the O2 Sensor signal circuit for a short to ground, open circuit, short to voltage, or high resistance.

Were any problems found?

Yes

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

No

- Go to step 6

6. O2 SENSOR RETURN CIRCUIT

1. Using the wiring diagram/schematic as a guide, inspect the O2 Sensor Return circuit and connectors between the O2 sensor and the PCM.
2. Check the O2 Sensor return circuit for a short to ground, open circuit, short to voltage or high resistance.

Were any problems found?

Yes

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

No

- Go to step 7

7. POWERTRAIN CONTROL MODULE (PCM)

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the O2 sensor and the PCM.
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Monitor the scan tool data relative to the components tested in this procedure and wiggle test the wiring and connectors.
5. Look for the data to change or for a DTC to set during the wiggle test.
6. Refer to any Technical Service Bulletins that may apply.

Were any problems found?

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Yes

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

No

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

CHECKING THE PCM POWER AND GROUND CIRCUITS

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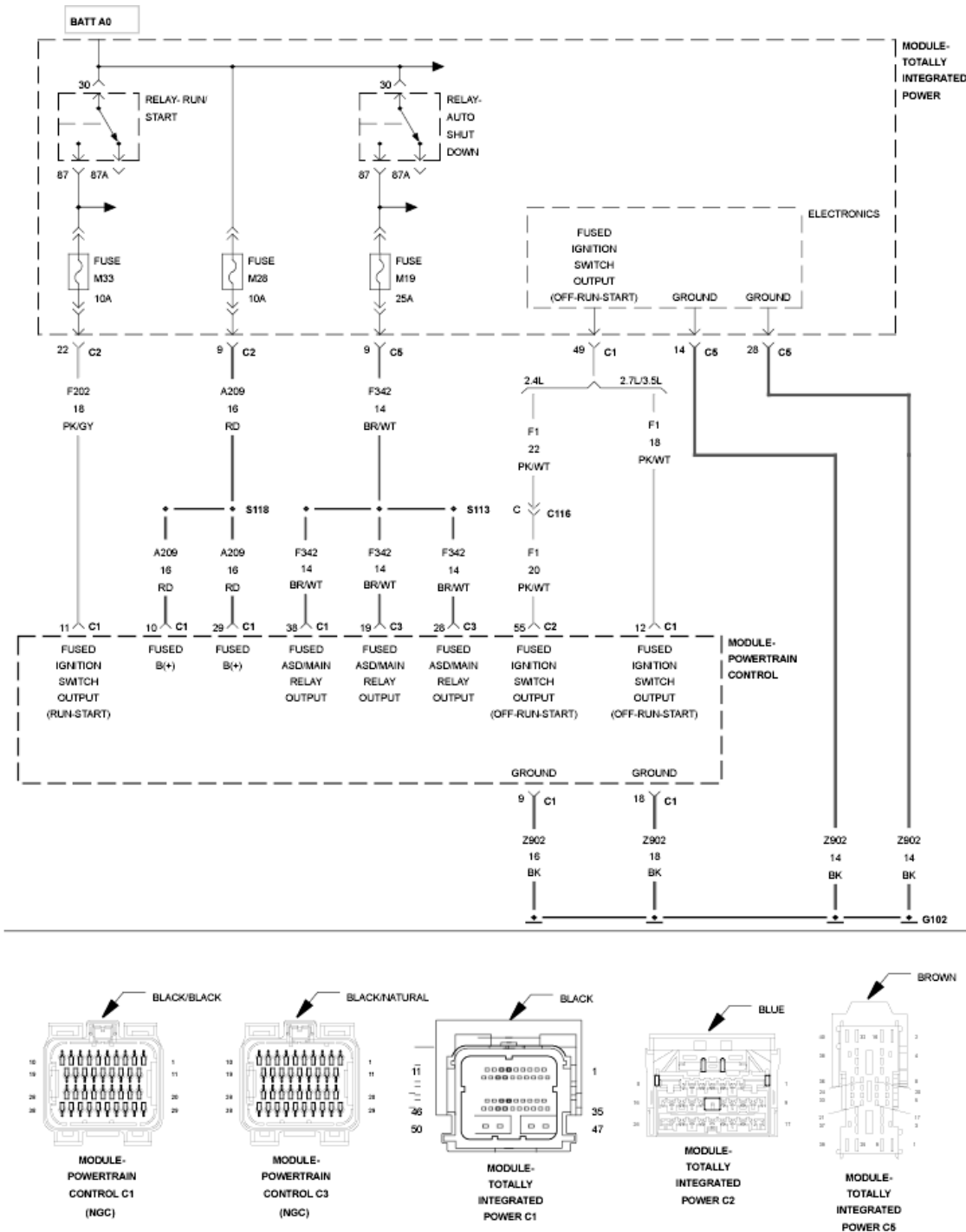


Fig. 19: PCM Power And Ground Circuits Schematic
Courtesy of CHRYSLER LLC

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

Diagnostic Test

1. PCM WIRING OR CONNECTORS

1. Turn the ignition off.
2. Using the wiring diagram/schematic as a guide, inspect the wiring and each connector at the PCM.
3. Look for any chafed, pierced, pinched, or partially broken wires.
4. Look for broken, bent, pushed out or corroded terminals.

Were any problems found?

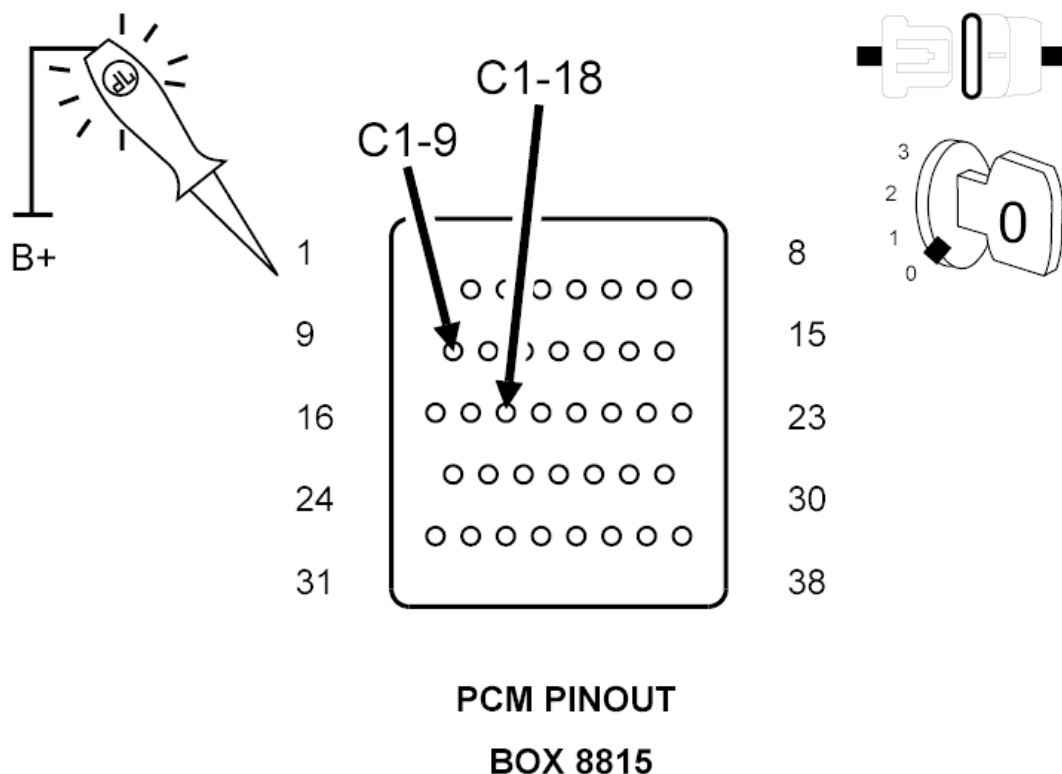
Yes

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

No

- Go to step 2

2. CHECKING THE PCM GROUND CIRCUITS



107823

Fig. 20: Checking PCM Ground Circuits For Open

Courtesy of CHRYSLER LLC

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

2. Using a 12 volt test light connected to 12 volts, check the PCM ground circuits.
3. Wiggle test each circuit during the test to check for an intermittent open in the circuit.

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?

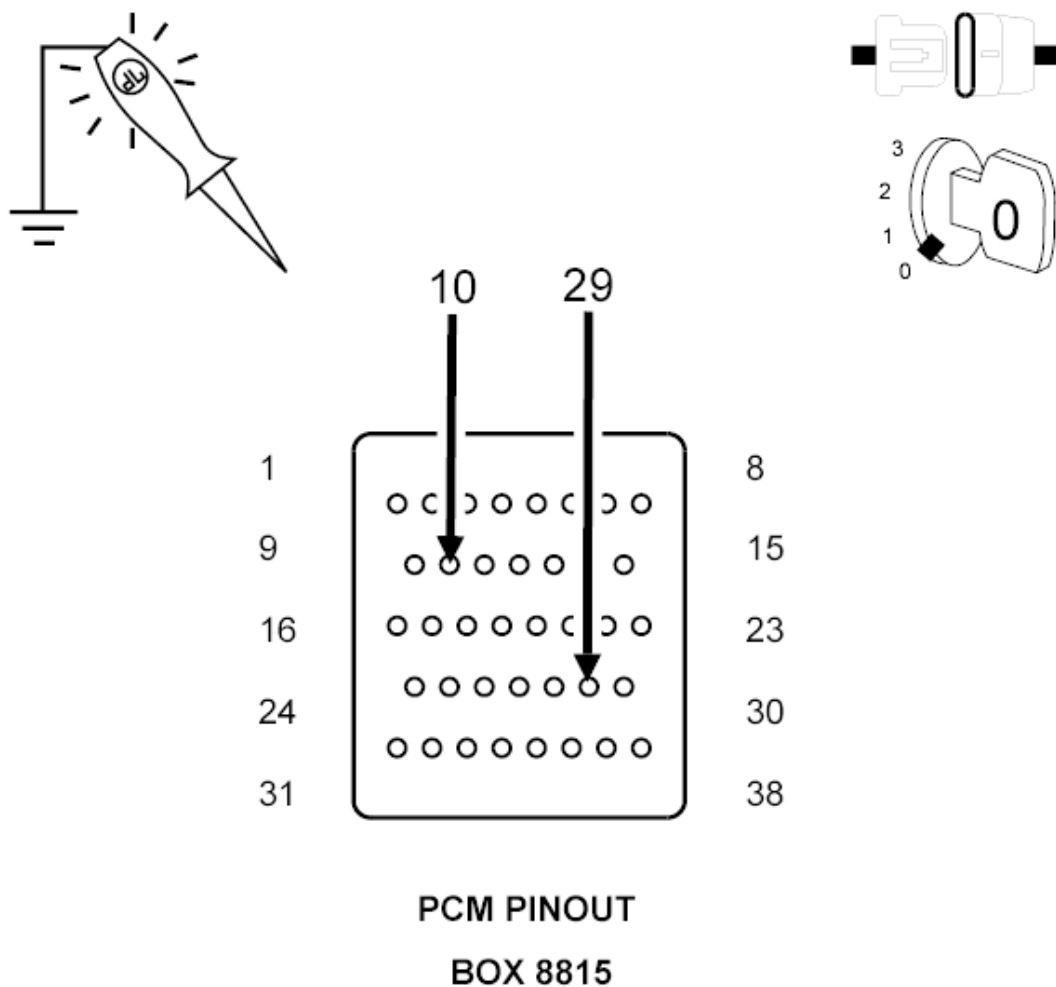
Yes

- Go to step 3.

No

- Repair the PCM ground circuit(s) for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. CHECKING THE PCM FUSED B+ CIRCUITS



107825

Fig. 21: Checking Fused B+ Circuits For Open Or Short To Ground

Courtesy of CHRYSLER LLC

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

1. Using a 12 volt test light connected to ground, check the PCM power supply circuits.
2. Wiggle test each circuit during the test to check for an intermittent open in the circuit.

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

- Go to step 4.

No

- Repair the PCM power supply circuit(s) for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. CHECKING THE PCM FUSED IGNITION SWITCH CIRCUITS

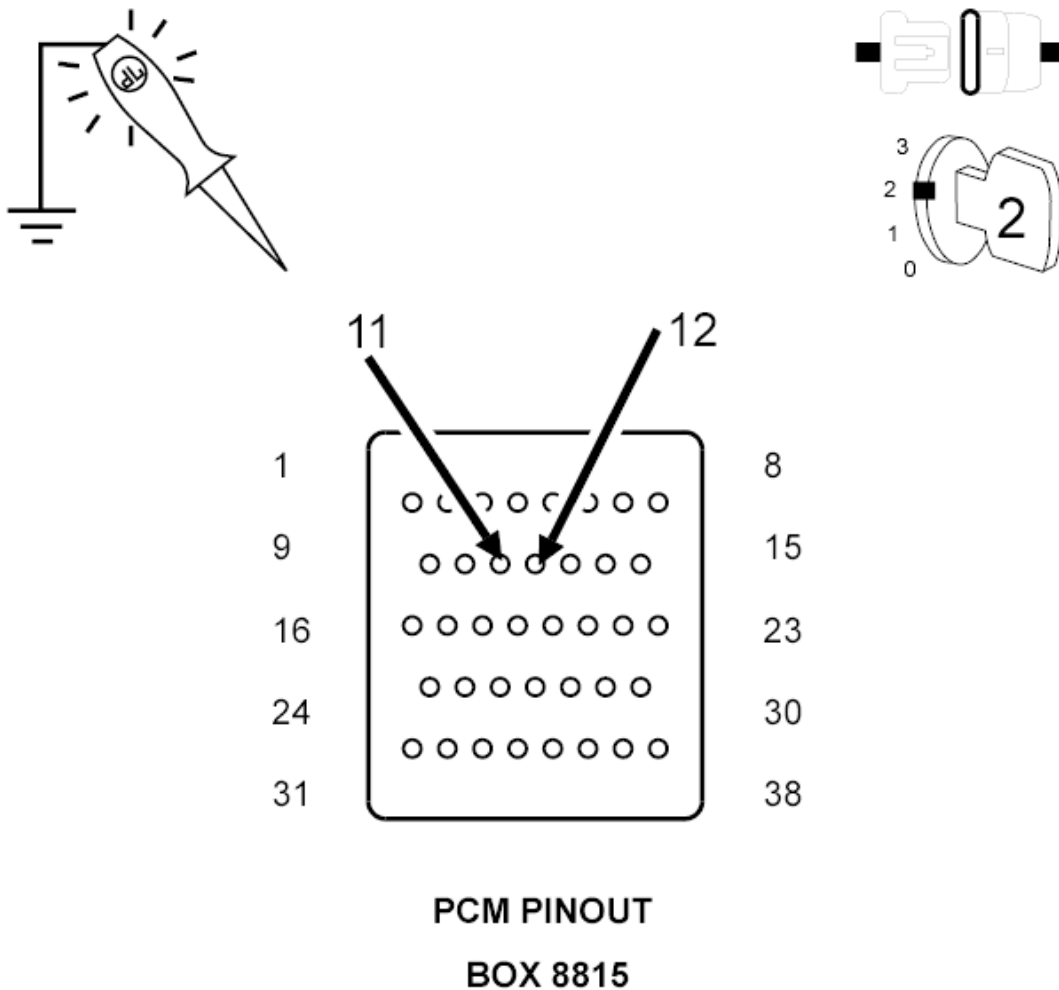


Fig. 22: Checking PCM Fused Ignition Switch Circuits For Open Or Short
 Courtesy of CHRYSLER LLC

1. Turn the ignition on.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

2. Using a 12 volt test light connected to ground, check the PCM (F202) and (F1) Fused Ignition circuits.
3. Wiggle test each circuit during the test to check for an intermittent open or short in the circuit.

NOTE: The test light should be illuminated and bright with the ignition on and not illuminated with the ignition off. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated as described above?

Yes

- Go to step 5.

No

- Repair the open or short in the Fused Ignition Switch circuits.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. CHECKING THE PCM FUSED IGNITION SWITCH CIRCUITS

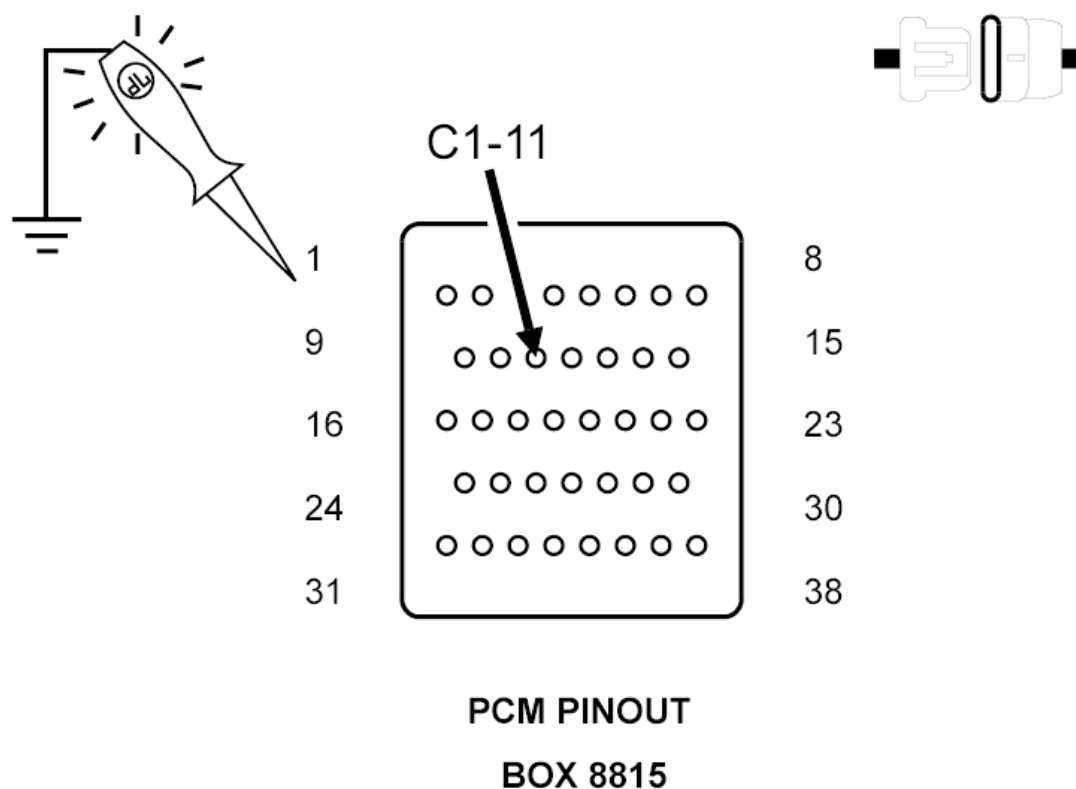


Fig. 23: Checking PCM Fused Ignition Switch Circuit
 Courtesy of CHRYSLER LLC

1. Turn the ignition on.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

2. Using a 12 volt test light connected to ground, check the PCM Fused Ignition Switch circuits.
3. Check each circuit with the ignition off, ignition on, engine not running position, and during cranking.
4. Wiggle test each circuit during the test to check for an intermittent open in the circuit.

NOTE: The test light should be illuminated and bright with the ignition on and not illuminated with the ignition off. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated as described above?

Yes

- Test complete.

No

- Repair the PCM Fused Ignition Switch circuit(s) for as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE TEMPERATURE SENSORS

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

Diagnostic Test

1. COMPARE TEMPERATURE SENSOR VALUES

1. Turn the ignition off.
2. Allow the vehicle to sit with the ignition off in an environment where the temperature is consistent and above -7° C (19.4° F) until the engine coolant temperature is equal to ambient temperature.
3. Turn the ignition on.
4. Using a thermometer, measure and record the underhood and ambient temperatures.
5. With a scan tool, read the ambient air temperature (AAT), engine coolant temperature (ECT), engine oil temperature (EOT) and intake air temperature (IAT) sensor values, as applicable.

Are all temperature sensor values within 10° C (18° F) of the thermometer and the other sensor values?

Yes

- Test complete.

No

- Go to step 2

2. TEMPERATURE SENSOR WIRING OR CONNECTORS

NOTE: **Perform the following procedures for each sensor that was not within the specified range as described in the previous step.**

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the temperature sensor(s) and the applicable control module.
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Turn the ignition on.

5. Monitor the scan tool data relative to the sensor(s) and wiggle test the wiring and connectors.
6. Look for the data to change or for a DTC to set during the wiggle test.

Were any problems found?

Yes

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

No

- Go to step 3

3. SENSOR VOLTAGE

1. Turn the ignition off.
2. Disconnect the temperature sensor harness connector.
3. Connect a jumper wire between the signal circuit and the sensor ground circuit in the sensor harness connector.
4. Turn the ignition on.
5. With a scan tool, read the sensor voltage.

NOTE: **The sensor voltage should be approximately 0.0 volts (plus or minus .1 volt) with the jumper wire in place.**

Does the scan tool display the voltage as described above?

Yes

- Go to step 4

No

- Go to step 5

4. TEMPERATURE SENSOR

1. Turn the ignition off.
2. Remove the jumper wire from between the signal circuit and the sensor ground circuit in the sensor harness connector.
3. Turn the ignition on.
4. With a scan tool, read the sensor voltage.

NOTE: **The sensor voltage should be approximately 5.0 volts (plus or**

minus .1 of a volt) with the connector disconnected.

Does the scan tool display the voltage as described above?

Yes

- Replace the sensor.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 5

5. SIGNAL CIRCUIT SHORTED TO GROUND

1. Turn the ignition off.
2. Measure the resistance between ground and the signal circuit in the sensor harness connector.

Is the resistance above 100 Ohms?

Yes

- Go to step 6

No

- Repair the signal circuit for a short to ground.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

6. SIGNAL CIRCUIT SHORTED TO SENSOR GROUND CIRCUIT

1. Measure the resistance between the signal circuit and the sensor ground circuit in the sensor harness connector.

Is the resistance above 100 Ohms?

Yes

- Go to step 7

No

- Repair the signal circuit for a short to the sensor ground circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

7. SIGNAL CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.
2. Connect the temperature sensor harness connector.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

3. Using a voltmeter, perform a voltage drop test by backprobing the signal circuit at the sensor harness connector and at the applicable module connector (or by probing the appropriate terminal of the PCM Pinout Box 8815). Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

4. Start the engine.

Is the voltage below 0.5 of a volt?

Yes

- Go to step 8

No

- Repair the signal circuit for high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

8. SENSOR GROUND CIRCUIT HIGH RESISTANCE

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the sensor ground circuit at the sensor harness connector and at the applicable module connector (or by probing the appropriate terminal of the PCM Pinout Box 8815). Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

Is the voltage below 0.5 of a volt?

Yes

- Go to step 9

No

- Repair the sensor ground circuit for high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

9. MODULE

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the sensor and the applicable control module. Refer to the system schematic.
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Monitor the scan tool data relative to this circuit and wiggle test the wiring and connectors.
5. Look for the data to change or for the DTC to reset during the wiggle test.
6. Perform any Technical Service Bulletins that may apply.

Were any problems found?

Yes

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

No

- Replace the applicable control module in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

CHECKING A NO RESPONSE - NO START CONDITION

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

Possible Causes

INTERMITTENT NO RESPONSE CONDITION
 (K51) ASD RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE
 (K51) ASD RELAY CONTROL CIRCUIT SHORTED TO GROUND
 (K51) ASD RELAY CONTROL CIRCUIT OPEN OR HIGH RESISTANCE
 FUSED B+ CIRCUIT(S) OPEN OR HIGH RESISTANCE
 FUSED IGNITION SWITCH OUTPUT CIRCUITS OPEN OR HIGH RESISTANCE
 PCM GROUND CIRCUIT(S) OPEN OR HIGH RESISTANCE
 (D65) CAN C BUS (+) CIRCUIT OPEN
 (D64) CAN C BUS (-) CIRCUIT OPEN
 POWERTRAIN CONTROL MODULE (PCM)

Diagnostic Test

1. INTERMITTENT NO RESPONSE CONDITION

NOTE: Verify that the IOD fuse is installed and not open. If the fuse is open, check the circuit for a short to ground.

NOTE: The battery must be fully charged and in good condition. An undercharged battery may produce invalid test results.

NOTE: The battery cables must be clean and fastened properly. The chassis ground must be clean and fastened properly.

NOTE: The scan tool (including the cable) must be operating properly for the results of this test to be valid.

NOTE: With the scan tool, check the FCM for any active CAN C hardware DTCs, and perform appropriate diagnostic procedure before continuing with this test.

NOTE: On the scan tool screen, a red X next to a module indicates that the module is not active (communicating) on the Bus network. A green check indicates that the module is active on the Bus network.

1. Turn the ignition on.
2. With the scan tool, select ECU view.

Is the PCM active (communicating) on the BUS?

Yes

- The PCM no response condition is not present at this time. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors for any problems that would result in an intermittent no response condition.

No

- Go to step 2

2. (K51) ASD RELAY CONTROL CIRCUIT OPERATION

1. Turn the ignition off.
2. Remove the Auto Shutdown Relay.
3. Using a 12 volt test light connected to 12 volts, check the (K51) ASD Relay Control circuit at the Auto Shutdown Relay connector.
4. Turn the ignition on.

NOTE: **The test light should illuminate for approximately 3 seconds and then turn off, this is considered normal operation.**

Is the test light illuminated and bright as described above?

Yes

- Go to step 9

No

- Go to step 3

3. (K51) ASD RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE

1. Turn the ignition off.
2. Disconnect the C3 Powertrain Control Module (PCM) harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (K51) ASD Relay Control circuit at the Auto Shutdown Relay connector.

Is there any voltage present?

Yes

- Repair the short to voltage in the (K51) ASD Relay Control circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 4

4. (K51) ASD RELAY CONTROL CIRCUIT SHORTED TO GROUND

1. Turn the ignition off.
2. Measure the resistance between ground and the (K51) ASD Relay Control circuit at the Auto Shutdown Relay connector.

Is the resistance below 100 ohms?

Yes

- Repair the short to ground in the (K51) ASD Relay Control circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 5

5. (K51) ASD RELAY CONTROL CIRCUIT OPEN OR HIGH RESISTANCE

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the (K51) ASD Relay Control between the Auto Shutdown Relay connector and the appropriate terminal of special tool #8815.

Is the resistance below 5.0 ohms?

Yes

- Go to step 6

No

- Repair the open or high resistance in the (K51) ASD Relay Control circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. FUSED B+ CIRCUIT(S) OPEN OR HIGH RESISTANCE

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

1. Using a 12 volt test light connected to ground check the Fused B+ circuit(s) at the appropriate

terminal of special tool #8815.

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

Is the test light illuminated and bright?

Yes

- Go to step 7

No

- Repair the Fused B+ circuit(s) as necessary. Inspect and replace fuses as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

7. FUSED IGNITION SWITCH OUTPUT CIRCUIT(S) OPEN OR HIGH RESISTANCE

1. Turn the ignition on.
2. Using a 12 volt test light connected to ground, check the Fused Ignition Switch Output circuit(s) in the appropriate terminal(s) of special tool #8815.

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

Is the test light illuminated and bright?

Yes

- Go to step 8

No

- Repair the Fused Ignition Switch Output circuit(s) as necessary. Inspect and replace fuses as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

8. PCM GROUND CIRCUITS

1. Turn the ignition off.
2. Using a 12 volt test light connected to battery voltage, check the PCM ground circuits in the appropriate terminals of special tool #8815.

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

Is the test light illuminated and bright?

Yes

- Go to step 11

No

- Repair the PCM ground circuit(s) as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

9. (D65) CAN C BUS (+) CIRCUIT OPEN OR HIGH RESISTANCE

1. Turn the ignition off.
2. Disconnect the C1 TIPM harness connector.
3. Measure the resistance of the (D65) CAN C Bus (+) circuit between the TIPM connector and the appropriate terminal of the special tool #8815.

Is the resistance below 5.0 ohms?

Yes

- Go to step 10

No

- Repair the open or high resistance in the (D65) CAN C Bus (+) circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

10. (D64) CAN C BUS (-) CIRCUIT OPEN OR HIGH RESISTANCE

1. Measure the resistance of the (D64) CAN C Bus (-) circuit between the C1 TIPM harness connector and the appropriate terminal of the special tool #8815.

Is the resistance below 5.0 ohms?

Yes

- Go to step 11

No

- Repair the open or high resistance in the (D64) CAN C Bus (-) circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

11. POWERTRAIN CONTROL MODULE (PCM)

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1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Auto Shutdown Relay and the Powertrain Control Module (PCM).
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Refer to any Technical Service Bulletins that may apply.

Were any problems found?

Yes

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

No

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

ENGINE CRANKS BUT DOES NOT START

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

Possible Causes
5 VOLT SUPPLY CIRCUIT OPEN OR SHORTED
UNDERCHARGED BATTERY
SYSTEM DTCS PRESENT
POWERTRAIN POWER AND GROUND CIRCUIT(S) OPEN OR HIGH RESISTANCE
POWERTRAIN FUSES OPEN
FUEL DELIVERY SYSTEM
FUEL CONTAMINATION
INADEQUATE SPARK
ENGINE MECHANICAL PROBLEM

Diagnostic Test

1. UNDERCHARGED BATTERY

NOTE: Diagnose any 5 Volt Supply DTCs before continuing

NOTE: The battery must be fully charged and in good condition. An undercharged

battery may produce invalid test results.

1. Test the battery in accordance with the Service Information.

Were any problems found?

Yes

- Charge or replace the battery as necessary and retest.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 2

2. SYSTEM DTCS PRESENT

NOTE: If the battery was low, make sure the battery is properly charged and attempt to start the vehicle. Crank the engine for 15 seconds, 3 consecutive times. This will allow any DTCs to set that may have been erased due to a dead battery.

1. With the scan tool, select System DTCs to read DTCs in all modules. If any DTCs are present, perform the appropriate diagnostic procedure before continuing with this test. If a no response condition is detected in any module, refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate NO RESPONSE diagnostic procedure.

Were any problems found?

Yes

- Perform the appropriate diagnostic procedure and repair as necessary. If any pending DTCs are detected, perform the diagnostic procedure as if the DTC is active.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 3

3. PCM POWER OR GROUND CIRCUIT OPEN OR HIGH RESISTANCE

1. Turn the ignition off.
2. Disconnect the PCM harness connector(s).
3. Using a 12-volt test light, check all PCM power and ground circuits.

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

Is the test light illuminated and bright when checking each of the PCM power and ground circuits?

Yes

- Repair the PCM power or ground circuit for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 4

4. OPEN FUSE(S)

1. Inspect all of the fuses in the TIPM. If any open fuses are found, check the related circuit(s) for a short to ground or high resistance.

Were any problems found?

Yes

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

No

- Go to step 5

5. CHECKING THE FUEL DELIVERY SYSTEM

NOTE: **Verify that the fuel tank is not empty before continuing.**

1. Perform the diagnostic procedure for **CHECKING THE FUEL DELIVERY SYSTEM**.

Were any problems found?

Yes

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

No

- Go to step 6

6. FUEL CONTAMINATION

1. Check the fuel system for contamination in accordance with the Service Information.

Was any evidence of fuel contamination found?

Yes

- Clean and repair the fuel system as necessary in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 7

7. CHECKING THE IGNITION COIL OPERATION

1. Perform the diagnostic procedure for **CHECKING THE IGNITION COIL OPERATION**.

Were any problems found?

Yes

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

No

- Go to step 8

8. CHECKING THE ENGINE MECHANICAL SYSTEM

1. Perform the diagnostic procedure for **CHECKING THE ENGINE MECHANICAL SYSTEM**.

Were any problems found?

Yes

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

No

- Test complete. Refer to any Technical Service Bulletins that may apply.

FUEL DELIVERY SYSTEM OUTPUT - FLOW TEST

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

WARNING: Follow these safety precautions to reduce the risk of fire and possible serious or fatal injury when performing this test procedure.

- Fuel or fuel vapors are highly flammable. A fire could occur if an ignition source is present. Do not expose the fuel or the test equipment used in this procedure to open flames or sparks.
- Inhalation of fuel vapors could lead to disorientation and personal injury. Keep the service area well ventilated, or perform this test procedure in an area where there is a building exhaust removal system.
- Relieve fuel system pressure before servicing fuel system components.
- Use extreme caution when connecting and disconnecting fuel lines.
- Considerable fuel leakage may occur when servicing the fuel system. Wear protective eyewear and clothing to protect from fuel splash, and take suitable fuel containment measures.
- Wrap a shop towel around the fuel pressure gauge connection to absorb fuel leakage that occurs when connecting the test equipment. Place the towel in an approved container when complete.
- Never store fuel in an open container due to the possibility of fire or explosion. Have a dry chemical (Class B) fire extinguisher nearby.

Diagnostic Test**1. CHECK FUEL DELIVERY SYSTEM FOR LEAKS AND DAMAGE**

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Visually and physically inspect the fuel delivery system for external leaks and damage.

Is the system leaking or damaged?

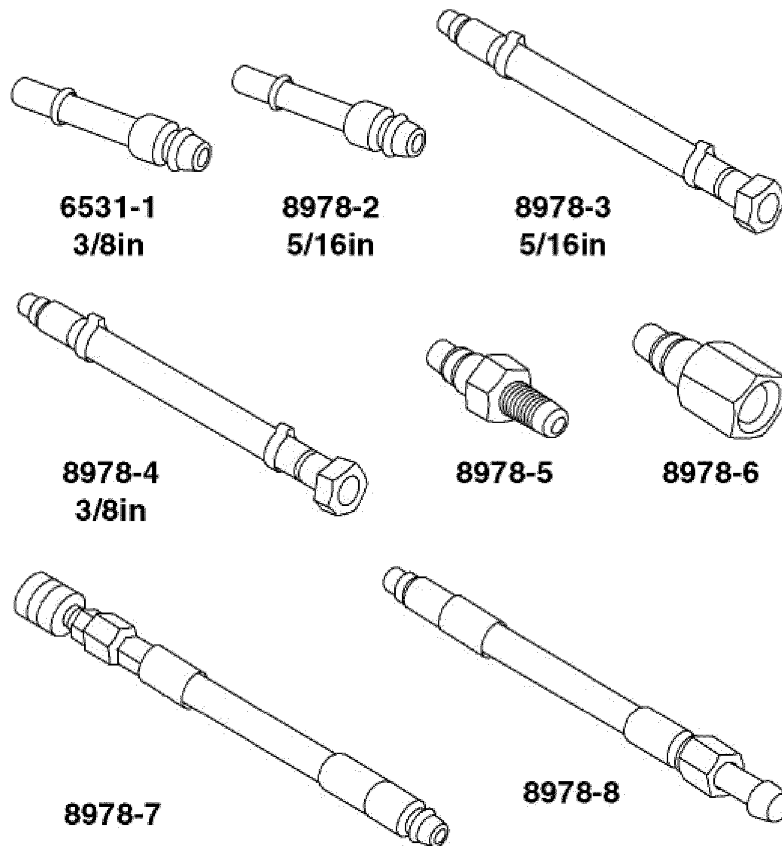
Yes

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

No

- Go to step 2

2. INSTALL APPROPRIATE FUEL LINE ADAPTERS/FITTING FROM THE GAS AND DIESEL FUEL PRESSURE/DECAY TESTER 8978A



81f05ae2

Fig. 24: Fuel Line Adapters/Fitting
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the

engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Disconnect the frame rail fuel supply line connector between the fuel supply line and the fuel rail.
3. Install the appropriate Fuel Line Adapters/Fitting from the Gas and Diesel Fuel Pressure/Decay Tester 8978A.

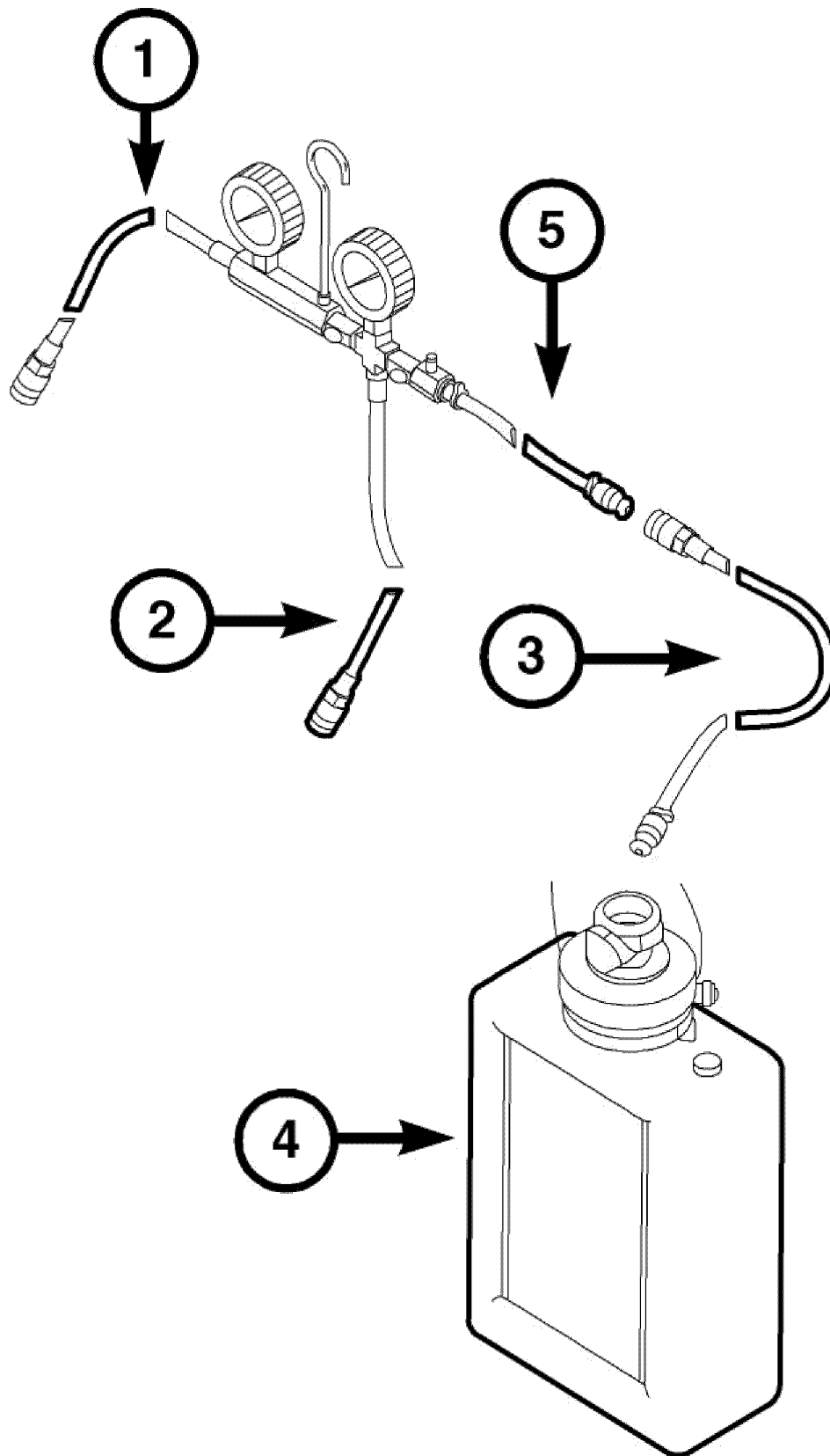
Proceed

- Go to step 3

3. INSTALL FUEL PRESSURE GAUGE ASSEMBLY

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Fig. 25: Identifying Fuel Pressure Gauge Assembly

Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

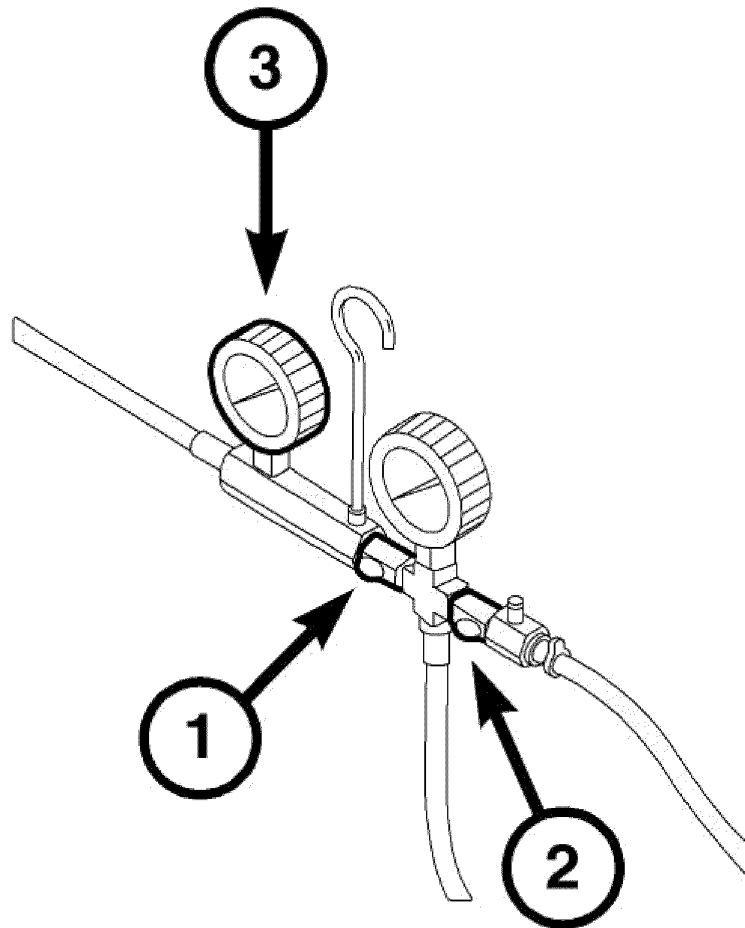
1. Connect the Gas and Diesel Fuel Pressure/Decay Tester 8978A, Fuel Inlet Hose (1) and Fuel Outlet Hose (2) to the Fuel Line Adapters/Fitting.
2. Connect special tool Drain Extension Hose 535680 (3) to the Fuel Pressure Gauge Assembly Drain Hose (5).
3. Connect Reservoir Assembly 534960 (4) to Drain Extension Hose 535680 (3).

WARNING: To reduce the risk of fire and possible serious or fatal injury, place Reservoir Assembly 534960 (4) on the floor and out of the way so that it is not a trip hazard.

Proceed

- Go to step 4

4. CHECK FUEL PRESSURE



81f09882

Fig. 26: Checking Fuel Pressure
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

Perform the following procedure to purge air from the system:

- Open the Fuel System Isolation Valve (1).
- Close the Flow Test Valve (2).
- Ignition on, engine not running.
- With the scan tool, actuate the fuel pump.
- Open the Flow Test Valve (1) for 10 seconds, then close the Valve.
- **CAUTION: Stop All Actuations.**

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- Turn the ignition off.
 - Disconnect, empty and then reconnect the Reservoir Assembly.
1. Turn the ignition on, wait five seconds, turn the ignition off and then wait one minute before proceeding.
 2. Read the Fuel Pressure Gauge (3) and record the reading. **Non SRT-4** fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi). **SRT-4** fuel pressure specification is 552 kPa +/- 34 kPa (80 psi +/- 5 psi).

Is the fuel pressure within specifications?

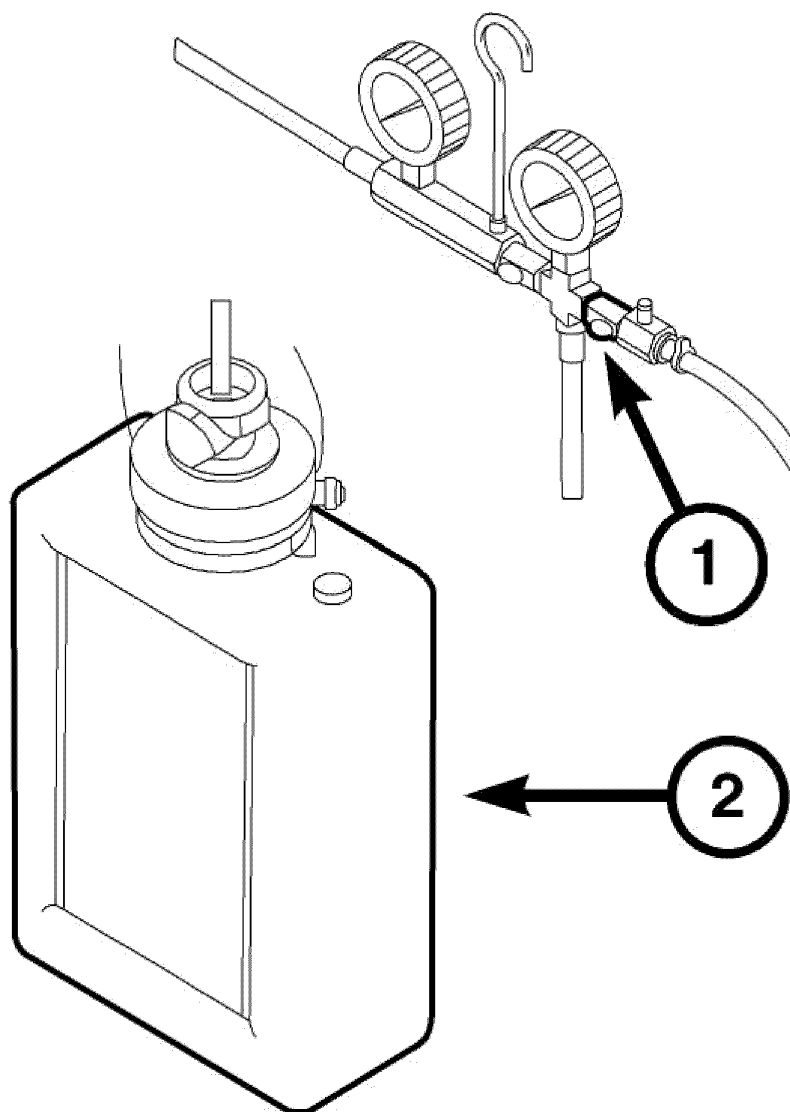
Yes

- Go to step 5

No

- Perform the **CHECKING THE FUEL DELIVERY SYSTEM** diagnostic procedure.

5. **CHECK FUEL DELIVERY SYSTEM OUTPUT**



81f0cf9a

Fig. 27: Checking Fuel Delivery System Output
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Ignition on, engine not running.
2. With the scan tool, actuate the fuel pump.
3. Open the Flow Test Valve (1) for 20 seconds, then close the Valve.

CAUTION: Stop All Actuations.

4. Turn the ignition off.
5. Measure the amount of fuel in the Reservoir Assembly (2). The fuel output specification is ml/s x 20 seconds = fuel flow in ml.

FUEL FLOW		
ENGINE	ml/s	ml per 20 Seconds
4 Cylinder and 6 Cylinder	20.8333A	417
8 Cylinder	38.88889	778
SRT-4	50	1000

FUEL PRESSURE LEAK DOWN

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

Possible Causes
FUEL DELIVERY SYSTEM LEAKING OR DAMAGED
FUEL PUMP MODULE
FUEL INJECTOR(S)

WARNING: Follow these safety precautions to reduce the risk of fire and serious possible serious or fatal injury when performing this test procedure.

- Fuel or fuel vapors are highly flammable. A fire could occur if an ignition source is present. Do not expose the fuel or the test equipment used in this procedure to open flames or sparks.
- Inhalation of fuel vapors could lead to disorientation and personal injury. Keep the service area well ventilated, or perform this test procedure in an area where there is a building exhaust removal system.
- Relieve fuel system pressure before servicing fuel system components.
- Use extreme caution when connecting and disconnecting fuel lines.
- Considerable fuel leakage may occur when servicing the fuel system. Wear protective eye wear and clothing to protect from fuel splash, and take suitable fuel containment measures.
- Wrap a shop towel around the fuel pressure gauge connection to absorb fuel leakage that occurs when connecting the test equipment. Place the towel in an approved container when complete.

- **Never store fuel in an open container due to the possibility of fire or explosion. Have a dry chemical (Class B) fire extinguisher nearby.**

Diagnostic Test**1. CHECK FUEL DELIVERY SYSTEM FOR LEAKS AND DAMAGE**

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Visually and physically inspect the fuel delivery system for external leaks and damage.

Is the system leaking or damaged?

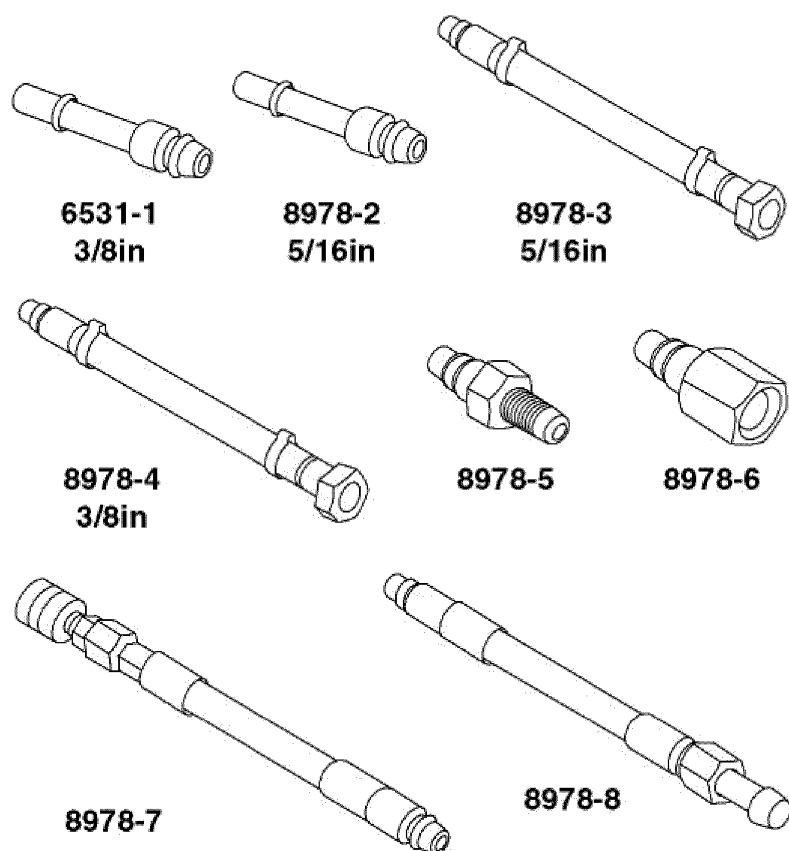
Yes

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

No

- Go to step 2

2. INSTALL APPROPRIATE FUEL LINE ADAPTERS/FITTING FROM GAS AND DIESEL FUEL PRESSURE/DECAY TESTER 8978A



81f05ae2

Fig. 28: Fuel Line Adapters/Fitting
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Disconnect the frame rail fuel supply line connector between the fuel supply line and the fuel rail.

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3. Install the appropriate Fuel Line Adapters/Fitting from Gas and Diesel Fuel Pressure/Decay Tester 8978A.

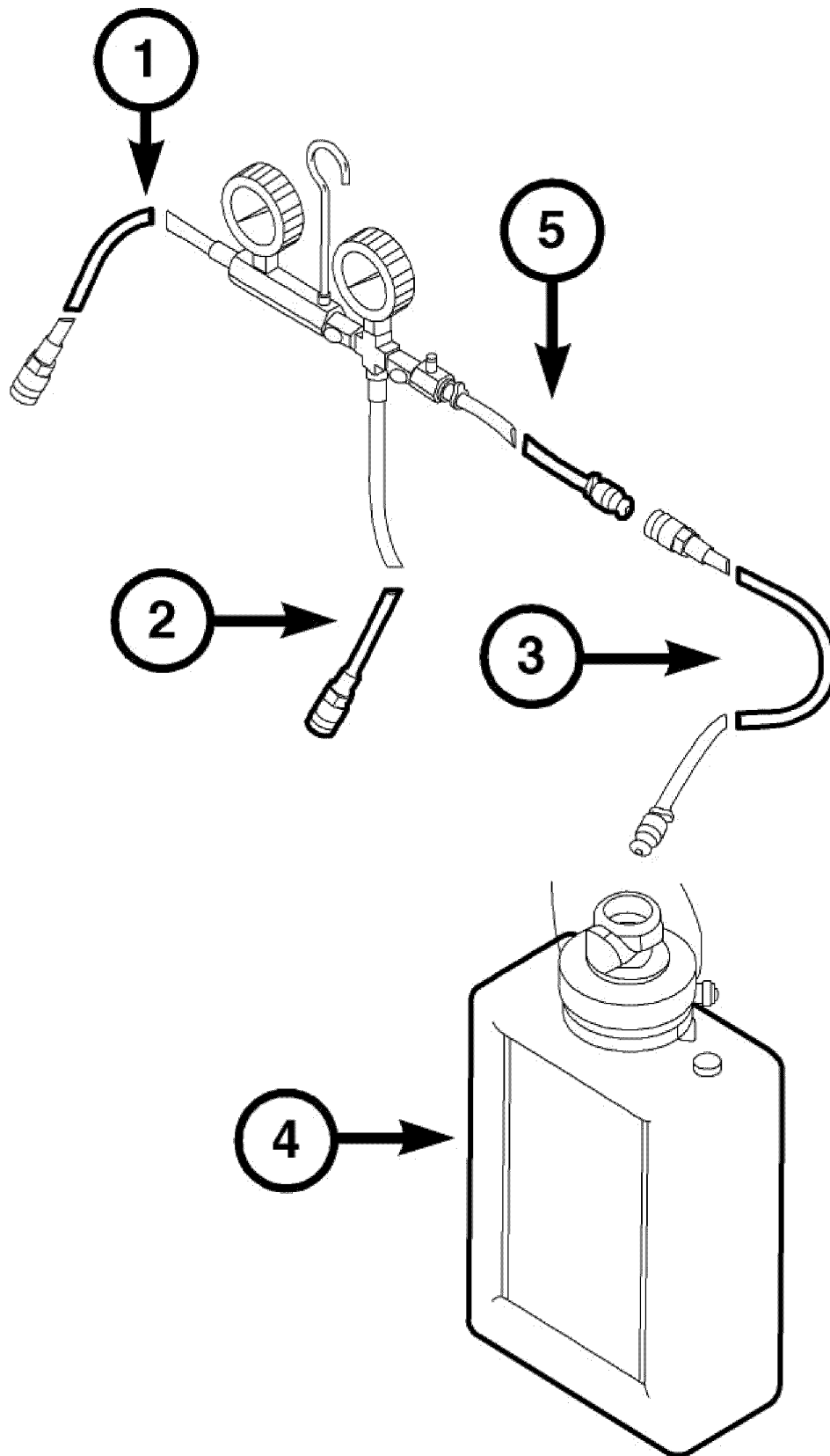
Proceed

- Go to step 3

3. INSTALL FUEL PRESSURE GAUGE ASSEMBLY

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81f09767

Fig. 29: Identifying Fuel Pressure Gauge Assembly

Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

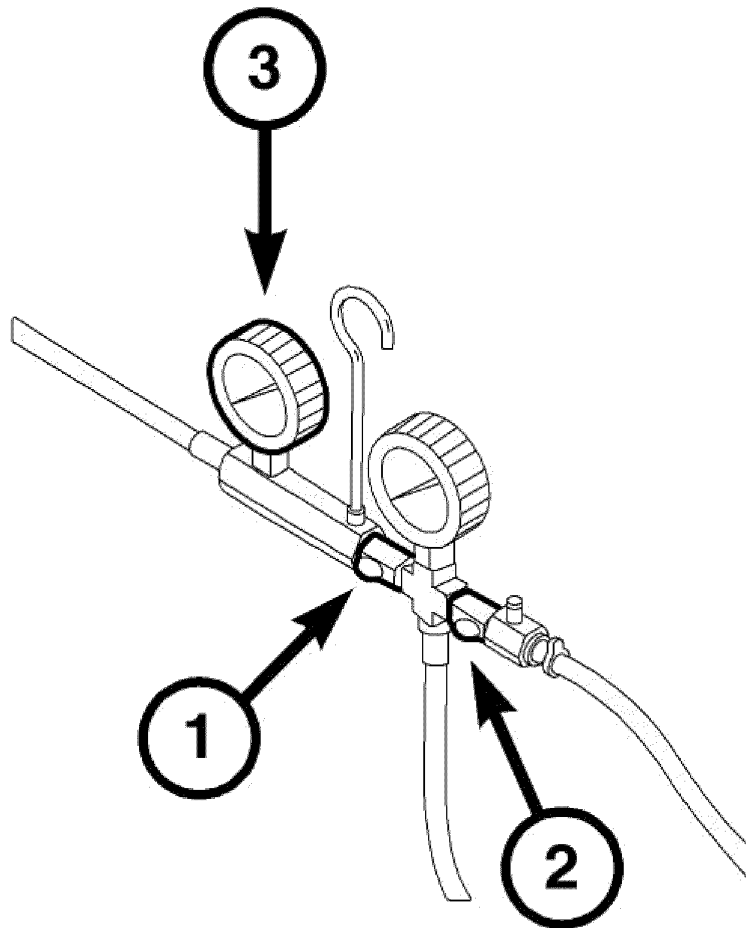
1. Connect Gas and Diesel Fuel Pressure/Decay Tester 8978A, Fuel Inlet Hose (1) and Fuel Outlet Hose (2) to the Fuel Line Adapters/Fitting.
2. Connect Drain Extension Hose 535680 (3) to the Fuel Pressure Gauge Assembly Drain Hose (5).
3. Connect the Reservoir Assembly 534960 (4) to the Drain Extension Hose 535680 (3).

WARNING: To reduce the risk of fire and serious possible serious or fatal injury, place Reservoir Assembly 534960 (4) on the floor and out of the way so that it is not a trip hazard.

Proceed

- Go to step 4

4. CHECK FUEL PRESSURE



81f09882

Fig. 30: Checking Fuel Pressure
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Perform the following procedure to purge air from the system:
 - Open the Fuel System Isolation Valve (1).
 - Close the Flow Test Valve (2).
 - Ignition on, engine not running.
 - With the scan tool, actuate the fuel pump.
 - Open the Flow Test Valve (1) for 10 seconds, then close the Valve.
 - **CAUTION: Stop All Actuations.**
 - Turn the ignition off.

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- Disconnect, empty and then reconnect the Reservoir Assembly.
- 2. Turn the ignition on, wait five seconds, turn the ignition off and then wait 1 minute before proceeding.
- 3. Read the Fuel Pressure Gauge (3) and record the reading. **Non SRT-4** fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi). **SRT-4** fuel pressure specification is 552 kPa +/- 34 kPa (80 psi +/- 5 psi).

Is the fuel pressure within specifications?

Yes

- Go to step 5

No

- Perform the **CHECKING THE FUEL DELIVERY SYSTEM** diagnostic procedure as directed.

5. CHECK FUEL DELIVERY SYSTEM FOR LEAK DOWN

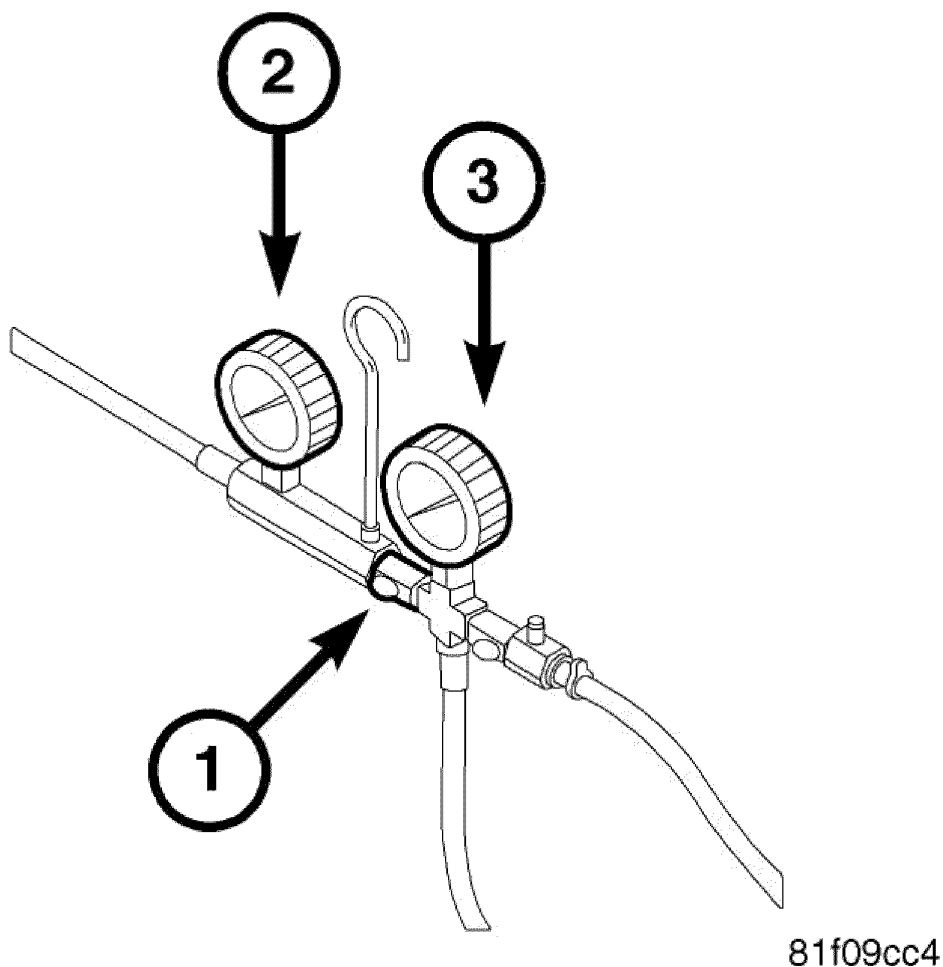


Fig. 31: Checking Fuel Delivery System For Leak Down
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Close the Fuel System Isolation Valve (1) and then wait five minutes before proceeding.
2. Read the Fuel Inlet (2) and Fuel Outlet (3) Pressure Gauges. The pressure should not drop more than 10 psi on either gauge.

Does the fuel pressure drop more than 10 psi?

Yes - On Fuel Inlet Gauge (1)

- Replace the appropriate fuel pump module as indicated in the table below.

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Vehicle	Check Valve Location
LC	Auxiliary fuel pump module (right-side of fuel tank)
LX	Auxiliary fuel pump module (right-side of fuel tank)
JC	Primary fuel pump module (left-side of fuel tank)
JS	Primary fuel pump module (left-side of fuel tank)
MK	Primary fuel pump module (left-side of fuel tank)
PM	Primary fuel pump module (left-side of fuel tank)

NOTE: The check valve allows residual fuel pressure to remain in the line and not depressurize into the tank when the fuel pump is off.

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

Yes - On Fuel Outlet Gauge (2)

- Replace the leaking fuel injector(s).
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- If directed here by another test, return to that test. Otherwise, test complete.

HARD START FUEL SYSTEM

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

Possible Causes
FUEL CONTAMINATION RESTRICTED FUEL SUPPLY LINE FUEL PUMP INLET STRAINER PLUGGED FUEL PUMP MODULE FAULTY FUEL PUMP MODULE FUEL INJECTOR(S)

Diagnostic Test

1. CHECKING FUEL PRESSURE

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Install a fuel pressure gauge at the engine.
3. Ignition on, engine not running.
4. With a scan tool, actuate the Fuel Pump and observe the fuel pressure gauge.

NOTE: Fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

Choose a conclusion that best matches your fuel pressure reading.

Below Specification

- Go to step 2

Within Specification

- Go to step 4

2. RESTRICTED FUEL SUPPLY LINE

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Raise vehicle on hoist, and disconnect the fuel supply line at the fuel pump module.
3. Install special tool #6539 (5/16") #6631(3/8") fuel line adapter and the fuel pressure gauge between the fuel supply line and the fuel pump module.
4. Ignition on, engine not running.
5. With the scan tool, actuate the Fuel Pump and observe the fuel pressure gauge.

NOTE: Fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

Is the fuel pressure within specification?

Yes

- Visually and physically inspect the fuel supply lines between the fuel tank and the fuel rail. Repair/replace as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 3

3. CHECKING THE FUEL PUMP INLET

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Remove the Fuel Pump Module and Fuel Tank Module (if equipped), inspect the Fuel Pump Inlet and the bottom of the fuel tank for debris that could cause the fuel pump inlet to be plugged.

Is the Fuel Inlet Strainer plugged?

Yes

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

No

- Replace the Fuel Pump Module.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. FUEL PUMP MODULE

NOTE: Before continuing visually and physically inspect the fuel delivery system for external leaks or damage. Repair/replace as necessary.

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose,

fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Install special tool #6539 (5/16") or #6631 (3/8") fuel line adapter.
3. Install the fuel pressure gauge.
4. Start the engine and allow the fuel system to reach maximum pressure.
5. Turn the ignition off.

NOTE: Fuel specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

6. Using special tool #C4390, Hose Clamp Pliers, pinch the rubber fuel line between the fuel pressure gauge and the engine.
7. Monitor the fuel pressure gauge for a minimum of 5 minutes.

NOTE: The pressure should not fall below 241 kPa (35 psi).

Does the fuel pressure drop below 241 kPa (35 psi)?

Yes

- Replace Fuel Pump Module.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 5

5. FUEL INJECTOR(S)

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Remove special tool #C4390.
2. Start the engine and allow the fuel system to reach maximum pressure.
3. Turn the ignition off.

NOTE: Fuel specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

4. Using special tool #C4390, Hose Clamp Pliers, pinch the rubber fuel line between the fuel pressure gauge and fuel pump module.

5. Monitor the fuel pressure gauge for a minimum of 5 minutes.

NOTE: **The pressure should not fall below 241 kPa (35 psi)**

Does the fuel pressure drop below 241 kPa (35 psi)?

Yes

- Replace the leaking fuel injectors.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Check the fuel for contaminants.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

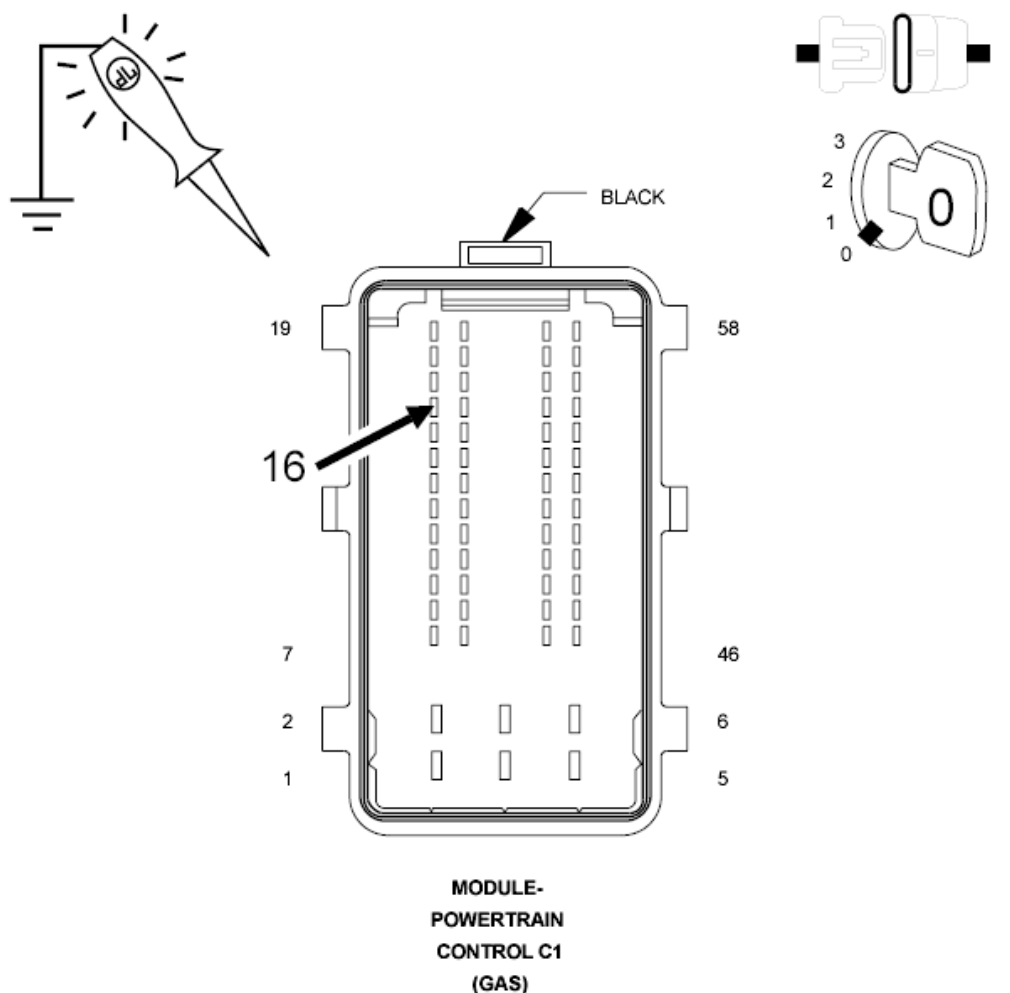
NO RESPONSE WITH A NO START CONDITION

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

Possible Causes
(A931) FUSED B+ CIRCUIT (PCM)
(F202) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS (PCM)
(Z925) PCM GROUND CIRCUITS (PCM)
(K51) MAIN RELAY CONTROL CIRCUIT
(A14) FUSED B+ CIRCUIT (MAIN RELAY)
(A935) FUSED B+ CIRCUIT (MAIN RELAY)
(K542) MAIN RELAY OUTPUT CIRCUIT (TO TIPM)
(F342/F343/344) MAIN RELAY OUTPUT CIRCUIT (TO PCM)
TIPM
PCM

Diagnostic Test

1. **(A931) FUSED B+ CIRCUIT (PCM)**



107787

Fig. 32: Checking Fused B(+) Circuit
Courtesy of CHRYSLER LLC

NOTE: The scan tool and cable must be operating properly for the results of this test to be valid.

NOTE: Make sure the ignition switch was on while trying to communicate with the PCM.

1. Turn the ignition off.
2. Disconnect the C1 PCM harness connectors.
3. Using a 12-volt test light connected to ground, probe the (A931) Fused B+ circuit in the PCM harness connector.

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

Does the test light illuminate brightly?

Yes

- Go to step 2

No

- Repair the open or short to ground in the (A931) Fused B+ circuit. Inspect and replace fuses as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

2. (F202) IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS (PCM)

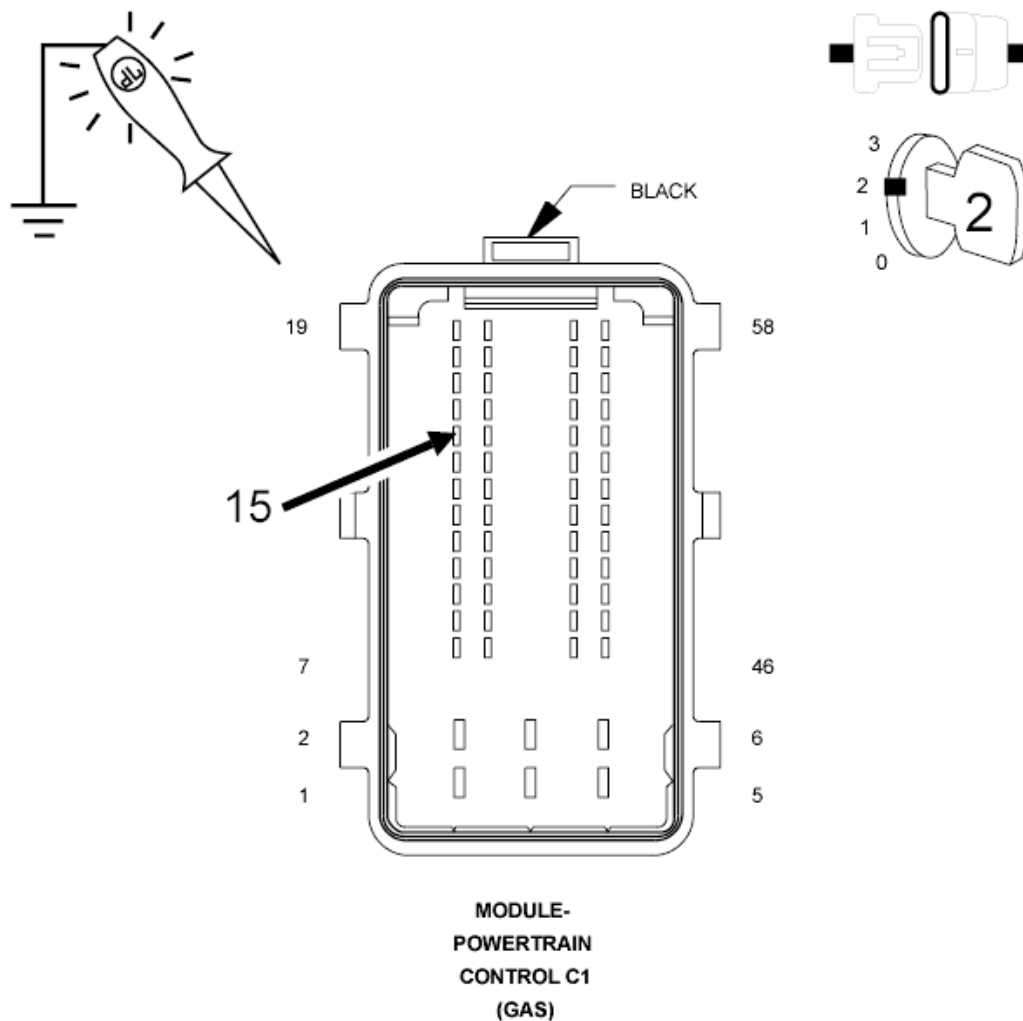


Fig. 33: Checking Ignition Switch Output Circuit
Courtesy of CHRYSLER LLC

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1. Turn the ignition on.
2. Using a 12-volt test light connected to ground, probe the (F202) Fused Ignition Switch Output circuit in the PCM harness connector.
3. Turn the ignition to run.

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

Does the test light illuminate brightly?

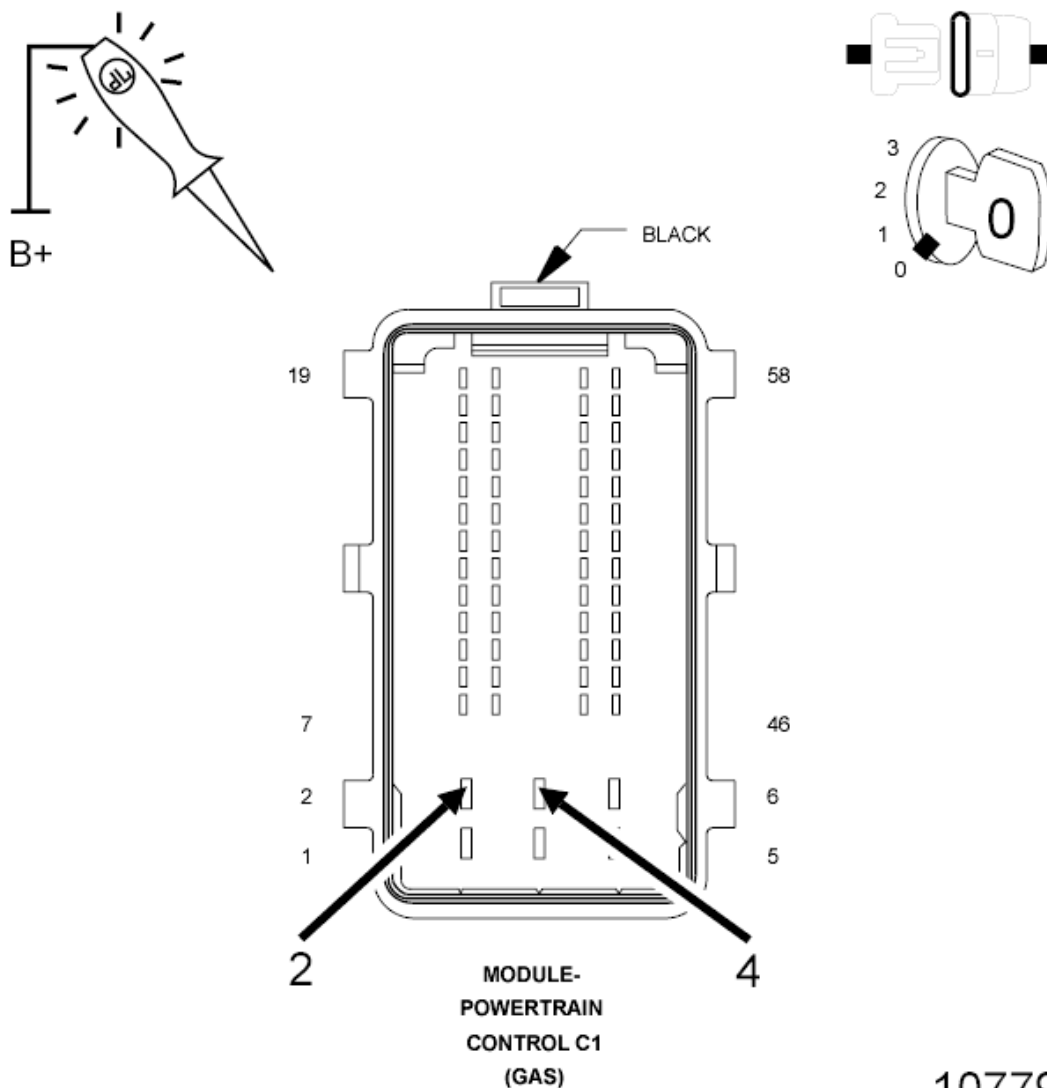
Yes

- Go to step 3

No

- Repair the (F202) Ignition Switch Output circuits. Inspect and replace fuses as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. (Z925) GROUND CIRCUITS (PCM)



107791

Fig. 34: Checking Ground Circuit

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Using a 12-volt test light connected to battery voltage, probe both the (Z925) PCM ground circuits

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

Does the test light illuminate brightly at both terminals?

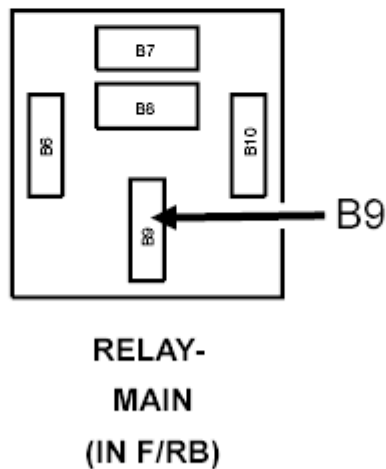
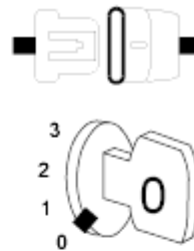
Yes

- Go to step 4

No

- Repair the Ground circuit(s).
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. (A14) FUSED B+ CIRCUIT (MAIN RELAY)



107793

Fig. 35: Checking Fused B+ Circuit A14 At Main Relay
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

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2. Remove the Main Relay.
3. Using a 12-volt test light connected to ground, probe the (A14) Fused B+ circuit at the Main Relay terminal.

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

Does the test light illuminate brightly?

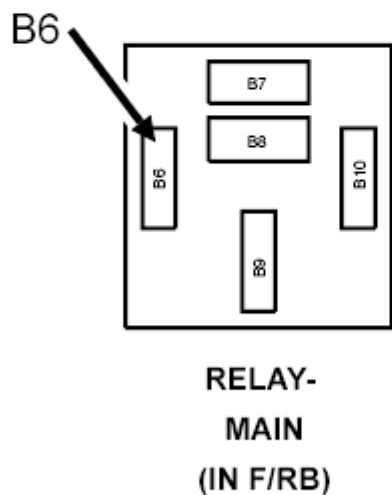
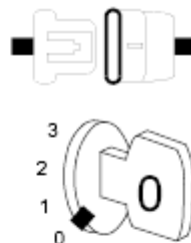
Yes

- Go to step 5

No

- Repair the (A14) Fused B+ circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. (A935) FUSED B+ CIRCUIT (MAIN RELAY)



107795

Fig. 36: Checking Fused B+ Circuit A935 At Main Relay
 Courtesy of CHRYSLER LLC

1. Using a 12-volt test light connected to ground, probe the (A935) Fused B+ circuit at the Main Relay terminal.

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

Does the test light illuminate brightly?

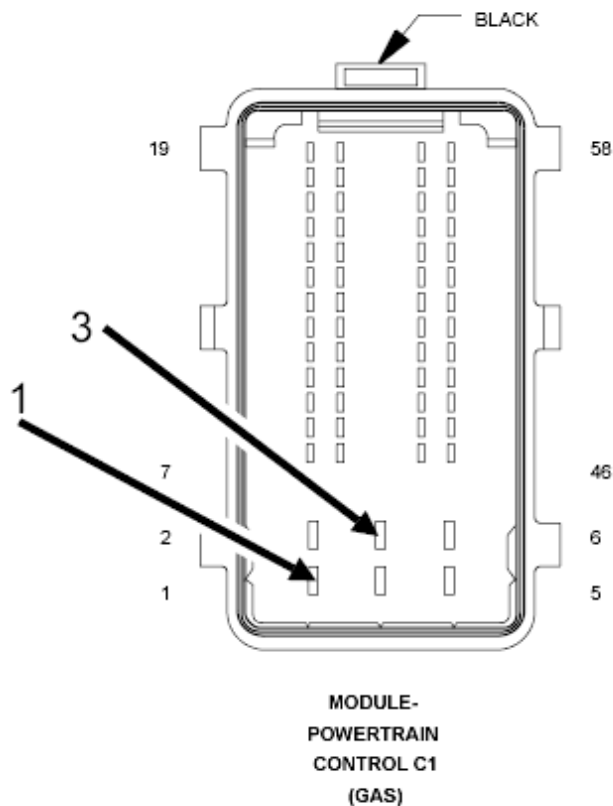
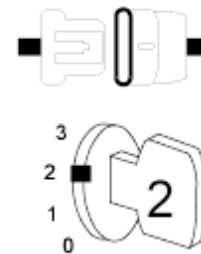
Yes

- Go to step 6

No

- Repair the (A935) Fused B+ circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. (F342) MAIN RELAY OUTPUT CIRCUITS



107797

Fig. 37: Checking Main Relay Output Circuits F342 At PCM Harness Connector C1
Courtesy of CHRYSLER LLC

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1. Turn the ignition on.
2. Using a jumper wire, jumper across the Main Relay from (K542) Main Relay Output circuit and the (A14) Fused B+ circuit.
3. With a 12-volt test light connected to ground, probe the (F342) Main Relay Output circuits in the PCM harness connector.

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

Does the test light illuminate brightly at both terminals?

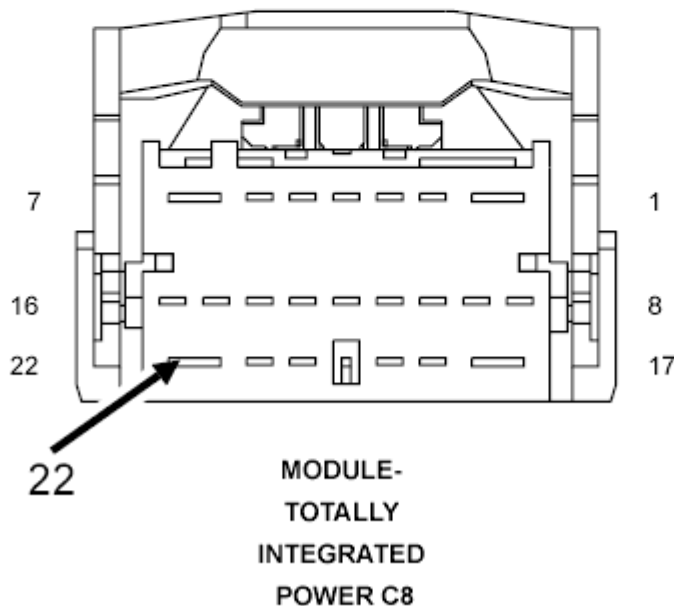
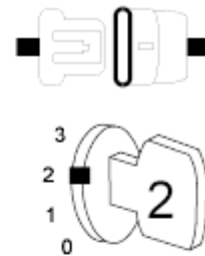
Yes

- Go to step 8

No

- Go to step 7

7. (K542) MAIN RELAY OUTPUT CIRCUIT



107799

Fig. 38: Checking Main Relay Output Circuit K542 At TIPM Connector

Courtesy of CHRYSLER LLC

1. Jumper wire still installed.
2. Disconnect the C8 TIPM harness connector.
3. Using a 12-volt test light connected to ground, probe the (K542) Main Relay Output circuit in the TIPM harness connector.

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

Does the test light illuminate brightly?

Yes

- Repair the (K542) Main Relay Output circuit between the TIPM and the Main Relay. Inspect the related fuses.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Repair the (F342) Main Relay Output circuit(s).
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

8. MAIN RELAY OUTPUT

1. Turn the ignition off.
2. Remove one end of the jumper wire.
3. Connect the PCM harness connector.
4. Turn the ignition on.
5. Return the jumper wire across the Main Relay.
6. Using a scan tool, attempt to communication with the PCM.

Were you able to communication with the PCM?

Yes

- Go to step 9

No

- Go to step 11

9. MAIN RELAY

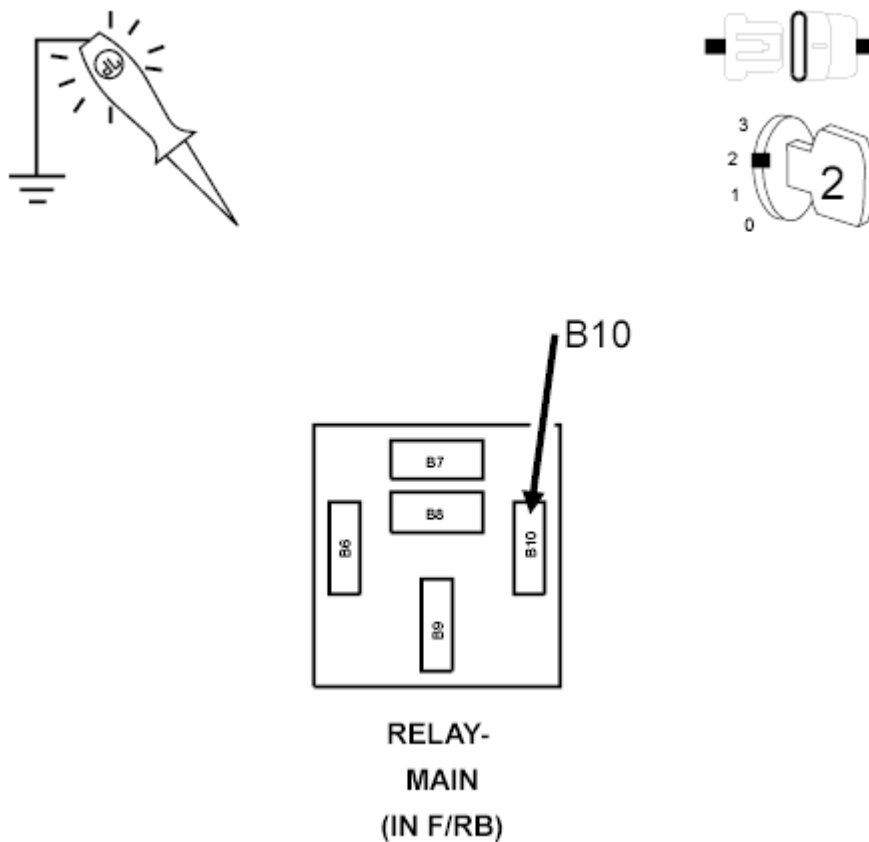


Fig. 39: Checking Main Relay Control Circuit K51 At Main Relay

Courtesy of CHRYSLER LLC

NOTE: To continue the following test, leave the jumper wire in place with the ignition on.

1. Using the scan tool, actuate the Main Relay.
2. Using a 12-volt test light connected to battery voltage, probe the (K51) Main Relay Control circuit in the Main Relay connector.

Does the test light illuminate and flash on and off?

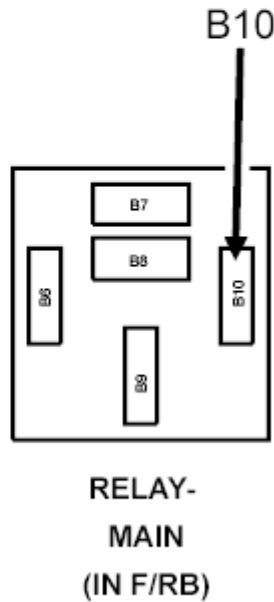
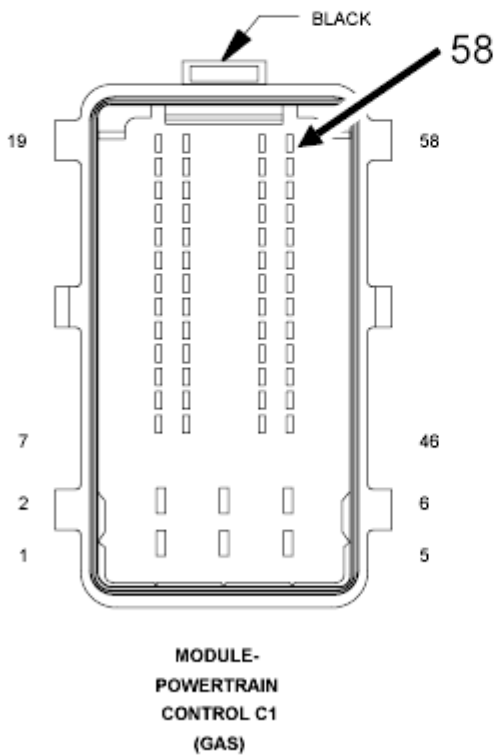
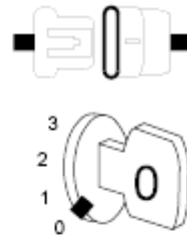
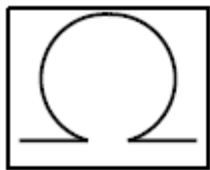
Yes

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

No

- Go to step 10

10. (K51) MAIN RELAY CONTROL CIRCUIT



107803

Fig. 40: Checking Main Relay Control Circuit K51 Between PCM & Main Relay
 Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the PCM harness connector.
3. Disconnect the C1 PCM harness connector.
4. Measure the resistance of the (K51) Main Relay Control circuit between the PCM harness connector and the Main relay connector.

Is the resistance below 5.0 ohms?

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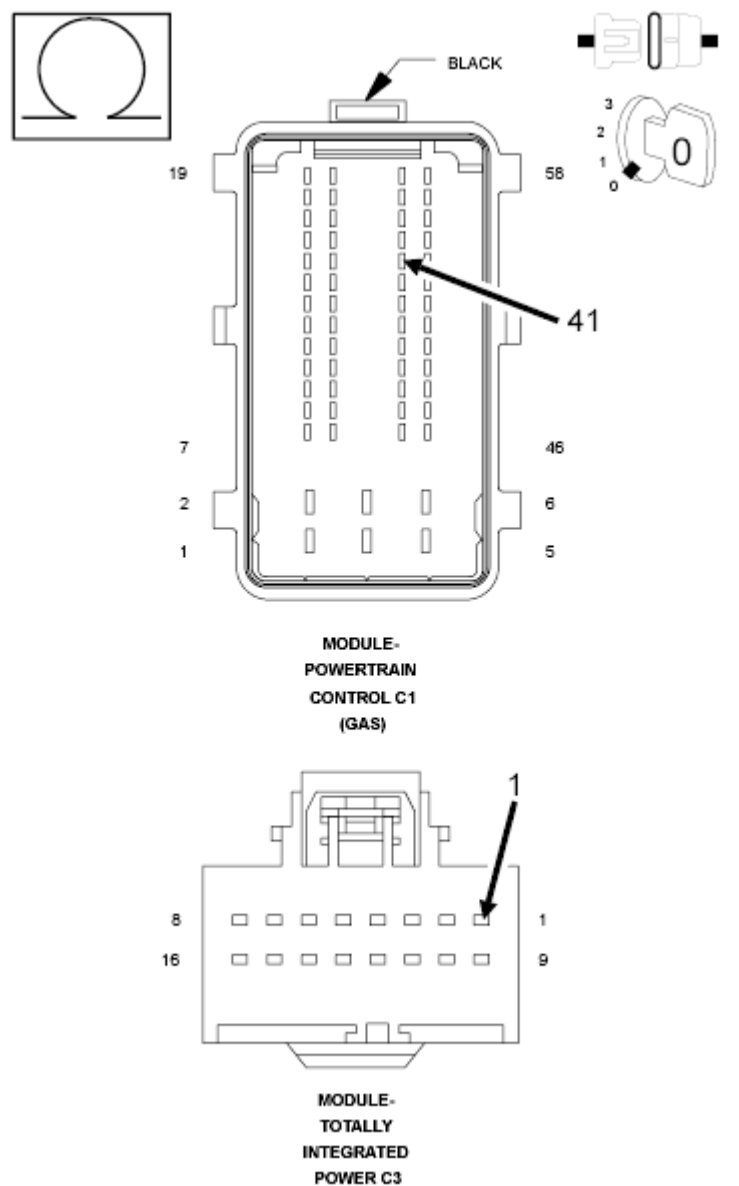
Yes

- Repair the open in the (K51) Main Relay Control circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Replace and program the Powertrain Control Module per Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

11. (D65) CAN C BUS (+) CIRCUIT OPEN



107805

Fig. 41: Checking CAN C Bus (+) Circuit For Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the TIPM harness connector.
3. Measure the resistance of the (D65) CAN C Bus (+) circuit between the TIPM connector and the PCM harness connector.

Is the resistance below 5.0 ohms?

Yes

- Go to step 12

No

- Repair the (D65) CAN C Bus (+) circuit for an open.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

12. (D64) CAN C BUS (-) CIRCUIT OPEN

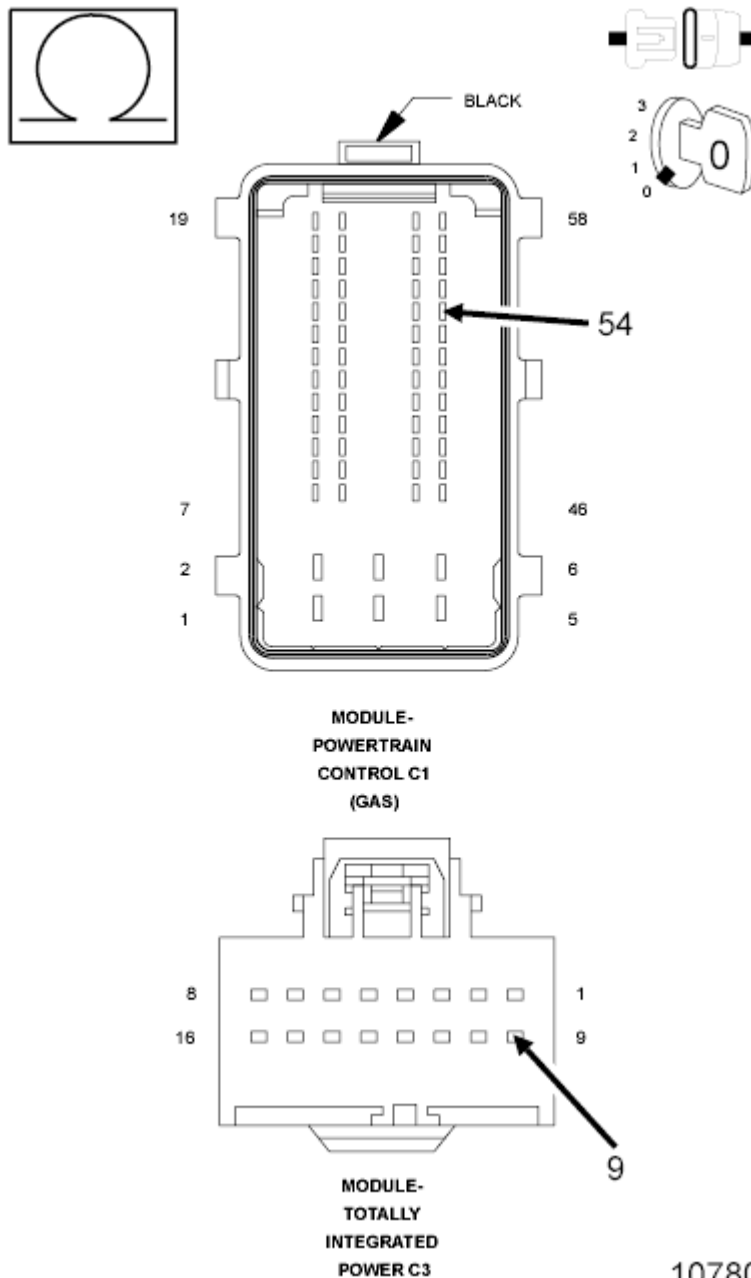


Fig. 42: Checking CAN C Bus (-) Circuit For Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (D64) CAN C Bus (-) circuit between the TIPM connector and the PCM harness connector.

Is the resistance below 5.0 ohms?

Yes

- Replace and program the Powertrain Control Module in accordance with the service information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Repair the (D64) CAN C Bus (-) circuit for an open.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

START AND STALL CONDITION

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

Possible Causes
CURRENT PCM DTCS
CURRENT WIN THEFT DTCS
RESTRICTED EXHAUST
ENGINE MECHANICAL
VACUUM LEAKS
CRACKED SPARK PLUG(S), CARBON TRACKING SPARK PLUG AND COIL
CARBON BUILDUP ON THROTTLE BODY
FUEL CONTAMINATION
FUEL DELIVERY
VALVE TIME OUT OF SPECIFICATION
5-VOLT SUPPLY CIRCUIT
SENSOR GROUND CIRCUIT
CMP SIGNAL CIRCUIT
CAMSHAFT POSITION SENSOR
CKP SIGNAL CIRCUIT
CRANKSHAFT POSITION SENSOR
FLEX PLATE (TARGET WHEEL)
CMP AIRGAP

**CKP AIRGAP
POWERTRAIN CONTROL MODULE (PCM)****Diagnostic Test****1. CHECKING DTCS****NOTE:**

- Before continuing with this procedure, review the TSBs that may be related to a start and stall condition.
- It may be helpful to review Secondary Indicators, if a two trip DTC(s) is present, drive the vehicle to try and mature the DTC to Active.

1. Ignition on, engine not running.
2. With a scan tool, read DTCs.

Are any DTCs present?

Yes

- Perform the appropriate diagnostic procedures.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 2

2. CHECKING VEHICLE THEFT DTCS**NOTE:**

If you are unable to communicate with the Wireless Ignition Node (WIN), refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** .

1. With the scan tool, read the WIN codes.

Are there any WIN DTCs?

Yes

- Refer to **DTC-Based Diagnostics/NODE, Wireless Ignition (WIN) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Go to step 3

3. CAM/CRANK VERIFICATION

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1. Using a scan tool, under OBDII Monitors, read and record the Cam Crank Synchronization Event Monitors.
2. Using this table, determine if any of the values are present in the Cam Crank Synchronization Event Monitor display.

CAM EVENT STATUS						
CM1ULTRH	CM1ULTLH	CM1TOL1	CM1LOW	CM1ULZERO	CM1MFS	CM1MFR
CM1IF	CM1ONLY	CM2ULTRH	CM2ULTLH	CM2TOL1	CM2LOW	CM2ULZERO
CM2MFS	CM2MFR	CM2IF	CM2ONLY	CM3ULTRH	CM3ULTLH	CM3TOL1
CM3LOW	CM3ULZERO	CM3MFS	CM3MFR	CM3IF	CM3ONLY	CM4ULTRH
CM4ULTLH	CM4TOL1	CM4LOW	CM4ULZERO	CM4MFS	CM4MFR	CM4IF
CM4ONLY	SYULCAM	-	-	-	-	-
CRANK EVENT STATUS						
CKULTRH	CKULTLH	CKLOW	CKUL60M2	CKMFS	CKMFR	CK1IF
CKULGTRH	CKULGTLH	CKULGTVR	CKULGTVL	CKUL220	CKUL40	SYULCRK
SYNOCLCK	-	-	-	-	-	-
SYNC EVENT STATUS						
SYULTOL	SYTOLF	-	-	-	-	-

4. SPARK PLUG(S)

NOTE: Inspect the ignition coil for damage, carbon tracking on the coil or a damaged spark plug insulator boot. If a problem is found, replace the ignition coil.

1. Turn the ignition off.
2. Remove the spark plug.
3. Inspect the spark plug for any of the following conditions:
 - Cracks or damage
 - Carbon tracking
 - Foreign material
 - Gap not within specification
 - Loose or broken electrode

NOTE: Lightly tap the bottom of the spark plug on a solid surface. The electrode in the spark plug should not move.

Were any problems found?

Yes

- Replace the spark plug.

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

No

- Go to step 5

5. POSSIBLE CAUSES OF START AND STALL CONDITION

The following items should be checked as a possible cause for a start and stall condition:

- Perform any Technical Service Bulletins (TSBs) that may apply to the symptom.
- The exhaust system must be free of any restrictions.
- The engine compression must be within specifications.
- The engine valve timing must be within specifications.
- The engine must be free from vacuum leaks.
- The throttle body must be free of carbon buildup and dirt.
- Cracked spark plugs, carbon track on spark plugs, coil and coil boot.

Do any of the above conditions exist?

Yes

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

No

- Go to step 6

6. FUEL PUMP DELIVERY

1. Verify that the Fuel tank is not empty before continuing.
2. Follow the diagnostics for **CHECKING THE FUEL DELIVERY SYSTEM** . .

Was the No Start condition solved after following the above diagnostic test?

Yes

- Test Complete.

No

- Check for contamination/water in the fuel. Make sure the fuel being used in this vehicle meets OEM Fuel Requirement.

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

7. 5-VOLT SUPPLY CIRCUIT VOLTAGE (CMP)

1. Turn the ignition off.
2. Disconnect the Camshaft Position Sensor connector.
3. Turn the ignition on.
4. Measure the voltage of between the Sensor Ground circuit and the 5-volt Supply circuit in the Camshaft Position Sensor harness connector.

Is the voltage 5.0 volts?

Yes

- Go to step 8

No

- Repair the 5-volt Supply.

NOTE: **A battery disconnect must be performed to clear the Cam Crank Synchronization Events.**

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

8. SENSOR GROUND CIRCUIT TEST

1. Turn the ignition off.
2. Using a 12-volt test light connected to 12 volts, probe the Sensor Ground circuit in the Camshaft Position Sensor 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

- Go to step 9

No

- Repair the Ground Circuit.

NOTE: **A battery disconnect must be performed to clear the Cam Crank**

Synchronization Events.

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

9. CMP SIGNAL

1. Turn the ignition on.
2. Measure the voltage of the CMP Signal circuit in the Camshaft Position Sensor harness connector.

Is the voltage between 4.7 and 5.0 volts?

Yes

- Go to step 13

No

- Go to step 10

10. CMP SIGNAL CIRCUIT SHORTED TO VOLTAGE

1. Turn the ignition off.
2. Disconnect the C2 Powertrain Control Module harness connector.
3. Turn the ignition on.
4. Measure the voltage of the CMP Signal circuit in the Camshaft Position Sensor harness connector.

Is there any voltage present?

Yes

- Repair the CMP Signal circuit for a short to voltage.

NOTE: **A battery disconnect must be performed to clear the Cam Crank Synchronization Events.**

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

No

- Go to step 11

11. CMP SIGNAL CIRCUIT SHORTED TO GROUND

1. Turn the ignition off.
2. Measure the resistance between ground and the CMP Signal circuit in the Camshaft Position Sensor harness connector.

Is the resistance above 100 Ohms?

Yes

- Go to step 12

No

- Repair the CMP Signal circuit for a short to ground.

NOTE: **A battery disconnect must be performed to clear the Cam Crank Synchronization Events.**

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

12. CMP SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install the PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the CMP Signal circuit between the Camshaft Position Sensor harness connector and the appropriate terminal of PCM Pinout Box 8815.

Is the resistance below 5.0 Ohms?

Yes

- Go to step 24

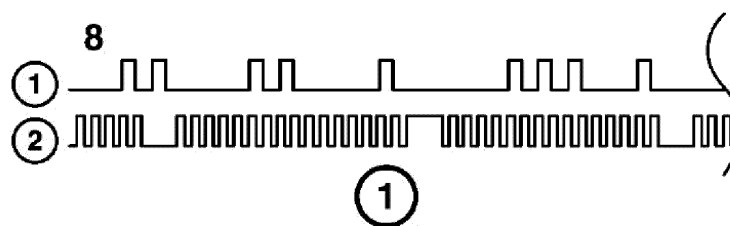
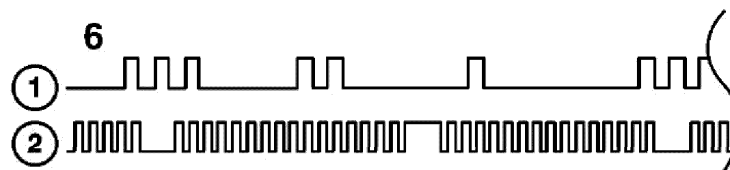
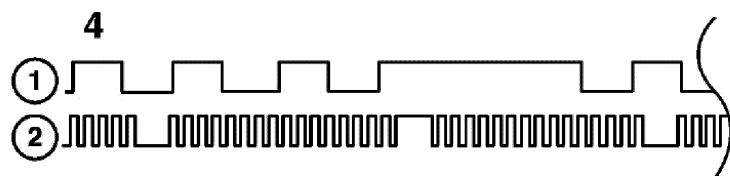
No

- Repair the CMP Signal circuit for an open circuit or high resistance.

NOTE: **A battery disconnect must be performed to clear the Cam Crank Synchronization Events.**

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

13. CAMSHAFT POSITION SENSOR SIGNAL

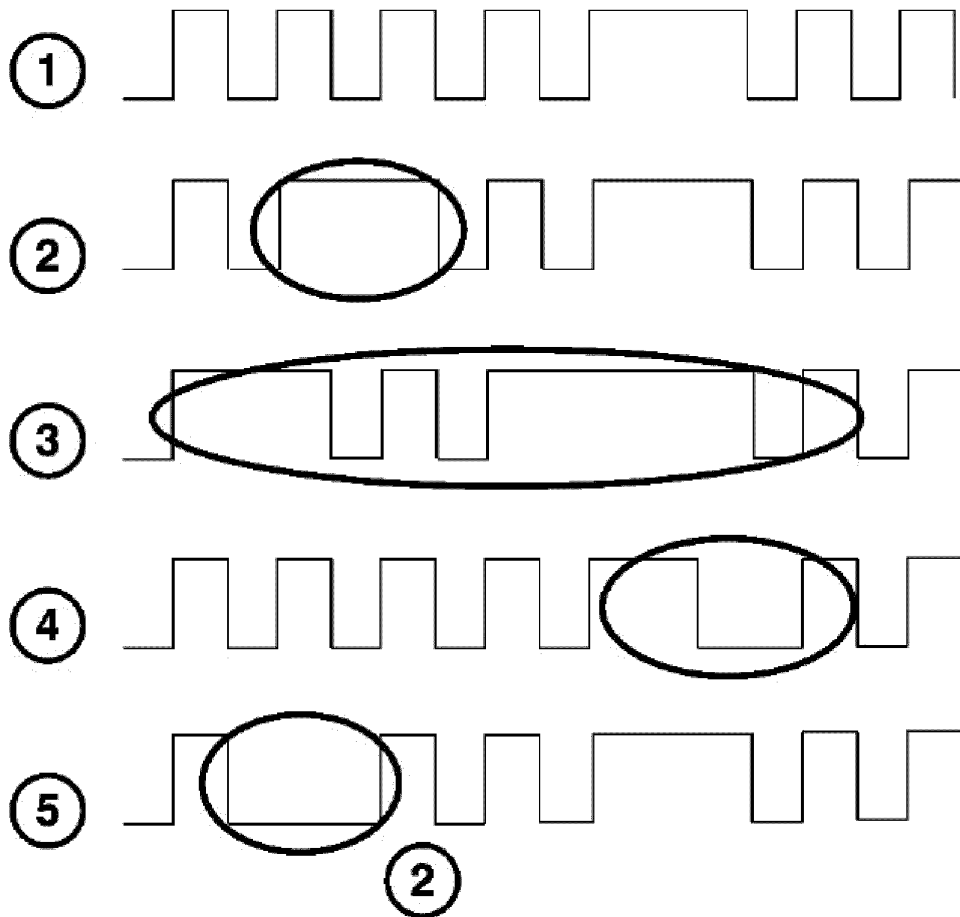


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Fig. 43: Cam/Crank Sensors Scope Patterns (1 Of 2)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

2. **Fig. 43** is a depiction of typical scope patterns of the Cam (1) and Crank (2) sensors for 4, 6, and 8 cylinder engines. The square wave patterns are uniform and are identical to one another. The patterns must be evenly spread apart and at the same height. The larger gap pattern (signature) after the shorter wave forms are used for cylinder identification (Crank signal) and the distance between the series of slots (trigger) on the camshaft pulley (cam signal). Any variation of the pattern will indicate an issue with the sensor, wiring, or trigger (target) wheel.



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Fig. 44: Cam/Crank Sensors Scope Patterns (2 Of 2)

Courtesy of CHRYSLER LLC

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install the PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

3. With a lab scope, probe the CMP Signal circuit in the appropriate terminal of the PCM Pinout Box 8815.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts, or fan. Do not wear loose clothing. Failure to follow these instructions can result in possible serious or fatal injury.

4. Start and allow the engine to run.
5. Observe the lab scope screen.
6. Compare the scope pattern with the ones in Figure 2.
 1. Pattern indicates a clean (good) square wave form that is identical to what the cam and crank should be. The square wave patterns are uniformed and are identical to one another.
 2. Two pulses joined together in the same spot on target. Indicates damage to the target (trigger) on the flex plate or broke tooth, runout in the target or large air gap between the sensor and the target wheel.
 3. Wide air gap or intermittent connection.
 4. Early signature, predominately at high speed. Large air gap between the sensor and the target wheel.
 5. Missed pulse. Possible burr or light damage to target or incorrect lateral position of the crank sensor to target (trigger).

NOTE: If any of the above (except pattern 1) is displayed on the lab scope repair as necessary.

Was the square wave found to match any of the above except pattern 1?

Yes

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

No

- Replace the Camshaft Position Sensors.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

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

14. 5-VOLT SUPPLY CIRCUIT VOLTAGE (CKP)

1. Turn the ignition off.
2. Disconnect the Crankshaft Position Sensor connector.
3. Turn the ignition on.
4. Measure the voltage of the 5-volt Supply circuit in the Crankshaft Position Sensor harness connector.

Is the voltage 5.0 volts?

Yes

- Go to step 15

No

- Repair the 5-volt Supply.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

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

15. SENSOR GROUND CIRCUIT TEST

1. Turn the ignition off.
2. Using a 12-volt test light connected to 12 volts, check the Sensor Ground circuit in the Crankshaft Position Sensor 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

- Go to step 16

No

- Repair the Ground Circuit.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

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

16. CKP SIGNAL

1. Turn the ignition on.
2. Measure the voltage of the CKP Signal circuit in the Crankshaft Position Sensor harness connector.

Is the voltage between 4.7 and 5.0 volts?

Yes

- Go to step 20

No

- Go to step 17

17. CKP SIGNAL CIRCUIT SHORTED TO VOLTAGE

1. Turn the ignition off.
2. Disconnect the Powertrain Control Module (PCM) connector.
3. Turn the ignition on.
4. Measure the voltage of the CKP Signal circuit in the Crankshaft Position Sensor harness connector.

Is there any voltage present?

Yes

- Repair the CKP Signal circuit for a short to voltage.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

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

No

- Go to step 18

18. CKP SIGNAL CIRCUIT SHORTED TO GROUND

1. Turn the ignition off.
2. Measure the resistance between ground and the CKP Signal circuit in the Crankshaft Position Sensor harness connector.

Is the resistance above 100 Ohms?

Yes

- Go to step 19

No

- Repair the CMP Signal circuit for a short to ground.

NOTE: **A battery disconnect must be performed to clear the Cam Crank Synchronization Events.**

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

19. CKP SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install the PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the CKP Signal circuit between the Camshaft Position Sensor harness connector and the appropriate terminal of PCM Pinout Box 8815.

Is the resistance below 5.0 Ohms?

Yes

- Go to step 24

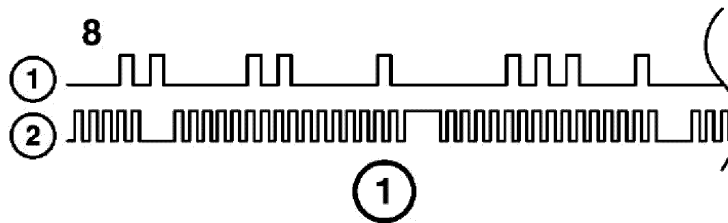
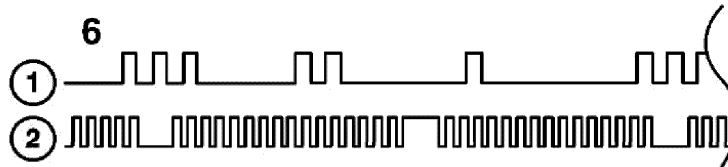
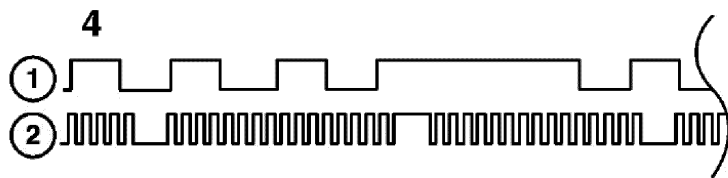
No

- Repair the CMP Signal circuit for an open circuit or high resistance.

NOTE: **A battery disconnect must be performed to clear the Cam Crank Synchronization Events.**

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

20. CRANKSHAFT POSITION SENSOR SIGNAL

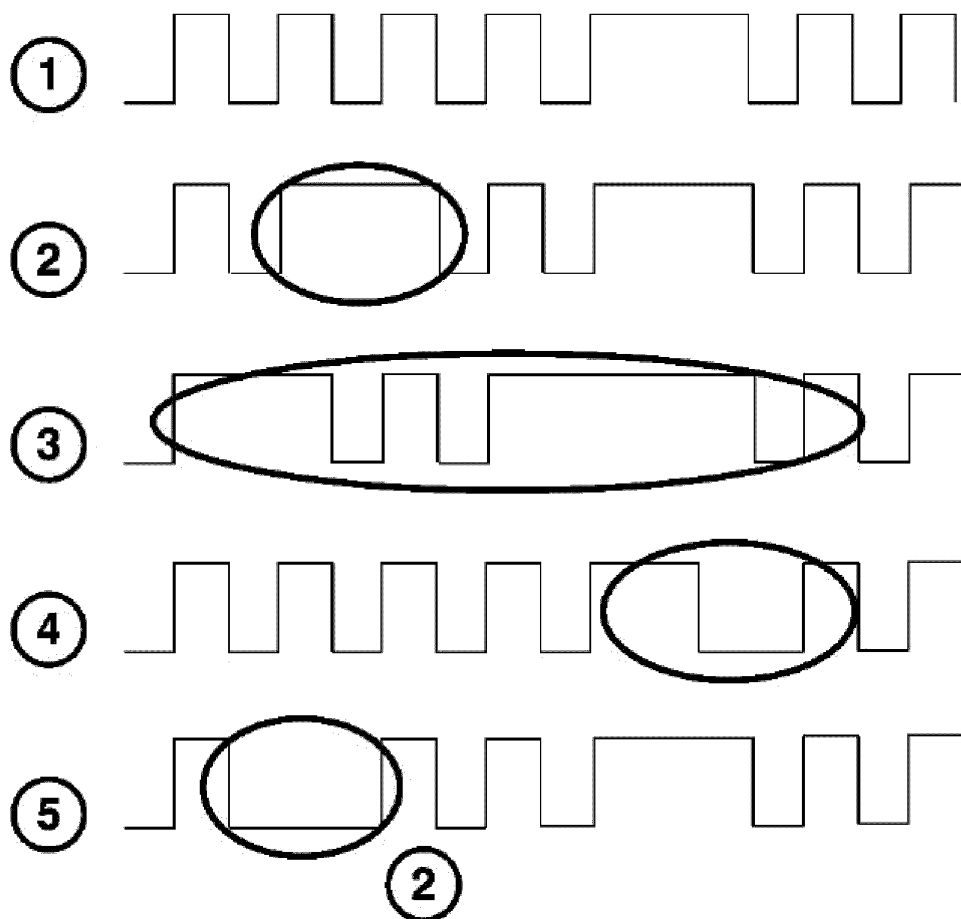


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Fig. 45: Cam/Crank Sensors Scope Patterns (1 Of 2)
 Courtesy of CHRYSLER LLC

1. Turn the ignition off.

2. **Fig. 45** is a depiction of typical scope patterns of the Cam (1) and Crank (2) sensors for 4, 6, and 8 cylinder engines. The square wave patterns are uniform and are identical to one another. The patterns must be evenly spread apart and at the same height. The larger gap pattern (signature) after the shorter wave forms are used for cylinder identification (Crank signal) and the distance between the series of slots (trigger) on the camshaft pulley (cam signal). Any variation of the pattern will indicate an issue with the sensor, wiring, and trigger (target) wheel.



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Fig. 46: Cam/Crank Sensors Scope Patterns (2 Of 2)

Courtesy of CHRYSLER LLC

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install the PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

3. With a lab scope, probe the CKP Signal circuit in the appropriate terminal of the PCM Pinout Box 8815.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts, or fan. Do not wear loose clothing. Failure to follow these instructions can result in possible serious or fatal injury.

4. Start and allow the engine to run.
5. Observe the lab scope screen.
6. Compare the scope pattern with the ones in Figure 2.
 1. Pattern indicates a clean (good) square wave form that is identical to what the cam and crank should be. The square wave patterns are uniformed and are identical to one another.
 2. Two pulses joined together in the same spot on target. Indicates damage to the target (trigger) on the flex plate or broke tooth, runout in the target or large air gap between the sensor and the target wheel.
 3. Wide air gap or intermittent connection.
 4. Early signature, predominately at high speed. Large air gap between the sensor and the target wheel.
 5. Missed pulse. Possible burr or light damage to target or incorrect lateral position of the crank sensor to target (trigger).

NOTE: If any of the above (except pattern 1) is displayed on the lab scope repair as necessary.

Was the square wave found to match any of the above except pattern 1?

Yes

- Repair as necessary.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

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

No

- Replace the Crankshaft Position Sensor.

NOTE: **A battery disconnect must be performed to clear the Cam Crank Synchronization Events.**

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

21. VALVE TIMING

1. Make sure the valve timing is within specification. Refer to the appropriate diagnostic procedure.

Was the valve timing within specification?

Yes

- Go to step 22

No

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

22. 5-VOLT SUPPLY CIRCUIT VOLTAGE (CMP/CKP)

NOTE: **The 5-volt Supply circuit must be present at both CMP and CKP Sensors.**

1. Turn the ignition off.
2. Disconnect the Camshaft Position Sensor connector.
3. Turn the ignition on.
4. Measure the voltage of the 5-volt Supply circuit in the Camshaft Position Sensor harness connector.
5. **Repeat the above test at the Crankshaft Position Sensor (Crankshaft Position Sensor harness connector measure).**

Is the voltage 5.0 volts at each sensor?

Yes

- Go to step 23

No

- Repair the 5-volt Supply circuit(s) as necessary.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

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

23. SENSOR GROUND CIRCUIT

NOTE: The Ground circuit must be present at both CMP and CKP Sensors.

1. Turn the ignition off.
2. Using a 12-volt test light connected to 12 volts, probe the Sensor Ground circuit in the Camshaft Position Sensor harness connector.
3. Repeat the above test at the Crankshaft Position Sensor (Crankshaft Position Sensor harness connector measure).

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 both the Camshaft Position Sensor and Crankshaft Position Sensor in accordance with the Service Information.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

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

No

- Repair the Ground Circuit(s) as necessary.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

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

24. POWERTRAIN CONTROL MODULE (PCM)

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Camshaft Position Sensor and the Powertrain Control Module (PCM).
2. Look for any chafed, nicked, pinched, or partially broken wires.

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3. Look for broken, bent, pushed out or corroded terminals.
4. Monitor the scan tool data relative to this circuit and wiggle test the wiring and connectors.
5. Look for the data to change or for the DTC to reset during the wiggle test.
6. Perform any Technical Service Bulletins that may apply.

Were any problems found?

Yes

- Repair as necessary.

NOTE: **A battery disconnect must be performed to clear the Cam Crank Synchronization Events.**

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

No

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