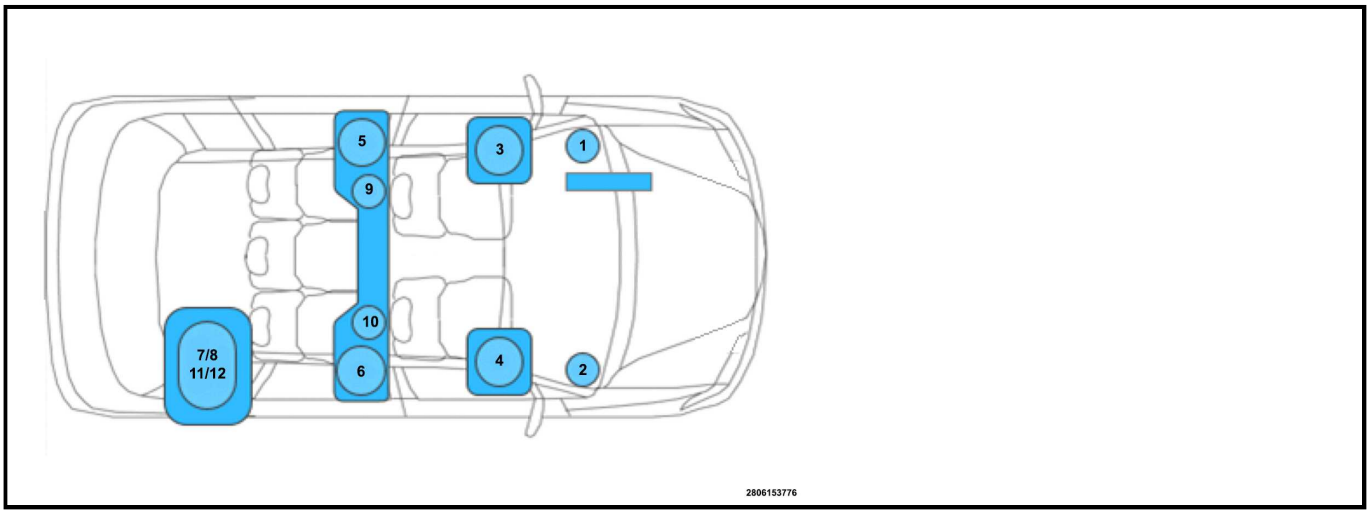
DTC TROUBLESHOOTING

B1460-11-CHANNEL 1 AUDIO SPEAKER OUTPUT - CIRCUIT SHORT TO GROUND

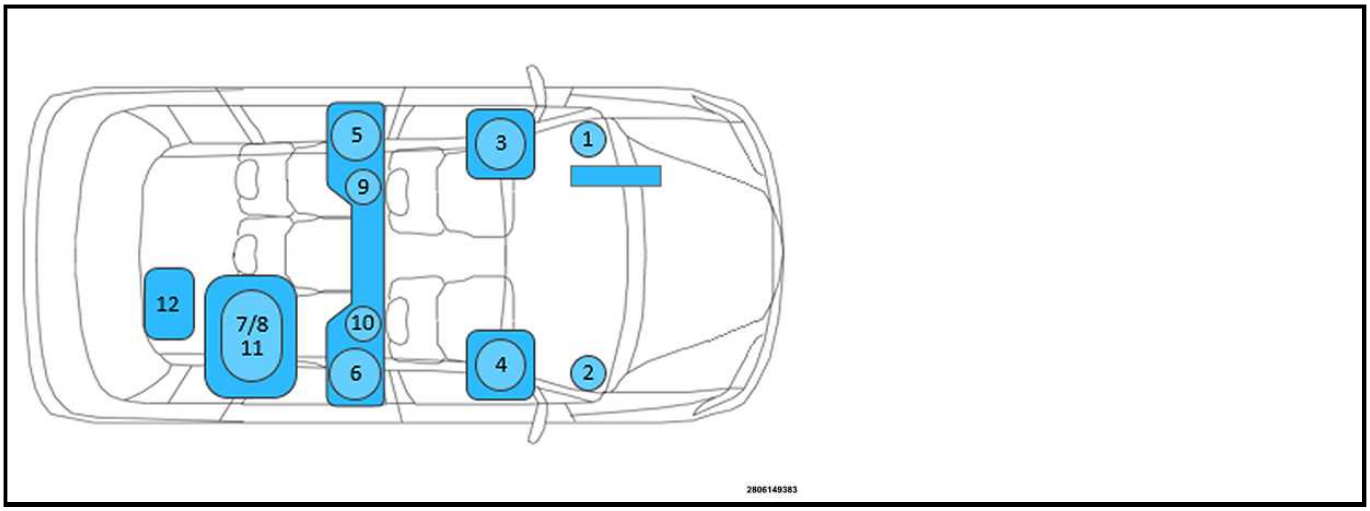
For a complete AUDIO SYSTEM BASE/PREMIUM wiring diagram, **Refer to the appropriate wiring information** .

AUDIO CHANNEL MAPPING

NOTE: **Proper diagnosis of the audio system will require the use of this Audio Channel Mapping in addition to using the Audio System wiring diagrams. The use of Audio Channel Mapping and sales codes are being used to quickly identify those differences in locations; and the total number of speakers in the audio system configurations noted below.**



CHANNEL 12	
SALES CODE	**DESCRIPTION**
Without RSJ	WIRELESS SPEAKER - BLUETOOTH



CHANNEL 12	
SALES CODE	**DESCRIPTION**
RSJ	WIRELESS SPEAKER - BLUETOOTH

Is there continuity between ground and the circuit being tested?

Yes

- Repair the circuit for a short to ground. Use the wiring diagram as a guide to trace the circuit and look for any in-line connectors to help isolate the location of the short.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

No

- Go To 4

4. **ISOLATE AND CHECK THE SPEAKER (-) CIRCUIT FOR A SHORT TO GROUND**
    1. The ignition must be off when checking a circuit for continuity to ground.
    2. Isolate the circuit by disconnecting the Electronic Control Unit (ECU) and every component harness connector containing the circuit being tested. **Note:** Use the wiring diagram as a guide to follow the path of the circuit.
    3. Connect the negative lead of the DVOM to a known good ground.
    4. With the positive lead of the DVOM, probe the circuit being tested at the component harness connector and check for continuity between the circuit and ground.

NOTE: **When probing a circuit at an Electronic Control Unit (ECU) harness connector, always use an appropriate back probing tool to prevent any possible damage to the ECU terminals.**

NOTE: **There should be no continuity between ground and the circuit being tested.**

Is there continuity between ground and the circuit being tested?

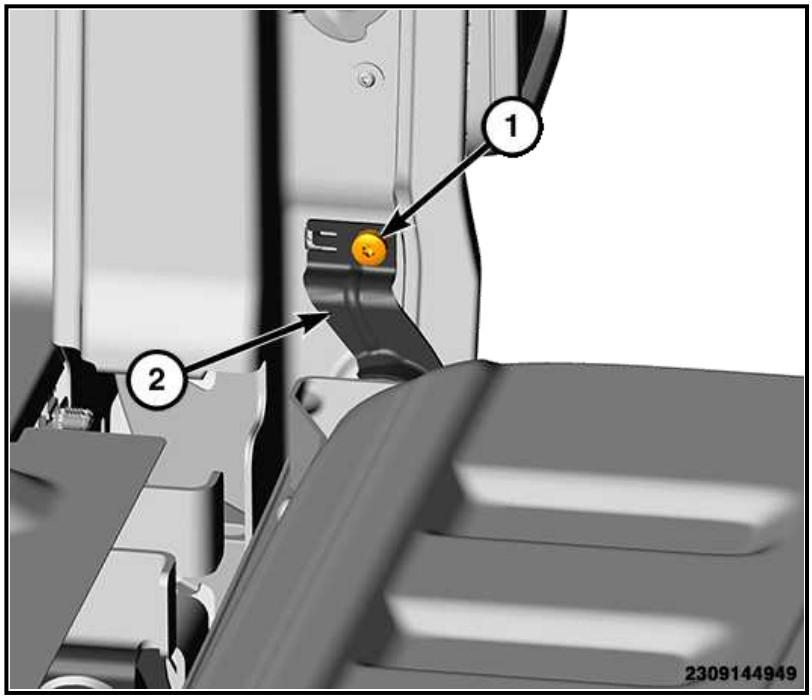
Yes

- Repair the circuit for a short to ground. Use the wiring diagram as a guide to trace the circuit and look for any in-line connectors to help isolate the location of the short.
- Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

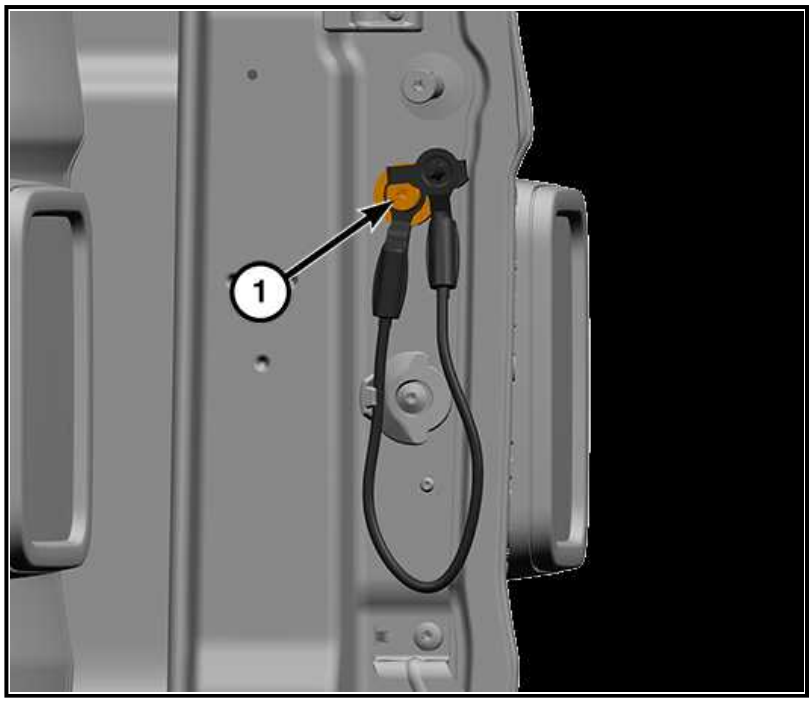
No

- Go To 5

5. **CHECK RELATED HARNESS CONNECTIONS**
    1. Disconnect all Amplifier harness connectors.
    2. Disconnect all related in-line harness connections (if equipped).
    3. Disconnect the related component harness connectors.
    4. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.



5. Install the lock plate (2) and install the screw (1)
6. Tighten the screw (1) to the proper Refer to **TORQUE SPECIFICATIONS** .



7. Position the tailgate check cable onto the left and right side of the cargo box.
8. Install the bolts (1) that secure the tailgate check cable(s) to the box and tighten to the proper Refer to **TORQUE SPECIFICATIONS** .

6. **DISCONNECT THE BCM HARNESS CONNECTOR(S) - CHECK THE RESISTANCE ON THE (W2) WIPER HIGH/LOW RELAY CONTROL CIRCUIT BETWEEN THE BCM AND WIPER HIGH/LOW RELAY TERMINAL**
    1. The ignition must be off when checking the resistance of a circuit.
    2. Disconnect all Electronic Control Unit (ECU) harness connectors containing the circuit being tested. **Note:** Use the wiring diagram as a guide to follow the path of the circuit.
    3. Before measuring the resistance of any circuit, first measure the resistance between the two leads of the DVOM. **Note:** The meter leads can add resistance to the measurement value.
    4. Connect one lead of the DVOM to the circuit being tested at the relay terminal in the PDC Assembly.
    5. Connect the other lead to the circuit being tested at the ECU harness connector and measure the resistance of the circuit.

    NOTE: **When probing a circuit at any harness connector, always use an appropriate probing tool to prevent any possible damage to the harness connector terminals.**

    Is the resistance above 3.0 Ohms?

    Yes

    - Go To 7

    No

    - Go To 8
7. **DISCONNECT THE PDC ASSEMBLY HARNESS CONNECTOR(S) AND CHECK THE (W2) WIPER HIGH/LOW RELAY CONTROL CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**
    1. The ignition must be off when checking the resistance of a circuit.
    2. Disconnect all Power Distribution Center (PDC) Assembly harness connectors containing the circuit being tested. **Note:** Use the wiring diagram as a guide to follow the path of the circuit.
    3. Before measuring the resistance of any circuit, first measure the resistance between the two leads of the DVOM. **Note:** The meter leads can add resistance to the measurement value.
    4. Connect one lead of the DVOM to the circuit being tested at the PDC Assembly harness connector.
    5. Connect the other lead to the circuit being tested at the Electronic Control Unit (ECU) harness connector and measure the resistance of the circuit.

    NOTE: **When probing a circuit at any harness connector, always use an appropriate probing tool to prevent any possible damage to the harness connector terminals.**

    Is the resistance above 3.0 Ohms?

    Yes

    - Repair the circuit for an open or high resistance.
    - Perform the BODY VERIFICATION TEST. Refer to **BODY VERIFICATION TEST** .

    No

    - Go To 10
8. **CHECK THE PDC ASSEMBLY GROUND CIRCUIT(S) FOR AN OPEN OR HIGH RESISTANCE BY LOAD TESTING THE CIRCUIT AT THE WIPER HIGH/LOW RELAY TERMINAL**

RADIO

Refer to COMPONENT INDEX.

Inputs

- Radio Mode status
- Dead reckoning information
- GPS data
- GPS antenna fail information
- Touchscreen input request
- Outputs from BCM
- Distance unit

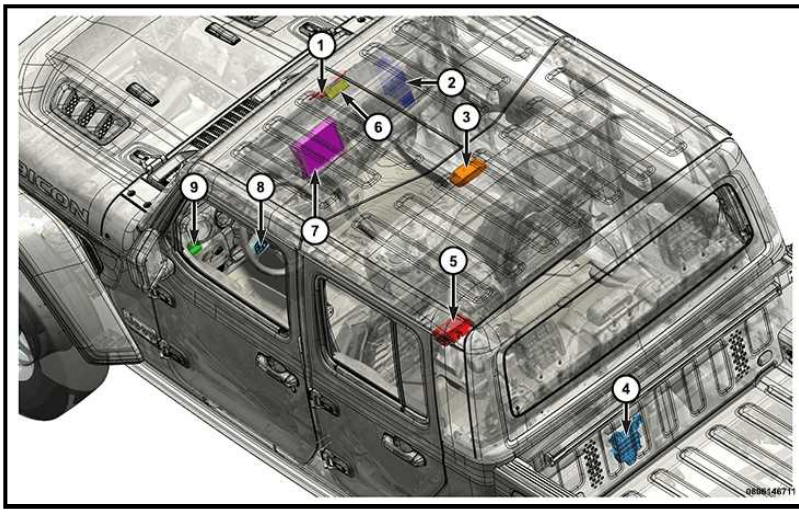
Outputs

- Short distances unit data
- Navigation vocal instructions
- Navigation visual instructions information

The navigation system components cannot be adjusted or repaired. If any of the navigation system components is damaged or ineffective, that component must be replaced. The external combination antenna can be repaired separately from the radio. The navigation system software as well as the map data is flash programmable through the USB port.

UCONNECT + SIRIUSXM GUARDIAN

DESCRIPTION



The UconnectB® + SiriusXMB® Guardian™ system includes the following major components:

COMPONENT INDEX

1.	Refer to MICROPHONES.
2.	Refer to BODY CONTROL MODULE (BCM).
3.	Refer to LONG TERM EVOLUTION 1 (LTE1) ANTENNA.
4.	Refer to RADIO FREQUENCY HUB (RFH) MODULE.
5.	Refer to OCCUPANT RESTRAINT CONTROLLER (ORC).
6.	Refer to SOS/ASSIST SWITCHES - part of the Passenger AirBag (PAB) Indicator.
7.	Refer to RADIO.

- Perform a terminal drag test on each connector terminal to verify proper terminal tension.

Repair any conditions that are found.

5. Reconnect all ESM harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
6. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
7. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
8. With the scan tool, erase DTCs.
9. Using the recorded Event and Environmental Data, along with the When Monitored and Set Conditions above, operate the vehicle in the conditions that set the DTC.
10. With the scan tool, read ESM DTCs.

Did the DTC return?

Yes

- Replace the PRNDM Display in accordance with the Service information.
- Perform the ESM VERIFICATION TEST. Refer to **ELECTRONIC SHIFT MODULE (ESM) VERIFICATION TEST**.
- If the DTC returns, replace the Electronic Shift Module (ESM) in accordance with the Service information. Refer to **SHIFTER, TRANSMISSION, REMOVAL AND INSTALLATION** , or **SHIFTER, TRANSMISSION, REMOVAL AND INSTALLATION** .
- Perform the ESM VERIFICATION TEST. Refer to **ELECTRONIC SHIFT MODULE (ESM) VERIFICATION TEST**.

No

- Perform the ESM VERIFICATION TEST. Refer to **ELECTRONIC SHIFT MODULE (ESM) VERIFICATION TEST**.
- Test complete.

5. **CHECK WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
    3. Wiggle the wires while checking for shorted and open circuits.
    4. Check for any Service Bulletins that may apply.

    Were there any problems found?

    Yes

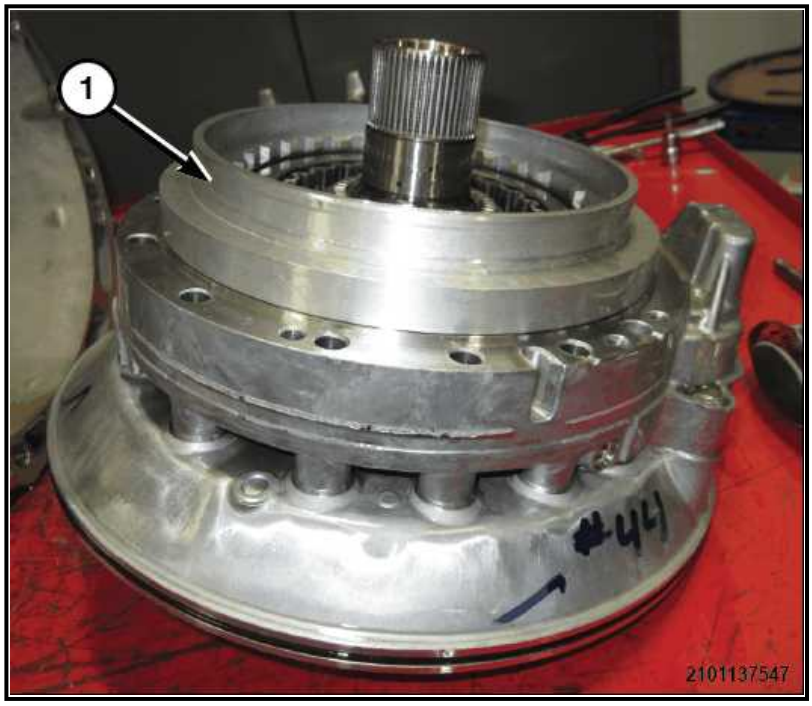
    - Repair as necessary.
    - Perform the ESM VERIFICATION TEST. Refer to **ELECTRONIC SHIFT MODULE (ESM) VERIFICATION TEST**.

    No

    - Test complete.

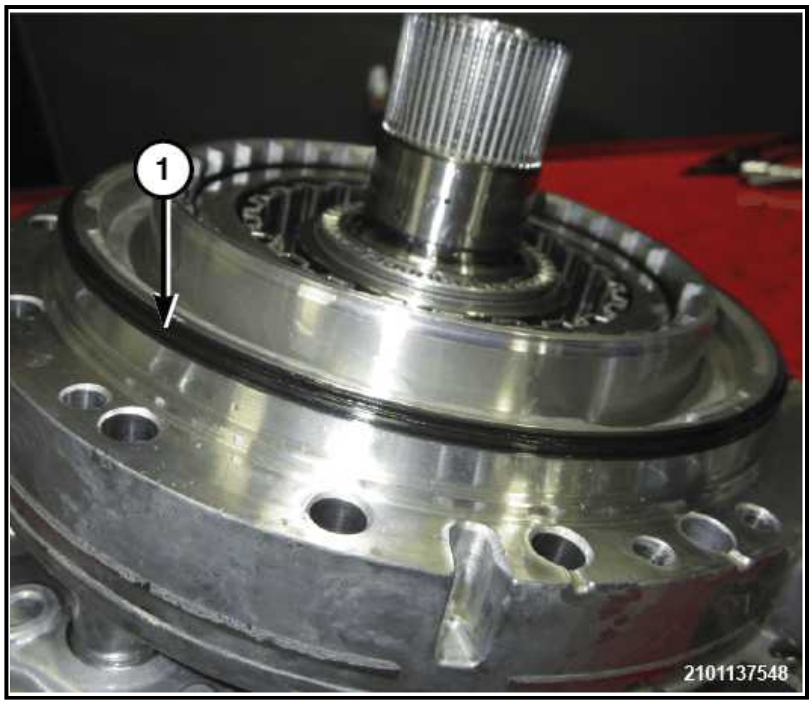
U11C3-00-ESM LOST COMMUNICATION WITH TCM ON D-PT CAN

For a complete TRANSMISSION wiring diagram, **refer to the appropriate wiring information** .



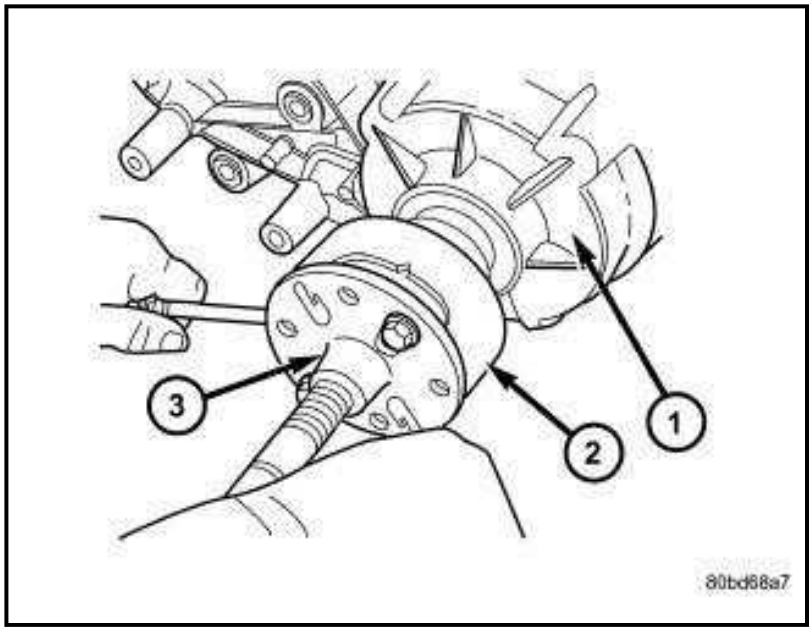
1 - Clutch B Piston

3. Remove the Clutch B piston from the assembly.



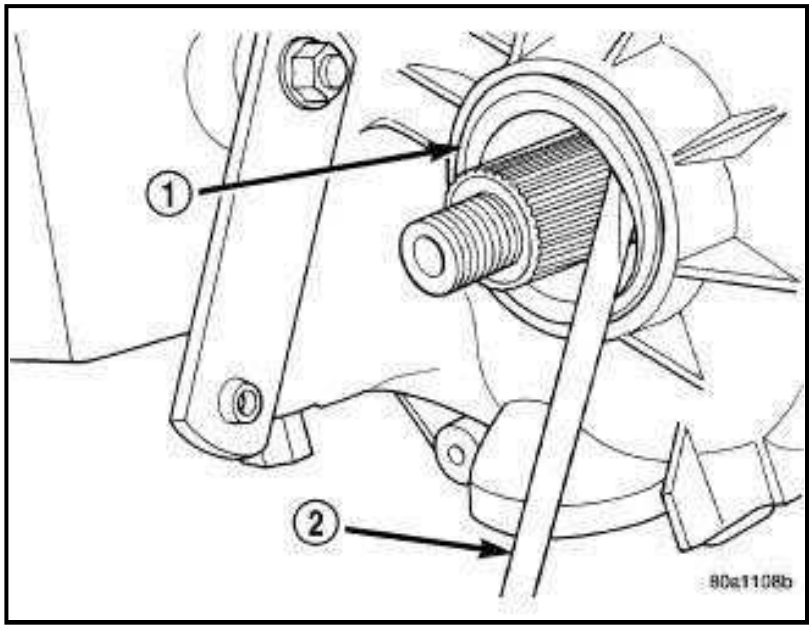
1 -Clutch B Piston Seal

4. Check the Clutch B piston seal for damage or wear and replace if necessary.



1 - Transfer Case Assembly
2 - Companion Flange
3 - Companion Flange Puller

5. Using the (special tool #C-452, Puller, Companion Flange) remove the companion flange from the assembly.



1 - Output shaft seal
2 - Seal Remover Tool

Front output seal as shown in illustration, rear output seal similar.

6. Remove the output shaft seal.

INSTALLATION

During installation, torque the fasteners to the specifications in the torque table(s) below.

Follow the removal procedure in reverse for general reassembly of the components on the vehicle. The steps listed below are calling out specific procedures that should be followed during installation.

- Use (special tool #6952A, Installer, Seal) as follows:

- Perform the appropriate diagnostic procedures before continuing with this test. Refer to **DIAGNOSIS AND TESTING** .

No

- Go To 4

4. **CHECK THE CONDITION OF THE BATTERY**
   1. Use the (special tool #GR8-1220KIT-CHRY, AGM Battery Tester/Charger Station)or equivalent to load test the Battery.

      Did the Battery pass or fail?

      Passed

      - Go To 5

      Failed

      - Perform the appropriate repair according to the Battery tester.
      - Perform the ABS VERIFICATION TEST. Refer to **ABS VERIFICATION TEST** .
5. **CHECK THE ANTI-LOCK BRAKE SYSTEM (ABS) MODULE SUPPLY FUSES**
   1. Turn the ignition on.
   2. With a 12-volt test light connected to ground, check the F106 (40A), F100 (30A) and F34 (10A) Fuses for power.

   Does the test light illuminate brightly?

   Yes

   - Go To 6

   No

   - If the related fuse is open, check the circuit for a short to ground
   - Perform the ABS VERIFICATION TEST. Refer to **ABS VERIFICATION TEST** .
6. **CHECK THE (A107) FUSED (B+), (A200) FUSED (B+) AND (F941) IGNITION RUN/START CONTROL OUTPUT CIRCUITS FOR HIGH RESISTANCE BY LOAD TESTING THE CIRCUIT**
   1. Disconnect the ABS Module harness connector to isolate the 12.0 volt supply circuit.
   2. Connect the positive lead of the load test tool to the 12.0 volt supply circuit at the ABS Module harness connector (A). **Note:** refer to the diagram below.
   3. Connect the negative lead of the load test tool to the ground circuit of the Battery or a good chassis ground.
   4. Make sure that the circuit being tested is being powered on. If the 12.0 volt circuit being tested is an ignition feed for example, the ignition must be on. If testing an output from a relay, verify that the relay is energized and on.
   5. The bulb on the load test tool should be illuminated and bright if there is no resistance in the circuitry.

   NOTE: **Why load test a circuit? A load test is used to determine if a circuit is capable of carrying the amperage needed to perform properly. The 3156 bulb in the load tool illustrated, is a simple but effective method of testing circuit functionality. A 3156 Bulb has approximately 6.0 Ohms of resistance when the bulb is powered and draws approximately 2.0 amps of current. Read the CIRCUIT LOAD TESTING PROCEDURE for**

Yes

- Perform the appropriate repair.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **PCM VERIFICATION TEST** .

No

- Go To 5

5. **CHECK THE (F204) FUSED IGNITION OUTPUT CIRCUIT AND THE (Z908) SENSOR GROUND CIRCUIT FOR A SHORT TO GROUND OR AN OPEN/HIGH RESISTANCE**
   1. Turn the engine off.
   2. Disconnect the NOx Sensor 1/1 Sensor (vehicle harness) harness connector.

      CAUTION: **Do not attempt to disconnect the NOx harness connector between the NOx Sensor Probe and the NOx Sensor Module. This connector is permanently attached to the NOx Sensor Module. Any attempt to remove this connector will permanently damage the NOx Sensor.**

   3. Turn the ignition on, engine off.
   4. Measure the voltage across the (F204) Fused Ignition Output circuit and the (Z908) Sensor Ground circuit at the NOx Sensor 1/1 (vehicle harness) harness connector.

      Does the voltage read within 1.0 volt of battery voltage?

      Yes

      - Go To 6

      No

      - Repair the (F204) Fused Ignition Output circuit for an open or short to ground, or check the (Z908) Sensor Ground circuit for an open.
      - Perform the POWERTRAIN VERIFICATION TEST. Refer to **PCM VERIFICATION TEST** .

6. **CHECK FOR DAMAGED WIRES OR DAMAGED TERMINALS**
   1. Turn the ignition off.

      CAUTION: **Do not attempt to disconnect the NOx harness connector between the NOx Sensor Probe and the NOx Sensor Module. This connector is permanently attached to the NOx Sensor Module. Any attempt to remove this connector will permanently damage the NOx Sensor.**

   2. Using the appropriate wiring diagram/schematic as a guide, inspect the wiring and connectors between the NOx Sensor 1/1 and the Powertrain Control Module (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 POWERTRAIN VERIFICATION TEST. Refer to **PCM VERIFICATION TEST** .

Did the DTC return?

Yes

- Go To 6

No

- Replacing the faulty component repaired the fault.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **PCM VERIFICATION TEST** .

6. **CHECK RELATED PCM AND COMPONENT CONNECTIONS**
    1. Perform any Service Bulletins that apply.
    2. Disconnect all PCM harness connectors.
    3. Disconnect all related in-line harness connections (if equipped).
    4. Disconnect the related component harness connectors.
    5. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.
        - Check for spread terminals and verify proper terminal tension.

        Repair any conditions that are found.

    6. Reconnect all PCM harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
    7. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
    8. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
    9. With the scan tool, erase DTCs.
    10. Test drive or operate the vehicle in accordance with the when monitored and set conditions.
    11. With the scan tool, read DTCs.

        Did the DTC return?

        Yes

        - Replace and program the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL (PCM), REMOVAL AND INSTALLATION** .
        - Perform the POWERTRAIN VERIFICATION TEST. Refer to **PCM VERIFICATION TEST** .

        No

        - The wiring or poor connection problem has been repaired.

Yes

- Go To 2

No

- Perform the INTERMITTENT CONDITION diagnostic procedure. Refer to **INTERMITTENT DTC** .

2. **CHECK FOR OTHER DTCS**
   1. Refer to the recorded DTCs.

      Are there any DEF Level circuit Low or High DTCs or DEF Heater-related DTCs Active or Pending?

      Yes

      - Perform the applicable diagnostic procedure(s). Refer to **3.0L DIESEL - DIAGNOSTIC CODE INDEX** .

      No

      - Go To 3

3. **VISUALLY INSPECT FOR ICE FORMATION IN THE DEF TANK**

   NOTE: Ice forming on the inside of the DEF Tank can set this DTC.

   1. Remove the filler tube to the DEF Tank and visually inspect for the presence of ice crystals forming.

      Are there ice crystals forming within the DEF system?

      Yes

      - Allow the vehicle to remain inside the repair facility long enough for the ice within the DEF System to dissolve. Then, return to Test Step **1. CHECK FOR AN ACTIVE DTC** .

        If the DTC does not return, perform the POWERTRAIN VERIFICATION TEST. If the DTC does return, continue this Diagnostic Procedure from the beginning.

      - Perform the POWERTRAIN VERIFICATION TEST. Refer to **PCM VERIFICATION TEST** .

      No

      - Go To 4

4. **INSTALL A NEW DEF LEVEL/TEMPERATURE SENSOR ASSEMBLY (ENTIRE DEF TANK) AND RETEST FOR DTC**
   1. Turn the ignition off.
   2. Install a new DEF Level/Temperature Sensor Assembly in accordance with the Service Information. (Must replace entire DEF Tank).
   3. Turn the ignition on.
   4. With the scan tool, erase PCM DTCs.
   5. Start the engine and allow to reach operating temperature.
   6. Test drive the vehicle during normal operating conditions.
   7. With the scan tool, read PCM DTCs.

- Go To 7

7. **CHECK RELATED PCM AND COMPONENT CONNECTIONS**
    1. Perform any Service Bulletins that apply.
    2. Disconnect all PCM harness connectors.
    3. Disconnect all related in-line harness connections (if equipped).
    4. Disconnect the related component harness connectors.
    5. Inspect harness connectors, component connectors, and all male and female terminals for the following conditions:
        - Proper connector installation.
        - Damaged connector locks.
        - Corrosion.
        - Other signs of water intrusion.
        - Weather seal damage (if equipped).
        - Bent terminals.
        - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
        - Terminals that have been pushed back into the connector cavity.
        - Check for spread terminals and verify proper terminal tension.

        Repair any conditions that are found.

    6. Reconnect all PCM harness connectors. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
    7. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
    8. Reconnect all related component harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
    9. With the scan tool, erase DTCs.
    10. Test drive or operate the vehicle in accordance with the when monitored and set conditions.
    11. With the scan tool, read DTCs.

        Did the DTC return?

        Yes

        - Replace and program the Powertrain Control Module (PCM) in accordance with the Service Information. Refer to **MODULE, POWERTRAIN CONTROL (PCM), REMOVAL AND INSTALLATION** .
        - Perform the POWERTRAIN VERIFICATION TEST. Refer to **POWERTRAIN VERIFICATION TEST** .

        No

        - The wiring or poor connection problem has been repaired.
        - Perform the POWERTRAIN VERIFICATION TEST. Refer to **POWERTRAIN VERIFICATION TEST** .

P0037-O2-SENSOR 1/2 HEATER CIRCUIT LOW

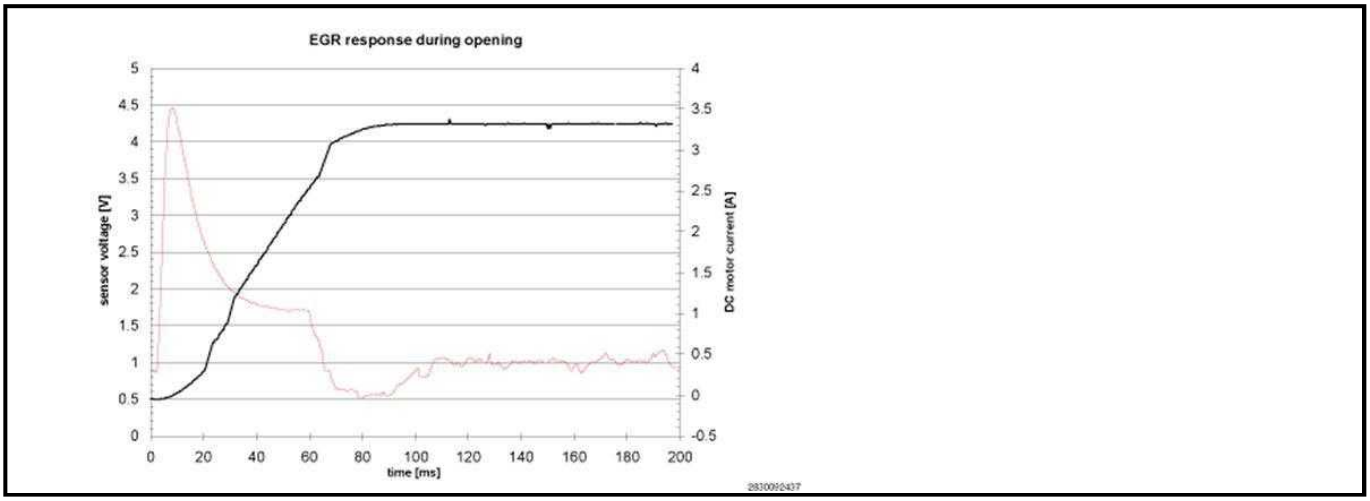
For a complete CATALYST MONITOR SYSTEM wiring diagram, **refer to the appropriate wiring information** .

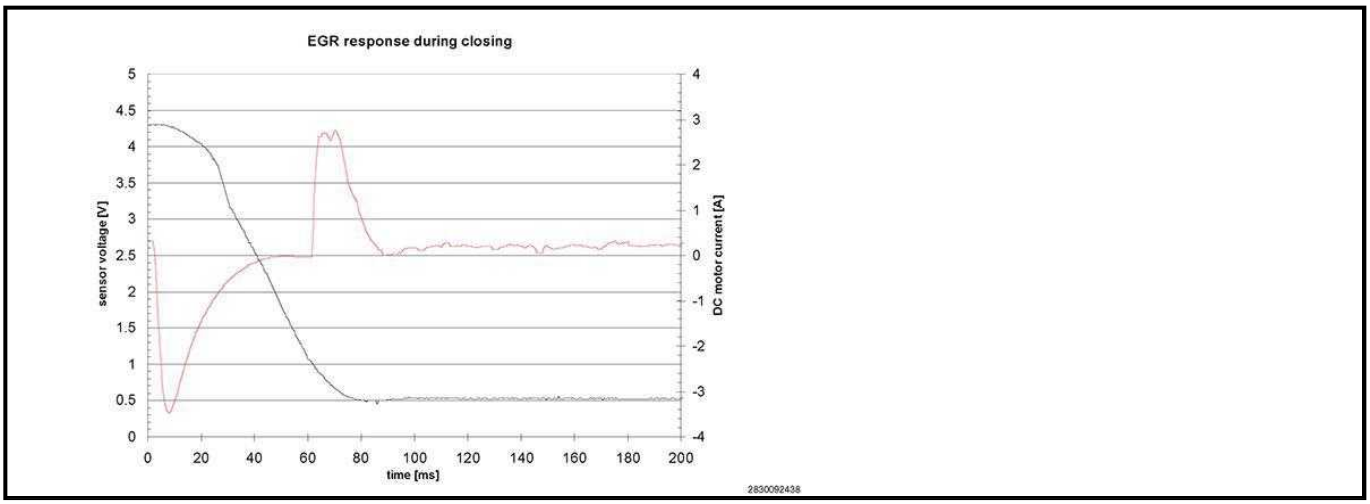
operates the DC Motor using a Pulse Width Modulation (PWM) control to help reduce current draw. This helps protect the DC Motor from overheating and reduces electrical load on the system voltage.

- During initial opening of the EGR Valve the PCM drives the Pulse Width Modulation (PWM) voltage high resulting in a high current draw. After the valve is fully opened the PCM voltage is reduced to maintain the EGR Valve position. This reduces the current draw and protects from overheating the DC Motor.
    - The PCM monitors the temperature and current draw of the DC Motor inside EGR Valve and will adjust the duty cycle to prevent the EGR Valve windings from overheating. Typically, the peak current draw by the EGR Valve occurs during opening and the maximum current load for a typical application is approximately 6.0 amps. The duty cycle is adjusted after opening so that the typical average current draw is approximately 0.5 amps while holding the valve open.
- The PCM also applies a current in the closing direction to fulfill the required dynamic performance. This is done to control the closing speed of the shaft near the stop. This ensures that the valve does not close too fast causing the valve disk to be forced into the stop harshly which may damage the internal gearbox.

There is a position sensor located on the output shaft. The sensor operates as a typical three wire sensor, with a 5-Volt Supply, Sensor Signal, and Sensor Ground circuit. Full range of travel of the output shaft will result in a change of approximately 3.9 volts in the position sensor reading. During normal operation the position sensor signal voltage will range between approximately 0.5 volts (closed) and 4.3 volts (open).

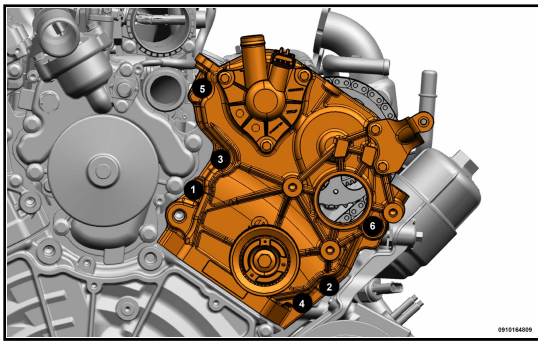
NOTE: **See the figures below for a typical current draw on the DC Motor and voltage reading of the sensor during the EGR Valve opening and closing. The red line represents current draw of the DC Motor and the black line represents the position sensor voltage.**

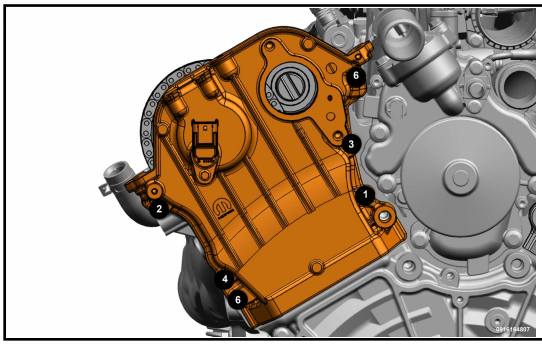


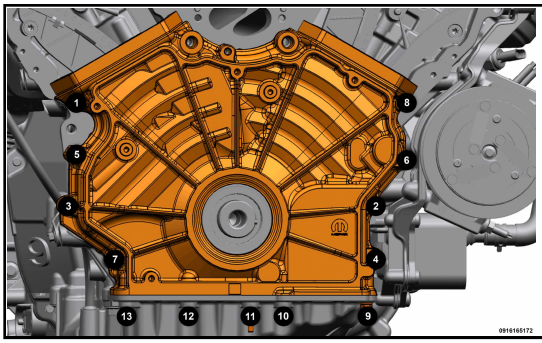


WHEN MONITORED

CALLOUT	DESCRIPTIONS	SPECIFICATIONS	COMMENT
7	Vibration Damper Cover Bolts	**10 N.m (7 Ft. Lbs.)**	-
8	Vibration Damper Cover Nut	**9 N.m (80 In. Lbs.)**	-
10	Belt Tensioner to Mounting Bracket - M10 Bolt	**45 N.m (33 Ft. Lbs.)**	-
11	Belt Tensioner to Mounting Bracket - M6 Bolt	**11 N.m (8 Ft. Lbs.)**	-
-	Fuel Injection Pump Blocker Plate Bolts	**25 N.m (18 Ft. Lbs.)**	-
-	Oil Breather/Camshaft Seal Housing Bolts	**14 N.m (10 Ft. Lbs.)**	-
-	Vacuum Pump Bolt	**30 N.m (22 Ft. Lbs.)**	-







AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL AND INSTALLATION

AIR CLEANER

REMOVAL

1. Loosen the clamp and remove the clean air hose.