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HEATING & AIR CONDITIONING

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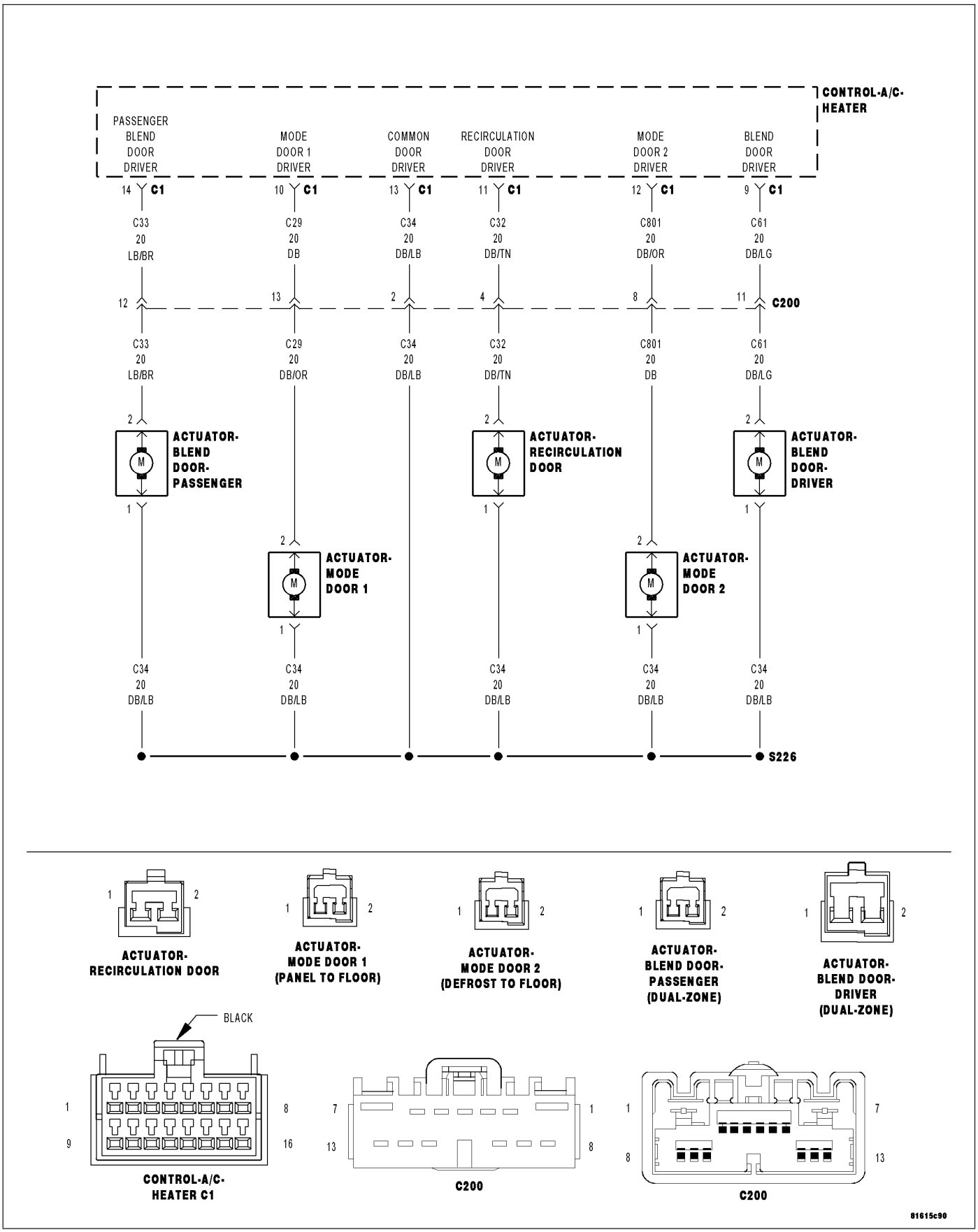
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HVAC - ELECTRICAL DIAGNOSTICS

DIAGNOSIS AND TESTING

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B10AA–RIGHT BLEND DOOR CONTROL CIRCUIT LOW (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Passenger Blend Door Actuator via the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C33) Passenger Blend Door Driver circuit is shorted to ground.

Possible Causes
(C33) PASSENGER BLEND DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C33) PASSENGER BLEND DOOR DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
PASSENGER BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C33) PASSENGER BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

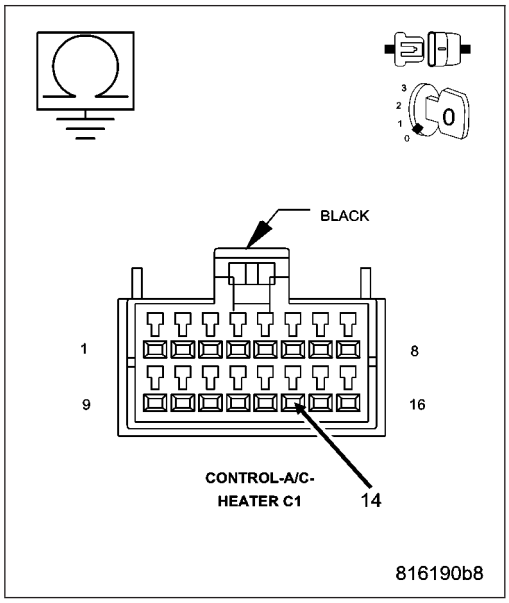
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C33) Passenger Blend Door Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C33) Passenger Blend Door Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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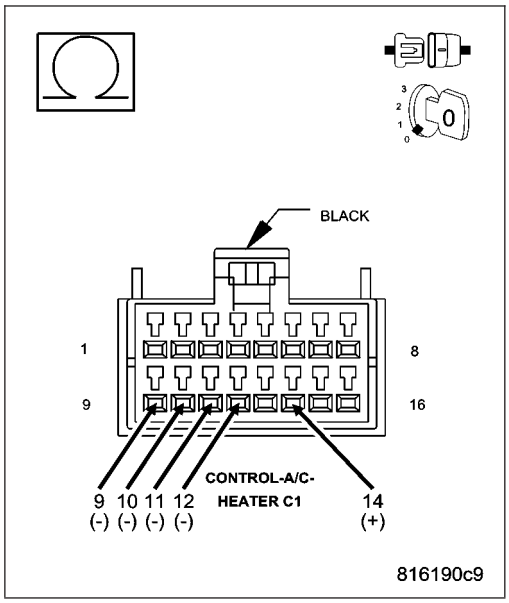
2. CHECK (C33) PASSENGER BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

Measure the resistance between the (C33) Passenger Blend Door Driver circuit and the (C61) Blend Door Driver circuit, the (C29) Mode Door 1 Driver circuit, the (C32) Recirculation Door Driver circuit, and the (C801) Mode Door 2 Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms between the (C33) Passenger Blend Door Driver circuit and any of the other door driver circuits?

Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C33) Passenger Blend Door Driver circuit.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



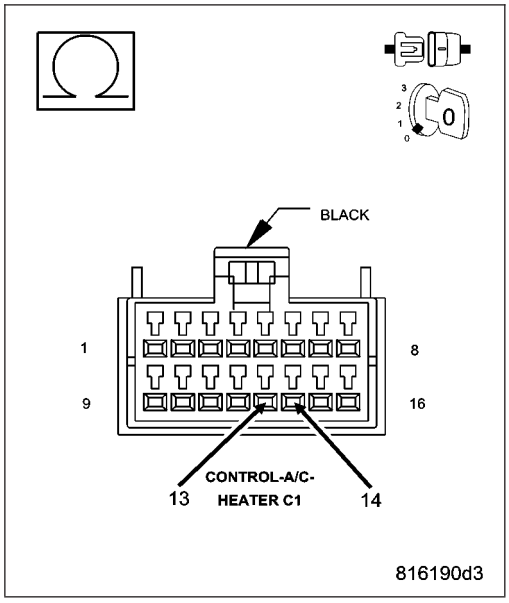
3. CHECK PASSENGER BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5

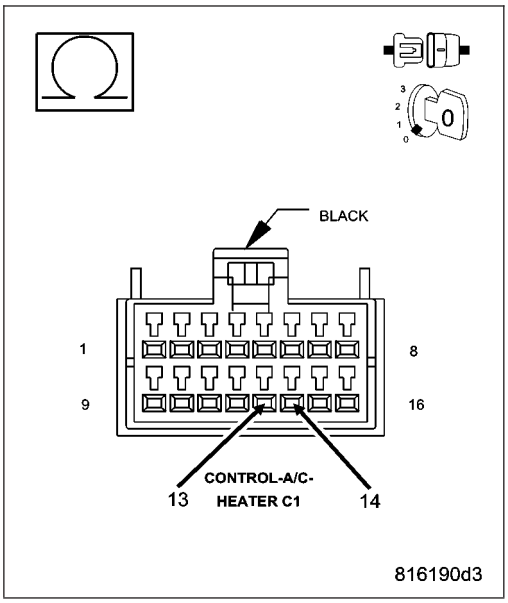


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4. CHECK (C33) PASSENGER BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Passenger Blend Door Actuator harness connector.

Measure the resistance between the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance below 10k ohms?

Yes >> Repair the (C33) Passenger Blend Door Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Passenger Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B10AA–RIGHT BLEND DOOR CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

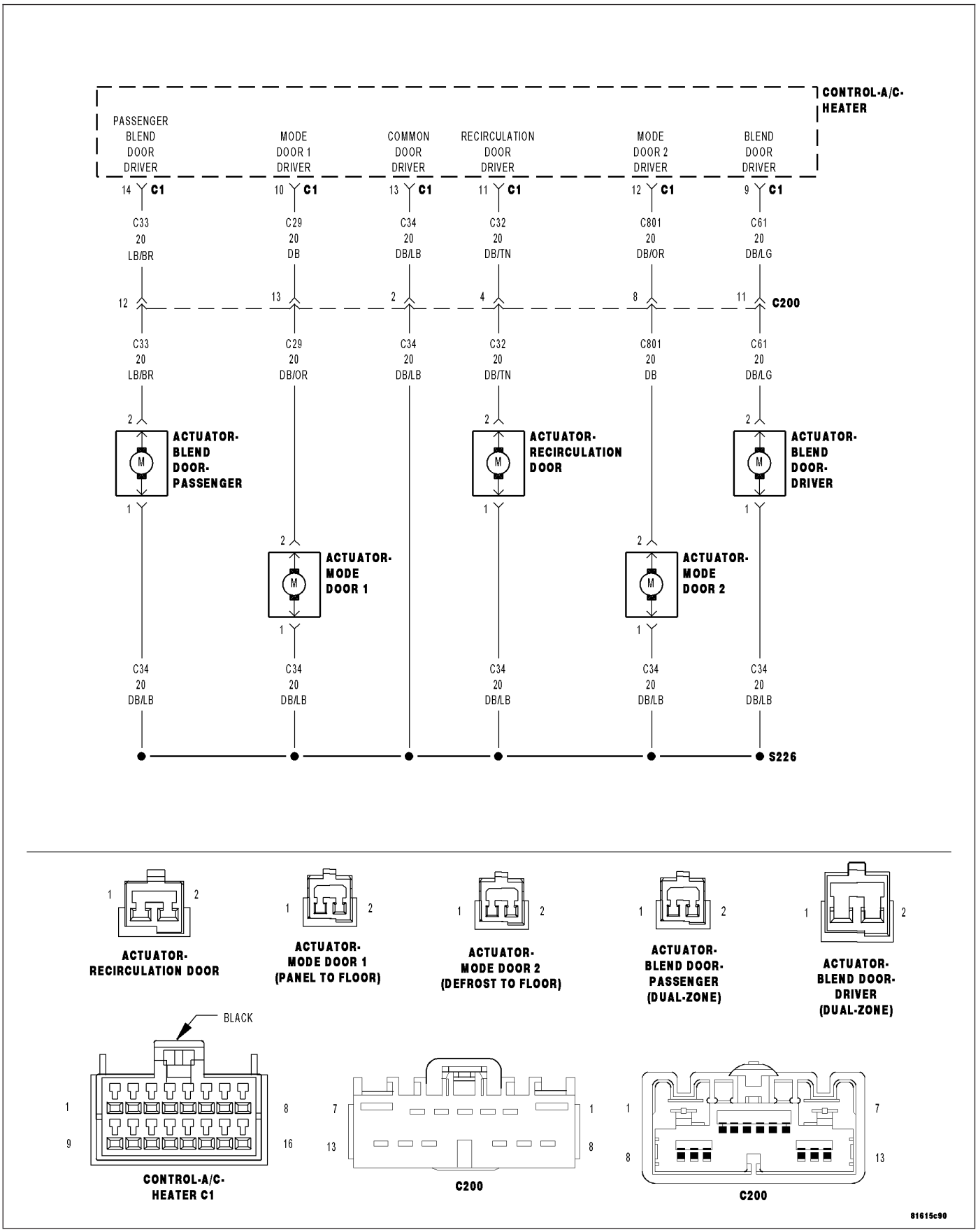
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10AB–RIGHT BLEND DOOR CONTROL CIRCUIT HIGH (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Passenger Blend Door Actuator via the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C33) Passenger Blend Door Driver circuit is shorted to voltage.

Possible Causes
(C33) PASSENGER BLEND DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C33) PASSENGER BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

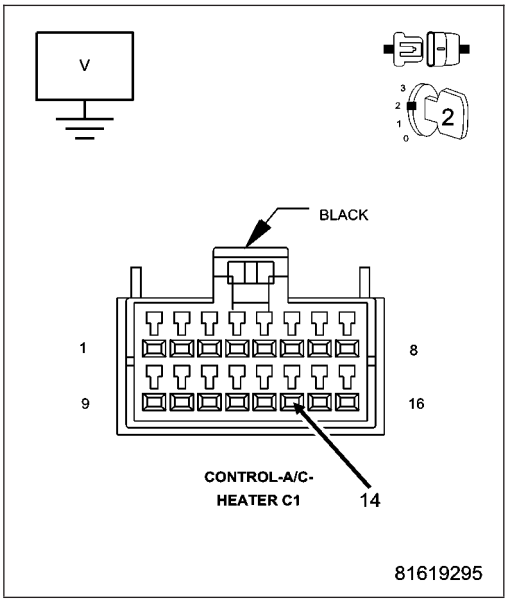
Turn the ignition on.

Measure the voltage of the (C33) Passenger Blend Door Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C33) Passenger Blend Door Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B10AB–RIGHT BLEND DOOR CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

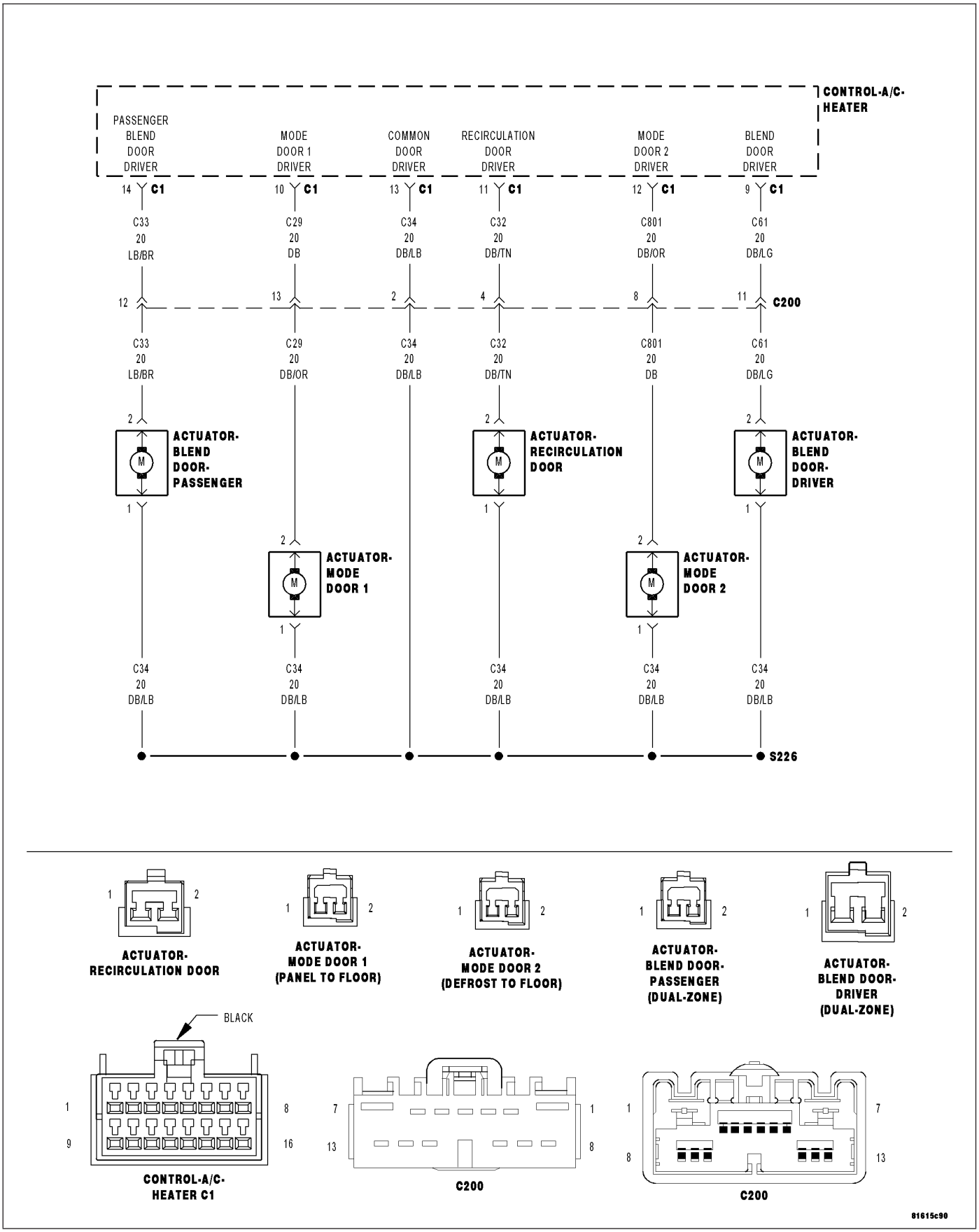
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10AC–RIGHT BLEND DOOR CONTROL CIRCUIT OPEN (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Passenger Blend Door Actuator via the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If Passenger Blend Door Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C33) PASSENGER BLEND DOOR DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
PASSENGER BLEND DOOR ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK PASSENGER BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

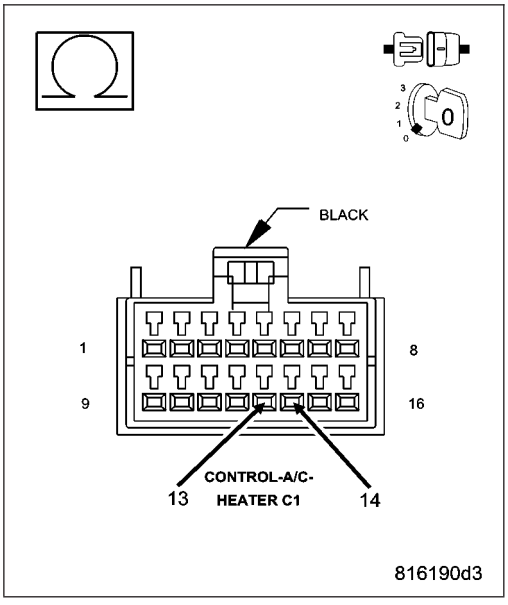
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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3. CHECK (C33) PASSENGER BLEND DOOR DRIVER CIRCUIT FOR AN OPEN

Disconnect the Passenger Blend Door Actuator harness connector.

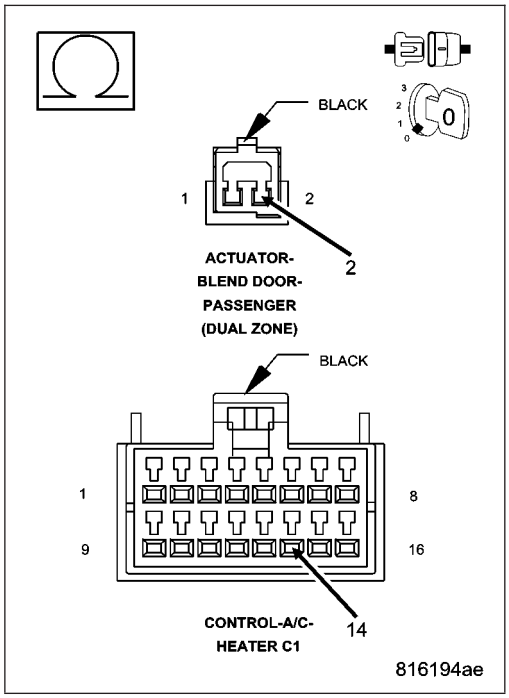
Measure the resistance of the (C33) Passenger Blend Door Driver circuit between the A/C Heater Control C1 harness connector and the Passenger Blend Door Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C33) Passenger Blend Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Passenger Blend Door Actuator harness connector.

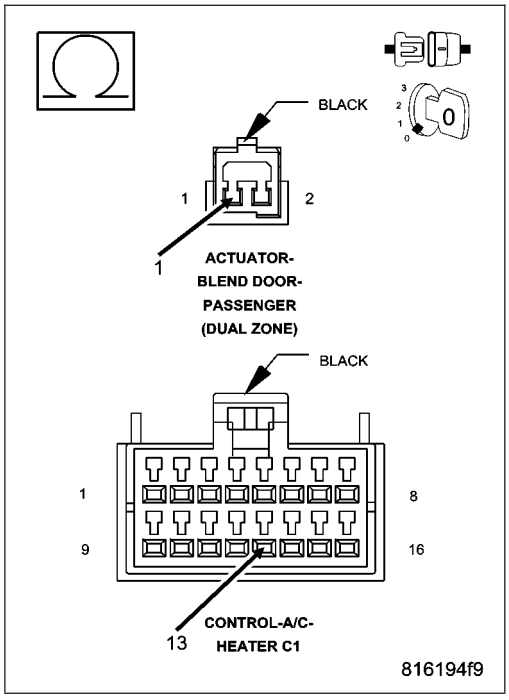
Is the resistance below 5.0 ohms?

Yes >> Replace the Passenger Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B10AD–RIGHT BLEND DOOR TRAVEL RANGE TOO SMALL (DUAL-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value is less than the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Right Blend Door is less than the low range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
RIGHT BLEND DOOR SEIZED, BINDING, OBSTRUCTED
RIGHT BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

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3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes >> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. INSPECT ACTUATOR & HOUSING ASSEMBLY FOR A CONDITION CAUSING THE DOOR TO SEIZE OR BIND

Turn the ignition off.

Inspect the actuator, linkage, and housing assembly for a condition causing the door to seize or bind.

Are there any physical or mechanical problems with the door, housing, linkage, or actuator?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK RIGHT BLEND DOOR TRAVEL

Remove the Right Blend Door Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the door in both directions. The door should operate smoothly in both directions over approximately 50 degrees of travel.

Does the door operate smoothly in both directions over approximately 50 degrees of travel?

Yes >> Replace the Right Blend Door Actuator in accordance with the Service Information. Then, Go To 6.

No >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B10AD–RIGHT BLEND DOOR TRAVEL RANGE TOO SMALL?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10AE–RIGHT BLEND DOOR TRAVEL RANGE TOO LARGE (DUAL-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value exceeds the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Right Blend Door exceeds the high range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
RIGHT BLEND DOOR OR A/C HEATER HOUSING COMPONENTS WARPED, WORN, DAMAGED, MISSING, BROKEN
RIGHT BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

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3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes >> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. CHECK FOR A BROKEN RIGHT BLEND DOOR ACTUATOR

Turn the ignition off.

Remove the Right Blend Door Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the actuator in both directions.

Does the actuator turn in either direction?

Yes >> Replace the Right Blend Door Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK RIGHT BLEND DOOR & A/C HEATER HOUSING FOR WARPED, WORN, DAMAGED, MISSING, & BROKEN COMPONENTS

Inspect for excessively worn, disconnected, missing, or broken door linkage. Inspect for a damaged or broken A/C Heater Housing Assembly. Inspect for a warped or broken door, and missing door seals. Rotate the door from stop to stop. The door should rotate approximately 50 degrees.

Are there any physical or mechanical problems with the door or housing?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Right Blend Door Actuator in accordance with the Service Information. Then, Go To 6.

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B10AE–RIGHT BLEND DOOR TRAVEL RANGE TOO LARGE?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10A2–LEFT BLEND DOOR CONTROL CIRCUIT/PERFORMANCE (DUAL-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control monitors the door driver circuits during actuator operation for shorts to ground, shorts to battery, and shorts to other door driver circuits. If detected, the A/C Heater Control reports these types of faults as Control Circuit/Performance DTCs. It is important to note that Control Circuit/Performance DTCs do not indicate where or what type of short is present and that additional system testing is necessary to provide more details about the reported fault.

- **When Monitored:**
  When actuator movement is requested.
- **Set Condition:**
  If the A/C Heater Control detects an excessive current draw on any of the door driver circuits while attempting to drive this actuator. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored, it will stay in memory for 100 ignition cycles.

Possible Causes
DOOR DRIVER CIRCUIT(S) SHORTED

NOTE: The DTC must be active for the results of this test to be valid. Do not perform this test if the DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition on.

With the scan tool in HVAC, erase DTCs.

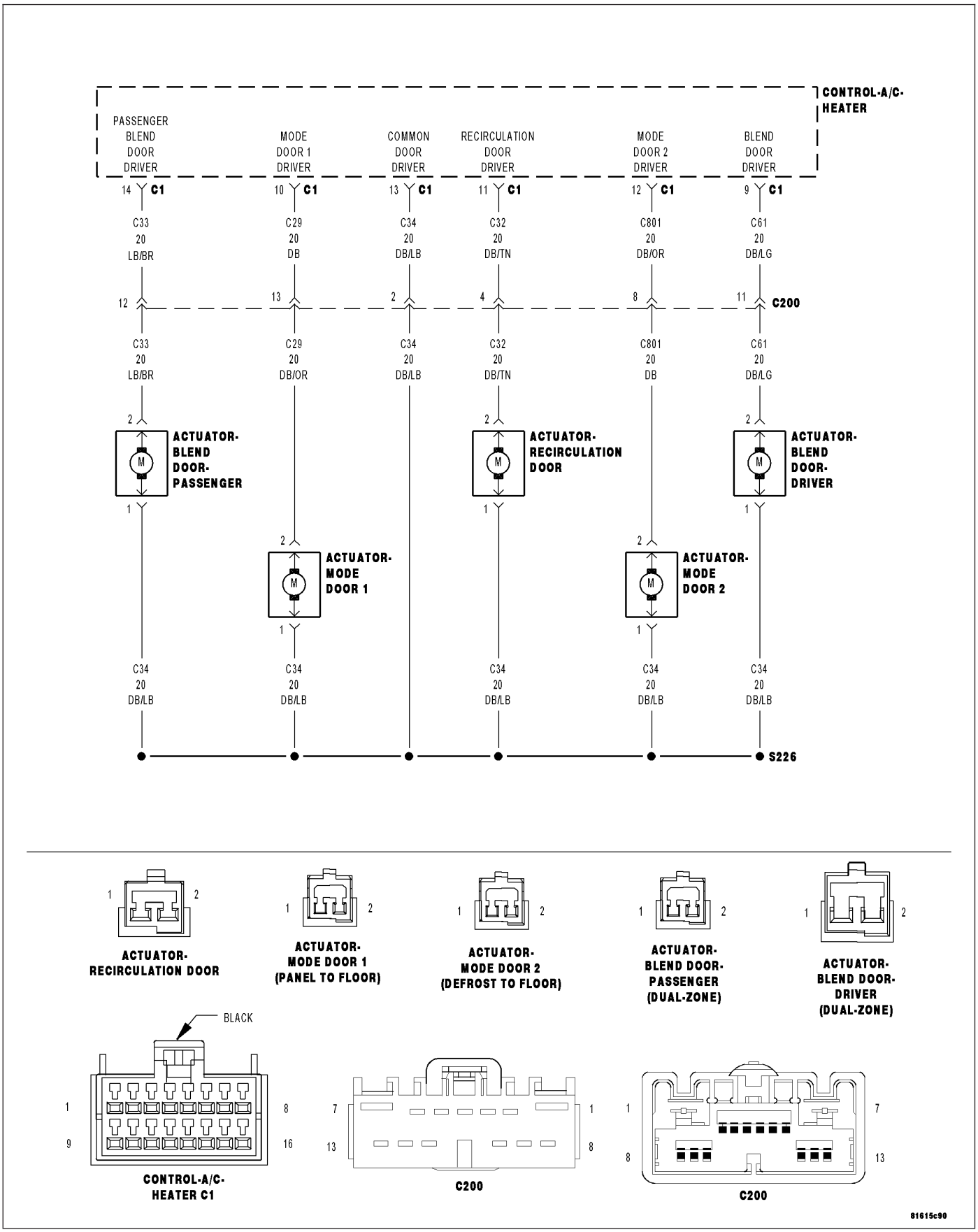
With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Repair

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

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B10A3–LEFT BLEND DOOR CONTROL CIRCUIT LOW (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Left Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C61) Blend Door Driver circuit is shorted to ground.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
LEFT BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND

NOTE: If present, diagnose and repair DTC B10AB Right Blend Door Control Circuit High or B10AA Right Blend Door Control Circuit Low before proceeding.

Turn the ignition off.

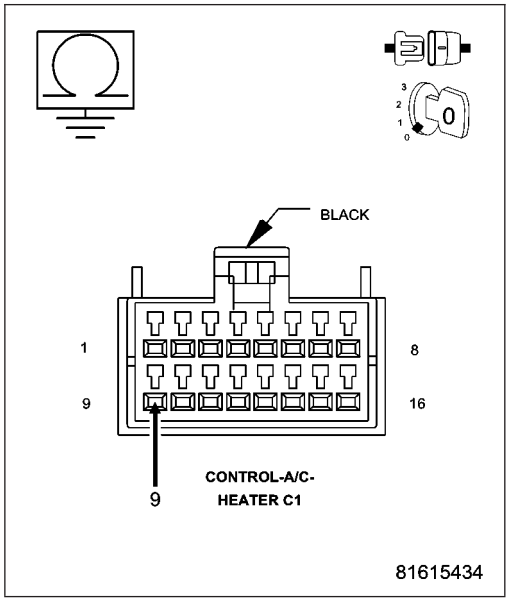
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C61) Blend Door Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C61) Blend Door Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

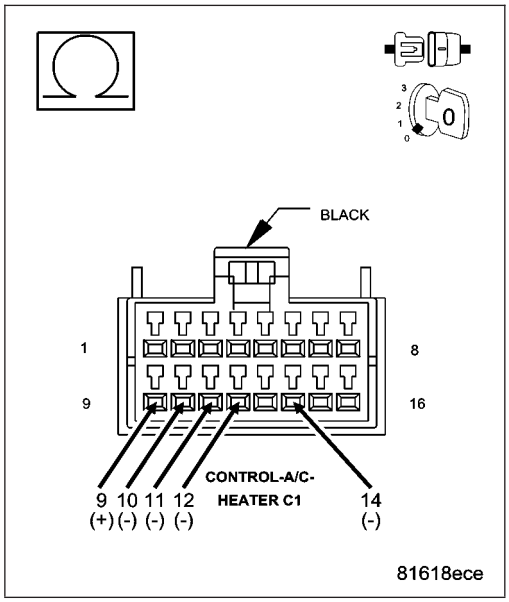
Measure the resistance between the (C61) Blend Door Driver circuit and the (C29) Mode Door 1 Driver circuit, the (C32) Recirculation Door Driver circuit, the (C801) Mode Door 2 Driver circuit, and the (C33) Passenger Blend Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms between the (C61) Blend Door Driver circuit and any of the other door driver circuits?

Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C61) Blend Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



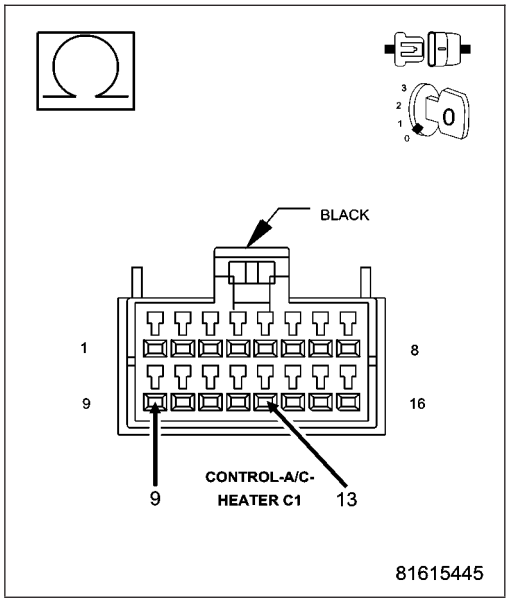
3. CHECK LEFT BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5



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4. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Left Blend Door Actuator harness connector.

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

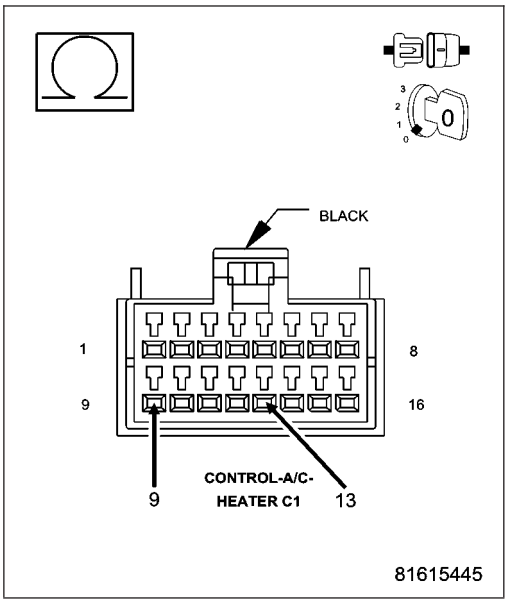
Is the resistance below 10k ohms?

Yes >> Repair the (C61) Blend Door Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Left Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B10A3–LEFT BLEND DOOR CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

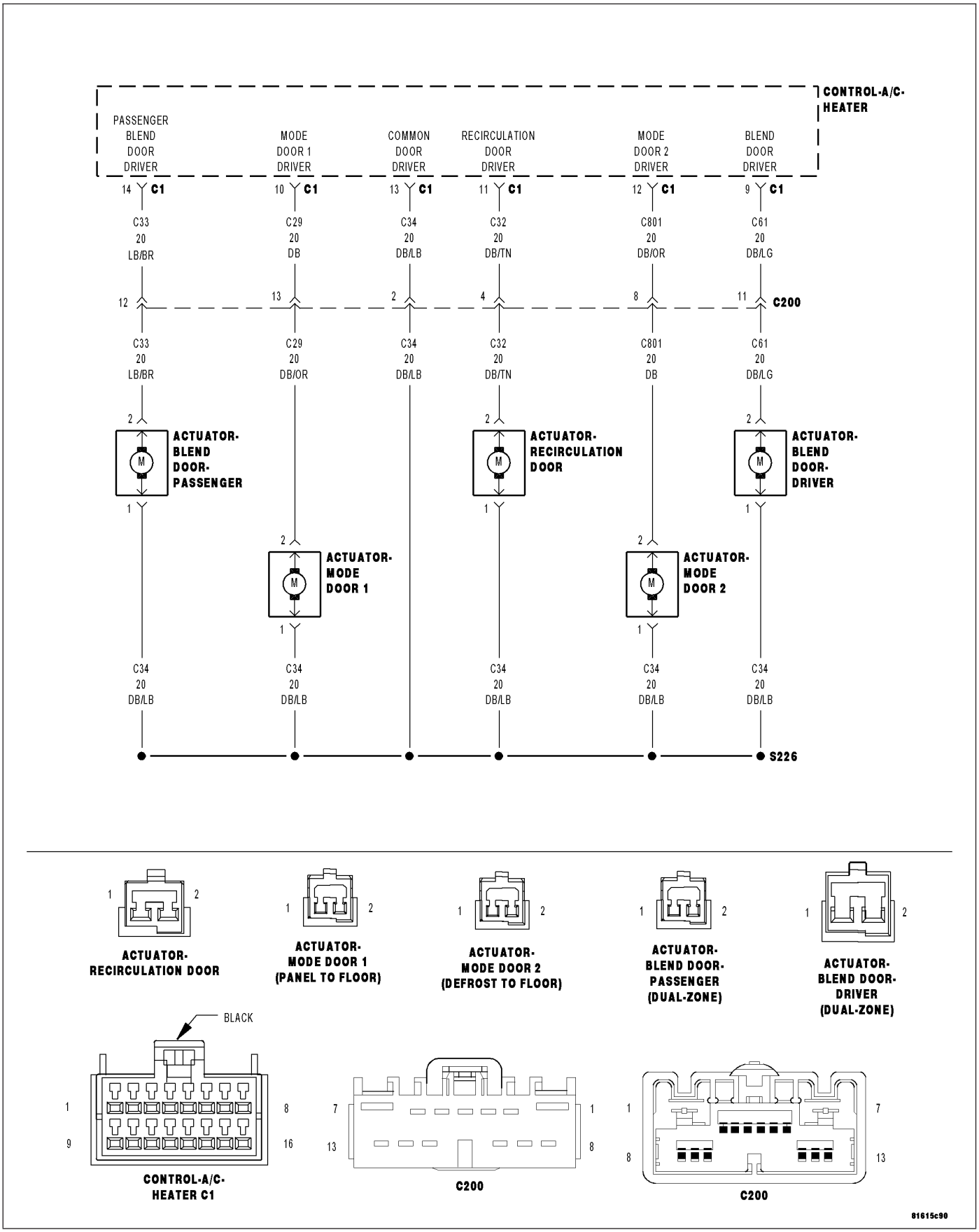
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10A4–LEFT BLEND DOOR CONTROL CIRCUIT HIGH (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Left Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C61) Blend Door Driver circuit is shorted to voltage.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

NOTE: If present, diagnose and repair DTC B10AB Right Blend Door Control Circuit High or B10AA Right Blend Door Control Circuit Low before proceeding.

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

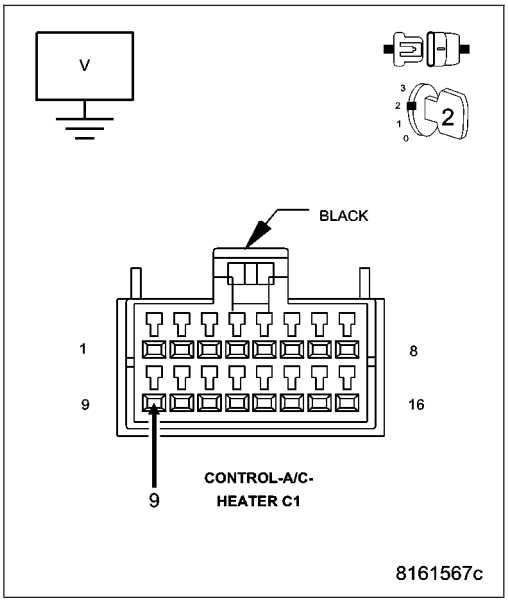
Turn the ignition on.

Measure the voltage of the (C61) Blend Door Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C61) Blend Door Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B10A4–LEFT BLEND DOOR CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

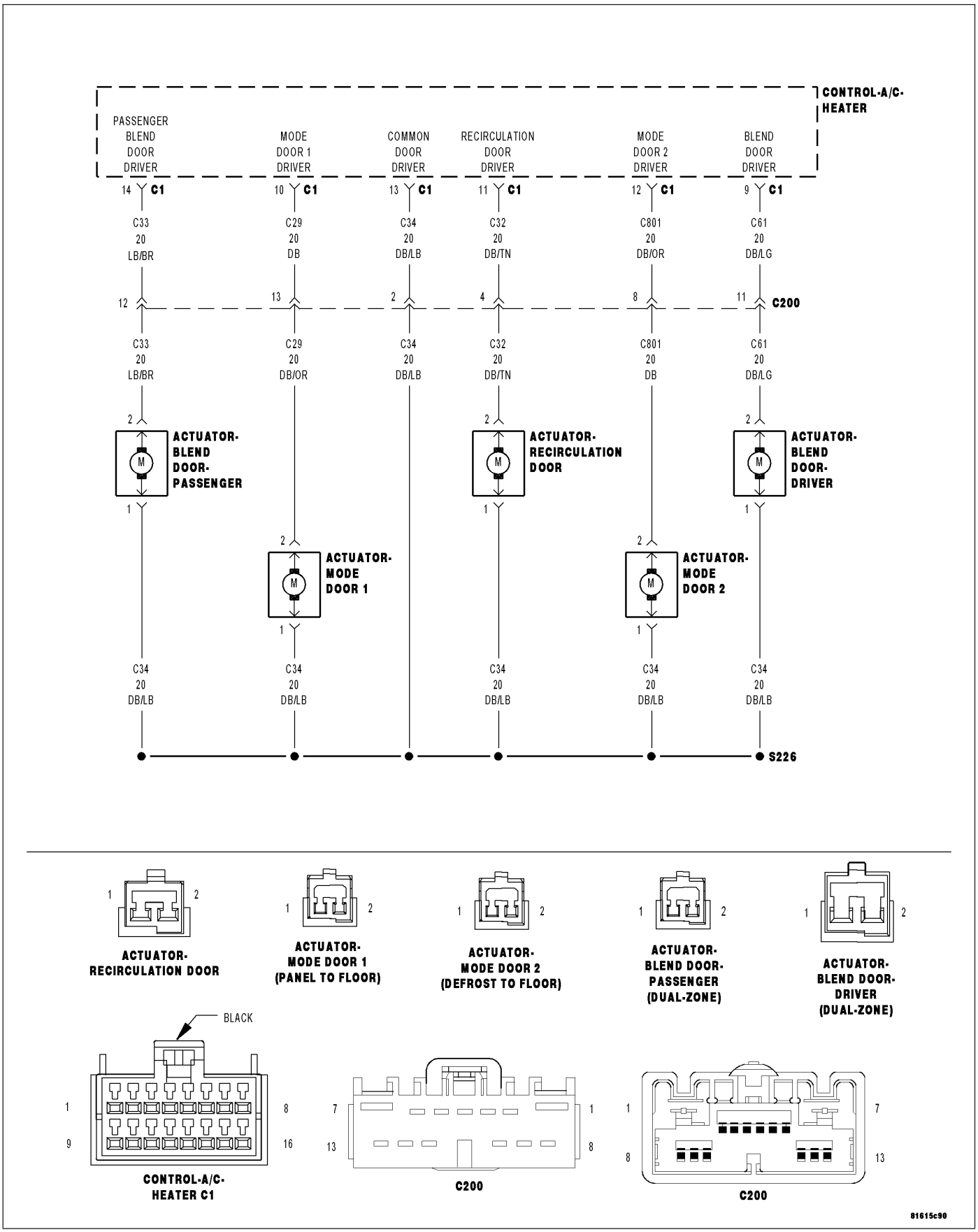
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10A5–LEFT BLEND DOOR CONTROL CIRCUIT OPEN (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Left Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If Left Blend Door Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
LEFT BLEND DOOR ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

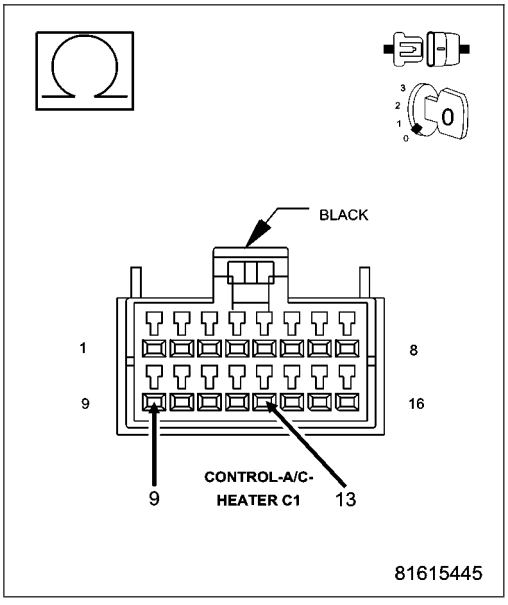
No >> Go To 2

2. CHECK LEFT BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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3. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR AN OPEN

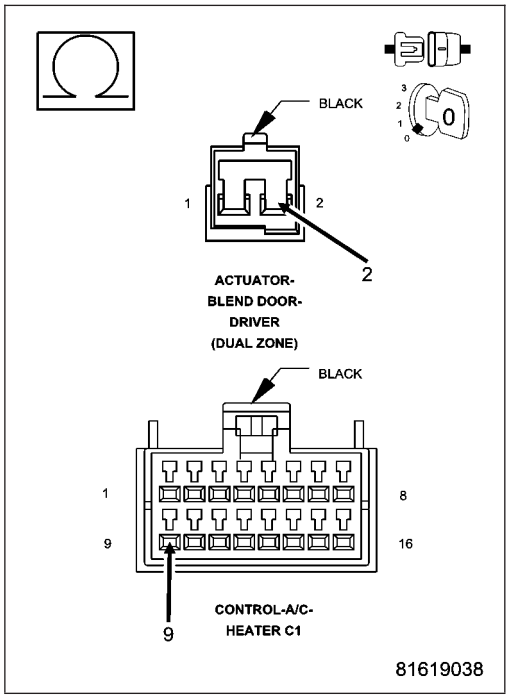
Disconnect the Left Blend Door Actuator harness connector.

Measure the resistance of the (C61) Blend Door Driver circuit between the A/C Heater Control C1 harness connector and the Left Blend Door Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C61) Blend Door Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



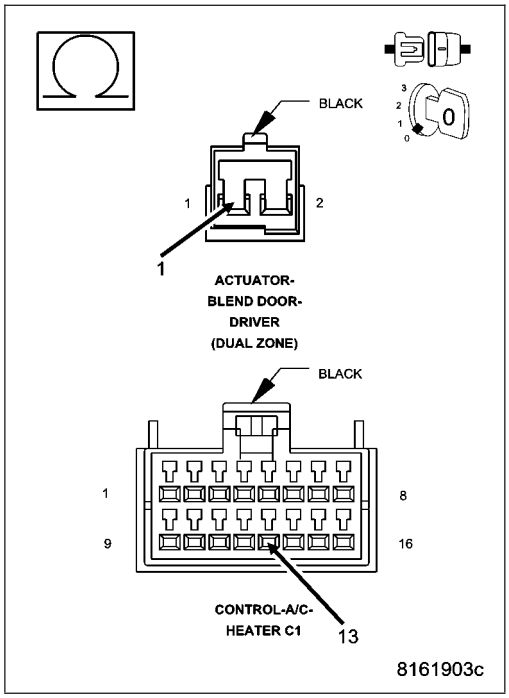
4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Left Blend Door Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Replace the Left Blend Door Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B10A6–LEFT BLEND DOOR TRAVEL RANGE TOO SMALL (DUAL-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value is less than the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Left Blend Door is less than the low range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
LEFT BLEND DOOR SEIZED, BINDING, OBSTRUCTED
LEFT BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes >> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

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4. INSPECT ACTUATOR & HOUSING ASSEMBLY FOR A CONDITION CAUSING THE DOOR TO SEIZE OR BIND

Turn the ignition off.

Inspect the actuator, linkage, and housing assembly for a condition causing the door to seize or bind.

Are there any physical or mechanical problems with the door, housing, linkage, or actuator?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK LEFT BLEND DOOR TRAVEL

Remove the Left Blend Door Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the door in both directions. The door should operate smoothly in both directions over approximately 53 degrees of travel.

Does the door operate smoothly in both directions over approximately 53 degrees of travel?

Yes >> Replace the Left Blend Door Actuator in accordance with the Service Information. Then, Go To 6.

No >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B10A6–LEFT BLEND DOOR TRAVEL RANGE TOO SMALL?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10A7–LEFT BLEND DOOR TRAVEL RANGE TOO LARGE (DUAL-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value exceeds the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Left Blend Door exceeds the high range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
LEFT BLEND DOOR OR A/C HEATER HOUSING COMPONENTS WARPED, WORN, DAMAGED, MISSING, BROKEN
LEFT BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

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3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes >> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. CHECK FOR A BROKEN LEFT BLEND DOOR ACTUATOR

Turn the ignition off.

Remove the Left Blend Door Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the actuator in both directions.

Does the actuator turn in either direction?

Yes >> Replace the Left Blend Door Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK LEFT BLEND DOOR & A/C HEATER HOUSING FOR WARPED, WORN, DAMAGED, MISSING, & BROKEN COMPONENTS

Inspect for excessively worn, disconnected, missing, or broken door linkage. Inspect for a damaged or broken A/C Heater Housing Assembly. Inspect for a warped or broken door, and missing door seals. Rotate the door from stop to stop. The door should rotate approximately 53 degrees.

Are there any physical or mechanical problems with the door or housing?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Left Blend Door Actuator in accordance with the Service Information. Then, Go To 6.

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B10A7–LEFT BLEND DOOR TRAVEL RANGE TOO LARGE?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10A9–RIGHT BLEND DOOR CONTROL CIRCUIT/PERFORMANCE (DUAL-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control monitors the door driver circuits during actuator operation for shorts to ground, shorts to battery, and shorts to other door driver circuits. If detected, the A/C Heater Control reports these types of faults as Control Circuit/Performance DTCs. It is important to note that Control Circuit/Performance DTCs do not indicate where or what type of short is present and that additional system testing is necessary to provide more details about the reported fault.

- **When Monitored:**
  When actuator movement is requested.
- **Set Condition:**
  If the A/C Heater Control detects an excessive current draw on any of the door driver circuits while attempting to drive this actuator. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored, it will stay in memory for 100 ignition cycles.

Possible Causes
DOOR DRIVER CIRCUIT(S) SHORTED

NOTE: The DTC must be active for the results of this test to be valid. Do not perform this test if the DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition on.

With the scan tool in HVAC, erase DTCs.

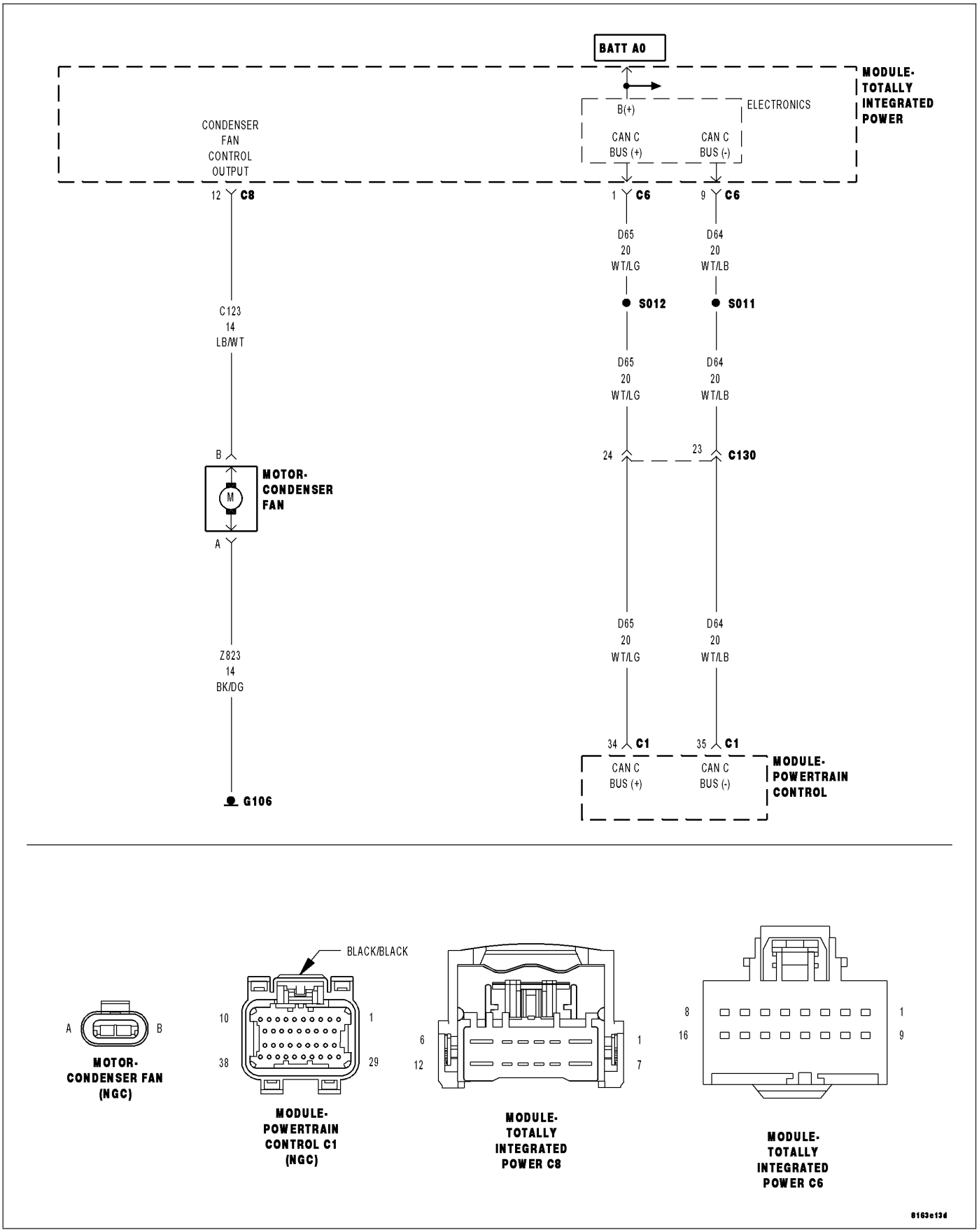
With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Repair

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

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B10BE–CONDENSER FAN CONTROL CIRCUIT LOW (TIPM)



For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on. Battery voltage greater than 10.4 volts.
- **Set Condition:**
  If the Totally Integrated Power Module (TIPM) detects a shorted low condition in the (C123) Condenser Fan Control circuit.

Possible Causes
(C123) CONDENSER FAN CONTROL OUTPUT CIRCUIT SHORTED TO GROUND
CONDENSER FAN MOTOR
TIPM

Diagnostic Test

1. VERIFY DTC IS ACTIVE

Turn the ignition on.

With the scan tool, erase TIPM DTCs.

Turn the ignition off, wait 10 seconds, and turn the ignition on.

With the scan tool, actuate the Condenser Fan.

With the scan tool, read TIPM DTCs.

Does this DTC reset?

Yes >> With the scan tool, de-actuate the Condenser Fan. Then, Go To 2

No >> With the scan tool, de-actuate the Condenser Fan. Then, check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also, inspect the related connectors for broken, bent, corroded, and contaminated terminals.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

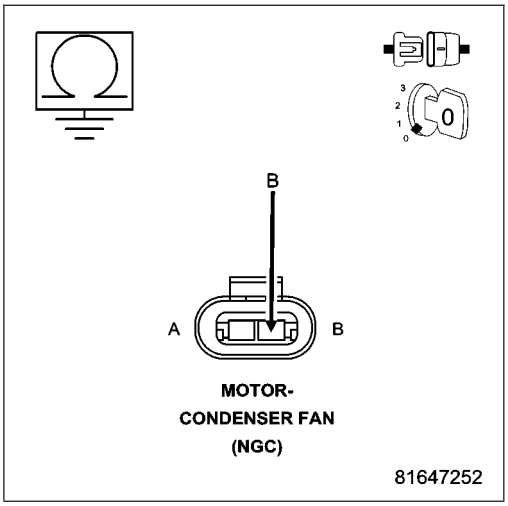
2. CHECK (C123) CONDENSER FAN CONTROL OUTPUT CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

Disconnect the TIPM C8 harness connector.

Disconnect the Condenser Fan Motor harness connector.

Measure the resistance of the (C123) Condenser Fan Control Output circuit between ground and the Condenser Fan Motor harness connector.



Is the resistance below 100 ohms?

Yes >> Repair the (C123) Condenser Fan Control Output circuit for a short to ground.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3

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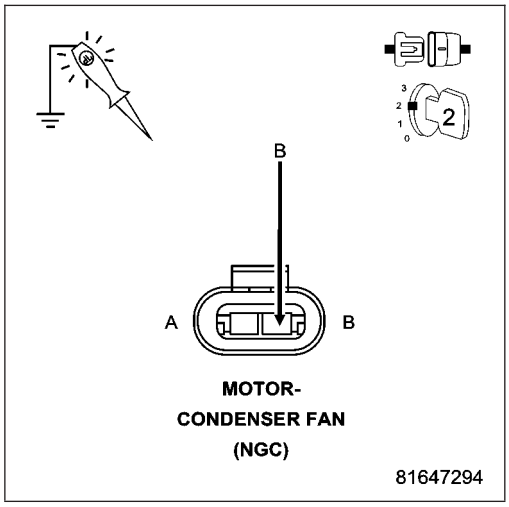
3. CHECK FOR A SHORTED CONDENSER FAN MOTOR

Reconnect the TIPM C8 harness connector.

Ignition on, engine not running.

With the scan tool, actuate the Condenser Fan.

Using a 12-volt test light connected to ground, probe the (C123) Condenser Fan Control Output circuit at the Condenser Fan Motor harness connector.



Does the test light illuminate brightly and flash on and off?

Yes >> With the scan tool, de-actuate the Condenser Fan. Then, replace the Condenser Fan Motor in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> With the scan tool, de-actuate the Condenser Fan. Then, Go To 4

4. INSPECT RELATED WIRING

NOTE: Before continuing, check the TIPM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Turn the ignition off.

Using the schematics as a guide, inspect the related wiring harness and connectors.

Pay particular attention to all Power and Ground circuits.

Were any problems found?

Yes >> Repair as necessary.

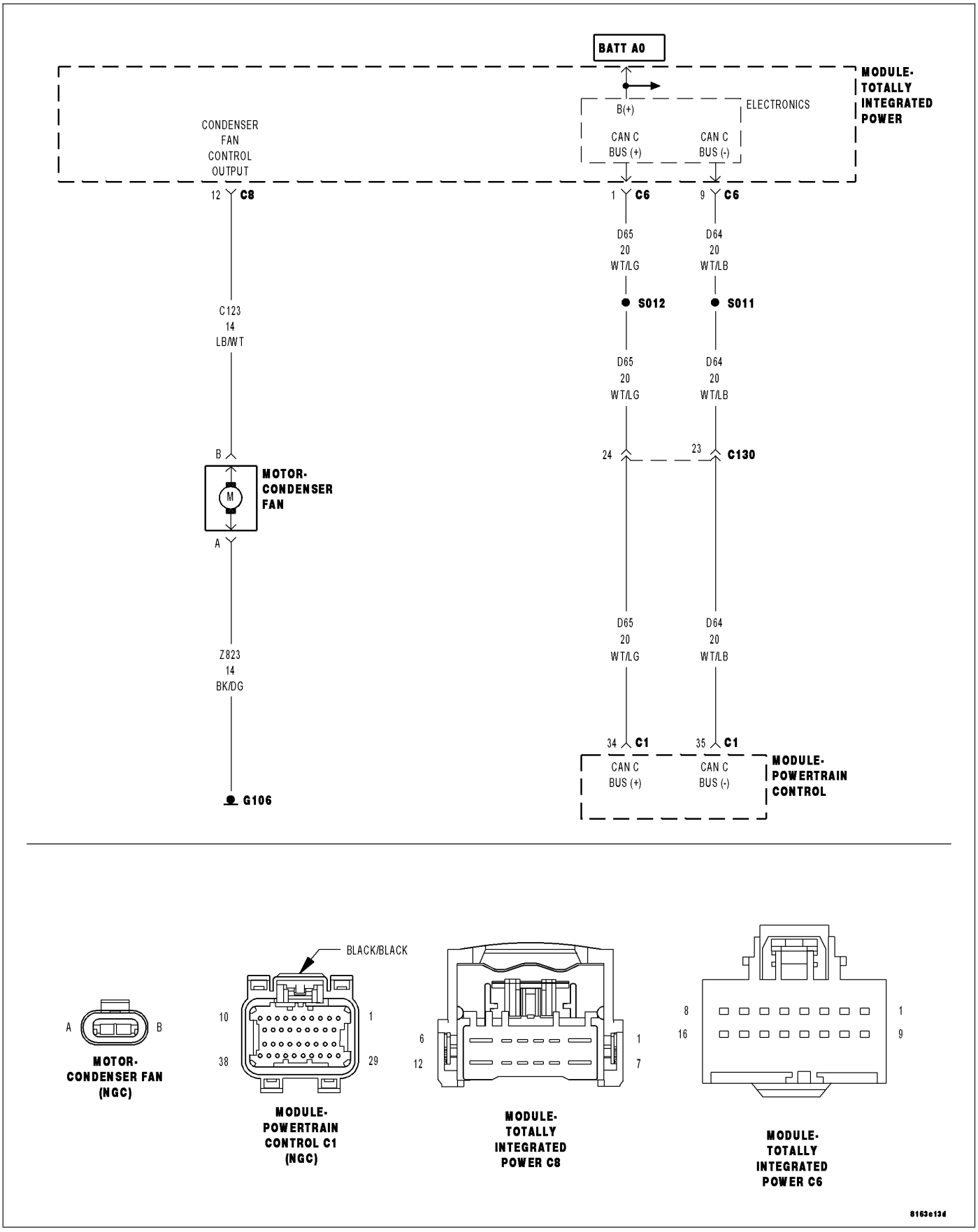
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the TIPM in accordance with the Service Information.

Perform the BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE)

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B10BF–CONDENSER FAN CONTROL CIRCUIT HIGH (TIPM)



For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on. Battery voltage greater than 10.4 volts.
- **Set Condition:**
  If the Totally Integrated Power Module (TIPM) detects a shorted high condition in the (C123) Condenser Fan Control circuit.

Possible Causes
(C123) CONDENSER FAN CONTROL OUTPUT CIRCUIT SHORTED TO BATTERY VOLTAGE
EXCESSIVE RESISTANCE IN THE (Z823) GROUND CIRCUIT
CONDENSER FAN MOTOR
TIPM

Diagnostic Test

1. VERIFY DTC IS ACTIVE

Turn the ignition on.
With the scan tool, erase TIPM DTCs.
Turn the ignition off, wait 10 seconds, and turn the ignition on.
With the scan tool, actuate the Condenser Fan.
With the scan tool, read TIPM DTCs.

Does this DTC reset?

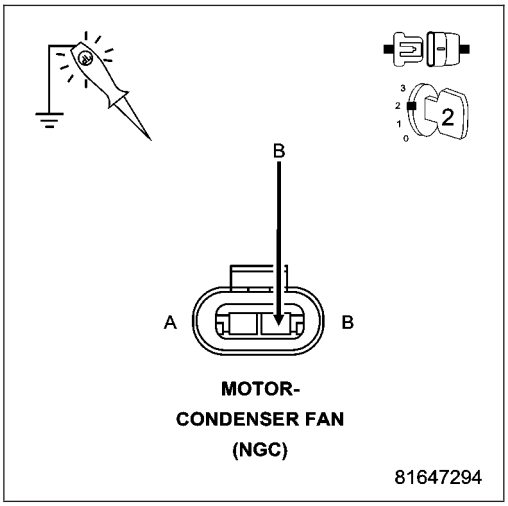
Yes >> With the scan tool, de-actuate the Condenser Fan. Then, Go To 2

No >> With the scan tool, de-actuate the Condenser Fan. Then, check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also, inspect the related connectors for broken, bent, corroded, and contaminated terminals.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

2. CHECK (C123) CONDENSER FAN CONTROL OUTPUT CIRCUIT FOR A SHORT TO BATTERY VOLTAGE

Turn the ignition off
Disconnect the TIPM C8 harness connector.
Disconnect the Condenser Fan Motor harness connector.
Ignition on, engine not running.
Using a 12-volt test light connected to ground, probe the (C123) Condenser Fan Control Output circuit at the Condenser Fan Motor harness connector.



Does the test light illuminate?

Yes >> Repair the (C123) Condenser Fan Control Output circuit for a short to battery voltage.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3

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3. CHECK (Z823) GROUND CIRCUIT FOR AN OPEN

Turn the ignition off.

Reconnect the TIPM C8 harness connector.

NOTE: The test light should illuminate brightly. Compare the brightness to that of a direct connection to the battery.

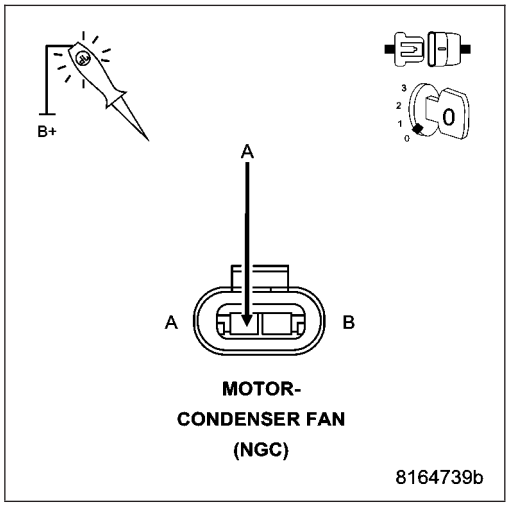
Using a 12-volt test light connected to 12 volts, probe the (Z823) Ground circuit at the Condenser Fan Motor harness connector.

Does the test light illuminate brightly?

Yes >> Go To 4

No >> Repair the excessive resistance in the (Z823) Ground circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



4. CHECK CONDENSER FAN MOTOR

Ignition on, engine not running.

With the scan tool, actuate the Condenser Fan.

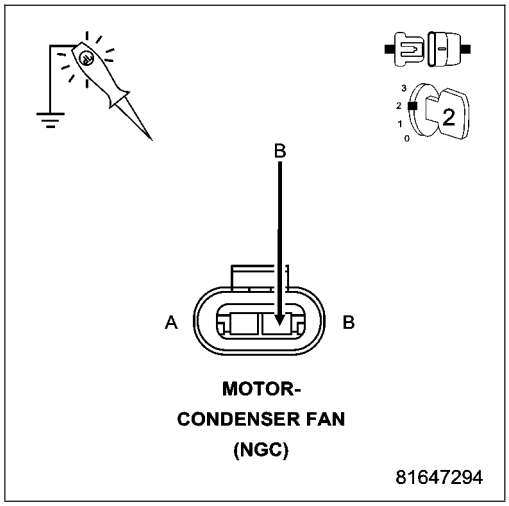
Using a 12-volt test light connected to ground, probe the (C123) Condenser Fan Control Output circuit at the Condenser Fan Motor harness connector.

Does the test light illuminate brightly and flash on and off?

Yes >> With the scan tool, de-actuate the Condenser Fan. Then, replace the Condenser Fan Motor in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> With the scan tool, de-actuate the Condenser Fan. Then, Go To 5



5. INSPECT RELATED WIRING

NOTE: Before continuing, check the TIPM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the related wiring harness and connectors.

Pay particular attention to all Power and Ground circuits.

Were any problems found?

Yes >> Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the TIPM in accordance with the Service Information.

Perform the BODY VERIFICATION TEST – VER 1. (Refer to 9 - ENGINE - STANDARD PROCEDURE)

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B10B2–A/C COOL DOWN TEST PERFORMANCE (DUAL-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The Cooldown Test checks A/C system performance based on Evaporator Temperature Sensor input. The main criteria is to lower evaporator temperature 11.11°C (20°F) within one minute. Before starting the test, the evaporator temperature must be above 13°C (55°F) and the front blower speed must be set to high speed. When the test is running, A/C Select and A/C Request will be on and the A/C status indicator will flash. When the test is complete, the scan tool will display one or more test status messages to indicate the outcome of the Cooldown Test. A Successful Cooldown – Test Passed status message indicates that the main test criteria was met. A DTC Set During Routine – Test Not Passed status message indicates that the A/C system is unable to lower the evaporator temperature 11.11°C (20°F) within one minute. A Conditions Too Cold – Test Not Run status message indicates that the evaporator temperature was below 13°C (55°F) when starting the Cooldown Test. A Blowers Not On High – Test Not Run status message indicates that either the front blower speed was not set to high speed prior to starting the Cooldown Test or the front blower speed was changed from high speed to another setting after starting the Cooldown test. A Refrigerant Temperature Sensor Error status message indicates that a fault occurred with the Evaporator Temperature Sensor/sensor circuits. A No Results Stored/Test Not Complete status message indicates that the power was cycled while the test was running.

- **When Monitored:**
  When the Cooldown Test is executed.
- **Set Condition:**
  If the A/C system is unable to lower the evaporator temperature 11.11°C (20°F) within one minute.

Possible Causes
OTHER HVAC SYSTEM FAULTS PRESENT
EVAPORATOR TEMPERATURE SENSOR CIRCUITS
EVAPORATOR TEMPERATURE SENSOR
TOTALLY INTEGRATED POWER MODULE (TIPM) FAULTS PRESENT
POWERTRAIN SYSTEM FAULTS PRESENT

Diagnostic Test

1. DIAGNOSE COOLDOWN TEST STATUS MESSAGES

Were any of the following status messages present after performing the Cooldown Test?

Yes, Conditions Too Cold - Test Not Run
If running, turn the A/C compressor off. Verify that the work area ambient temperature is above 15.6°C (60°F). If not, move the vehicle to a warmer work area. Verify that the evaporator temperature is above 13°C (55°F). If not, set the blower to high speed and allow the blower to run for five minutes. Then, run the Cooldown Test again.

Yes, Blowers Not On High - Test Not Run
Set the blower speed to high speed and then run the Cooldown Test again.

Yes, No Results Stored/Test Not Complete
Verify that power is not interrupted while rerunning the Cooldown Test.

No >> Go To 2

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2. CHECK FOR DTCs IN THE A/C HEATER CONTROL MODULE

Turn the ignition on.

With the scan tool, read HVAC DTCs.

Excluding B10B2–A/C Cool Down Test Performance, are any DTCs present in the A/C Heater Control Module?

Yes >> Diagnose and Repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms. Rerun the Cooldown Test after the repair is complete.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3

3. CHECK FOR DTCs IN THE TIPM

With the scan tool, read TIPM DTCs.

Are any DTCs present in the TIPM?

Yes >> Diagnose and Repair the DTC(s). Rerun the Cooldown Test after the repair is complete.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 4

4. CHECK FOR DTCs IN THE PCM / ECM

With the scan tool, read PCM / ECM DTCs.

Are any DTCs present in the PCM / ECM?

Yes >> Diagnose and repair the DTC(s). (Refer to 9 - ENGINE - DIAGNOSIS AND TESTING) for the diagnostic procedures. Rerun the Cooldown Test after the repair is complete.

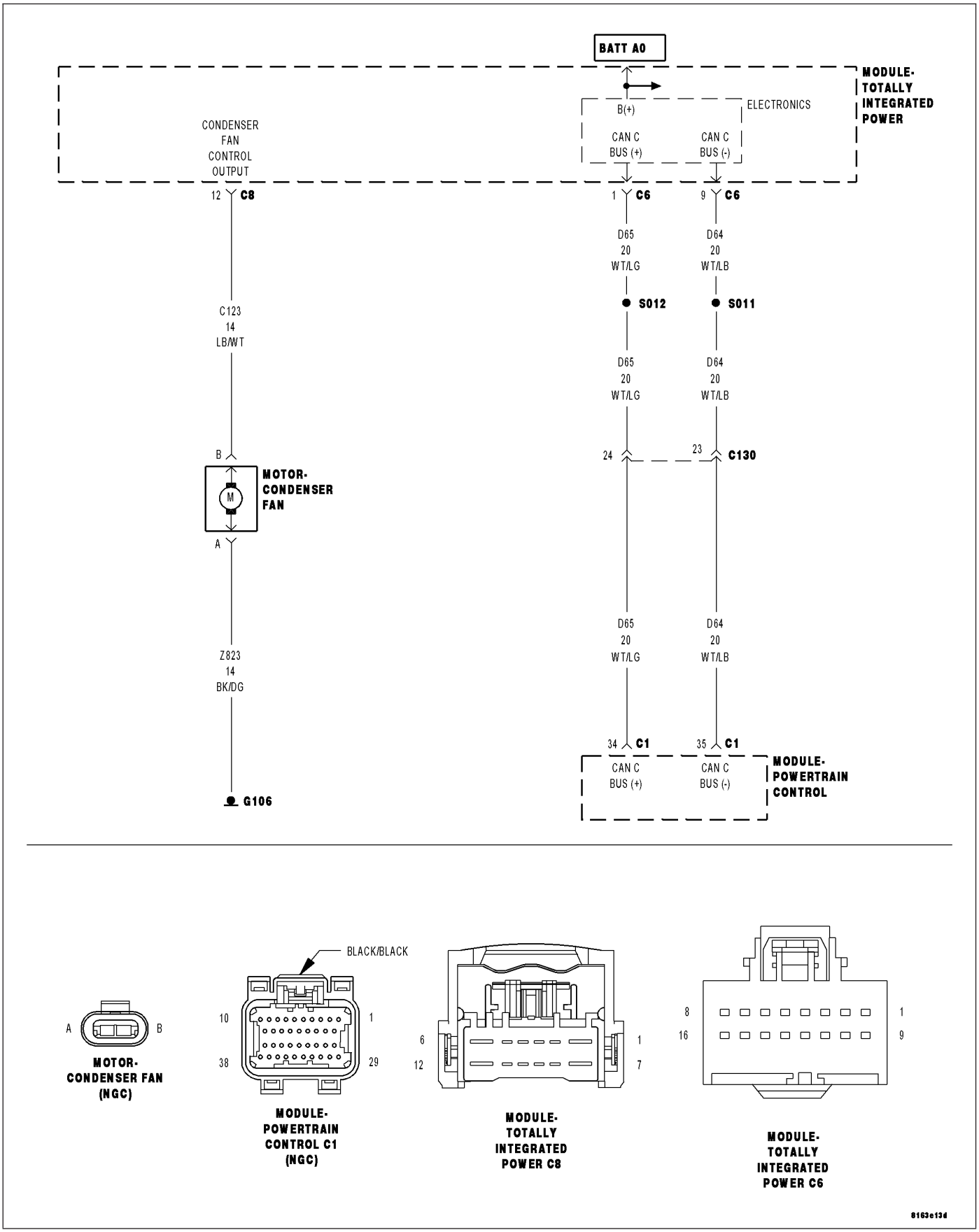
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Refer to the Service Information for additional Cooldown Test related diagnostic information and testing procedures. Rerun the Cooldown Test after the repair is complete.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10C0–CONDENSER FAN CONTROL CIRCUIT OPEN (TIPM)



For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on. Battery voltage greater than 10.4 volts. TIPM requesting Condenser Fan operation.
- **Set Condition:**
  If the Totally Integrated Power Module (TIPM) detects an open condition in the (C123) Condenser Fan Control circuit.

Possible Causes
(C123) CONDENSER FAN CONTROL OUTPUT CIRCUIT OPEN
CONDENSER FAN MOTOR
TIPM

Diagnostic Test

1. VERIFY DTC IS ACTIVE

Turn the ignition on.

With the scan tool, erase TIPM DTCs.

Turn the ignition off, wait 10 seconds, and turn the ignition on.

With the scan tool, actuate the Condenser Fan.

With the scan tool, read TIPM DTCs.

Does this DTC reset?

Yes >> With the scan tool, de-actuate the Condenser Fan. Then, Go To 2

No >> With the scan tool, de-actuate the Condenser Fan. Then, check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also, inspect the related connectors for broken, bent, corroded, and contaminated terminals.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

2. CHECK (C123) CONDENSER FAN CONTROL OUTPUT CIRCUIT OPEN

Turn the ignition off.

Disconnect the TIPM C8 harness connector.

Disconnect the Condenser Fan harness connector.

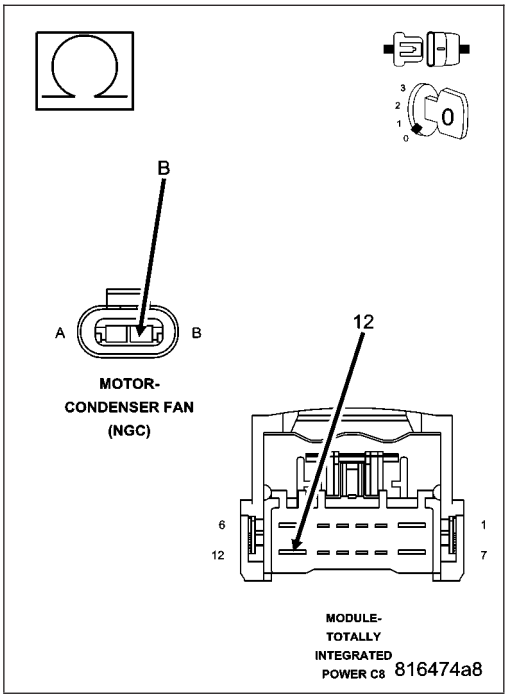
Measure the resistance of the (C123) Condenser Fan Control Output circuit between the TIPM C8 harness connector and the Condenser Fan harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 3

No >> Repair the (C123) Condenser Fan Control Output circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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3. CHECK CONDENSER FAN MOTOR

Reconnect the TIPM C8 harness connector.

Ignition on, engine not running.

With the scan tool, actuate the Condenser Fan.

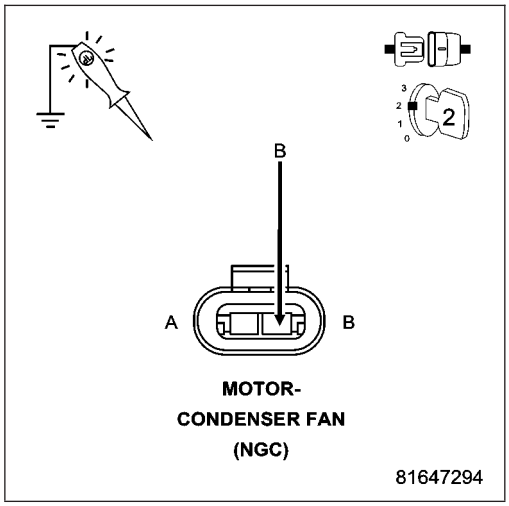
Using a 12-volt test light connected to ground, probe the (C123) Condenser Fan Control Output circuit at the Condenser Fan harness connector.

Does the test light illuminate brightly and flash on and off?

Yes >> With the scan tool, de-actuate the Condenser Fan. Then, replace the Condenser Fan Motor in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> With the scan tool, de-actuate the Condenser Fan. Then, Go To 4



4. INSPECT RELATED WIRING

NOTE: Before continuing, check the TIPM harness connector terminals for corrosion, damage, or terminal push out. Repair as necessary.

Using the schematics as a guide, inspect the wire harness and connectors.

Pay particular attention to all Power and Ground circuits.

Were any problems found?

Yes >> Repair as necessary.

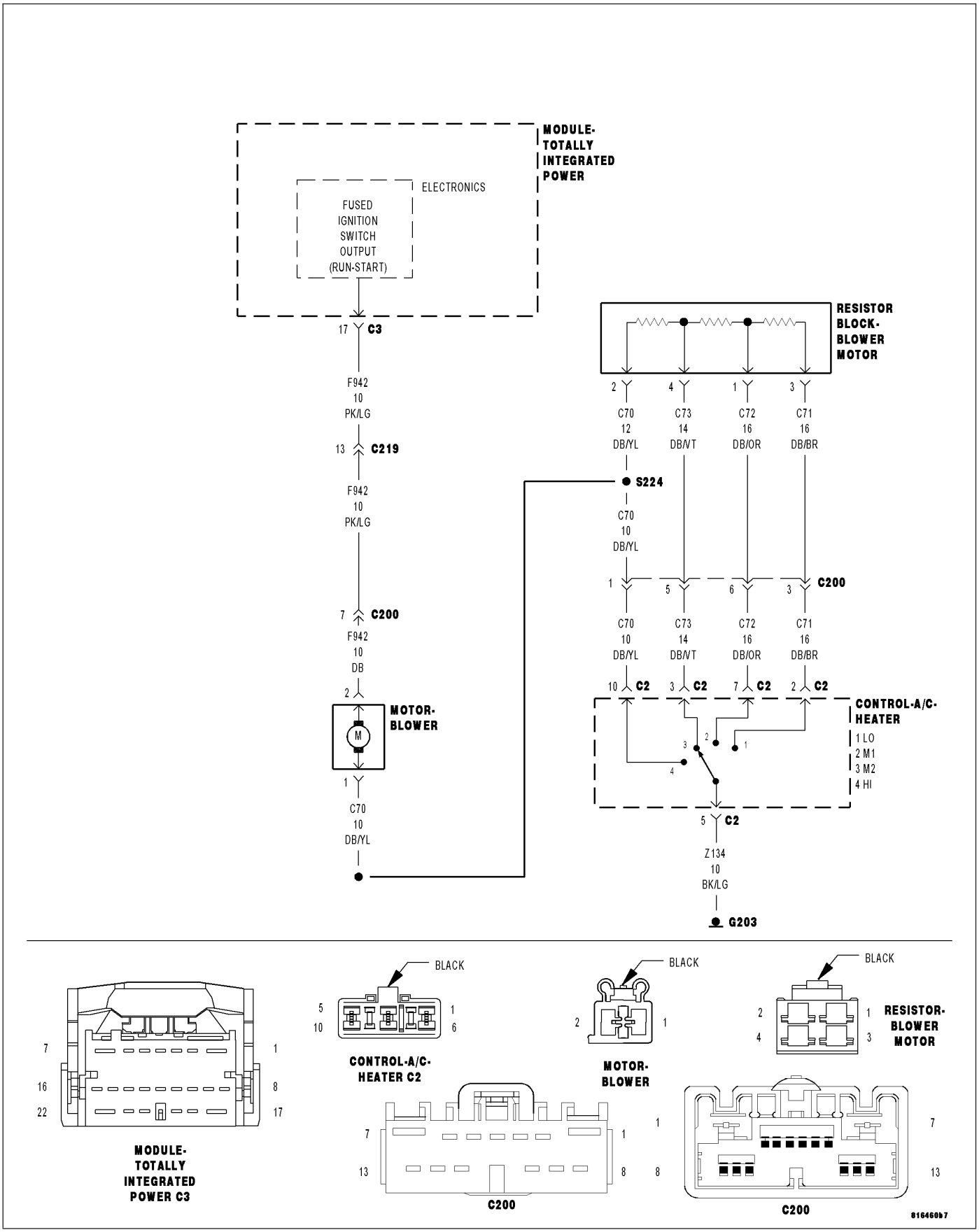
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Totally Integrated Power Module in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10EC–BLOWER MOTOR CONTROL CIRCUIT OVERCURRENT (TIPM)



For a complete wiring diagram **Refer to Section 8W**

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- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  The Totally Integrated Power Module (TIPM) will set this DTC if it detects an overcurrent condition on the (F942) Fused Ignition Switch Output (Run-Start) circuit for more than 500 ms when blower motor operation is requested.

Possible Causes
TERMINAL DAMAGE OR CORROSION
HIGH RESISTANCE ON (F942) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT
HIGH RESISTANCE ON (C70) BLOWER MOTOR HIGH DRIVER CIRCUIT
HIGH RESISTANCE ON (Z134) GROUND CIRCUIT
BLOCKAGE STALLING BLOWER MOTOR
BLOWER MOTOR
TIPM
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR AN ACTIVE OR STORED DTC B10E9 BLOWER MOTOR CONTROL CIRCUIT LOW IN THE TIPM

Turn the ignition on.

With the scan tool, read TIPM DTCs.

Does the scan tool display active or stored DTC B10E9 BLOWER MOTOR CONTROL CIRCUIT LOW?

Yes >> Diagnose and repair the DTC. Refer to the Table of Contents in this section for a complete list of HVAC related symptoms.

No >> Go To 2

2. INSPECT THE TIPM & BLOWER MOTOR CONNECTOR TERMINALS & WIRE HARNESS FOR A CONDITION CAUSING HIGH CIRCUIT RESISTANCE

Turn the ignition off.

Disconnect the TIPM C3 harness connector.

Disconnect the Blower Motor harness connector.

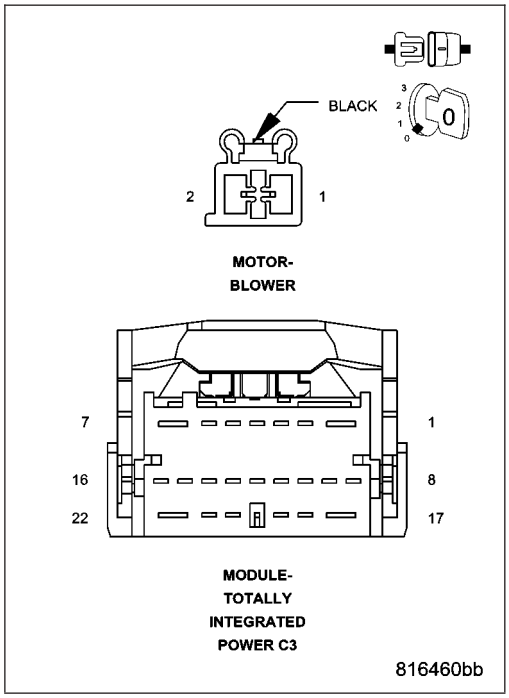
Inspect the connector terminals for signs of corrosion build up and damage.

Visually inspect the wiring harness for any chafed, pierced, pinched or partially broken wires hidden in the wire insulation.

Were any of the above conditions found?

Yes >> Repair as necessary.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



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3. CHECK THE (F942) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT FUNCTION

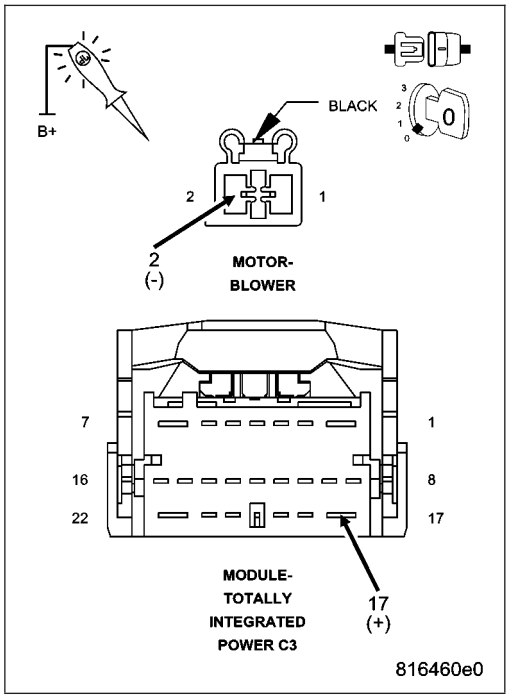
Connect one end of a jumper wire to the (F942) Fused Ignition Switch Output (Run-Start) circuit in the Blower Motor harness connector and connect the other end of the jumper wire to a clean chassis ground.

NOTE: The test light should illuminate brightly. Compare the brightness to that of a direct connection to the battery.
Using a 12-volt test light connected to 12 volts, probe the (F942) Fused Ignition Switch Output (Run-Start) circuit in the TIPM C3 harness connector.

Does the test light illuminate brightly?

Yes >> Go To 4

No >> Repair the (F942) Fused Ignition Switch Output (Run-Start) circuit for high resistance.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



4. CHECK (C70) BLOWER MOTOR HIGH DRIVER CIRCUIT & (Z134) GROUND CIRCUIT FUNCTION

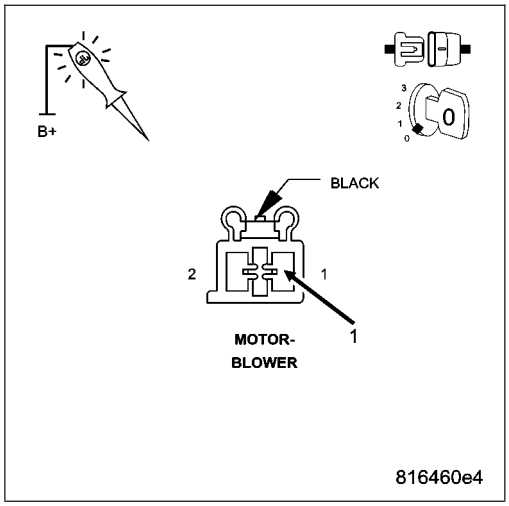
Remove the jumper wire from the Blower Motor harness connector.
Turn the blower control on.

NOTE: The test light should illuminate brightly. Compare the brightness to that of a direct connection to the battery.
Using a 12-volt test light connected to 12 volts, probe the (C70) Blower Motor High Driver circuit in the Blower Motor harness connector.

Does the test light illuminate brightly?

Yes >> Go To 5

No >> Go To 7



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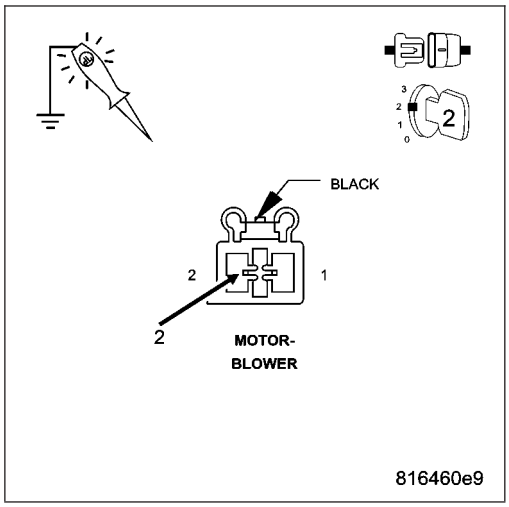
5. CHECK THE OUTPUT FROM THE TIPM ON THE (F942) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT

Reconnect the TIPM C3 harness connector.

Turn the ignition on.

With a scan tool in TIPM, select Actuators, and actuate the Blower Motor.

Using the 12-volt test light connected to ground, probe the (F942) Fused Ignition Switch Output (Run-Start) circuit in the Blower Motor harness connector.



Does the test light illuminate brightly?

Yes >> Go To 6

No >> Replace the TIPM in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

6. CHECK FOR A BLOCKAGE STALLING THE BLOWER MOTOR

Turn the ignition off.

Remove the blower motor from the HVAC housing assembly.

Look for anything on the blower motor and in the HVAC housing that is physically preventing blower motor operation.

Is anything physically preventing blower operation?

Yes >> Repair as necessary. Also, check blower motor for proper operation. Reinstall or replace the blower motor as necessary in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

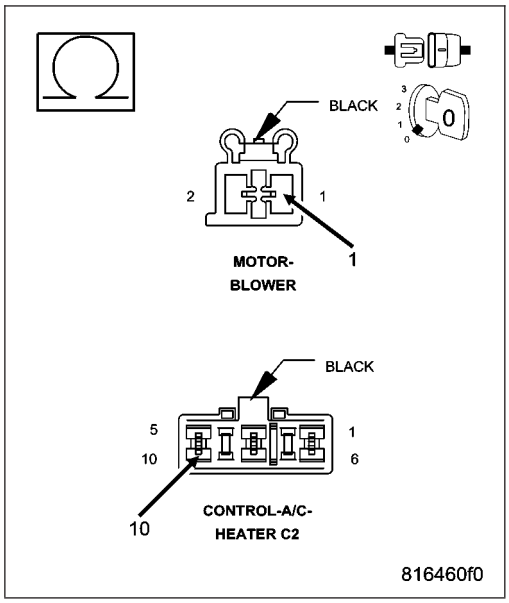
No >> Replace the blower motor in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

7. CHECK THE (C70) BLOWER MOTOR HIGH DRIVER CIRCUIT FOR HIGH RESISTANCE

Disconnect the A/C Heater Control C2 harness connector.

Measure the resistance of the (C70) Blower Motor High Driver circuit between the A/C Heater Control C2 harness connector and the Blower Motor harness connector.



Is the resistance below 5.0 ohms?

Yes >> Go To 8

No >> Repair the (C70) Blower Motor High Driver circuit for high resistance.

Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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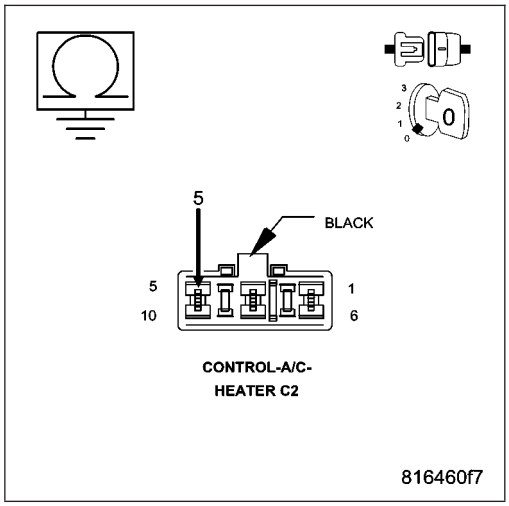
8. CHECK THE (Z134) GROUND CIRCUIT FOR HIGH RESISTANCE

Measure the resistance of the (Z134) Ground circuit between ground and the A/C Heater Control C2 harness connector.

Is the resistance below 5.0 ohms?

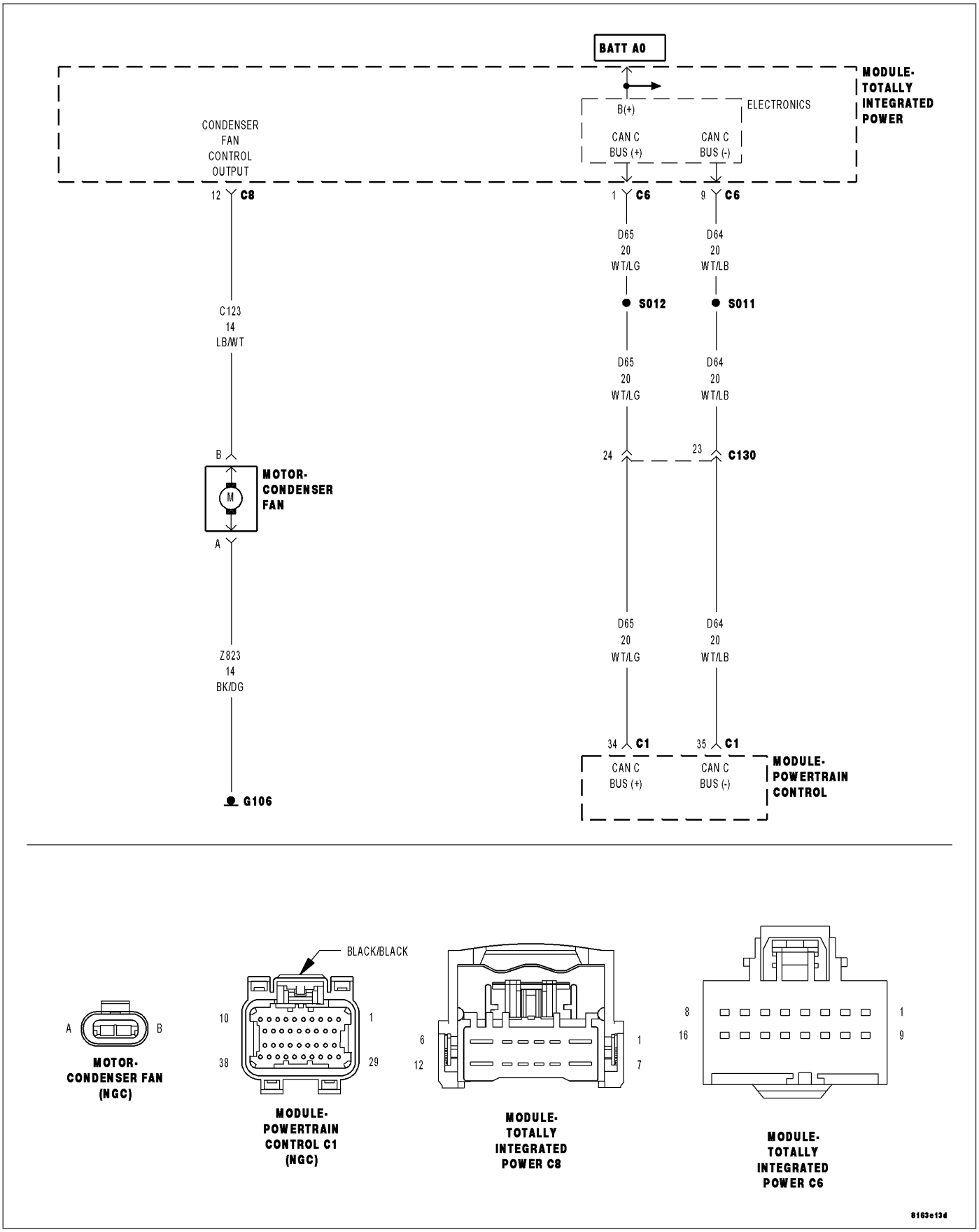
Yes >> Replace the A/C Heater Control in accordance with the Service Information.

No >> Repair the (Z134) Ground circuit for high resistance.
Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B10EE–CONDENSER FAN CONTROL CIRCUIT OVERCURRENT (TIPM)



For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on. Battery voltage greater than 10.4 volts. PCM requesting Condenser Fan operation.
- **Set Condition:**
  If the Totally Integrated Power Module (TIPM) detects an overcurrent condition on the (C123) Condenser Fan Control Output circuit.

Possible Causes
TERMINAL DAMAGE OR CORROSION
(Z823) GROUND CIRCUIT HIGH RESISTANCE
(C123) CONDENSER FAN CONTROL OUTPUT CIRCUIT HIGH RESISTANCE
CONDENSER FAN MOTOR
TIPM

Diagnostic Test

1. VERIFY DTC IS ACTIVE

Turn the ignition on.

With the scan tool, erase TIPM DTCs.

Turn the ignition off, wait 10 seconds, and turn the ignition on.

With the scan tool, actuate the Condenser Fan.

With the scan tool, read TIPM DTCs.

Does this DTC reset?

Yes >> With the scan tool, de-actuate the Condenser Fan. Then, Go To 2

No >> With the scan tool, de-actuate the Condenser Fan. Then, check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also, inspect the related connectors for broken, bent, corroded, and contaminated terminals.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

2. INSPECT RELATED WIRING HARNESS & CONNECTORS

Turn the ignition off.

Disconnect the TIPM C8 harness connector.

Disconnect the Condenser Fan Motor harness connector.

Inspect the terminal and connector condition. Check for signs of corrosion build up and damage that would compromise the terminal to controller pin connection.

NOTE: Make sure that all in-line connectors are inspected for corrosion and damage.
Visually inspect the wiring harness. Look for any chafed, pierced, pinched or partially broken wires hidden in the wire insulation.

Were any of the above conditions found?

Yes >> Repair or replace as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3

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3. CHECK (C123) CONDENSER FAN CONTROL OUTPUT CIRCUIT FOR HIGH RESISTANCE

Connect one end of a jumper wire to the (C123) Condenser Fan Control Output circuit in the Condenser Fan Motor harness connector and connect the other end to a clean chassis ground.

Using a 12-volt test light connected to 12 volts, probe the (C123) Condenser Fan Control Output circuit in the TIPM C8 harness connector.

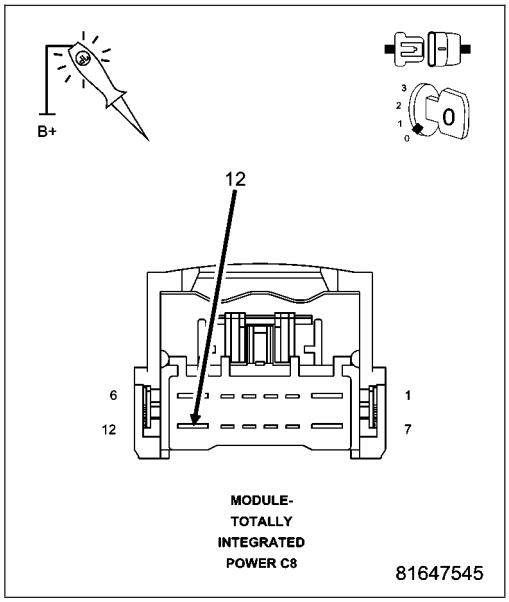
NOTE: The test light should illuminate brightly. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly.

Yes >> Go To 4

No >> Repair the excessive resistance in the (C123) Condenser Fan Control Output circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



4. CHECK (Z823) GROUND CIRCUIT

Using a 12-volt test light connected to 12 volts, probe the (Z823) Ground circuit in the Condenser Fan Motor harness connector.

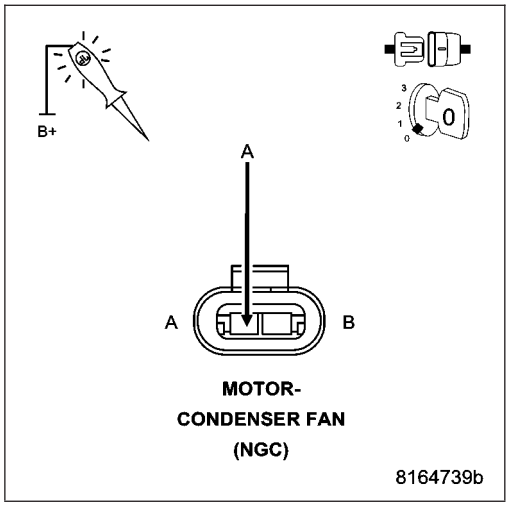
NOTE: The test light should illuminate brightly. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly.

Yes >> Go To 5

No >> Repair the excessive resistance in the (Z823) Ground circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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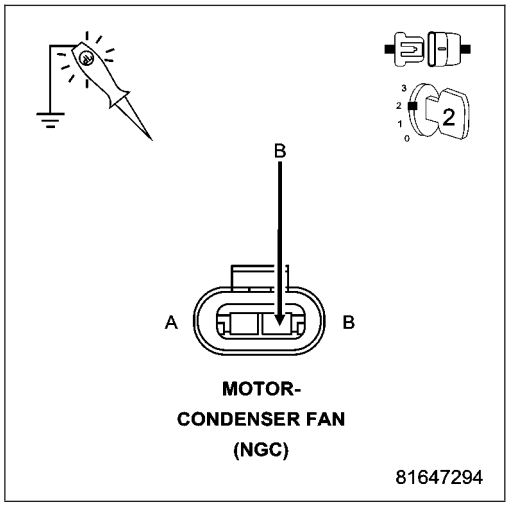
5. CHECK (C123) CONDENSER FAN CONTROL OUTPUT FROM TIPM

Reconnect the TIPM C8 harness connector.

Ignition on, engine not running.

With a scan tool, actuate the Condenser Fan.

Using the 12-Volt test light connected to ground, probe the (C123) Condenser Fan Control Output circuit in the Condenser Fan Motor harness connector.



Does the test light illuminate brightly?

Yes >> With a scan tool, de-actuate the Condenser Fan. Then, replace the Condenser Fan Motor in accordance with the Service Information.

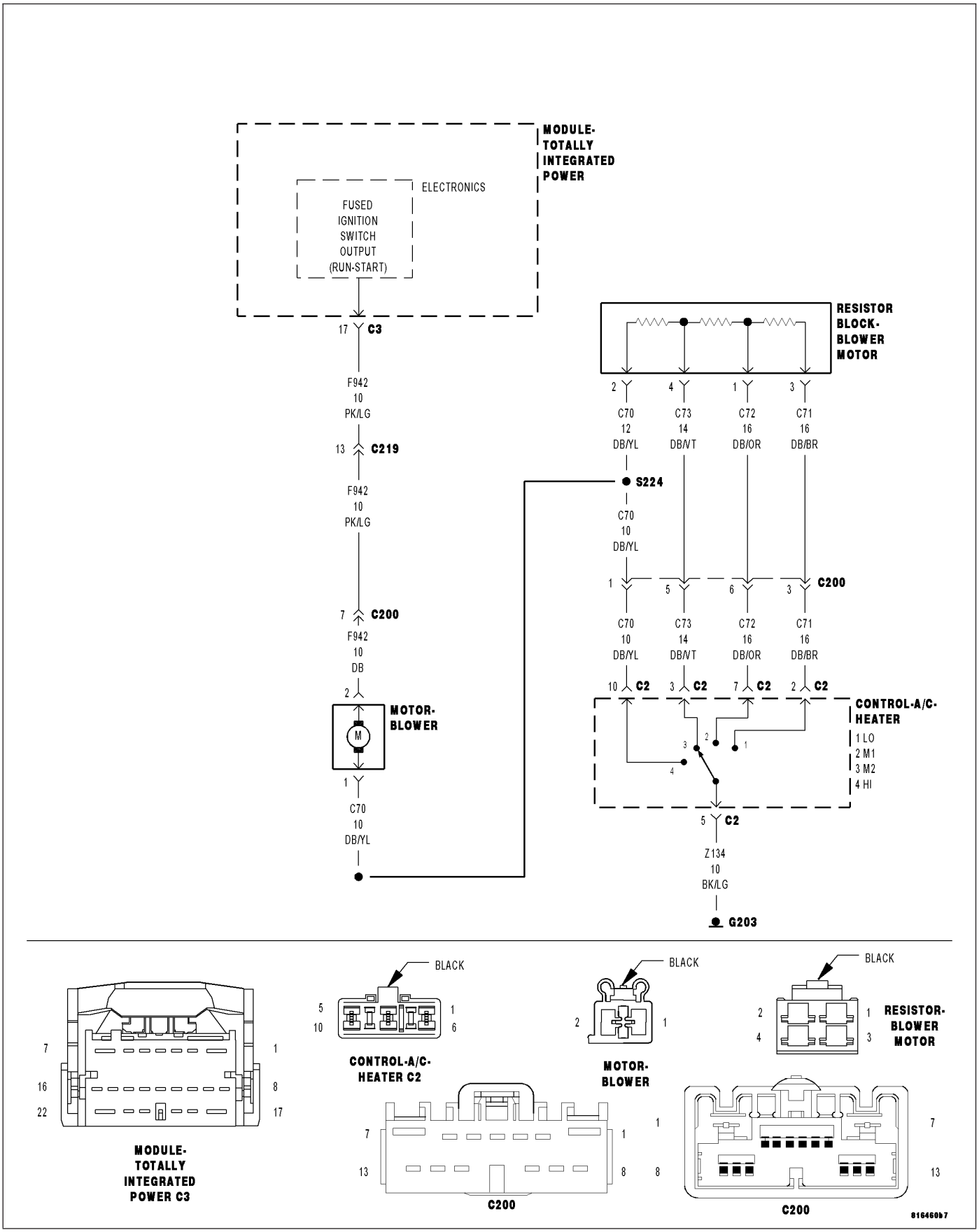
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> With a scan tool, de-actuate the Condenser Fan. Then, replace the TIPM in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B10E9–BLOWER MOTOR CONTROL CIRCUIT LOW (TIPM)



For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the Totally Integrated Power Module (TIPM) detects an excessive current draw on the (F942) Fused Ignition Switch Output (Run-Start) circuit for 20 micro seconds when blower motor operation is requested.

Possible Causes
(F942) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT SHORTED TO GROUND
BLOWER MOTOR
TIPM

Diagnostic Test

1. VERIFY DTC IS ACTIVE

Turn the blower control switch to off.
Turn the ignition off, wait 10 seconds, and turn the ignition on.
With the scan tool, erase TIPM DTCs.
Turn the ignition off, wait 10 seconds, and turn the ignition on.
Turn the blower control switch to on.
With the scan tool, read TIPM DTCs.

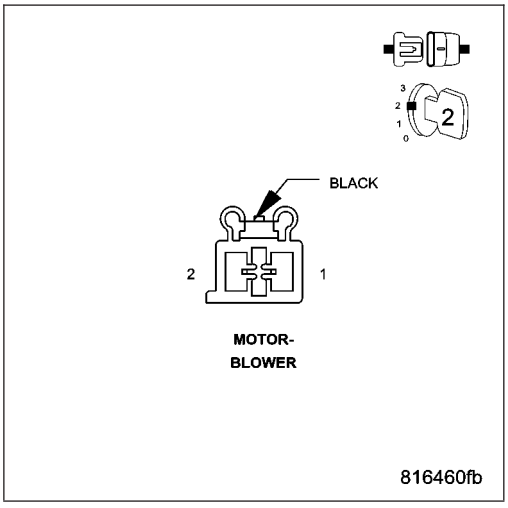
Does this DTC reset?

Yes >> Go To 2

No >> Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also, inspect the related connectors for broken, bent, corroded, and contaminated terminals.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

2. CHECK FOR ACTIVE DTC B10E9–BLOWER MOTOR CONTROL CIRCUIT LOW WITH BLOWER MOTOR HARNESS CONNECTOR DISCONNECTED

Turn the blower control switch to off.
Disconnect the Blower Motor harness connector.
Turn the ignition off, wait 10 seconds, and turn the ignition on.
With the scan tool, erase TIPM DTCs.
Turn the ignition off, wait 10 seconds, and turn the ignition on.
Turn the blower control switch to on.
With the scan tool, read TIPM DTCs.



Does the scan tool display active: B10E9–BLOWER MOTOR CONTROL CIRCUIT LOW?

Yes >> Go To 3

No >> Replace the Blower Motor in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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3. CHECK THE (F942) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

Disconnect the TIPM C3 harness connector.

Measure the resistance of the (F942) Fused Ignition Switch Output (Run-Start) circuit between ground and the Blower Motor harness connector.

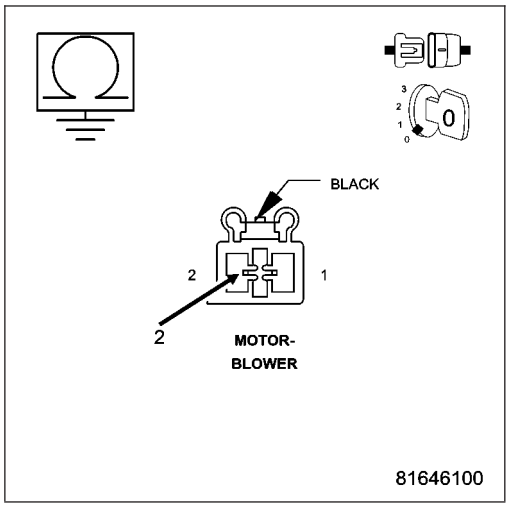
Is the resistance below 10k ohms?

Yes >> Repair the (F942) Fused Ignition Switch Output (Run-Start) circuit for a short to ground.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the TIPM in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B104A–FLOOR/DEFROST MODE DOOR TRAVEL RANGE TOO SMALL

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value is less than the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Mode 2 (Defrost to Floor) Door is less than the low range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
MODE 2 (DEFROST TO FLOOR) DOOR SEIZED, BINDING, OBSTRUCTED
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes, Dual-Zone System
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Yes, Single-Zone System

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>> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs first and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. INSPECT ACTUATOR & HOUSING ASSEMBLY FOR A CONDITION CAUSING THE DOOR TO SEIZE OR BIND

Turn the ignition off.

Inspect the actuator, linkage, and housing assembly for a condition causing the door to seize or bind.

Are there any physical or mechanical problems with the door, housing, linkage, or actuator?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK MODE 2 (DEFROST TO FLOOR) DOOR TRAVEL

Remove the Mode Door 2 (Defrost to Floor) Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the door in both directions. The door should operate smoothly in both directions over approximately 103 degrees of travel.

Does the door operate smoothly in both directions over approximately 103 degrees of travel?

Yes >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information. Then, Go To 6.

No >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B104A–FLOOR/DEFROST MODE DOOR TRAVEL RANGE TOO SMALL?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B104B–FLOOR/DEFROST MODE DOOR TRAVEL RANGE TOO LARGE

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value exceeds the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Mode 2 (Defrost to Floor) Door exceeds the high range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
MODE 2 (DEFROST TO FLOOR) DOOR OR A/C HEATER HOUSING COMPONENTS WARPED, WORN, DAMAGED, MISSING, BROKEN
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

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3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes, Dual-Zone System
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Yes, Single-Zone System
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs first and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. CHECK FOR A BROKEN MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR

Turn the ignition off.

Remove the Mode Door 2 (Defrost to Floor) Actuator from the A/C Heater Housing assembly.

By hand, attempt to rotate the actuator in both directions.

Does the actuator turn in either direction?

Yes >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK MODE 2 (DEFROST TO FLOOR) DOOR & A/C HEATER HOUSING FOR WARPED, WORN, DAMAGED, MISSING, & BROKEN COMPONENTS

Inspect for excessively worn, disconnected, missing, or broken door linkage. Inspect for a damaged or broken A/C Heater Housing Assembly. Inspect for a warped or broken door, and missing door seals. Rotate the door from stop to stop. The door should rotate approximately 103 degrees.

Are there any physical or mechanical problems with the door or housing?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode 2 (Defrost to Floor) Actuator in accordance with the Service Information. Then, Go To 6.

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B104B–FLOOR/DEFROST MODE DOOR TRAVEL RANGE TOO LARGE?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B104C–BLEND DOOR CONTROL CIRCUIT/PERFORMANCE (SINGLE-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control monitors the door driver circuits during actuator operation for shorts to ground, shorts to battery, and shorts to other door driver circuits. If detected, the A/C Heater Control reports these types of faults as Control Circuit/Performance DTCs. It is important to note that Control Circuit/Performance DTCs do not indicate where or what type of short is present and that additional system testing is necessary to provide more details about the reported fault.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control detects a short on any of the door driver circuits while attempting to drive this actuator. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored, it will stay in memory for 100 ignition cycles.

Possible Causes
DOOR DRIVER CIRCUIT(S) SHORTED

NOTE: The DTC must be active for the results of this test to be valid. Do not perform this test if the DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition on.

With the scan tool in HVAC, erase DTCs.

Turn the ignition off, wait 10 seconds, and then turn the ignition on.

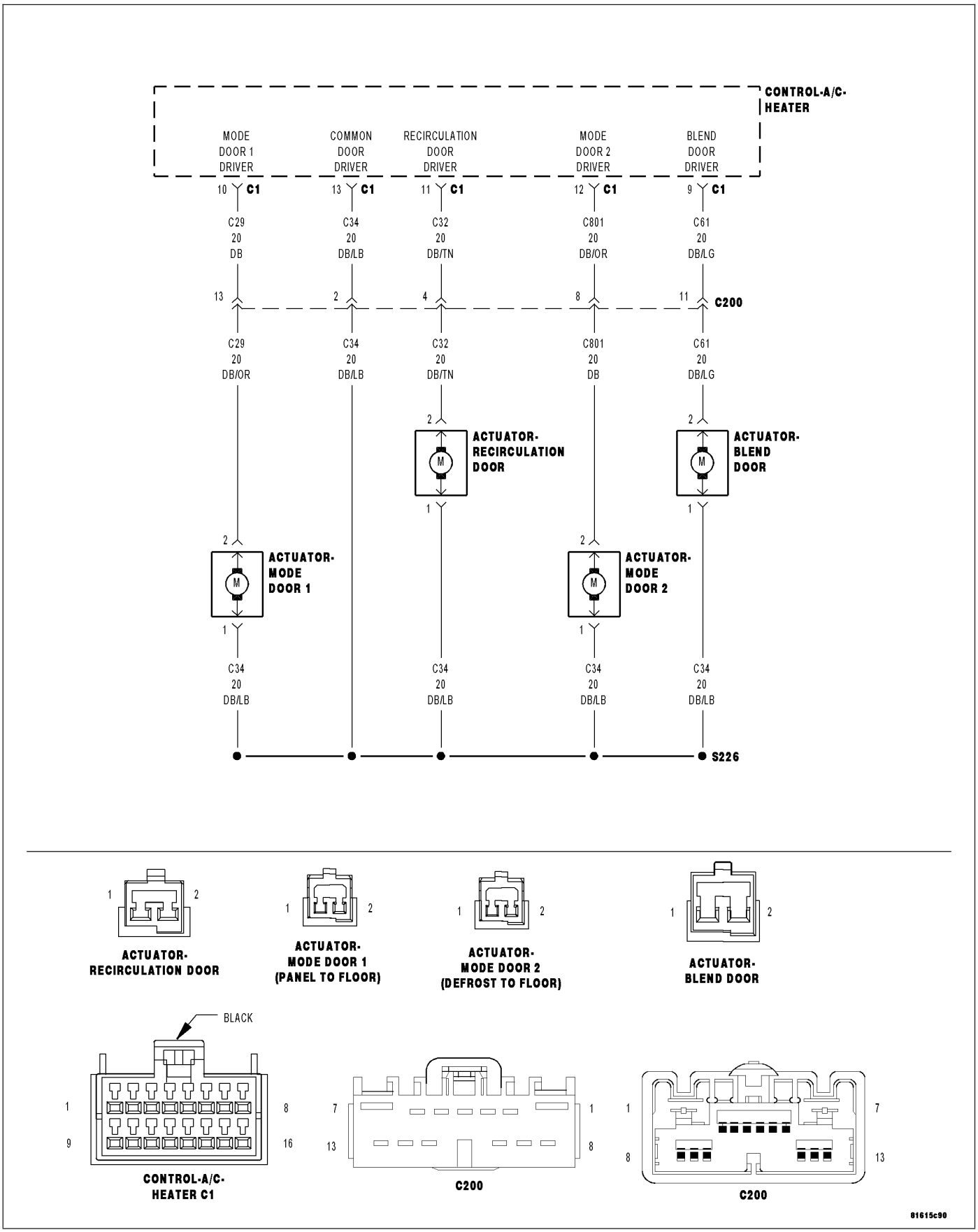
With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Repair

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuits, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

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B104D–BLEND DOOR CONTROL CIRCUIT LOW (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C61) Blend Door Driver circuit is shorted to ground.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

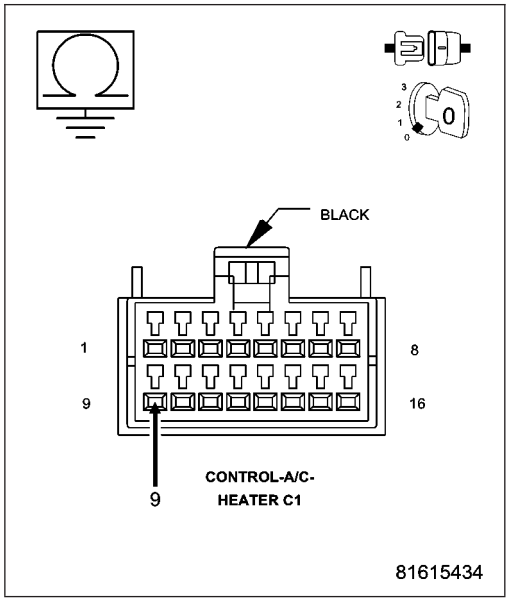
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C61) Blend Door Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C61) Blend Door Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

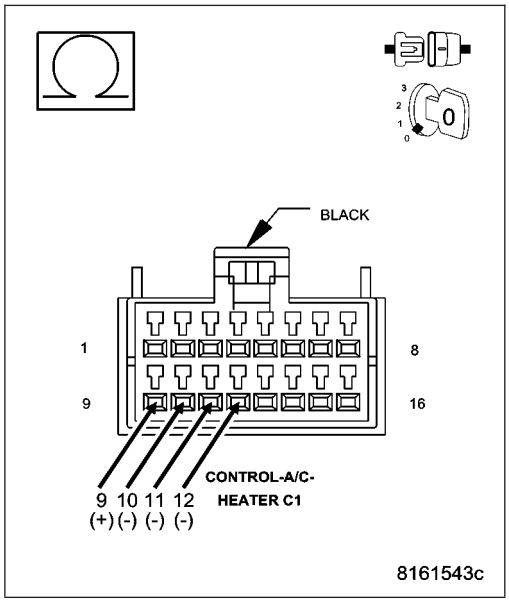
Measure the resistance between the (C61) Blend Door Driver circuit and the (C29) Mode Door 1 Driver circuit, the (C32) Recirculation Door Driver circuit, and the (C801) Mode Door 2 Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms between the (C61) Blend Door Driver circuit and any of the other door driver circuits?

Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C61) Blend Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



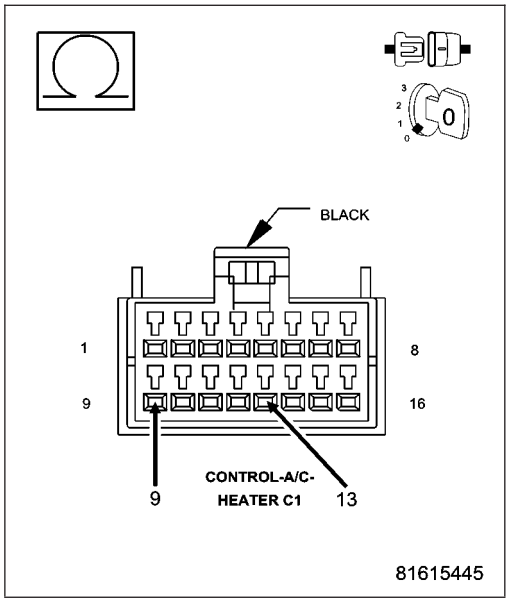
3. CHECK BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5

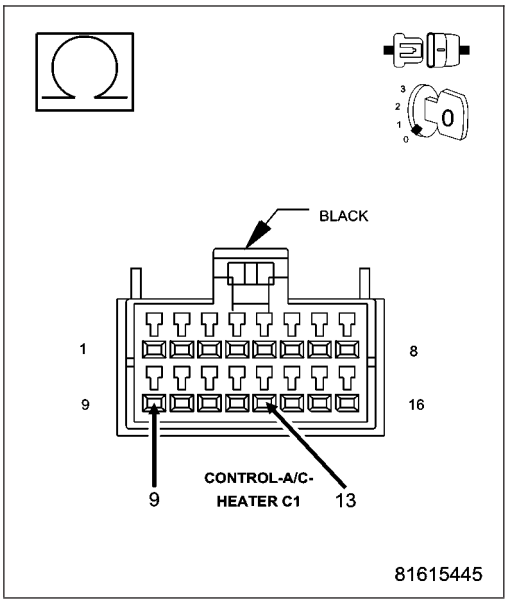


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4. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Blend Door Actuator harness connector.

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance below 10k ohms?

Yes >> Repair the (C61) Blend Door Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B104D–BLEND DOOR CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

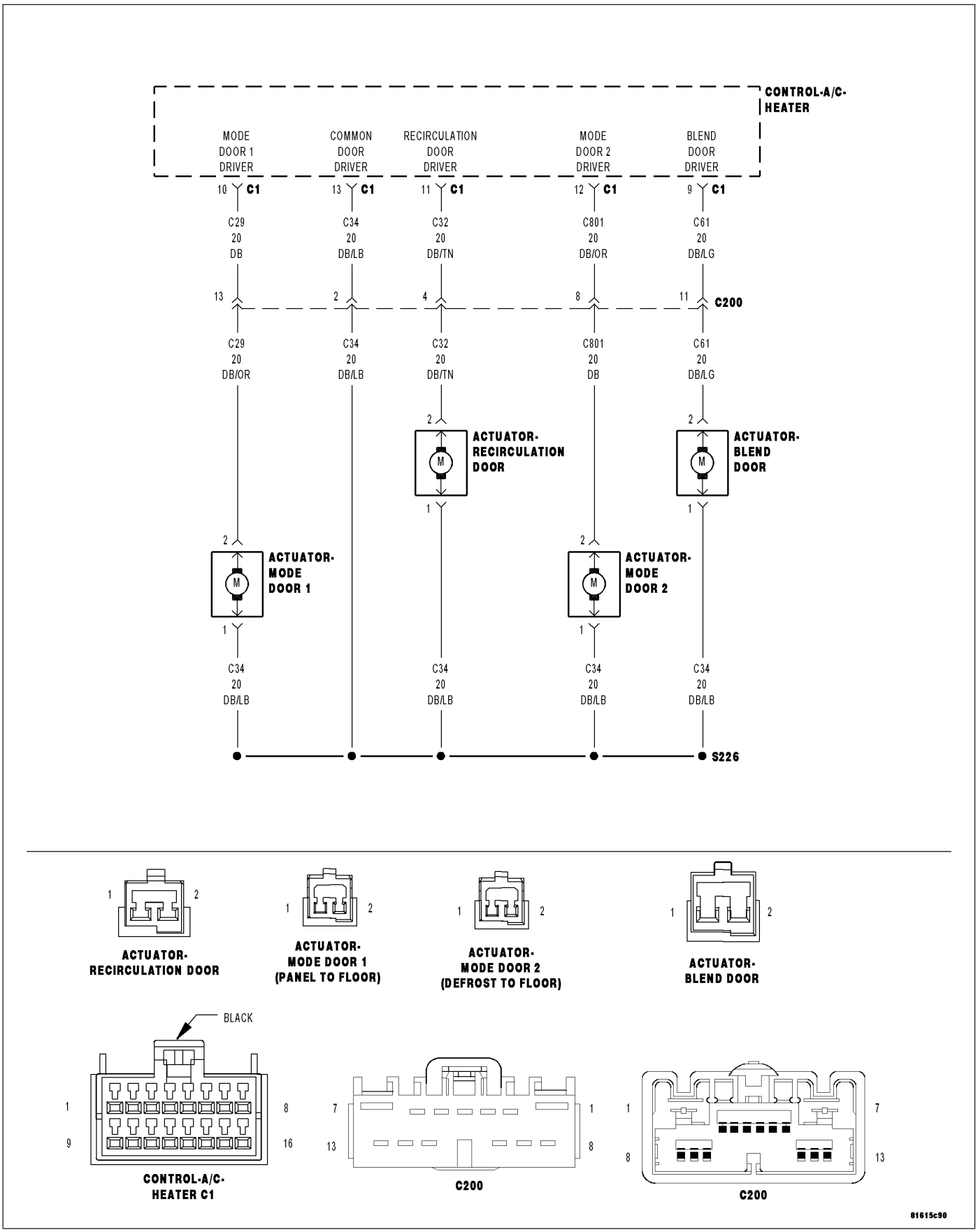
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B104E–BLEND DOOR CONTROL CIRCUIT HIGH (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C61) Blend Door Driver circuit is shorted to voltage.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

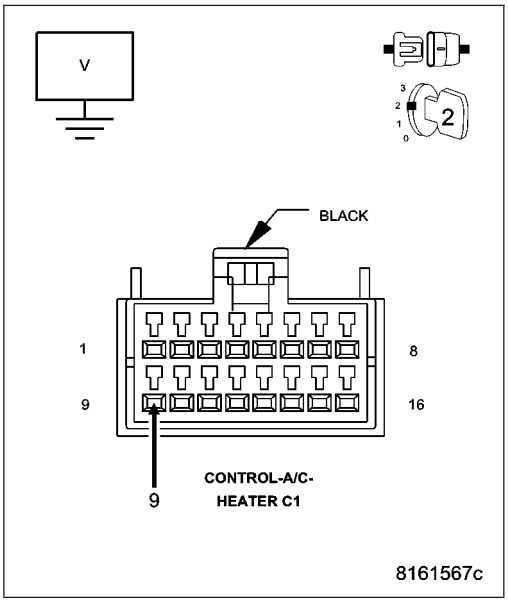
Turn the ignition on.

Measure the voltage of the (C61) Blend Door Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C61) Blend Door Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B104E–BLEND DOOR CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

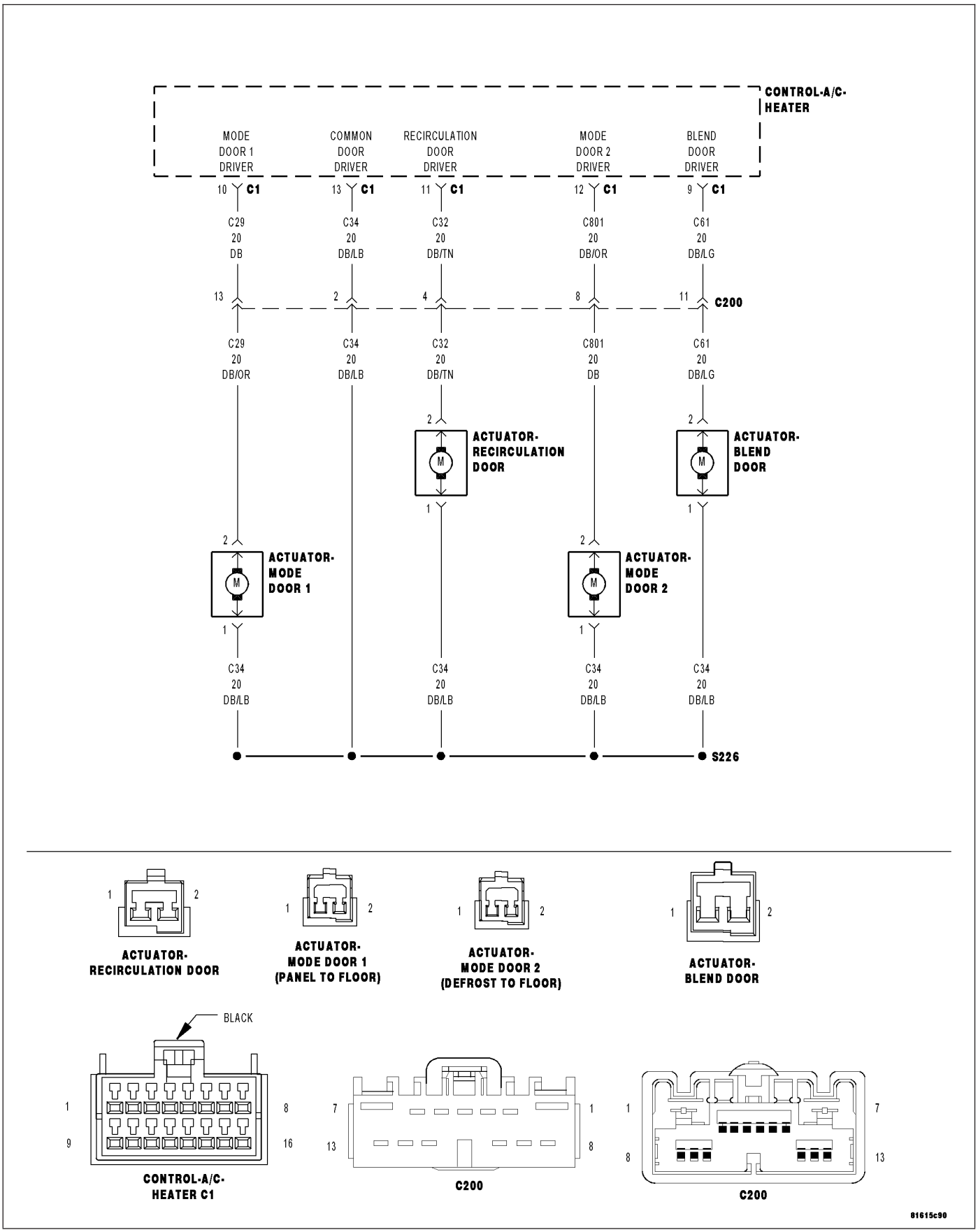
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B104F–BLEND DOOR CONTROL CIRCUIT OPEN (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If Blend Door Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

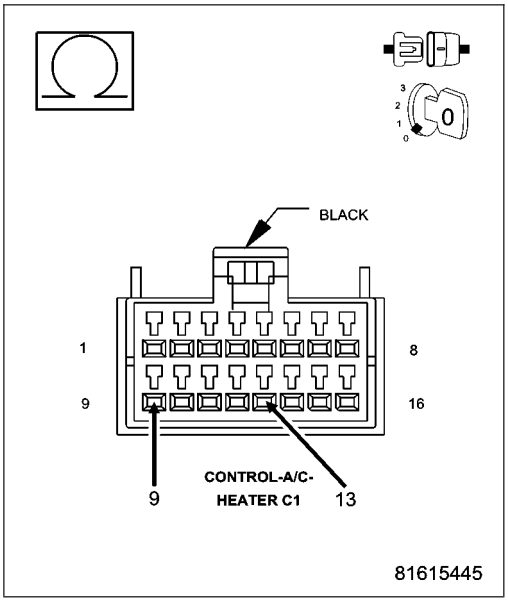
No >> Go To 2

2. CHECK BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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3. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR AN OPEN

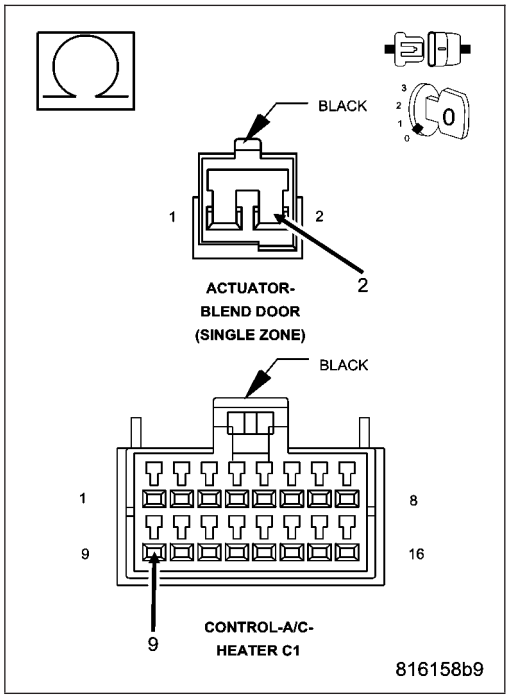
Disconnect the Blend Door Actuator harness connector.

Measure the resistance of the (C61) Blend Door Driver circuit between the A/C Heater Control C1 harness connector and the Blend Door Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C61) Blend Door Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



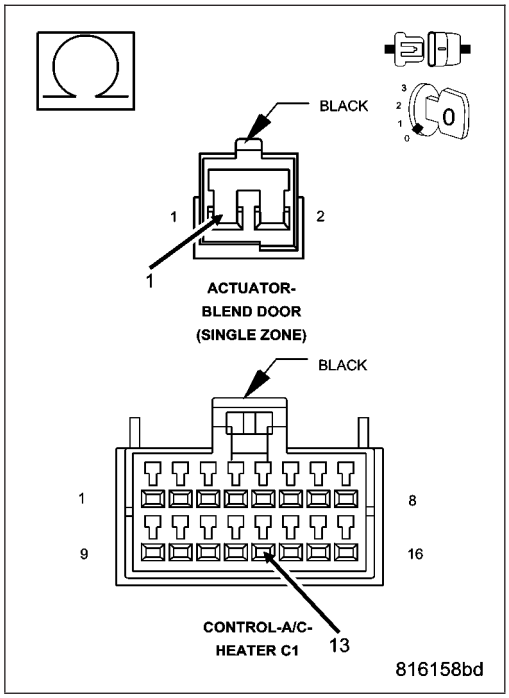
4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Blend Door Actuator harness connector.

Is the resistance below 5.0 ohms?

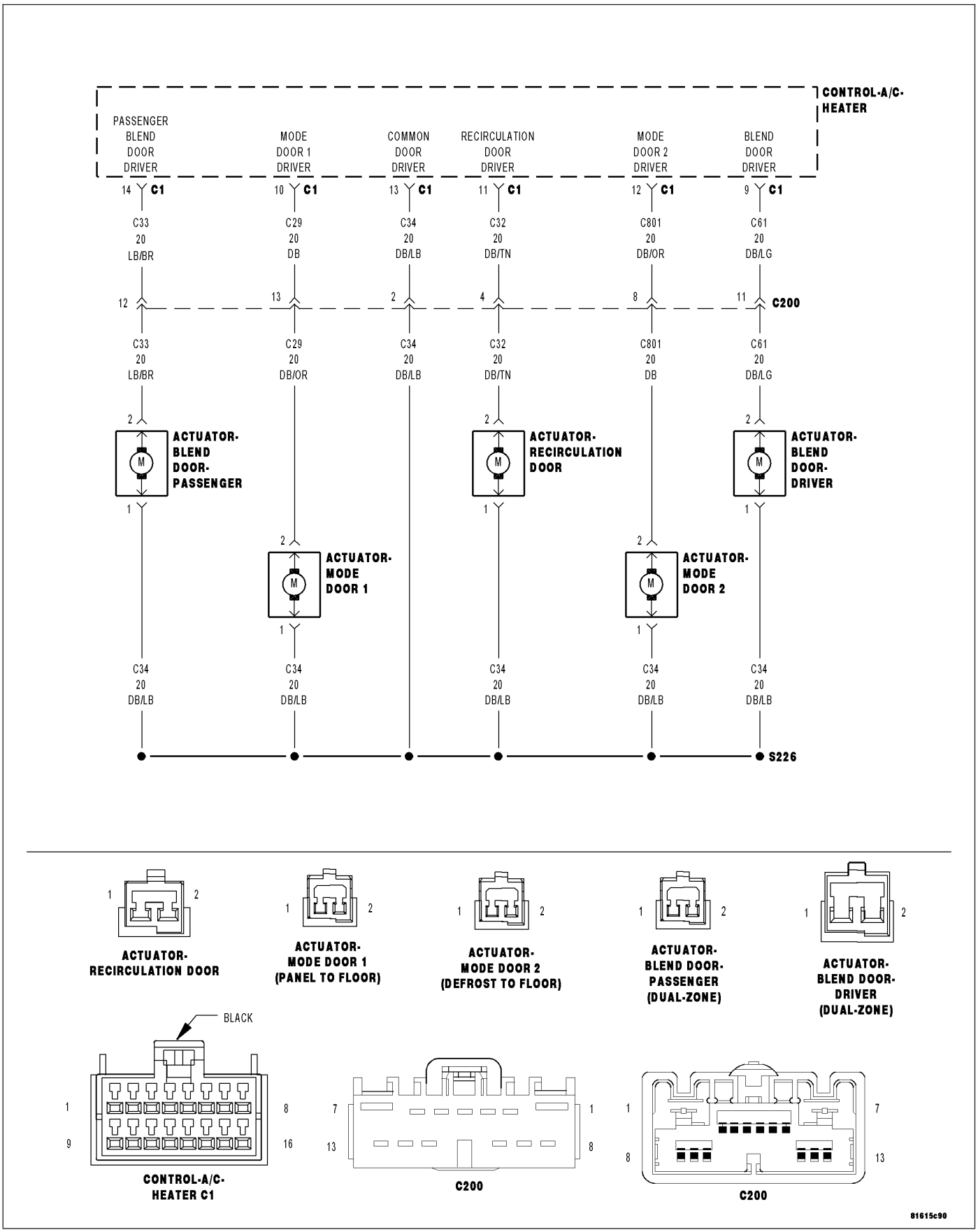
Yes >> Replace the Blend Door Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B105A–RECIRCULATION DOOR CONTROL CIRCUIT HIGH (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C32) Recirculation Door Driver circuit is shorted to voltage.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

NOTE: If present, diagnose and repair DTC B10AB Right Blend Door Control Circuit High or B10AA Right Blend Door Control Circuit Low before proceeding.

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

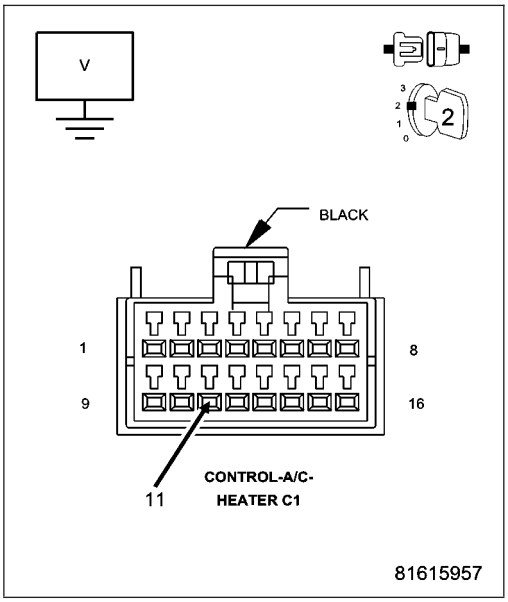
Turn the ignition on.

Measure the voltage of the (C32) Recirculation Door Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C32) Recirculation Door Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B105A–RECIRCULATION DOOR CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

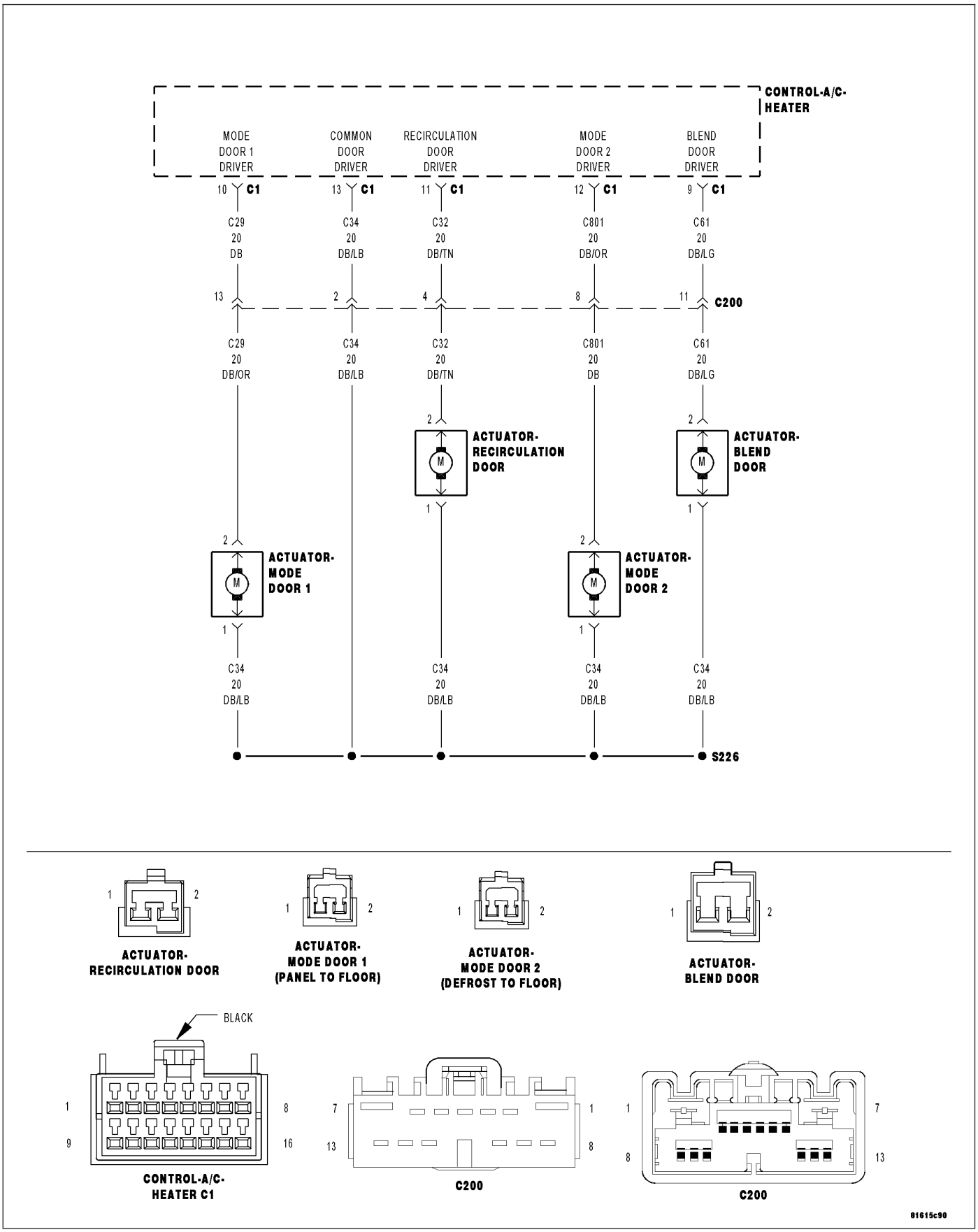
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B105A–RECIRCULATION DOOR CONTROL CIRCUIT HIGH (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C32) Recirculation Door Driver circuit is shorted to voltage.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

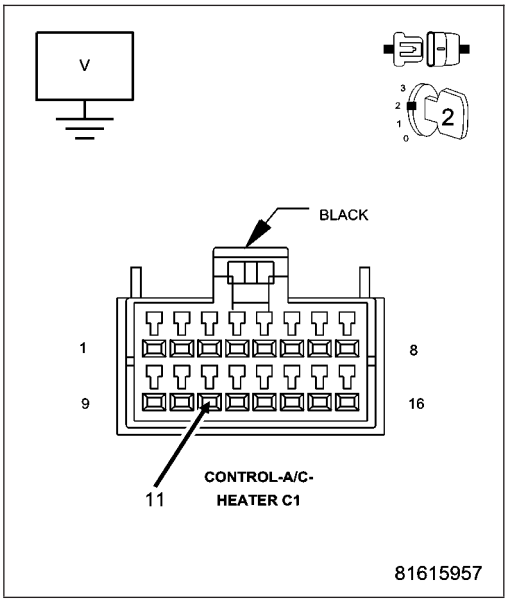
Turn the ignition on.

Measure the voltage of the (C32) Recirculation Door Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C32) Recirculation Door Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B105A–RECIRCULATION DOOR CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

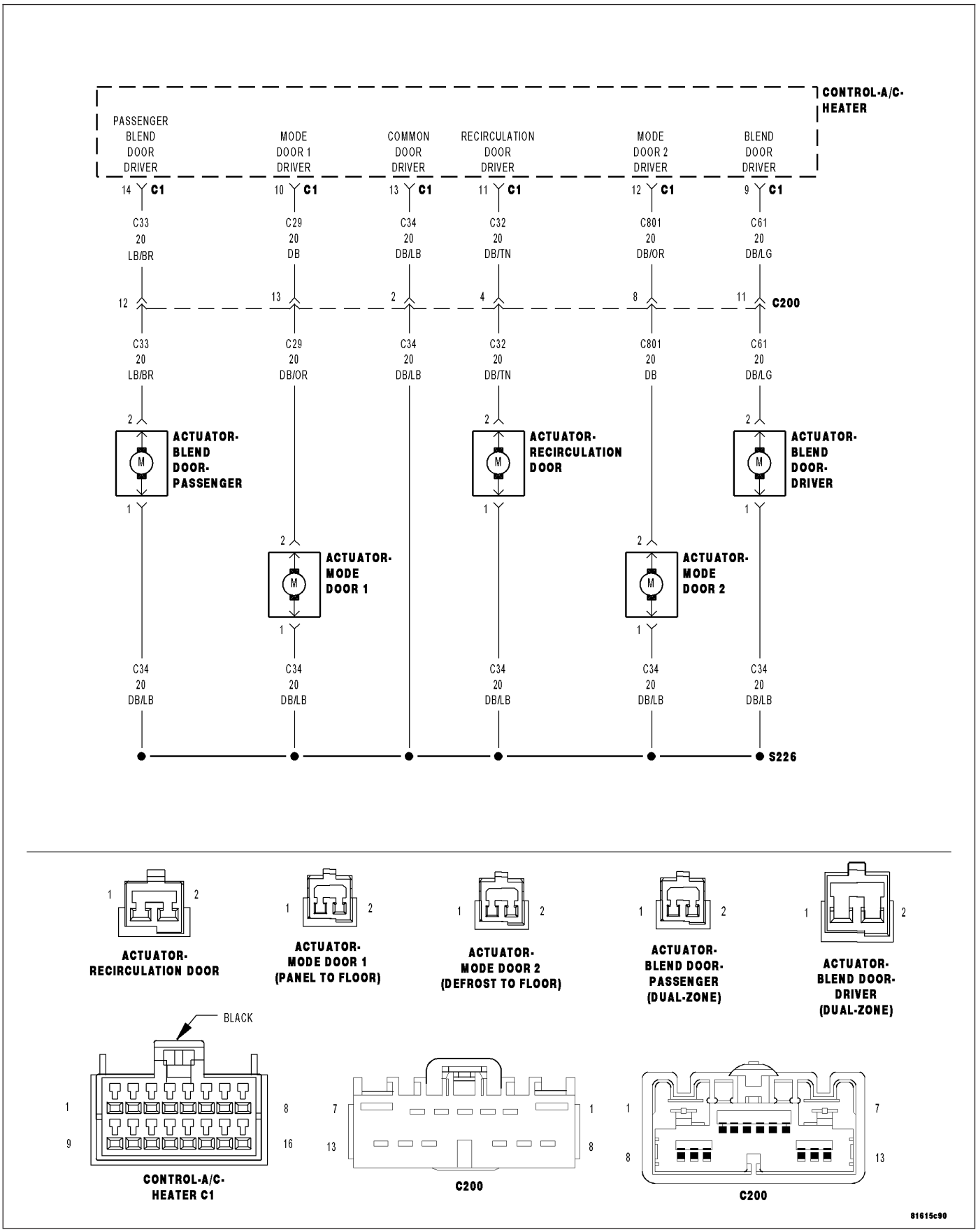
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B105B–RECIRCULATION DOOR CONTROL CIRCUIT OPEN (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If Recirculation Door Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK RECIRCULATION DOOR ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

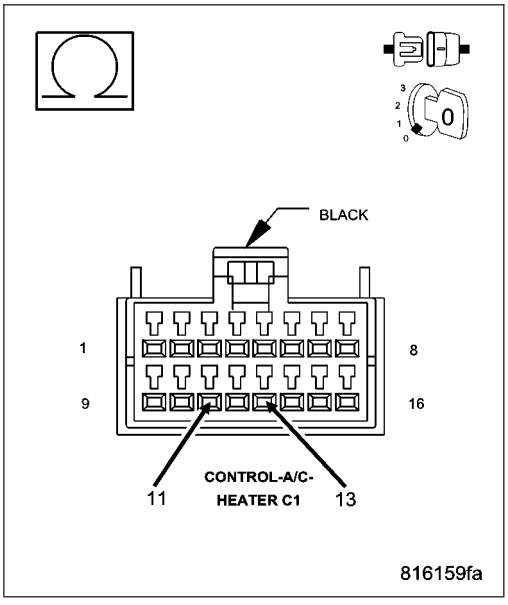
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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3. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR AN OPEN

Disconnect the Recirculation Door Actuator harness connector.

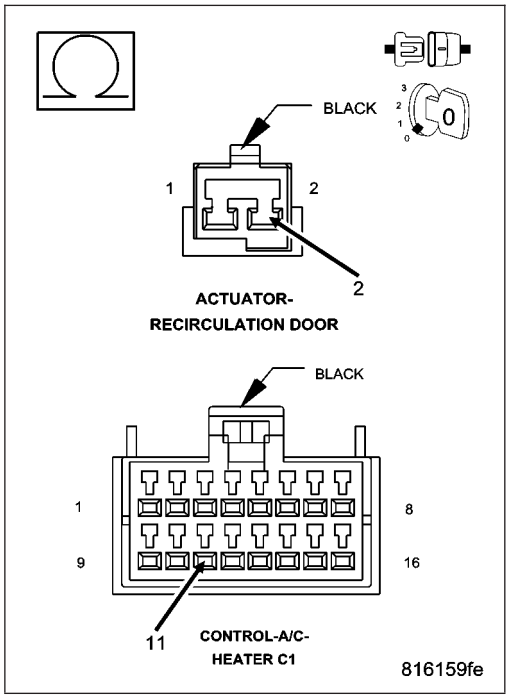
Measure the resistance of the (C32) Recirculation Door Driver circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C32) Recirculation Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

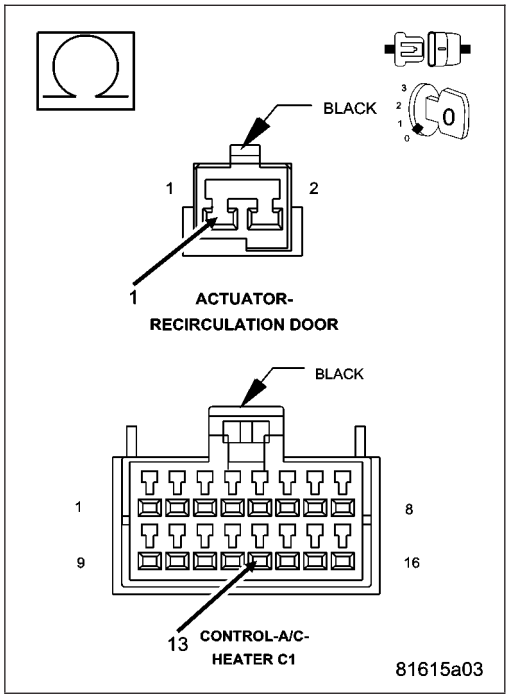
Is the resistance below 5.0 ohms?

Yes >> Replace the Recirculation Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

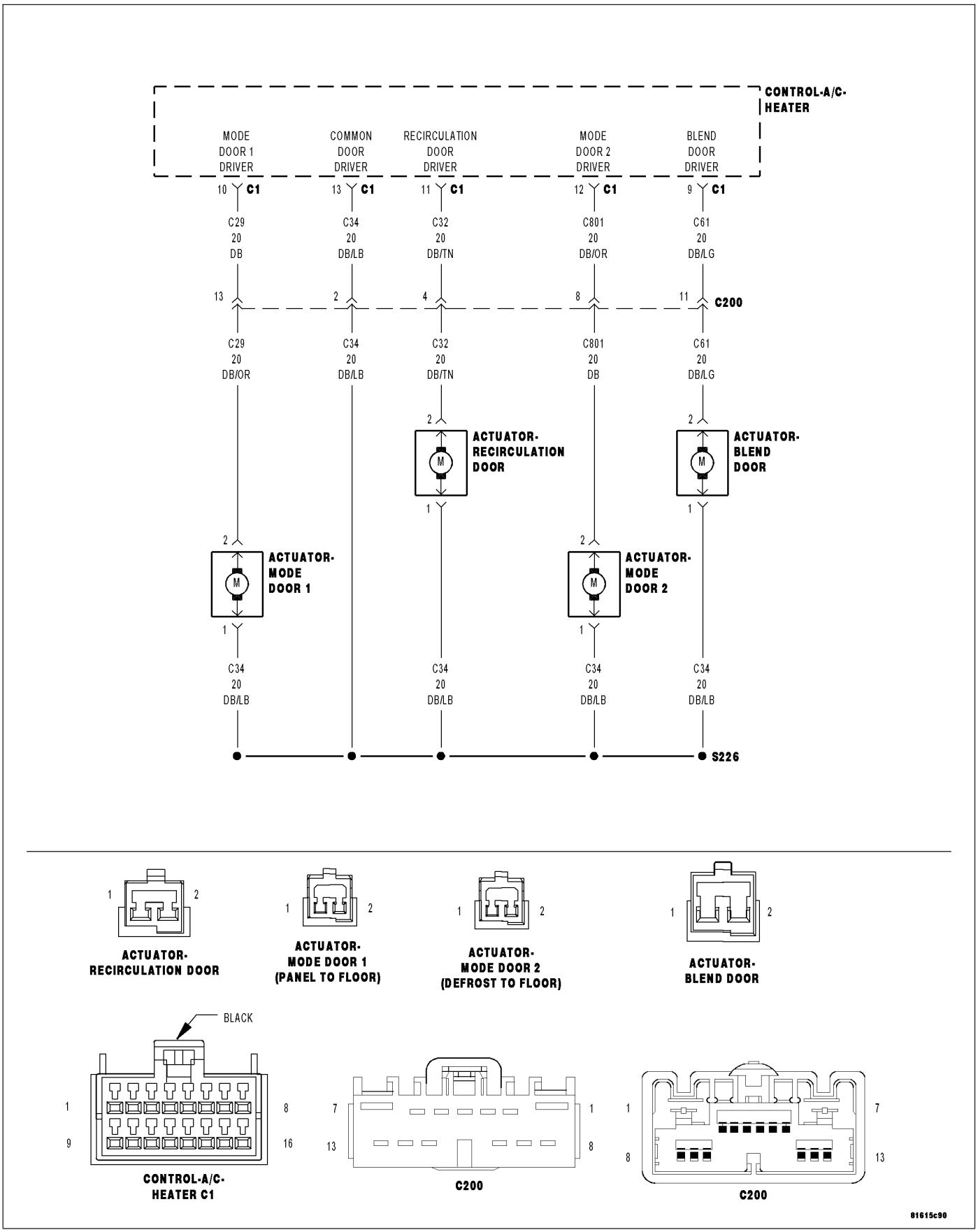
No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B105B–RECIRCULATION DOOR CONTROL CIRCUIT OPEN (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If Recirculation Door Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK RECIRCULATION DOOR ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

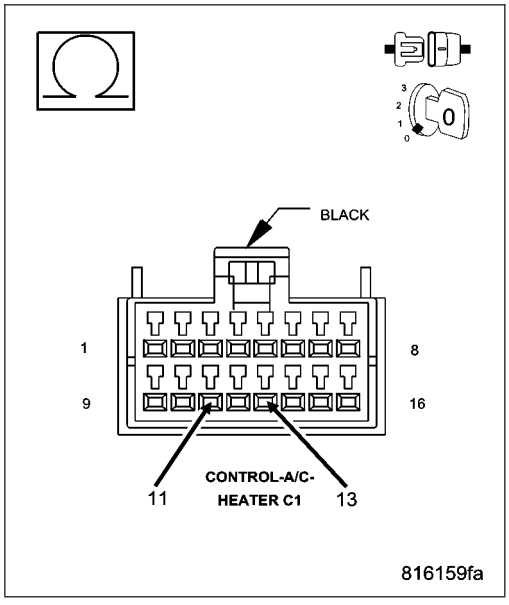
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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3. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR AN OPEN

Disconnect the Recirculation Door Actuator harness connector.

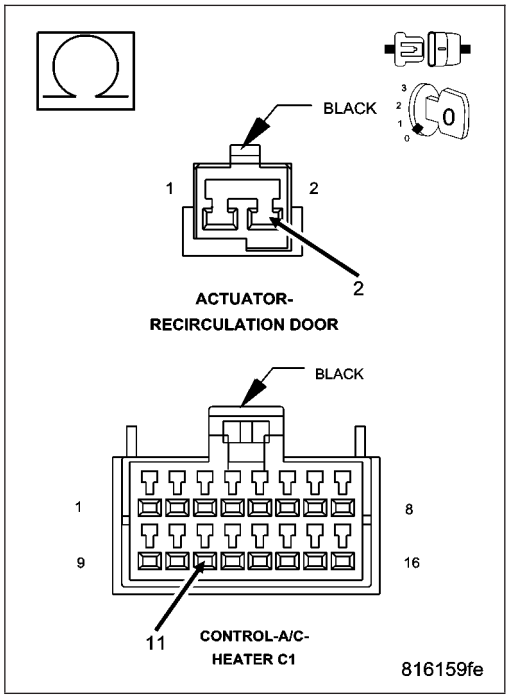
Measure the resistance of the (C32) Recirculation Door Driver circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C32) Recirculation Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

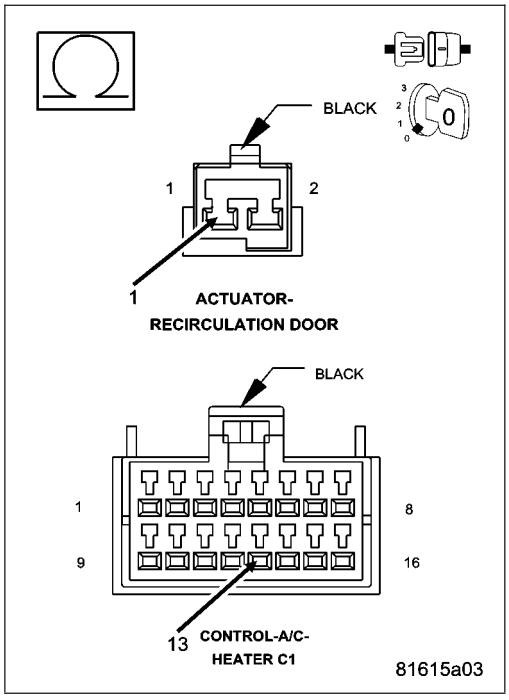
Is the resistance below 5.0 ohms?

Yes >> Replace the Recirculation Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B105C–RECIRCULATION DOOR TRAVEL RANGE TOO SMALL

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value is less than the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Recirculation Door is less than the low range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
RECIRCULATION DOOR SEIZED, BINDING, OBSTRUCTED
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes, Dual-Zone System

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Yes, Single-Zone System

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>> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs first and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. INSPECT ACTUATOR & HOUSING ASSEMBLY FOR A CONDITION CAUSING THE DOOR TO SEIZE OR BIND

Turn the ignition off.

Inspect the actuator and the housing assembly for a condition causing the door to seize or bind.

Are there any physical or mechanical problems with the door, housing, or actuator?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK RECIRCULATION DOOR TRAVEL

Remove the Recirculation Door Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the door in both directions. The door should operate smoothly in both directions over approximately 95 degrees of travel.

Does the door operate smoothly in both directions over approximately 95 degrees of travel?

Yes >> Replace the Recirculation Door Actuator in accordance with the Service Information. Then, Go To 6

No >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B105C–RECIRCULATION DOOR TRAVEL RANGE TOO SMALL?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B105D–RECIRCULATION DOOR TRAVEL RANGE TOO LARGE

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value exceeds the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Recirculation Door exceeds the high range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
RECIRCULATION DOOR OR A/C HEATER HOUSING COMPONENTS WARPED, WORN, DAMAGED, MISSING, BROKEN
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

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3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes, Dual-Zone System
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Yes, Single-Zone System
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs first and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. CHECK FOR A BROKEN RECIRCULATION DOOR ACTUATOR

Turn the ignition off.

Remove the Recirculation Door Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the actuator in both directions.

Does the actuator turn in either direction?

Yes >> Replace the Recirculation Door Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK RECIRCULATION DOOR & A/C HEATER HOUSING FOR WARPED, WORN, DAMAGED, MISSING, & BROKEN COMPONENTS

Inspect for a damaged or broken A/C Heater Housing Assembly, a warped, worn, or broken door, and missing door seals. Rotate the door from stop to stop. The door should rotate approximately 95 degrees.

Are there any physical or mechanical problems with the door or housing?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Recirculation Door Actuator in accordance with the Service Information. Then, Go To 6.

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

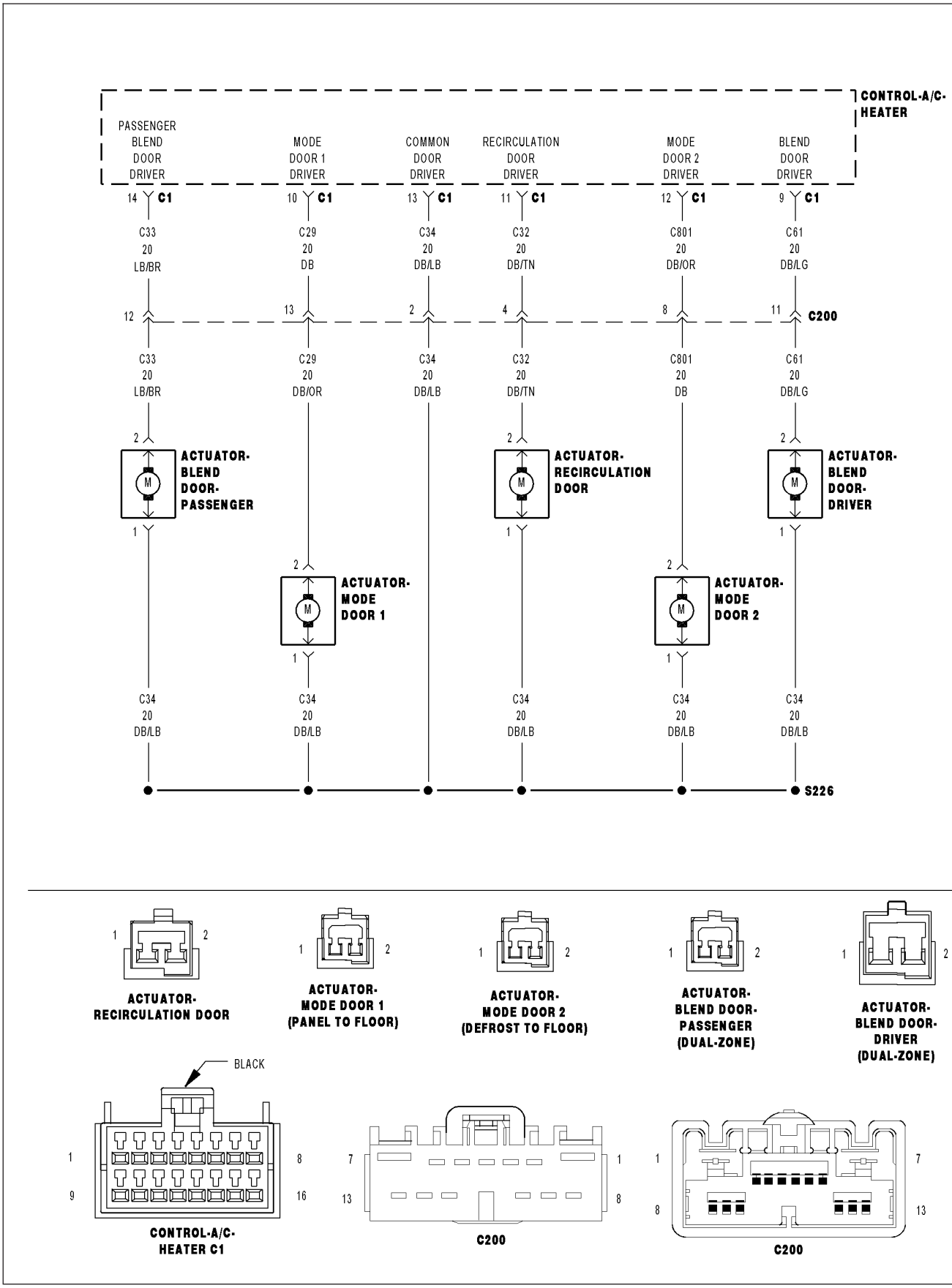
Does the scan tool display: B105D–RECIRCULATION DOOR TRAVEL RANGE TOO LARGE?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B105F–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT LOW (DUAL-ZONE)



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For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control drives the Driver Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Passenger Blend Door Actuator via the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C34) Common Door Driver circuit is shorted to ground.

Possible Causes
(C34) COMMON DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C34) COMMON DOOR DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
DRIVER BLEND DOOR ACTUATOR
PASSENGER BLEND DOOR ACTUATOR
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

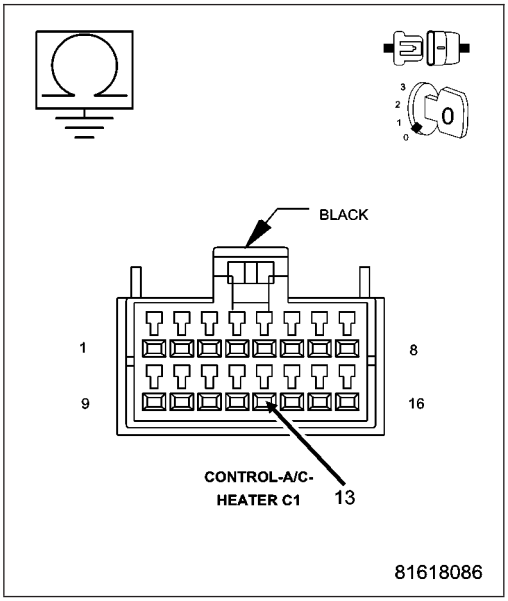
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C34) Common Door Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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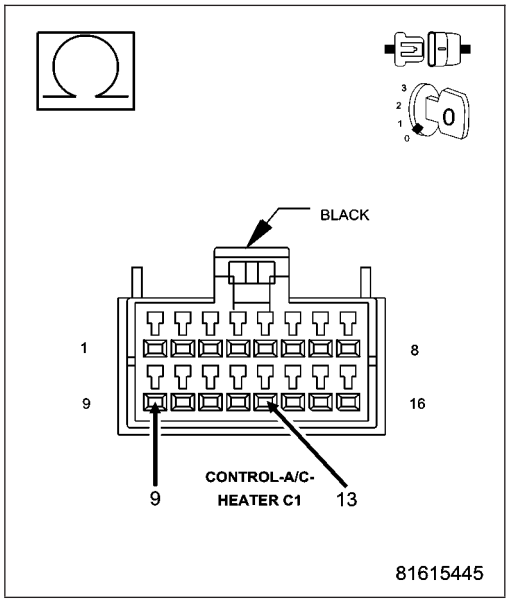
2. CHECK DRIVER BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 3

No >> Go To 4



3. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Driver Blend Door Actuator harness connector.

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

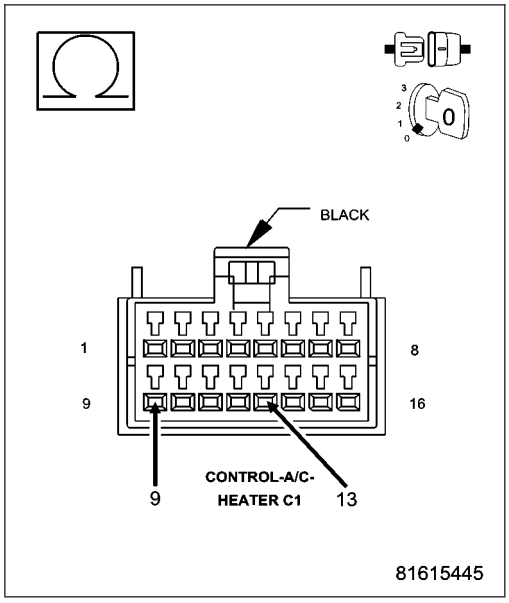
Is the resistance below 10k ohms?

Yes >> Repair the (C61) Blend Door Driver Circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Driver Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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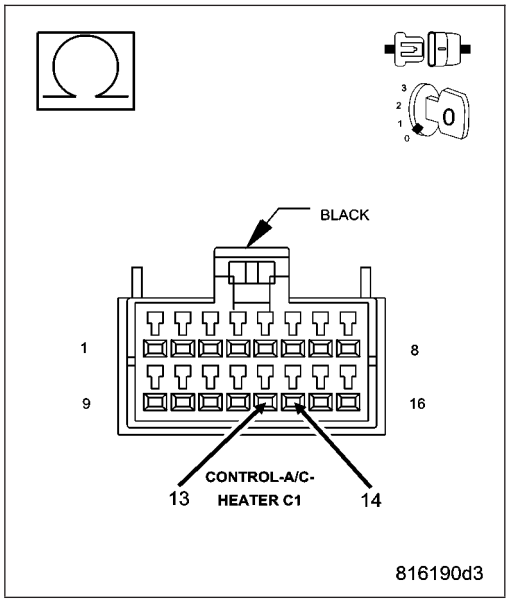
4. CHECK PASSENGER BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 5

No >> Go To 6



5. CHECK (C33) PASSENGER BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Passenger Blend Door Actuator harness connector.

Measure the resistance between the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

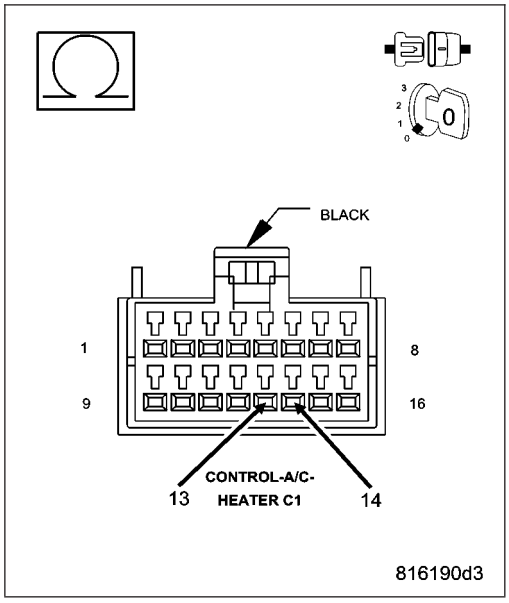
Is the resistance below 10k ohms?

Yes >> Repair the (C33) Passenger Blend Door Driver Circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Passenger Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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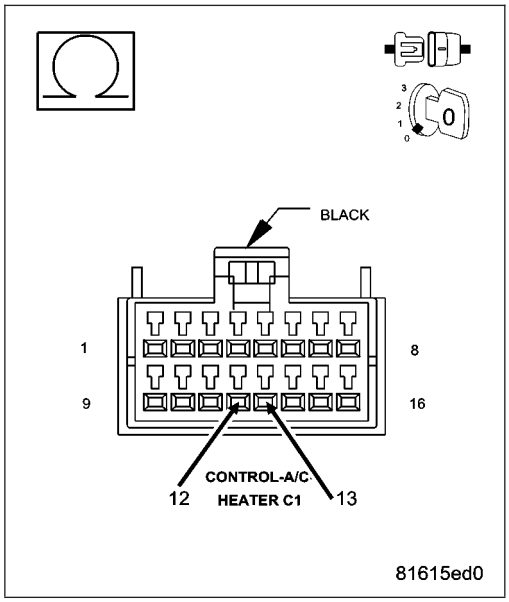
6. CHECK MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 7

No >> Go To 8



7. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

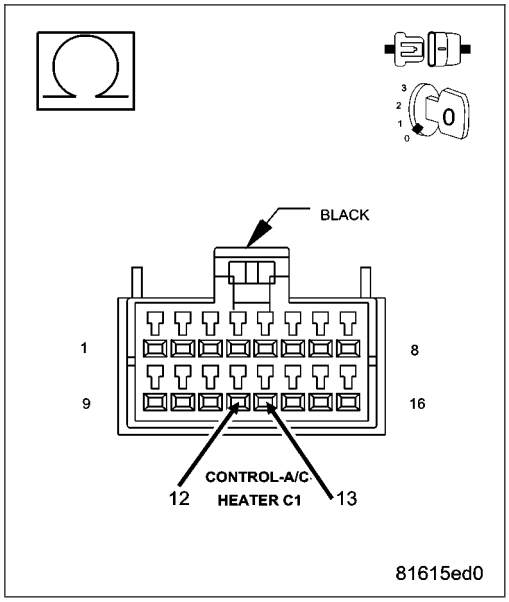
Is the resistance below 10k ohms?

Yes >> Repair the (C801) Mode Door 2 Driver Circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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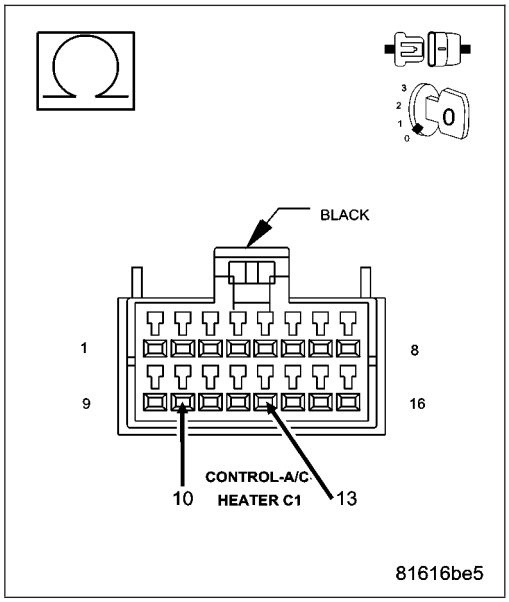
8. CHECK MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 9

No >> Go To 10



9. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Mode Door 1 (Panel to Floor) Actuator harness connector.

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

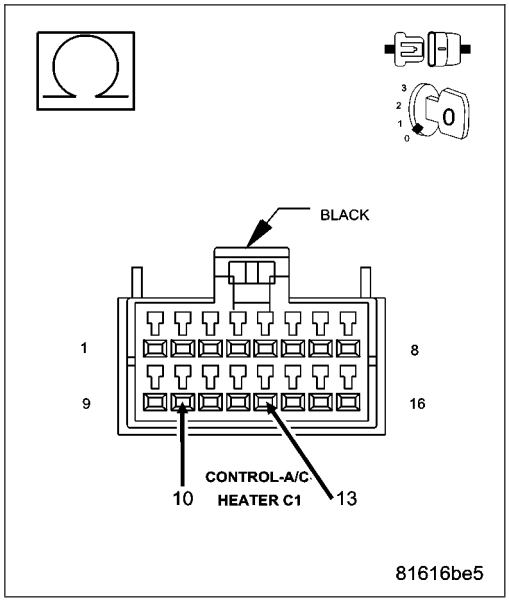
Is the resistance below 10k ohms?

Yes >> Repair the (C29) Mode Door 1 Driver Circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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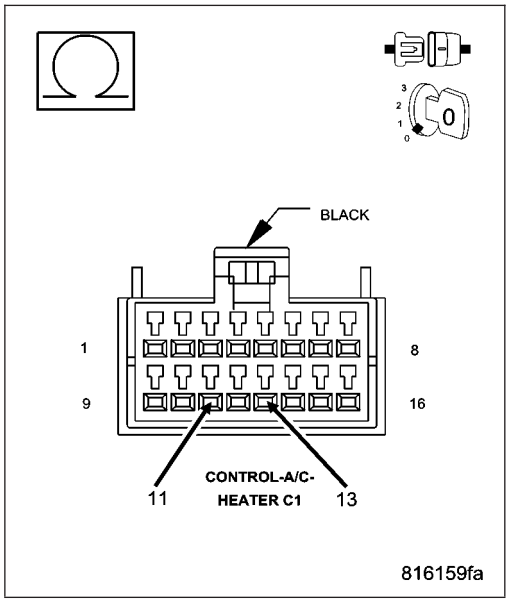
10. CHECK RECIRCULATION DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 11

No >> Go To 12



11. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Recirculation Door Actuator harness connector.

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

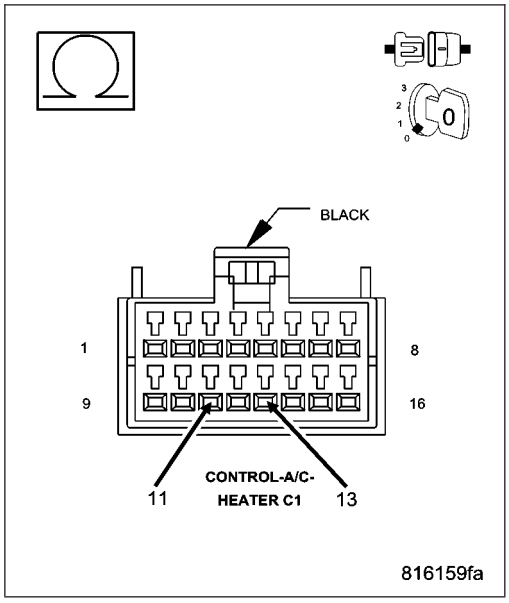
Is the resistance below 10k ohms?

Yes >> Repair the (C32) Recirculation Door Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Recirculation Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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12. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B105F–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

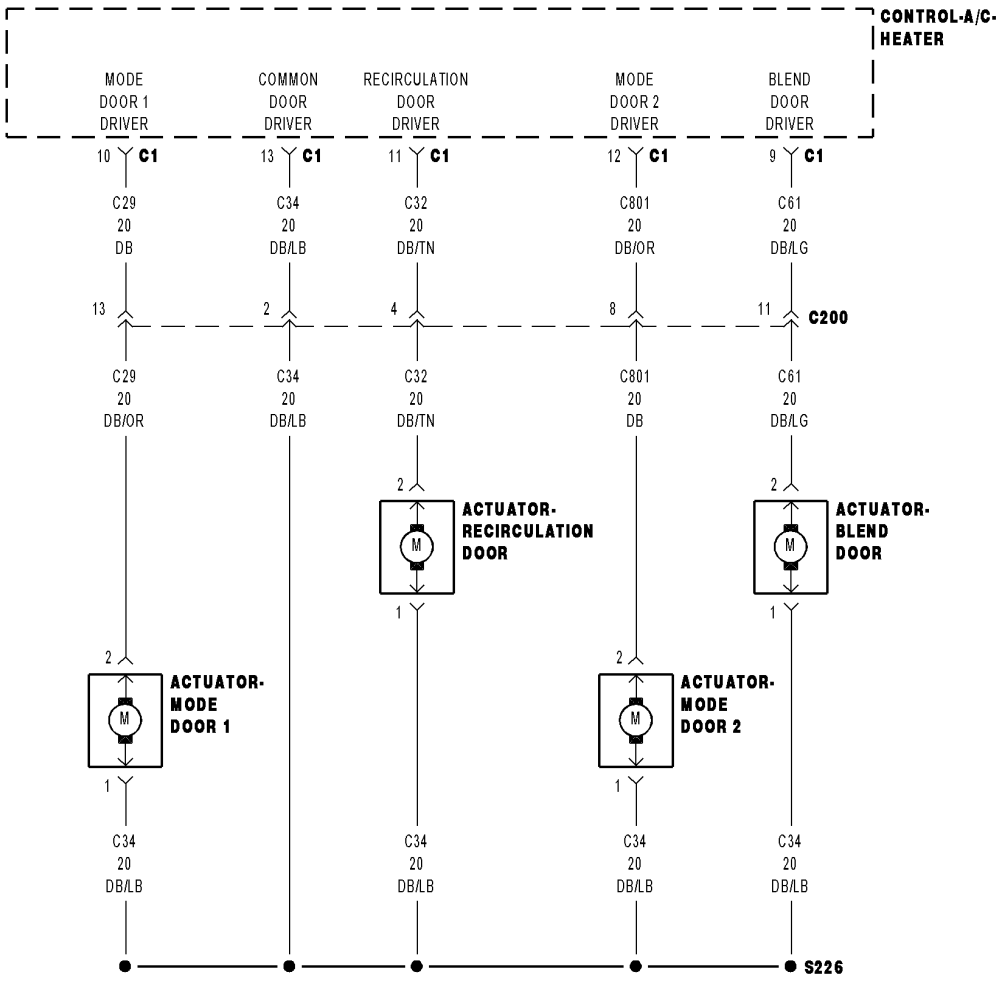
No, And No DTCs Displayed

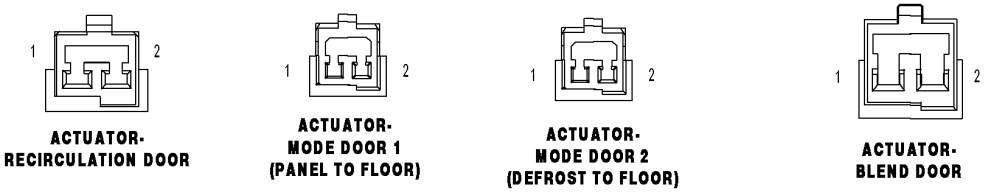
Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

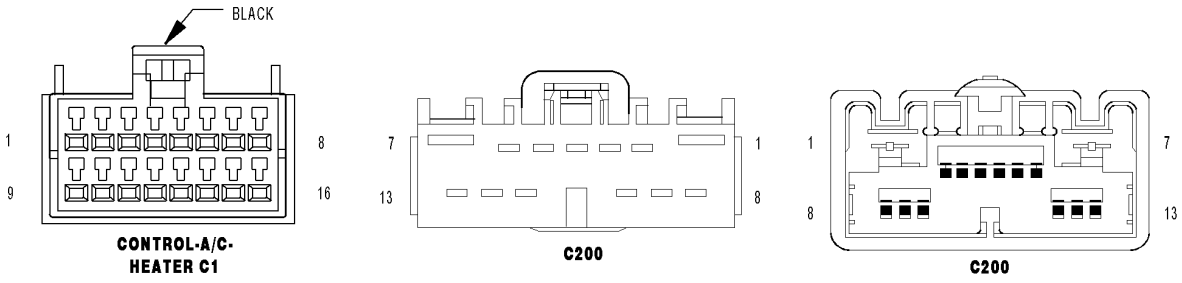
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B105F–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT LOW (SINGLE-ZONE)







81615c90

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For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control drives the Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C34) Common Door Driver circuit is shorted to ground.

Possible Causes
(C34) COMMON DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C34) COMMON DOOR DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
BLEND DOOR ACTUATOR
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

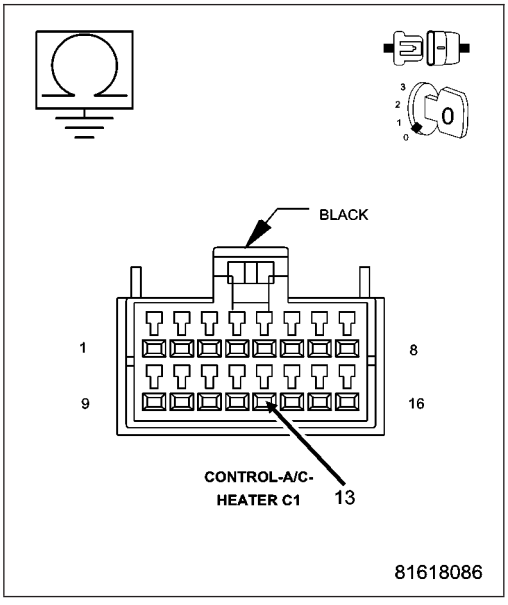
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C34) Common Door Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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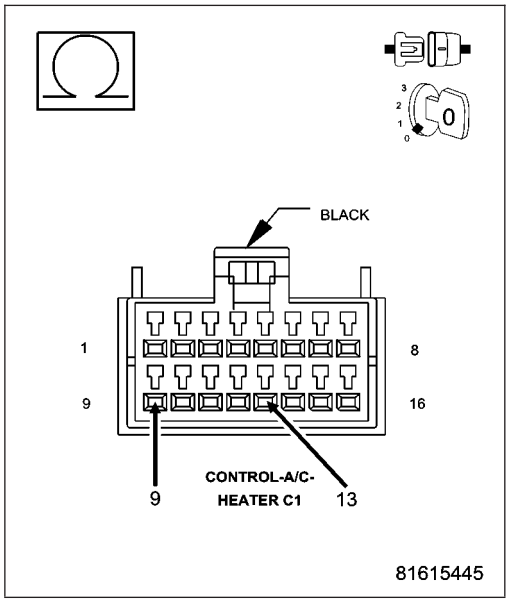
2. CHECK BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 3

No >> Go To 4



3. CHECK (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Blend Door Actuator harness connector.

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

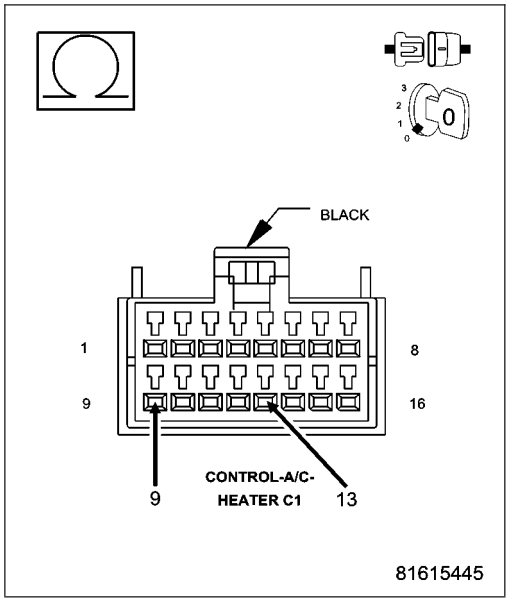
Is the resistance below 10k ohms?

Yes >> Repair the (C61) Blend Door Driver Circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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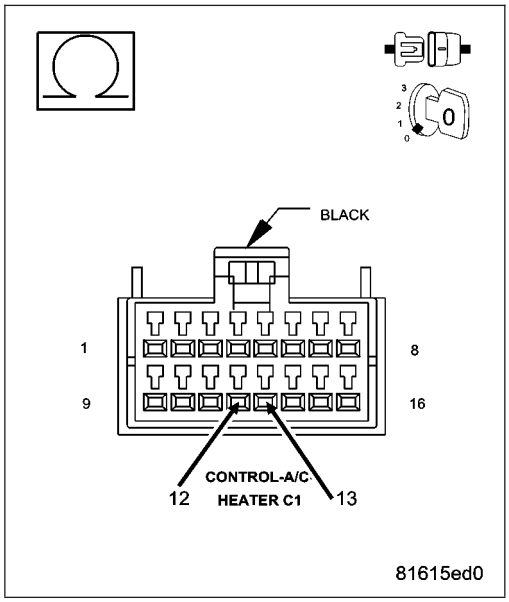
4. CHECK MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 5

No >> Go To 6



5. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

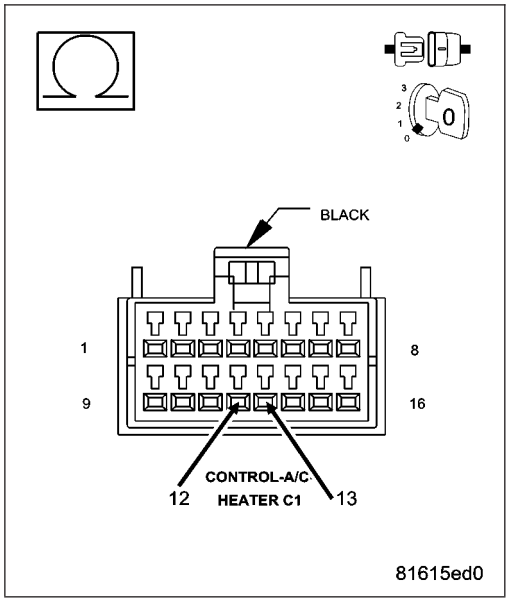
Is the resistance below 10k ohms?

Yes >> Repair the (C801) Mode Door 2 Driver Circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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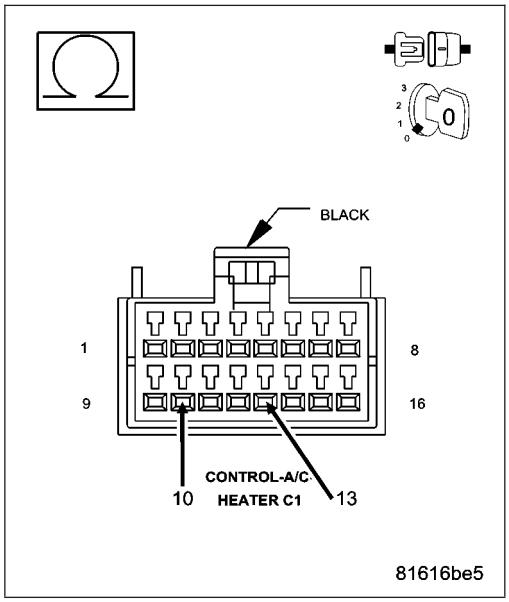
6. CHECK MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 7

No >> Go To 8



7. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Mode Door 1 (Panel to Floor) Actuator harness connector.

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

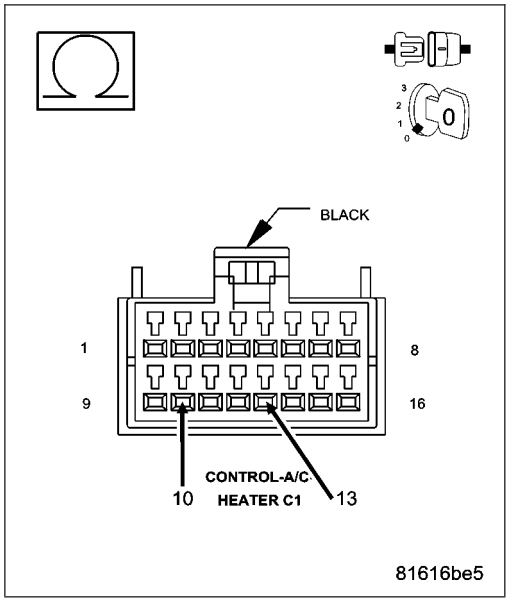
Is the resistance below 10k ohms?

Yes >> Repair the (C29) Mode Door 1 Driver Circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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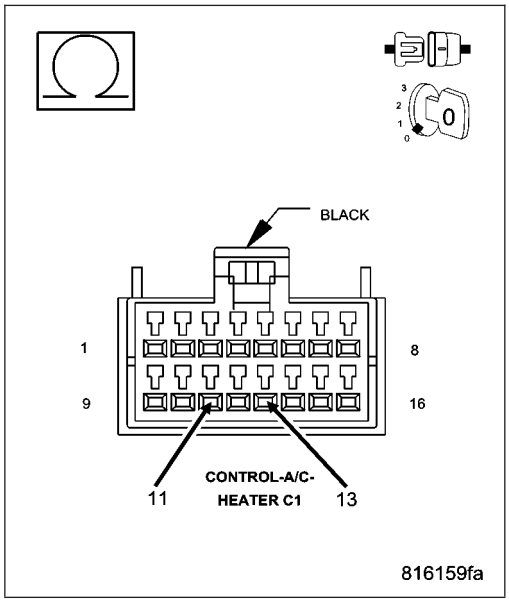
8. CHECK RECIRCULATION DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 9

No >> Go To 10



9. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Recirculation Door Actuator harness connector.

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

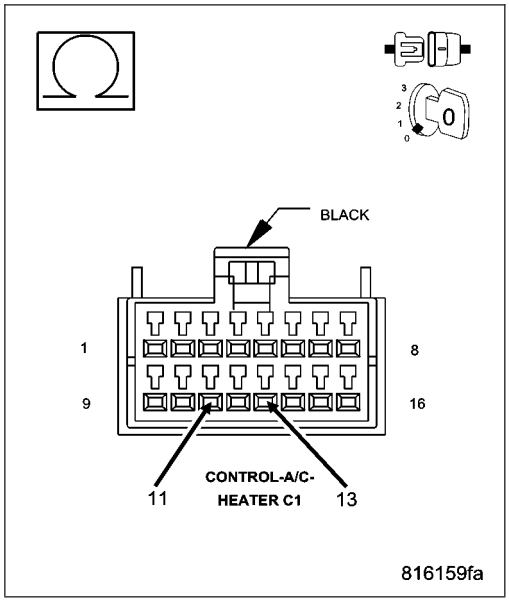
Is the resistance below 10k ohms?

Yes >> Repair the (C32) Recirculation Door Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Recirculation Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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10. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B105F–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No, And No DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1001–A/C SWITCH REQUEST INPUT CIRCUIT LOW (SINGLE-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C mode switch input changes when the switch is pushed down. A stored DTC B1001 indicates that the A/C mode switch was stuck in a pushed position for more than two minutes, but has since returned to its normal state. An active DTC B1001 indicates that the A/C mode switch is stuck in a pushed position. An active DTC B1001 will also prevent proper A/C mode switch and status indicator function as evidenced by not being able to turn the A/C status indicator either on if off or off if on.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C mode switch stays in a pushed position for more than two minutes. This DTC has a maturing time of two minutes and a de-maturing time of two seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
A/C HEATER CONTROL DAMAGED
OBJECT HOLDING A/C MODE SWITCH IN A PUSHED POSITION
SUBSTANCE CAUSING A/C MODE SWITCH TO GET STUCK IN A PUSHED POSITION
A/C HEATER CONTROL

Diagnostic Test

1. INSPECT THE A/C HEATER CONTROL FOR DAMAGE

Inspect the A/C Heater Control for damage.

Is the A/C Heater Control damaged?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2

2. INSPECT FOR OBJECT OR SUBSTANCE CAUSING THE A/C MODE SWITCH TO STAY OR STICK IN A PUSHED POSITION

Inspect the A/C Heater Control for anything that would cause the A/C mode switch to stay or stick in a pushed position.

Is anything present that would cause the A/C mode switch to stay or stick in a pushed position?

Yes >> Repair as necessary.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3

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3. CHECK FOR NORMAL A/C MODE SWITCH & STATUS INDICATOR FUNCTION

Turn the ignition on.

Turn the blower control on.

Press the A/C mode switch on and off several times while observing the A/C status indicator.

Does the A/C status indicator turn on and off with respect to the switch position?

Yes >> Go To 4

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

4. VERIFY THAT DTC B1001–A/C SWITCH REQUEST INPUT CIRCUIT LOW IS STILL ACTIVE

Turn the blower control off.

With the scan tool, erase HVAC DTCs.

Turn the ignition off, wait 10 seconds, and then turn the ignition on. Wait two minutes before proceeding.

With the scan tool, read HVAC DTCs.

Does the scan tool display active: B1001–A/C SWITCH REQUEST INPUT CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1016–REAR DEFROST SWITCH REQUEST INPUT CIRCUIT LOW (SINGLE-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The Rear Defrost mode switch input changes when the switch is pushed down. A stored DTC B1016 indicates that the Rear Defrost mode switch was stuck in a pushed position for more than two minutes, but has since returned to its normal state. An active DTC B1016 indicates that the Rear Defrost mode switch is stuck in a pushed position. An active DTC B1016 will also prevent proper Rear Defrost mode switch and status indicator function as evidenced by not being able to turn the Rear Defrost status indicator either on if off or off if on.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the Rear Defrost mode switch stays in a pushed position for more than two minutes. This DTC has a maturing time of two minutes and a de-maturing time of two seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
A/C HEATER CONTROL DAMAGED
OBJECT HOLDING REAR DEFROST MODE SWITCH IN A PUSHED POSITION
SUBSTANCE CAUSING REAR DEFROST MODE SWITCH TO GET STUCK IN A PUSHED POSITION
A/C HEATER CONTROL

Diagnostic Test

1. INSPECT THE A/C HEATER CONTROL FOR DAMAGE

Inspect the A/C Heater Control for damage.

Is the A/C Heater Control damaged?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2

2. INSPECT FOR OBJECT OR SUBSTANCE CAUSING THE REAR DEFROST MODE SWITCH TO STAY OR STICK IN A PUSHED POSITION

Inspect the A/C Heater Control for anything that would cause the Rear Defrost mode switch to stay or stick in a pushed position.

Is anything present that would cause the Rear Defrost mode switch to stay or stick in a pushed position?

Yes >> Repair as necessary.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3

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3. CHECK FOR NORMAL REAR DEFROST MODE SWITCH & STATUS INDICATOR FUNCTION

Turn the ignition on.

Press the Rear Defrost mode switch on and off several times while observing the status indicator.

Does the Rear Defrost status indicator turn on and off with respect to the switch position?

Yes >> Go To 4

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

4. VERIFY THAT DTC B1016–REAR DEFROST SWITCH REQUEST INPUT CIRCUIT LOW IS STILL ACTIVE

With the scan tool, erase HVAC DTCs.

Turn the ignition off, wait 10 seconds, and then turn the ignition on. Wait two minutes before proceeding.

With the scan tool, read HVAC DTCs.

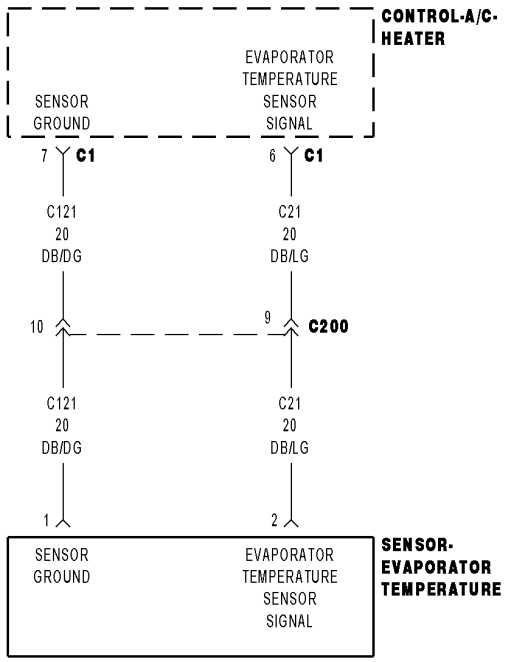
Does the scan tool display active: B1016–REAR DEFROST SWITCH REQUEST INPUT CIRCUIT LOW?

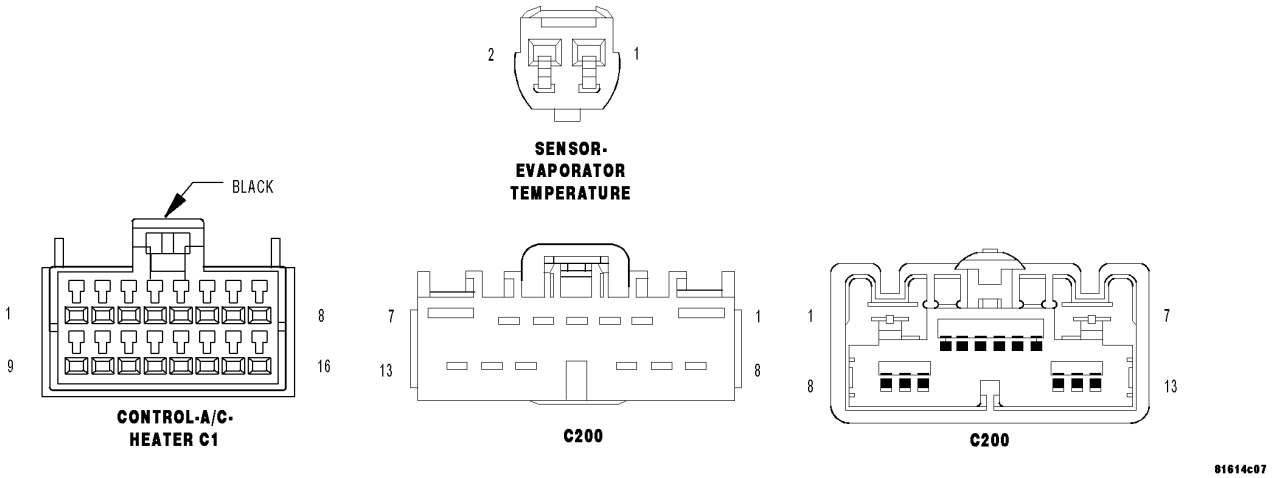
Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1031–EVAPORATOR TEMPERATURE SENSOR CIRCUIT LOW





For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the Evaporator Temperature Sensor input is out of range toward the low voltage threshold, (A/D counts reach low threshold of 3). This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO GROUND
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO (C121) SENSOR GROUND CIRCUIT
EVAPORATOR TEMPERATURE SENSOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT VOLTAGE WITH THE SENSOR DISCONNECTED

Turn the ignition off.

Disconnect the Evaporator Temperature Sensor harness connector.

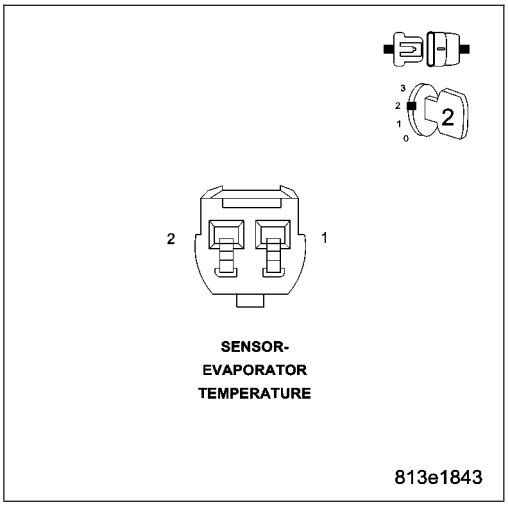
Turn the ignition on.

With the scan tool in Data Display, read the Evaporator Temperature Sensor voltage.

Is the voltage 4.9 volts or greater?

Yes >> Replace the Evaporator Temperature Sensor in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

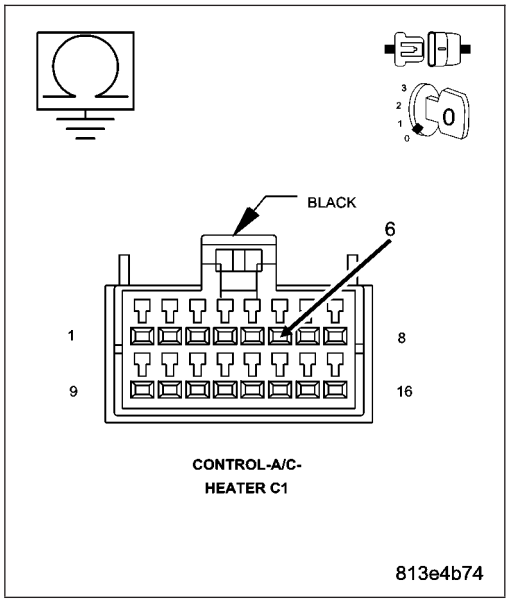
Measure the resistance of the (C21) Evaporator Temperature Sensor Signal circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to ground.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



3. CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO (C121) SENSOR GROUND CIRCUIT

Measure the resistance between the (C21) Evaporator Temperature Sensor Signal circuit and the (C121) Sensor Ground circuit in the A/C Heater Control C1 harness connector.

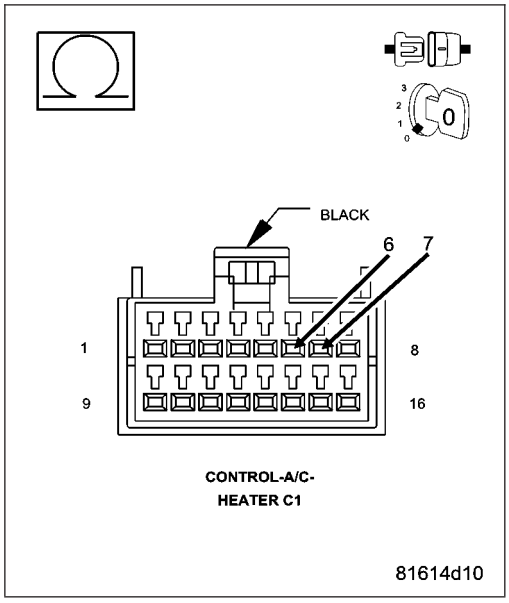
Is the resistance below 10k ohms?

Yes >> Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to the (C121) Sensor Ground circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

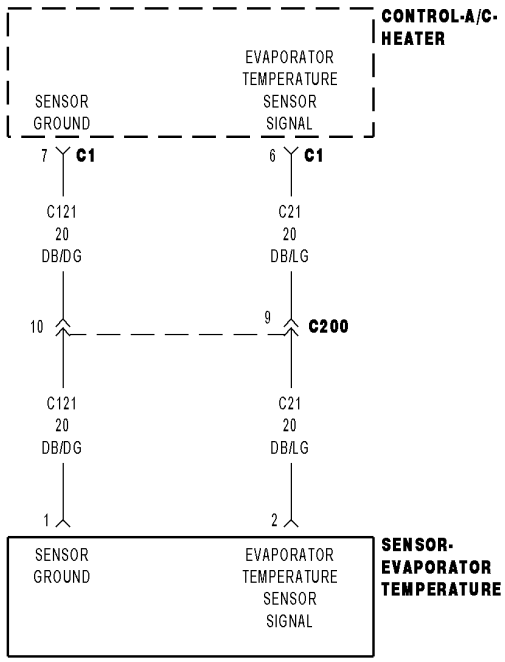
No >> Replace the A/C Heater Control in accordance with the Service Information.

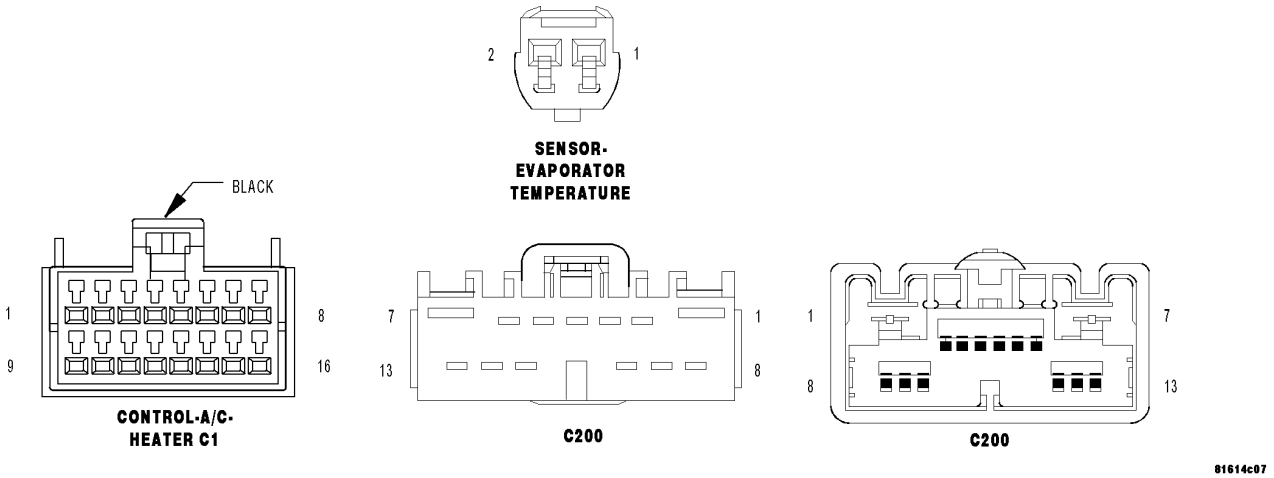
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B1032–EVAPORATOR TEMPERATURE SENSOR CIRCUIT HIGH





For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the Evaporator Temperature Sensor input is out of range toward the high voltage threshold, (A/D counts reach high threshold of 253). This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT OPEN
(C121) SENSOR GROUND CIRCUIT OPEN
EVAPORATOR TEMPERATURE SENSOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

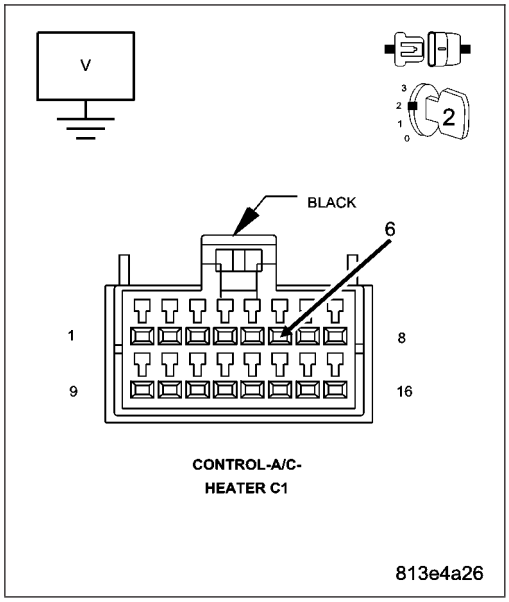
Turn the ignition on.

Measure the voltage of the (C21) Evaporator Temperature Sensor Signal circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT & (C121) SENSOR GROUND CIRCUIT FUNCTION

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Disconnect the Evaporator Temperature Sensor harness connector.

Connect a jumper wire between the (C21) Evaporator Temperature Sensor Signal circuit and the (C121) Sensor Ground circuit in the Evaporator Temperature Sensor harness connector.

Turn the ignition on.

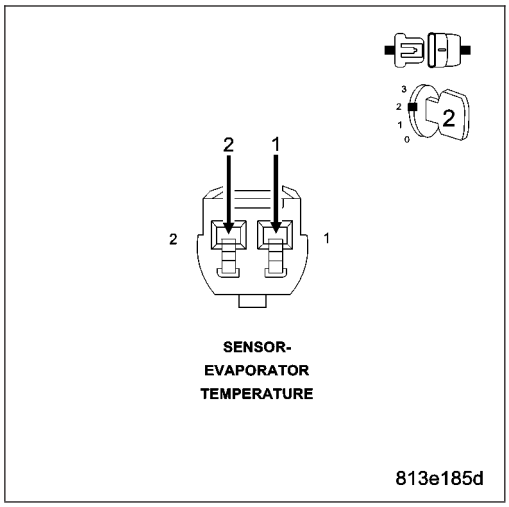
With the scan tool in Data Display, read the Evaporator Temperature Sensor voltage.

Is the voltage below 0.10 volts?

Yes >> Replace the Evaporator Temperature Sensor in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



3. CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR AN OPEN

Turn the ignition off.

Remove the jumper wire from the Evaporator Temperature Sensor harness connector.

Disconnect the A/C Heater Control C1 harness connector.

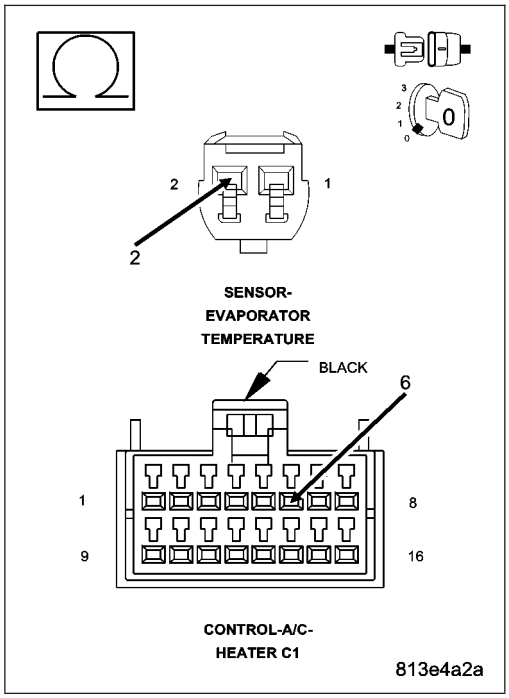
Measure the resistance of the (C21) Evaporator Temperature Sensor Signal circuit between the Evaporator Temperature Sensor harness connector and the A/C Heater Control C1 harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C21) Evaporator Temperature Sensor Signal circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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4. CHECK (C121) SENSOR GROUND CIRCUIT FOR AN OPEN

Measure the resistance of the (C121) Sensor Ground circuit between the Evaporator Temperature Sensor harness connector and the A/C Heater Control C1 harness connector.

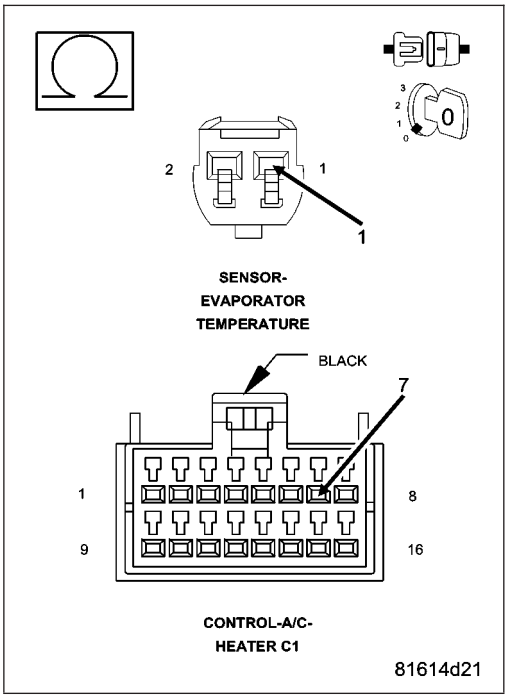
Is the resistance below 5.0 ohms?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C121) Sensor Ground circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B1040–PANEL MODE DOOR 1 CONTROL CIRCUIT/PERFORMANCE

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control monitors the door driver circuits during actuator operation for shorts to ground, shorts to battery, and shorts to other door driver circuits. If detected, the A/C Heater Control reports these types of faults as Control Circuit/Performance DTCs. It is important to note that Control Circuit/Performance DTCs do not indicate where or what type of short is present and that additional system testing is necessary to provide more details about the reported fault.

- **When Monitored:**
  When actuator movement is requested.
- **Set Condition:**
  If the A/C Heater Control detects an excessive current draw on any of the door driver circuits while attempting to drive this actuator. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
DOOR DRIVER CIRCUIT(S) SHORTED

NOTE: The DTC must be active for the results of this test to be valid. Do not perform this test if the DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition on.

With the scan tool in HVAC, erase DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Repair, Dual-Zone System

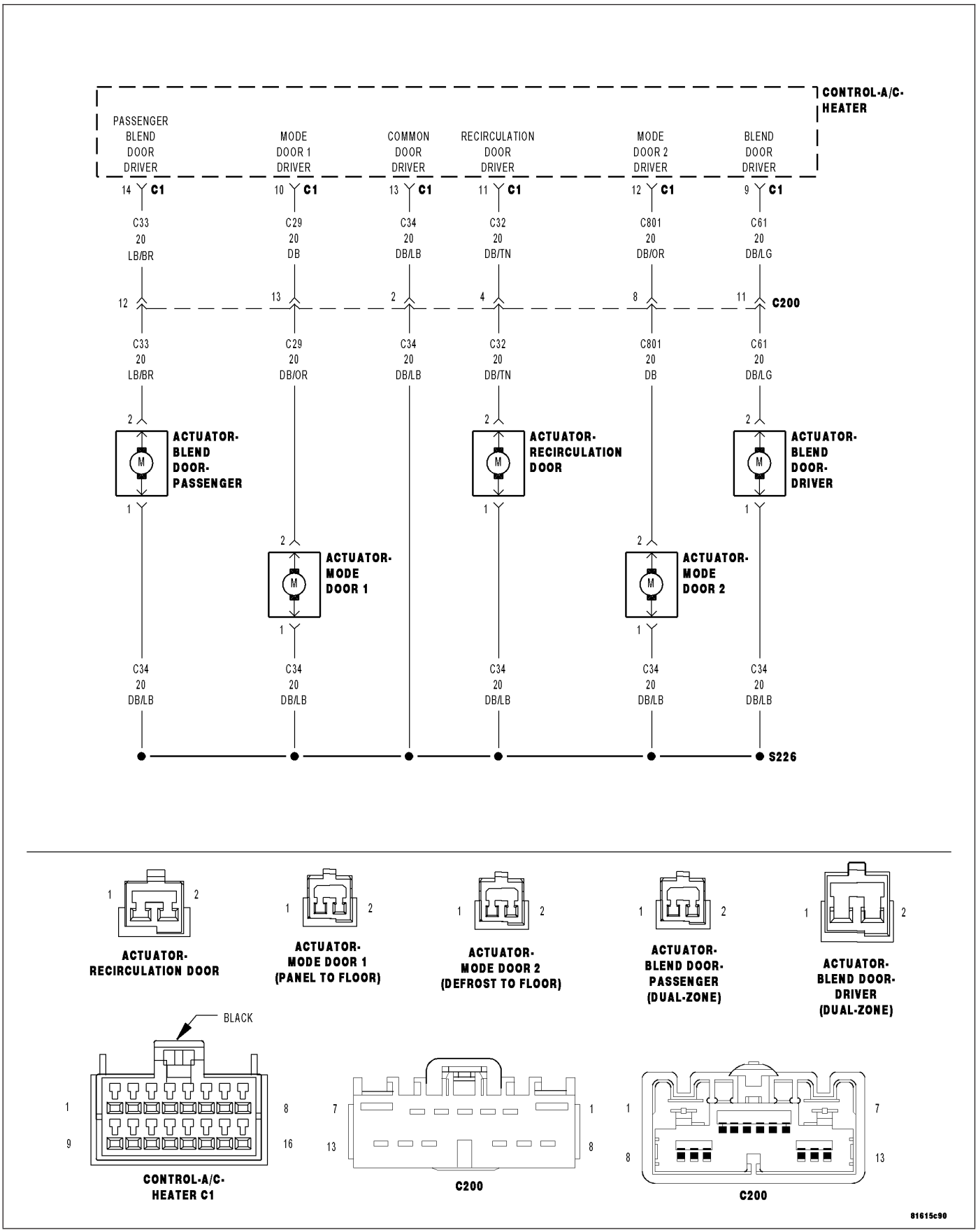
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Repair, Single-Zone System

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

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B1041–PANEL MODE DOOR 1 CONTROL CIRCUIT LOW (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C29) Mode Door 1 Driver circuit is shorted to ground.

Possible Causes
(C29) MODE DOOR 1 DRIVER CIRCUIT SHORTED TO GROUND
(C29) MODE DOOR 1 DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO GROUND

NOTE: If present, diagnose and repair DTC B10AB Right Blend Door Control Circuit High or B10AA Right Blend Door Control Circuit Low before proceeding.

Turn the ignition off.

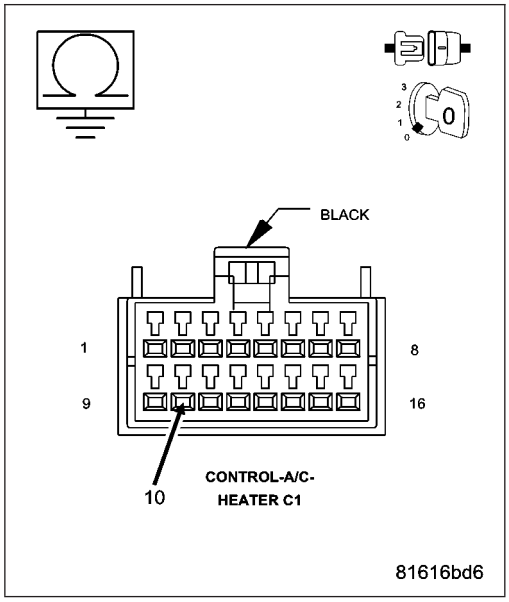
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C29) Mode Door 1 Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C29) Mode Door 1 Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

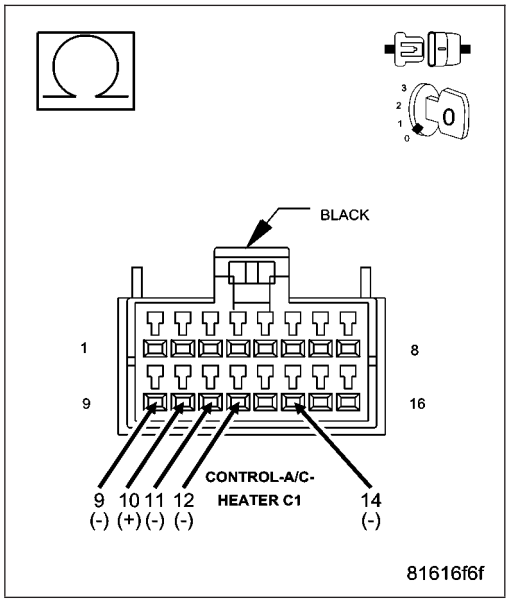
Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C61) Blend Door Driver circuit, the (C801) Mode Door 2 Driver circuit, the (C32) Recirculation Door Driver circuit, and the (C33) Passenger Blend Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms between the (C29) Mode Door 1 Driver circuit and any of the other door driver circuits?

Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C29) Mode Door 1 Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



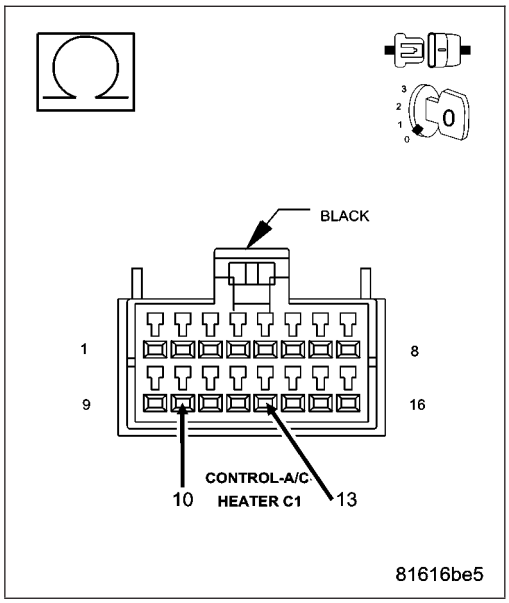
3. CHECK MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5

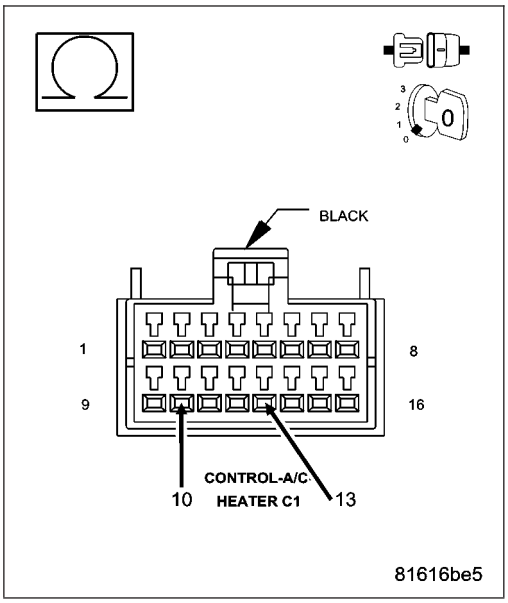


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4. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Mode Door 1 (Panel to Floor) Actuator harness connector.

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance below 10k ohms?

Yes >> Repair the (C29) Mode Door 1 Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1041–PANEL MODE DOOR 1 CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

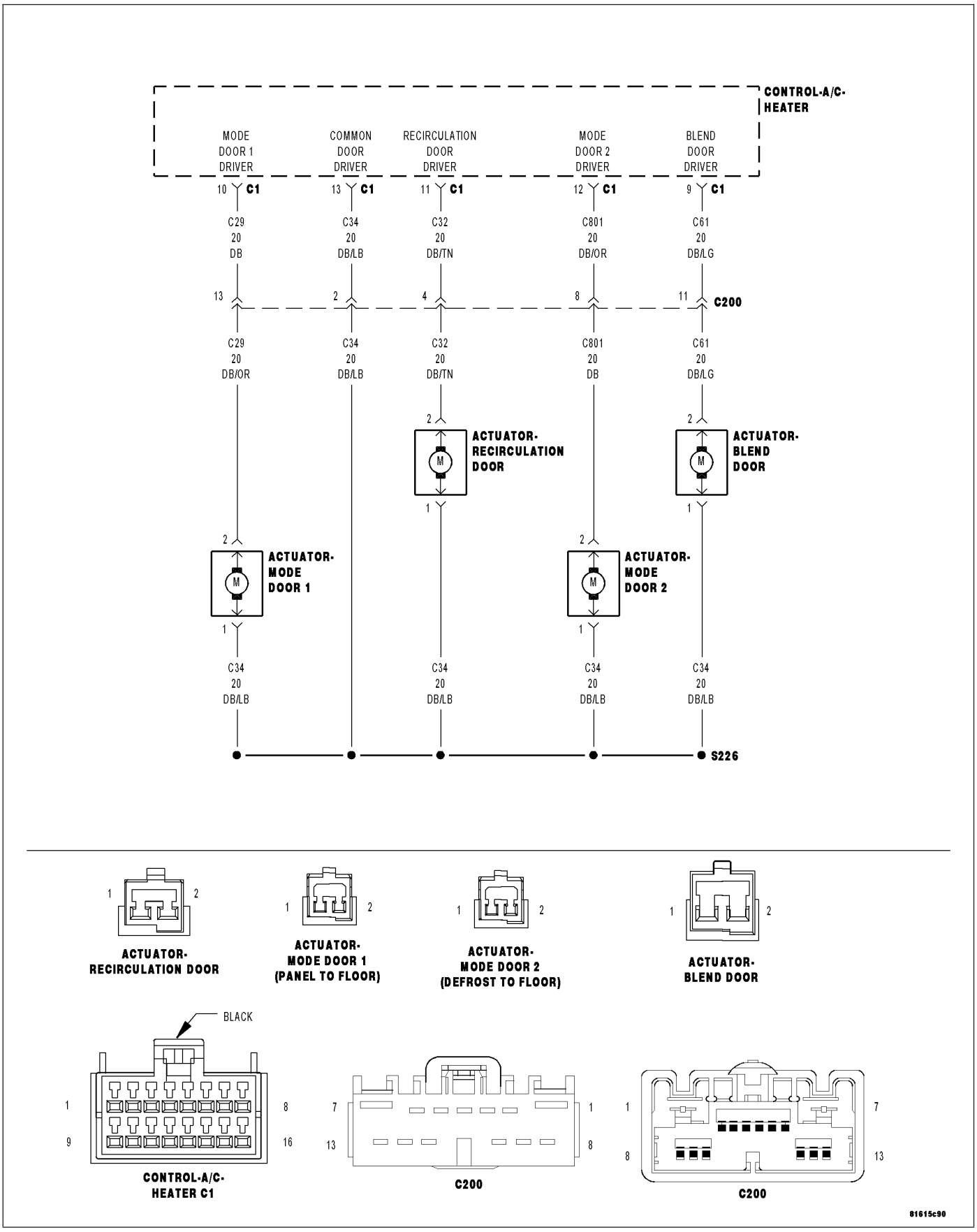
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1041–PANEL MODE DOOR 1 CONTROL CIRCUIT LOW (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C29) Mode Door 1 Driver circuit is shorted to ground.

Possible Causes
(C29) MODE DOOR 1 DRIVER CIRCUIT SHORTED TO GROUND
(C29) MODE DOOR 1 DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

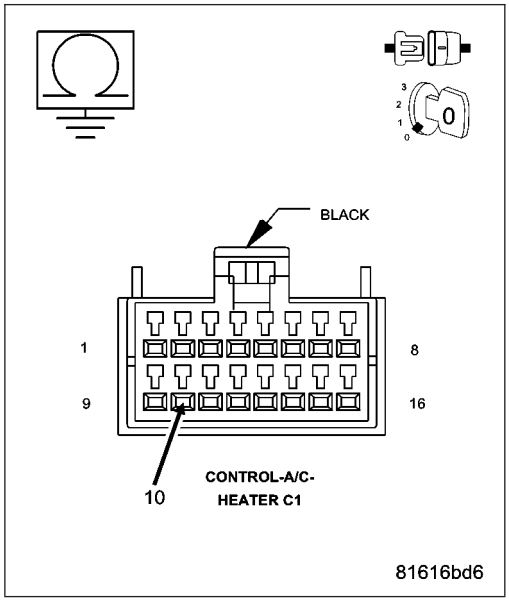
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C29) Mode Door 1 Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C29) Mode Door 1 Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

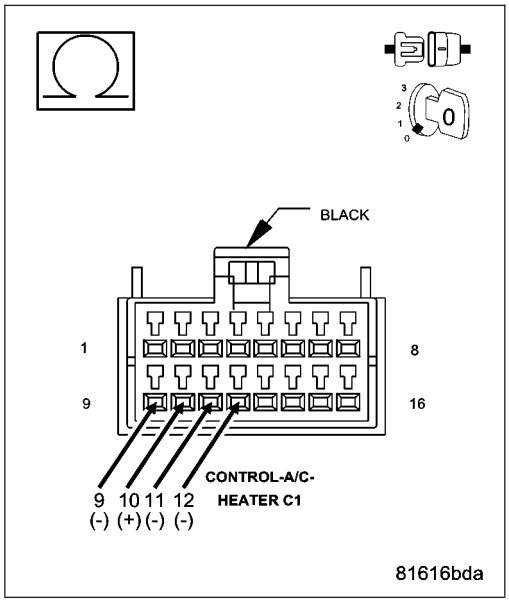
Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C61) Blend Door Driver circuit, the (C801) Mode Door 2 Driver circuit, and the (C32) Recirculation Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms between the (C29) Mode Door 1 Driver circuit and any of the other door driver circuits?

Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C29) Mode Door 1 Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



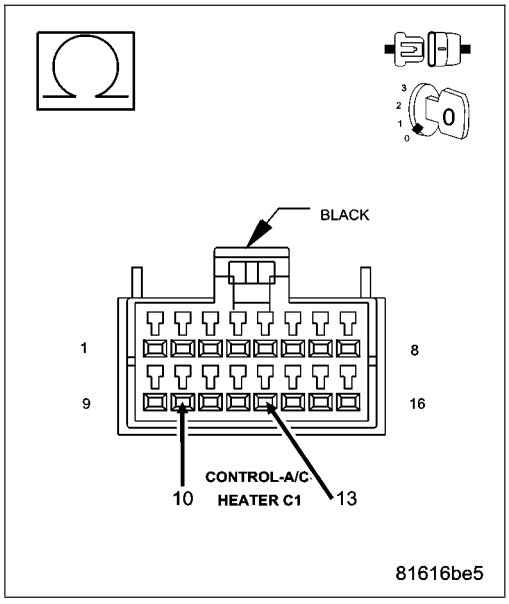
3. CHECK MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5

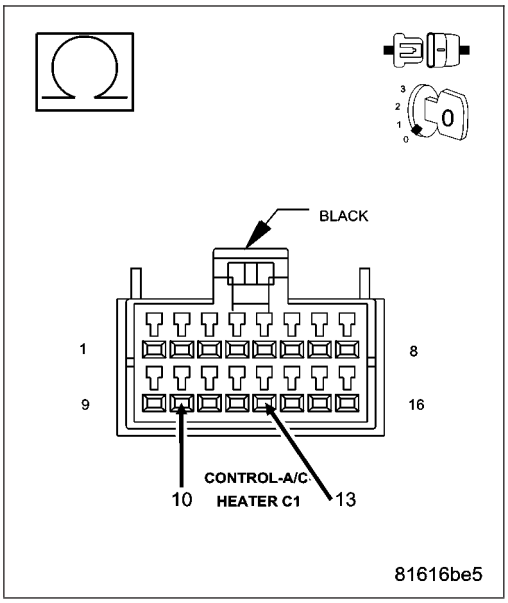


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4. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Mode Door 1 (Panel to Floor) Actuator harness connector.

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance below 10k ohms?

Yes >> Repair the (C29) Mode Door 1 Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1041–PANEL MODE DOOR 1 CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

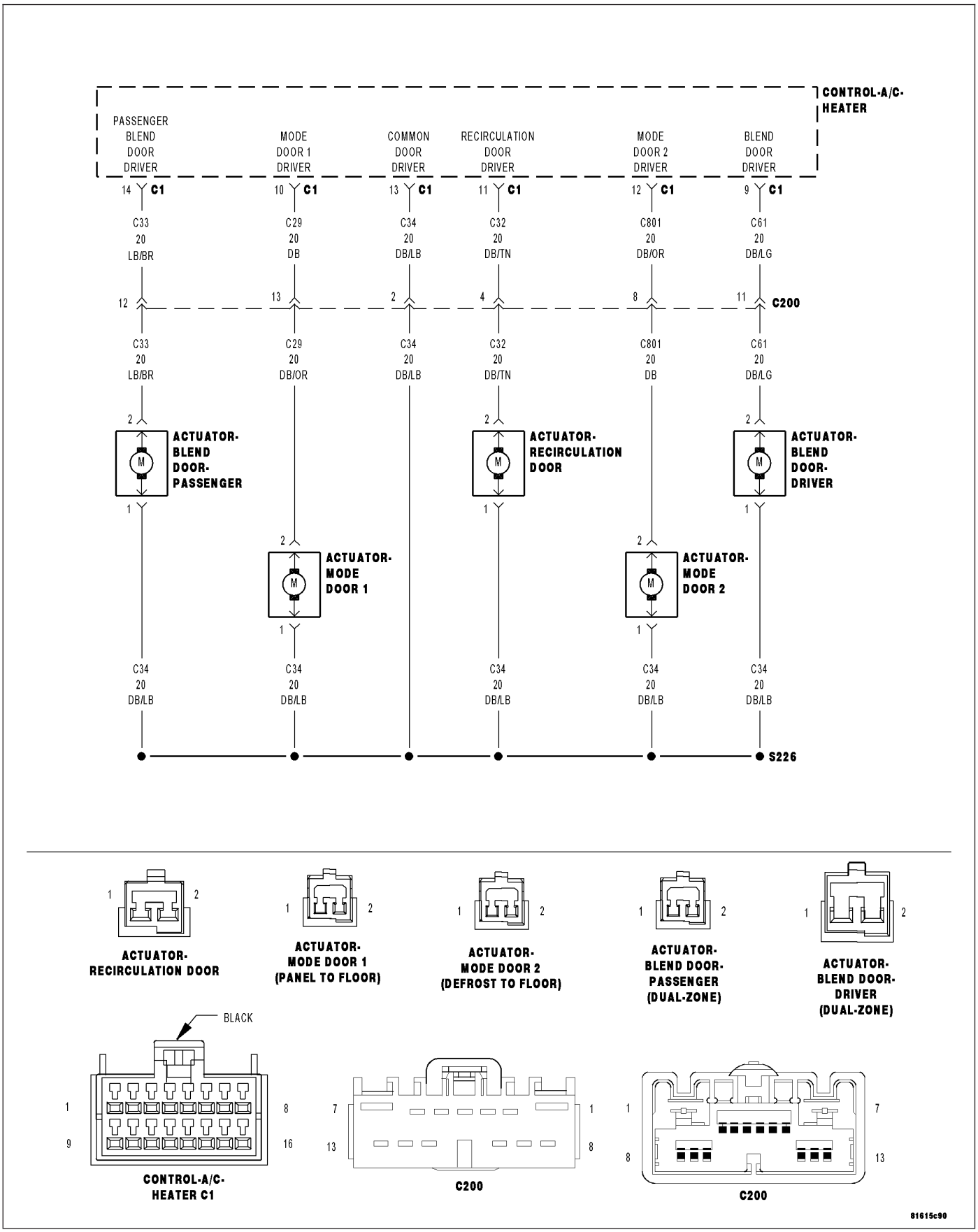
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1042–PANEL MODE DOOR 1 CONTROL CIRCUIT HIGH (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Note that due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C29) Mode Door 1 Driver circuit is shorted to voltage.

Possible Causes
(C29) MODE DOOR 1 DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

NOTE: If present, diagnose and repair DTC B10AB Right Blend Door Control Circuit High or B10AA Right Blend Door Control Circuit Low before proceeding.

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

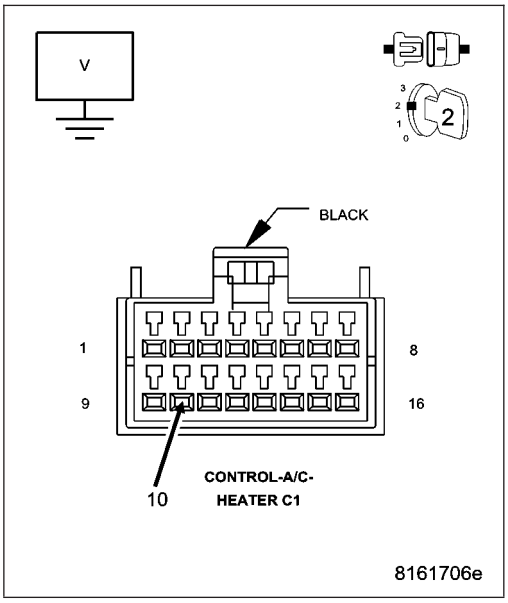
Turn the ignition on.

Measure the voltage of the (C29) Mode Door 1 Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C29) Mode Door 1 Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1042–PANEL MODE DOOR 1 CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

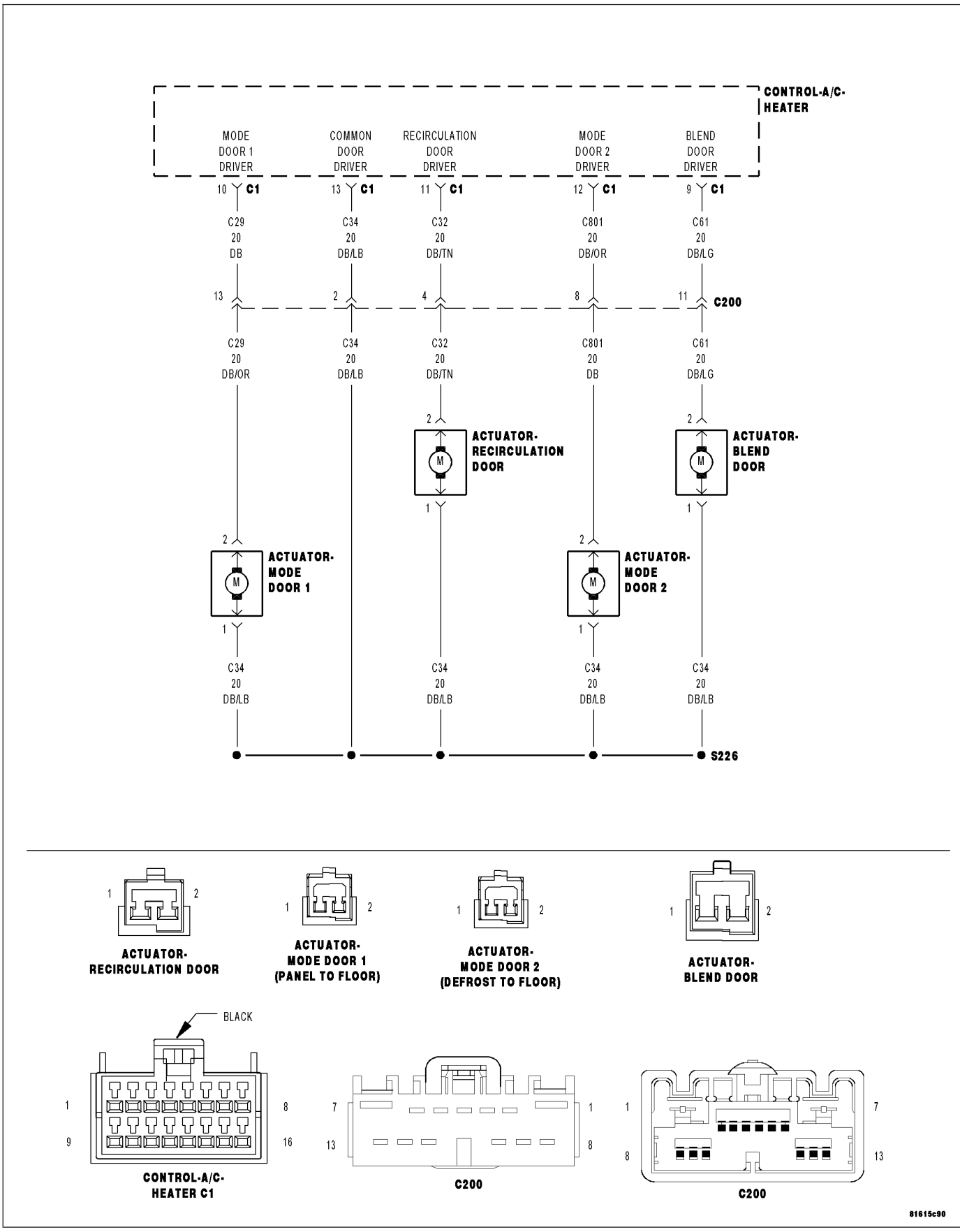
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1042–PANEL MODE DOOR 1 CONTROL CIRCUIT HIGH (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Note that due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C29) Mode Door 1 Driver circuit is shorted to voltage.

Possible Causes
(C29) MODE DOOR 1 DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

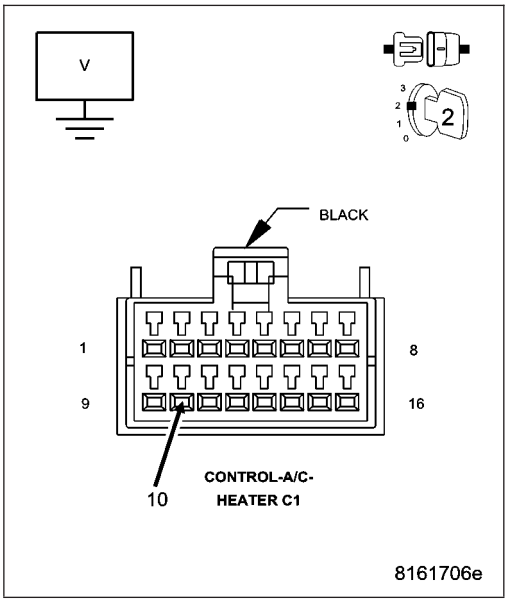
Turn the ignition on.

Measure the voltage of the (C29) Mode Door 1 Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C29) Mode Door 1 Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1042–PANEL MODE DOOR 1 CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

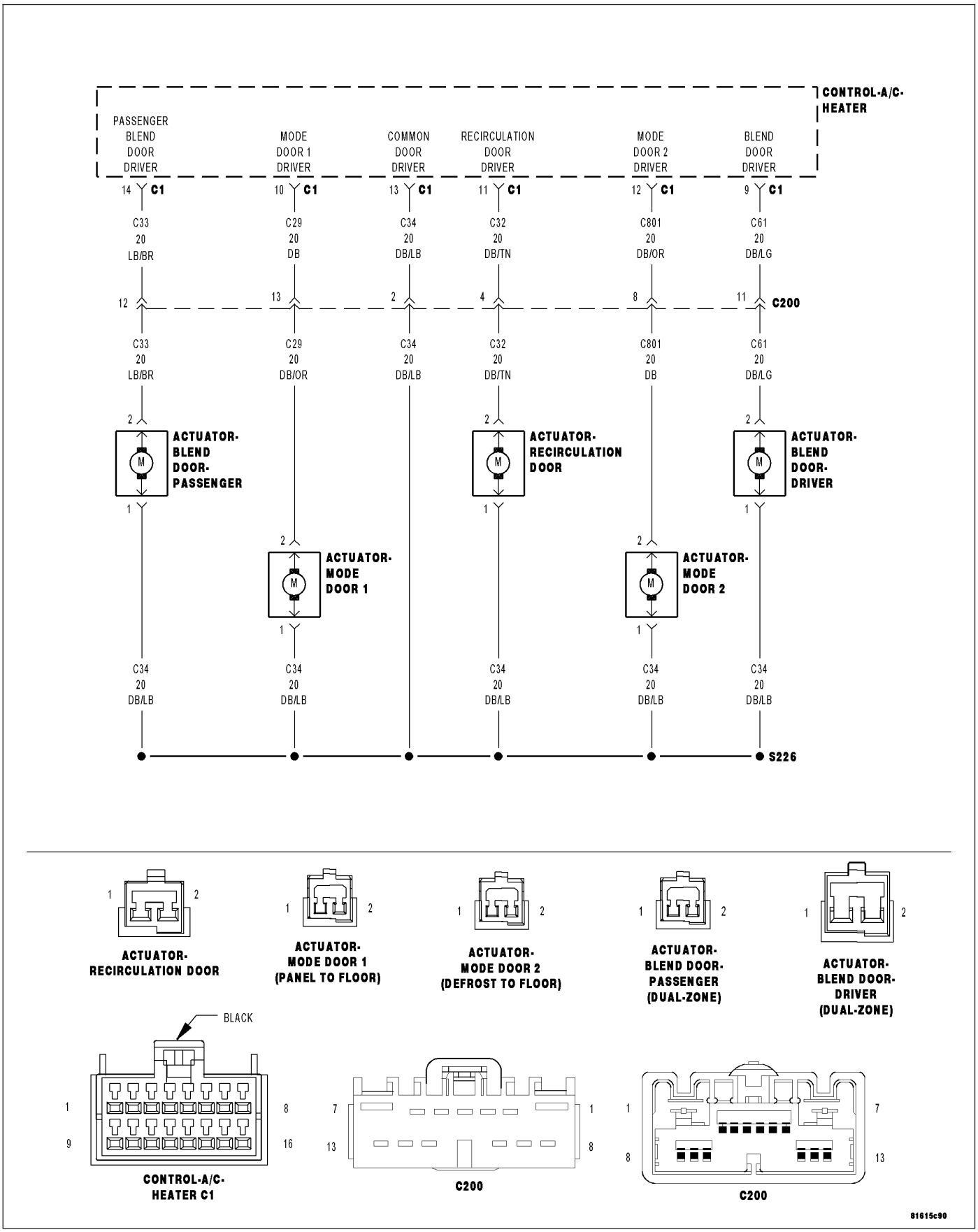
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1043–PANEL MODE DOOR 1 CONTROL CIRCUIT OPEN (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Note that due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the Mode Door 1 (Panel to Floor) Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C29) MODE DOOR 1 DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

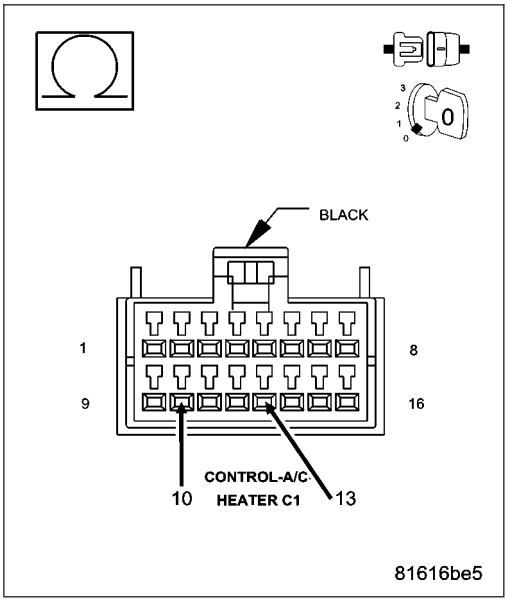
No >> Go To 2

2. CHECK MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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3. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR AN OPEN

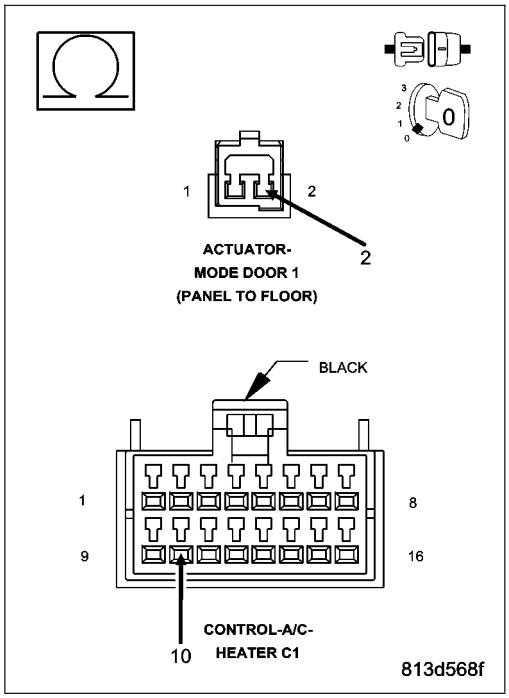
Disconnect the Mode Door 1 (Panel to Floor) Actuator harness connector.

Measure the resistance of the (C29) Mode Door 1 Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 1 (Panel to Floor) Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C29) Mode Door 1 Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



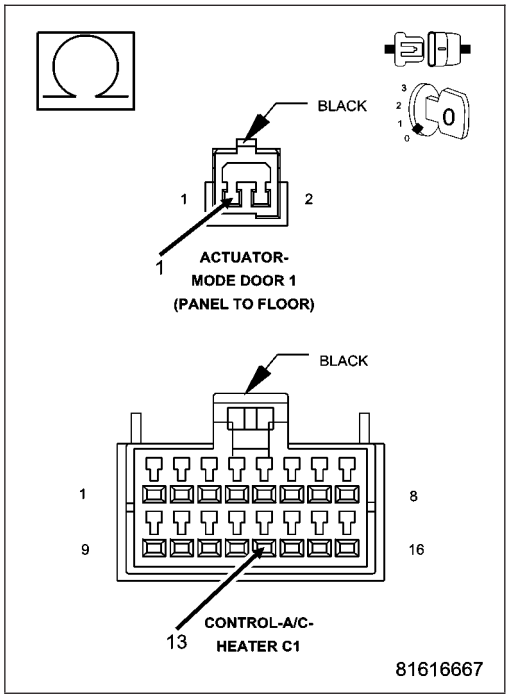
4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 1 (Panel to Floor) Actuator harness connector.

Is the resistance below 5.0 ohms?

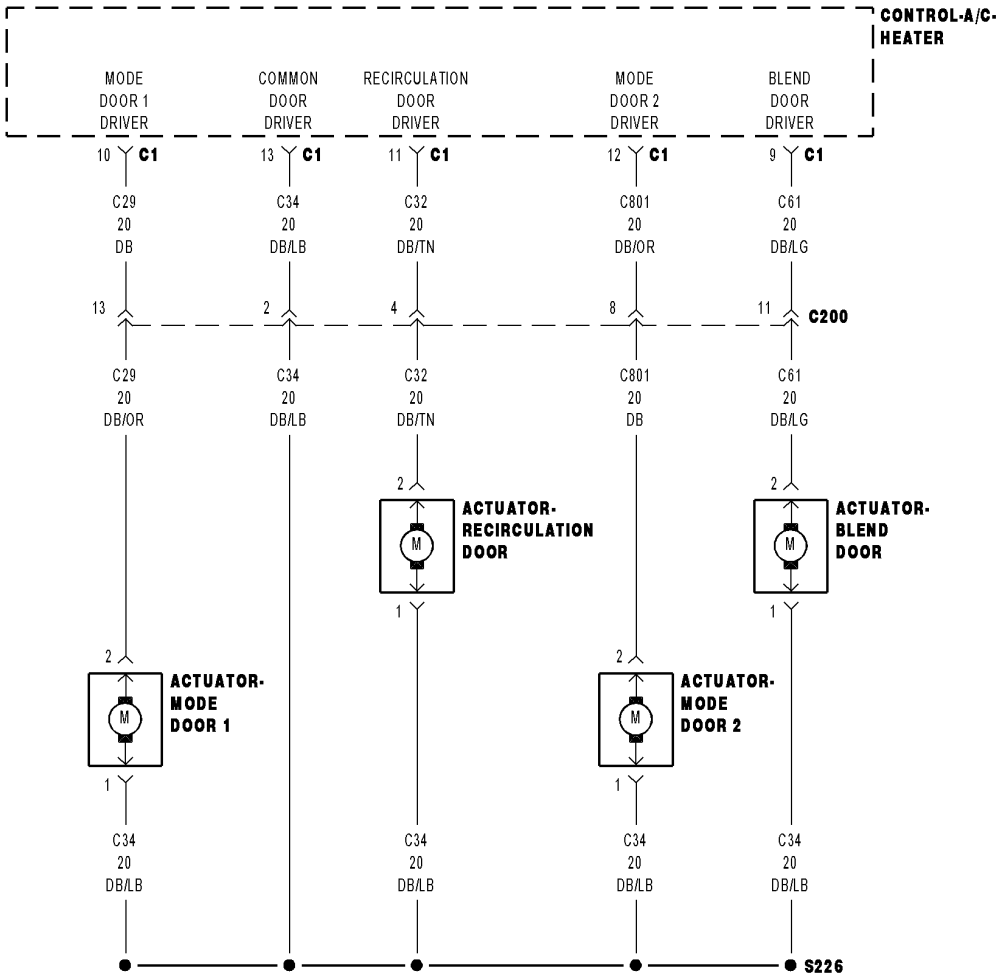
Yes >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

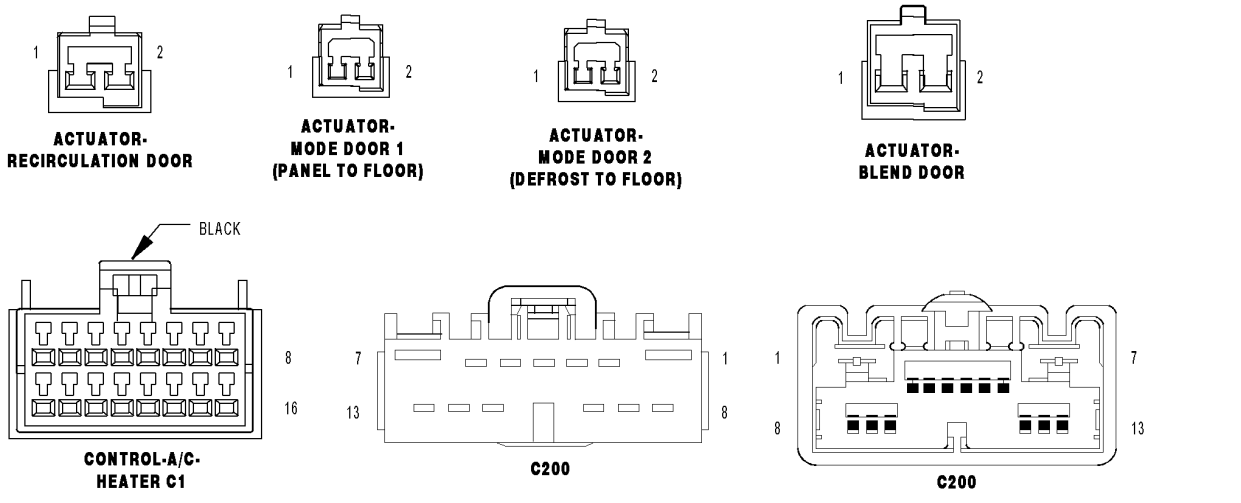
No >> Repair the (C34) Common Door Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B1043–PANEL MODE DOOR 1 CONTROL CIRCUIT OPEN (SINGLE-ZONE)





For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Note that due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the Mode Door 1 (Panel to Floor) Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C29) MODE DOOR 1 DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

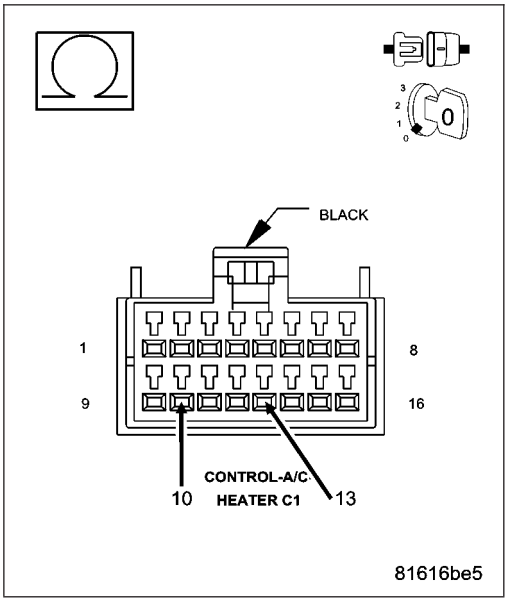
No >> Go To 2

2. CHECK MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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3. CHECK (C29) MODE DOOR 1 DRIVER CIRCUIT FOR AN OPEN

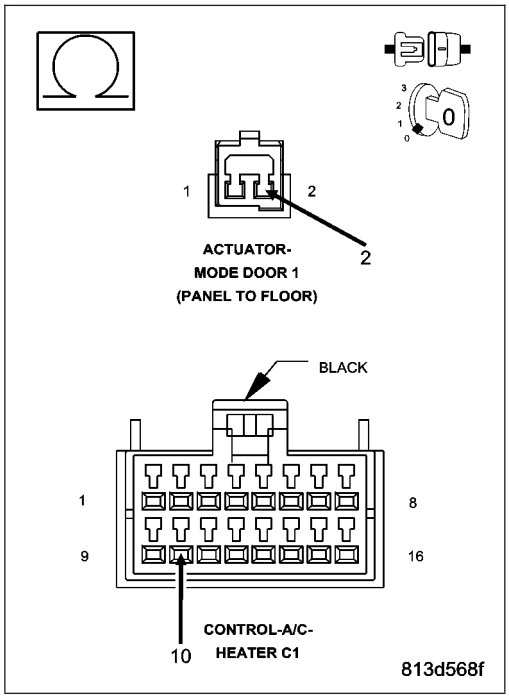
Disconnect the Mode Door 1 (Panel to Floor) Actuator harness connector.

Measure the resistance of the (C29) Mode Door 1 Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 1 (Panel to Floor) Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C29) Mode Door 1 Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



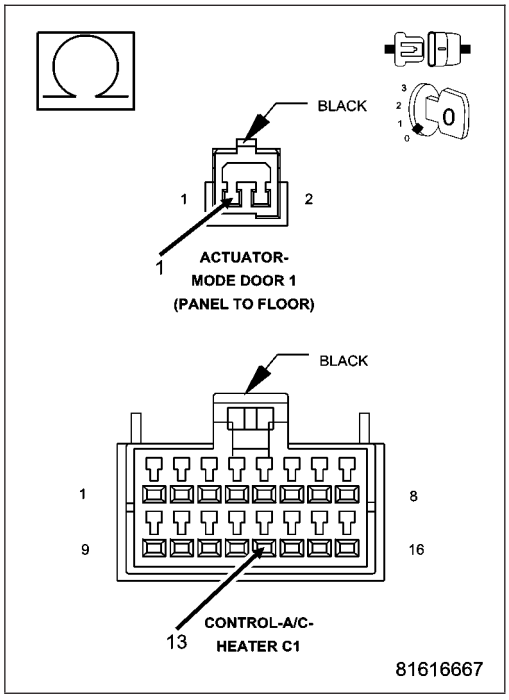
4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 1 (Panel to Floor) Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B1044–PANEL MODE DOOR 1 TRAVEL RANGE TOO SMALL

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value is less than the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Mode 1 (Panel to Floor) Door is less than the low range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
MODE 1 (PANEL TO FLOOR) DOOR SEIZED, BINDING, OBSTRUCTED
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes, Dual-Zone System
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Yes, Single-Zone System

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>> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs first and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. INSPECT ACTUATOR & HOUSING ASSEMBLY FOR A CONDITION CAUSING THE DOOR TO SEIZE OR BIND

Turn the ignition off.

Inspect the actuator, linkage, and housing assembly for a condition causing the door to seize or bind.

Are there any physical or mechanical problems with the door, housing, linkage, or actuator?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK MODE 1 (PANEL TO FLOOR) DOOR TRAVEL

Remove the Mode Door 1 (Panel to Floor) Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the door in both directions. The door should operate smoothly in both directions over approximately 70 degrees of travel.

Does the door operate smoothly in both directions over approximately 70 degrees of travel?

Yes >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information. Then, Go To 6.

No >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B1044–PANEL MODE DOOR 1 TRAVEL RANGE TOO SMALL?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1045–PANEL MODE DOOR 1 TRAVEL RANGE TOO LARGE

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value exceeds the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Mode 1 (Panel to Floor) Door exceeds the high range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
MODE 1 (PANEL TO FLOOR) DOOR OR A/C HEATER HOUSING COMPONENTS WARPED, WORN, DAMAGED, MISSING, BROKEN
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

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3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes, Dual-Zone System
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Yes, Single-Zone System
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs first and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

4. CHECK FOR A BROKEN MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR

Turn the ignition off.

Remove the Mode Door 1 (Panel to Floor) Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the actuator in both directions.

Does the actuator turn in either direction?

Yes >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK MODE 1 (PANEL TO FLOOR) DOOR & A/C HEATER HOUSING FOR WARPED, WORN, DAMAGED, MISSING, & BROKEN COMPONENTS

Inspect for excessively worn, disconnected, missing, or broken door linkage. Inspect for a damaged or broken A/C Heater Housing Assembly. Inspect for a warped or broken door, and missing door seals. Rotate the door from stop to stop. The door should rotate approximately 70 degrees.

Are there any physical or mechanical problems with the door or housing?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information. Then, Go To 6.

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B1045–PANEL MODE DOOR 1 TRAVEL RANGE TOO LARGE?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1046–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT/PERFORMANCE

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control monitors the door driver circuits during actuator operation for shorts to ground, shorts to battery, and shorts to other door driver circuits. If detected, the A/C Heater Control reports these types of faults as Control Circuit/Performance DTCs. It is important to note that Control Circuit/Performance DTCs do not indicate where or what type of short is present and that additional system testing is necessary to provide more details about the reported fault.

- **When Monitored:**
  When actuator movement is requested.
- **Set Condition:**
  If the A/C Heater Control detects an excessive current draw on any of the door driver circuits while attempting to drive this actuator. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
DOOR DRIVER CIRCUIT(S) SHORTED

NOTE: The DTC must be active for the results of this test to be valid. Do not perform this test if the DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition on.

With the scan tool in HVAC, erase DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Repair, Dual-Zone System

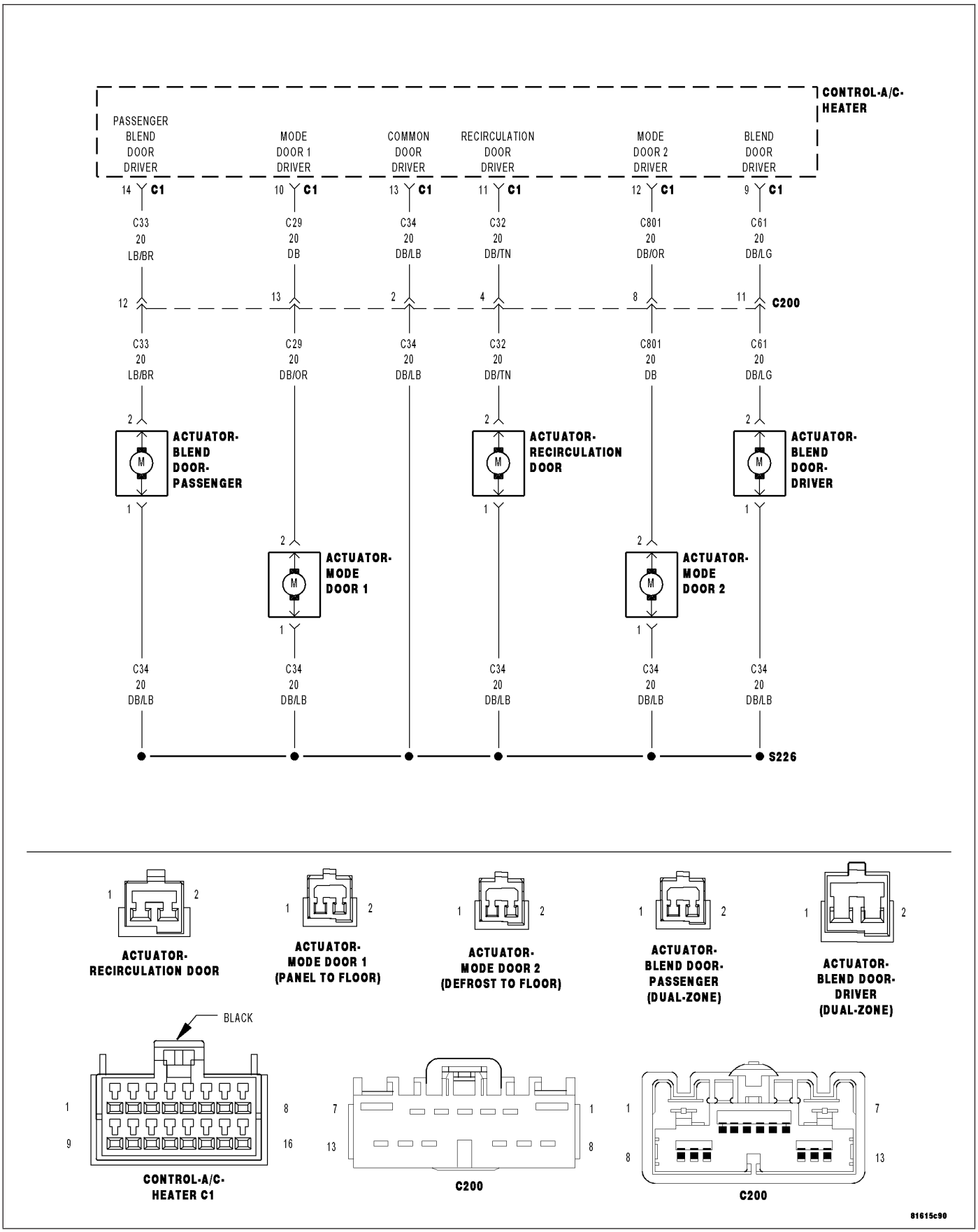
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Repair, Single-Zone System

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

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B1047–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT LOW (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C801) Mode Door 2 Driver circuit is shorted to ground.

Possible Causes
(C801) MODE DOOR 2 DRIVER CIRCUIT SHORTED TO GROUND
(C801) MODE DOOR 2 DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO GROUND

NOTE: If present, diagnose and repair DTC B10AB Right Blend Door Control Circuit High or B10AA Right Blend Door Control Circuit Low before proceeding.

Turn the ignition off.

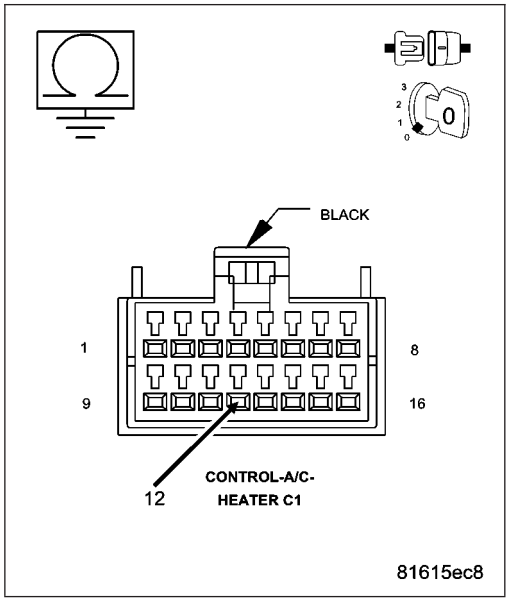
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C801) Mode Door 2 Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C801) Mode Door 2 Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

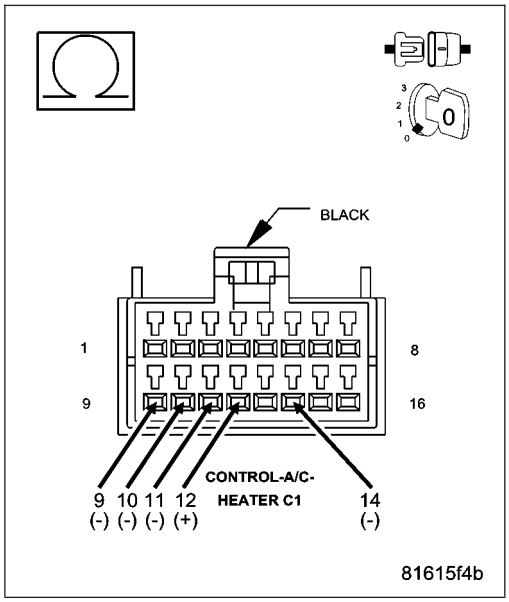
Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C61) Blend Door Driver circuit, the (C32) Recirculation Door Driver circuit, the (C29) Mode Door 1 Driver circuit, and the (C33) Passenger Blend Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms between the (C801) Mode Door 2 Driver circuit and any of the other door driver circuits?

Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C801) Mode Door 2 Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



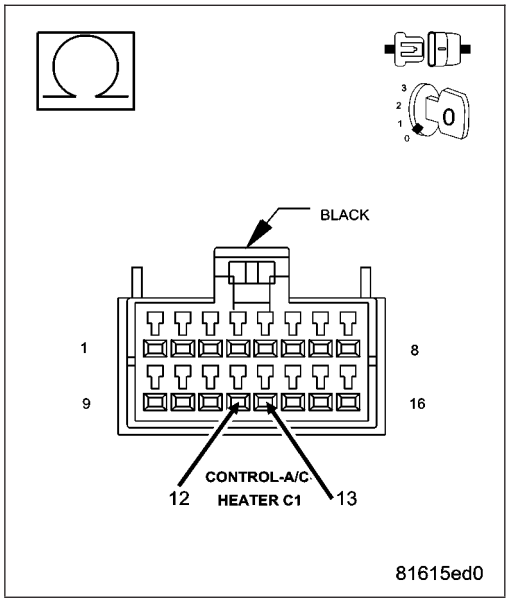
3. CHECK MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5

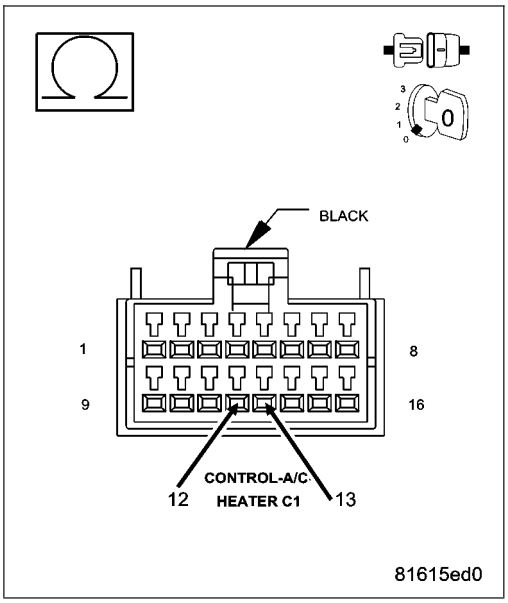


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4. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO (C34) FRONT COMMON DOOR DRIVER CIRCUIT

Disconnect the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance below 10k ohms?

Yes >> Repair the (C801) Mode Door 2 Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1047–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

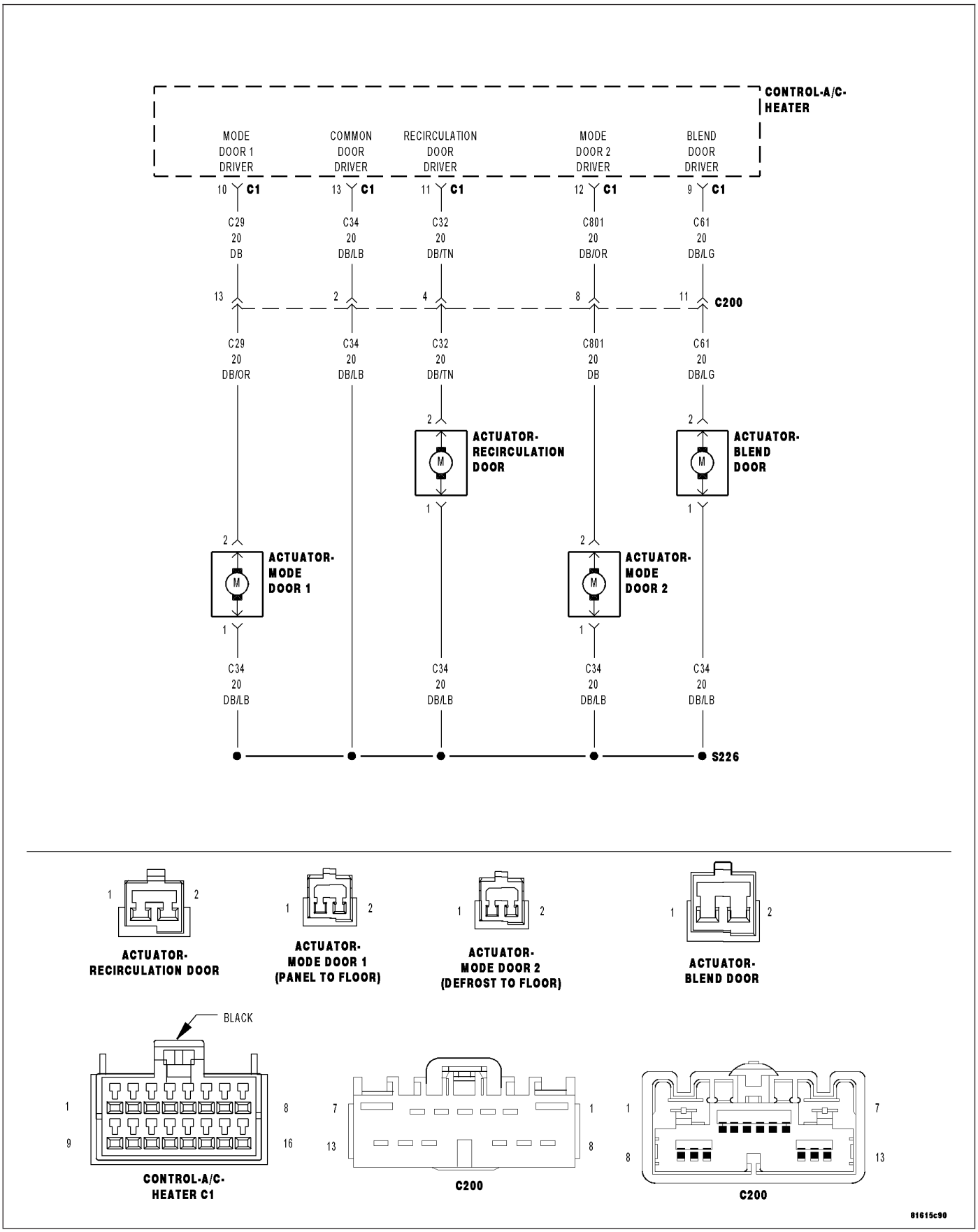
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1047–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT LOW (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C801) Mode Door 2 Driver circuit is shorted to ground.

Possible Causes
(C801) MODE DOOR 2 DRIVER CIRCUIT SHORTED TO GROUND
(C801) MODE DOOR 2 DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

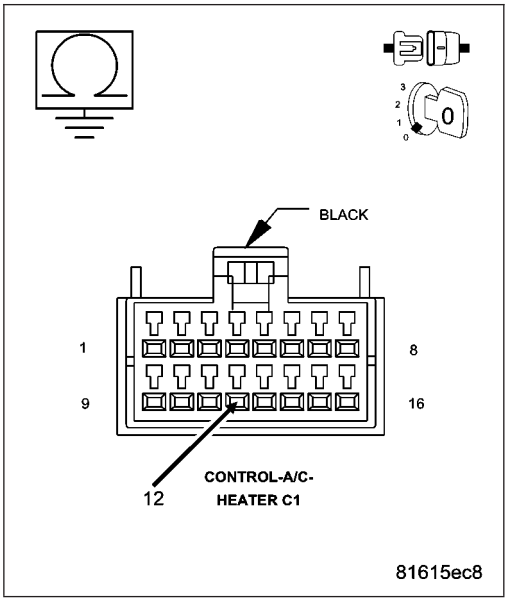
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C801) Mode Door 2 Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C801) Mode Door 2 Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

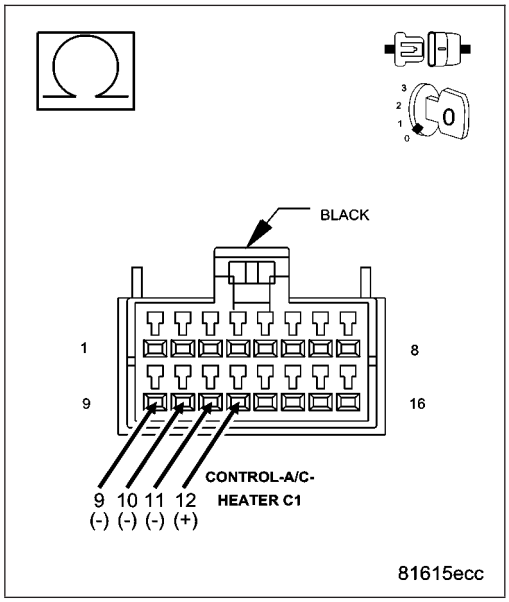
Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C61) Blend Door Driver circuit, the (C32) Recirculation Door Driver circuit, and the (C29) Mode Door 1 Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms between the (C801) Mode Door 2 Driver circuit and any of the other door driver circuits?

Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C801) Mode Door 2 Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



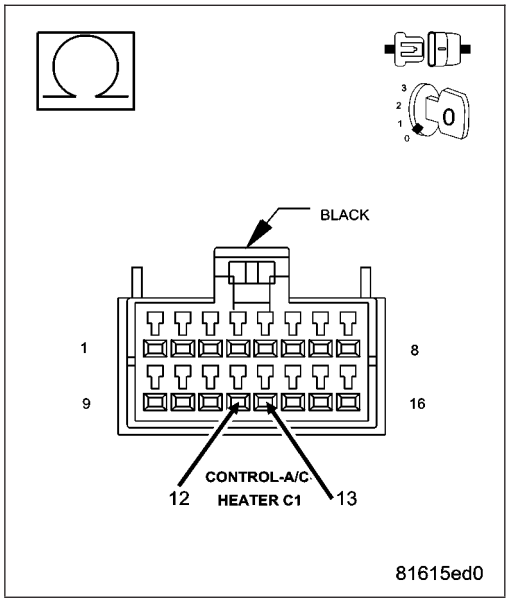
3. CHECK MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5

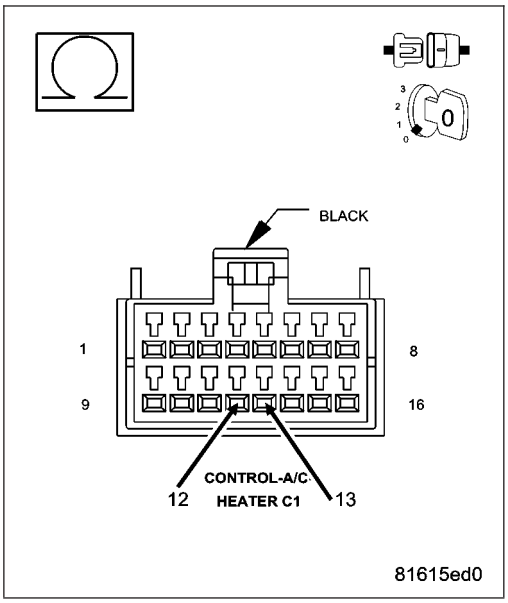


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4. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO (C34) FRONT COMMON DOOR DRIVER CIRCUIT

Disconnect the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance below 10k ohms?

Yes >> Repair the (C801) Mode Door 2 Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1047–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

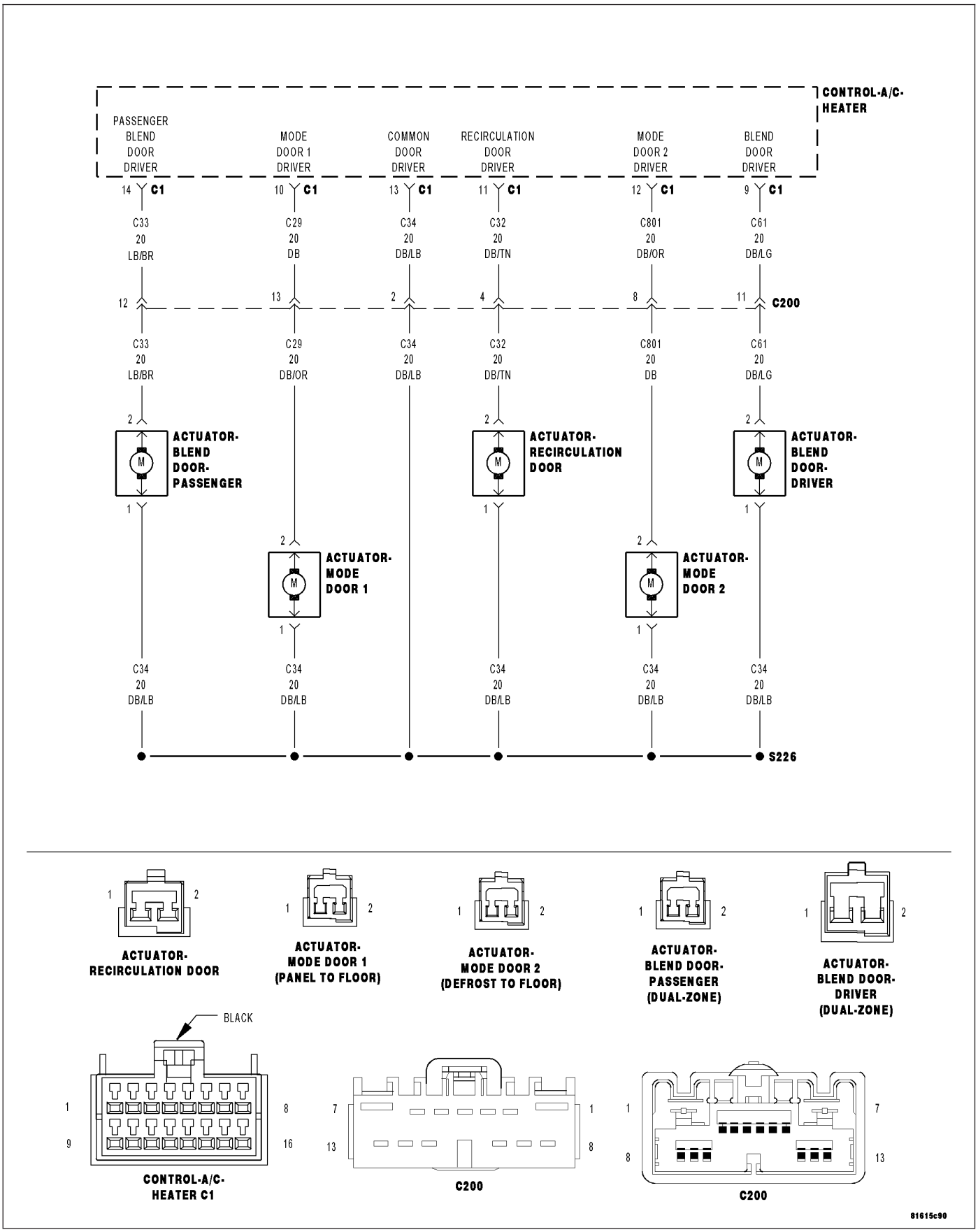
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1048–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT HIGH (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C801) Mode Door 2 Driver circuit is shorted to voltage.

Possible Causes
(C801) MODE DOOR 2 DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

NOTE: If present, diagnose and repair DTC B10AB Right Blend Door Control Circuit High or B10AA Right Blend Door Control Circuit Low before proceeding.

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

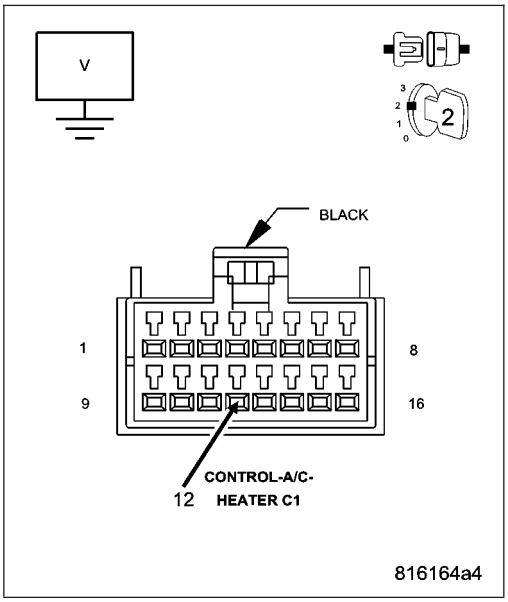
Turn the ignition on.

Measure the voltage of the (C801) Mode Door 2 Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C801) Mode Door 2 Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1048–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

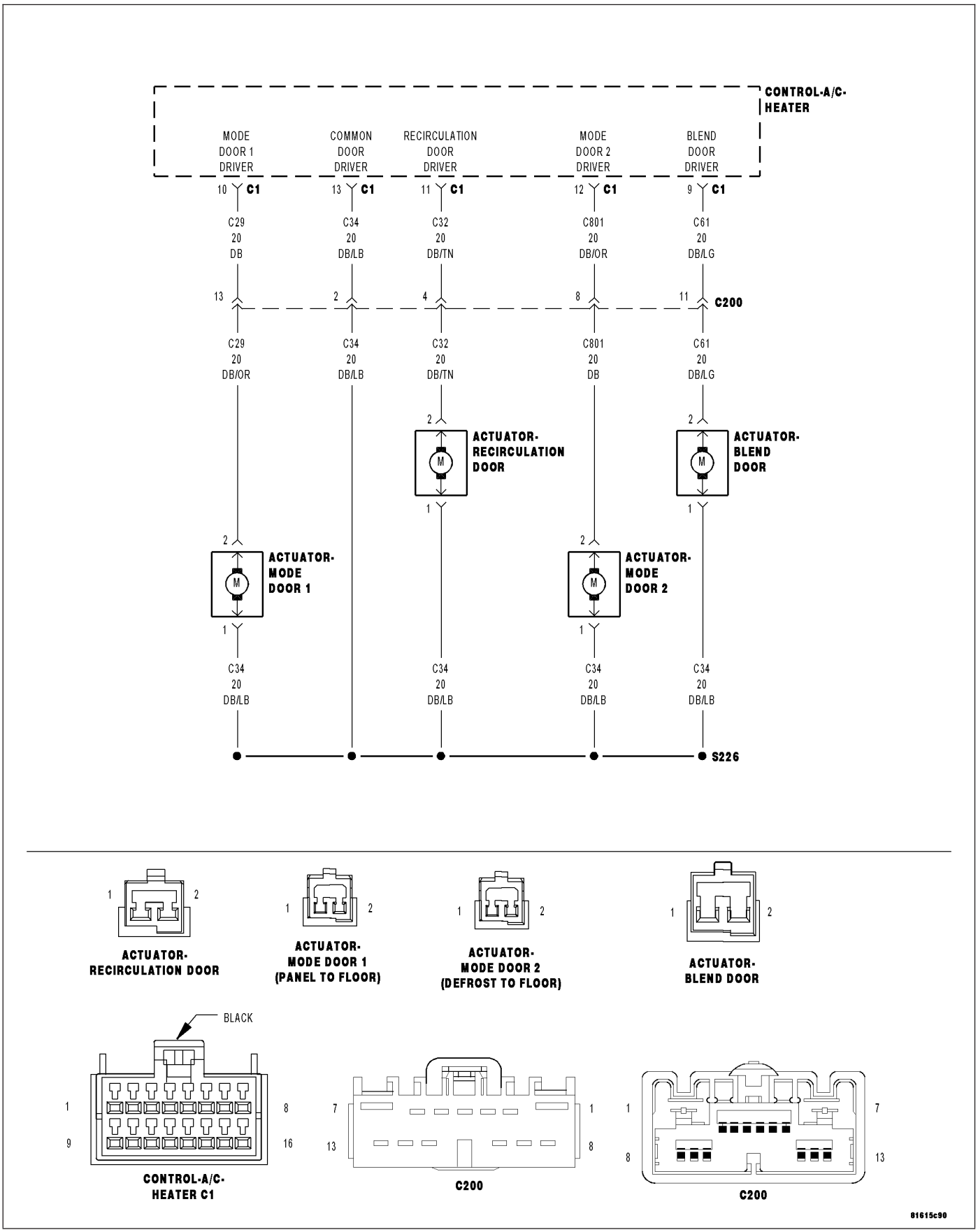
No, And No DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1048–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT HIGH (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C801) Mode Door 2 Driver circuit is shorted to voltage.

Possible Causes
(C801) MODE DOOR 2 DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

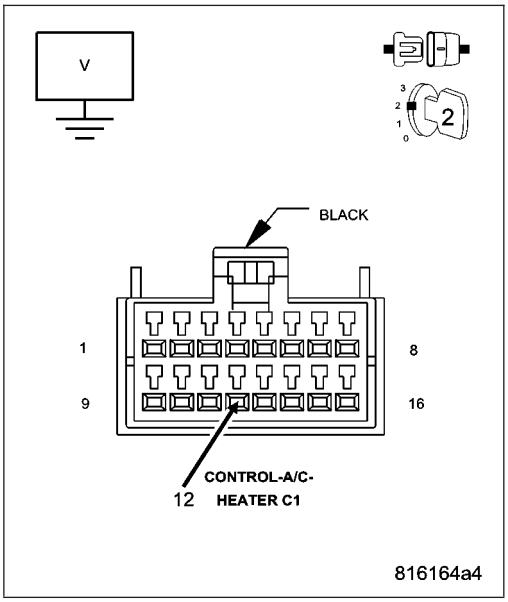
Turn the ignition on.

Measure the voltage of the (C801) Mode Door 2 Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C801) Mode Door 2 Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1048–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

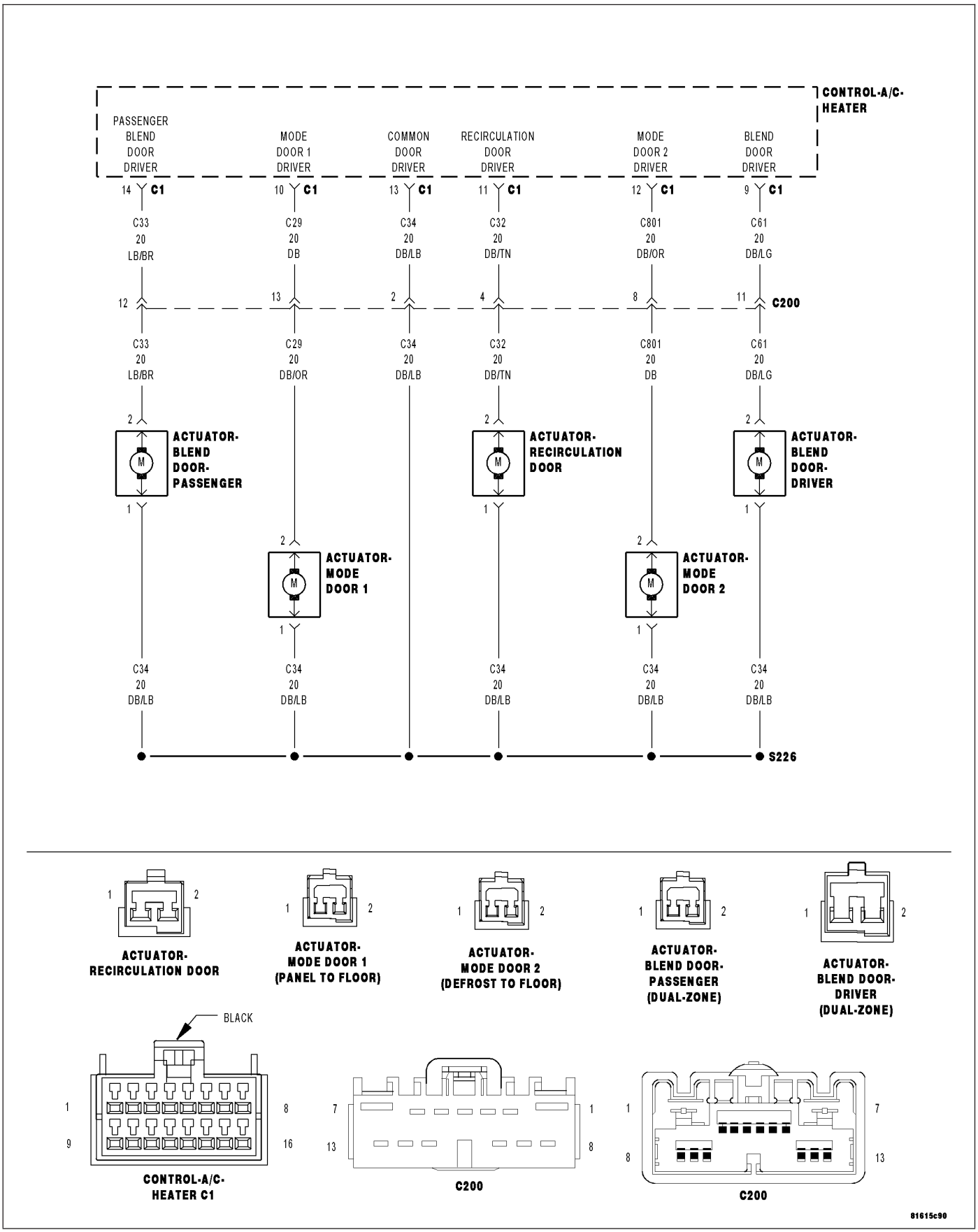
No, And No DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1049–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT OPEN (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the Mode Door 2 (Defrost to Floor) Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C801) MODE DOOR 2 DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

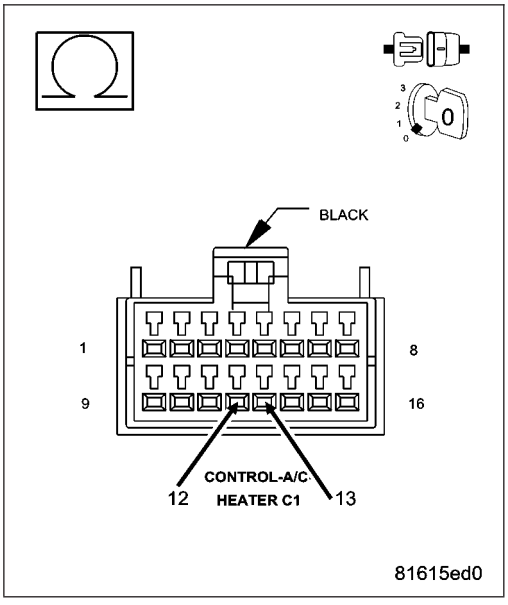
No >> Go To 2

2. CHECK MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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3. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR AN OPEN

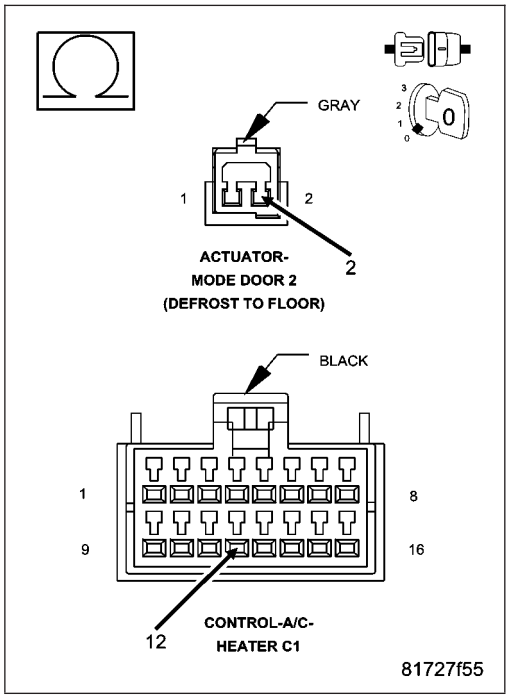
Disconnect the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Measure the resistance of the (C801) Mode Door 2 Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C801) Mode Door 2 Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



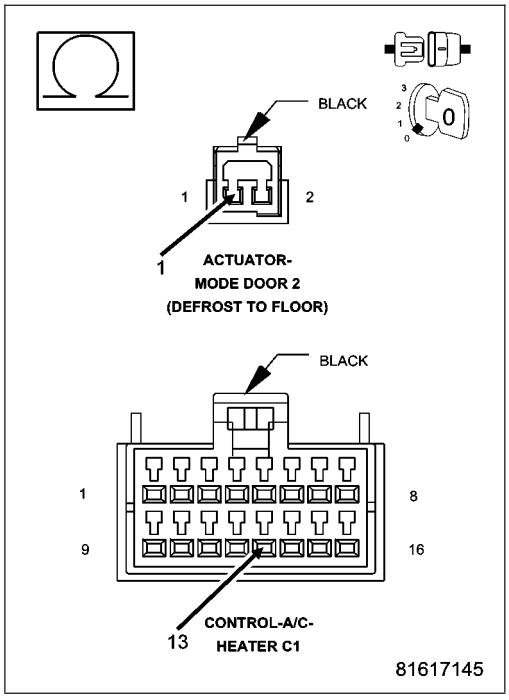
4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Is the resistance below 5.0 ohms?

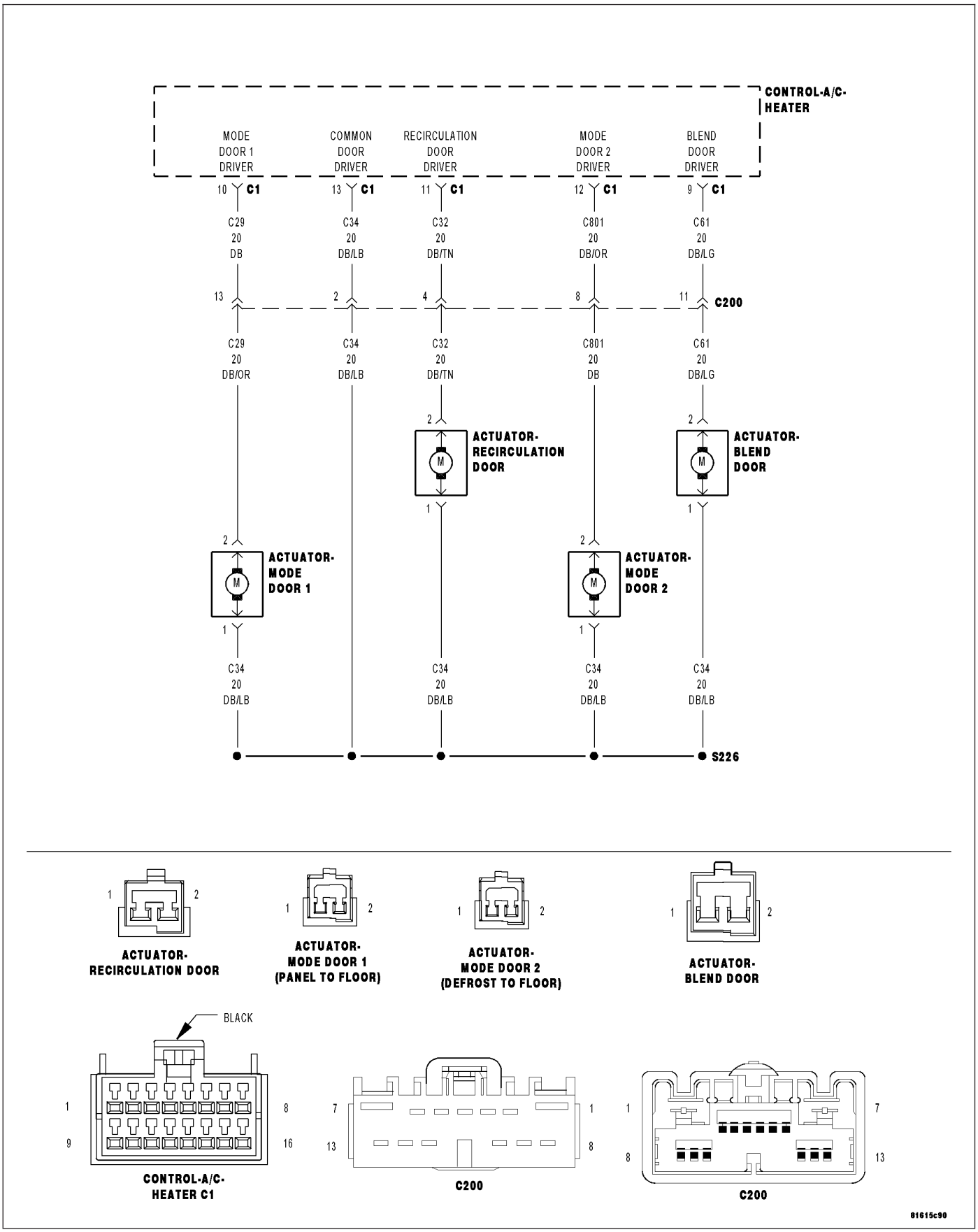
Yes >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B1049–FLOOR/DEFROST MODE DOOR CONTROL CIRCUIT OPEN (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the location of the open circuit and the direction the actuator is moving when the open is present.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the Mode Door 2 (Defrost to Floor) Actuator's electrical circuit is open. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
(C801) MODE DOOR 2 DRIVER CIRCUIT OPEN
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

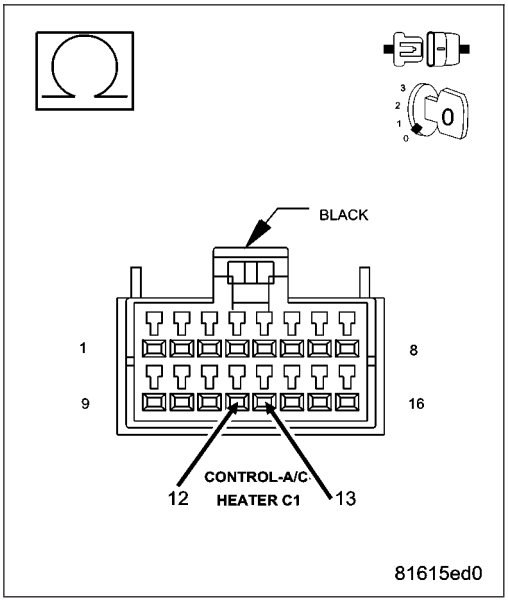
No >> Go To 2

2. CHECK MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance above 70 ohms?

Yes >> Go To 3

No >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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3. CHECK (C801) MODE DOOR 2 DRIVER CIRCUIT FOR AN OPEN

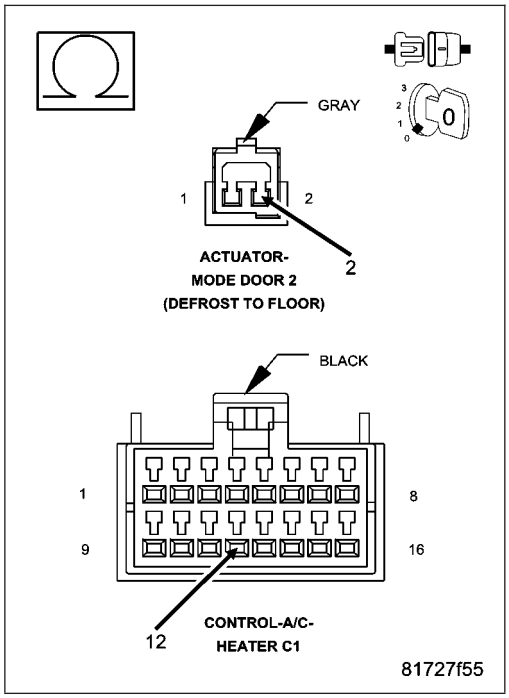
Disconnect the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Measure the resistance of the (C801) Mode Door 2 Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 4

No >> Repair the (C801) Mode Door 2 Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



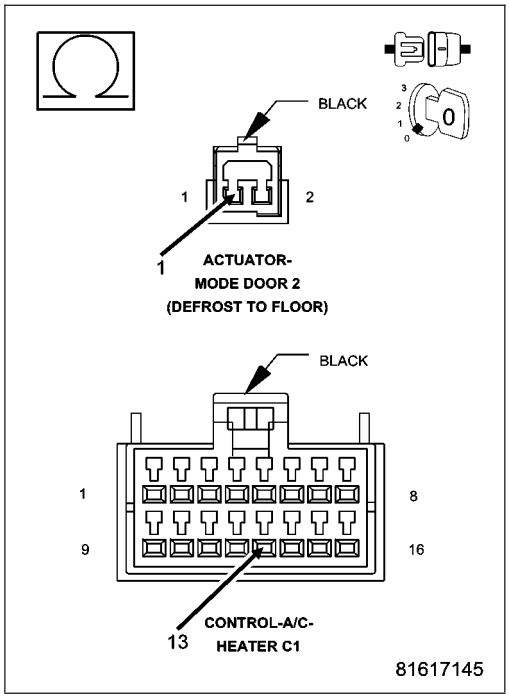
4. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 2 (Defrost to Floor) Actuator harness connector.

Is the resistance below 5.0 ohms?

Yes >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B1050–BLEND DOOR TRAVEL RANGE TOO SMALL (SINGLE-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value is less than the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Blend Door is less than the low range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
BLEND DOOR SEIZED, BINDING, OBSTRUCTED
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes >> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs first and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

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4. INSPECT ACTUATOR & HOUSING ASSEMBLY FOR A CONDITION CAUSING THE DOOR TO SEIZE OR BIND

Turn the ignition off.

Inspect the actuator, linkage, and housing assembly for a condition causing the door to seize or bind.

Are there any physical or mechanical problems with the door, housing, linkage, or actuator?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK BLEND DOOR TRAVEL

Remove the Blend Door Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the door in both directions. The door should operate smoothly in both directions over approximately 53 degrees of travel.

Does the door operate smoothly in both directions over approximately 53 degrees of travel?

Yes >> Replace the Blend Door Actuator in accordance with the Service Information. Then, Go To 6.

No >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B1050–BLEND DOOR TRAVEL RANGE TOO SMALL?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1051–BLEND DOOR TRAVEL RANGE TOO LARGE (SINGLE-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control calibrates each actuator individually. Automatic calibration occurs upon power up after installing a new A/C Heater Control. Manual calibration occurs by sending a command with the scan tool. The purpose of actuator calibration is to determine the total span of door travel between physical stops. To calibrate the actuator, the A/C Heater Control first moves the door to an end stop, and then counts the number of pulses it takes to move the door to its other stop. An expected range of span is stored in the control's memory. If the measured calibration value exceeds the expected range for this actuator, this DTC will set. Note that the control clears all stored calibration faults at the beginning of the calibration procedure.

- **When Monitored:**
  During actuator calibration.
- **Set Condition:**
  If the total span of the Blend Door exceeds the high range limit.

Possible Causes
DOOR DRIVER ELECTRICAL CIRCUIT(S)
BLEND DOOR OR A/C HEATER HOUSING COMPONENTS WARPED, WORN, DAMAGED, MISSING, BROKEN
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK FOR ACTIVE CONTROL CIRCUIT/PERFORMANCE DTCs

Turn the ignition on.

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT/PERFORMANCE DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 2

2. CHECK FOR ACTIVE CONTROL CIRCUIT OPEN DTCs

With the scan tool, read active HVAC DTCs.

Does the scan tool display any active: XXXX CONTROL CIRCUIT OPEN DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 3

3. RUN THE ACTUATOR DTC DETECTION TEST

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes >> Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs first and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> Go To 4

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4. CHECK FOR A BROKEN BLEND DOOR ACTUATOR

Turn the ignition off.

Remove the Blend Door Actuator from the A/C Heater Housing Assembly.

By hand, attempt to rotate the actuator in both directions.

Does the actuator turn in either direction?

Yes >> Replace the Blend Door Actuator in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5

5. CHECK BLEND DOOR & A/C HEATER HOUSING FOR WARPED, WORN, DAMAGED, MISSING, & BROKEN COMPONENTS

Inspect for excessively worn, disconnected, missing, or broken door linkage. Inspect for a damaged or broken A/C Heater Housing Assembly. Inspect for a warped or broken door, and missing door seals. Rotate the door from stop to stop. The door should rotate approximately 53 degrees.

Are there any physical or mechanical problems with the door or housing?

Yes >> Repair as necessary in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Blend Door Actuator in accordance with the Service Information. Then, Go To 6.

6. RUN ACTUATOR CALIBRATION TEST

Turn the ignition on.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display: B1051–BLEND DOOR TRAVEL RANGE TOO LARGE?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1058–RECIRCULATION DOOR CONTROL CIRCUIT/PERFORMANCE

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control monitors the door driver circuits during actuator operation for shorts to ground, shorts to battery, and shorts to other door driver circuits. If detected, the A/C Heater Control reports these types of faults as Control Circuit/Performance DTCs. It is important to note that Control Circuit/Performance DTCs do not indicate where or what type of short is present and that additional system testing is necessary to provide more details about the reported fault.

- **When Monitored:**
  When actuator movement is requested.
- **Set Condition:**
  If the A/C Heater Control detects an excessive current draw on any of the door driver circuits while attempting to drive this actuator. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
DOOR DRIVER CIRCUIT(S) SHORTED

NOTE: The DTC must be active for the results of this test to be valid. Do not perform this test if the DTC is stored. Refer to HVAC System Test for stored DTC test procedures.

Diagnostic Test

1. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition on.

With the scan tool in HVAC, erase DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Repair, Dual-Zone System

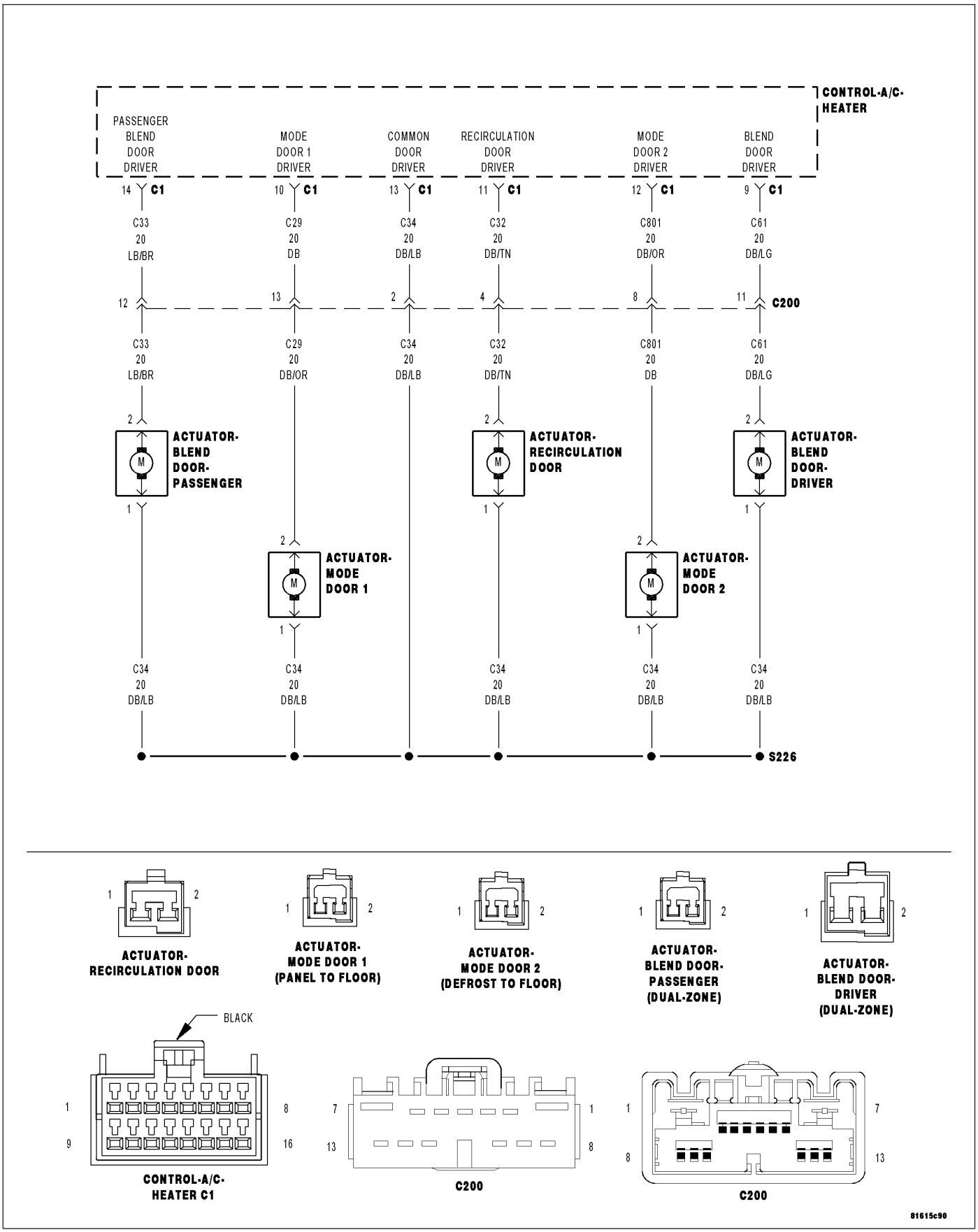
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Repair, Single-Zone System

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

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B1059–RECIRCULATION DOOR CONTROL CIRCUIT LOW (DUAL-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C32) Recirculation Door Driver circuit is shorted to ground.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND

NOTE: If present, diagnose and repair DTC B10AB Right Blend Door Control Circuit High or B10AA Right Blend Door Control Circuit Low before proceeding.

Turn the ignition off.

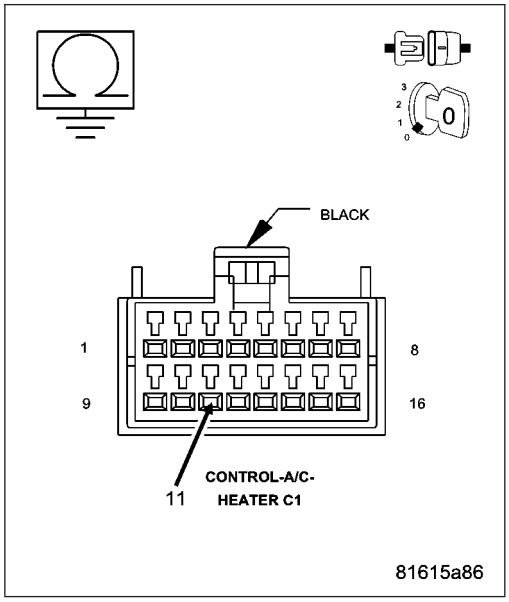
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C32) Recirculation Door Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C32) Recirculation Door Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

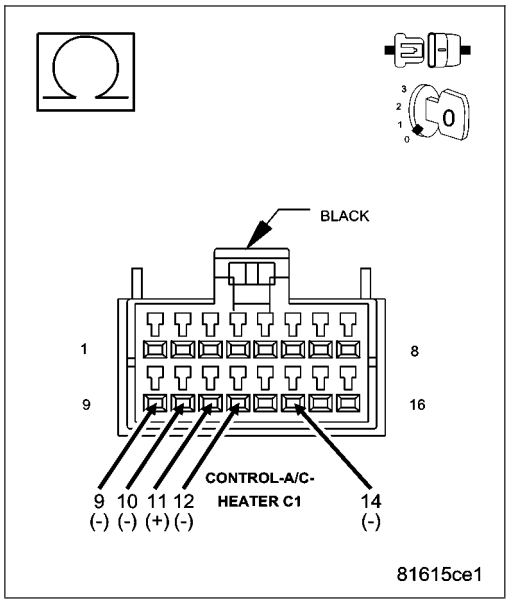
No >> Go To 2



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2. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C61) Blend Door Driver circuit, the (C29) Mode Door 1 Driver circuit, the (C801) Mode Door 2 Driver circuit, and the (C33) Passenger Blend Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance below 10k ohms between the (C32) Recirculation Door Driver circuit and any of the other door driver circuits?

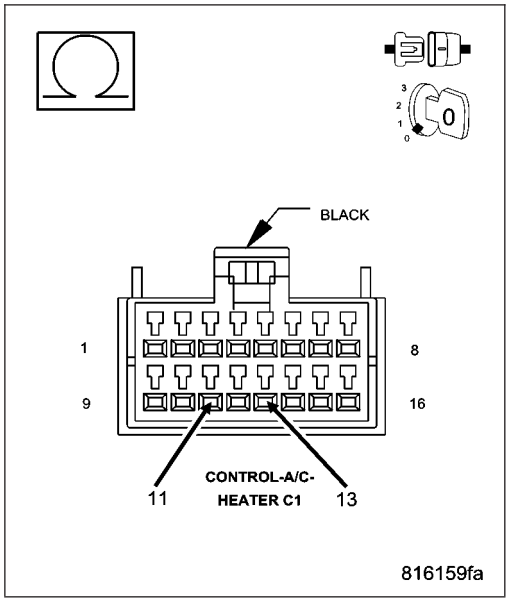
Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C32) Recirculation Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3

3. CHECK RECIRCULATION DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.



Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5

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4. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Recirculation Door Actuator harness connector.

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

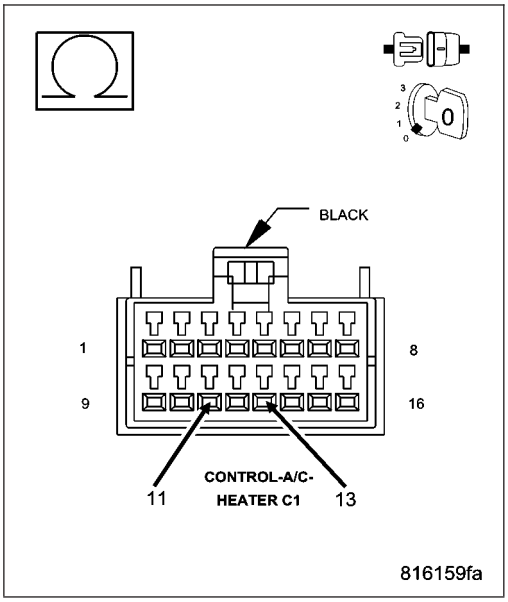
Is the resistance below 10k ohms?

Yes >> Repair the (C32) Recirculation Door Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Recirculation Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1059–RECIRCULATION DOOR CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

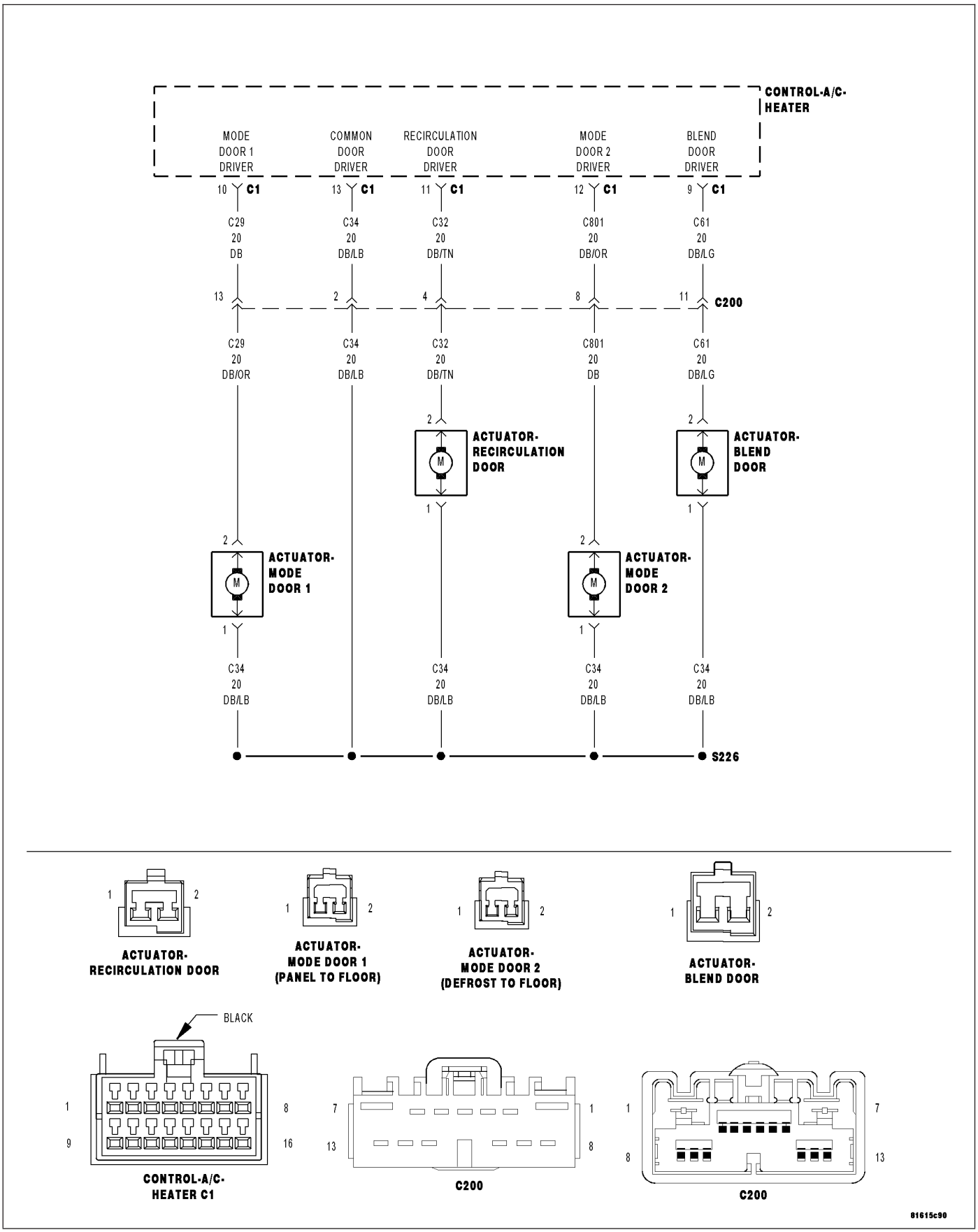
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1059–RECIRCULATION DOOR CONTROL CIRCUIT LOW (SINGLE-ZONE)



For a complete wiring diagram **Refer to Section 8W**.

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Theory of Operation

The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C32) Recirculation Door Driver circuit is shorted to ground.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO OTHER DOOR DRIVER CIRCUIT(S)
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND

Turn the ignition off.

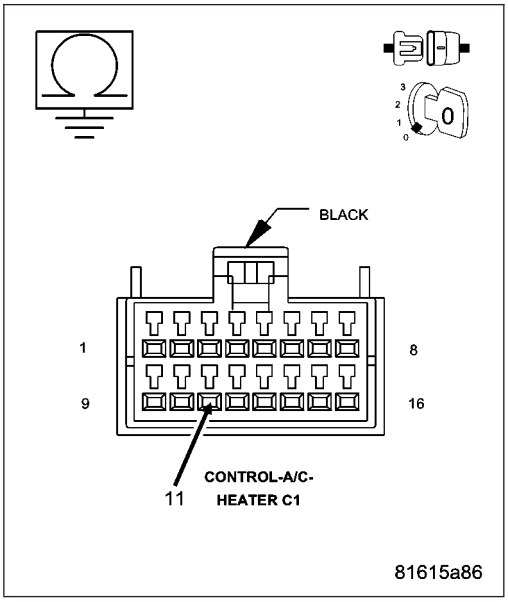
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance of the (C32) Recirculation Door Driver circuit between ground and the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms?

Yes >> Repair the (C32) Recirculation Door Driver circuit for a short to ground.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO OTHER DOOR DRIVER CIRCUITS

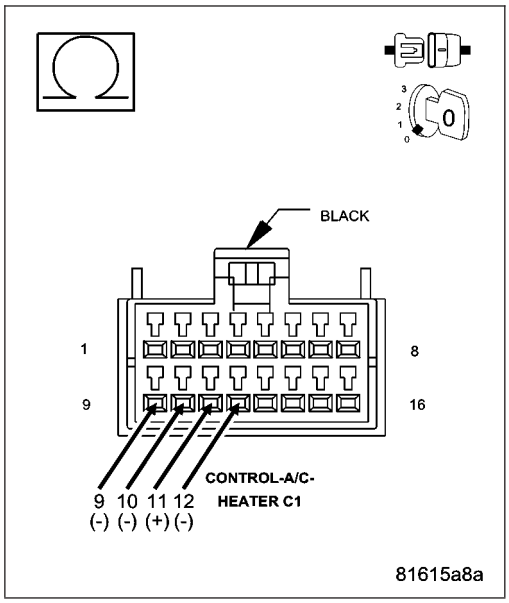
Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C61) Blend Door Driver circuit, the (C29) Mode Door 1 Driver circuit, and the (C801) Mode Door 2 Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 10k ohms between the (C32) Recirculation Door Driver circuit and any of the other door driver circuits?

Yes >> Repair the circuit(s) with a resistance below 10k ohms for a short to the (C32) Recirculation Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3



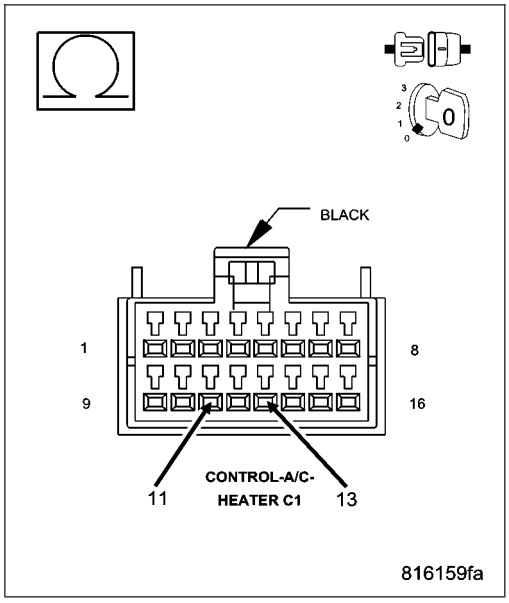
3. CHECK RECIRCULATION DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 30 ohms?

Yes >> Go To 4

No >> Go To 5



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4. CHECK (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO (C34) COMMON DOOR DRIVER CIRCUIT

Disconnect the Recirculation Door Actuator harness connector.

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

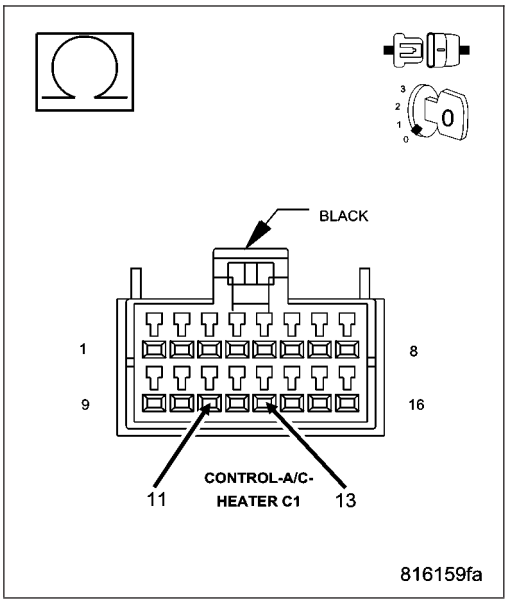
Is the resistance below 10k ohms?

Yes >> Repair the (C32) Recirculation Door Driver circuit for a short to the (C34) Common Door Driver circuit.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Replace the Recirculation Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool, erase HVAC DTCs.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1059–RECIRCULATION DOOR CONTROL CIRCUIT LOW?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

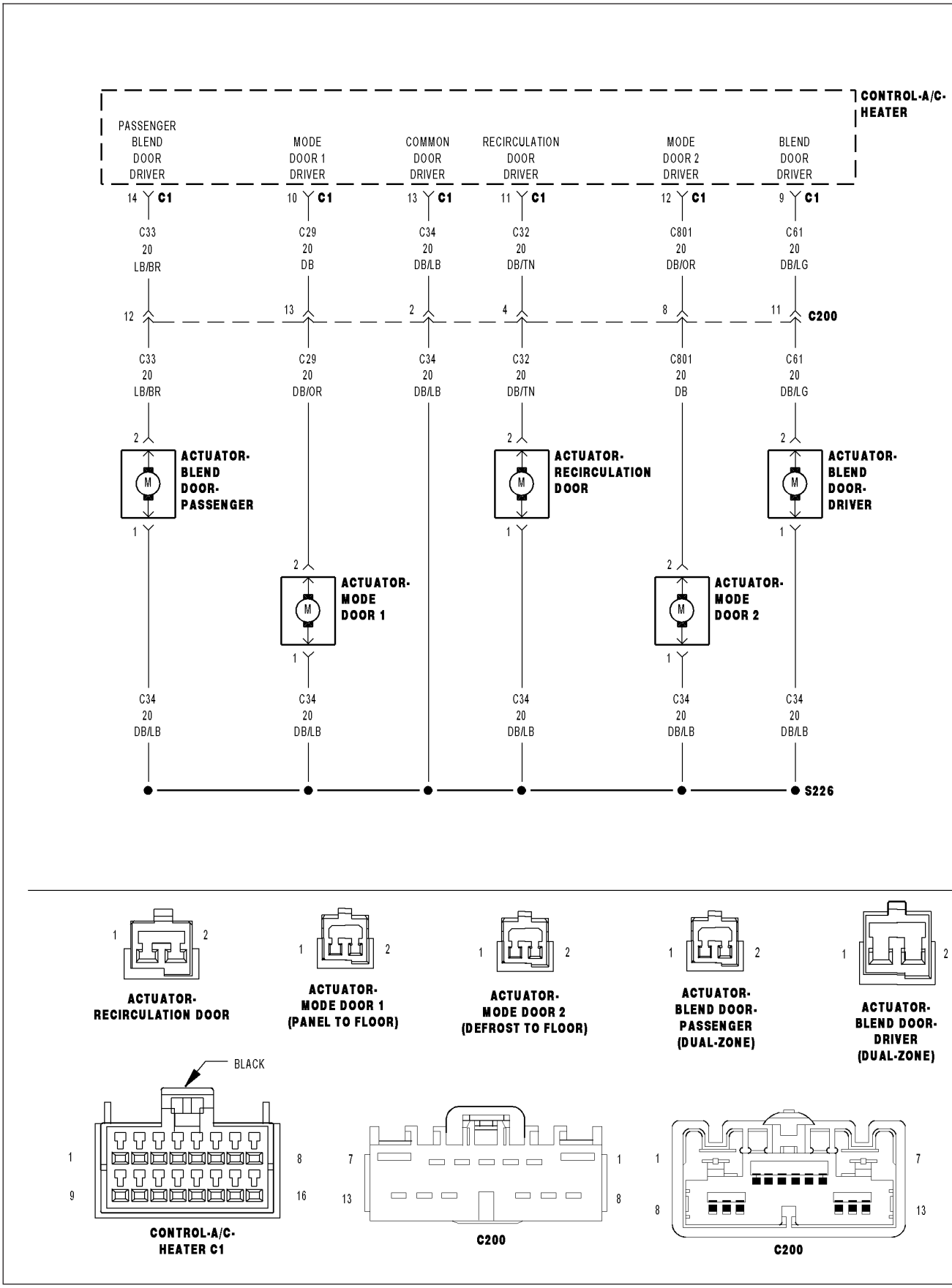
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1060–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT HIGH (DUAL-ZONE)



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For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control drives the Driver Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Passenger Blend Door Actuator via the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C34) Common Door Driver circuit is shorted to voltage.

Possible Causes
(C34) COMMON DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

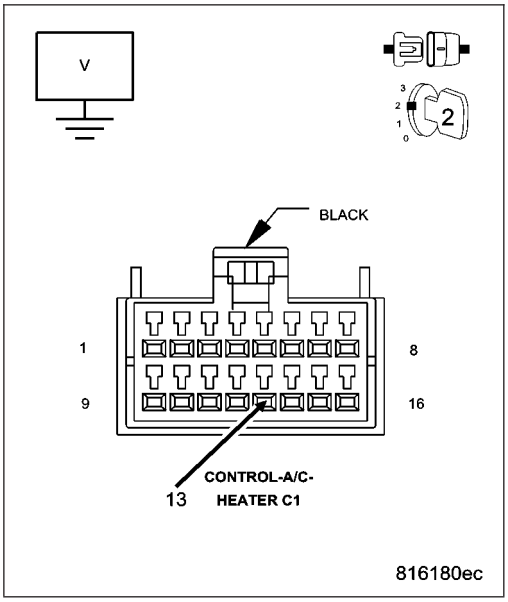
Measure the voltage of the (C34) Common Door Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C34) Common Door Driver circuit for a short to voltage.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1060–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

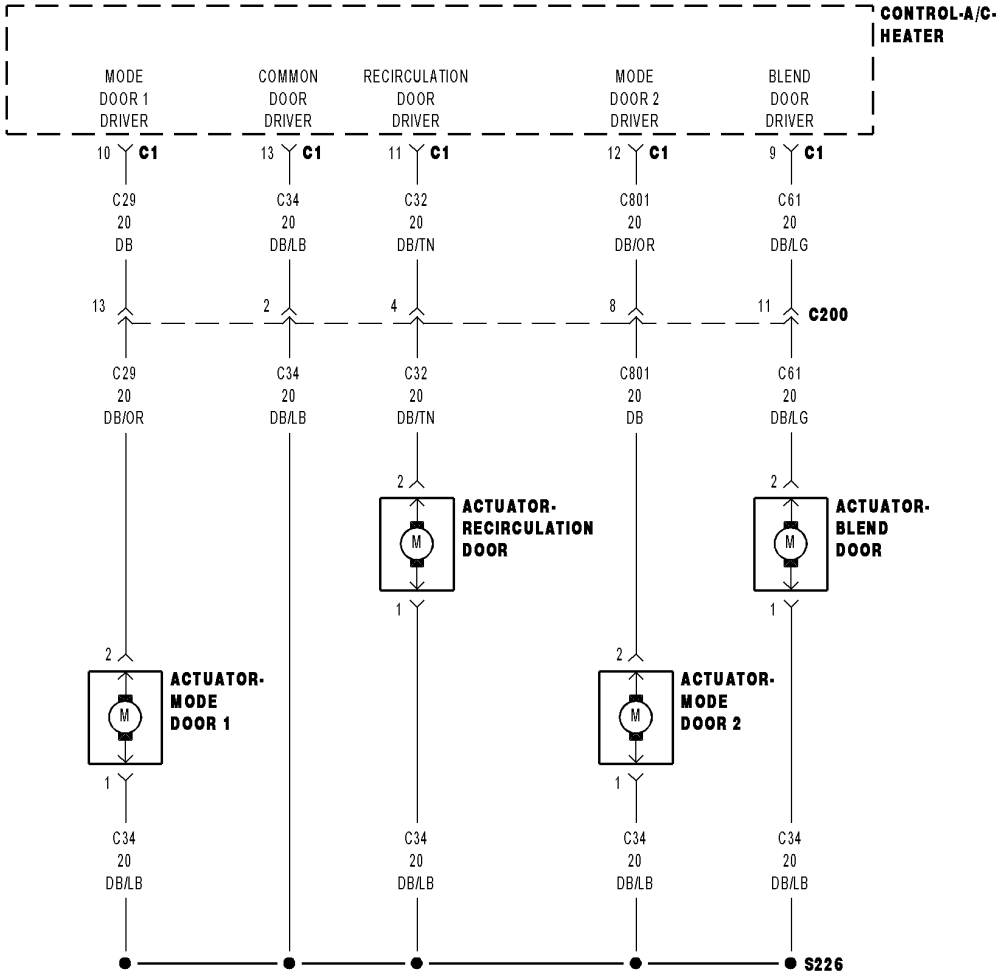
No, And No Other DTCs Displayed

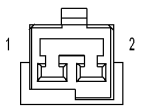
Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

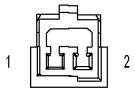
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

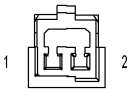
https://truckmanualshub.com/

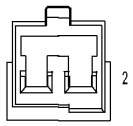
B1060–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT HIGH (SINGLE-ZONE)

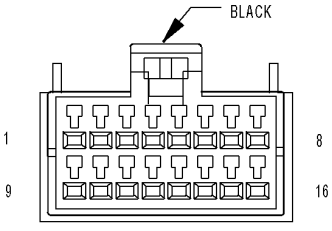



ACTUATOR- RECIRCULATION DOOR

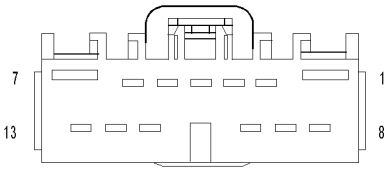

ACTUATOR- MODE DOOR 1 (PANEL TO FLOOR)


ACTUATOR- MODE DOOR 2 (DEFROST TO FLOOR)

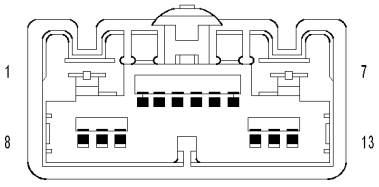

ACTUATOR- BLEND DOOR



CONTROL-A/C- HEATER C1



C200



C200

81615c90

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For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control drives the Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C34) Common Door Driver circuit is shorted to voltage.

Possible Causes
(C34) COMMON DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
A/C HEATER CONTROL

Diagnostic Test

1. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE

Turn the ignition off.

Disconnect the A/C Heater Control C1 harness connector.

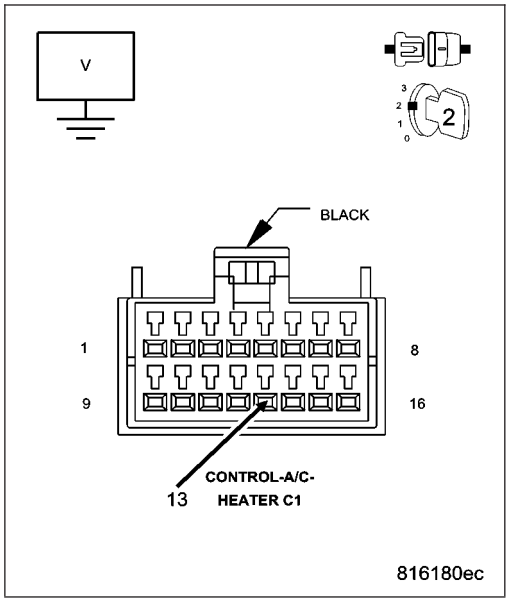
Turn the ignition on.

Measure the voltage of the (C34) Common Door Driver circuit.

Is the voltage above 0.2 volts?

Yes >> Repair the (C34) Common Door Driver circuit for a short to voltage.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 2



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2. RUN THE ACTUATOR DTC DETECTION TEST

Turn the ignition off.

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1060–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT HIGH?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

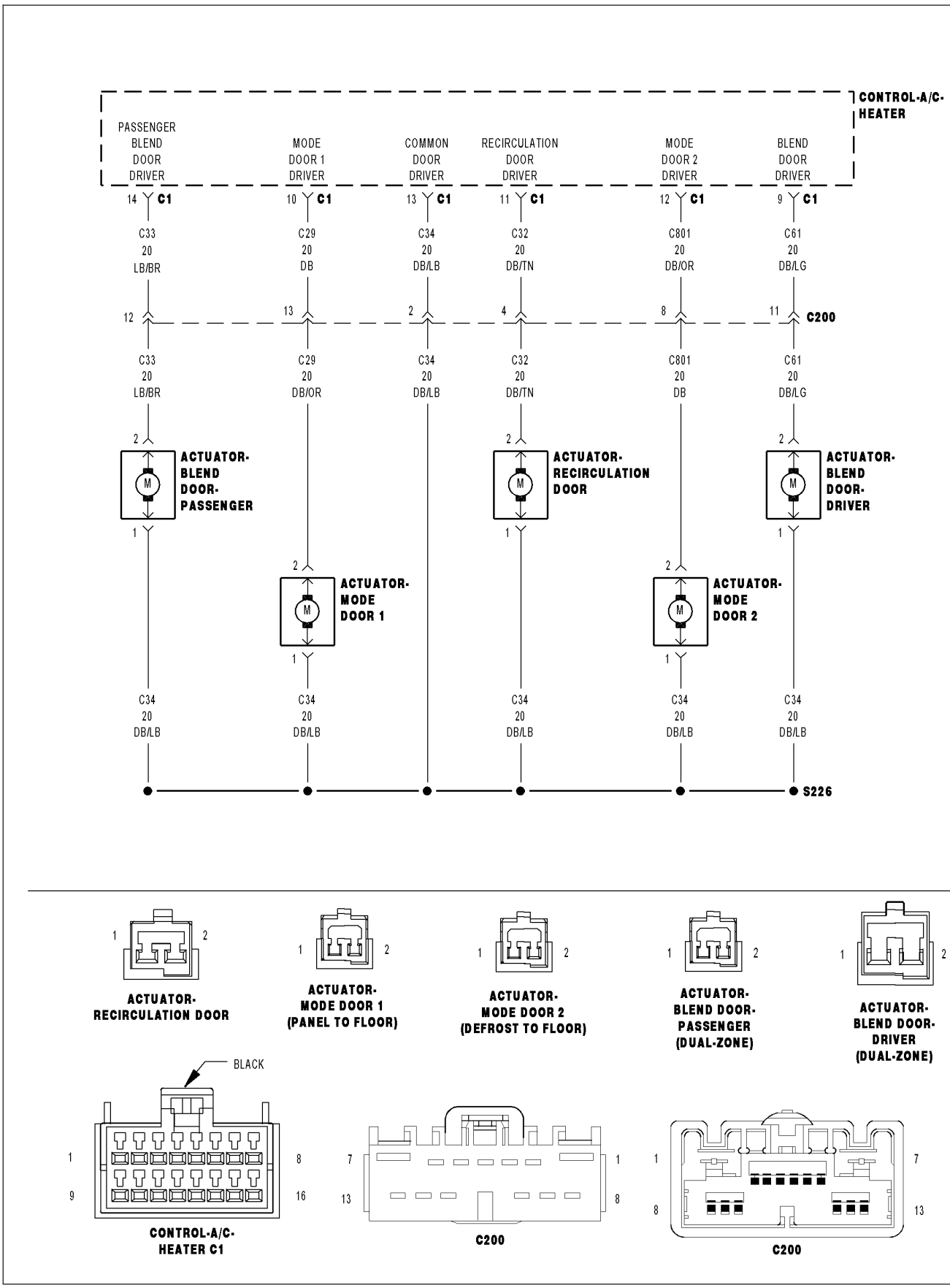
No, And No Other DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B1061–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT OPEN (DUAL-ZONE)



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For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control drives the Driver Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Passenger Blend Door Actuator via the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C34) Common Door Driver circuit is open.

Possible Causes
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
DRIVER BLEND DOOR ACTUATOR
PASSENGER BLEND DOOR ACTUATOR
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK DRIVER BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

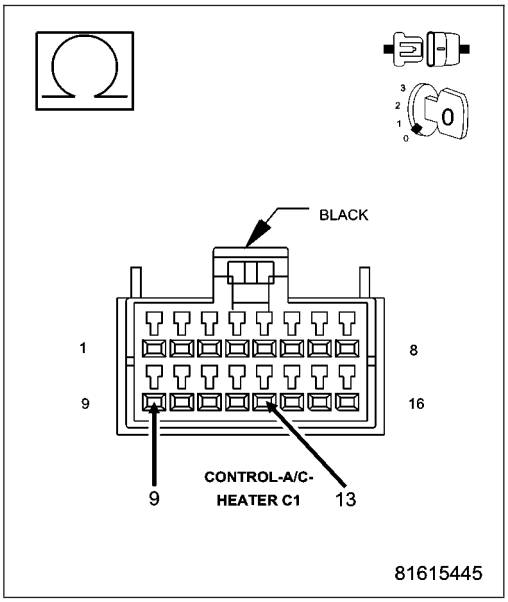
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 2

No >> Go To 7



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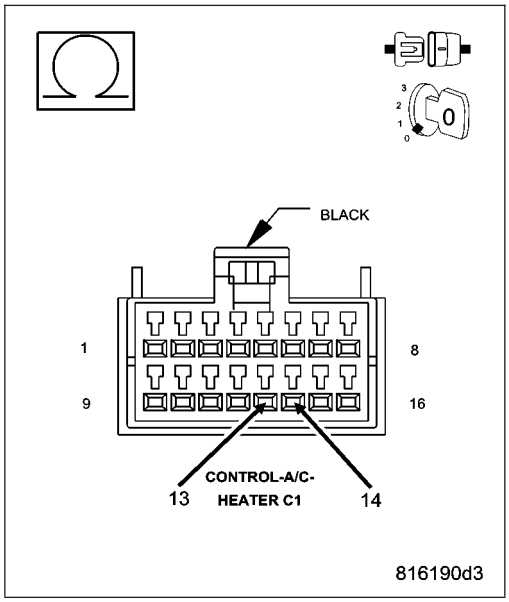
2. CHECK PASSENGER BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C33) Passenger Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 3

No >> Go To 8



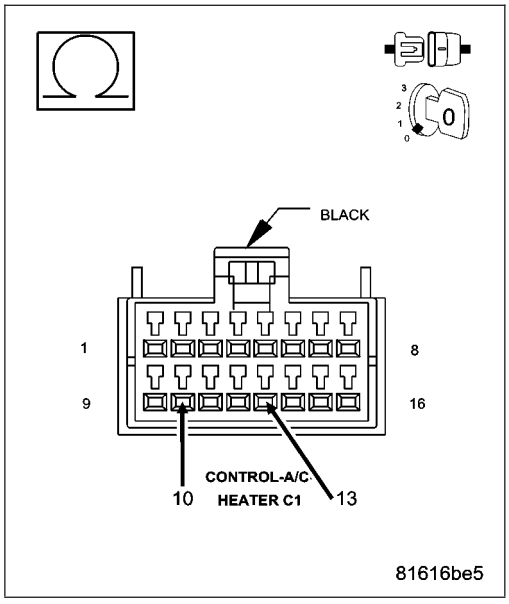
3. CHECK MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 4

No >> Go To 9



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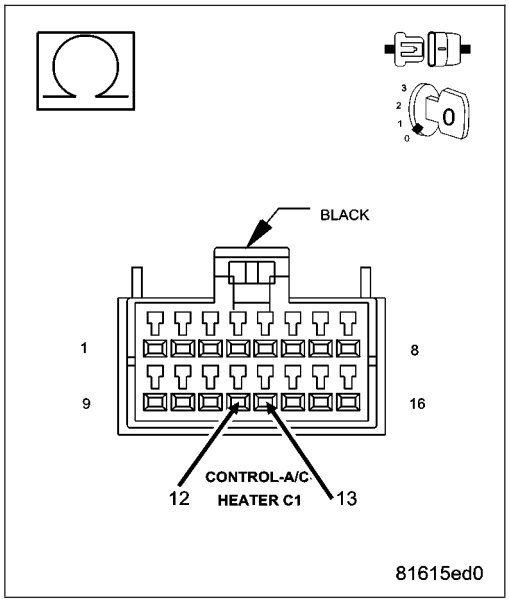
4. CHECK MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 5

No >> Go To 10



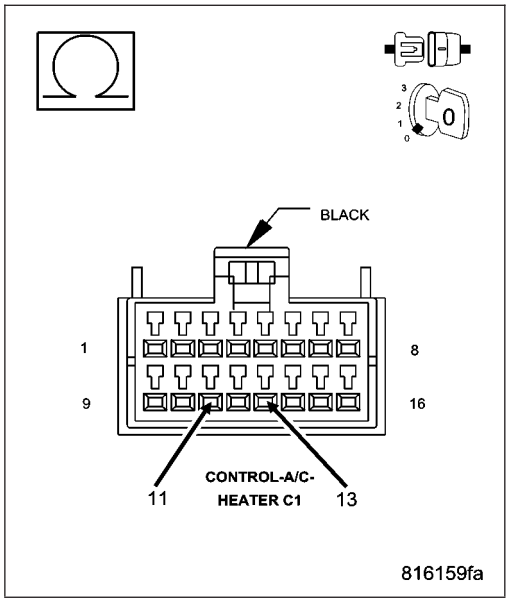
5. CHECK RECIRCULATION DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 6

No >> Go To 11



6. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1061–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT OPEN?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

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Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No, And No DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

7. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE DRIVER BLEND DOOR ACTUATOR

Disconnect the Driver Blend Door Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Driver Blend Door Actuator harness connector.

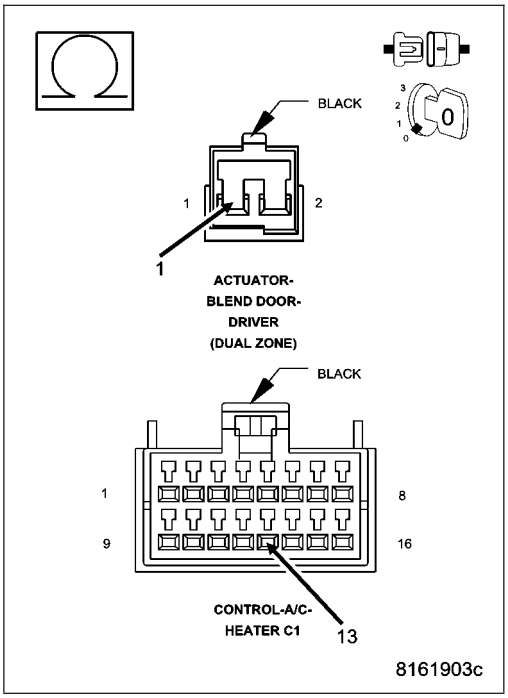
Is the resistance below 5.0 ohms?

Yes >> Replace the Driver Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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8. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE PASSENGER BLEND DOOR ACTUATOR

Disconnect the Passenger Blend Door Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Passenger Blend Door Actuator harness connector.

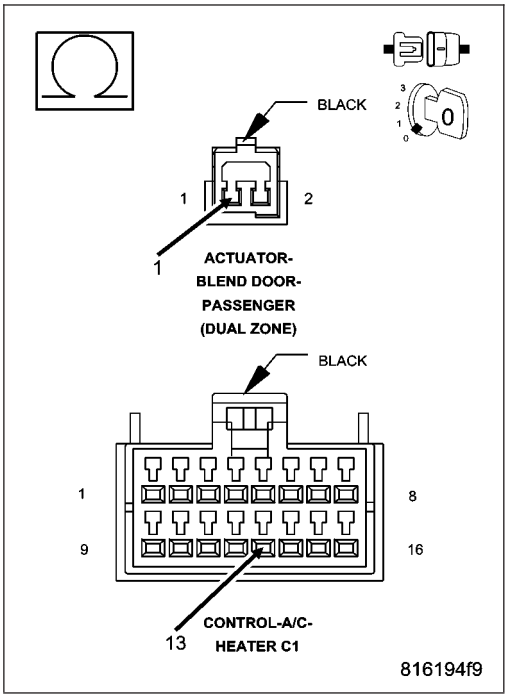
Is the resistance below 5.0 ohms?

Yes >> Replace the Passenger Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



9. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE MODE DOOR 1 ACTUATOR

Disconnect the Mode Door 1 Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 1 (Panel to Floor) Actuator harness connector.

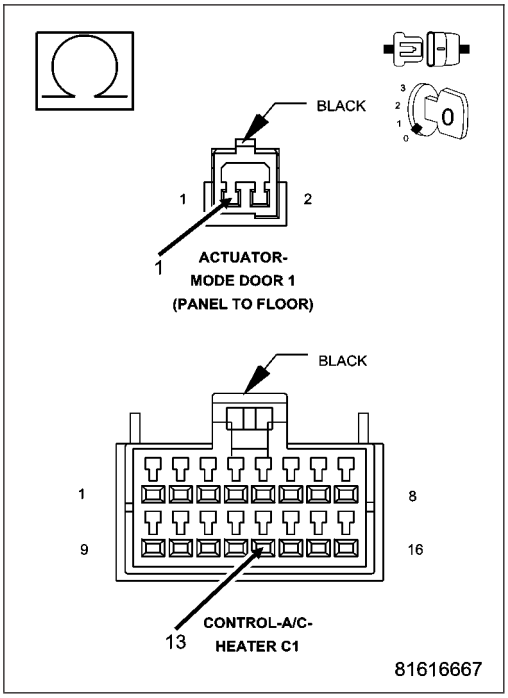
Is the resistance below 5.0 ohms?

Yes >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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10. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE MODE DOOR 2 ACTUATOR

Disconnect the Mode Door 2 Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 2 (Defrost to Floor) Actuator harness connector.

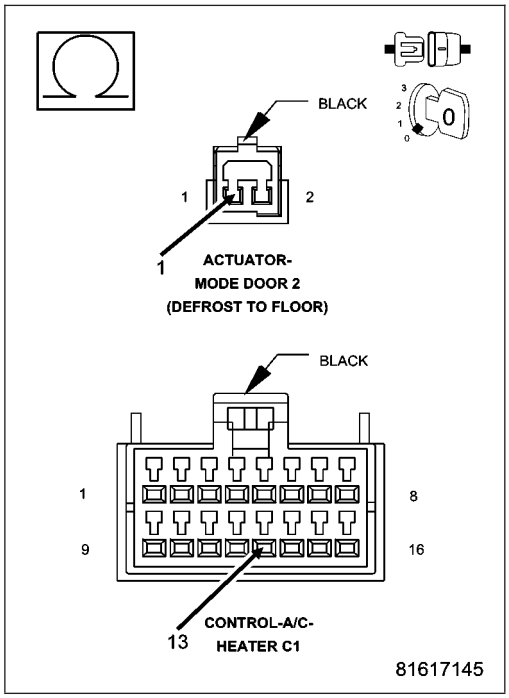
Is the resistance below 5.0 ohms?

Yes >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



11. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE RECIRCULATION DOOR ACTUATOR

Disconnect the Recirculation Door Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

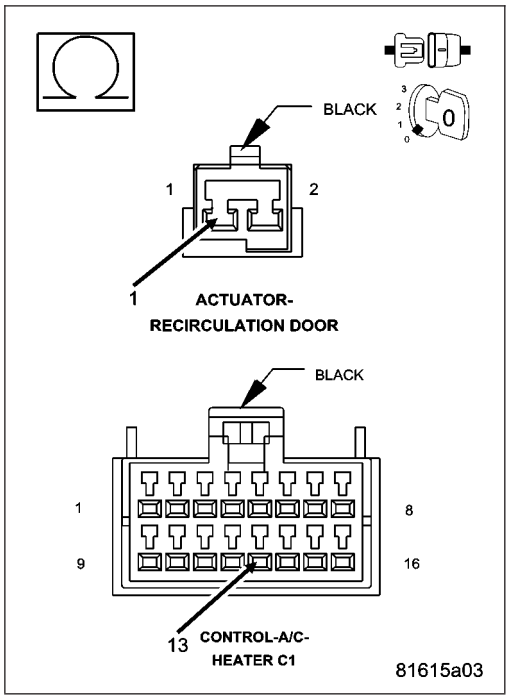
Is the resistance below 5.0 ohms?

Yes >> Replace the Recirculation Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

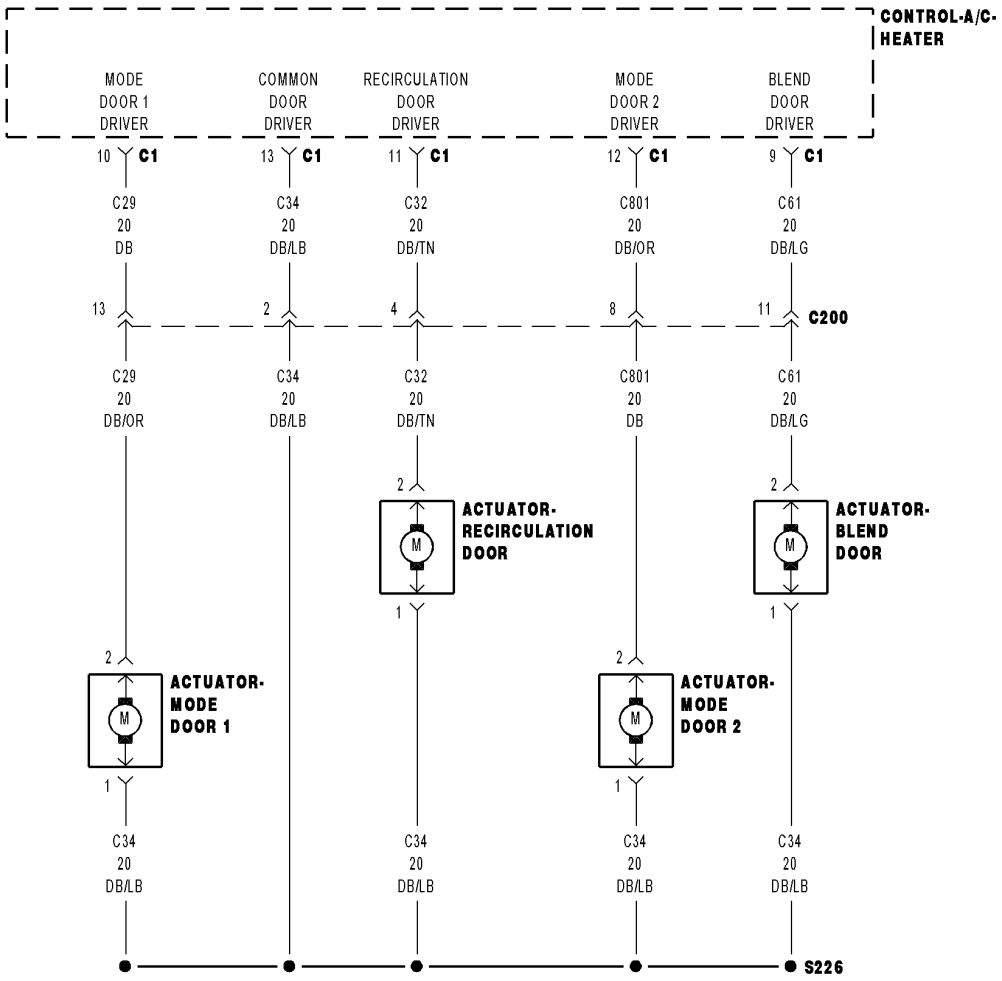
No >> Repair the (C34) Common Door Driver circuit for an open.

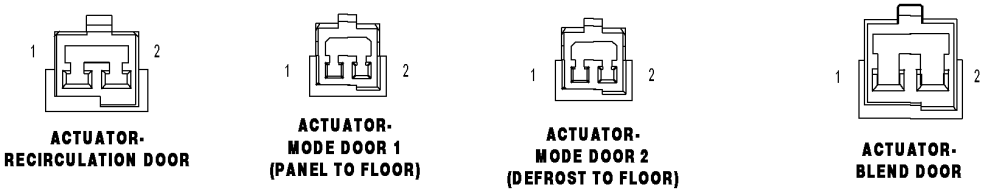
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

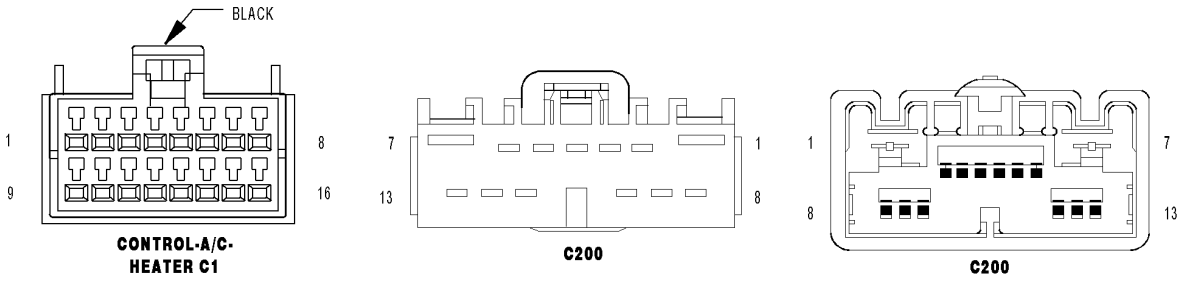


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B1061–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT OPEN (SINGLE-ZONE)







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For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The A/C Heater Control drives the Blend Door Actuator via the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 1 (Panel to Floor) Actuator via the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Mode Door 2 (Defrost to Floor) Actuator via the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit. The A/C Heater Control drives the Recirculation Door Actuator via the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit. All of the door actuators share the (C34) Common Door Driver circuit. Inside the A/C Heater Control, each door actuator has its own unique driver, but all share a single common door driver circuit. Due to the shared circuitry similar DTCs can set at the same time for multiple actuators depending upon the type of short, its location, and the direction the actuator is moving when the short is present.

- **When Monitored:**
  When the Actuator DTC Detection Test is executed.
- **Set Condition:**
  If the (C34) Common Door Driver circuit is open.

Possible Causes
(C34) COMMON DOOR DRIVER CIRCUIT OPEN
BLEND DOOR ACTUATOR
MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR
MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Diagnostic Test

1. CHECK BLEND DOOR ACTUATOR CIRCUIT RESISTANCE

Turn the ignition off.

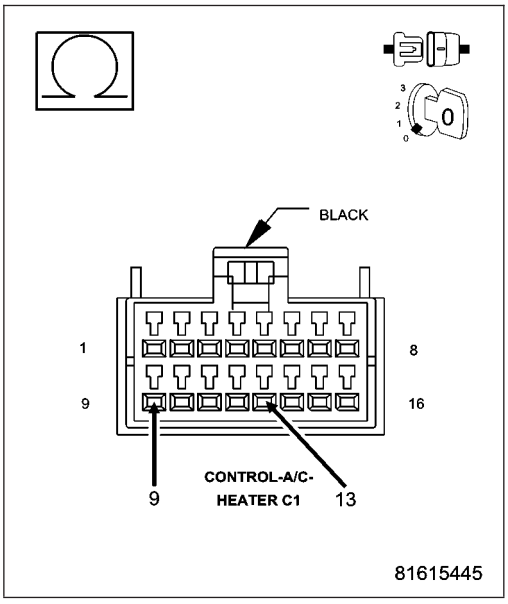
Disconnect the A/C Heater Control C1 harness connector.

Measure the resistance between the (C61) Blend Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 2

No >> Go To 6



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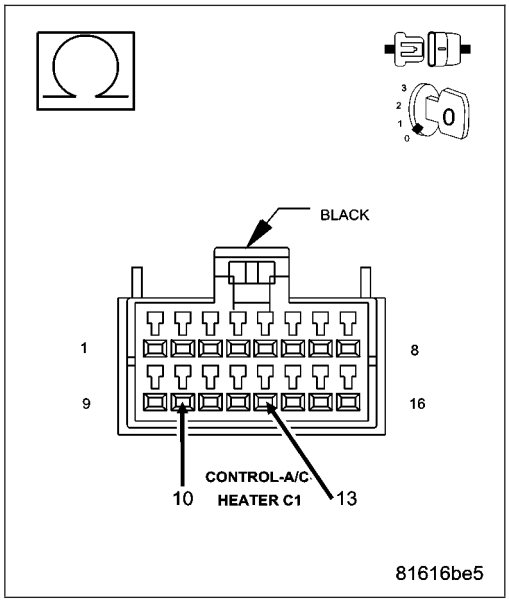
2. CHECK MODE DOOR 1 (PANEL TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C29) Mode Door 1 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 3

No >> Go To 7



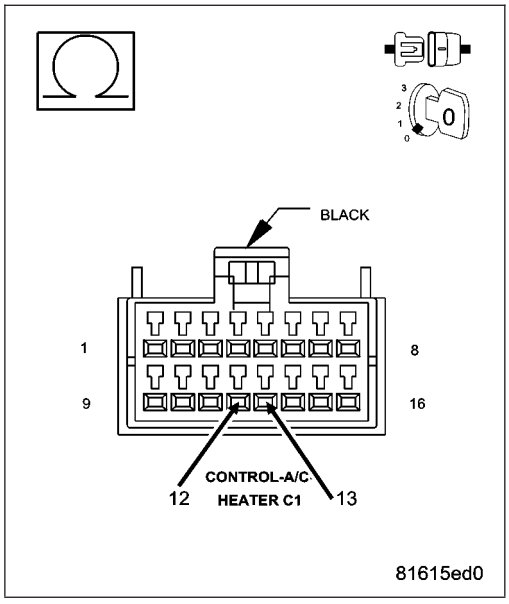
3. CHECK MODE DOOR 2 (DEFROST TO FLOOR) ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C801) Mode Door 2 Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 4

No >> Go To 8



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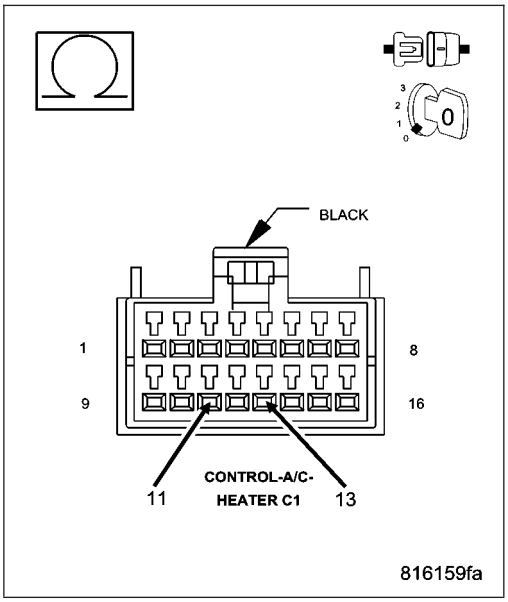
4. CHECK RECIRCULATION DOOR ACTUATOR CIRCUIT RESISTANCE

Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C34) Common Door Driver circuit in the A/C Heater Control C1 harness connector.

Is the resistance below 70 ohms?

Yes >> Go To 5

No >> Go To 9



5. RUN THE ACTUATOR DTC DETECTION TEST

Reconnect the A/C Heater Control C1 harness connector.

Turn the ignition on.

With the scan tool in HVAC, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool only display: B1061–CLIMATE CONTROL MOTOR(S) COMMON 1 CONTROL CIRCUIT OPEN?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No, Other DTC(s) Displayed

Diagnose and repair the other DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No, And No DTCs Displayed

Using the wiring diagram as a guide, inspect the wiring and connectors for conditions causing an intermittent short. Repair as necessary.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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6. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE BLEND DOOR ACTUATOR

Disconnect the Blend Door Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Blend Door Actuator harness connector.

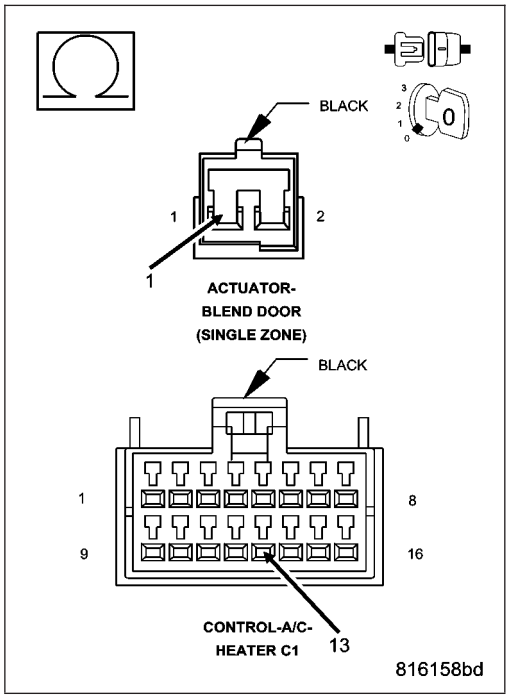
Is the resistance below 5.0 ohms?

Yes >> Replace the Blend Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



7. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE MODE DOOR 1 ACTUATOR

Disconnect the Mode Door 1 Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 1 (Panel to Floor) Actuator harness connector.

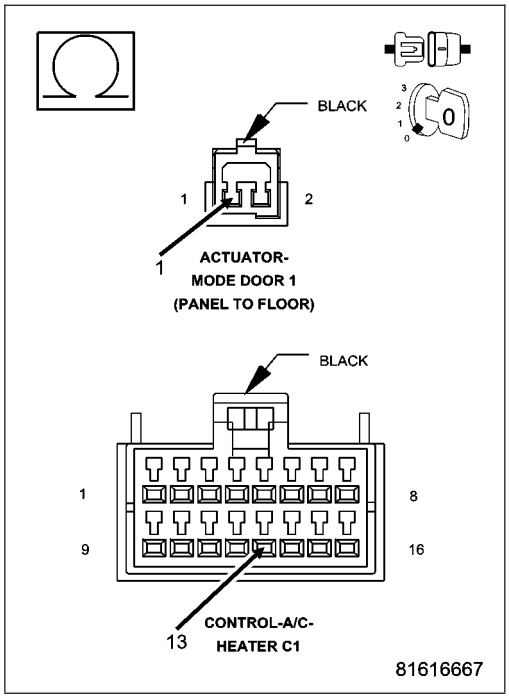
Is the resistance below 5.0 ohms?

Yes >> Replace the Mode Door 1 (Panel to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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8. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE MODE DOOR 2 ACTUATOR

Disconnect the Mode Door 2 Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door 2 (Defrost to Floor) Actuator harness connector.

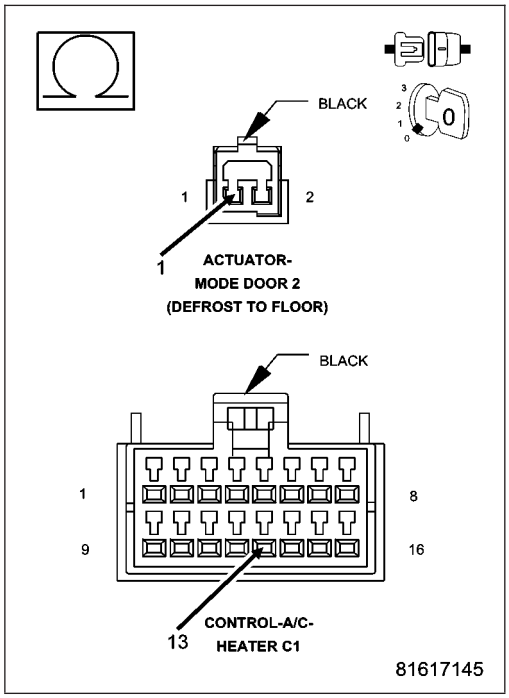
Is the resistance below 5.0 ohms?

Yes >> Replace the Mode Door 2 (Defrost to Floor) Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



9. CHECK (C34) COMMON DOOR DRIVER CIRCUIT FOR AN OPEN TO THE RECIRCULATION DOOR ACTUATOR

Disconnect the Recirculation Door Actuator harness connector.

Measure the resistance of the (C34) Common Door Driver circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

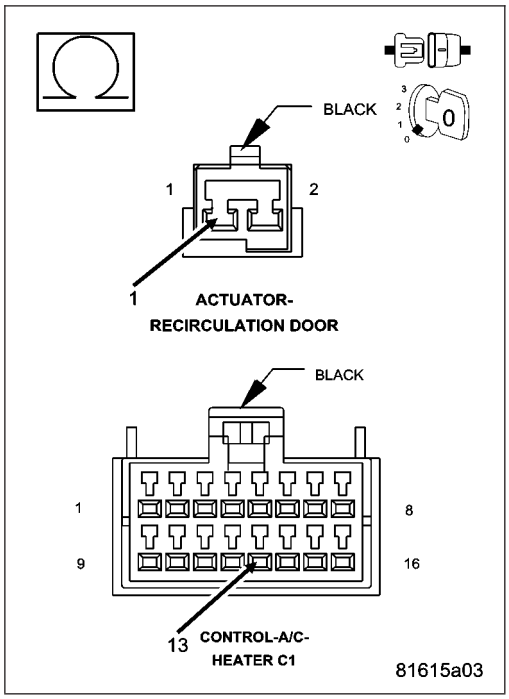
Is the resistance below 5.0 ohms?

Yes >> Replace the Recirculation Door Actuator in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (C34) Common Door Driver circuit for an open.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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B1079–CLIMATE CONTROL COOL DOWN TEST EXCESSIVE TIME (SINGLE-ZONE)

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The Cooldown Test checks A/C system performance based on Evaporator Temperature Sensor input. The main criteria is to lower evaporator temperature 11.11°C (20°F) within one minute. Before starting the test, the evaporator temperature must be above 13°C (55°F) and the front blower speed must be set to high speed. When the test is running, A/C Select and A/C Request will be on and the A/C status indicator will flash. When the test is complete, the scan tool will display one or more test status messages to indicate the outcome of the Cooldown Test. A Successful Cooldown – Test Passed status message indicates that the main test criteria was met. A DTC Set During Routine – Test Not Passed status message indicates that the A/C system is unable to lower the evaporator temperature 11.11°C (20°F) within one minute. A Conditions Too Cold – Test Not Run status message indicates that the evaporator temperature was below 13°C (55°F) when starting the Cooldown Test. A Blowers Not On High – Test Not Run status message indicates that either the front blower speed was not set to high speed prior to starting the Cooldown Test or the front blower speed was changed from high speed to another setting after starting the Cooldown test. A Refrigerant Temperature Sensor Error status message indicates that a fault occurred with the Evaporator Temperature Sensor/sensor circuits. A No Results Stored/Test Not Complete status message indicates that the power was cycled while the test was running.

- **When Monitored:**
  When the Cooldown Test is executed.
- **Set Condition:**
  If the A/C system is unable to lower the evaporator temperature 11.11°C (20°F) within one minute.

Possible Causes
OTHER HVAC SYSTEM FAULTS PRESENT
EVAPORATOR TEMPERATURE SENSOR CIRCUITS
EVAPORATOR TEMPERATURE SENSOR
TOTALLY INTEGRATED POWER MODULE (TIPM) FAULTS PRESENT
POWERTRAIN SYSTEM FAULTS PRESENT

Diagnostic Test

1. DIAGNOSE COOLDOWN TEST STATUS MESSAGES

Were any of the following status messages present after performing the Cooldown Test?

Yes, Conditions Too Cold - Test Not Run
If running, turn the A/C compressor off. Verify that the work area ambient temperature is above 15.6°C (60°F). If not, move the vehicle to a warmer work area. Verify that the evaporator temperature is above 13°C (55°F). If not, set the blower to high speed and allow the blower to run for five minutes. Then, run the Cooldown Test again.

Yes, Blowers Not On High - Test Not Run
Set the blower speed to high speed and then run the Cooldown Test again.

Yes, No Results Stored/Test Not Complete
Verify that power is not interrupted while rerunning the Cooldown Test.

No >> Go To 2

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2. CHECK FOR DTCs IN THE A/C HEATER CONTROL MODULE

Turn the ignition on.

With the scan tool, read HVAC DTCs.

Excluding B1079–Climate Control Cool Down Test Excessive Time, are any DTCs present in the A/C Heater Control Module?

Yes >> Diagnose and Repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms. Rerun the Cooldown Test after the repair is complete.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 3

3. CHECK FOR DTCs IN THE TIPM

With the scan tool, read TIPM DTCs.

Are any DTCs present in the TIPM?

Yes >> Diagnose and Repair the DTC(s). Rerun the Cooldown Test after the repair is complete.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 4

4. CHECK FOR DTCs IN THE PCM / ECM

With the scan tool, read PCM / ECM DTCs.

Are any DTCs present in the PCM / ECM?

Yes >> Diagnose and repair the DTC(s). (Refer to 9 - ENGINE - DIAGNOSIS AND TESTING) for the diagnostic procedures. Rerun the Cooldown Test after the repair is complete.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Refer to the Service Information for additional Cooldown Test related diagnostic information and testing procedures. Rerun the Cooldown Test after the repair is complete.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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B2214–(HVAC) CLIMATE CONTROL INTERNAL

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control has an internal fault. This DTC has a maturing time of 5 seconds and a de-maturing time of 10 seconds. If the DTC's status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
A/C HEATER CONTROL

NOTE: This DTC must be active for the results of this test to be valid. Do not perform this test if this DTC is stored. Refer to either HVAC System Test (ATC) or to HVAC System Test (MTC) for stored DTC test procedures.

Diagnostic Test

1. REPLACE THE A/C HEATER CONTROL

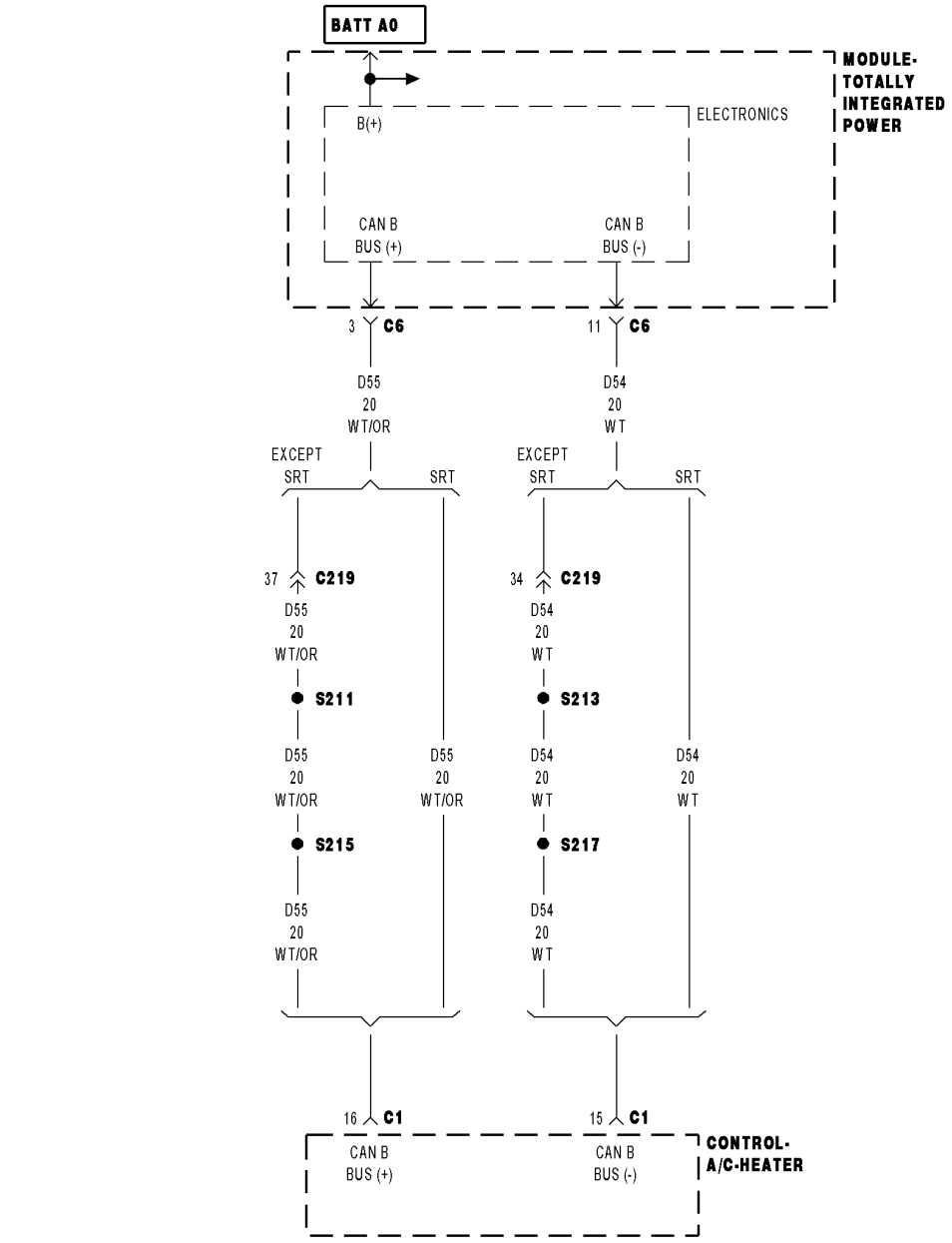
Repair

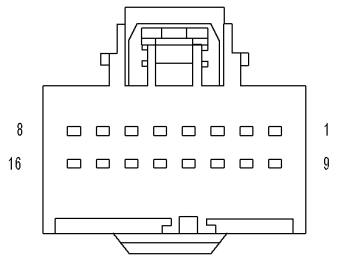
Replace the A/C Heater Control in accordance with the Service Information.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

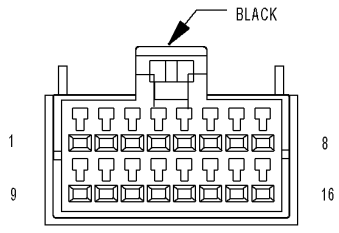
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U0019–CAN B BUS





MODULE-
TOTALLY
INTEGRATED
POWER C6



CONTROL-A/C-
HEATER C1

81614e2b

For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  Continuously
- **Set Condition:**
  If the CAN B Bus (+) or CAN B Bus (-) circuit is open, shorted to voltage, or shorted to ground.

Possible Causes
ACTIVE U0019 CAN B BUS DTC IN THE TOTALLY INTEGRATED POWER MODULE (TIPM)
(D55) CAN B BUS (+) CIRCUIT OPEN
(D54) CAN B BUS (-) CIRCUIT OPEN
A/C HEATER CONTROL

Diagnostic Test

1. VERIFY DTC U0019–CAN B BUS IS ACTIVE

Turn the ignition on.

With the scan tool, read HVAC DTCs.

Does the scan tool display active: U0019–CAN B BUS?

Yes >> Go To 2

No >> If the DTC is stored, check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, and partially broken wires. Also, inspect the related connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.

Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

2. CHECK FOR ACTIVE CAN B BUS RELATED DTCS IN THE TOTALLY INTEGRATED POWER MODULE (TIPM)

With the scan tool, read Totally Integrated Power Module (TIPM) DTCs.

Does the scan tool display any active CAN B BUS related DTCs?

Yes >> Diagnose and repair the DTC(s). (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING).

No >> Go To 3

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3. CHECK (D55) CAN B BUS (+) CIRCUIT FOR AN OPEN

Turn the ignition off.

Disconnect the negative battery cable.

Disconnect the A/C Heater Control C1 harness connector.

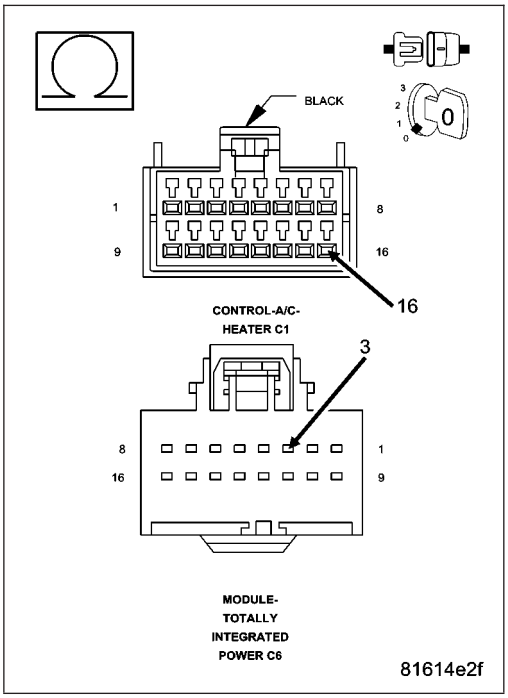
Disconnect the Totally Integrated Power Module (TIPM) C6 harness connector.

Measure the resistance of the (D55) CAN B Bus (+) circuit between the TIPM C6 harness connector and the A/C Heater Control C1 harness connector.

Is the resistance below 2.0 ohms?

Yes >> Go To 4

No >> Repair the (D55) CAN B Bus (+) circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



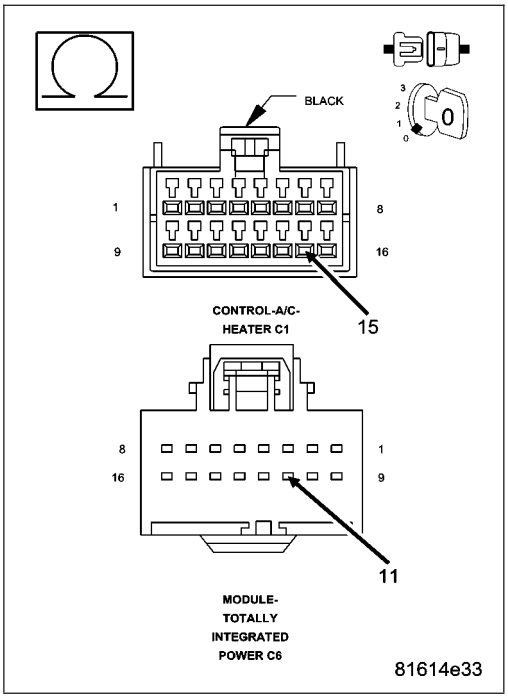
4. CHECK (D54) CAN B BUS (–) CIRCUIT FOR AN OPEN

Measure the resistance of the (D54) CAN B Bus (–) circuit between the TIPM C6 harness connector and the A/C Heater Control C1 harness connector.

Is the resistance below 2.0 ohms?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (D54) CAN B Bus (–) circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



U0141–LOST COMMUNICATION WITH FRONT CONTROL MODULE

For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Totally Integrated Power Module (TIPM).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0151–LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Occupant Restraint Controller (ORC).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0154–LOST COMMUNICATION WITH OCCUPANT CLASSIFICATION MODULE

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Occupant Classification Module (OCM).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0155–LOST COMMUNICATION WITH CLUSTER/CCN

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Cluster (CCN).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0156–LOST COMMUNICATION WITH EOM

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Compass Temperature Module (EOM).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0168–LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (SKREEM/WCM)

For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Vehicle Security Control Module (SKREEM/WCM).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0169–LOST COMMUNICATION WITH SUNROOF CONTROL MODULE

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Sunroof Control Module (SCM).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0184–LOST COMMUNICATION WITH RADIO

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Radio.

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0186–LOST COMMUNICATION WITH AUDIO AMPLIFIER

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Amplifier (AMP).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0195–LOST COMMUNICATION WITH SDARS

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Satellite Audio Receiver (SDARS).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0196–LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE

For a complete wiring diagram **Refer to Section 8W**.

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- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Vehicle Entertainment System (VES).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

U0197–LOST COMMUNICATION WITH HANDS FREE PHONE MODULE

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  With the ignition on.
- **Set Condition:**
  If the A/C Heater Control looses communication with the Hands Free Phone Module (HFM).

(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for the diagnostic test procedure.

DTC SET DURING ROUTINE - TEST NOT PASSED

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  When the Cooldown Test is executed.
- **Set Condition:**
  If the A/C system is unable to lower the evaporator temperature 11.11°C (20°F) within one minute.

For dual-zone HVAC systems, **refer to B10B2-A/C COOL DOWN TEST PERFORMANCE** for the diagnostic test procedure. For single-zone HVAC systems, **refer to B1079–CLIMATE CONTROL COOL DOWN TEST EXCESSIVE TIME** for the diagnostic test procedure.

BLOWERS NOT ON HIGH - TEST NOT RUN

For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  When the Cooldown Test is executed.
- **Set Condition:**
  If either the blower speed was not set to high speed prior to starting the Cooldown Test or the blower speed was changed from high speed to another setting after starting the Cooldown test.

For dual-zone HVAC systems, **refer to B10B2-A/C COOL DOWN TEST PERFORMANCE** for the diagnostic test procedure. For single-zone HVAC systems, **refer to B1079–CLIMATE CONTROL COOL DOWN TEST EXCESSIVE TIME** for the diagnostic test procedure.

REFRIGERANT TEMPERATURE SENSOR ERROR

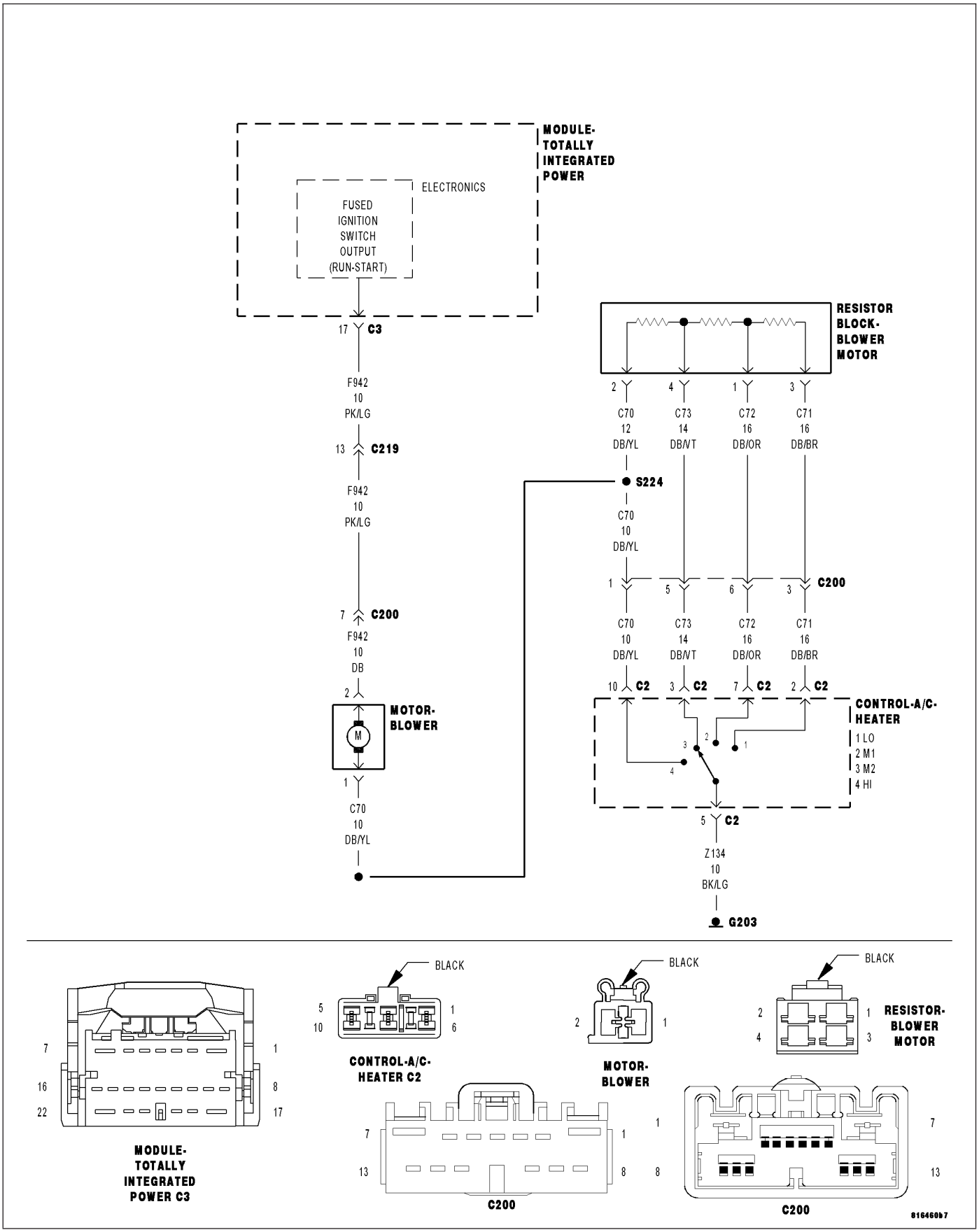
For a complete wiring diagram **Refer to Section 8W**.

- **When Monitored:**
  When the Cooldown Test is executed.
- **Set Condition:**
  If a fault occurred with the Evaporator Temperature Sensor/sensor circuits.

For dual-zone HVAC systems, **refer to B10B2-A/C COOL DOWN TEST PERFORMANCE** for the diagnostic test procedure. For single-zone HVAC systems, **refer to B1079–CLIMATE CONTROL COOL DOWN TEST EXCESSIVE TIME** for the diagnostic test procedure.

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*BLOWER MOTOR INOPERATIVE



For a complete wiring diagram **Refer to Section 8W**

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Possible Causes
(F942) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT OPEN
(C70) BLOWER MOTOR HIGH DRIVER CIRCUIT OPEN
(Z134) GROUND CIRCUIT OPEN
BLOWER MOTOR
A/C HEATER CONTROL
TIPM

Diagnostic Test

1. CHECK FOR DTCs IN THE TIPM

Turn the ignition on.

With the scan tool, read TIPM DTCs.

Does the scan tool display any DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in the applicable section for the diagnostic procedure.

No >> Go To 2

2. CHECK OUTPUT FROM THE TIPM ON THE (F942) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT

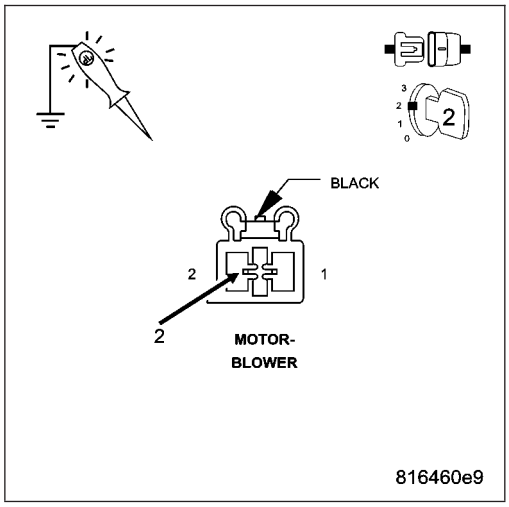
Turn the ignition off.

Disconnect the Blower Motor harness connector.

Turn the ignition on.

With a scan tool in TIPM, select Actuators, and actuate the Blower Motor.

Using the 12-volt test light connected to ground, probe the (F942) Fused Ignition Switch Output (Run-Start) circuit in the Blower Motor harness connector.



Does the test light illuminate brightly?

Yes >> Go To 3

No >> Go To 4

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3. CHECK (C70) BLOWER MOTOR HIGH DRIVER CIRCUIT & (Z134) GROUND CIRCUIT FUNCTION

Turn the ignition off.

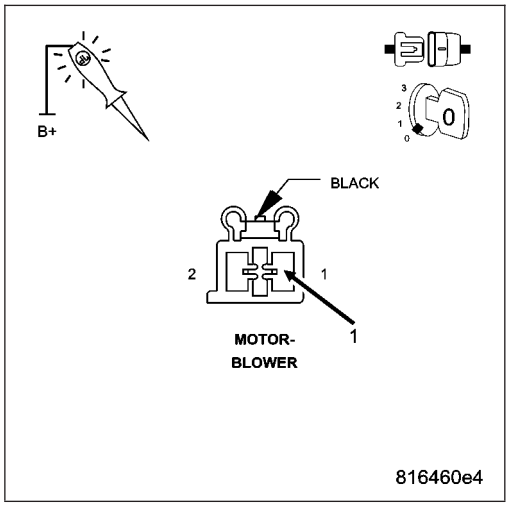
Turn the blower control on.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.
Using a 12-volt test light connected to 12 volts, probe the (C70) Blower Motor High Driver circuit in the Blower Motor harness connector.

Does the test light illuminate brightly?

Yes >> Replace the Blower Motor in accordance with the Service Information.
Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Go To 5



4. CHECK THE (F942) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUIT FOR AN OPEN

Turn the ignition off.

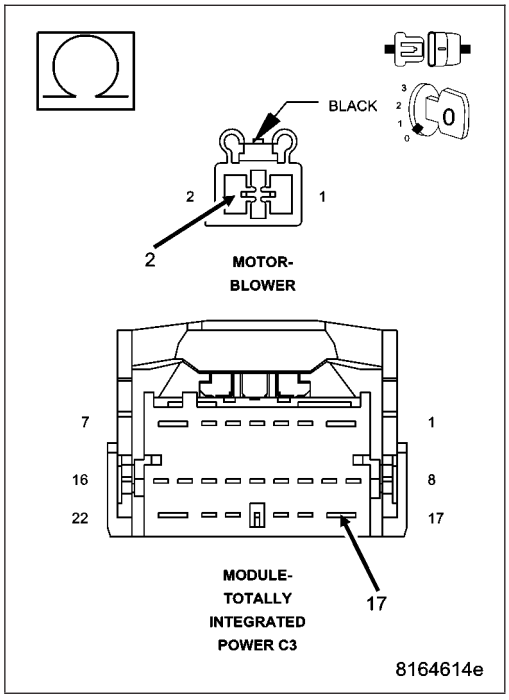
Disconnect the TIPM C3 harness connector.

Measure the resistance of the (F942) Fused Ignition Switch Output (Run-Start) circuit between the TIPM C3 harness connector and the Blower Motor harness connector.

Is the resistance below 5.0 ohms?

Yes >> Replace the TIPM in accordance with the Service Information.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

No >> Repair the (F942) Fused Ignition Switch Output (Run-Start) circuit for an open.
Perform BODY VERIFICATION TEST – VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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5. CHECK THE (C70) BLOWER MOTOR HIGH DRIVER CIRCUIT FOR AN OPEN

Disconnect the A/C Heater Control C2 harness connector.

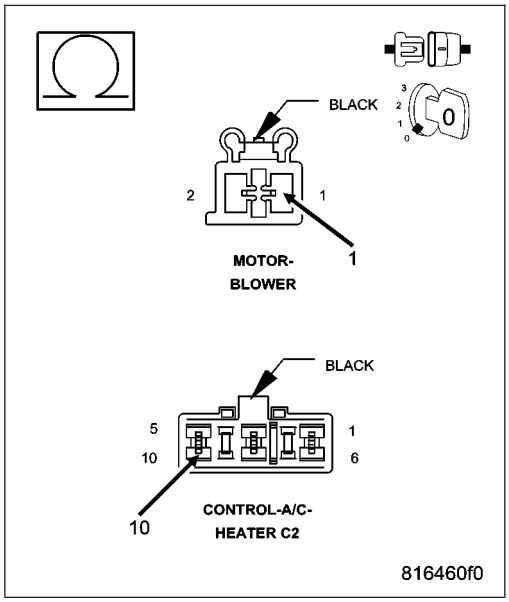
Measure the resistance of the (C70) Blower Motor High Driver circuit between the A/C Heater Control C2 harness connector and the Blower Motor harness connector.

Is the resistance below 5.0 ohms?

Yes >> Go To 6

No >> Repair the (C70) Blower Motor High Driver circuit for an open.

Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



6. CHECK THE (Z134) GROUND CIRCUIT FOR AN OPEN

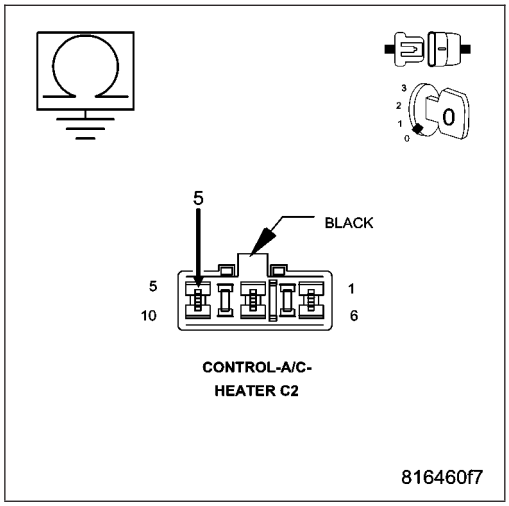
Measure the resistance of the (Z134) Ground circuit between ground and the A/C Heater Control C2 harness connector.

Is the resistance below 5.0 ohms?

Yes >> Replace the A/C Heater Control in accordance with the Service Information.

No >> Repair the (Z134) Ground circuit for an open.

Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).



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*HVAC SYSTEM TEST

For a complete wiring diagram **Refer to Section 8W**.

Theory of Operation

The HVAC System Test provides a starting point in the diagnostic process by identifying the appropriate diagnostic procedure or system test to perform when diagnosing a given symptom, condition, or DTC. It also provides a means for testing the entire HVAC system by utilizing the A/C-heater control's On-Board System Tests. The On-Board System Tests can also assist in diagnosing stored DTCs. (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING) for additional information about on-board diagnostics.

Diagnostic Test

1. HVAC SYSTEM TEST

NOTE: Diagnose and repair all active DTCs before diagnosing and repairing stored DTCs.

Make a selection based on the symptom, condition, or DTC that you want to diagnose.

For Any Active DTC
Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Scan Tool Indicates HVAC Not Active On Bus
(Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - DIAGNOSIS AND TESTING) for no response related diagnostic procedures.

Blower Motor Inoperative
Refer to *Blower Motor Inoperative in this Section.

Complete HVAC System Test
Go To 2

A/C System Performance Test
Go To 2

Mode Switch & Door Actuator Ckt Test
Go To 3

Actuator DTC Detection Test
Go To 4

Actuator Calibration Test
Go To 5

2. A/C SYSTEM PERFORMANCE TEST

NOTE: The following are prerequisites of the Cooldown Test. Verify each of the following before running the test:

- **If active, diagnose and repair Evaporator Temperature Sensor related DTCs before proceeding. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.**
- **Verify that the refrigerant system has an adequate charge. Check and repair as necessary before proceeding. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - DIAGNOSIS AND TESTING).**
- **Verify that the blower motor operates correctly in all speeds. Diagnose and repair all blower related faults before proceeding.**
- **Verify that the work area ambient temperature is above 15.6°C (60°F) before proceeding. Move the vehicle to a warmer work area if necessary.**
- **Verify that the evaporator temperature is above 13°C (55°F) before proceeding.**
- **Verify that the Mode Select control is set to the panel position.**
- **Verify that the A/C compressor is not running. If the compressor is running, turn the A/C off and allow the evaporator to warm up before proceeding.**

NOTE: Running the AC Cooldown test will cause the A/C status indicator to flash.

NOTE: One or more status messages will display on the scan tool after running the Cooldown Test. These messages will clear after paging back out of this test function. Therefore, it is important to note all messages before doing so.

Start the engine.

Turn the Blower control to the high speed position.

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With the scan tool in HVAC, select System Tests and then select Cooldown test. Allow the test to run to completion.

Does the scan tool display a status message that indicates a fault has occurred?

Yes, Conditions Too Cold - Test Not Run
If running, turn the A/C compressor off. Verify that the work area ambient temperature is above 15.6°C (60°F). If not, move the vehicle to a warmer work area. Verify that the evaporator temperature is above 13°C (55°F). If not, set the blower to high speed and allow the blower to run for five minutes. Then, run the Cooldown Test again.

Yes, Blowers Not On High - Test Not Run
Set the blower speed to high speed and then run the Cooldown Test again.

Yes, No Results Stored/Test Not Complete
Verify that power is not interrupted while rerunning the Cooldown Test.

Yes, Refrigerant Temperature Sensor Error
For Dual-Zone HVAC systems, refer to B10B2–A/C COOL DOWN TEST PERFORMANCE for the diagnostic test procedure. For Single-Zone HVAC systems, refer to B1079–CLIMATE CONTROL COOL DOWN TEST EXCESSIVE TIME for the diagnostic test procedure.

Yes, DTC Set During Routine - Test Not Passed
For Dual-Zone HVAC systems, refer to B10B2–A/C COOL DOWN TEST PERFORMANCE for the diagnostic test procedure. For Single-Zone HVAC systems, refer to B1079–CLIMATE CONTROL COOL DOWN TEST EXCESSIVE TIME for the diagnostic test procedure.

No >> As necessary, either Go To 3, 4, or 5, or Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

3. MODE SWITCH & DOOR ACTUATOR CIRCUIT TEST

NOTE: If at anytime a DTC becomes active during this test, proceed to the conclusion question.

NOTE: If multiple DTCs are active, diagnose those that relate to a short circuit first.

NOTE: Dual-Zone A/C Heater Controls do not set DTCs for stuck mode switches. Therefore, verify that the A/C Heater Control is not damaged and that the mode switches and status indicators function properly and repair as necessary before proceeding.

If not done so previously, start the engine.

Turn the Blower control to the low speed position.

Set the Blend control (single-zone) or Driver Blend control (dual-zone) to the full cold position.

If equipped, set the Passenger Blend control to the full cold position.

Monitor the scan tool for active HVAC DTCs while performing the following test steps.

If equipped, press the A/C mode switch on, wait 30 seconds, and then press it off.

On Dual-Zone systems, press the Recirc mode switch on, wait 30 seconds, and then press it off.

If equipped, press the EBL mode switch on, wait 30 seconds, and then press it off.

Move the Blend control (single-zone) or Driver Blend control (dual-zone) from full cold to full hot, wait 30 seconds, and then move it back to full cold.

If equipped, move the Passenger Blend control from full cold to full hot, wait 30 seconds, and then moved it back to full cold.

Turn the Mode select control to the defrost position, wait 30 seconds, and then turn it to the panel position (dual-zone) or panel / recirc position (single-zone). Wait 30 seconds before proceeding.

Does the scan tool display any active DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> If you are here due to a stored DTC, it is possible that a technician may not have erased the DTC following a repair. If possible, verify if the vehicle was recently in for this type of service. Otherwise, either Go To 4 or 5, or visually inspect the related wiring harness for chafed, pierced, pinched, and partially broken wires and the wiring harness connectors for broken, bent, pushed out, and corroded terminals, and repair as necessary.

Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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4. ACTUATOR DTC DETECTION TEST

NOTE: The Actuator DTC Detection Test clears all door actuator related DTCs when the test is actuated.
If not done so previously, start the engine.

With the scan tool, select System Tests and then select Actuator DTC Detection. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes, Dual-Zone
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

Yes, Single-Zone
Diagnose and repair the DTC(s). If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high DTCs and then all short low DTCs. Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> If you are here due to a stored DTC, it is possible that a technician may not have erased the DTC following a repair. If possible, verify if the vehicle was recently in for this type of service. Otherwise, either Go To 5 or visually inspect the related wiring harness for chafed, pierced, pinched, and partially broken wires and the wiring harness connectors for broken, bent, pushed out, and corroded terminals, and repair as necessary.

Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

5. ACTUATOR CALIBRATION TEST

NOTE: For vehicles equipped with EBL, running the HVAC Door Recalibration will cause the EBL status indicator to flash.

NOTE: The Actuator Calibration Test clears all door actuator related DTCs when the test is actuated.
If not done so previously, start the engine.

With the scan tool, select System Tests and then select Actuator Calibration Test. When the test is complete, select View DTCs.

Does the scan tool display any DTCs?

Yes >> Diagnose and repair the DTC(s). Refer to the Table of Contents in this Section for a complete list of HVAC related symptoms.

No >> No problem found. However, if you are here due to a stored DTC, it is possible that a technician may not have erased the DTC following a repair. If possible, verify if the vehicle was recently in for this type of service. Otherwise, visually inspect the related wiring harness for chafed, pierced, pinched, and partially broken wires and the wiring harness connectors for broken, bent, pushed out, and corroded terminals, and repair as necessary.

Perform BODY VERIFICATION TEST - VER 1. (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES - STANDARD PROCEDURE).

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HVAC - SERVICE INFORMATION

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HVAC - SERVICE INFORMATION

DESCRIPTION

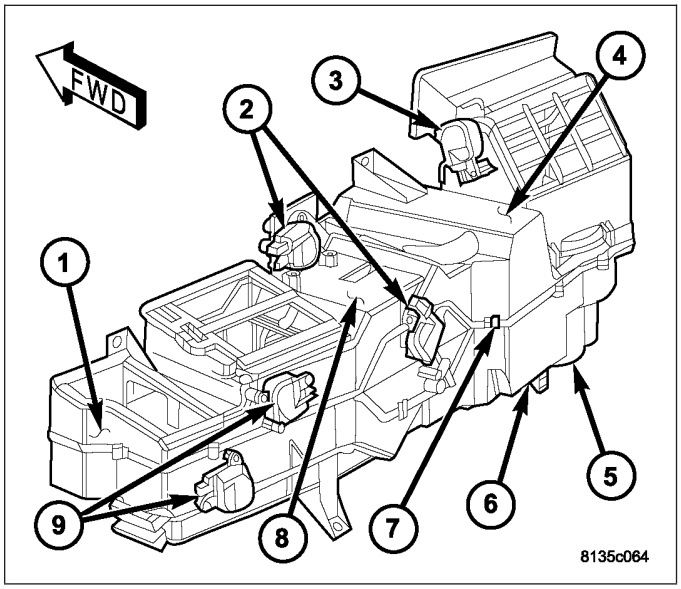
A manually controlled single zone type heating-air conditioning system or a manually controlled dual zone type heating-air conditioning system is available on this model.

To maintain the performance level of the heating, ventilation and air conditioning (HVAC) system, the engine cooling system must be properly maintained. The use of a bug screen is not recommended. Any obstructions in front of the radiator or A/C condenser will reduce the performance of the A/C and engine cooling systems.

The engine cooling system includes the radiator, thermostat, radiator hoses and the engine coolant pump. Refer to 7 - Cooling for more information before opening or attempting any service to the engine cooling system.

All vehicles are equipped with a common heater, ventilation and air conditioning (HVAC) housing (1). The system combines air conditioning, heating, and ventilating capabilities in a single unit housing mounted within the passenger compartment under the instrument panel. The HVAC housing includes:

- Blend-air door(s) and actuator(s) (2)
- Recirculation-air door and actuator (3)
- A/C evaporator (4)
- Blower motor (5)
- Blower motor resistor (6)
- Evaporator temperature sensor (7)
- Heater core (8)
- Mode-air doors and actuators (9)



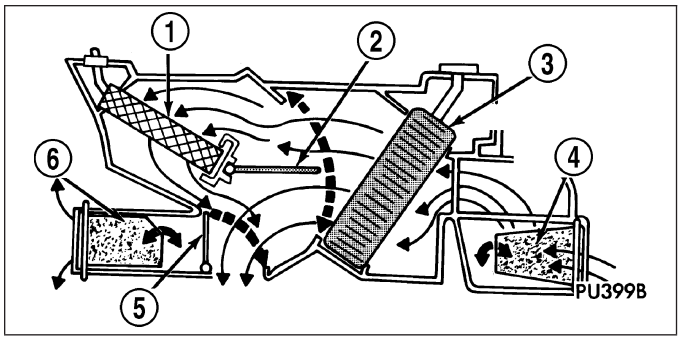
Based upon the system and mode selected, conditioned air can exit the HVAC housing through one or a combination of the three main housing outlets: defrost, panel or floor. The defrost and the panel outlets are located on the top of the housing and, the floor outlet is located on the bottom of the housing. Once the conditioned air exits the HVAC housing, it is further directed through molded plastic ducts to the various outlets within the vehicle interior. These outlets and their locations are as follows:

- **Defroster Outlet** - A single large defroster outlet is located in the center of the instrument panel top cover, near the base of the windshield.
- **Side Window Demister Outlets** - There are two side window demister outlets, one is located at each outboard end of the instrument panel top cover, near the belt line at the A-pillars.
- **Panel Outlets** - There are four panel outlets in the instrument panel, one located near each outboard end of the instrument panel facing the rear of the vehicle and two located near the top of the instrument panel center bezel.
- **Front Floor Outlets** - There are two front floor outlets, one located above each side of the floor panel center tunnel near the dash panel.
- **Rear Outlets** - On Mega Cab models there are two outlets located at the rear of the center front seat.

OPERATION

Both the manual temperature control (MTC) single zone and dual zone heating-A/C system are blend-air type systems. In a blend-air heating-A/C, a blend-air door controls the amount of conditioned air that is allowed to flow through, or around, the heater core. In the available dual zone system, two blend-air doors are used to provide completely independent side-to-side temperature control of the discharge air. The temperature control(s) determines the discharge air temperature(s) by operating the blend door actuator(s), which move the blend-air door(s). This design allows almost immediate control of output air temperature(s).

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The heating-A/C systems pulls outside (ambient) air through the cowl opening at the base of the windshield, then into the air inlet housing above the heating, ventilation and air conditioning (HVAC) housing. On models equipped with A/C, the air passes through the A/C evaporator (3). Air flow can be directed either through or around the heater core (1). This is done by adjusting the blend-air door(s) (2) with the temperature control(s) located on the A/C-heater control in the instrument panel. The air flow can then be directed from the panel, floor and defrost outlets in various combinations using the mode control located on the A/C-heater control. Air flow velocity can be adjusted with the blower speed control located on the A/C-heater control.

On all models, the outside air intake can be shut off by selecting the Recirculation Mode with the mode control. This will operate a electrically actuated recirculation-air door (4) that closes off the fresh air intake and recirculates the air that is already inside the vehicle.

On models with A/C, the A/C compressor can be engaged in any mode by pressing the snowflake, A/C on/off button. It can also be engaged by placing the mode control in the mix to defrost positions. This will remove heat and humidity from the air before it is directed through or around the heater core. The mode control on the A/C-heater control is used to also direct the conditioned air to the selected system outlets. The mode control uses electric actuators to control the mode-air doors (5 and 6).

The defroster outlet receives airflow from the HVAC housing through the molded plastic defroster duct, which connects to the HVAC housing defroster outlet. The airflow from the defroster outlets is directed by fixed vanes in the defroster outlet grilles and cannot be adjusted. The defroster outlet grilles are integral to the instrument panel top cover.

The side window demister outlets receive airflow from the HVAC housing through the molded plastic defroster duct and two molded plastic demister ducts. The airflow from the side window demister outlets is directed by fixed vanes in the demister outlet grilles and cannot be adjusted. The side window demister outlet grilles are integral to the instrument panel. The demisters direct air from the HVAC housing through the outlets located on the top corners of the instrument panel. The demisters operate when the mode control knob is positioned in the floor-defrost and defrost-only settings. Some air may be noticeable from the demister outlets when the mode control is in the bi-level to floor positions.

The panel outlets receive airflow from the HVAC housing through a molded plastic main panel duct, center panel duct and two end panel ducts. The two end panel ducts direct airflow to the left and right instrument panel outlets, while the center panel duct directs airflow to the two center panel outlets. Each of these outlets can be individually adjusted to direct the flow of air.

The floor outlets receive airflow from the HVAC housing through the floor distribution duct. The front floor outlets are integral to the molded plastic floor distribution duct, which is secured to the bottom of the housing. The floor outlets cannot be adjusted.

NOTE: It is important to keep the air intake opening clear of debris. Leaf particles and other debris that is small enough to pass through the cowl opening screen can accumulate within the HVAC housing. The closed, warm, damp and dark environment created within the housing is ideal for the growth of certain molds, mildews and other fungi. Any accumulation of decaying plant matter provides an additional food source for fungal spores, which enter the housing with the fresh intake-air. Excess debris, as well as objectionable odors created by decaying plant matter and growing fungi can be discharged into the passenger compartment during heater-A/C operation if the air intake opening is not kept clear of debris.

The A/C system on models so equipped is designed for the use of non-CFC, R-134a refrigerant and uses an A/C fixed orifice tube located in the liquid line to meter the flow of refrigerant to the A/C evaporator. The A/C evaporator cools and dehumidifies the incoming air prior to blending it with the heated air. To maintain minimum evaporator temperature and prevent evaporator freezing, an evaporator temperature sensor is used to supply evaporator temperature input to the A/C-heater control. The powertrain control module (PCM) cycles the A/C compressor clutch off and on as necessary to protect the A/C system from evaporator freezing and optimize A/C system performance.

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DIAGNOSIS AND TESTING

HEATING-A/C SYSTEM DIAGNOSTICS

CAUTION: Do not exchange A/C Heater Controls from vehicle to vehicle. Software versions differ between models and model years. Installing an A/C Heater Control with software that is incompatible for a given vehicle can result in either improper or failed HVAC system operation.

ON-BOARD DIAGNOSTICS

The A/C-heater control communicates on the controller area network (CAN) B bus and is fully addressable with a scan tool.

The A/C-heater control's primary means of fault detection is through active and stored diagnostic trouble codes (DTCs). Active DTCs are those which currently exist in the system. The condition causing the fault must be repaired in order to clear this type of DTC. Stored DTCs are those which occurred in the system since the A/C-heater control received the last clear diagnostic info message. DTCs must be read with a scan tool. Refer to 24 - HVAC - Electrical Diagnostics for HVAC DTC diagnostic test procedures.

The A/C-heater control's secondary means of fault detection is through system tests. These tests include the HVAC System Test, the A/C Cooldown Test, Actuator Calibration, and Actuator DTC Detection. Refer to System Tests in this Section for a detailed description of each test.

SYSTEM TESTS

HVAC System Test

The HVAC System Test, found in 24 - HVAC - Electrical Diagnostics, provides a starting point in the diagnostic process by identifying the appropriate diagnostic procedure or system test to perform when diagnosing a given symptom, condition, or DTC. It also provides a means for testing the entire HVAC system by utilizing the A/C-heater control's On-Board System Tests. The On-Board System Tests can also assist in diagnosing stored DTCs.

A/C COOLDOWN TEST

The A/C Cooldown Test:

- is actuated with a scan tool.
- tests A/C system performance based on evaporator temperature sensor input.
- will fail if evaporator temperature is below 13°C (55°F) when initiating the test.
- will pass if the evaporator temperature drops 11°C (20°F).
- indicates an outcome by displaying one or more test status messages on the scan tool. These test status messages will clear after paging back out of this test function. Therefore, is it important to note all of the messages before doing so.
- will cause the A/C status indicator to flash while the test is running.

ACTUATOR CALIBRATION FUNCTION

The Actuator Calibration function:

- is actuated with a scan tool.
- clears all actuator related DTCs when the test is actuated.
- homes and repositions door actuators.
- monitors for door span faults. Door span faults (XXX Door Travel Range Too Large or XXX Door Travel Range Too Small) will only display after calibration.
- will cause the electric backlight (EBL) status indicator (if equipped) to flash while the test is running.

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ACTUATOR DTC DETECTION TEST — DUAL-ZONE

The Actuator DTC Detection Test:

- is actuated with a scan tool.
- clears all actuator related DTCs when the test is actuated.
- supplements the continuous diagnostics on the actuator drive system.
- monitors for shorted actuator circuits allowing service to easily diagnose and troubleshoot up to three simultaneous shorts. Shorted actuator circuit faults (XXX Control Circuit High or XXX Control Circuit Low) will only display after running the Actuator DTC Detection Test.

After repairing each DTC, cycle the ignition switch, and then run the Actuator DTC Detection Test again to ensure that no new DTCs exist. If multiple DTCs are present, beginning with the passenger blend door, diagnose and repair all short high faults and then short low faults. When the test returns passed, clear all faults and run the Actuator Calibration function as a final check of system health.

ACTUATOR DTC DETECTION TEST — SINGLE-ZONE

The Actuator DTC Detection Test:

- is actuated with a scan tool.
- clears all actuator related DTCs when the test is actuated.
- supplements the continuous diagnostics on the actuator drive system.
- monitors for shorted actuator circuits allowing service to easily diagnose and troubleshoot up to three simultaneous shorts. Shorted actuator circuit faults (XXX Control Circuit High or XXX Control Circuit Low) will only display after running the Actuator DTC Detection Test.

After repairing each DTC, cycle the ignition switch, and then run the Actuator DTC Detection Test again to ensure that no new DTCs exist. If multiple DTCs are present, beginning with the common circuit, diagnose and repair all short high faults and then short low faults. When the test returns passed, clear all faults and run the Actuator Calibration function as a final check of system health.

A/C PERFORMANCE

The A/C system is designed to provide the passenger compartment with low temperature and low humidity air. The A/C evaporator, located in the HVAC housing is cooled to temperatures near the freezing point. As warm damp air passes over the fins of the A/C evaporator, the air transfers its heat to the refrigerant in the evaporator coils and the moisture in the air condenses on the evaporator fins. During periods of high heat and humidity, an A/C system will be more effective in the Recirculation mode (max-A/C). With the system in the Recirculation mode, only air from the passenger compartment passes through the A/C evaporator. As the passenger compartment air dehumidifies, the A/C system performance levels rise.

Humidity has an important bearing on the temperature of the air delivered to the interior of the vehicle. It is important to understand the effect that humidity has on the performance of the A/C system. When humidity is high, the A/C evaporator has to perform a double duty. It must lower the air temperature, and it must lower the temperature of the moisture in the air that condenses on the evaporator fins. Condensing the moisture in the air transfers heat energy into the evaporator fins and coils. This reduces the amount of heat the A/C evaporator can absorb from the air. High humidity greatly reduces the ability of the A/C evaporator to lower the temperature of the air.

However, evaporator capacity used to reduce the amount of moisture in the air is not wasted. Wringing some of the moisture out of the air entering the vehicle adds to the comfort of the passengers. Although, an owner may expect too much from their A/C system on humid days. A performance test is the best way to determine whether the system is performing up to design standards. This test also provides valuable clues as to the possible cause of trouble with the A/C system. The ambient air temperature in the location where the vehicle will be tested must be a minimum of 21° C (70° F) for this test.

A/C PERFORMANCE TEST

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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NOTE: When connecting the service equipment coupling to the line fitting, verify that the valve of the coupling is fully closed. This will reduce the amount of effort required to make the connection.

NOTE: The work area ambient temperature must be above 21° C (70° F) and the evaporator temperature must be above 13° C (55° F) prior to conducting the A/C Performance Test.

1. Conduct the A/C System Performance Test (Cooldown Test) found within the HVAC System Test (refer to 24 - HVAC Electrical Diagnostics). If no diagnostic trouble codes (DTCs) are found in the A/C-heater control, powertrain control module (PCM) or engine control module (ECM) (depending on engine application), gateway module or the totally integrated power module (TIPM), go to Step 2. If any DTCs are found, repair as required, then proceed to Step 2.
2. Connect a tachometer and a manifold gauge set or an A/C recycling/charging station.
3. Operate the heating-A/C system under the following conditions.
   - Engine at 1,000 rpm at operating temperature
   - Door or windows open
   - Transmission in Park or Neutral with parking brake set (depending on application)
   - A/C-heater controls set to Recirculation mode (max-A/C), full cool, panel mode, high blower and with A/C compressor engaged. If the A/C compressor does not engage, see the A/C System Diagnosis chart.
4. Insert a thermometer in the driver side center panel air outlet and operate the A/C system until the thermometer temperature stabilizes.
5. With the A/C compressor clutch engaged, compare the air temperature at the center panel outlet and the A/C compressor discharge pressure (high side) to the A/C Performance Temperature and Pressure chart. The compressor clutch may cycle, depending upon the ambient temperature and humidity. If the clutch cycles, use the readings obtained before the clutch disengaged.

A/C PERFORMANCE TEMPERATURE AND PRESSURE

Ambient Air Temperature	21° C (70° F)	27° C (80° F)	32° C (90° F)	38° C (100° F)	43° C (110° F)
Air Temperature at Center Panel Outlet	7° C (45° F)	7° C (45° F)	13° C (55° F)	13° C (55° F)	18° C (64° F)
Compressor Inlet Pressure at Service Port (low Side)	138 to 207 kPa (20 to 30 psi)	172 to 241 kPa (25 to 35 psi)	207 to 276 kPa (30 to 40 psi)	241 to 310 kPa (35 to 45 psi)	276 to 345 kPa (40 to 50 psi)
Compressor Discharge Pressure at Service Port (High Side)	1034 to 1724 kPa (150 to 250 psi)	1379 to 2068 kPa (200 to 300 psi)	1724 to 2413 kPa (250 to 350 psi)	1999 to 2689 kPa (290 to 390 psi)	2413 to 2965 kPa (350 to 430 psi)

6. If the air outlet temperature fails to meet the specifications in the A/C Performance Temperature and Pressure chart, or if the A/C compressor discharge pressure is high, refer to the A/C System Diagnosis chart.

A/C SYSTEM DIAGNOSIS

Condition	Possible Causes	Correction
Constant compressor engagement and warm air from passenger vents.	1. Low refrigerant system charge.	1. See Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
Equal pressures, but the compressor clutch does not engage.	1. No refrigerant in the refrigerant system.	1. See Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.

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Condition	Possible Causes	Correction
	2. Faulty fuse.	2. Check the fuse in the junction block. Repair the shorted circuit or component and replace the fuse, if required.
	3. Faulty A/C compressor clutch field coil.	3. See A/C Compressor Clutch Field Coil in this group. Test the compressor clutch field coil and replace, if required.
	4. Improperly installed or faulty Evaporator Temperature Sensor.	4. See Evaporator Temperature Sensor in this group. Correctly install or replace the sensor as required.
	5. Faulty A/C pressure transducer.	5. See A/C pressure transducer in this group. Test the transducer and replace, if required.
	6. Faulty A/C-heater control, totally integrated power module (TIPM), gateway module or PCM/ECM.	6. Refer to the appropriate Electrical Diagnostic Procedures for testing of the A/C-heater control, TIPM, gateway module or PCM/ECM. Test the module and replace, if required.
Normal pressures, but A/C Performance Test air temperatures at center panel outlet are too high.	1. Excessive refrigerant oil in system.	1. See Refrigerant Oil Level in this group. Recover the refrigerant from the refrigerant system and inspect the refrigerant oil content. Restore the refrigerant oil to the proper level, if required.
	2. Blend door inoperative or sealing improperly.	2. See Blend Door in this group. Inspect the blend door for proper operation and sealing and correct, if required.
	3. Blend door actuator faulty or inoperative.	3. Perform blend door actuator diagnosis, replace if faulty.
The low side pressure is normal or slightly low, and the high side pressure is too low.	1. Low refrigerant system charge.	1. See Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	2. Refrigerant flow through the accumulator is restricted.	2. See Accumulator in this group. Replace the restricted accumulator, if required.
	3. Refrigerant flow through the evaporator coil is restricted.	3. See A/C Evaporator in this group. Replace the restricted evaporator coil, if required.
	4. Faulty compressor.	4. See A/C Compressor in this group. Replace the compressor, if required.
The low side pressure is normal or slightly high, and the high side pressure is too high.	1. Condenser air flow restricted.	1. Check the A/C condenser for damaged fins, foreign objects obstructing air flow through the condenser fins, and missing or improperly installed air seals. Refer to Cooling for more information on air seals. Clean, repair, or replace components as required.
	2. Inoperative cooling fan.	2. Refer to Cooling for more information. Test the cooling fan and replace, if required.
	3. Refrigerant system overcharged.	3. See Refrigerant System Charge in this group. Recover the refrigerant from the refrigerant system. Charge the refrigerant system to the proper level, if required.
	4. Air in the refrigerant system.	4. See Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.

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Condition	Possible Causes	Correction
	5. Engine overheating.	5. Refer to Cooling for more information. Test the cooling system and repair, if required.
The low side pressure is too high, and the high side pressure is too low.	1. Accessory drive belt slipping.	1. Refer to Cooling for more information. Inspect the accessory drive belt condition and tension. Tighten or replace the accessory drive belt, if required.
	2. Fixed orifice tube not installed.	2. See A/C Orifice Tube in this group. Replace the liquid line, if required.
	3. Faulty A/C compressor.	3. See A/C Compressor in this group. Replace the compressor, if required.
The low side pressure is too low, and the high side pressure is too high.	1. Restricted refrigerant flow through the refrigerant lines.	1. See Liquid, Suction, and Discharge Line in this group. Inspect the refrigerant lines for kinks, tight bends or improper routing. Correct the routing or replace the refrigerant line, if required.
	2. Restricted refrigerant flow through the fixed orifice tube.	2. See A/C Orifice Tube in this group. Replace the liquid line, if required.
	3. Restricted refrigerant flow through the condenser.	3. See A/C Condenser in this group. Replace the restricted condenser, if required.

HEATER PERFORMANCE

Before performing the following tests, refer to Group 7 - Cooling for the procedures to check the engine coolant level and flow, engine coolant reserve/recovery system operation, accessory drive belt condition and tension, radiator air flow and the fan drive operation. Perform the HVAC System Test (refer to 24 - HVAC Electrical Diagnostics). If any diagnostic trouble codes (DTCs) are found in the A/C-heater control, powertrain control module (PCM) or engine control module (ECM) (depending on engine application), gateway module or totally integrated power module (TIPM), repair as necessary.

MAXIMUM HEATER OUTPUT: TEST AND ACTION

Engine coolant is provided to the heater system through two heater hoses. With the engine idling at normal operating temperature, set the temperature control to maximum heat position, the mode control to the floor position, and the blower motor control to the highest speed position. Using a test thermometer, check the temperature of the air being discharged from the floor outlets. Compare the test thermometer reading to the Heater Temperature Reference chart.

HEATER TEMPERATURE REFERENCE

Ambient Air Temperature	16° C (60° F)	21° C (70° F)	26° C (80° F)	32° C (90° F)
Minimum Air Temperature at Floor Outlet	62° C (144° F)	64° C (147° F)	65° C (150° F)	67° C (153° F)

If the heater outlet air temperature is below the minimum specification, refer to Group 7 - Cooling. Both of the heater hoses should be hot to the touch. The coolant return heater hose should be slightly cooler than the coolant supply heater hose. If the return hose is much cooler than the supply hose, locate and repair the engine coolant flow obstruction in the cooling system. Refer to Group 7 - Cooling for more information.

OBSTRUCTED COOLANT FLOW

Possible locations or causes of obstructed coolant flow are as follows:

- Faulty water pump.
- Faulty thermostat.
- Pinched or kinked heater hoses.

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- Improper heater hose routing.
- Plugged heater hoses or supply and return ports at the cooling system connections.
- Plugged heater core.

If proper coolant flow through the cooling system is verified, and heater outlet air temperature is low, a mechanical problem may exist.

MECHANICAL PROBLEMS

Possible locations or causes of insufficient heat due to mechanical problems are as follows:

- Obstructed cowl air intake.
- Obstructed heater system outlets.
- Blend-air door(s) or actuator(s) not functioning properly.
- Faulty blower motor system
- Faulty A/C-heater control

TEMPERATURE CONTROL

If the heater outlet air temperature cannot be adjusted with the temperature control on the A/C-heater control, the following could require service:

- Faulty A/C-heater control.
- Faulty blend door actuator(s).
- Faulty, obstructed or improperly installed blend-air door.
- Faulty related wiring harness or connectors.
- Improper engine coolant temperature.

SPECIFICATIONS

A/C SYSTEM

Item	Description	Notes
A/C Compressor	Denso 10S17 (3.7L/4.7L/5.7L/8.3L engines)	ND-8 PAG oil
	Visteon HS-18 (5.9L engine)	VC-46 PAG oil
Freeze–up Control	Evaporator Temperature Sensor	A/C evaporator mounted
High psi Control	A/C pressure transducer	A/C discharge line mounted
Refrigerant Charge Capacity	Refer to the A/C Underhood Specification Label located in the engine compartment.	R134a refrigerant
A/C Clutch Field Coil Draw	3.2 - 3.3 amps @ 12V ± 0.5V @ 21° C (70° F)	3.7L/4.7L/5.7L/8.3L engines
	3.1 - 4 amps @ 12V ± 0.5V @ 21° C (70° F)	5.9L engine
A/C Clutch Air Gap	0.35 - 0.60 mm (0.014 - 0.024 in.)	3.7L/4.7L/5.7L/8.3L engines
	0.35 - 0.75 mm (0.014 - 0.030 in.)	5.9L engine

TORQUE

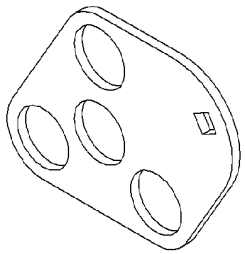
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Description	N·m	Ft. Lbs.	In. Lbs.
All Screws NOT Listed Below	2.2	—	20
A/C Accumulator Bolts	4.5	—	40
A/C Compressor to Engine #3 Bolt (3.7L/4.7L)	40	30	—
A/C Compressor to Engine (except #3) Bolts (3.7L/4.7L)	55	41	—
A/C Compressor to Mounting Bracket Lower Bolts (5.7L)	40	30	—
A/C Compressor to Mounting Bracket Rear Bolt (5.7L)	55	41	—
A/C Compressor to Mounting Bracket Bolts (5.9L)	23	17	—
A/C Compressor to Engine Bolts (8.3L)	23	17	—
A/C Condenser Bolts	10.5	—	95
A/C Compressor Clutch Plate Bolt (3.7L/4.7L/5.7L/ 8.3L)	19	—	168
A/C Compressor Clutch Plate Bolt (5.9L)	15	—	133
A/C Compressor Clutch Plate Bolt (3.7L/4.7L/5.7L/ 8.3L)	19	—	168
HVAC Housing to Engine Side of Dash Panel Nuts	6.2	—	55
HVAC Housing to Floor Bracket Bolt	6.2	—	55
HVAC Housing to Passenger Side of Dash Panel Nuts	6.2	—	55
Refrigerant Line to A/C Compressor Bolt/Nut (3.7L/4.7L/5.7L/8.3L)	20	15	—
Refrigerant Lines to A/C Compressor Bolt (5.9L)	23	17	—
Refrigerant Line to A/C Condenser Nut	20	15	—

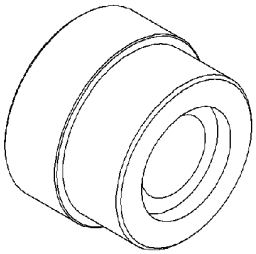
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SPECIAL TOOLS

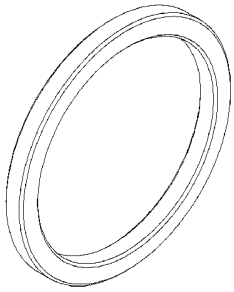
A/C SYSTEM



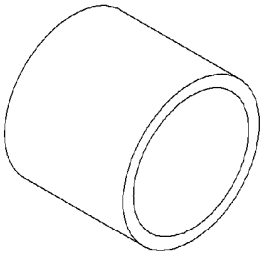
Compressor Clutch Holding Fixture 9351



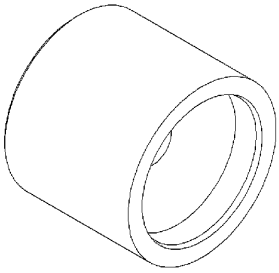
Compressor Field Coil Installer 9352



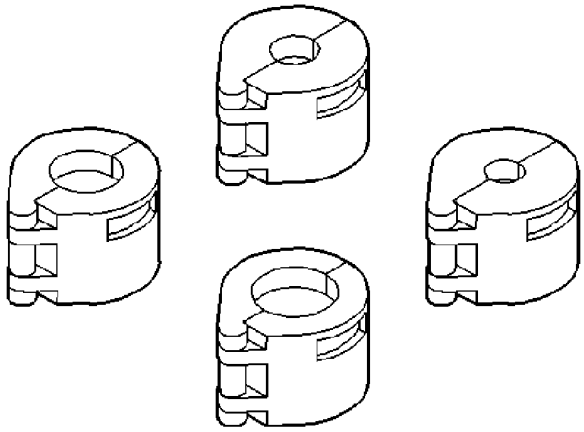
Compressor Field Coil Installer Spacer 9353



Compressor Field Coil Remover 9354



Clutch Pulley Installer 9355



A/C Line Disconnect Tools 7193

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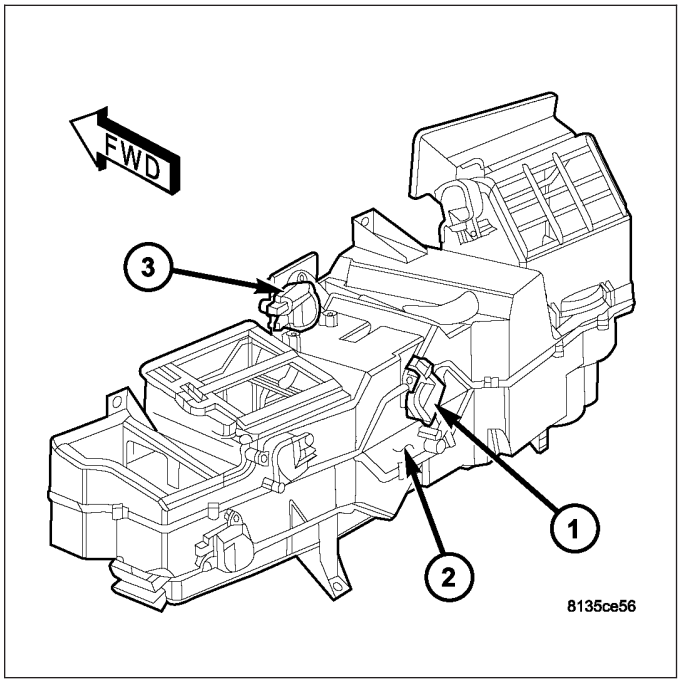
ACTUATOR-BLEND DOOR

DESCRIPTION

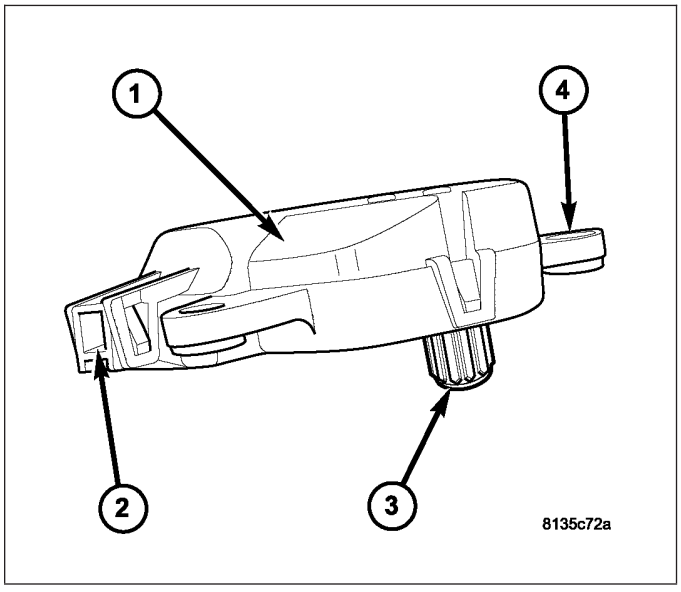
The blend door actuators are reversible, 12-volt direct current (DC), servo motors. Models with the single zone heating-A/C system have a single blend-air door, which is controlled by a single blend door actuator. Models with the dual zone system have two blend-air doors, which are controlled by two blend door actuators.

The blend door actuator (1) for the single zone heating-A/C system is located near the center of the HVAC housing (2), close to the dash panel.

For the dual zone heating-A/C system, the same blend door actuator used for the single zone system becomes the driver side blend door actuator, which is mechanically connected to only the driver side blend-air door. A second separate blend door actuator (3) located on the top of the HVAC housing is mechanically connected to the passenger side blend-air door.



All actuators (1) are interchangeable with each other. Each actuator is contained within an identical black molded plastic housing with an integral wire connector receptacle (2). Each actuator also has an identical output shaft with splines (3) that connect it to its respective door linkage and three integral mounting tabs (4) that allow the actuator to be secured to the HVAC housing. The blend door actuators do not require mechanical indexing to the blend-air doors, as they are electronically calibrated by the A/C-heater control.



OPERATION

The blend door actuators are connected to the A/C-heater control through the vehicle electrical system by a dedicated two-wire lead and connector of the HVAC wire harness. The blend door actuator(s) can move the blend-air door(s) in two directions. When the A/C-heater control pulls the voltage on one side of the motor connection high and the other connection low, the blend-air door will move in one direction. When the A/C-heater control reverses the polarity of the voltage to the motor, the blend-air door moves in the opposite direction.

When the A/C-heater control makes the voltage to both connections high or both connections low, the blend-air door stops and will not move. The A/C-heater control uses a pulse-count positioning system to monitor the operation and relative position of the blend door actuator(s) and the blend-air door(s). The A/C-heater control learns the blend-air door stop positions during the calibration procedure and will store a diagnostic trouble code (DTC) for any problems it detects in the blend door actuator circuits.

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The blend door actuators are diagnosed using a scan tool (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING and to 24 - HVAC Electrical Diagnostics for more information).

The blend door actuators cannot be adjusted or repaired and, if faulty or damaged, they must be replaced.

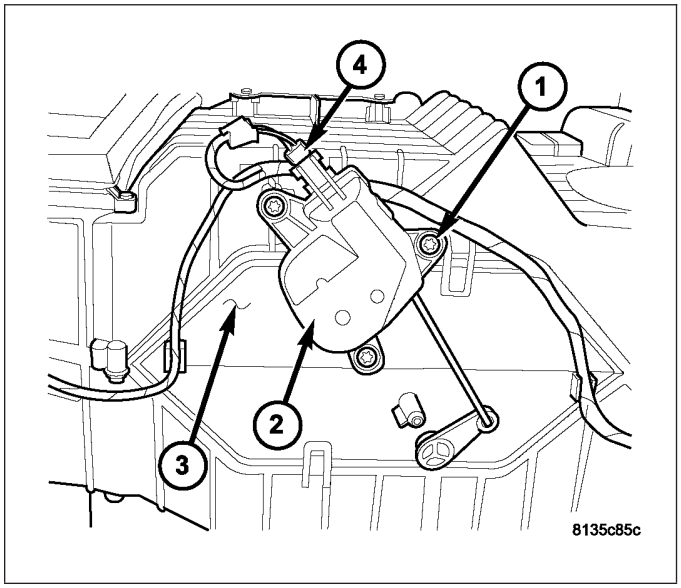
REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: The single zone heating-A/C system is equipped with a single blend door actuator. The dual zone system has two blend door actuators, one for the driver side blend-air door and one for the passenger side blend-air door.

SINGLE ZONE/DUAL ZONE DRIVER SIDE

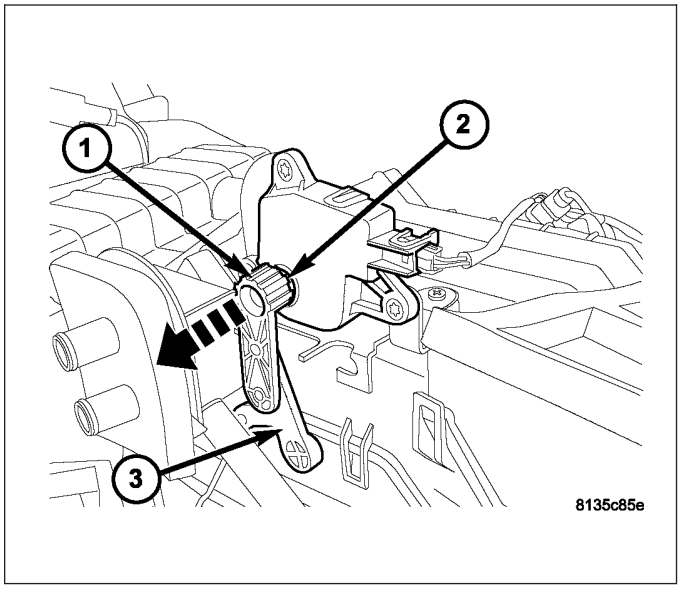
1. Disconnect and isolate the negative battery cable.
2. Remove the instrument panel from the vehicle (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - REMOVAL).
3. Remove the two screws (1) that secure the blend door actuator (2) to the back of the HVAC housing (3).
4. Remove the blend door actuator from the HVAC housing and disconnect the HVAC wire harness connector (4) from the actuator.
5. Remove the blend door actuator from the vehicle.



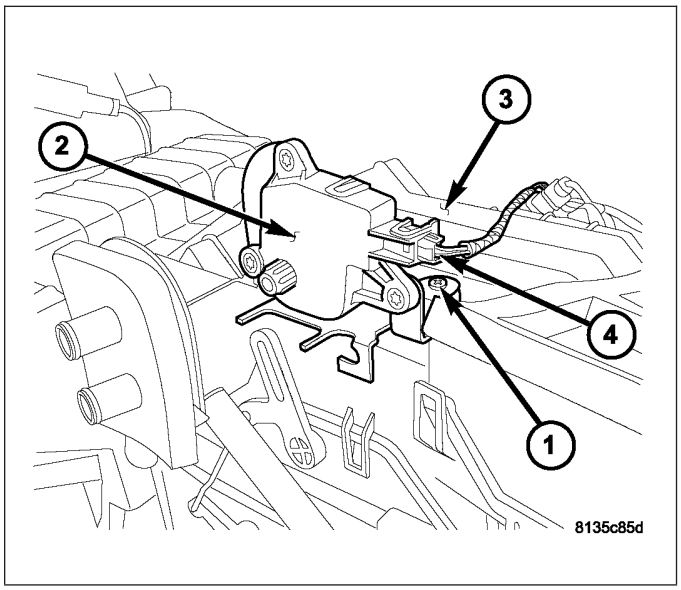
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DUAL ZONE PASSENGER SIDE

1. Disconnect and isolate the negative battery cable.
2. Remove the instrument panel from the vehicle (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - REMOVAL).
3. Remove the blend door lever (1) from the blend door actuator output shaft (2) and the blend door linkage (3).



4. Remove the two screws (1) that secure the blend door actuator and bracket assembly (2) to the top of the HVAC housing (3).
5. Remove the blend door actuator and bracket assembly from the HVAC housing and disconnect the HVAC wire harness connector (4) from the actuator.
6. Remove the blend door actuator and bracket assembly from the vehicle.



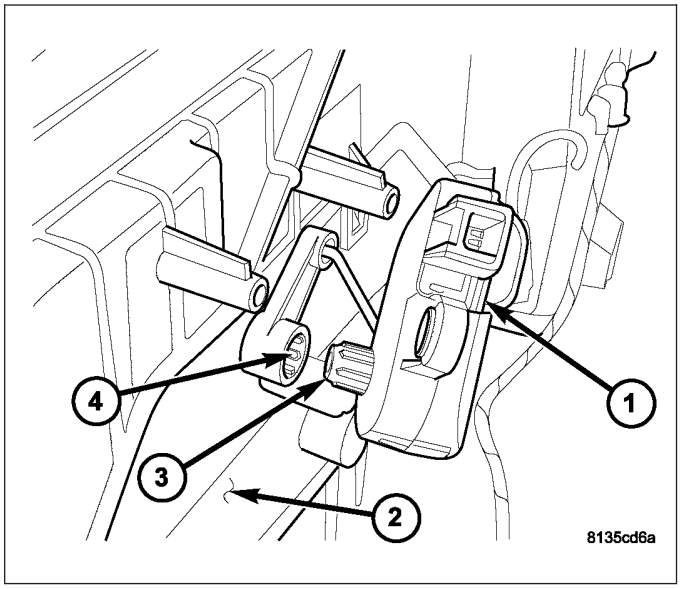
INSTALLATION

NOTE: The single zone heating-A/C system is equipped with a single blend door actuator. The dual zone system has two blend door actuators, one for the driver side blend-air door and one for the passenger side blend-air door.

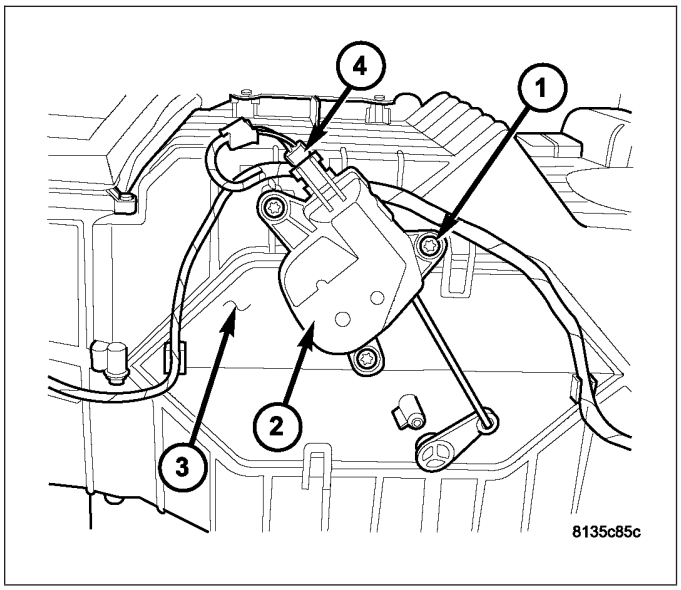
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SINGLE ZONE/DUAL ZONE DRIVER SIDE

1. Install the blend door actuator (1) onto the back of the HVAC housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those on the blend door lever (4).



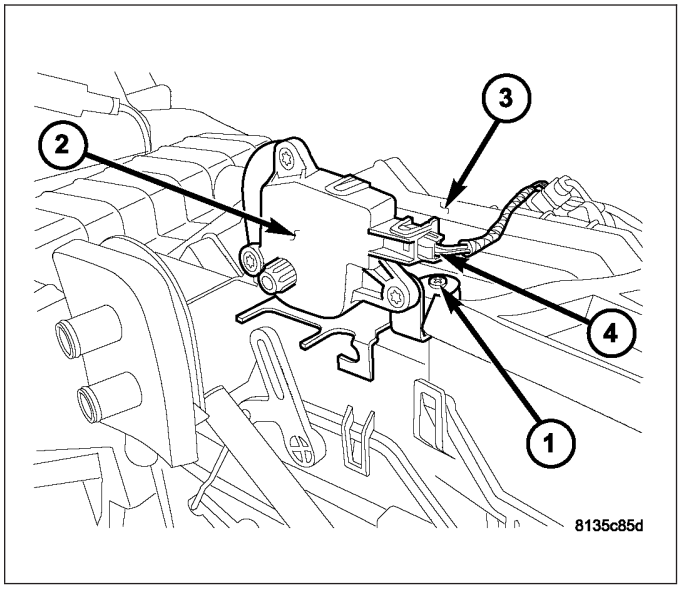
2. Install the screws (1) that secure the blend door actuator (2) to the HVAC housing (3). Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Connect the HVAC wire harness connector (4) to the blend door actuator.
4. Install the instrument panel (Refer to 23 - BODY/ INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).
5. Reconnect the negative battery cable.



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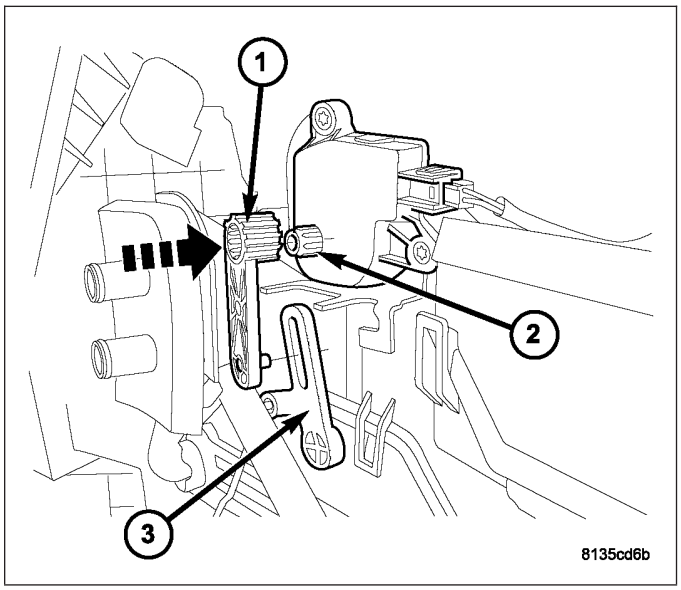
DUAL ZONE PASSENGER SIDE

1. Install the blend door actuator and bracket assembly (2) onto the top of the HVAC housing (3).
2. Install the screws (1) that secure the blend door actuator and bracket assembly to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Connect the HVAC wire harness connector (4) to the blend door actuator.



NOTE: Align the guide pin on the blend door lever with the guides on the blend door linkage during installation of the blend door lever.

4. Install the blend door lever (1) onto the blend door actuator output shaft (2) and the blend door linkage (3).
5. Install the instrument panel (Refer to 23 - BODY/ INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).
6. Reconnect the negative battery cable.



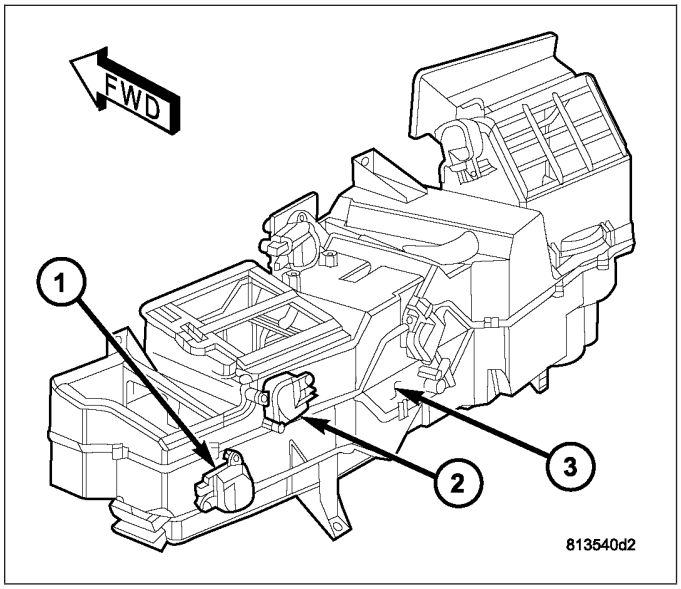
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ACTUATOR-MODE DOOR

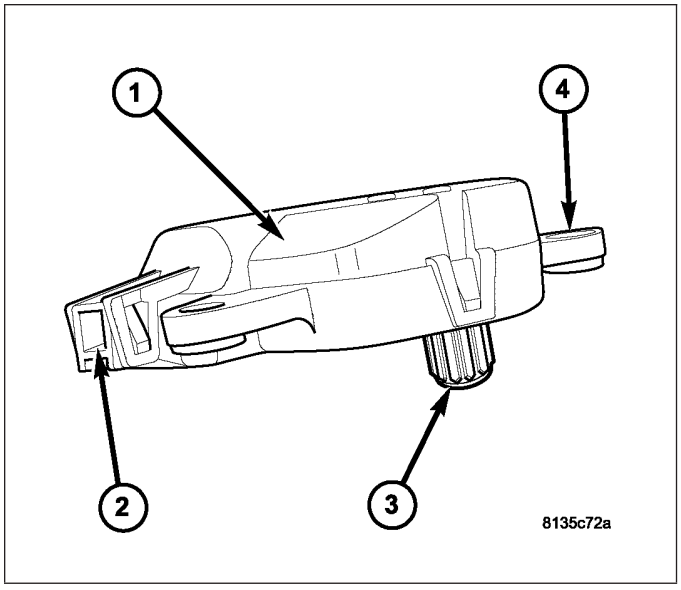
DESCRIPTION

The mode door actuators are reversible, 12-volt direct current (DC) servo motors. The heating-A/C systems on this vehicle use two mode door actuators. One for the panel/floor-air door and one for the defrost-air door.

Both the panel/floor door actuator (1) and the defrost door actuator (2) are located on the driver side end of the HVAC housing (3), close to the dash panel.



All actuators (1) are interchangeable with each other. Each actuator is contained within an identical black molded plastic housing with an integral wire connector receptacle (2). Each actuator also has an identical output shaft with splines (3) that connects it to its respective door linkage and three integral mounting tabs (4) that allow the actuator to be secured to the HVAC housing. The mode door actuators do not require mechanical indexing to the mode-air doors, as they are electronically calibrated by the A/C-heater control.



OPERATION

The mode door actuators are connected to the A/C-heater control through the vehicle electrical system by dedicated two-wire leads and connectors of the HVAC wire harness. The mode door actuators can move the defrost-air door and the panel/floor-air door in two directions. When the A/C-heater control pulls the voltage on one side of the motor connection high and the other connection low, the mode-air door will move in one direction. When the A/C-heater control reverses the polarity of the voltage to the motor, the mode-air door moves in the opposite direction.

When the A/C-heater control makes the voltage to both connections high or both connections low, the mode-air door stops and will not move. The A/C-heater control uses a pulse-count positioning system to monitor the operation and relative position of the mode door actuators and the mode-air doors. The A/C-heater control learns the mode-air door stop positions during the calibration procedure and will store a diagnostic trouble code (DTC) for any problems it detects in the mode door actuator circuits.

The mode door actuators are diagnosed using using a scan tool (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING and to 24 - HVAC Electrical Diagnostics for more information).

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The mode door actuators cannot be adjusted or repaired and, if faulty or damaged, they must be replaced.

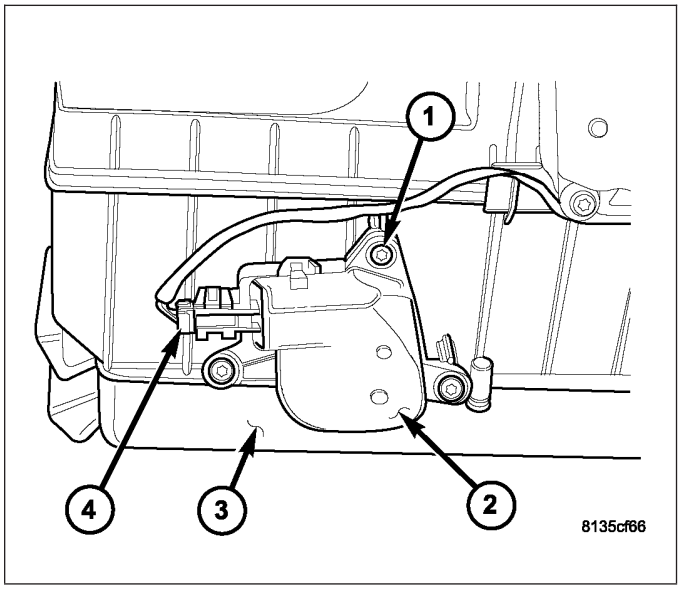
REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in an accidental airbag deployment and possible personal injury or death.

NOTE: The heating-A/C system is equipped with two mode door actuators, one for the panel/floor-air door and one for the defrost-air door.

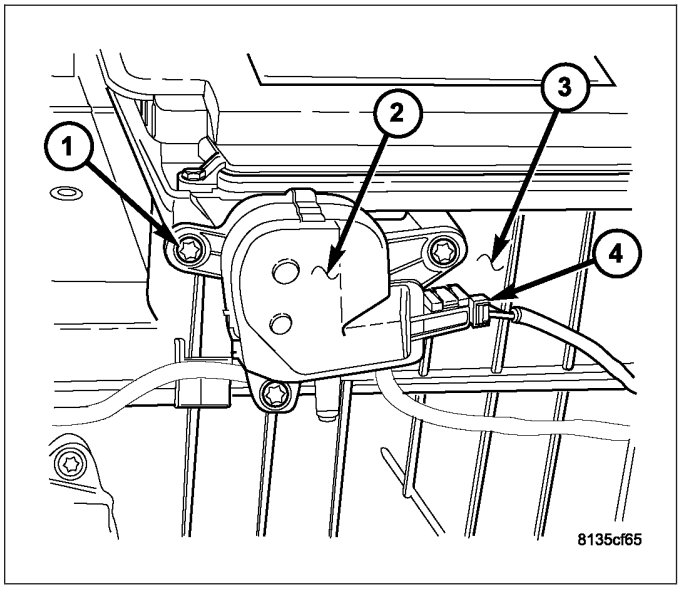
PANEL/FLOOR DOOR ACTUATOR

1. Disconnect and isolate the negative battery cable.
2. Remove the instrument panel from the vehicle (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - REMOVAL).
3. Remove the screws (1) that secure the panel/floor door actuator (2) to the back of the HVAC housing (3).
4. Remove the panel/floor door actuator from the HVAC housing and disconnect the HVAC wire harness connector (4) from the actuator.
5. Remove the panel/floor door actuator from the vehicle.



DEFROST DOOR ACTUATOR

1. Disconnect and isolate the negative battery cable.
2. Remove the instrument panel from the vehicle (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - REMOVAL).
3. Remove the screws (1) that secure the defrost door actuator (2) to the back of the HVAC housing (3).
4. Remove the defrost door actuator from the HVAC housing and disconnect the HVAC wire harness connector (4) from the actuator.
5. Remove the defrost door actuator from the vehicle.



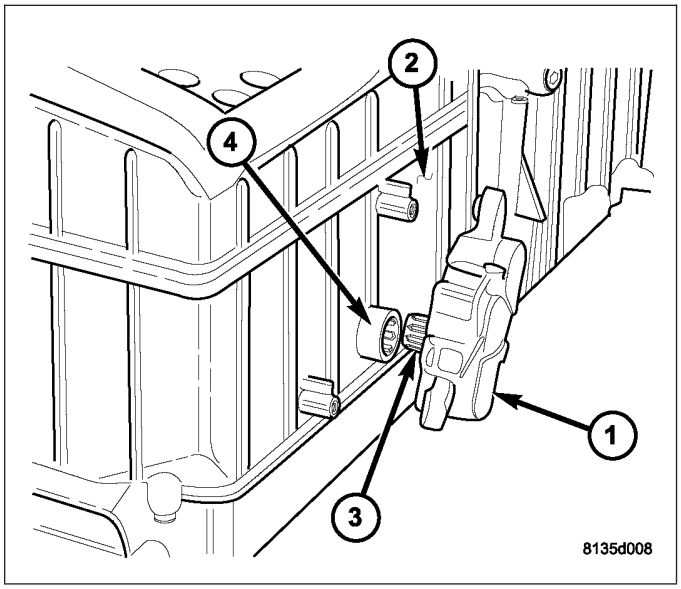
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INSTALLATION

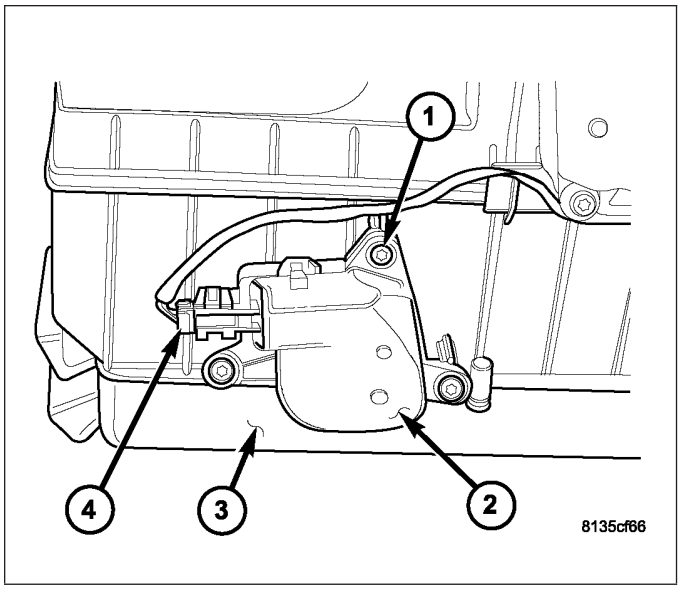
NOTE: The heating-A/C system is equipped with two mode door actuators, one for the panel/floor-air door and one for the defrost-air door.

PANEL/FLOOR DOOR ACTUATOR

1. Install the panel/floor door actuator (1) onto the back of the HVAC housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those on the panel/floor door actuator coupler (4).



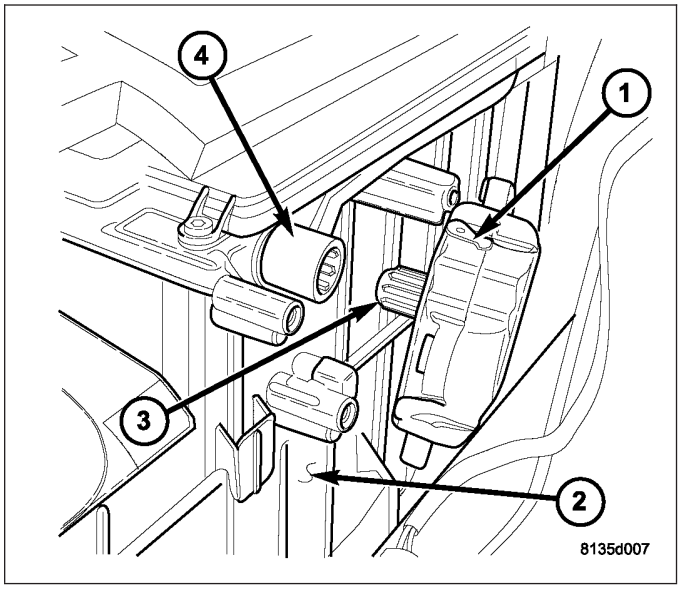
2. Install the screws (1) that secure the panel/floor door actuator (2) to the HVAC housing (3). Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Connect the HVAC wire harness connector (4) to the panel/floor door actuator.
4. Install the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).
5. Reconnect the negative battery cable.



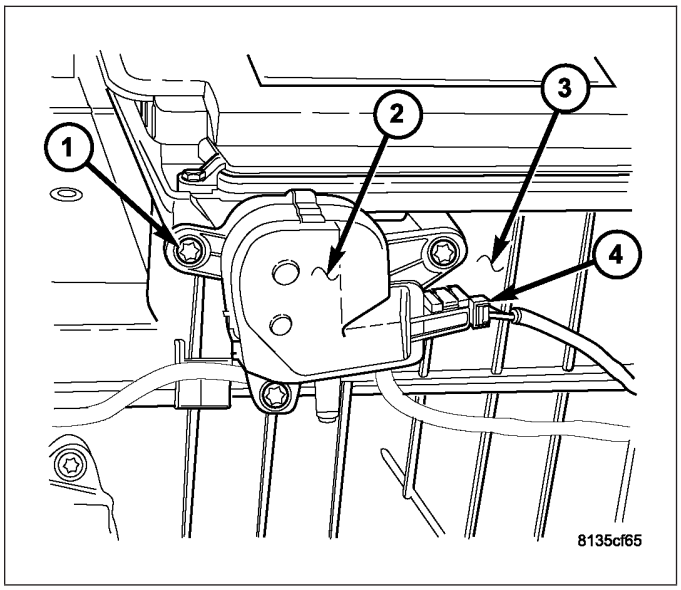
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DEFROST DOOR ACTUATOR

1. Install the defrost door actuator (1) onto the back of the HVAC housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those on the defrost door actuator coupler (4).



2. Install the screws (1) that secure the defrost door actuator (2) to the HVAC housing (3). Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Connect the HVAC wire harness connector (4) to the defrost door actuator.
4. Install the instrument panel (Refer to 23 - BODY/ INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).
5. Reconnect the negative battery cable.

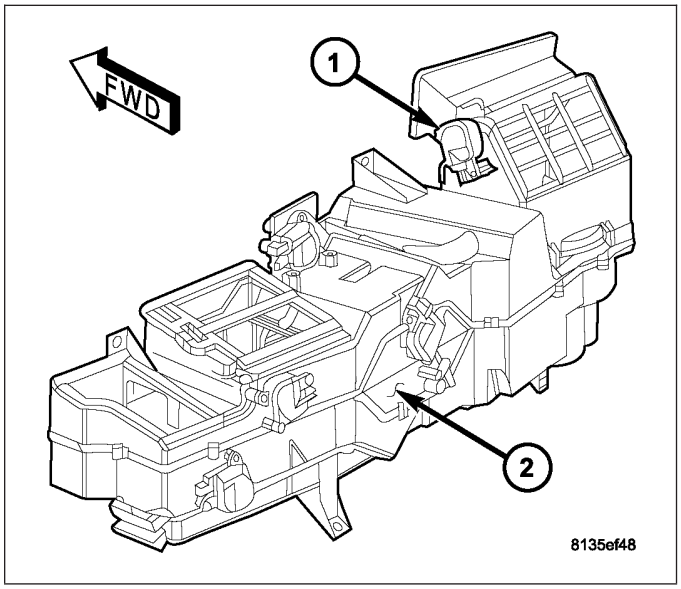


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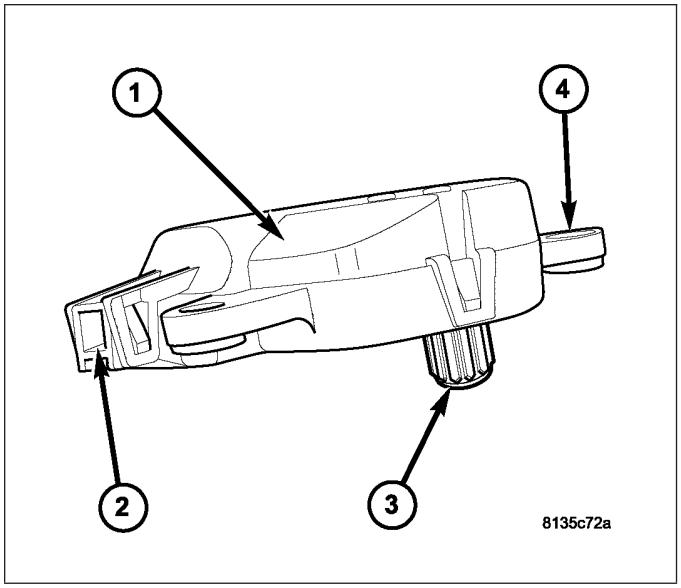
ACTUATOR-RECIRCULATION DOOR

DESCRIPTION

The recirculation door actuator (1) is a reversible 12-volt direct current (DC) servo motor. The single recirculation door actuator is located on the passenger side end of the HVAC housing (2), on the top of the air inlet housing.



All actuators (1) are interchangeable with each other. Each actuator is contained within an identical black molded plastic housing with an integral wire connector receptacle (2). Each actuator also has an identical output shaft with splines (3) that connects it to its respective door linkage and three integral mounting tabs (4) that allow the actuator to be secured to the HVAC housing. The recirculation door actuator does not require mechanical indexing to the recirculation-air door, as it is electronically calibrated by the A/C-heater control.



OPERATION

The recirculation door actuator is connected to the heater-A/C control module through the vehicle electrical system by a dedicated two-wire lead and connector of the HVAC wire harness. The recirculation door actuator can move the recirculation-air door in two directions. When the A/C-heater control pulls the voltage on one side of the motor connection high and the other connection low, the recirculation-air door will move in one direction.

When the A/C-heater control makes the voltage to both connections high or both connections low, the recirculation-air door stops and will not move. The A/C-heater control uses a pulse-count positioning system to monitor the operation and relative position of the recirculation door actuator and the recirculation-air door. The A/C-heater control learns the recirculation-air door stop positions during the calibration procedure and will store a diagnostic trouble code (DTC) for any problems it detects in the recirculation door actuator circuits.

The recirculation door actuator is diagnosed using a scan tool (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING and to 24 - HVAC Electrical Diagnostics for more information).

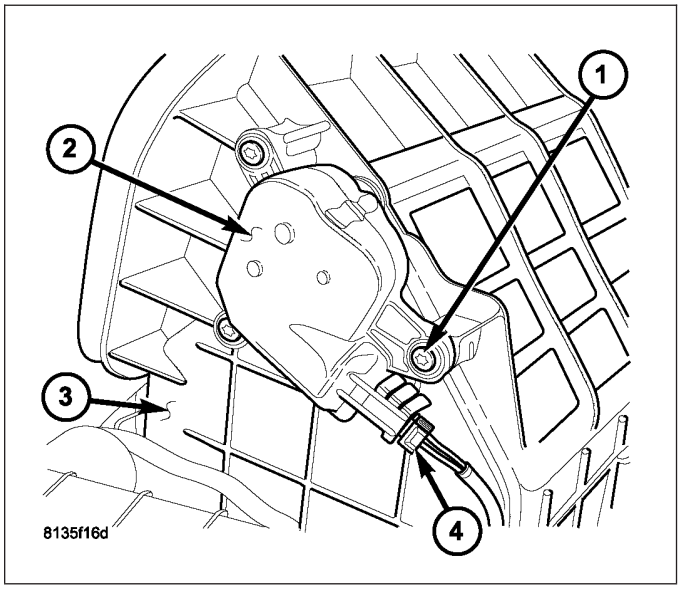
The recirculation door actuator cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

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REMOVAL

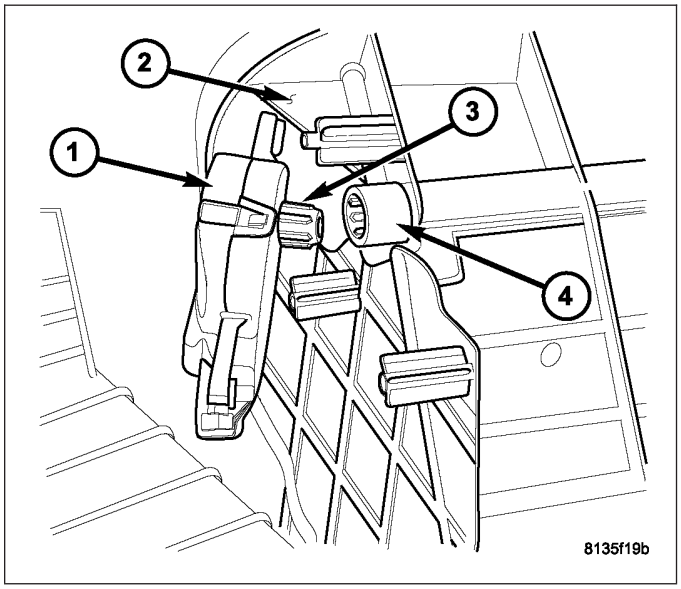
WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

1. Disconnect and isolate the negative battery cable.
2. Remove the glove box from the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/ GLOVE BOX - REMOVAL).
3. Remove the two screws (1) that secure the recirculation door actuator (2) to the side of the HVAC air inlet housing (3).
4. Remove the recirculation door actuator from the air inlet housing and disconnect the HVAC wire harness connector (4) from the actuator.
5. Remove the recirculation door actuator from the vehicle.



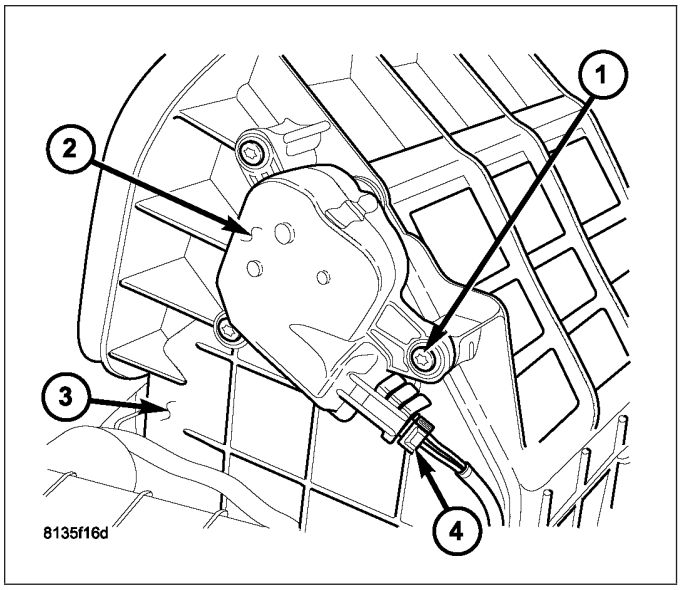
INSTALLATION

1. Install the recirculation door actuator (1) onto the side of the HVAC air inlet housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those in the recirculation door actuator coupler (4).



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2. Install the two screws (1) that secure the recirculation door actuator (2) to the air inlet housing (3). Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Connect the HVAC wire harness connector (4) to the recirculation door actuator.
4. Install the glove box (Refer to 23 - BODY/INSTRUMENT PANEL/GLOVE BOX - INSTALLATION).
5. Reconnect the negative battery cable.

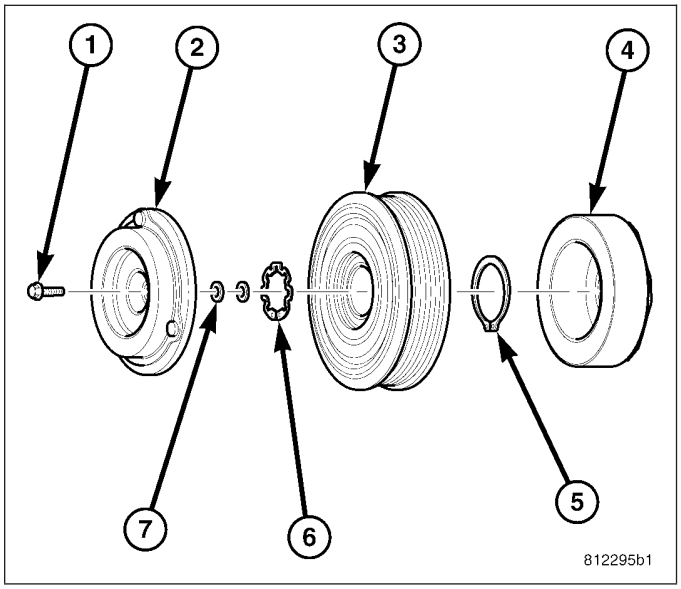


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CLUTCH-A/C COMPRESSOR

DESCRIPTION

NOTE: Denso 10S17 A/C clutch assembly shown. Visteon HS-18 compressor similar.



The A/C compressor clutch assembly consists of a stationary electromagnetic field coil (4), bearing and pulley assembly (3), shims (7) and a clutch plate (2) that is splined to the compressor shaft and secured by a bolt (1). These components provide the means to engage and disengage the A/C compressor from the engine accessory drive belt.

The A/C clutch bearing and pulley assembly on both A/C compressors are retained to the front of the compressor with a snap ring (6). The A/C clutch field coil on the Denso 10S17 A/C compressor is also retained to the front of the compressor using a snap ring (5). The field coil on the Visteon HS-!8 compressor is pressed onto the front of the compressor.

OPERATION

The A/C compressor clutch components provide the means to engage and disengage the A/C compressor from the engine accessory drive belt. When the electromagnetic A/C clutch field coil is energized, it magnetically draws the clutch plate into contact with the clutch pulley and drives the compressor shaft. When the coil is not energized, the pulley freewheels on the clutch hub bearing, which is part of the pulley assembly.

A/C compressor clutch engagement is controlled by the powertrain control module (PCM) or the engine control module (ECM), depending on engine application. When the A/C-heater control is set to any A/C position, it sends a request signal on the CAN-B bus to the totally integrated power module (TIPM), which then transfers the request on the CAN-C Bus to the PCM/ECM, which determines if operating conditions are correct for A/C clutch engagement. When all operating conditions have been met, the PCM/ECM sends a signal on a dedicated hard-wired circuit back to the totally integrated power module (TIPM) to energize the internal A/C clutch high side driver. When energized, the A/C clutch high side driver provides battery current to the A/C clutch field coil.

The A/C clutch control system is diagnosed using a scan tool (Refer to 24 - HVAC Electrical Diagnostics and to 9 - Engine Electrical Diagnostics for more information).

The A/C compressor clutch components cannot be repaired and, if faulty or damaged, they must be replaced.

DIAGNOSIS AND TESTING

A/C COMPRESSOR CLUTCH COIL

The A/C compressor clutch coil electrical circuit is controlled by the powertrain control module (PCM) or the engine control module (ECM) (depending on engine application) through the totally integrated power module (TIPM) (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/COIL-A/C COMPRESSOR CLUTCH - OPERATION for more information). Begin testing of a suspected compressor clutch coil problem by performing the preliminary checks.

PRELIMINARY CHECKS

1. Using a scan tool, check for diagnostic trouble codes (DTCs) in the A/C-heater control, TIPM, PCM/ECM and if equipped with the 8.3L engine, the gateway module. If no DTCs are found, go to Step 2. If any DTCs are found, repair as required.
2. If the A/C compressor clutch still will not engage, verify the refrigerant charge level (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - DIAGNOSIS AND TESTING - REFRIGERANT SYSTEM LEAKS). If the refrigerant charge level is OK, go to TESTS . If the refrigerant charge level is not OK, adjust the refrigerant charge as required.

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TESTS

1. Verify the battery state of charge (Refer to 8 - ELECTRICAL/BATTERY SYSTEM/BATTERY - DIAGNOSIS AND TESTING).
2. Connect an ammeter (0 to 10 ampere scale selected) in series with the clutch coil feed terminal. Connect a voltmeter (0 to 20 volt scale selected) to measure voltage across the battery and the clutch coil.
3. With the A/C-heater control in the A/C mode and the blower motor at low speed, start the engine and allow it to run at a normal idle speed.
4. The A/C compressor clutch should engage immediately, and the clutch coil supply voltage should be within two volts of the battery voltage. If the coil supply voltage is OK, go to Step 5. If the coil supply voltage is not within two volts of battery voltage, test the clutch coil feed circuit for excessive voltage drop and repair as necessary.
5. For the acceptable A/C clutch coil current draw specifications refer to 24 - HEATING & AIR CONDITIONING - SPECIFICATIONS. Specifications apply for a work area temperature of 21° C (70° F). If voltage is more than 12.5 volts, add electrical loads by turning on electrical accessories until voltage reads below 12.5 volts.

STANDARD PROCEDURE

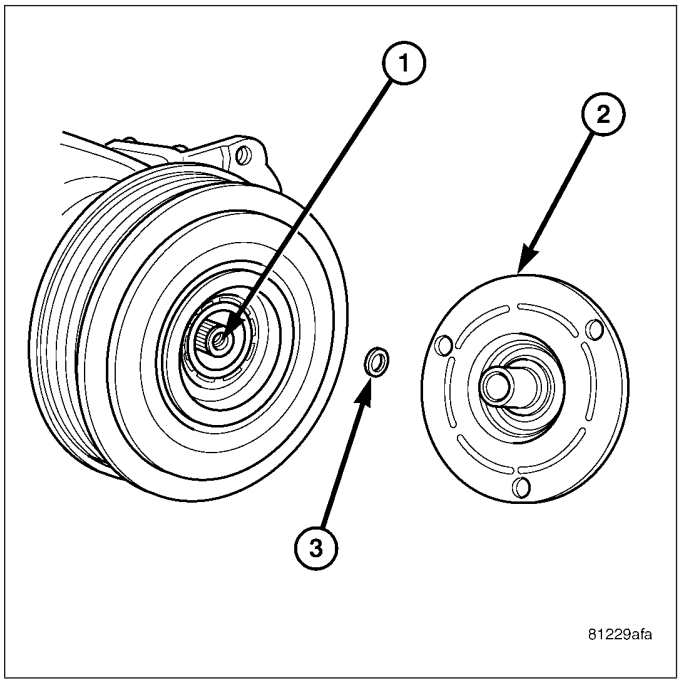
A/C CLUTCH PLATE INSPECTION

NOTE: The A/C clutch can be serviced in the vehicle. The refrigerant system can remain fully-charged during compressor clutch, pulley and bearing assembly, or coil replacement.

Examine the friction surfaces of the pulley and the clutch plate (2) for wear. The pulley and clutch plate should be replaced if there is excessive wear or scoring.

If the friction surfaces are oily, inspect the shaft and nose area of the A/C compressor (1) for refrigerant oil. If refrigerant oil is found, the compressor shaft seal is leaking and the A/C compressor must be replaced.

Check the pulley bearing for roughness or excessive leakage of grease. Replace the pulley and bearing assembly, if required.



A/C CLUTCH BREAK-IN

After a new A/C compressor clutch has been installed, cycle the compressor clutch approximately 20 times (5 seconds on, then 5 seconds off). During this procedure, set the A/C-heater controls to the A/C Recirculation Mode, the blower motor in the highest speed position, and the engine speed at 1500 to 2000 rpm. This procedure (burnishing) will seat the opposing friction surfaces and provide a higher compressor clutch torque capability.

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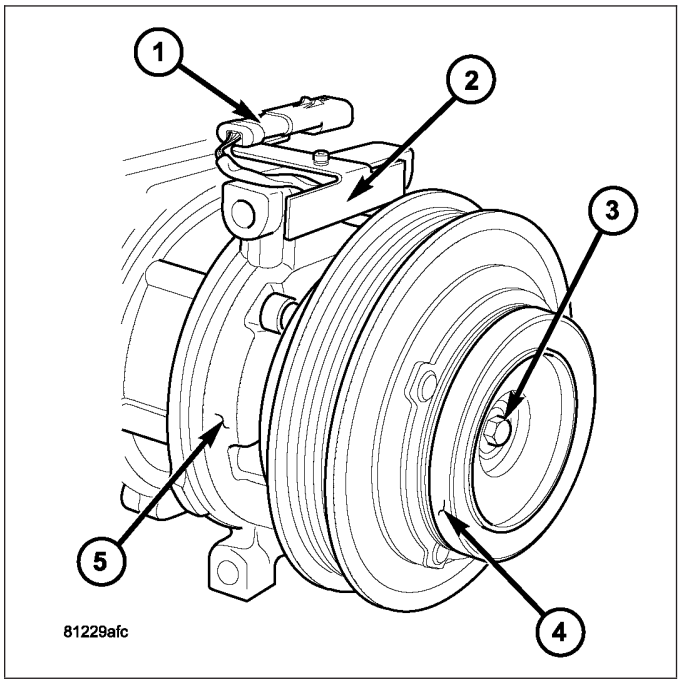
REMOVAL

DENSO A/C COMPRESSOR

NOTE: The compressor clutch assembly can be serviced with the refrigerant system fully-charged.

NOTE: Typical A/C compressor shown in illustrations.

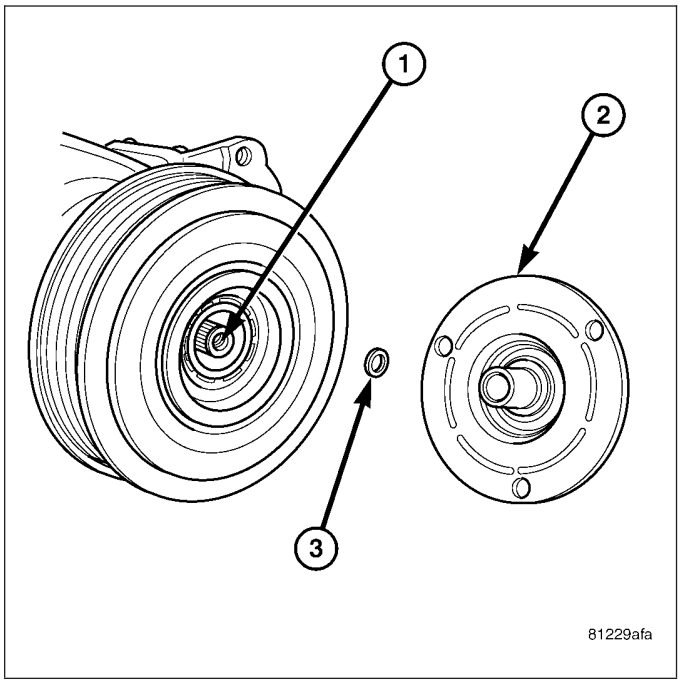
1. Disconnect and isolate the negative battery cable.
2. Remove the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - REMOVAL).
3. Disconnect the engine wire harness from the compressor clutch field coil connector (1) located on the top of the A/C compressor (5).
4. Remove the bolts that secure the A/C compressor to the engine and support the A/C compressor.
5. Carefully remove the compressor clutch field coil connector and wire lead from the connector bracket (2).
6. Remove the compressor shaft bolt (3). A band-type oil filter wrench or a strap wrench may be used to hold the clutch plate (4) from rotating during bolt removal.



CAUTION: Do not pry between the clutch plate and the pulley and bearing assembly to remove the clutch plate from the compressor shaft as this may damage the clutch plate.

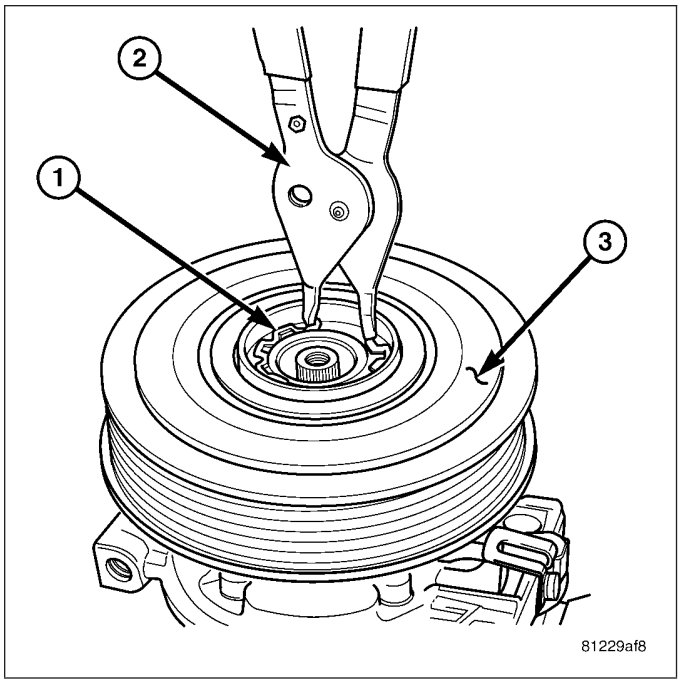
NOTE: Use care not to lose any clutch shim(s) during removal of the clutch plate, as they may be reused during the clutch plate installation process.

7. Tap the clutch plate (2) lightly with a plastic mallet to release it from the splines on the compressor shaft (1) and remove the clutch plate and shim(s) (3).

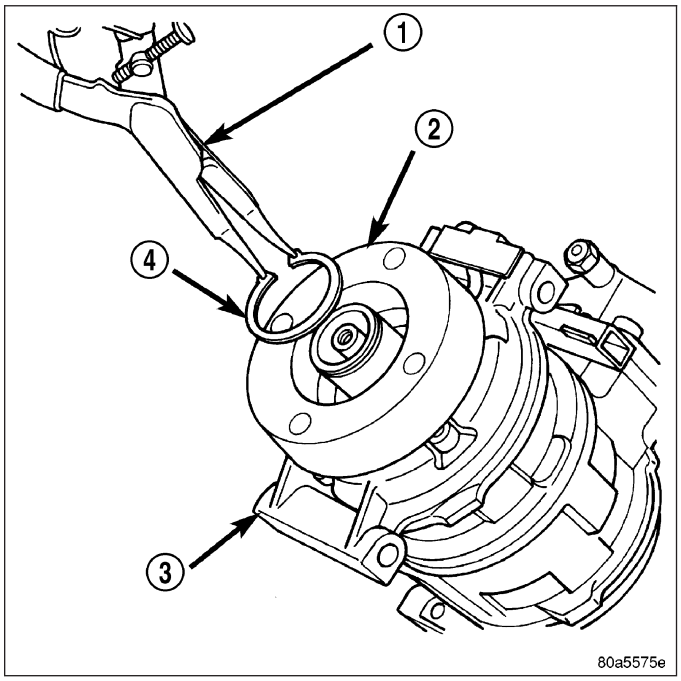


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8. Using snap ring pliers (2), remove the snap ring (1) that secures the pulley and bearing assembly (3) to the front of the A/C compressor and remove the pulley and bearing assembly.



9. Using snap ring pliers (Special Tool C-4574 or equivalent) (1), remove the snap ring (4) that secures the compressor clutch field coil (2) to the front of the A/C compressor (3) and remove the field coil.

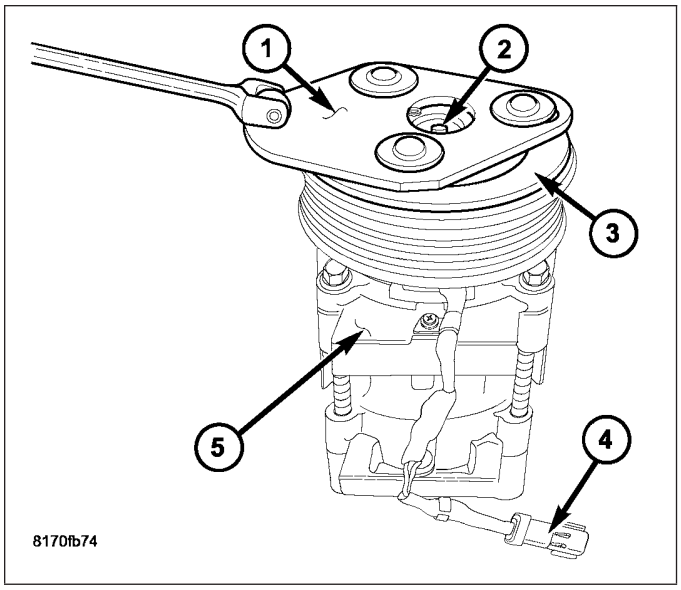


VISTEON A/C COMPRESSOR

NOTE: The A/C compressor clutch can be serviced in the vehicle. The refrigerant system can remain fully-charged during compressor clutch, pulley and bearing assembly or field coil replacement.

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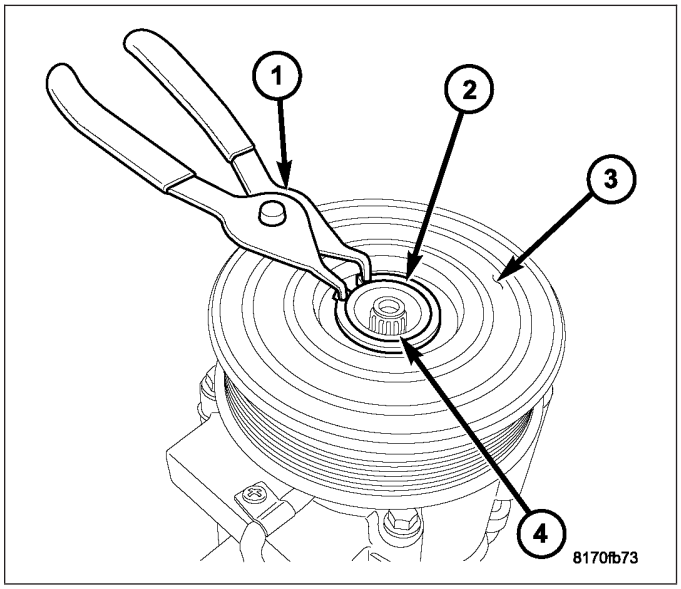
1. Disconnect and isolate negative battery cable.
2. Remove the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - REMOVAL).
3. Raise and support the vehicle.
4. Disconnect the engine wire harness from the clutch field coil connector (4).
5. Remove the bolts that secure the A/C compressor (5) to the mounting bracket (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COMPRESSOR-A/C - REMOVAL).
6. Remove the A/C compressor from the mounting bracket and support the compressor while servicing the clutch.
7. Using compressor clutch holding fixture (Special Tool 9351 in Kit 9349) (1), remove the bolt (2) that secures the clutch plate (3) to the compressor shaft.



NOTE: The clutch plate can be removed from the compressor shaft by hand or, if required, pressed off with an 8 x 1.25 mm bolt.

NOTE: Clutch plate shim(s) may remain inside the hub of the clutch plate. Be sure to remove all of the shims from inside the hub or from the end of the compressor shaft.

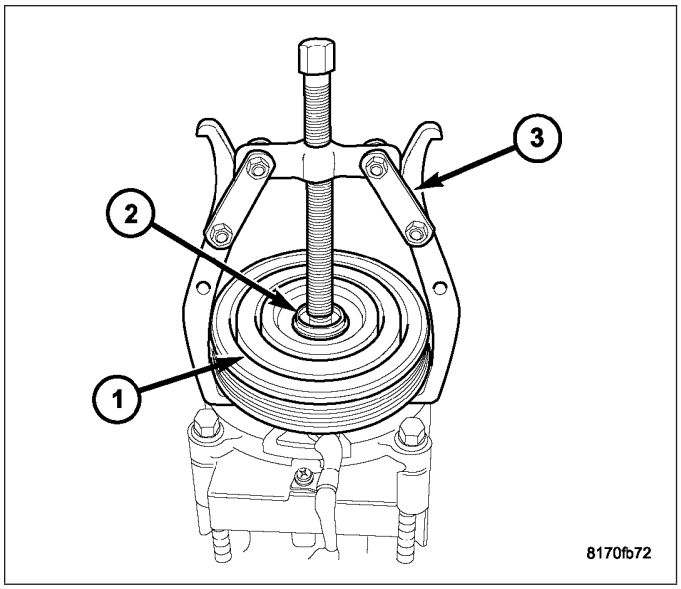
8. Remove the clutch plate and shim(s) from the A/C compressor. If required, install a 8 x 1.25 mm bolt into the center of the clutch plate and turn the bolt clockwise until the clutch plate is completely removed from the A/C compressor.
9. Using snap ring pliers (1), remove the snap ring (2) that secures the pulley and bearing assembly (3) to the front of the A/C compressor (4).



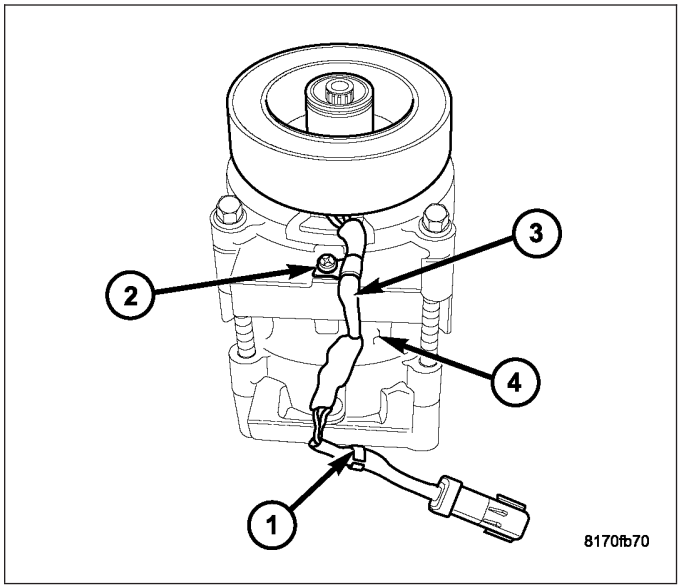
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NOTE: The pulley and bearing assembly can be removed from the compressor by hand or, if required, with a two jaw puller.

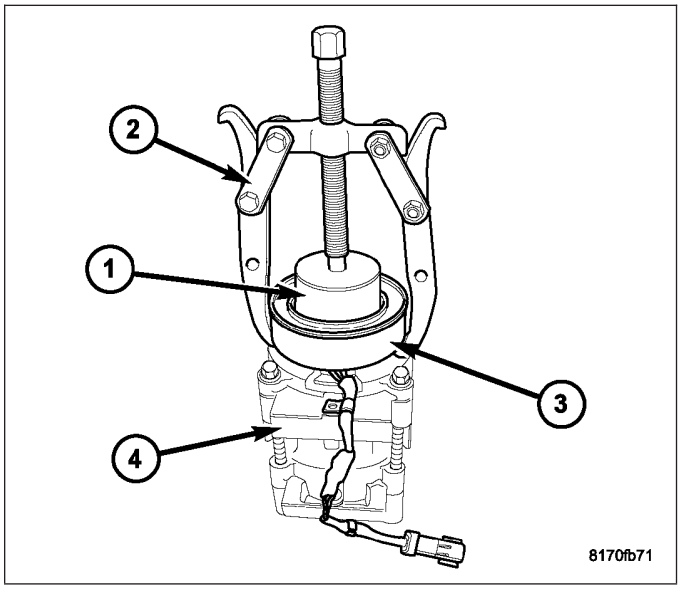
10. Remove the pulley and bearing assembly (1) from the front of the A/C compressor (2). If required, install a two jaw puller (3) and turn the puller center-bolt clockwise until the pulley and bearing assembly is completely removed.



11. Remove the plastic retaining clip (1) and the screw (2) that secures the clutch field coil wire lead and connector (3) to the A/C compressor (4).



12. Using compressor field coil remover (Special Tool 9354 in Kit 9349) (1) and a two jaw puller (2), remove the clutch field coil (3) from the front of the A/C compressor (4).



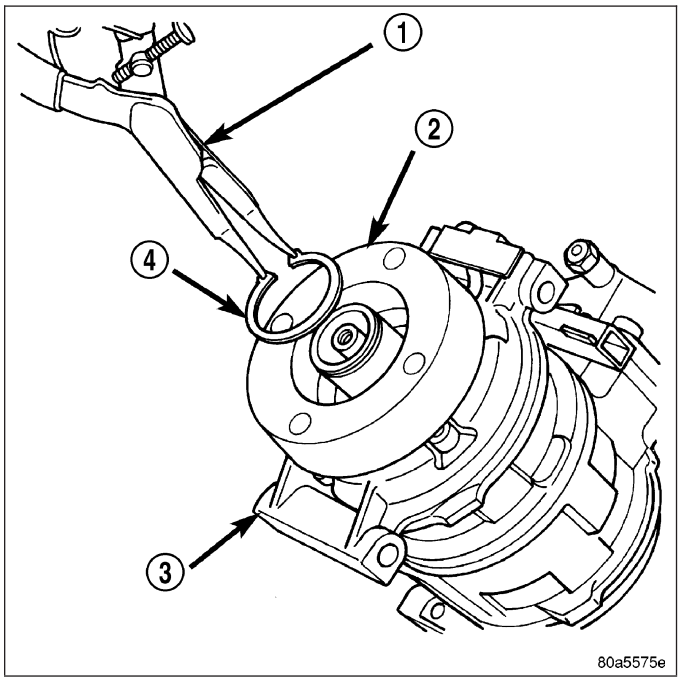
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INSTALLATION

DENSO A/C COMPRESSOR

NOTE: Typical A/C compressor shown in illustrations.

1. Align the dowel pin on the back of the compressor clutch field coil (2) with the hole in the front of the A/C compressor (3) and position the field coil onto the compressor. Be certain that the compressor clutch field coil wire lead is properly routed so that it is not pinched between the A/C compressor and the field coil.



CAUTION: The snap ring must be fully and properly seated in the groove or it will vibrate out, resulting in a clutch failure and severe damage to the A/C compressor.

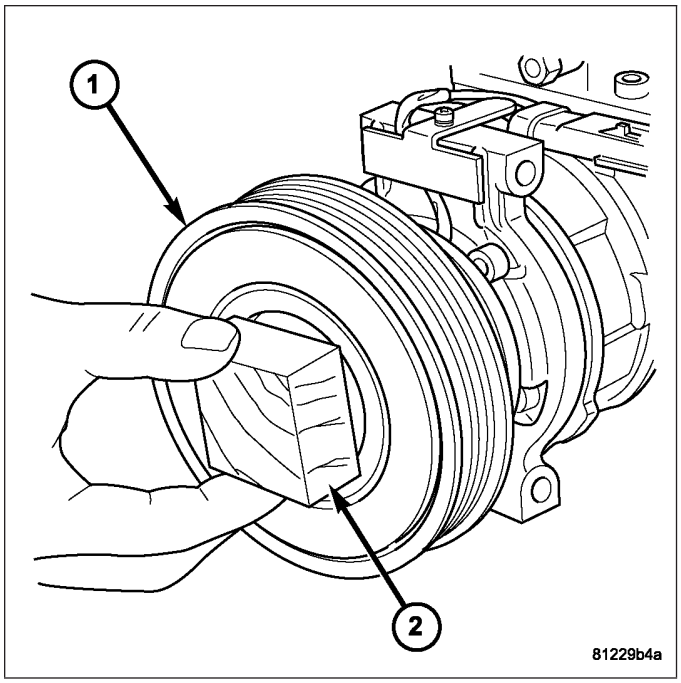
NOTE: A new snap ring must be used to secure the compressor clutch field coil to the A/C compressor. The bevel side of the snap ring must face outward and both snap ring eyelets must be oriented to the right or to the left of the field coil dowel pin location on the A/C compressor.

2. Using snap ring pliers (Special Tool C-4574 or equivalent) (1), install the snap ring (4) that secures the compressor clutch field coil to the front of the A/C compressor. Be certain that the snap ring is fully and properly seated in the groove and oriented correctly.

CAUTION: Be certain to position the compressor clutch field coil wire lead so that it is not damaged during A/C compressor pulley and bearing installation.

CAUTION: When installing the pulley and bearing assembly, DO NOT mar the friction surfaces of the pulley or premature failure of the clutch will result.

3. Install the pulley and bearing assembly (1) onto the front of the A/C compressor. If necessary, tap the pulley gently with a block of wood (2) placed on the pulley friction surface.

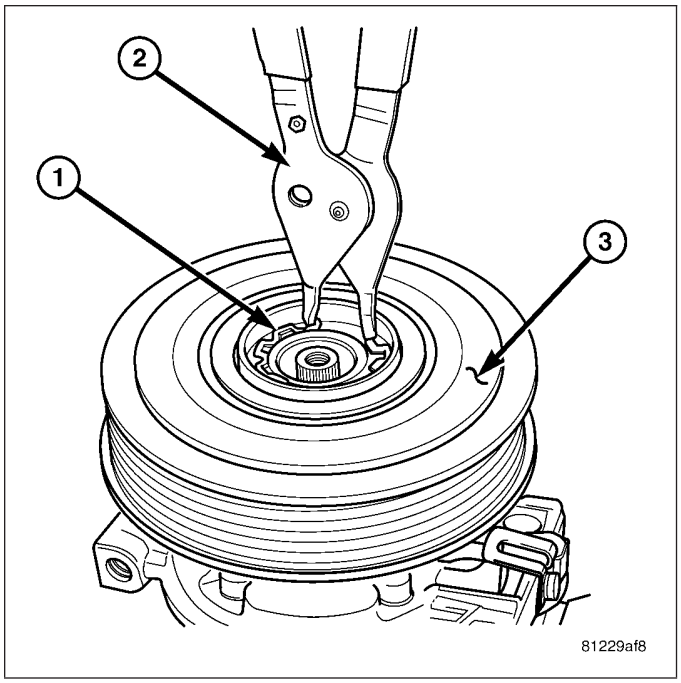


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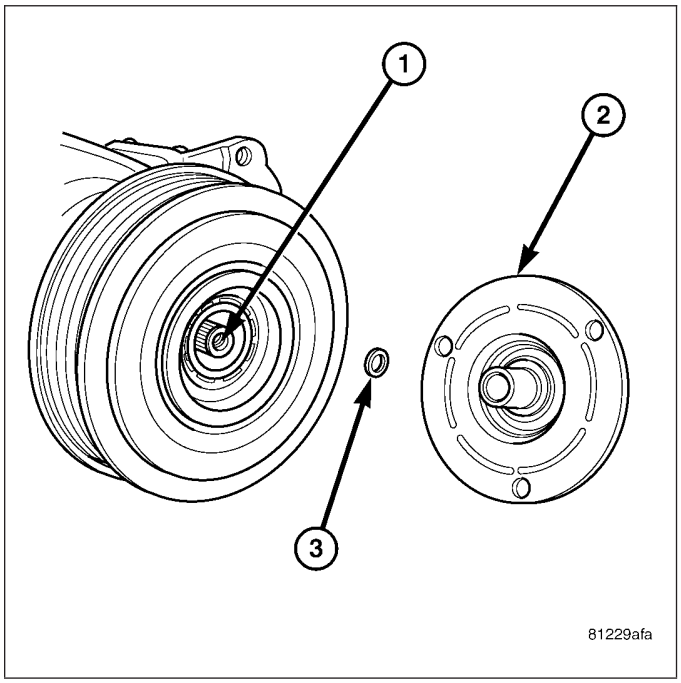
CAUTION: The snap ring must be fully and properly seated in the groove or it will vibrate out, resulting in a clutch failure and severe damage to the A/C compressor.

NOTE: A new snap ring must be used to secure the pulley and bearing assembly to the A/C compressor. The bevel side of the snap ring must face outward.

4. Using snap ring pliers (2), install the snap ring (1) that secures the pulley and bearing assembly (3) to the front of the A/C compressor. Be certain that the snap ring is fully and properly seated in the groove.



5. If the original clutch plate (2) and pulley and bearing assembly are to be reused, reinstall the original shim(s) (3) onto the compressor shaft (1). If a new clutch plate and pulley and bearing assembly are being used, install a trial stack of shims 2.54 mm (0.010 in.) thick onto the compressor shaft.



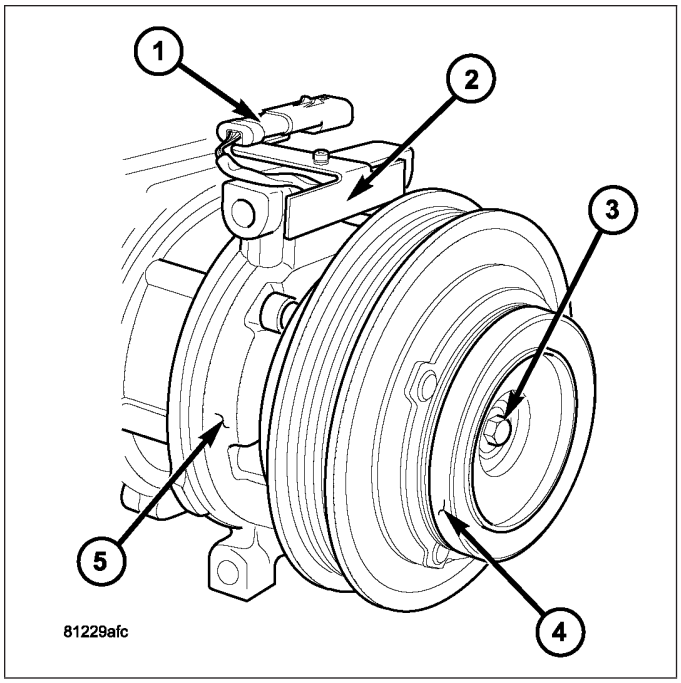
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6. Install the clutch plate (4) onto the front of the A/C compressor (5).
7. Install the compressor shaft bolt (3). Tighten the bolt to 19 N·m (168 in. lbs.).

NOTE: The shims may compress after tightening the shaft bolt. Check the air gap in four or more places to verify the air gap is correct. Spin the pulley before performing a final check of the air gap.

NOTE: On models with the clutch plate recessed into the pulley, use a 90° wire gap gauge to measure the clutch air gap. On other models, use a blade type feeler gauge to measure the air gap.

8. With the clutch plate assembled tight against the shim(s), measure the air gap between the clutch plate and the pulley and bearing assembly. The air gap should be between 0.35 - 0.60 mm (0.014 - 0.024 in.). If the air gap is not between specifications, add or subtract shims as needed until the correct air gap is obtained.



CAUTION: Be certain that the compressor clutch field coil wire harness is properly routed so that it is not pinched between the A/C compressor and the field coil connector bracket.

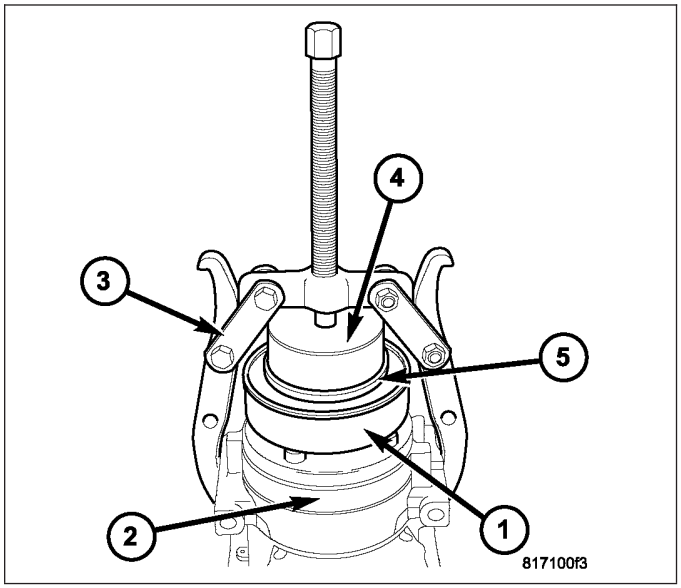
9. Carefully route the compressor clutch field coil wire lead behind the connector bracket (2).
10. Install the compressor clutch field coil connector (1) onto the connector bracket.
11. Position the A/C compressor to the engine and install the retaining bolts (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COMPRESSOR-A/C - INSTALLATION).
12. Connect the engine wire harness to the compressor clutch field coil connector.
13. Install the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - INSTALLATION).
14. Reconnect the negative battery cable.

VISTEON A/C COMPRESSOR

1. Position the A/C clutch field coil (1) squarely onto the front of the A/C compressor (2).

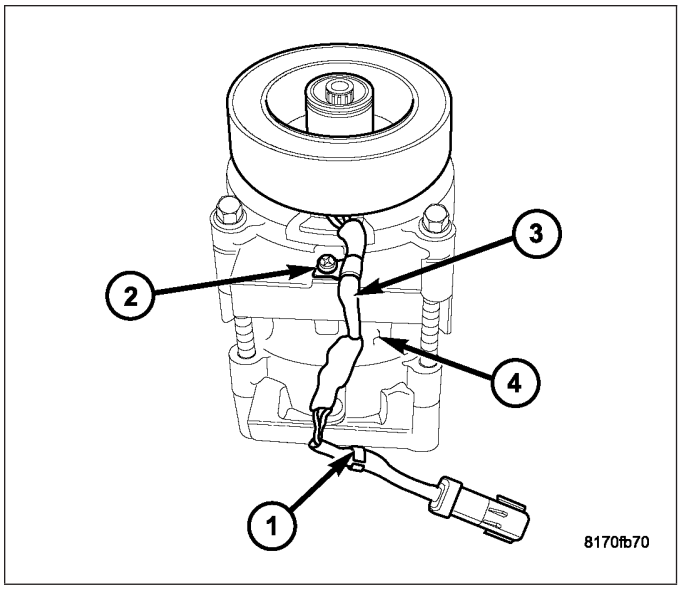
CAUTION: Position the A/C clutch field coil so that the coil positioning tabs and the wire harness lead are oriented in the correct direction. Failure to correctly position the field coil on the A/C compressor will result in field coil damage.

2. Align the field coil positioning tabs to the recessed area at the front of the A/C compressor and install the clutch field coil onto the compressor using a two jaw puller (3), compressor field coil installer (Special Tool 9352 in Kit 9349) (4) and the compressor field coil installer spacer (Special Tool 9353 in Kit 9349) (5).



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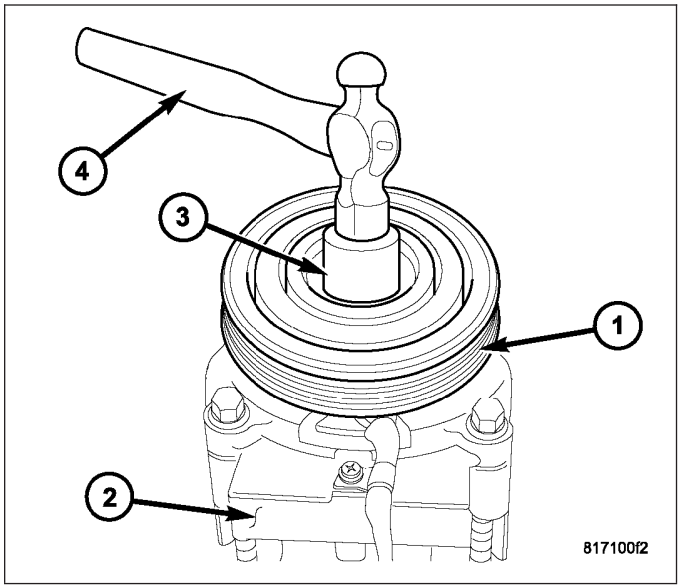
3. Position the clutch field coil wire lead and connector (3) to the A/C compressor (4) and install the plastic retaining clip (1) and the screw (2) that secures the wire lead to the compressor. Tighten the screw to 4 N·m (35 in. lbs.).



4. Align the pulley and bearing assembly (1) squarely onto the front of the A/C compressor (2).

NOTE: A distinct change of sound during the clutch pulley tapping process indicates that the pulley and bearing assembly has bottomed out against the compressor housing.

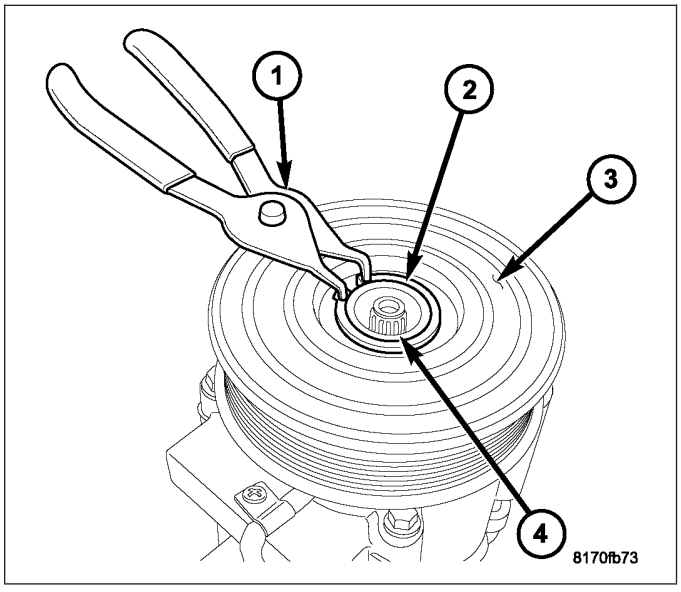
5. Using clutch pulley installer (Special Tool 9355 in Kit 9349) (3) and a hammer (4), install the pulley and bearing assembly onto the front of the A/C compressor. Tap the installer with a hammer until the pulley and bearing assembly has bottomed against the compressor housing.



CAUTION: If the snap ring is not fully seated in the groove it will vibrate out, resulting in clutch failure and severe damage to the A/C compressor.

NOTE: Install the snap ring with the beveled side of the snap ring facing outward.

6. Using snap ring pliers (1), install the snap ring (2) that secures the pulley and bearing assembly (3) to the front of the A/C compressor (4). Make sure the snap ring is properly seated in the groove.

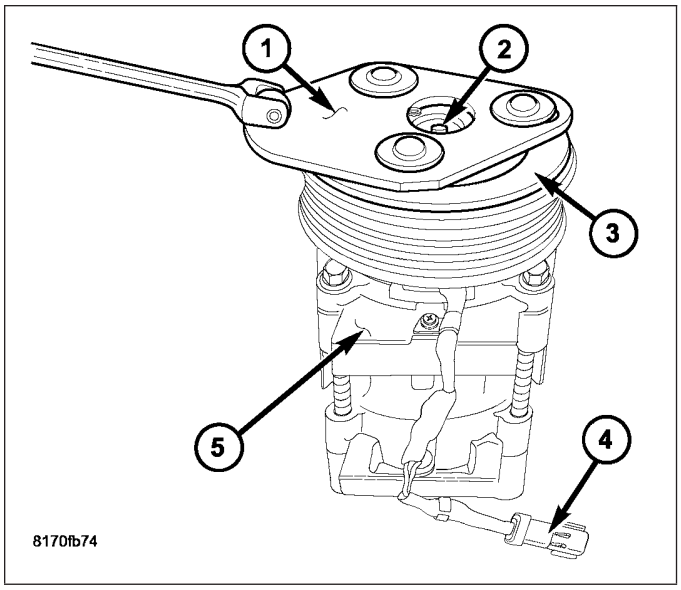


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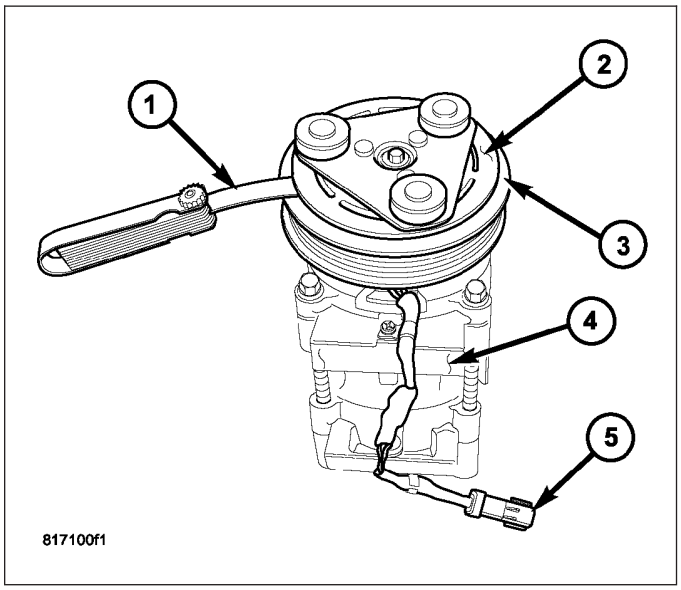
7. Verify that there is adequate clearance for the clutch field coil wire lead and connector (4) between the compressor housing and the pulley.

NOTE: When installing an original or a new clutch assembly, try the original shims first. When installing a clutch onto a compressor that previously did not have a clutch, use the 1.0, 0.50 and 0.13 millimeter (0.040, 0.020 and 0.005 inch) shims from the clutch hardware package which is provided with the new clutch.

8. Install the clutch shims onto the compressor shaft.
9. Using compressor clutch holding fixture (Special Tool 9351 in Kit 9349) (1), install the bolt (2) that secures the clutch plate (3) to the A/C compressor (5). Hold the clutch plate stationary with the holding fixture and tighten the bolt to 15 N·m (133 in. lbs.).



10. Using a feeler gauge (1), check the air gap between the clutch plate (2) and the pulley and bearing assembly (3). If the air gap is not 0.35 to 0.75 millimeter (0.014 to 0.030 inch), add or subtract shims as required.
11. Position the A/C compressor (4) onto the mounting bracket.
12. Install the bolts that secure the A/C compressor to the mounting bracket. Tighten the bolts to 23 N·m (17 ft. lbs.).
13. Connect the engine wire harness to the compressor clutch field coil connector (5).
14. Lower the vehicle.
15. Install the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).
16. Reconnect the negative battery cable.
17. Perform the Clutch Break-in Procedure (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C COMPRESSOR CLUTCH - STANDARD PROCEDURE).



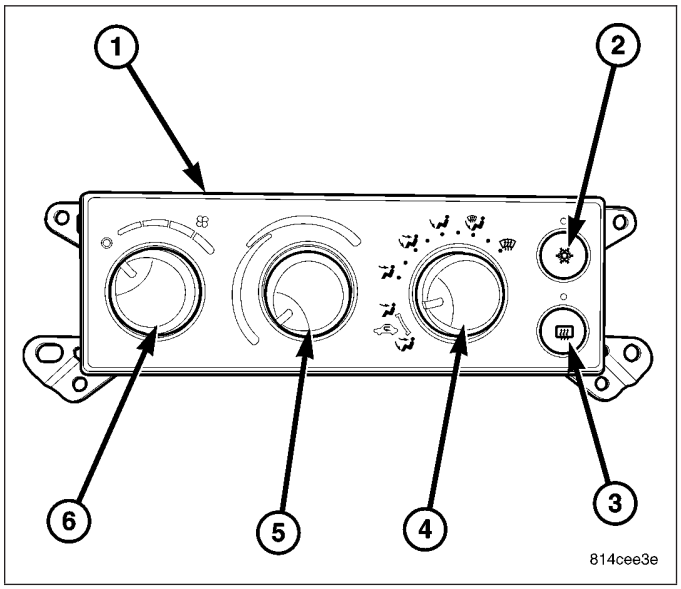
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CONTROL-A/C HEATER

DESCRIPTION

MANUAL SINGLE ZONE

The A/C-heater control (1) for the manual temperature control (MTC) single zone heating-A/C system allows one temperature setting for the entire vehicle. All controls are identified by ISO graphic symbols.



The A/C-heater control and integral computer is located in the instrument panel and contains:

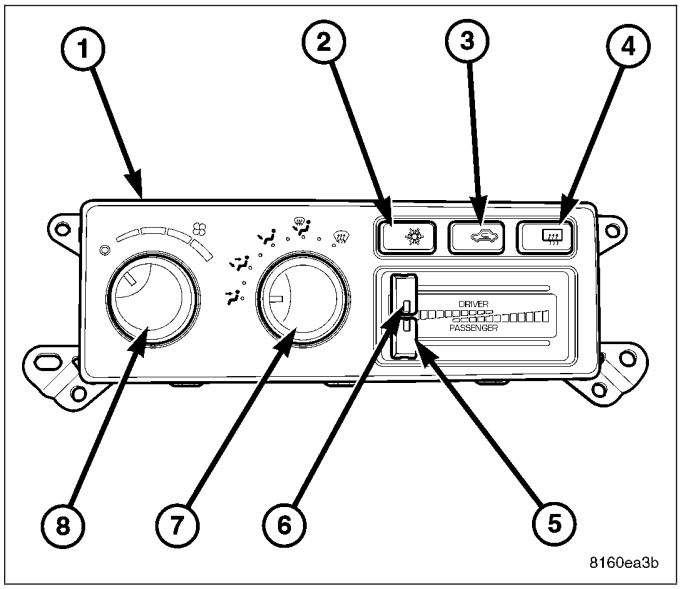
- a push button A/C on/off control (2). The Snowflake button contains an LED that illuminates when the A/C system is in operation.
- a push button rear window defogger on/off control (3) when equipped with the optional rear heated window. The defogger button contains an LED that illuminates when the rear window defogger (EBL) system is in operation.
- a rotary control knob for recirculation and mode control of the discharged air (4).
- a rotary control knob for temperature control of the discharged air (5).
- a rotary control knob for fan speed selection and turning the heating-A/C system off (6).

The A/C-heater control is diagnosed using a scan tool (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING and to 24 - HVAC Electrical Diagnostics for more information).

The A/C-heater control cannot be repaired and, if faulty or damaged, it must be replaced. The illumination lamps for the A/C-heater control are available for service replacement.

MANUAL DUAL ZONE

The A/C-heater control (1) for the manual temperature control (MTC) dual zone heating-A/C system allows both the driver and the front seat passenger the ability to individually regulate air temperature for their side of the vehicle. All controls are identified by ISO graphic symbols.



The dual zone A/C-heater control and integral computer is located in the instrument panel and contains:

- a push button A/C on/off control (2). The Snowflake button contains an LED that illuminates when the A/C system is in operation.
- a push button MAX A/C air recirculation control (3). The Recirculation button contains an LED that illuminates when the recirculation function is activated for high A/C demand.
- a push button rear window defogger on/off control (4). The defogger button contains an LED that illuminates when the rear window defogger system is in operation.
- two slid-type control levers for individual driver and front seat passenger temperature control of the discharged air (5 and 6).
- a rotary control knob for mode control of the discharged air (7).
- a rotary control knob for fan speed selection and turning the heating-A/C system off (8).

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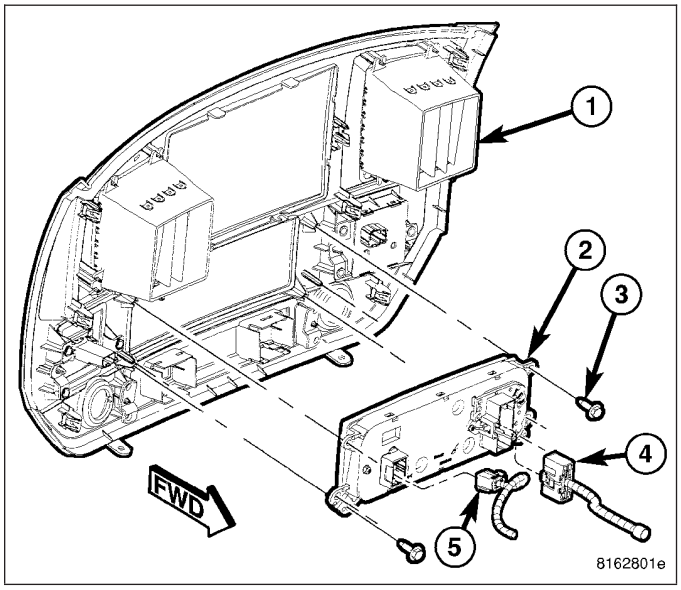
The A/C-heater control is diagnosed using a scan tool (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING and to 24 - HVAC Electrical Diagnostics for more information).

The A/C-heater control cannot be repaired and, if faulty or damaged, it must be replaced. The illumination lamps for the A/C-heater control are available for service replacement.

REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in an accidental airbag deployment and possible personal injury or death.

NOTE: Single zone A/C-heater control shown. Dual zone similar.



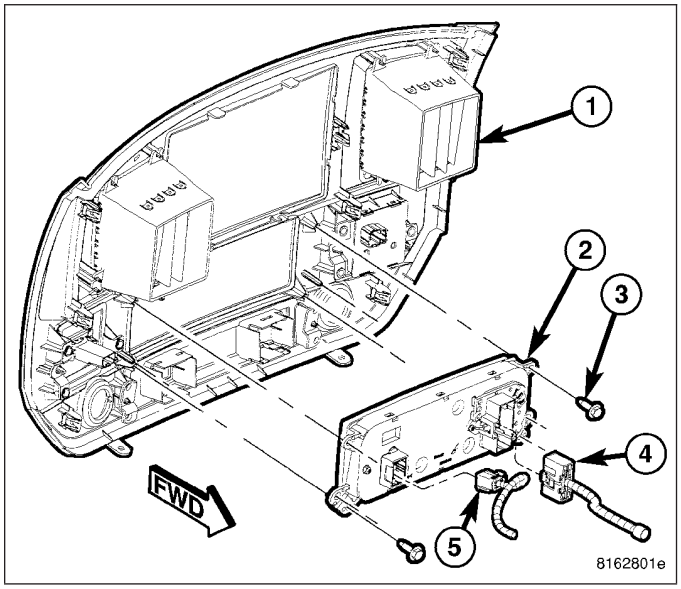
1. Disconnect and isolate the negative battery cable.
2. Remove the center bezel (1) from the instrument panel and disconnect the wire harness connectors (4 and 5) from the back of the A/C-heater control (2) (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL CENTER BEZEL - REMOVAL).

NOTE: Take the proper precautions to protect the front face of the center bezel from cosmetic damage.

3. Place the center bezel on a workbench and remove the four screws (3) that secure the A/C-heater control to the center bezel and remove the control.

INSTALLATION

NOTE: Single zone A/C-heater control shown. Dual zone similar.



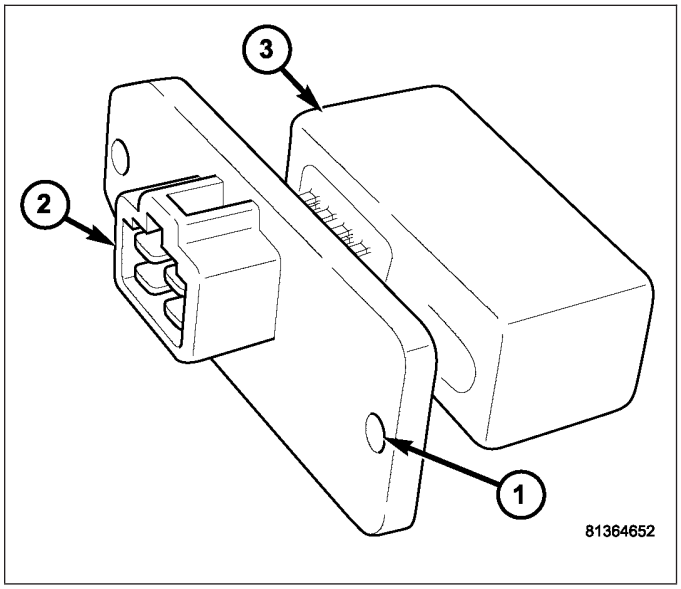
1. Position the A/C-heater control (2) into the back of the instrument panel center bezel (1).
2. Install the four screws (3) that secure the A/C-heater control to the center bezel. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Connect the wire harness connectors (4 and 5) to the back of the A/C-heater control and install the instrument panel center bezel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL CENTER BEZEL - INSTALLATION).
4. Reconnect the negative battery cable.

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RESISTOR-BLOWER MOTOR

DESCRIPTION

The blower motor resistor is mounted to the bottom of the HVAC housing, directly behind the glove box. The blower motor resistor consists of a molded plastic mounting plate (1) with an integral wire connector receptacle (2). Concealed behind the mounting plate are coiled resistor wires contained within a ceramic heat sink (3).



OPERATION

The blower motor resistor is connected to the vehicle electrical system through a dedicated wire lead and connector of the HVAC wire harness. The blower motor resistor has multiple resistor wires, each of which will reduce the current flow through the blower motor to change the blower motor speed.

The blower motor control for the heating-A/C system directs the ground path for the blower motor through the correct resistor wire to obtain the selected speed. With the blower motor control in the lowest speed position, the ground path for the blower motor is applied through all of the resistor wires. Each higher speed selected with the blower motor control applies the blower motor ground path through fewer of the resistor wires, increasing the blower motor speed.

The blower motor resistor cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

DIAGNOSIS AND TESTING

BLOWER MOTOR RESISTOR

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: For circuit descriptions and diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector from the blower motor resistor (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/RESISTOR-BLOWER MOTOR - REMOVAL).

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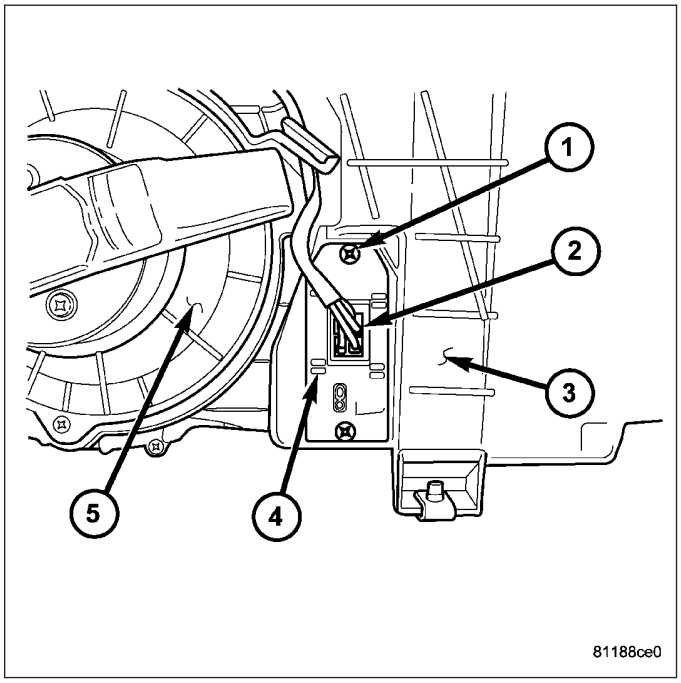
3. Using an ohmmeter, check for continuity between all of the blower motor resistor terminals. In each case there should be continuity. If OK, repair the wire harness circuits between the blower motor speed control and the blower motor resistor or blower motor as required. If not OK, replace the faulty blower motor resistor.

REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in an accidental airbag deployment and possible personal injury or death.

WARNING: The blower motor resistor may get very hot during normal operation. If the blower motor was turned on prior to servicing the blower motor resistor, wait five minutes to allow the blower motor resistors to cool before performing diagnosis or service. Failure to take this precaution can result in possible personal injury.

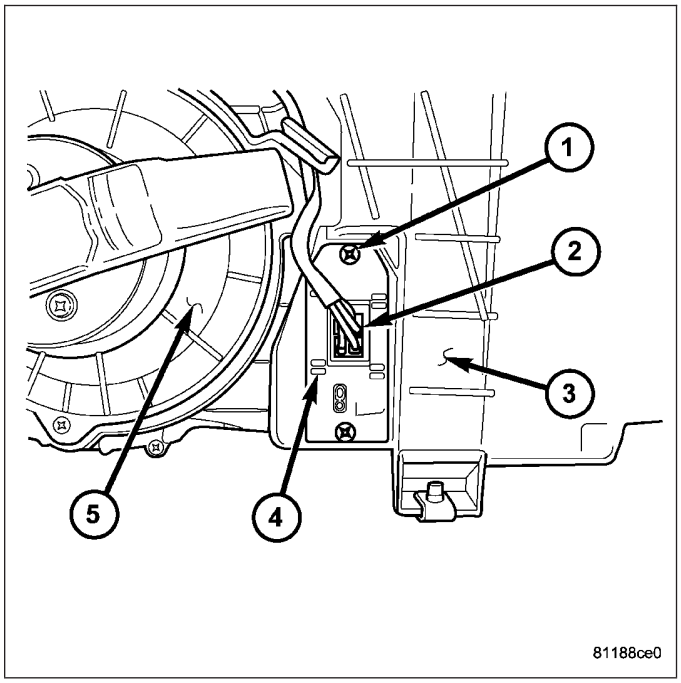
1. Disconnect and isolate the negative battery cable.
2. Reach under the instrument panel near the blower motor (5) and disconnect the wire harness connector (2) from the blower motor resistor (4).
3. Remove the two screws (1) that secure the blower motor resistor to the HVAC housing (3).
4. Remove the blower motor resistor from the HVAC housing.



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INSTALLATION

1. Position the blower motor resistor (4) into the opening of the HVAC housing (3) near the blower motor (5).
2. Install the two screws (1) that secure the blower motor resistor to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Connect the wire harness connector (2) to the blower motor resistor.
4. Reconnect the negative battery cable.

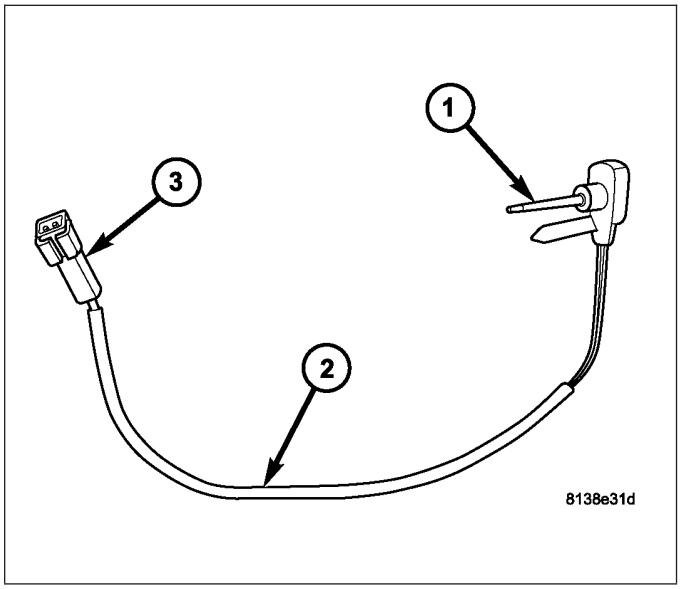


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SENSOR-EVAPORATOR TEMPERATURE

DESCRIPTION

The evaporator temperature sensor is a two-wire temperature sensing element located at the coldest point on the face of the A/C evaporator. The probe (1) for evaporator temperature sensor is attached to the evaporator coil fins. The wire lead (2) for evaporator temperature sensor is routed through an opening at the back of the HVAC housing and the connector (3) is attached to the HVAC wire harness.



OPERATION

The evaporator temperature sensor monitors the surface temperature of A/C evaporator and supplies an input signal to the A/C-heater control. The A/C-heater control uses the evaporator temperature sensor input signal to optimize A/C system performance and to protect the A/C system from evaporator freezing. The evaporator temperature sensor will change its internal resistance in response to the temperatures it monitors and is connected to the A/C-heater control through sensor ground circuit and a 5-volt reference signal circuit. As the temperature of the A/C evaporator decreases, the internal resistance of the evaporator temperature sensor decreases.

The A/C-heater control uses the monitored voltage reading as an indication of evaporator temperature. The A/C-heater control is programmed to respond to this input by requesting the powertrain control module (PCM) or the engine control module (ECM) (depending on engine application) to cycle the A/C compressor clutch as necessary to optimize A/C system performance and to protect the A/C system from evaporator freezing (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/COIL-A/C COMPRESSOR CLUTCH - OPERATION for more information).

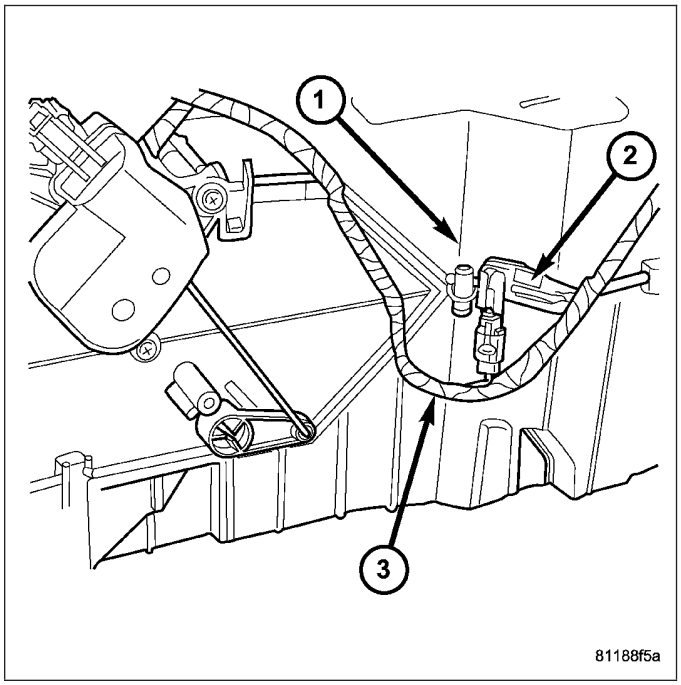
The evaporator temperature sensor is diagnosed using a scan tool (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING and to 24 - HVAC Electrical Diagnostics for more information).

The evaporator temperature sensor cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

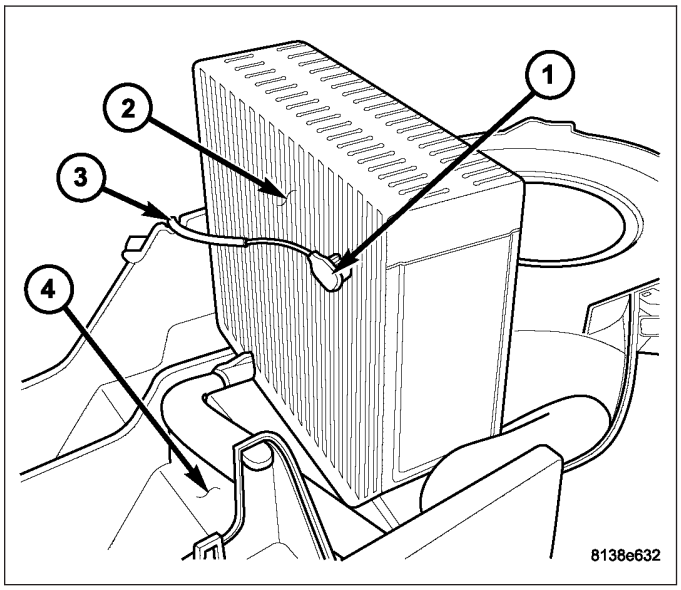
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REMOVAL

1. Remove the HVAC housing and place it on a workbench (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - REMOVAL).
2. Remove the wire lead for the evaporator temperature sensor (2) from the retainer located on the HVAC housing (1) and disconnect the sensor connector from the HVAC wire harness (3).
3. Remove the lower half of the HVAC housing from the upper half of the HVAC housing to gain access to the A/C evaporator (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - DISASSEMBLY).



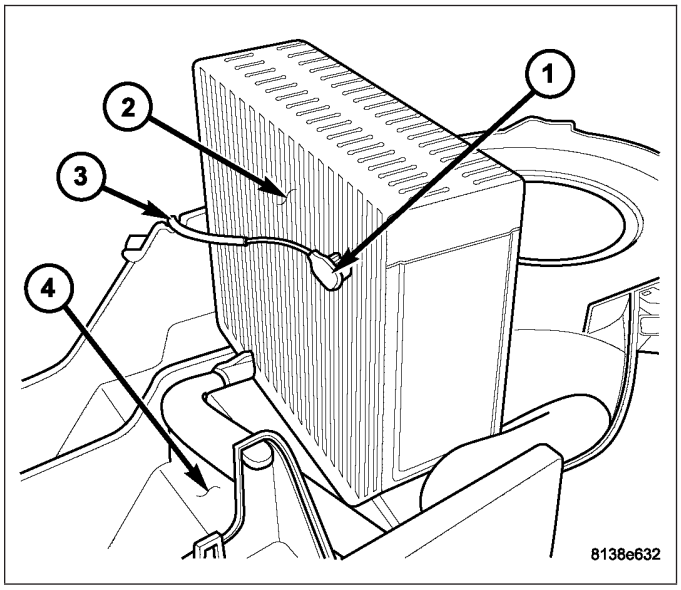
4. Carefully remove the probe of the evaporator temperature sensor (1) from the fins of the A/C evaporator (2).
5. Remove the wire lead of the evaporator temperature sensor (3) from the upper half of the HVAC housing (4).



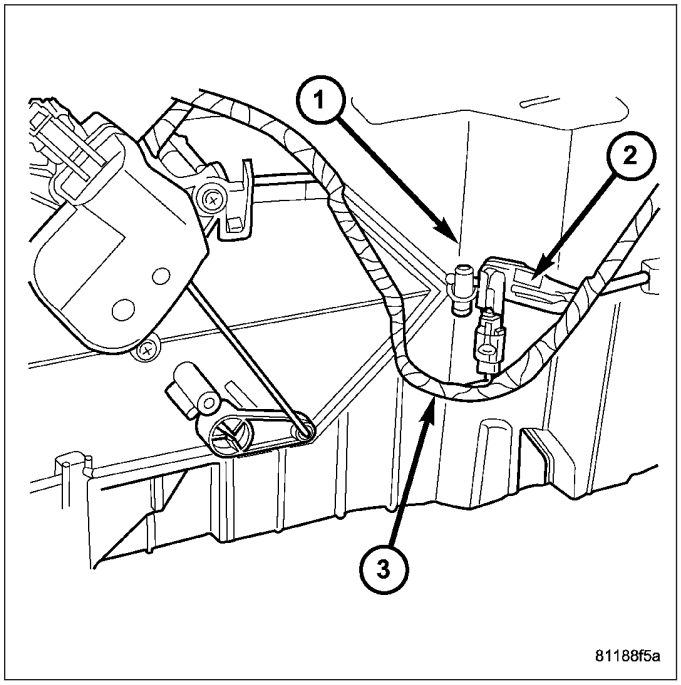
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INSTALLATION

1. Install the probe of the evaporator temperature sensor (1) between the fins of the A/C evaporator (2).
2. Route the wire lead for the evaporator temperature sensor (3) into the opening located on the upper half of the HVAC housing (4).



3. Assemble the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - ASSEMBLY).
4. Install the wire lead of the evaporator temperature sensor (2) to the retainer located on the HVAC housing (1) and connect the sensor connector to the HVAC wire harness (3).
5. Install the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - INSTALLATION).

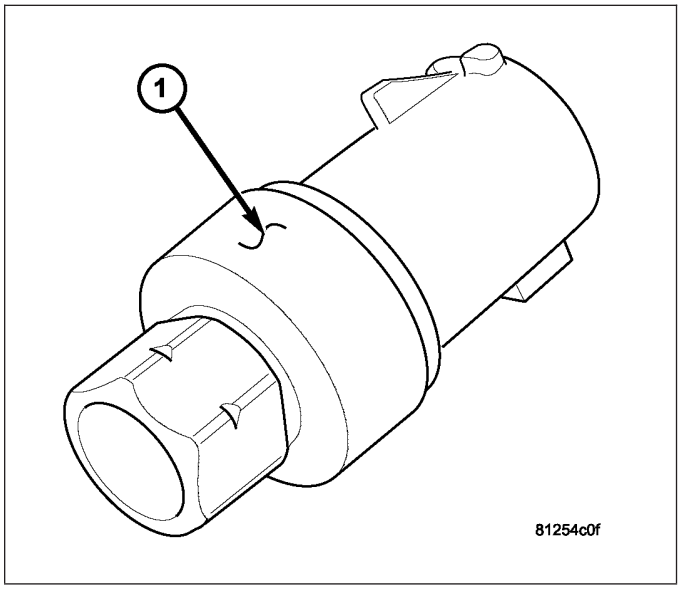


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TRANSDUCER-A/C PRESSURE

DESCRIPTION

The A/C pressure transducer (1) is a switch that is installed on a fitting located on the A/C discharge line. An internally threaded fitting on the A/C pressure transducer connects it to the externally threaded Schrader-type fitting on the A/C discharge line. A rubber O-ring seals the connection between the A/C pressure transducer and the discharge line fitting. The A/C pressure transducer is connected to the vehicle electrical system by a molded plastic connector with three terminals.



OPERATION

The A/C pressure transducer monitors the pressures in the high side of the refrigerant system through its connection to a fitting on the A/C discharge line. The A/C pressure transducer will change its internal resistance in response to the pressures it monitors. A Schrader-type valve in the A/C discharge line fitting permits the A/C pressure transducer to be removed or installed without disturbing the refrigerant in the A/C system.

The A/C pressure transducer will change its internal resistance in response to the pressures it monitors. The powertrain control module (PCM) or the engine control module (ECM) (depending on engine application) provides a five volt reference signal and a sensor ground to the A/C pressure transducer, then monitors the output voltage of the transducer on a sensor return circuit to determine refrigerant pressure. The PCM/ECM is programmed to respond to this and other sensor inputs by controlling the operation of the A/C compressor clutch and the radiator cooling fan to help optimize A/C system performance and to protect the system components from damage. The PCM will disengage the A/C compressor clutch when high side pressure rises above 3172 kPa (460 psi) and re-engage the clutch when high side pressure drops below 1999 kPa (290 psi). The A/C pressure transducer will also disengage the A/C compressor clutch if the high side pressure drops below 193 kPa (28 psi) and will re-engage the clutch when the high side pressure rises above 234 kPa (34 psi). If the refrigerant pressure rises above 1655 kPa (240 psi), the PCM will actuate the cooling fan. The A/C pressure transducer signal to the PCM/ECM will also prevent the A/C compressor clutch from engaging when ambient temperatures are below about 10° C (50° F) due to the pressure/temperature relationship of the refrigerant. The A/C pressure transducer input to the PCM/ECM will also prevent the A/C compressor clutch from engaging when ambient temperatures are below about 10° C (50° F) due to the pressure/temperature relationship of the refrigerant.

The A/C pressure transducer is diagnosed using a scan tool. Refer to 9 - Engine Electrical Diagnostics for more information.

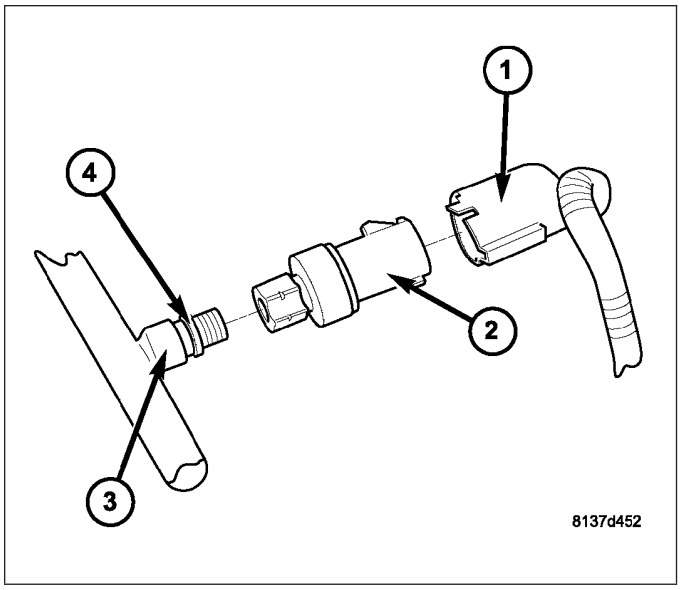
The A/C pressure transducer cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

REMOVAL

NOTE: It is not necessary to discharge the refrigerant system to replace the A/C pressure transducer.

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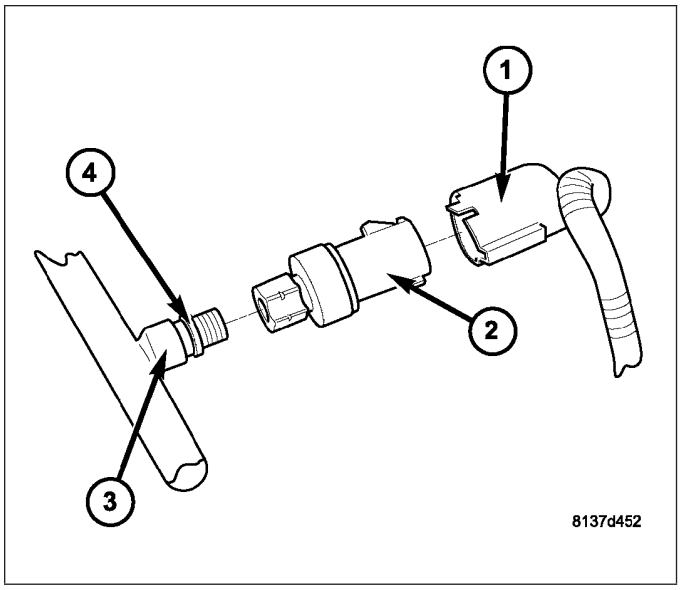
1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector (1) from the A/C pressure transducer (2) located on the A/C discharge line (3).
3. Remove the A/C pressure transducer from the fitting on the A/C discharge line and remove and discard the O-ring seal.



INSTALLATION

NOTE: Use only the specified O-ring as it is made of special material for R-134a. Use only refrigerant oil of the type required for the A/C compressor.

1. Lubricate a new rubber O-ring seal (4) with clean refrigerant oil and install it onto the discharge line fitting (3).
2. Install the A/C pressure transducer (2) onto the A/C discharge line. Tighten the A/C pressure transducer securely.
3. Connect the wire harness connector (1) to the A/C pressure transducer.
4. Reconnect the negative battery cable.



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DISTRIBUTION

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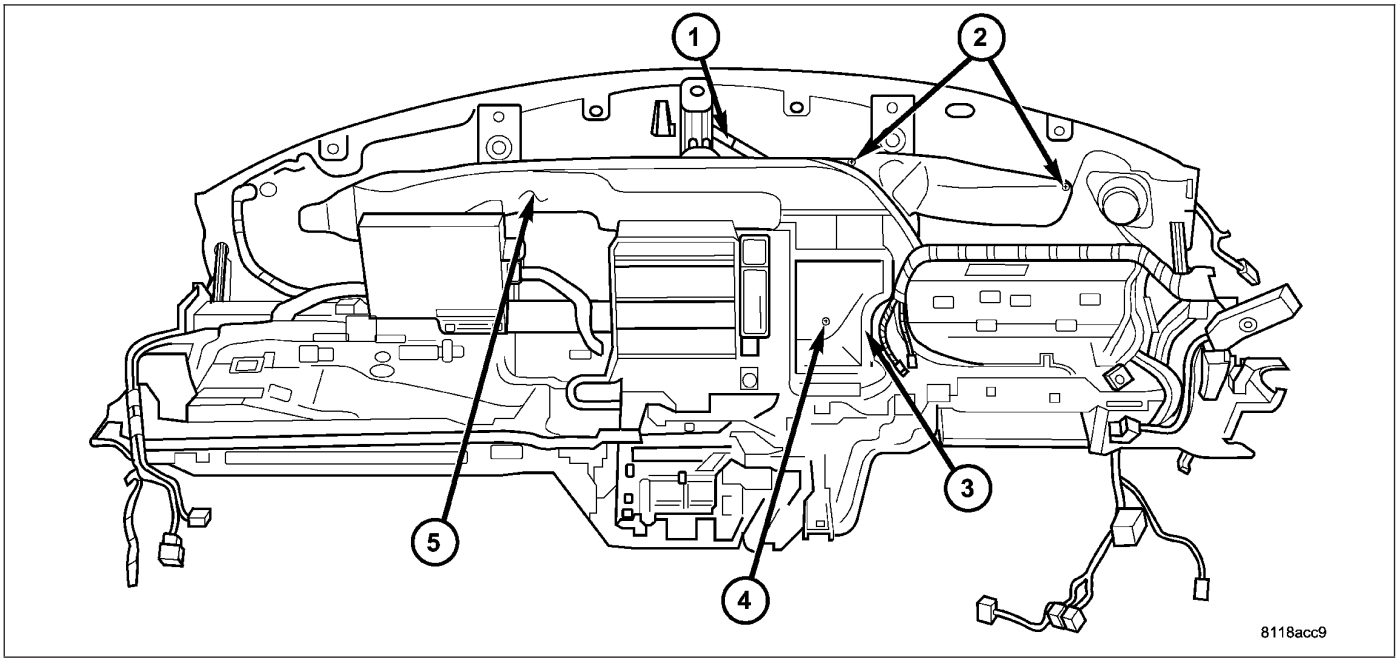
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DUCT-DEFROSTER

REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

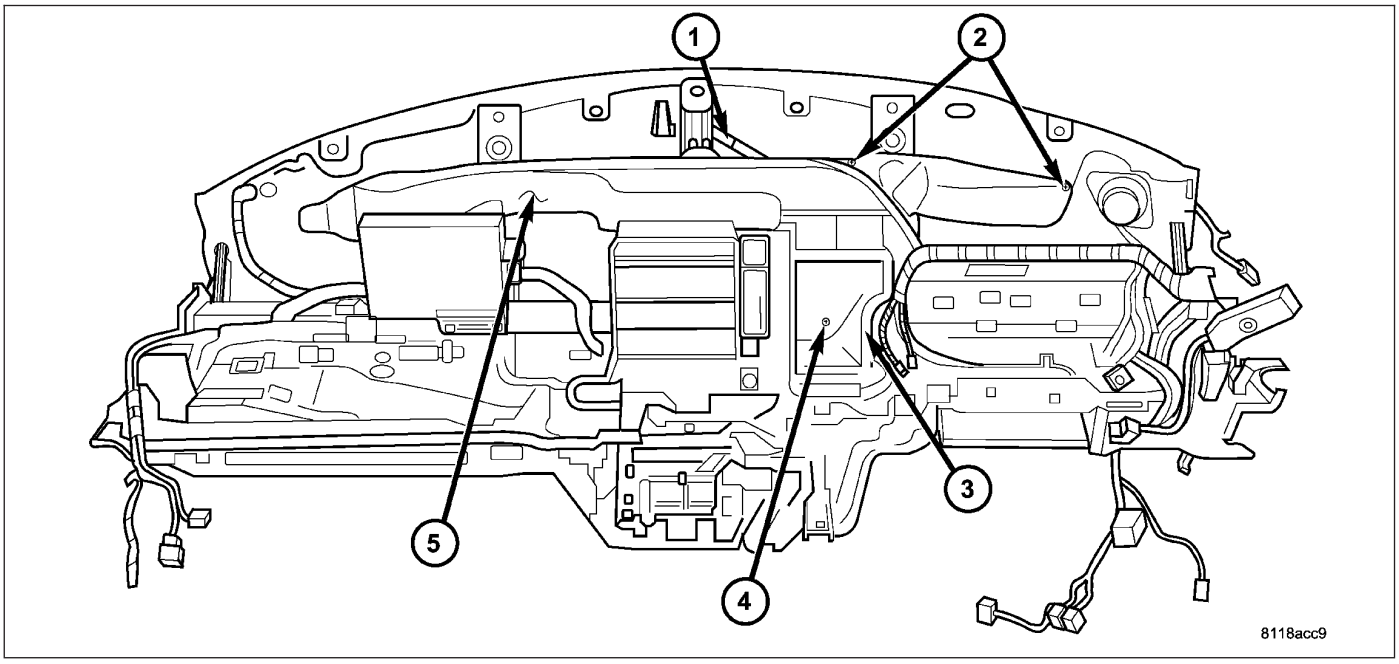
NOTE: Take the proper precautions to protect the instrument panel from cosmetic damage.



1. Remove the instrument panel and place it on a workbench (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - REMOVAL).
2. If required, disconnect the center radio speaker wire harness connector (1) and position it the wire harness lead out of the way.
3. Remove the screw (4) that secures the defroster duct adapter (3) to the instrument panel support.
4. Remove the defroster duct adapter from the defroster duct (5).
5. Remove the six screws (2) that secure the defroster duct to the instrument panel.
6. Remove the defroster duct from the instrument panel.

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INSTALLATION



1. Position the defroster duct (5) into the instrument panel.
2. Install the six screws (2) that secure the defroster duct to the instrument panel. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Install the defroster duct adapter (3) onto the defroster duct.
4. Install the screw (4) that secures the defroster duct adapter to the instrument panel support. Tighten the screw to 2.2 N·m (20 in. lbs.).
5. If removed, connect the center radio speaker wire harness connector (1) to the speaker.
6. Install the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).

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DUCT-FLOOR CONSOLE

REMOVAL

NOTE: Illustration shown with seat cushions removed from view for clarity.



1. Remove the floor console (Refer to 23 - BODY/INTERIOR/FLOOR CONSOLE - REMOVAL).
2. Slide the floor console duct (1) rearward and first disconnect it from the floor distribution duct (3) located on the bottom of the HVAC housing (4), then disconnect the floor duct from the rear duct (33) located below the center seat.
3. If required, remove the rear duct from the center seat support.

INSTALLATION

NOTE: Illustration shown with seat cushions removed from view for clarity.



1. If removed, install the rear duct (2) to the bottom of the center seat support. Make sure the duct is fully engaged to the rear outlets.
2. Install the floor console duct (1) onto the rear duct and then slide it forward and connect it to the floor distribution duct (3) located at the bottom of the HVAC housing (4). Make sure all ducts are fully to each other.
3. Install the floor console (Refer to 23 - BODY/INTERIOR/FLOOR CONSOLE - INSTALLATION).

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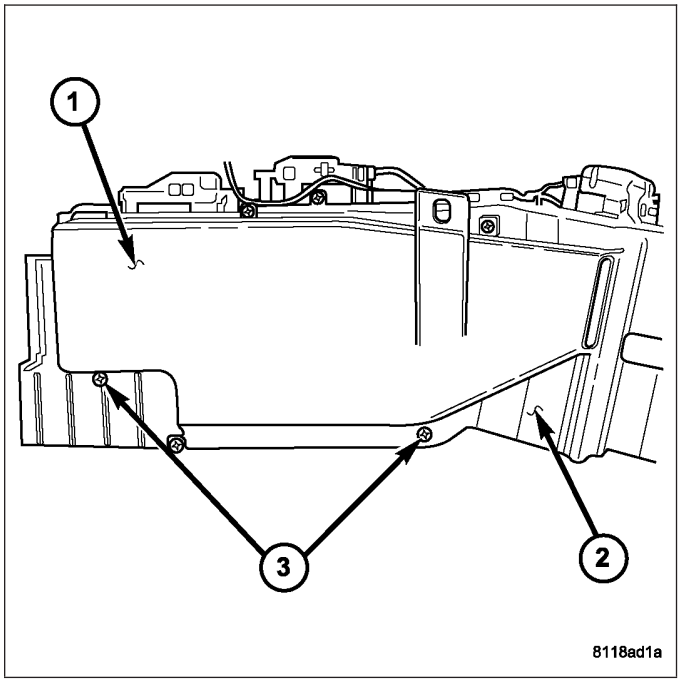
DUCT-FLOOR DISTRIBUTION

REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in an accidental airbag deployment and possible personal injury or death.

NOTE: Regular Cab model shown. Other models similar.

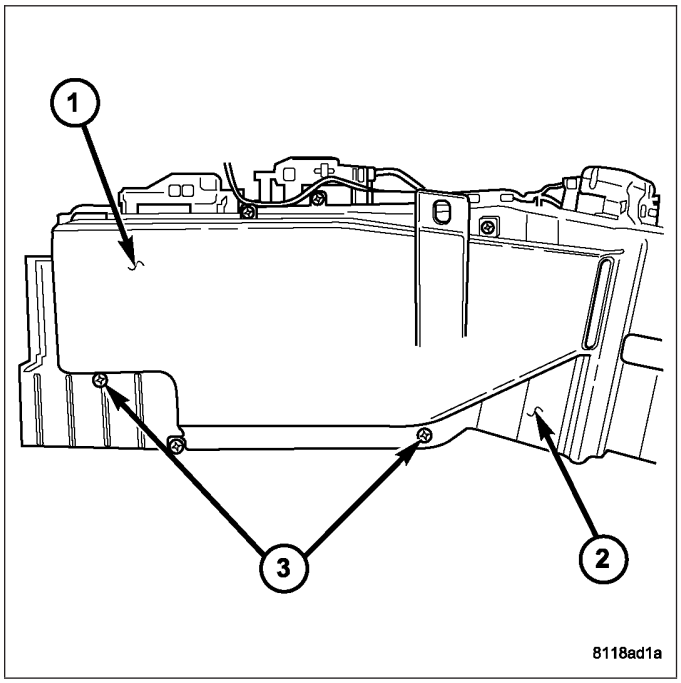
1. Remove the HVAC housing from the vehicle (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - REMOVAL).
2. Remove the screws (3) that secure the floor distribution duct (1) to the bottom of the HVAC housing (2).
3. Remove the floor distribution duct from the HVAC housing.



INSTALLATION

NOTE: Regular Cab model shown. Other models similar.

1. Position the floor distribution duct (1) onto the bottom of the HVAC housing (2).
2. Install the screws (3) that secure the floor distribution duct to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Install the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - INSTALLATION).



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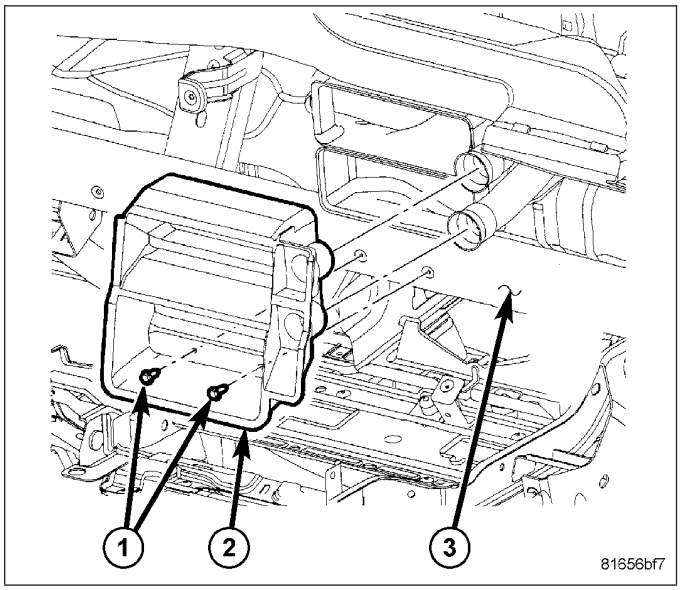
DUCT-INSTRUMENT PANEL

REMOVAL

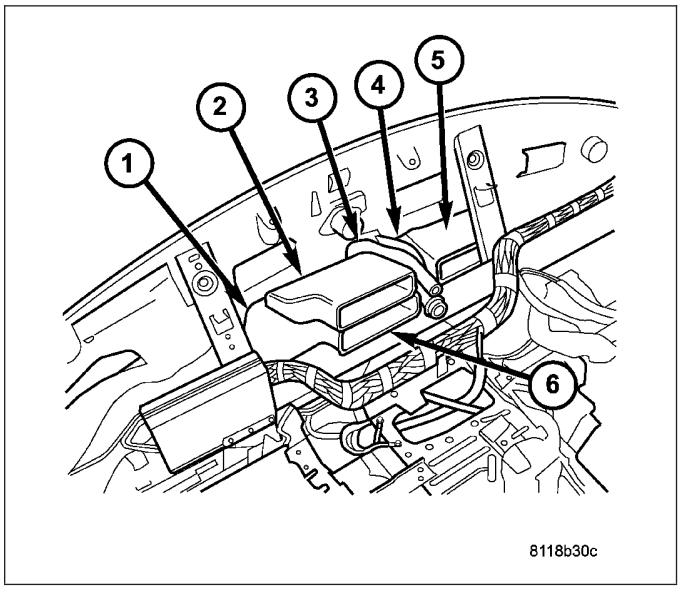
WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in an accidental airbag deployment and possible personal injury or death.

NOTE: Take the proper precautions to protect the instrument panel from cosmetic damage.

1. Remove the instrument panel and place it on a workbench (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - REMOVAL).
2. Remove the radio (Refer to 8 - ELECTRICAL/AUDIO/RADIO - REMOVAL).
3. Remove the defroster duct (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/DUCT-DEFROSTER - REMOVAL).
4. Remove the two screws (1) that secure the center distribution duct (2) to the instrument panel support (3) and remove the duct.



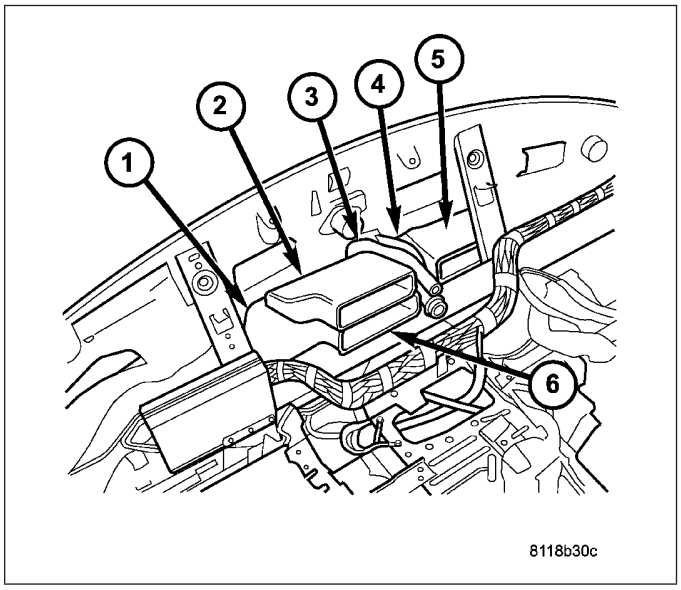
5. Disconnect the right side instrument panel duct adapter (2) from the right side instrument panel duct (1) and remove the adapter.
6. Remove the screw that secures each intermediate demister duct (3 and 4) to the instrument panel cover.
7. Disconnect the intermediate demister ducts from the demister ducts and remove the intermediate ducts.
8. Disconnect the left side instrument panel duct adapter (6) from the right side instrument panel duct (5) and remove the adapter
9. Remove the instrument panel cover (Refer to 23 - BODY/INSTRUMENT PANEL/COVER-INSTRUMENT PANEL - REMOVAL).
10. Remove the three screws that secure each instrument panel duct to the instrument panel support and remove the ducts.



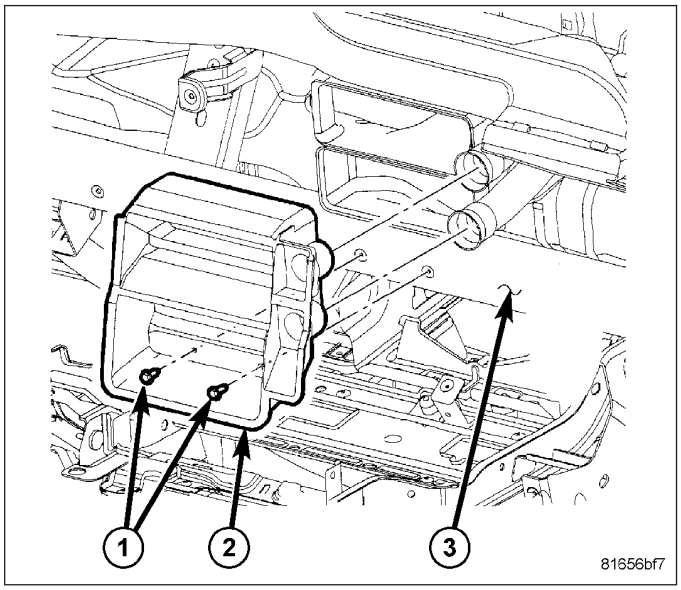
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INSTALLATION

1. Position the instrument panel ducts (1 and 5) onto the instrument panel support.
2. Install the three screws that secure each instrument panel duct to the instrument panel support. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Install the instrument panel cover (Refer to 23 - BODY/INSTRUMENT PANEL/COVER-INSTRUMENT PANEL - INSTALLATION).
4. Position the left side instrument panel duct adapter (6) into the instrument panel and connect it to the left panel duct.
5. Position the intermediate demister ducts (3 and 4) into the instrument panel and connect them to the demister ducts.
6. Install the screw that secures each intermediate demister duct to the instrument panel cover. Tighten the screws to 2.2 N·m (20 in. lbs.).



7. Position the right side instrument panel duct adapter (2) into the instrument panel and connect it to the right panel duct.
8. Position the center distribution duct (2) to the instrument panel support (3).
9. Install the two screws (1) that secure the center distribution duct to the instrument panel support. Tighten the screws to 2.2 N·m (20 in. lbs.).
10. Install the defroster duct (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/DUCT-DEFROSTER - INSTALLATION).
11. Install the radio (Refer to 8 - ELECTRICAL/AUDIO/RADIO - INSTALLATION).
12. Install the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).



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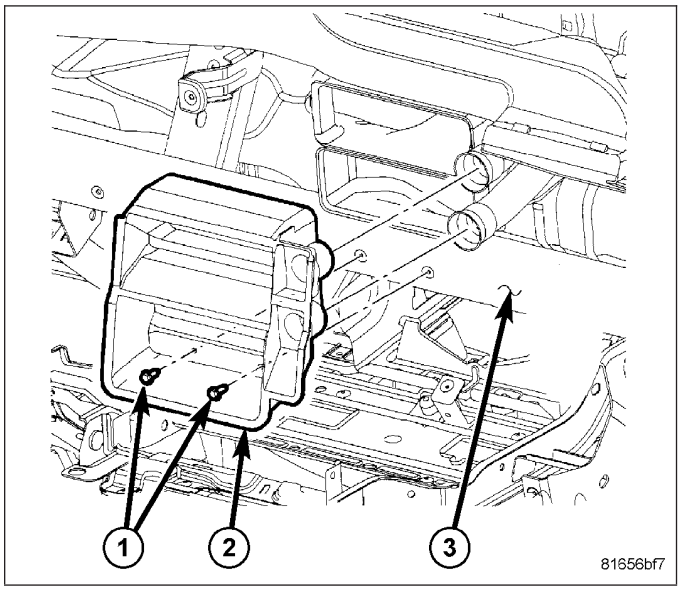
DUCT-INSTRUMENT PANEL DEMISTER

REMOVAL

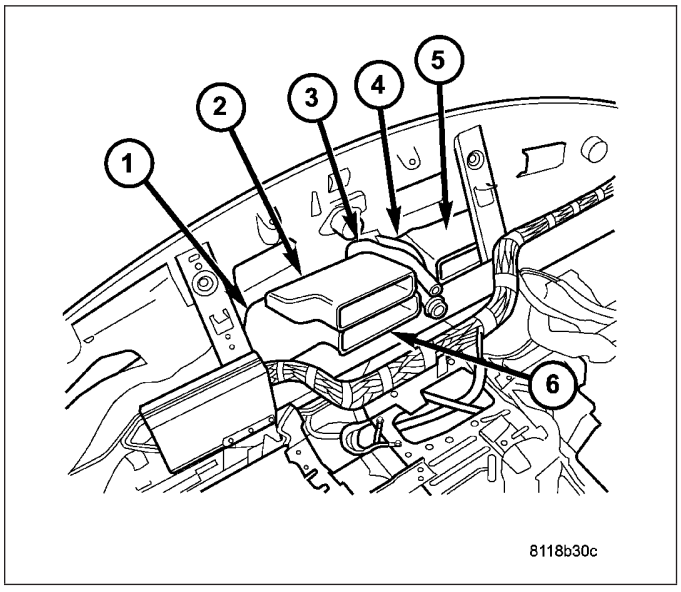
WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in an accidental airbag deployment and possible personal injury or death.

NOTE: Take the proper precautions to protect the instrument panel from cosmetic damage.

1. Remove the instrument panel and place it on a workbench (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - REMOVAL).
2. Remove the radio (Refer to 8 - ELECTRICAL/AUDIO/RADIO - REMOVAL).
3. Remove the defroster duct (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/DUCT-DEFROSTER - REMOVAL).
4. Remove the two screws (1) that secure the center distribution duct (2) to the instrument panel support (3) and remove the duct.



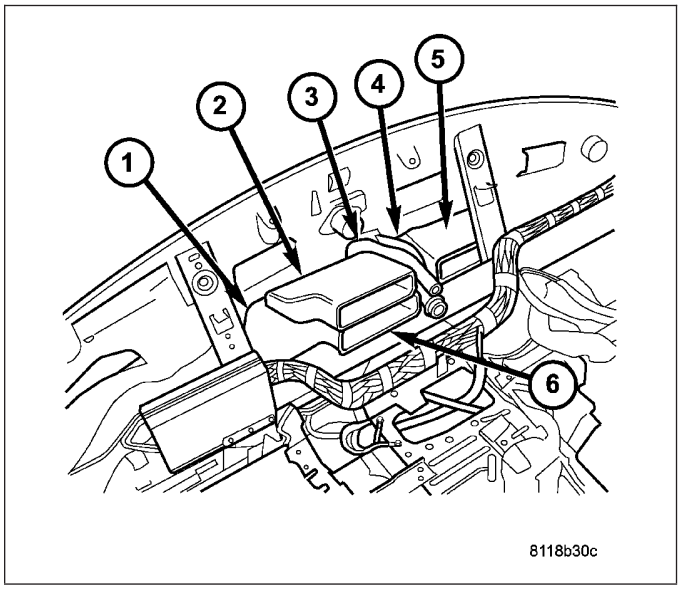
5. Disconnect the right side instrument panel duct adapter (2) from the right side instrument panel duct (1) and remove the adapter.
6. Remove the screw that secures each intermediate demister duct (3 and 4) to the instrument panel cover.
7. Disconnect the intermediate demister ducts from the demister ducts and remove the intermediate ducts.
8. Disconnect the left side instrument panel duct adapter (6) from the right side instrument panel duct (5) and remove the adapter
9. Remove the instrument panel cover (Refer to 23 - BODY/INSTRUMENT PANEL/COVER-INSTRUMENT PANEL - REMOVAL).
10. Remove the two screws that secure each demister duct to the instrument panel cover and remove the ducts.



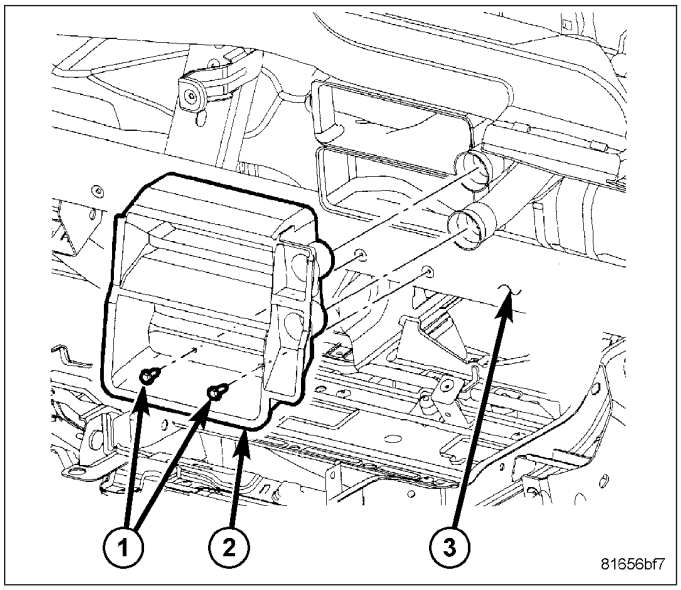
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INSTALLATION

1. Position the demister ducts onto the instrument panel cover.
2. Install the two screws that secure each demister duct to the instrument panel cover. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Install the instrument panel cover (Refer to 23 - BODY/INSTRUMENT PANEL/COVER-INSTRUMENT PANEL - INSTALLATION).
4. Position the left side instrument panel duct adapter (6) into the instrument panel and connect it to the left panel duct.
5. Position the intermediate demister ducts (3 and 4) into the instrument panel and connect them to the demister ducts.
6. Install the screw that secures each intermediate demister duct to the instrument panel cover. Tighten the screws to 2.2 N·m (20 in. lbs.).



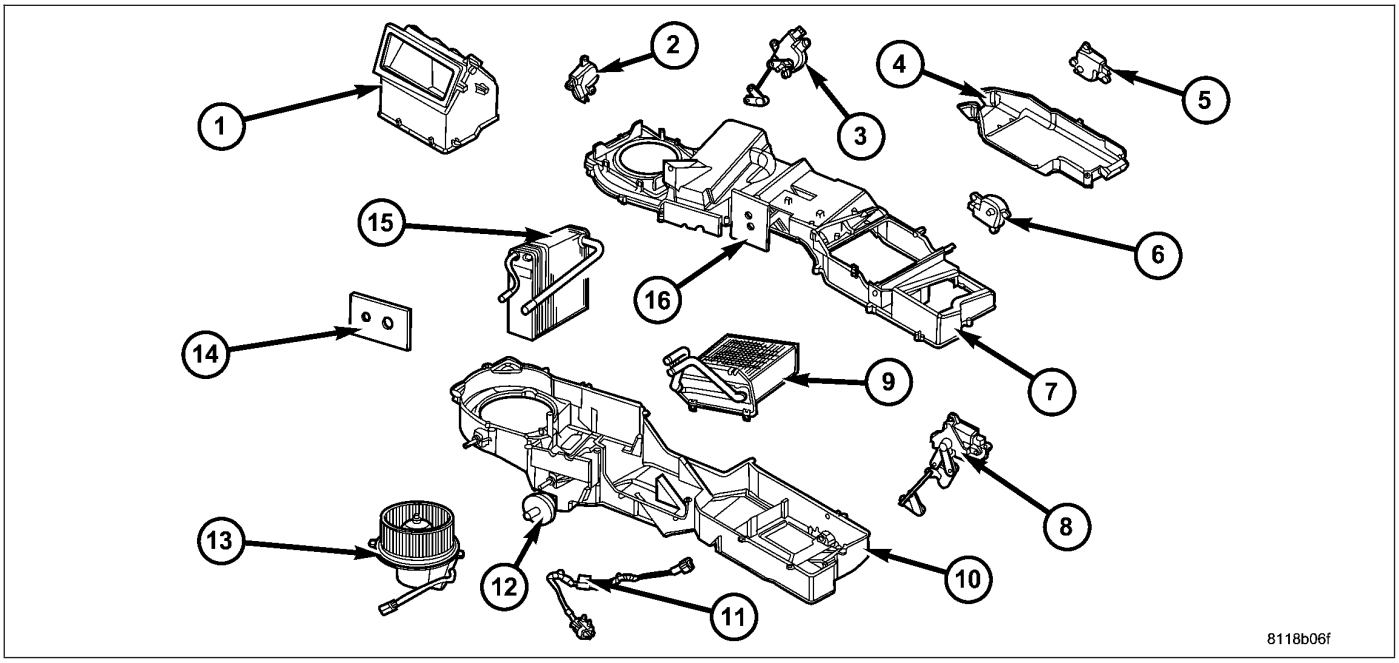
7. Position the right side instrument panel duct adapter (2) into the instrument panel and connect it to the right panel duct.
8. Position the center distribution duct (2) to the instrument panel support (3).
9. Install the two screws (1) that secure the center distribution duct to the instrument panel support. Tighten the screws to 2.2 N·m (20 in. lbs.).
10. Install the defroster duct (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/DUCT-DEFROSTER - INSTALLATION).
11. Install the radio (Refer to 8 - ELECTRICAL/AUDIO/RADIO - INSTALLATION).
12. Install the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).



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HOUSING-HVAC

DESCRIPTION



All models are equipped with a common HVAC housing assembly that combines A/C and heating capabilities into a single unit mounted within the passenger compartment. The HVAC housing assembly consists of the following:

- **HVAC housing** — The HVAC housing consists of an upper housing (7) and a lower housing (10) that are attached together by screws and is mounted to the dash panel behind the instrument panel. The HVAC housing contains the heater core (9), A/C evaporator (15), blend-air and mode-air doors, and has mounting provisions for the air-door actuators (3, 5, 6 and 8), floor distribution duct (4), blower motor (13), blower motor resistor, foam seals (12, 14 and 16) and the HVAC wire harness (11).
- **Air inlet housing** — The air inlet housing (1) is mounted to the right end of the HVAC housing and contains the recirculation-air door and has mounting provisions for the recirculation door actuator (2).

The heating-A/C system is a blend-air type system. The blend-air doors control the amount of conditioned air that is allowed to flow through, or around, the heater core. The dual zone heating A/C system uses two blend door actuators while the single zone system uses only one blend door actuator.

The A/C system is designed for the use of a non-CFC, R-134a refrigerant and uses an A/C evaporator to cool and dehumidify the incoming air prior to blending it with the heated air. A temperature control determines the discharge air temperature by operating the blend door actuator(s), which moves the blend-air door(s). This allows an almost immediate control of the output air temperature of the system. The mode door actuator operates the mode-air doors which direct the flow of the conditioned air out the various air outlets, depending on the mode selected. The recirculation door actuator operates the recirculation-air door which closes off the fresh air intake and recirculates the air already inside the vehicle. The electric door actuators are connected to the vehicle electrical system by the HVAC wire harness. The blower motor controls the velocity of air flowing through the HVAC housing assembly by spinning the blower wheel within the HVAC housings at the selected speed by use of the blower motor resistor.

The HVAC housing must be removed from the vehicle and disassembled for service of the heater core, A/C evaporator, evaporator temperature sensor, blend-air and mode-air doors. The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

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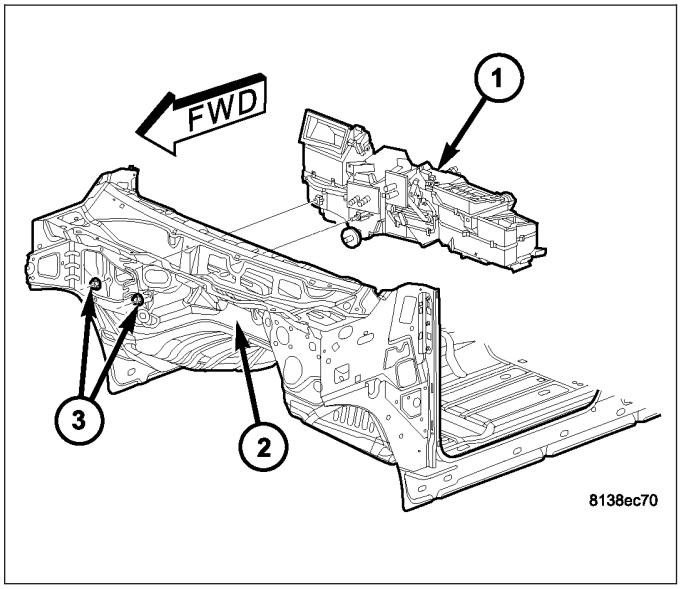
REMOVAL

HVAC HOUSING ASSEMBLY

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

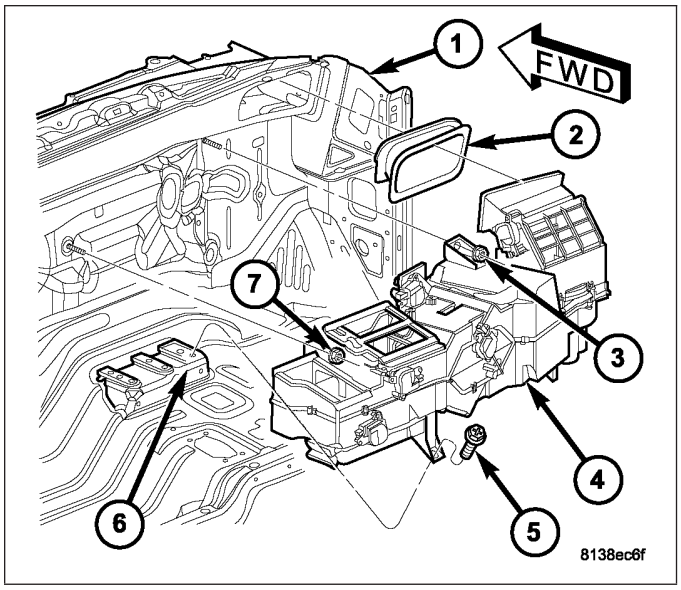
NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator, evaporator temperature sensor, mode-air and blend-air doors.



1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Drain the engine cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - COOLING SYSTEM DRAIN).
3. Disconnect and isolate the negative battery cable.
4. Disconnect the A/C liquid line and the A/C accumulator from the A/C evaporator (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C LIQUID - REMOVAL) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ACCUMULATOR-A/C - REMOVAL).
5. Disconnect the heater hoses from the heater core tubes.
6. Remove the powertrain control module (PCM) to gain access to the two nuts (3) that secure the HVAC housing (1) to the engine compartment side of the dash panel (2) and remove the nuts (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES/POWERTRAIN CONTROL MODULE - REMOVAL).

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7. On Mega Cab models, remove the floor console duct (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/DUCT-FLOOR CONSOLE - REMOVAL).
8. Remove the instrument panel from the passenger compartment (Refer to 23 - BODY/INSTRUMENT PANEL ASSEMBLY - REMOVAL).
9. Remove the bolt (5) that secures the HVAC housing (4) to the floor bracket (6).
10. Remove the two nuts (3 and 7) that secure the HVAC housing to the passenger compartment side of the dash panel (1).
11. Pull the HVAC housing assembly rearward and remove the housing assembly from the passenger compartment.
12. If required, remove the fresh air inlet (2) from the dash panel (1).



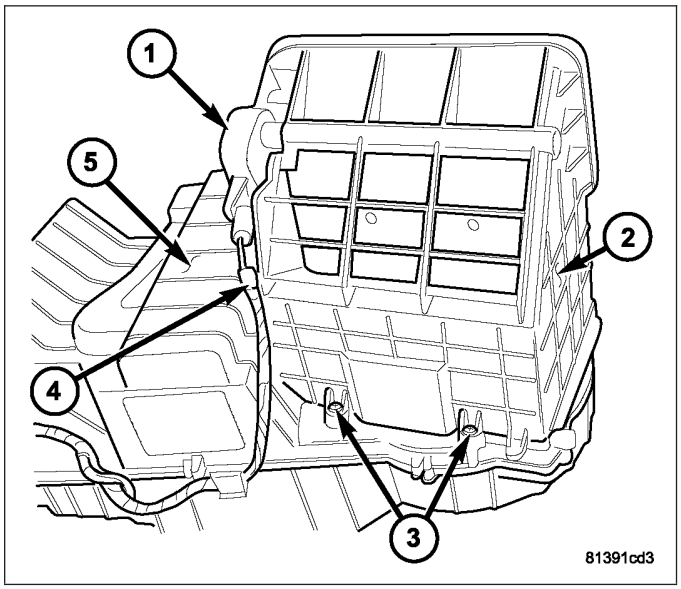
AIR INLET HOUSING

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

1. Remove the HVAC housing assembly (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - HVAC HOUSING ASSEMBLY - REMOVAL).
2. Remove the recirculation door actuator (1) from the air inlet housing (2) and disconnect the HVAC wire harness (4) from the actuator.
3. Remove the two screws (3) that secure the rear of the air inlet housing to the top of the HVAC housing (5).

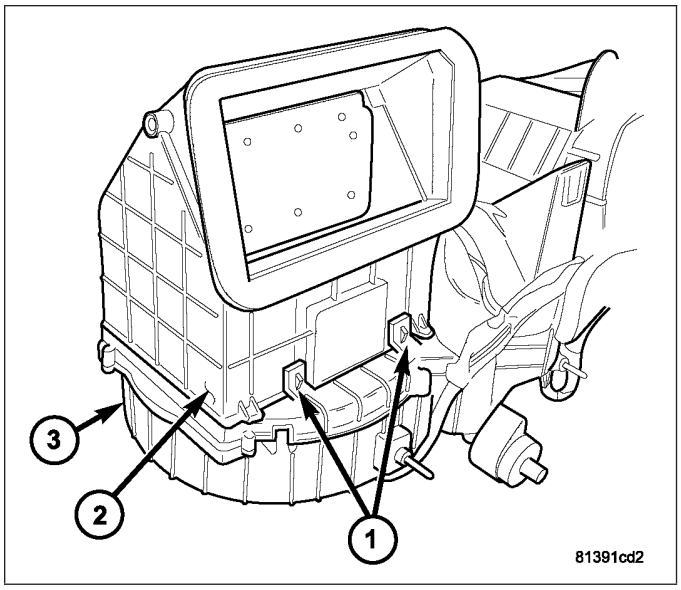


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4. Release the two retaining clips (1) that secure the front of the air inlet housing (2) to the top of the HVAC housing (3) and remove the air inlet housing.

NOTE: If the foam seal on the air inlet housing is deformed or damaged, it must be replaced.

5. If required, disassemble the air inlet housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC ASSEMBLY - AIR INLET HOUSING - DISASSEMBLY).

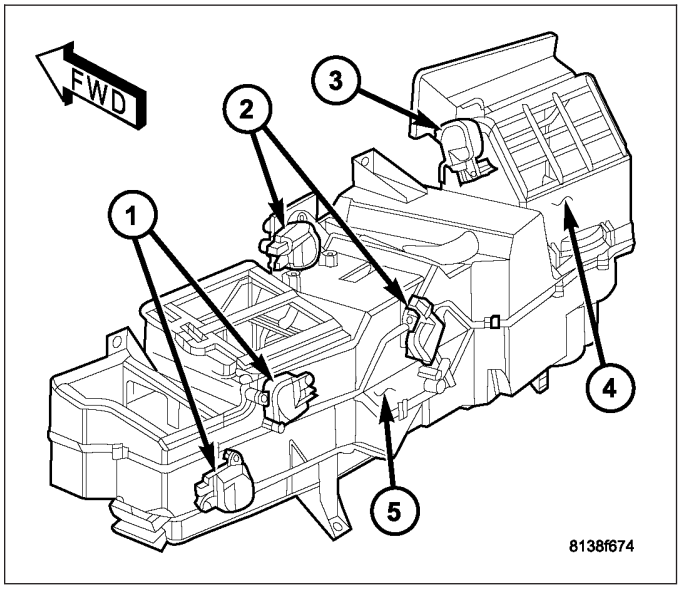


DISASSEMBLY

HVAC HOUSING

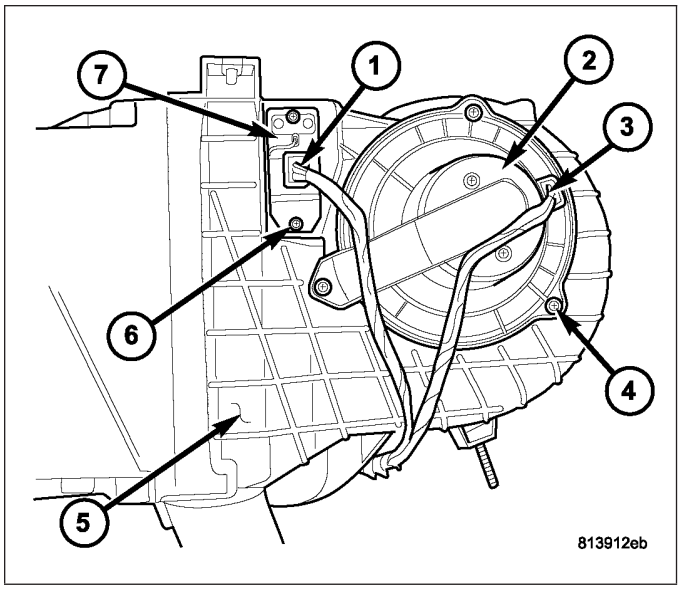
NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator, evaporator temperature sensor, mode-air and blend-air doors.

1. Remove the HVAC housing assembly and place it on a workbench (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION /HOUSING-HVAC - HVAC HOUSING ASSEMBLY - REMOVAL).
2. Disconnect the HVAC wire harness connectors from the mode door actuators (1), blend door actuators (2) and the recirculation door actuator (3).
3. Remove the screws that secure the mode door actuators and the blend door actuators to the HVAC housing (5) and remove the actuators.
4. Remove the screws that secure the recirculation door actuator to the air inlet housing (4) and remove the actuator.

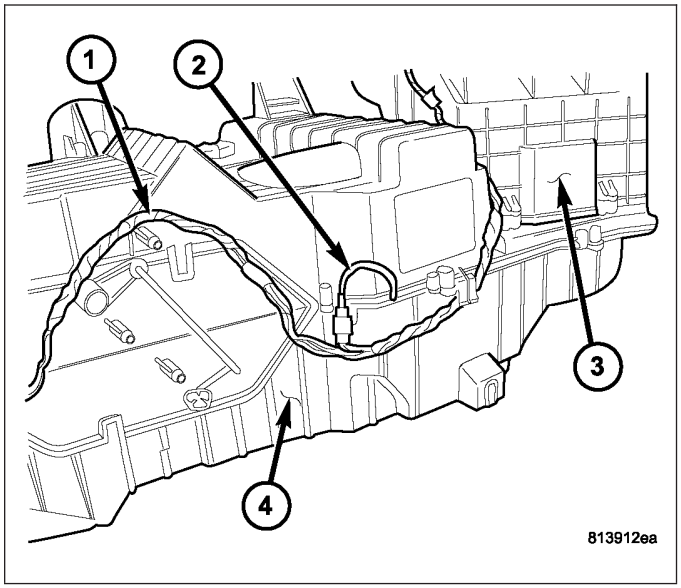


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5. Disconnect the wire harness connectors (1 and 3) from the blower motor resistor (7) and the blower motor (2).
6. Remove the screws (4) that secure the blower motor to the HVAC housing (5) and remove the blower motor.
7. Remove the screws (6) that secure the blower motor resistor to the HVAC housing and remove the resistor.



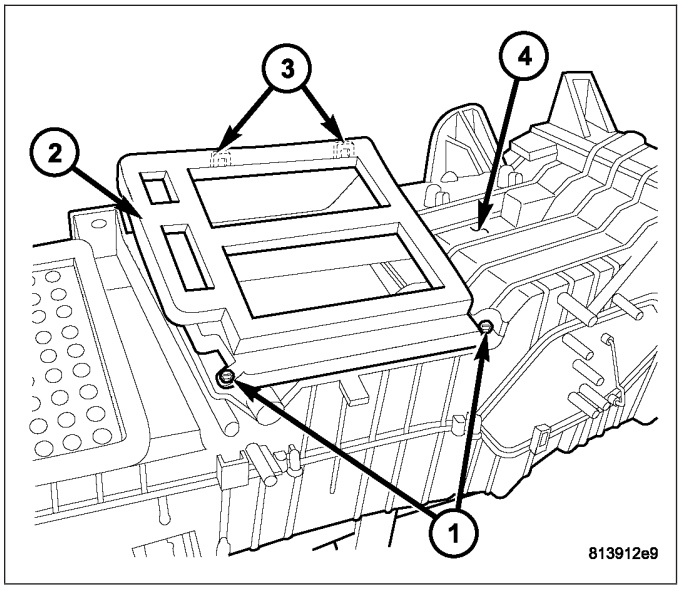
8. Disconnect the HVAC wire harness (1) from the evaporator temperature sensor (2) and remove the HVAC wiring harness from the HVAC housing (4).
9. Remove the air inlet housing (3) from the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - AIR INLET HOUSING - REMOVAL).



10. Remove the two screws (1) that secure the panel/floor door outlet (2) to the top of the HVAC housing (4).

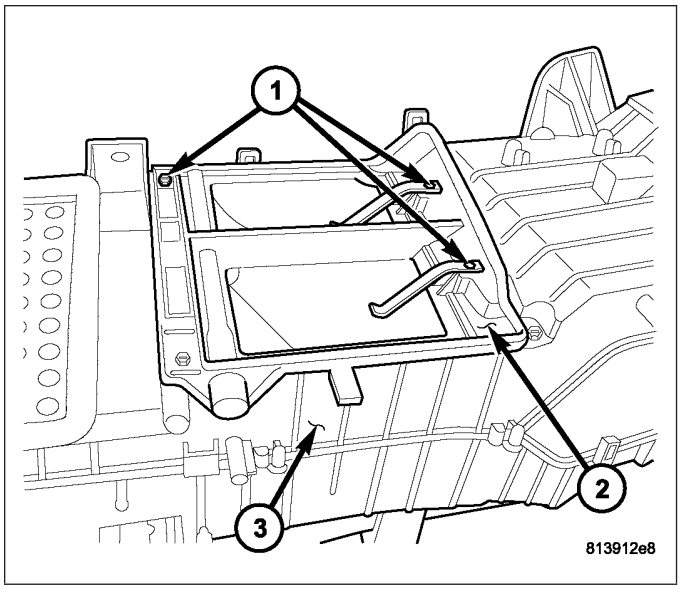
NOTE: If the foam seal on the panel/floor door outlet is deformed or damaged, it must be replaced.

11. Release the two retaining tabs (3) that secure the panel/floor door outlet to the front of the HVAC housing and remove the door outlet.



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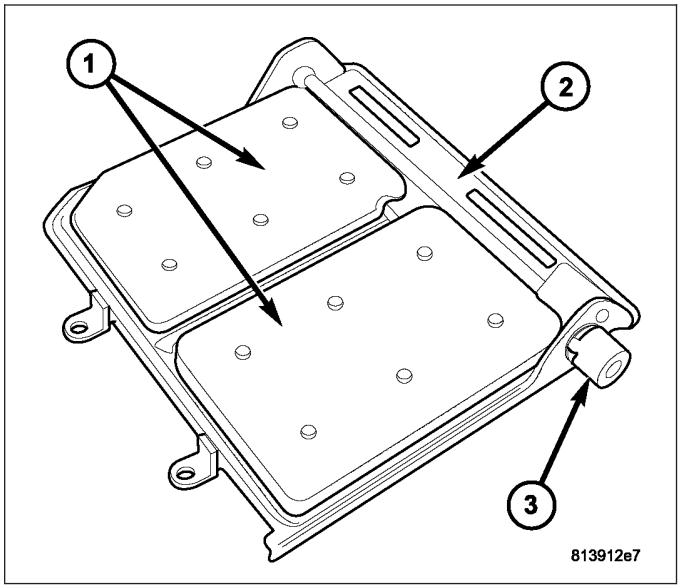
12. Remove the three screws (1) that secure the panel/floor door assembly (2) to the top of the HVAC housing (3) and remove the door assembly.



13. To remove the panel/floor-air doors (1) from the panel/floor door plate (2), first carefully release the retaining tabs of actuator coupler (3) located on the inside surface of the door plate and pull the actuator coupler out of the pivot shaft of the panel/floor-air doors.

NOTE: If the seals on the air doors is deformed or damaged, the air doors must be replaced.

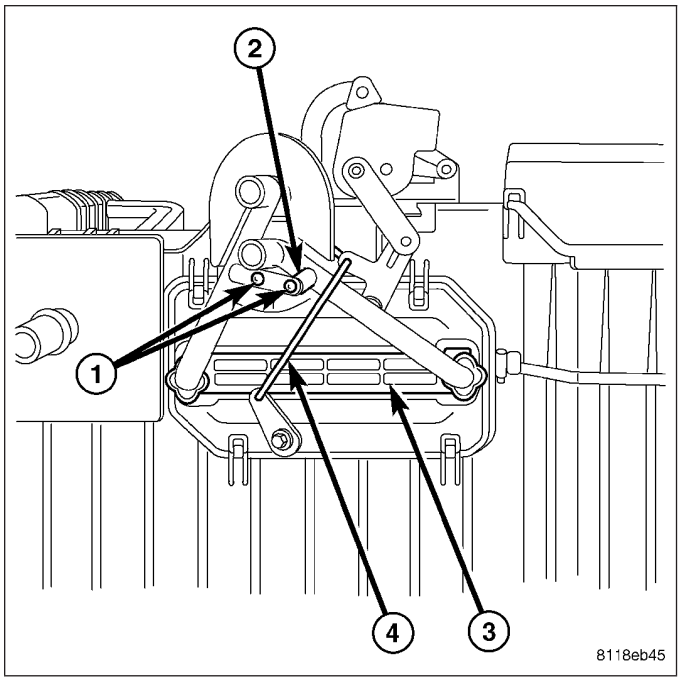
14. Remove the panel/floor-air doors from the panel/floor door plate.



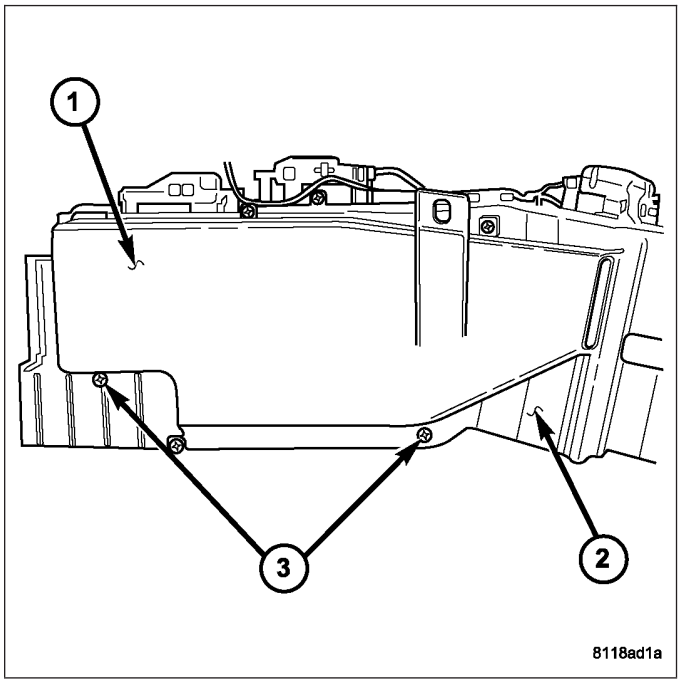
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NOTE: If the foam seal for the heater core tubes is deformed or damaged, the seal must be replaced.

15. Remove the foam seal from the heater core tubes.
16. If equipped with the dual zone heating-A/C system, remove the linkage rod (4) to gain access to the heater core (3).
17. Remove the two screws (1) that secure the heater core tube bracket (2) to the HVAC housing and remove the bracket.
18. Carefully pull the heater core out of the front of the HVAC housing.
19. Inspect all heater core foam seals and replace as required.



20. Remove the screws (3) that secure the floor distribution duct (1) to the bottom of the HVAC housing (2).
21. Remove the floor distribution duct from the HVAC housing.

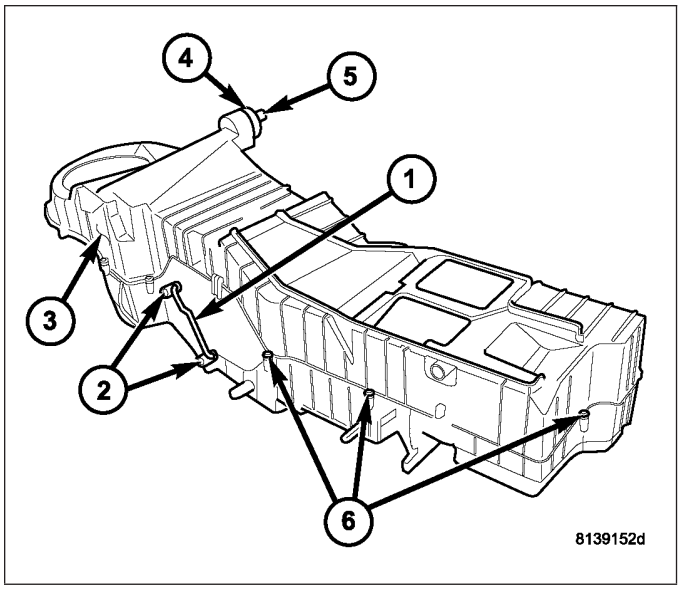


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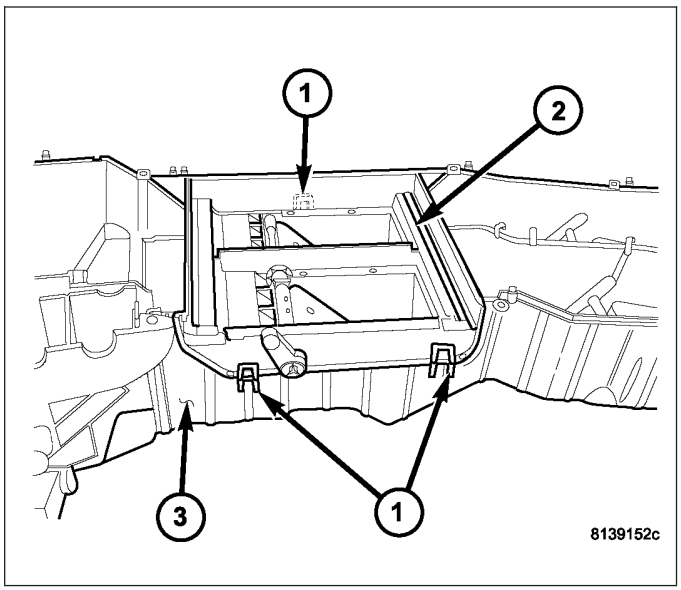
22. Carefully disconnect the linkage rod (1) from the two blend-air door levers (2) located on the back of the HVAC housing (3).

NOTE: If the foam seal for the evaporator condensate drain tube is deformed or damaged, the seal must be replaced.

23. Remove the foam seal (4) from the evaporator condensate drain tube (5).
24. Remove the fifteen screws (6) that secure the upper and lower HVAC housing halves together and separate the housing halves.



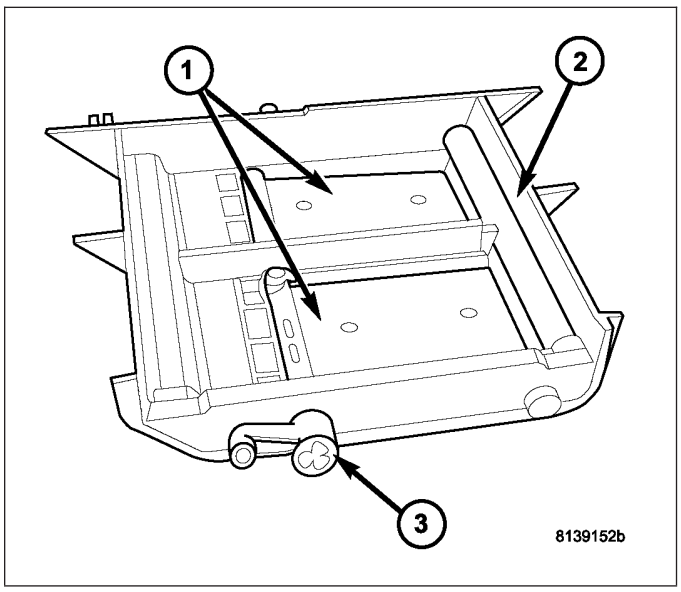
25. Release the three retaining tabs (1) that secure the lower blend door assembly (2) to the lower half of the HVAC housing (3) and remove the door assembly.
26. Release the three retaining tabs that secure the upper blend door assembly to the upper half of the HVAC housing and remove the door assembly.



27. To remove the blend-air doors (1) from each blend door plate (2), first carefully release the retaining tabs of actuator coupler (3) located on the inside surface of the door plate being serviced and pull the actuator coupler out of the pivot shaft of the blend-air doors.

NOTE: If the seals on the air doors is deformed or damaged, the air doors must be replaced.

28. Remove the blend-air doors from the blend door plates.

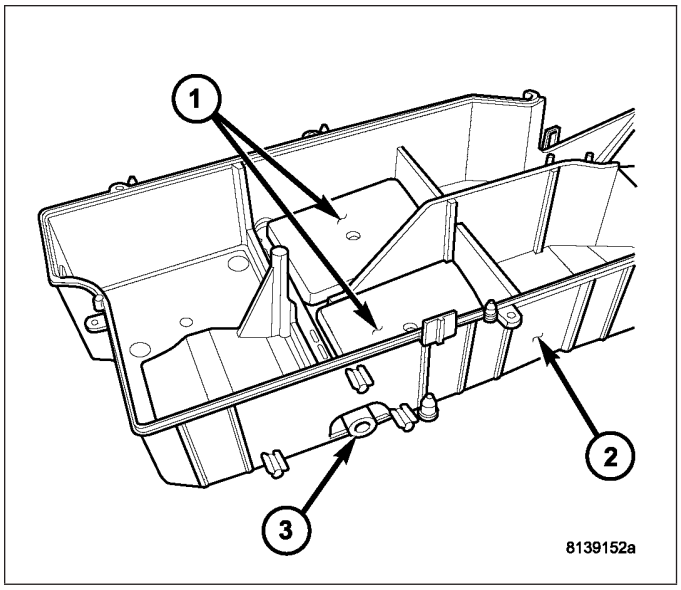


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29. Remove the defroster-air doors (1) from the lower half of the HVAC housing (2) by carefully release the retaining tabs of actuator coupler (3) located on the inside surface of the housing and pull the actuator coupler out of the pivot shaft of the defroster-air doors.

NOTE: If the seals on the air doors is deformed or damaged, the air doors must be replaced.

30. Remove the defroster-air doors from the HVAC housing.



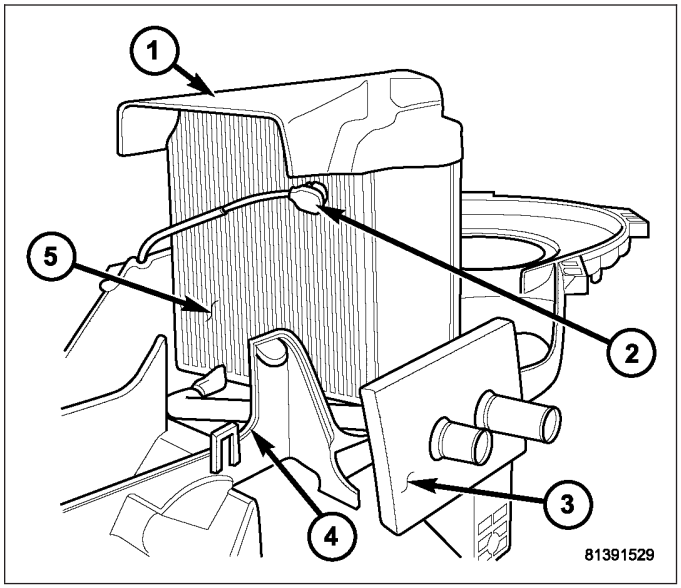
31. Remove the insulator (1) from the A/C evaporator (5).
32. Remove the probe of the evaporator temperature sensor (2) from the fins of the A/C evaporator.

NOTE: If the foam seal for the A/C evaporator tubes is deformed or damaged, the seal must be replaced.

33. Remove the foam seal (3) from the tubes of the A/C evaporator.

NOTE: If the foam seal around the A/C evaporator is deformed or damaged, the seal must be replaced.

34. Carefully lift the A/C evaporator out of the upper half of the HVAC housing (4).

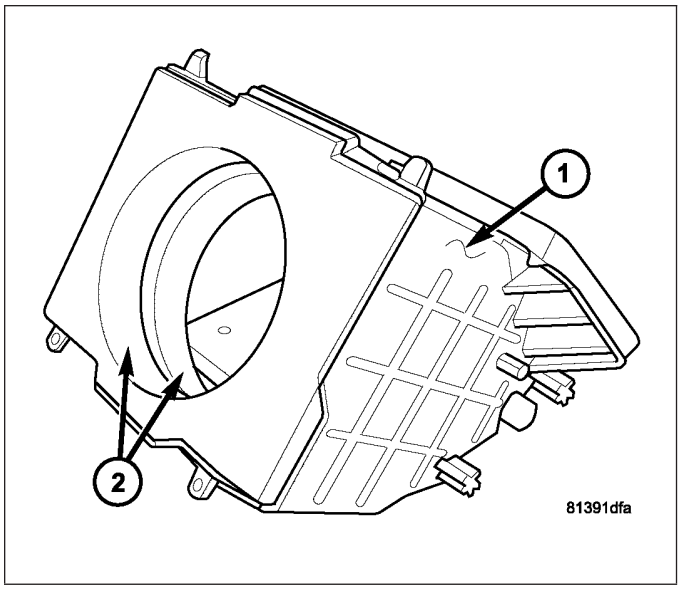


AIR INLET HOUSING

NOTE: The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

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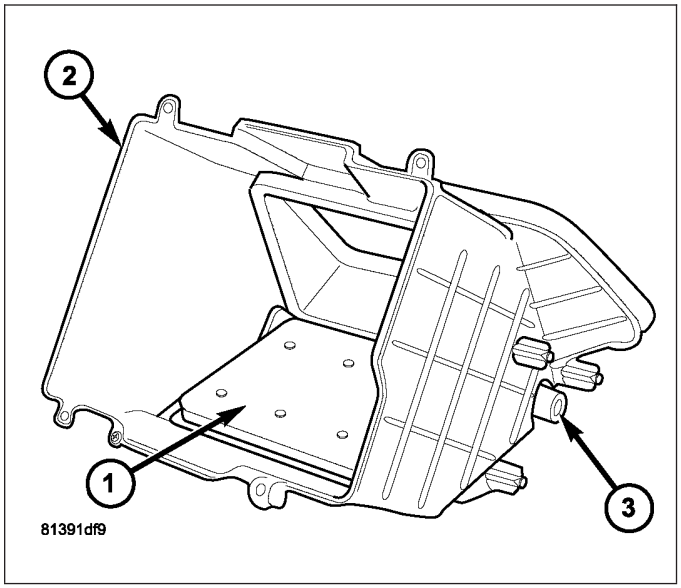
1. Remove the air inlet housing (1) from the HVAC housing and place it on a workbench (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/ HOUSING-HVAC - AIR INLET HOUSING - REMOVAL)
2. Remove the two foam insulators (2) from the air inlet housing.



3. To remove the recirculation-air door (1) from the air inlet housing (2), first carefully release the retaining tabs of actuator coupler (3) located on the inside surface of the air inlet housing and pull the actuator coupler out of the pivot shaft of the recirculation-air door.

NOTE: If the seals on the air door is deformed or damaged, the air door must be replaced.

4. Remove the recirculation-air door from the air inlet housing.

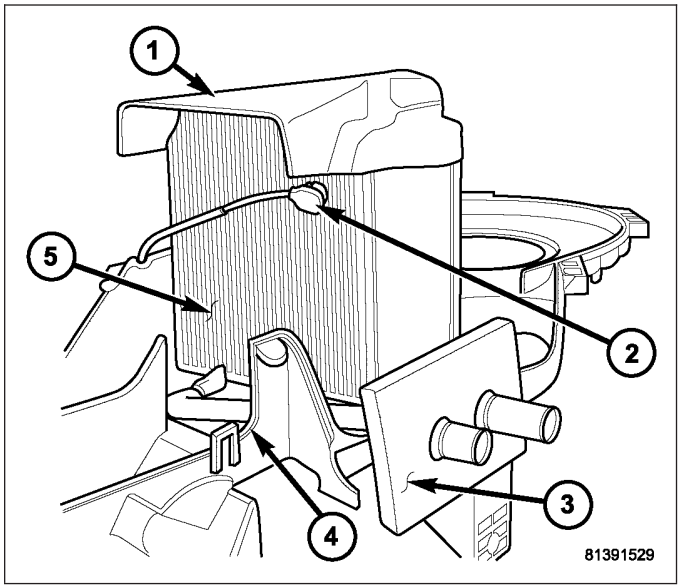


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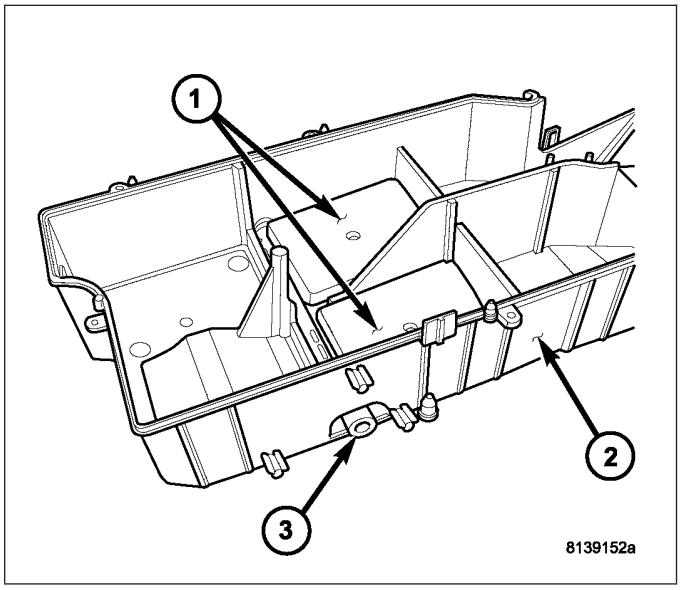
ASSEMBLY

HVAC HOUSING

1. Carefully install the A/C evaporator (2) into the upper half of the HVAC housing (4).
2. Install the foam seal (3) onto the tubes of the A/C evaporator.
3. Install the probe of the evaporator temperature sensor (2) between the fins of the A/C evaporator.
4. Install the insulator (1) onto the bottom of the A/C evaporator.

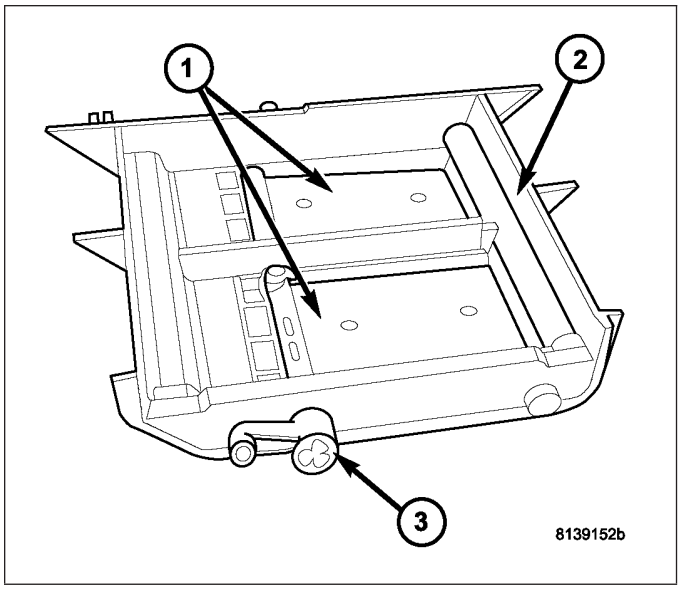


5. Install the defroster-air doors (1) into the lower half of the HVAC housing (2).
6. Align the actuator coupler (3) with the defroster-air door pivot shaft and install the coupler into side of the HVAC housing. Be sure to install the coupler with the coupler arm located between the two stop tabs on the HVAC housing.

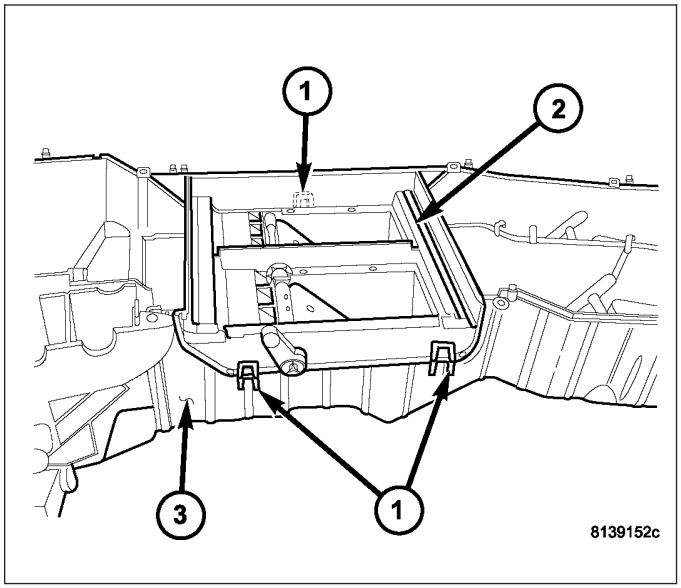


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7. Install the blend-air doors (1) into each of the two blend door plates (2).
8. Align the actuator coupler (3) with each blend-air door pivot shaft and install the coupler into side of each blend door plate. Be sure to install each coupler with the coupler arm located between the two stop tabs on each blend door plate.

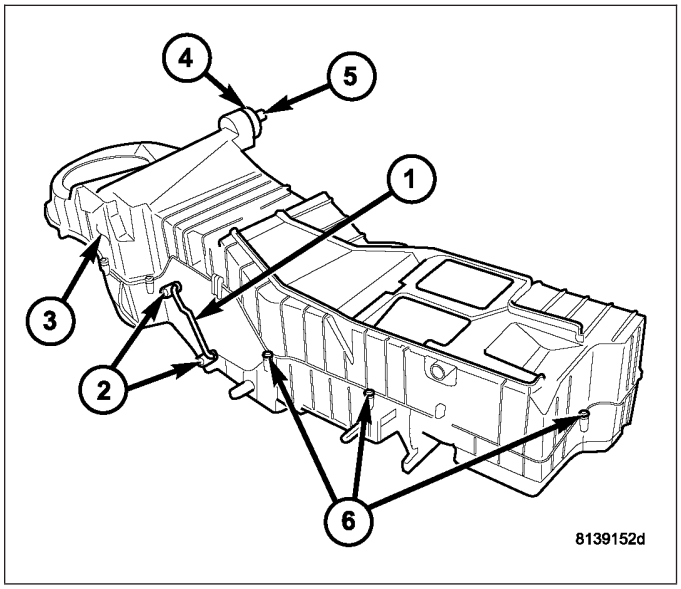


9. Position the lower blend door assembly (2) into the lower half of the HVAC housing (3) and fully engage the three retaining tabs (1).
10. Position the upper blend door assembly into the upper half of the HVAC housing and fully engage the three retaining tabs.



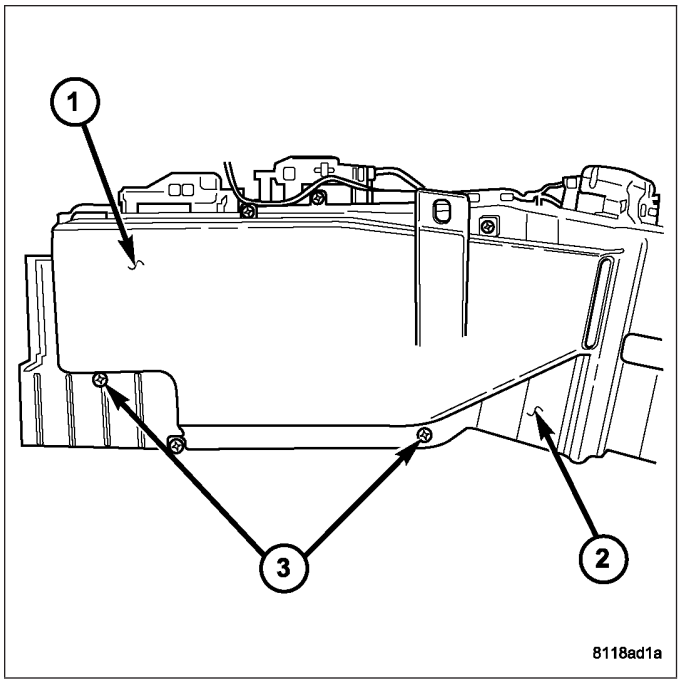
NOTE: Route the wire lead for the evaporator temperature sensor into the opening located on the upper half of the HVAC housing prior to installing the lower half of the HVAC housing.

11. Position the two halves of the HVAC housing together (3).
12. Install the fifteen screws (6) that secure the two housing halves together. Tighten the screws to 2.2 N·m (20 in. lbs.).
13. Install the foam seal (4) onto the evaporator condensate drain tube (5).
14. Connect the linkage rod (1) to the two blend-air door levers (2) located on the back of the HVAC housing.

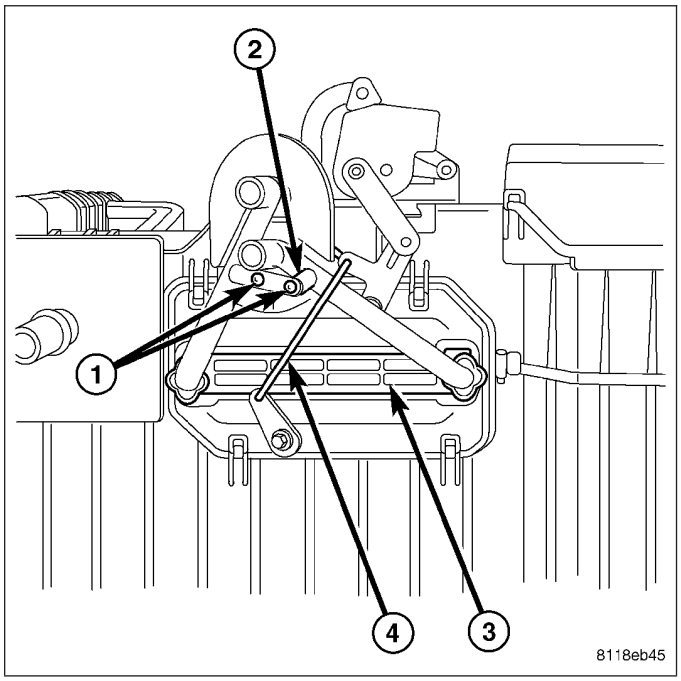


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15. Position the front floor distribution duct (1) to the bottom of the HVAC housing (2).
16. Install the screws (3) that secure the front floor distribution duct to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).

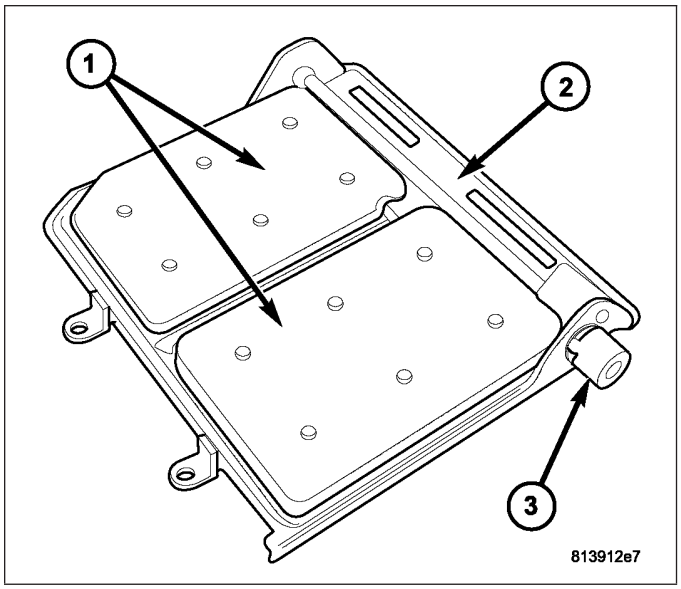


17. Carefully install the heater core (3) into the front of the HVAC housing.
18. Position the heater core tube bracket (2) onto the HVAC housing.
19. Install the two screws (1) that secures the heater core bracket to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).
20. If equipped with the dual zone heating-A/C system, install the linkage rod (4).
21. Install the foam seal onto the heater core tubes.



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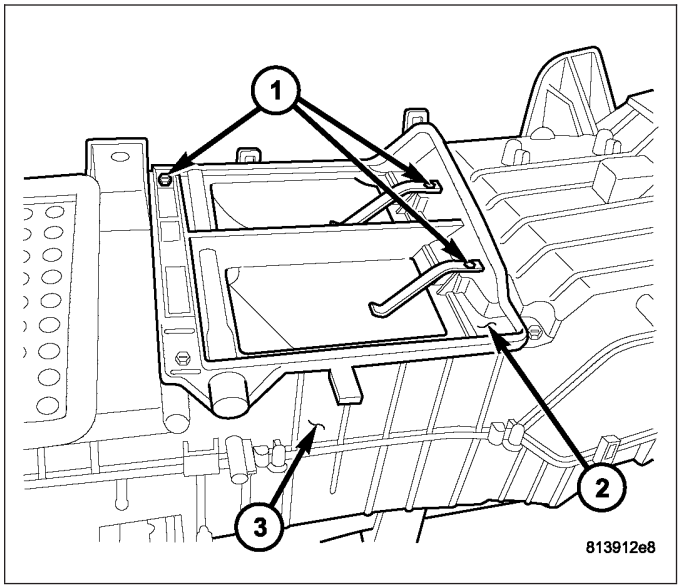
22. Install the panel/floor-air doors (1) into the panel/floor door plate (2).
23. Align the actuator coupler (3) with the panel/floor-air door pivot shaft and install the coupler into side of the panel/floor door plate. Be sure to install the coupler with the coupler arm located between the two stop tabs on the door plate.



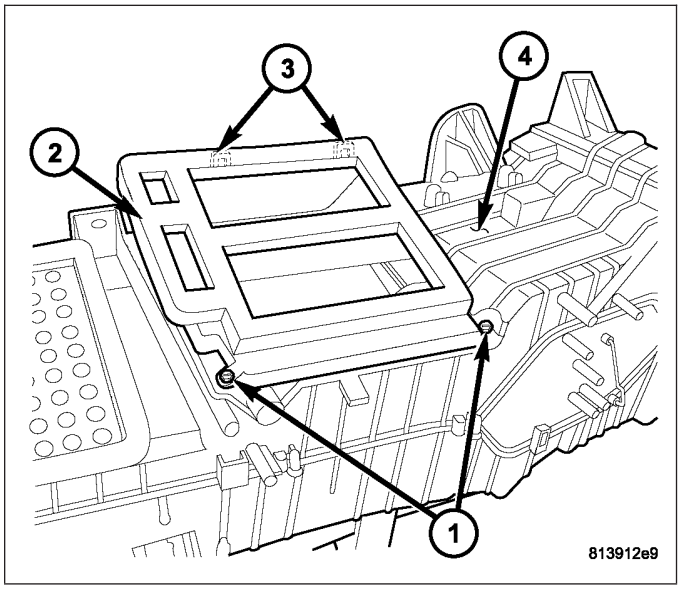
24. Position the panel/floor door assembly (2) onto the top of the HVAC housing (3).

NOTE: Install the two door springs onto the retaining screws prior to installation.

25. Install the three screws (2) that secure the door assembly to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).

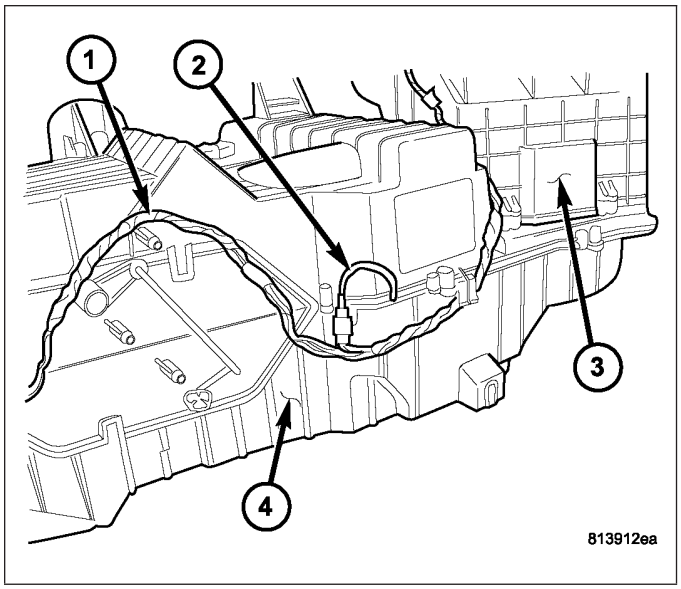


26. Position the panel/floor door outlet (2) onto the top of the HVAC housing (3) and fully engage the two retaining tabs (3).
27. Install the two screws (1) that secure the panel/floor door outlet to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).

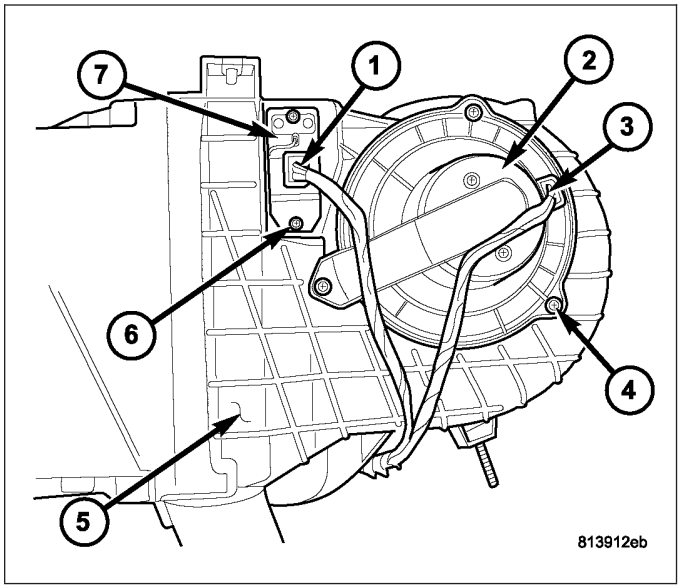


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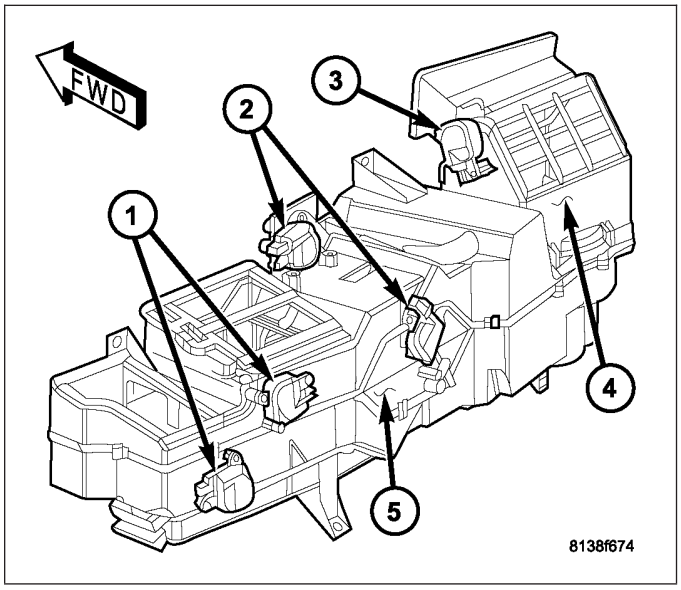
28. Install the air inlet housing (3) onto the top of the HVAC housing (4) (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - AIR INLET HOUSING - INSTALLATION).
29. Install the HVAC wire harness (1) onto the HVAC housing. Make sure the wires are routed through all wiring retainers.
30. Connect the HVAC wire harness to evaporator temperature sensor (2).



31. Position the blower motor resistor (7) and the blower motor (2) into the bottom of the HVAC housing (5).
32. Install the screws (4 and 6) that secure the blower motor resistor and the blower motor to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).
33. Connect the HVAC wire harness connectors (1 and 3) to blower motor resistor and the blower motor.



34. Position the recirculation door actuator (3) onto the air inlet housing (4) and install the retaining screws. Tighten the screws to 2.2 N·m (20 in. lbs.).
35. Position the mode door actuators (1) and the blend door actuators (2) onto the HVAC housing (5) and install the retaining screws. Tighten the screws to 2.2 N·m (20 in. lbs.).
36. Connect the HVAC wire harness connectors to the actuators.
37. Install the HVAC housing assembly (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - HVAC HOUSING ASSEMBLY - INSTALLATION).



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AIR INLET HOUSING

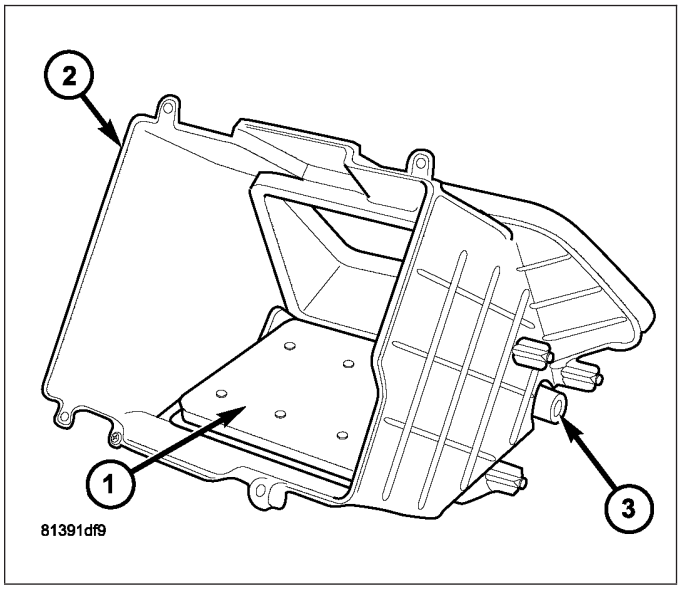
NOTE: The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

NOTE: If the seals on the air door is deformed or damaged, the air door must be replaced.

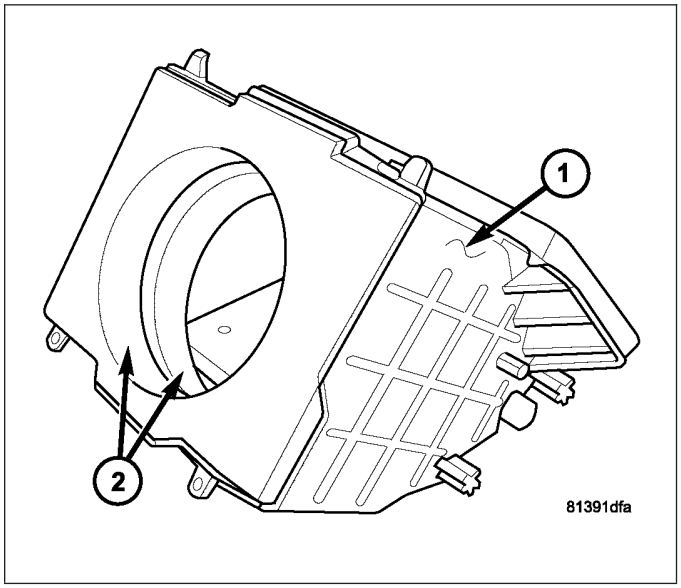
1. Position the recirculation-air door (1) into the air inlet housing (2).

CAUTION: Make sure that the recirculation-air door pivot shaft is properly seated in the pivot seat located in the air inlet housing.

2. Align the actuator coupler (3) with the recirculation-air door pivot shaft and install the coupler until the coupler retaining tabs are fully engaged to the air inlet housing. Be sure to install the coupler with the coupler arm located between the two stop tabs on the air inlet housing.



3. Install the two foam insulators (2) into the air inlet housing (1).
4. Install the air inlet housing onto the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/ DISTRIBUTION/HOUSING-HVAC - AIR INLET HOUSING - INSTALLATION).



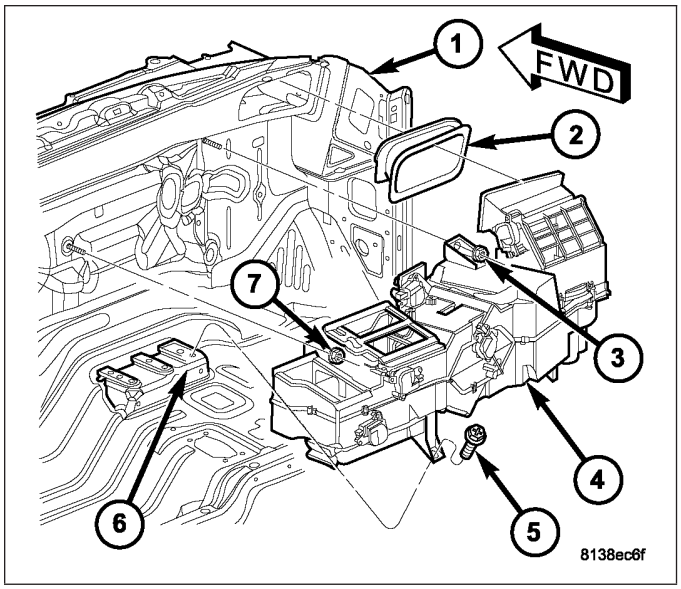
INSTALLATION

HVAC HOUSING ASSEMBLY

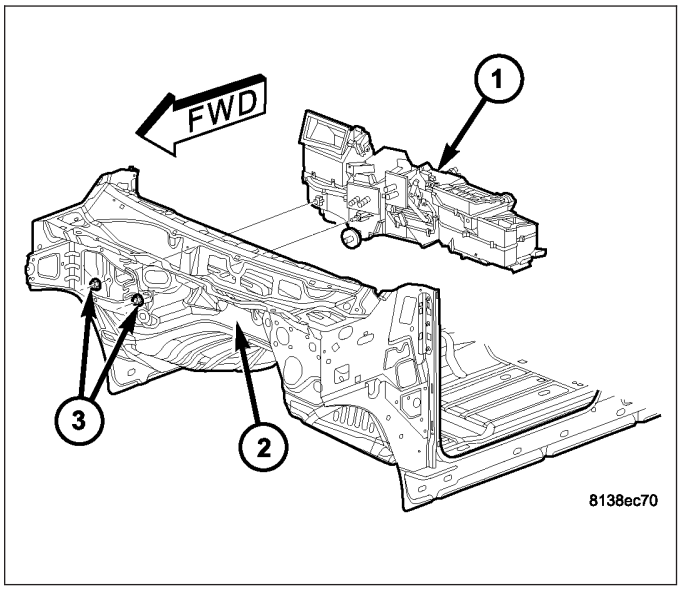
NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator, evaporator temperature sensor, mode-air and blend-air doors.

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1. If removed, install the fresh air inlet (2) onto the dash panel (1).
2. Position the HVAC housing assembly (4) into the passenger compartment with the mounting studs and the condensate drain tube in their proper locations in the dash panel.
3. Install the two nuts (3 and 7) that secure the HVAC housing to the passenger compartment side of the dash panel. Tighten the nuts to 6.2 N·m (55 in. lbs.).
4. Install the bolt (5) that secures the HVAC housing to the floor bracket (6). Tighten the bolt to 6.2 N·m (55 in. lbs.).
5. Install the instrument panel (Refer to 23 - BODY/ INSTRUMENT PANEL ASSEMBLY - INSTALLATION).
6. On Mega Cab models, install the floor console duct (Refer to 24 - HEATING & AIR CONDITIONING/ DISTRIBUTION/DUCT-FLOOR CONSOLE - INSTALLATION).



7. Install the two nuts (3) that secure the HVAC housing (1) to the engine compartment side of the dash panel (2). Tighten the nuts to 6.2 N·m (55 in. lbs.).
8. Install the powertrain control module (PCM) (Refer to 8 - ELECTRICAL/ELECTRONIC CONTROL MODULES/POWERTRAIN CONTROL MODULE - INSTALLATION).
9. Connect the heater hoses to the heater core tubes.
10. Connect the A/C liquid line and the A/C accumulator to the A/C evaporator (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING /LINE-A/C LIQUID - INSTALLATION) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ACCUMULATOR-A/C - INSTALLATION).
11. Reconnect the negative battery cable.
12. If the heater core is being replaced, flush the cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - COOLING SYSTEM CLEANING/REVERSE FLUSHING).



13. Refill the engine cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - COOLING SYSTEM REFILL).
14. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
15. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

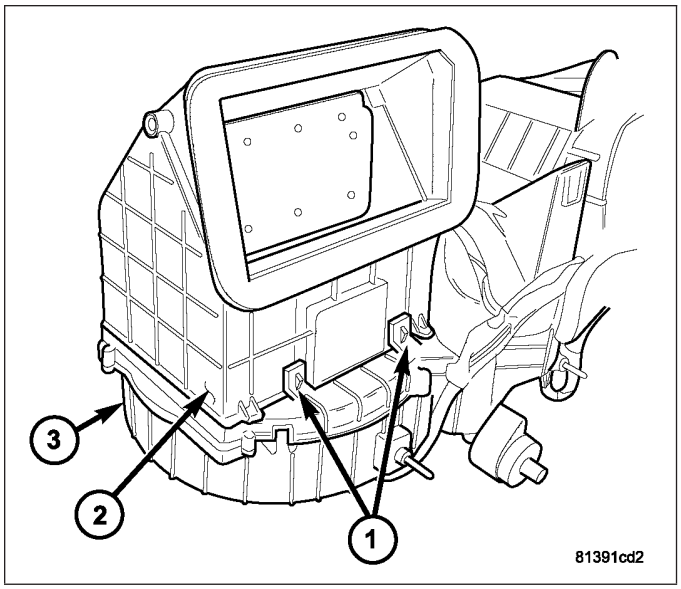
AIR INLET HOUSING

NOTE: The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

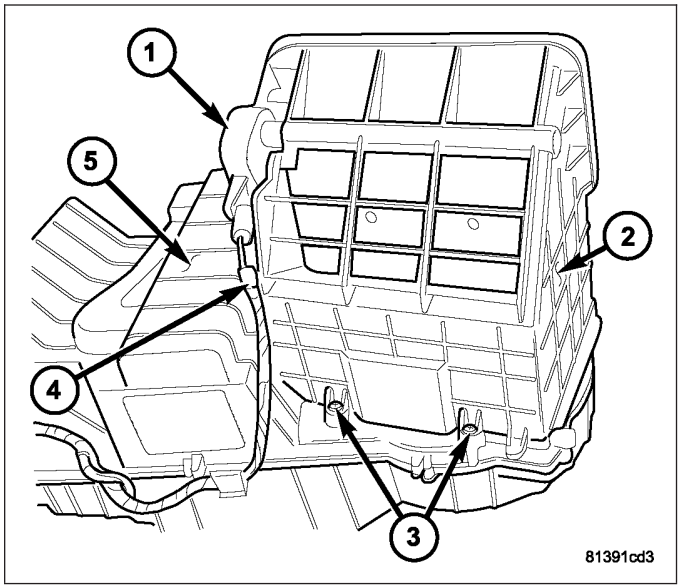
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NOTE: If the foam seal on the air inlet housing is deformed or damaged, it must be replaced.

1. Position the air inlet housing (2) onto the top of the HVAC housing (3).
2. Engage the two retaining clips (1) that secure the front of the air inlet housing to the HVAC housing.



3. Install the two screws (3) that secure the rear of the air inlet housing (2) to the top of the HVAC housing (5). Tighten the screws to 2.2 N·m (20 in. lbs.).
4. Install the recirculation door actuator (1) onto the air inlet housing (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/ACTUATOR-RECIRCULATION DOOR - INSTALLATION).
5. Connect the HVAC wire harness (4) to the recirculation door actuator.
6. Install the HVAC housing assembly (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - HVAC HOUSING ASSEMBLY - INSTALLATION).



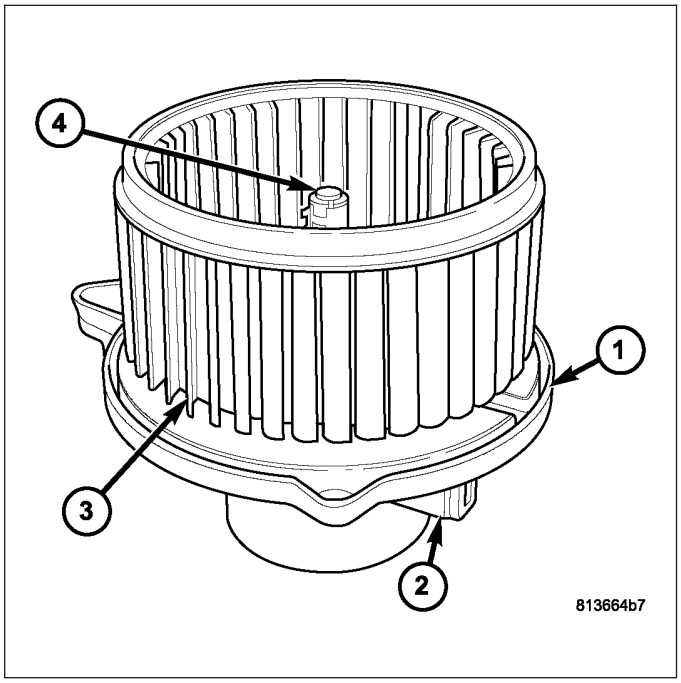
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MOTOR-BLOWER

DESCRIPTION

The blower motor (1) is used to control the velocity of air moving through the HVAC housing by spinning the blower wheel (3) within the HVAC air inlet housing at the selected speed.

The blower motor is a 12-volt, direct current (DC) motor mounted within a plastic housing with an integral wire harness connector (2) and squirrel cage-type blower wheel (3) that is secured to the blower motor shaft (4). The blower wheel is positioned within the air inlet housing on the passenger side end of the HVAC housing.



OPERATION

The blower motor is used to control the velocity of air moving through the HVAC housing by spinning the blower wheel within the HVAC air inlet housing at the selected speed.

The blower motor will operate whenever the ignition switch is in the Run position and the blower motor control is in any position except Off. The blower motor receives battery current through the totally integrated power module (TIPM) whenever the ignition switch is in the Run position.

Blower motor speed is controlled by regulating the ground path through or around the blower motor resistor and through the blower motor control located within the A/C-heater control.

The blower motor can be accessed for service from underneath the instrument panel.

NOTE: The blower motor is supplied with a 12V feed from the TIPM, through the resistor block, whenever the ignition switch is in the RUN position. Due to an open circuit condition within the blower motor control switch the TIPM is UNABLE to detect an OPEN circuit for the blower motor.

The blower motor control system is diagnosed using a scan tool (Refer to 24 - HVAC Electrical Diagnostics for more information).

The blower motor and blower wheel are factory balanced and cannot be adjusted or repaired. If faulty or damaged, the blower motor and wheel must be replaced as an assembly.

DIAGNOSIS AND TESTING

BLOWER MOTOR

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

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NOTE: The blower motor is supplied with a 12V feed from the TIPM, through the resistor block, whenever the ignition switch is in the RUN position. Due to an open circuit condition within the blower motor control switch the TIPM is UNABLE to detect an OPEN circuit for the blower motor.

To determine if an open condition exists within the blower motor circuit wiring, it is necessary to disconnect the negative battery cable and check for continuity within the blower motor circuits using an ohmmeter. For circuit descriptions and diagrams, refer to Air Conditioning/Heater in Group 8W - Wiring Diagrams.

OPERATION

Possible causes of the blower motor not operating include:

- Faulty blower motor
- Faulty blower motor circuit wiring or wire harness connectors
- Faulty blower motor control

Possible causes of the blower motor not operating in one or more speeds include:

- Faulty blower motor resistor
- Faulty blower motor circuit wiring or wire harness connectors
- Faulty blower motor control

VIBRATION

Possible causes of blower motor vibration include:

- Improper blower motor mounting
- Improper blower wheel mounting
- Deformed blower wheel
- Out of balance blower wheel due to foreign material in the wheel
- Faulty blower motor

NOISE

To determine if the blower motor is the source of the noise, simply switch the blower motor from Off to On. To verify that the blower motor is the source of the noise, unplug the blower motor wire harness connector and operate the heating-A/C system. If the noise goes away, possible causes include:

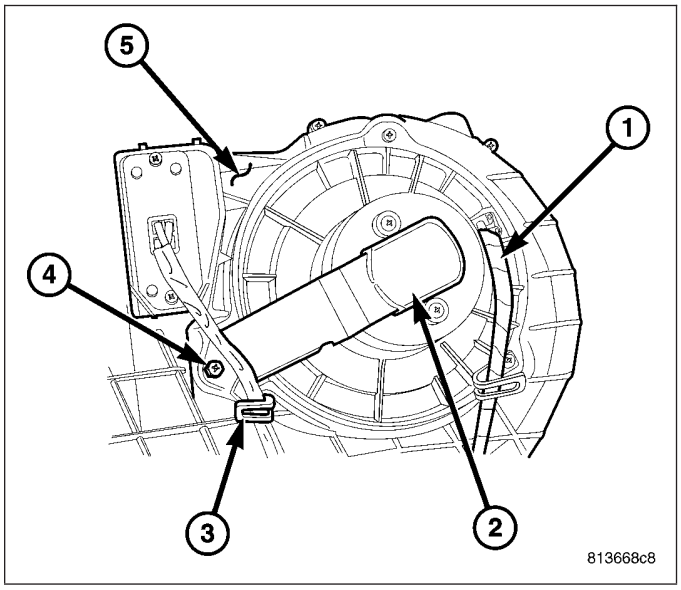
- Foreign material in the HVAC air inlet housing
- Improper blower motor mounting
- Improper blower wheel mounting
- Faulty blower motor

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REMOVAL

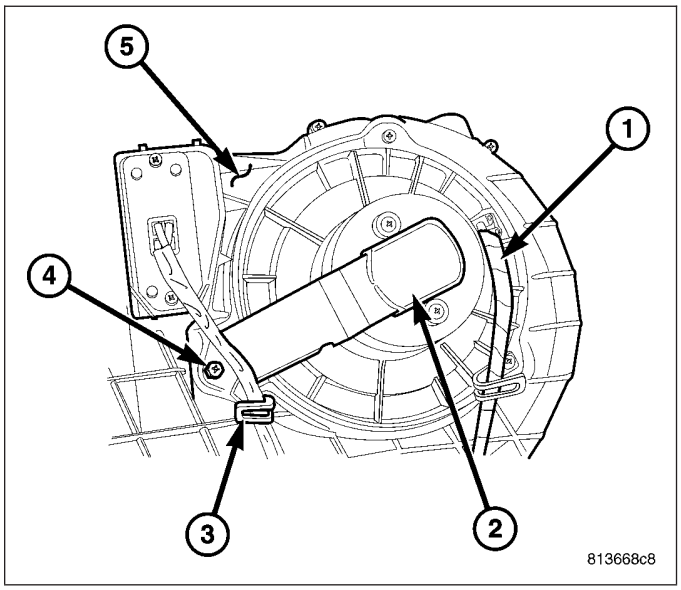
NOTE: The blower motor is located on the passenger side of the vehicle under the instrument panel. The blower motor can be removed from the vehicle without having to remove the HVAC housing.

1. Disconnect and isolate the negative battery cable.
2. Remove the passenger side cowl trim panel (Refer to 23 - BODY/INTERIOR/COWL TRIM PANEL - REMOVAL).
3. Disconnect the HVAC wire harness lead (1) from the blower motor (2).
4. Remove the HVAC wire harness lead from the two wire harness retainers (3).
5. Remove the three screws (4) that secure the blower motor to the bottom of the HVAC housing (5).
6. Remove the blower motor from the HVAC housing.



INSTALLATION

1. Position the blower motor (2) into the bottom of the HVAC housing (5).
2. Install the three screws (4) that secure the blower motor to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Connect the HVAC wire harness lead (1) to the blower motor and install the wire harness lead into the two wire harness retainers (3).
4. Install the passenger side cowl trim panel (Refer to 23 - BODY/INTERIOR/COWL TRIM PANEL - INSTALLATION).
5. Reconnect the negative battery cable.



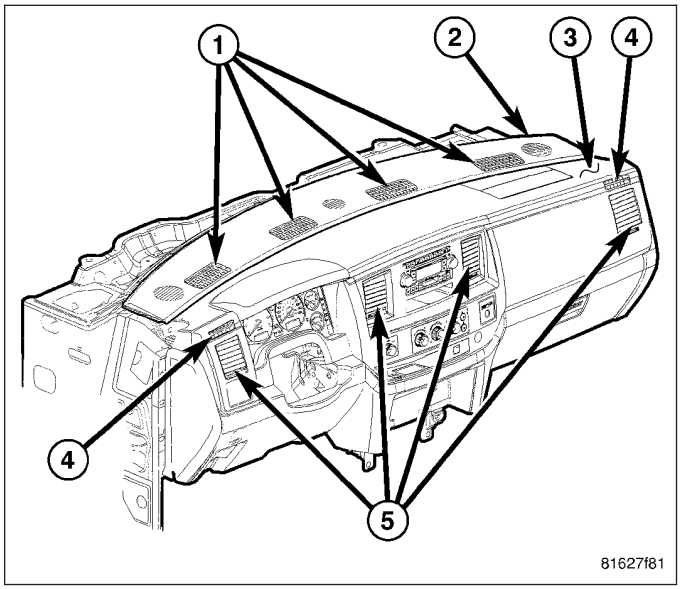
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OUTLETS-AIR

DESCRIPTION

There are four defroster air outlets (1) in the defroster grille (2) located on the top of the instrument panel (3). The airflow from the defroster outlets is directed by fixed vanes in the defroster grille and cannot be adjusted. The defroster air outlets are not serviceable from the defroster grille (Refer to 23 - BODY/INSTRUMENT PANEL/DEFROSTER GRILLE - REMOVAL).

There are two side window demister air outlets (4). One located on each end of the instrument panel near the A-pillar area. The airflow from the side window demister air outlets is directed by fixed vanes in the outlets and cannot be adjusted. The driver side window demister air outlet is serviced with the instrument cluster bezel and the passenger side demister outlet is serviced with the instrument panel cover (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT CLUSTER BEZEL - REMOVAL and 23 - BODY/INSTRUMENT PANEL/COVER-INSTRUMENT PANEL - REMOVAL).



There are four instrument panel air outlets (5). One air outlet is located near the end of the instrument panel facing the rear of the vehicle and two outlets are located on the instrument panel center bezel. Each of the instrument panel air outlets contain a grille with movable vanes that are used to direct or shut off the flow of the conditioned air leaving the instrument panel outlets. The driver side instrument panel air outlet is serviced with the instrument cluster bezel, the passenger side instrument panel air outlet is serviced with the instrument panel cover and the two center air outlets are serviced with the center bezel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT CLUSTER BEZEL - REMOVAL), (23 - BODY/INSTRUMENT PANEL/COVER-INSTRUMENT PANEL - REMOVAL) and)23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL CENTER BEZEL - REMOVAL).

On Mega Cab models there are two outlets located at the rear of the center front seat. Each of the rear air outlets contain a grille with movable vanes that are used to direct or shut off the flow of the conditioned air leaving the outlets. The rear air outlets are not serviceable.

ART UNDER CONSTRUCTION

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PLUMBING

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PLUMBING

DESCRIPTION

The A/C refrigerant lines and hoses are used to carry the refrigerant between the various A/C system components. The refrigerant lines and hoses for the R-134a system on this vehicle consist of a barrier-hose design with a nylon tube sandwiched between rubber layers. The nylon tube helps to contain the R-134a refrigerant, which has a smaller molecular structure than R-12 refrigerant. The ends of the refrigerant lines are made from lightweight aluminum or steel, and commonly use braze-less fittings.

Any kinks or sharp bends in the refrigerant lines and hoses will reduce the capacity of the entire A/C system and can reduce the flow of refrigerant in the system. The radius of all bends in the flexible hose refrigerant lines should be at least ten times the diameter of the hose and the refrigerant lines should be routed so they are at least 80 millimeters (3 inches) away from the exhaust manifold(s) and exhaust pipe(s).

OPERATION

High pressures are produced in the refrigerant system when the A/C compressor is operating. Extreme care must be exercised to make sure that each of the refrigerant system connections is pressure-tight and leak free. It is a good practice to inspect all flexible hose refrigerant lines at least once a year to make sure they are in good condition and properly routed.

The refrigerant lines and hoses are coupled to other A/C system components with block-type fittings. An O-ring seal, or a flat steel gasket with an integral O-ring (dual plane seal), is used to mate the refrigerant line fittings with A/C system components to ensure the integrity of the refrigerant system.

The refrigerant lines and hoses cannot be repaired and, if faulty or damaged, they must be replaced.

WARNING

WARNING: The A/C system contains refrigerant under high pressure. Repairs should only be performed by qualified service personnel. Severe personal injury or death may result from improper service procedures.

WARNING: Avoid breathing the refrigerant and refrigerant oil vapor or mist. Exposure may irritate the eyes, nose, and/or throat. Wear eye protection when servicing the A/C refrigerant system. Serious eye injury can result from direct contact with the refrigerant. If eye contact occurs, seek medical attention immediately.

WARNING: Do not expose the refrigerant to open flame. Poisonous gas is created when refrigerant is burned. An electronic leak detector is recommended. Severe personal injury or death may result from improper service procedures.

WARNING: If accidental system discharge occurs, ventilate the work area before resuming service. Large amounts of refrigerant released in a closed work area will displace the oxygen and cause suffocation and death.

WARNING: The evaporation rate of R-134a refrigerant at average temperature and altitude is extremely high. As a result, anything that comes in contact with the refrigerant will freeze. Always protect the skin or delicate objects from direct contact with the refrigerant.

WARNING: The R-134a service equipment or the vehicle refrigerant system should not be pressure tested or leak tested with compressed air. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures are potentially dangerous, and may result in fire or explosion causing property damage, personal injury or death.

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WARNING: The engine cooling system is designed to develop internal pressures up to 145 kilopascals (21 pounds per square inch). Do not remove or loosen the coolant pressure cap, cylinder block drain plugs, radiator drain, radiator hoses, heater hoses, or hose clamps while the engine cooling system is hot and under pressure. Allow the vehicle to cool for a minimum of 15 minutes before opening the cooling system for service. Failure to observe this warning can result in serious burns from the heated engine coolant.

CAUTION

CAUTION: Never add R-12 to a refrigerant system designed to use R-134a. Do not use R-12 equipment or parts on an R-134a A/C system. These refrigerants are not compatible and damage to the A/C system will result.

CAUTION: Never use R-12 refrigerant oil in a A/C system designed to use R-134a refrigerant oil. These refrigerant oils are not compatible and damage to the A/C system will result.

CAUTION: The use of A/C system sealers may result in damage to A/C refrigerant recovery/evacuation/recharging equipment and/or A/C system. Many federal, state/provincial and local regulations prohibit the recharge of A/C systems with known leaks. DaimlerChrysler recommends the detection of A/C system leaks through the use of approved leak detectors and fluorescent leak detection dyes. Vehicles found with A/C system sealers should be treated as contaminated and replacement of the entire A/C refrigerant system is recommended. A/C systems found to be contaminated with A/C system sealers, A/C stop-leak products or seal conditioners voids the warranty for the A/C system.

CAUTION: Recover the refrigerant before opening any fitting or connection. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant.

CAUTION: If equipped, do not remove the secondary retention clip from any spring-lock coupler connection while the refrigerant system is under pressure. Recover the refrigerant before removing the secondary retention clip. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant.

CAUTION: The internal parts of the A/C system will remain stable as long as moisture-free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability. This may cause operational troubles or even serious damage if present in more than very small quantities. Before disconnecting a component, clean the outside of the fittings thoroughly to prevent contamination from entering the refrigerant system. Keep service tools and the work area clean. Do not open the refrigerant system or uncap a replacement component until you are ready to service the system. Immediately after disconnecting a component from the refrigerant system, seal the open fittings with a cap or plug. This will prevent contamination from entering the A/C system.

CAUTION: Refrigerant oil will absorb moisture from the atmosphere if left uncapped. Do not open a container of refrigerant oil until you are ready to use it. Replace the cap on the oil container immediately after using. Store refrigerant oil only in a clean, airtight, and moisture-free container.

CAUTION: Do not overcharge the refrigerant system. Overcharging will cause excessive compressor head pressure and can cause compressor noise and A/C system failure.

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DIAGNOSIS AND TESTING

REFRIGERANT SYSTEM LEAKS

WARNING: R-134a service equipment or vehicle A/C system should not be pressure tested or leak tested with compressed air. Mixture of air and R-134a can be combustible at elevated pressures. These mixtures are potentially dangerous and may result in fire or explosion causing property damage, personal injury or death.
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved service equipment meeting SAE requirements to discharge R-134a system. If accidental system discharge occurs, ventilate work area before resuming service.

NOTE: If the A/C refrigerant system charge is empty or low, a leak in the A/C system is likely. Visually inspect all A/C lines, fittings and components for an oily residue. Oil residue can be an indicator of an A/C system leak location.

NOTE: The only way to correctly determine if the refrigerant system is fully charged with R-134a is to completely evacuate and recharge the A/C system.

Connect a suitable manifold gauge set and determine if the static A/C system pressure is above or below 345 kPa (50 psi) (refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM SERVICE EQUIPMENT). If less than 345 kPa (50 psi), proceed to SYSTEM EMPTY . If greater than 345 kPa (50 psi), go to SYSTEM LOW .

SYSTEM EMPTY

1. Evacuate the refrigerant system to the lowest degree of vacuum possible (approximately -88 kPa (- 26 in. Hg) or greater vacuum) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE). Determine if the system holds a vacuum for 15 minutes. If vacuum is held, a leak is probably not present. If system will not maintain vacuum level, proceed to Step 2.
2. Prepare and dispense 0.284 kilograms (10 ounces) of R-134a refrigerant into the evacuated refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE) and proceed to Step 1 of the System Low procedure.

SYSTEM LOW

1. Position the vehicle in a wind-free work area. This will aid in detecting small leaks.
2. Operate the heating-A/C system with the engine at idle under the following conditions for at least five minutes.
   - Doors or windows open
   - Transmission in Park or Neutral with the parking brake set (depending on application)
   - A/C-heater controls set to outside air, full cool, panel mode, high blower and with A/C compressor engaged

CAUTION: A leak detector only designed for R-12 refrigerant will not detect leaks in an R-134a refrigerant system.

3. Shut the vehicle Off and wait 2-7 minutes. Then use an electronic leak detector that is designed to detect R-134a refrigerant and search for leaks. Fittings, lines or components that appear to be oily usually indicate a refrigerant leak. To inspect the A/C evaporator for leaks, insert the leak detector probe into the drain tube opening or an air outlet. A dye for R-134a is available to aid in leak detection. Use only DaimlerChrysler approved refrigerant dye.

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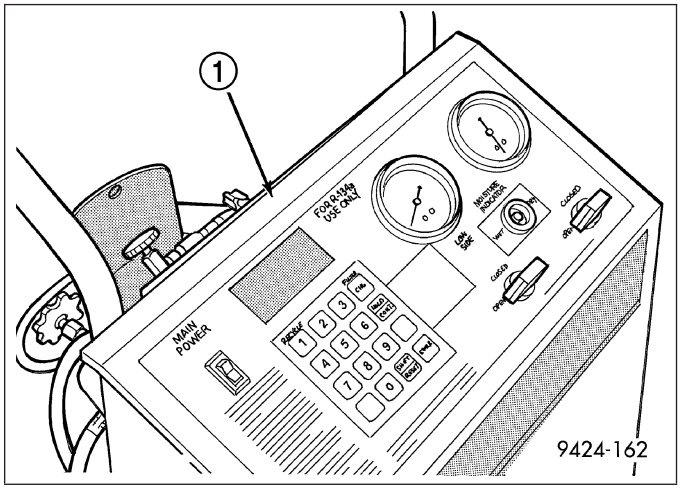
STANDARD PROCEDURE

REFRIGERANT SYSTEM SERVICE EQUIPMENT

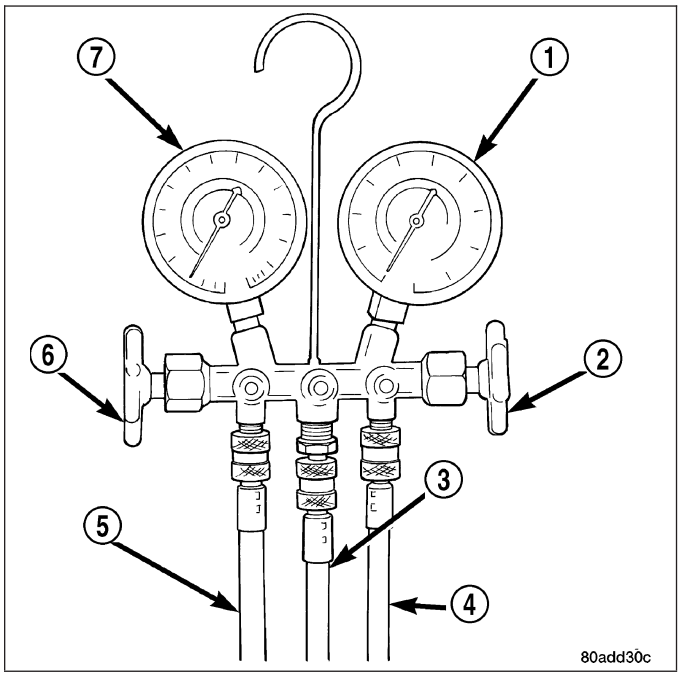
WARNING: Eye protection must be worn when servicing an A/C refrigerant system. Turn all valves off (rotate clockwise) on the equipment being used before connecting or disconnecting service equipment from the refrigerant system. Failure to observe these warnings may result in personal injury or death.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

When servicing the A/C system, an R-134a refrigerant recovery/recycling/charging station (1) that meets SAE standard J2210 must be used. Contact an automotive service equipment supplier for refrigerant recovery/recycling/charging equipment. Refer to the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.



A manifold gauge set (1) may be needed with some recovery/recycling/charging equipment. The manifold gauge set should have manual shut-off valves (2 and 6), or automatic back-flow valves located at the service port connector end of the manifold gauge set hoses (4 and 5). This will prevent refrigerant from being released into the atmosphere.



MANIFOLD GAUGE SET CONNECTIONS

CAUTION: Do not use an R-12 manifold gauge set on an R-134a system. The refrigerants are not compatible and system damage will result.

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RECOVERY/RECYCLING/EVACUATION/CHARGING HOSE – The center manifold hose (Yellow, or White, with Black stripe) (3) is used to recover, evacuate, and charge the refrigerant system. When the low or high pressure valves on the manifold gauge set are opened, the refrigerant in the system will escape through this hose.

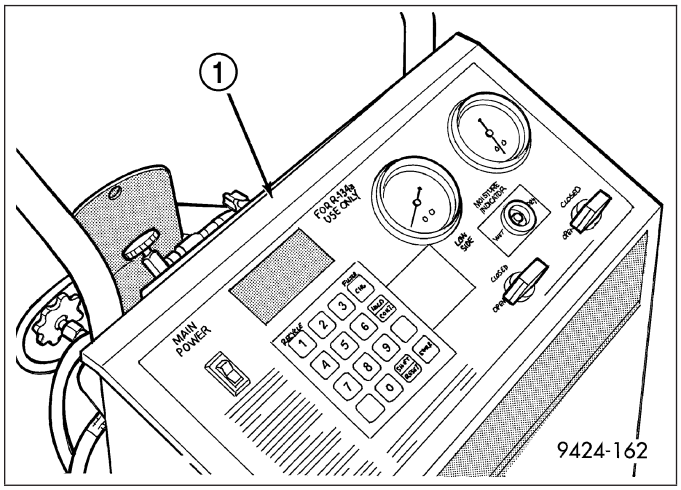
HIGH PRESSURE GAUGE HOSE – The high pressure hose (Red with Black stripe) (4) attaches to the high side service port. This service port is located on the A/C discharge line. On this model, an A/C pressure transducer is installed on the high side service port. A/C high-side pressures can be read using a scan tool. Refer to 9 - Engine Electrical Diagnostics for more information.

LOW PRESSURE GAUGE HOSE – The low pressure hose (Blue with Black stripe) (5) attaches to the low side service port. This service port is located either on the top of the A/C accumulator or on the A/C suction line near the accumulator, depending on engine application.

REFRIGERANT SYSTEM RECOVERY

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

An R-134a refrigerant recovery/recycling/charging station (1) that meets SAE standard J2210 must be used to recover the refrigerant from the R-134a refrigerant system. Refer to the operating instructions supplied by the equipment manufacturer for the proper care and use of this equipment.



REFRIGERANT SYSTEM EVACUATE

NOTE: Special effort must be used to prevent moisture from entering the A/C system oil. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

If an A/C compressor designed to use R-134a refrigerant is left open to the atmosphere for an extended period of time. It is recommended that the refrigerant oil be drained and replaced with new oil or a new A/C compressor be used. This will eliminate the possibility of contaminating the refrigerant system.

If the refrigerant system has been open to the atmosphere, it must be evacuated before the system can be filled. Moisture and air mixed with the refrigerant will raise the compressor head pressure above acceptable operating levels. This will reduce the performance of the A/C system and damage the A/C compressor. Moisture will boil at near room temperature when exposed to vacuum. To evacuate the refrigerant system:

NOTE: When connecting the service equipment coupling to the line fitting, verify that the valve of the coupling is fully closed. This will reduce the amount of effort required to make the connection.

1. Recover the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Connect a suitable charging station, refrigerant recovery machine or a manifold gauge set with vacuum pump and refrigerant recovery equipment (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM SERVICE EQUIPMENT).
3. Open the suction and discharge valves and start the vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to charge to eliminate all moisture in system. When the suction gauge reads to the lowest

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degree of vacuum possible (approximately -88 kPa (- 26 in. Hg) or greater) for 30 minutes, close all valves and turn off vacuum pump. If the system fails to reach specified vacuum, the refrigerant system likely has a leak that must be corrected. If the refrigerant system maintains specified vacuum for at least 30 minutes, start the vacuum pump, open the suction and discharge valves. Then allow the system to evacuate an additional 10 minutes.

4. Close all valves. Turn off and disconnect the vacuum pump.
5. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

REFRIGERANT SYSTEM CHARGE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: Always refer to the Underhood HVAC Specification Label for the refrigerant fill specification of the vehicle being serviced.

After all refrigerant system leaks have been repaired and the refrigerant system has been evacuated, a refrigerant charge can be injected into the system. For the proper amount of the refrigerant charge, refer to the Underhood HVAC Specification Label.

An R-134a refrigerant recovery/recycling/charging station that meets SAE Standard J2210 must be used to charge the refrigerant system with R-134a refrigerant. Refer to the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

CHARGING PROCEDURE

CAUTION: A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. Refer the equipment manufacturer instructions for more information.

1. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
2. A manifold gauge set and an R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2210 should be connected to the refrigerant system.
3. Measure the proper amount of refrigerant and heat it to 52° C (125° F) with the charging station. See the operating instructions supplied by the equipment manufacturer for proper use of this equipment.
4. Open both the suction and discharge valves, then open the charge valve to allow the heated refrigerant to flow into the system.
5. When the transfer of refrigerant has stopped, close both the suction and discharge valves.
6. If all of the refrigerant charge did not transfer from the dispensing device, open all of the windows in the vehicle and set the heating-A/C system controls so that the A/C compressor is engaged and the blower motor is operating at its lowest speed setting. Run the engine at a steady high idle (about 1400 rpm). If the A/C compressor does not engage, test the compressor clutch control circuit and repair as required.
7. Open the low-side valve to allow the remaining refrigerant to transfer to the refrigerant system.

WARNING: Take care not to open the discharge (high pressure) valve at this time. Failure to follow this warning could result in possible personal injury or death.

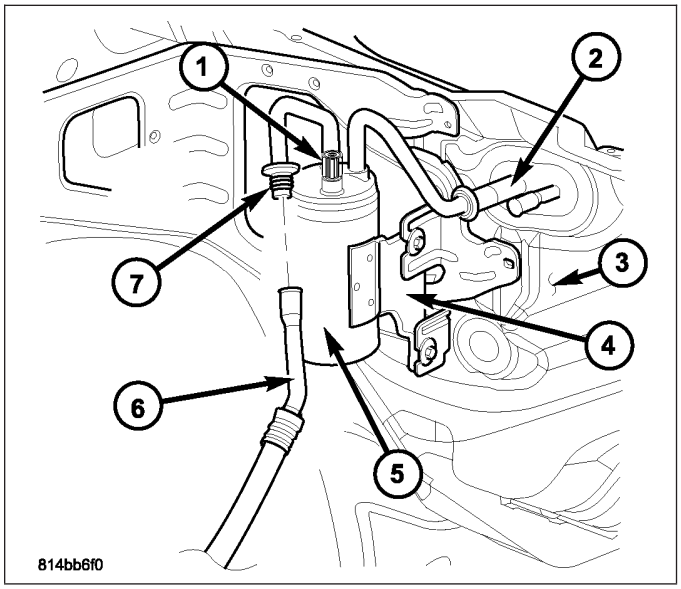
8. Disconnect the charging station and manifold gauge set from the refrigerant system service ports.
9. Reinstall the caps onto the refrigerant system service ports.

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ACCUMULATOR-A/C

DESCRIPTION

The A/C accumulator (5) is mounted in the engine compartment between the evaporator outlet tube (2) and the A/C suction line (6). An integral mounting bracket (4) is used to secure the accumulator to the dash panel (3). The A/C low side service port (1) is mounted to the top of the A/C accumulator.



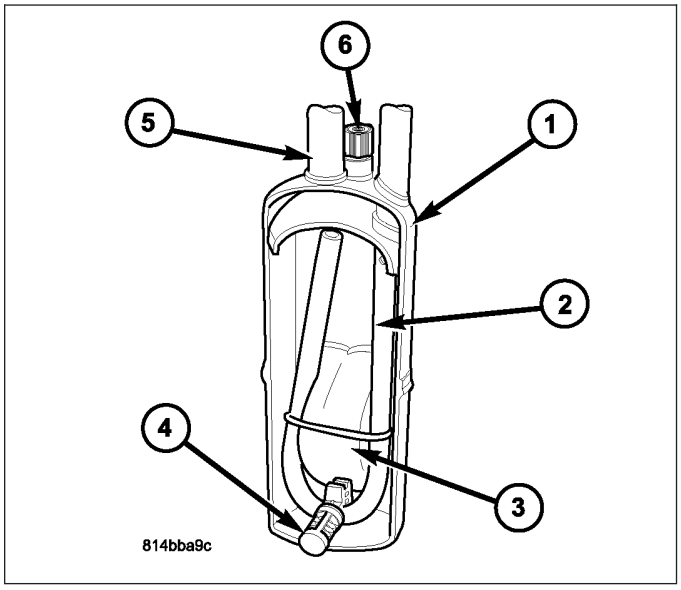
CAUTION: Use only O-ring seals specified for the vehicle. Failure to use the correct O-ring seal will cause the refrigerant system connections to leak.

The A/C accumulator has no serviceable parts except for the rubber O-ring seals, low side service port valve, cap and secondary retaining clips. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the A/C accumulator is removed and installed.

The A/C accumulator cannot be repaired and, if faulty or damaged, it must be replaced.

OPERATION

Refrigerant enters the A/C accumulator (1) mostly as a low pressure vapor through the inlet tube (2). Any liquid, oil-laden refrigerant falls to the bottom of the canister, which acts as a separator. A desiccant bag (3) is mounted inside the accumulator canister to absorb any moisture which may have entered and become trapped within the refrigerant system. A filter (4) is also mounted inside the canister to trap any foreign material that may have entered the refrigerant system during assembly. The low pressure vapor exits the A/C accumulator through the outlet tube (5). On this model, the low side service port (6) is located at the top of the A/C accumulator.

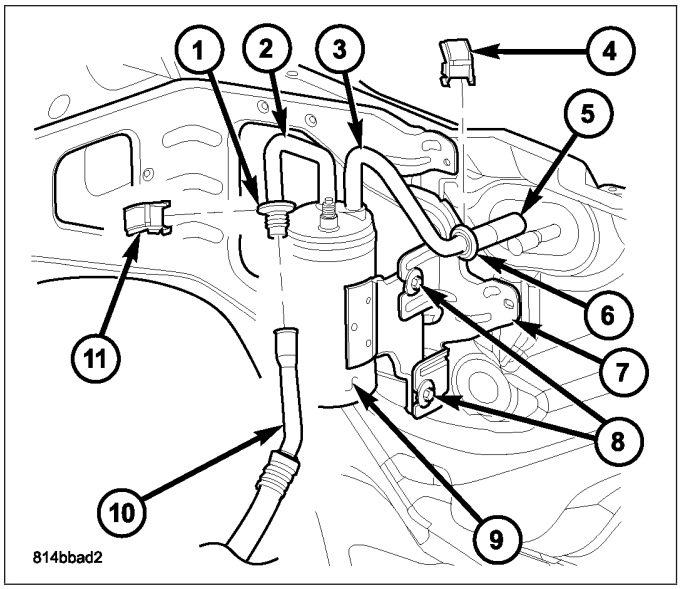


The A/C accumulator cannot be repaired. If the A/C accumulator is faulty or damaged, or if the A/C compressor has failed, it must be replaced.

REMOVAL

WARNING: Review the warnings and cautions in the front of this section before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS).

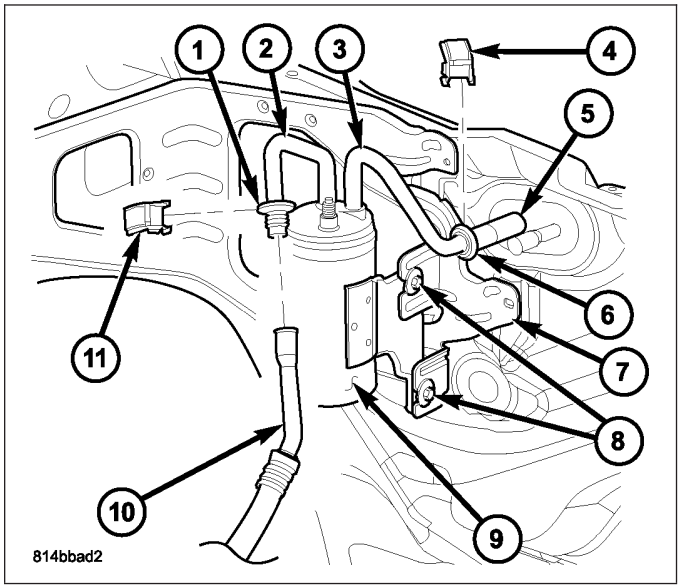
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1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY).
3. Remove the air filter housing cover to gain access to the A/C accumulator (9) (Refer to 9 - ENGINE/ AIR INTAKE SYSTEM).
4. Remove the secondary retaining clip (11) from the spring-lock coupler (1) that secures the A/C suction line (10) to the accumulator outlet tube (2).
5. Using the proper A/C line disconnect tool, disconnect the A/C suction line from the A/C accumulator and remove and discard the O-ring seals (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ COUPLER-REFRIGERANT LINE - REMOVAL).
6. If equipped, disengage the push-pin type wire harness retainer from the plastic wire harness bracket located on the side of the A/C accumulator and position the engine wire harness out of the way.
7. Loosen the bolts (8) that secure the A/C accumulator to the bracket (7) located on the dash panel.
8. Remove the secondary retaining clip (4) from the spring-lock coupler (6) that secures the accumulator inlet tube (3) to the evaporator outlet tube (5).
9. Using the proper A/C line disconnect tool, disconnect the accumulator inlet tube from the evaporator outlet tube and remove and discard the O-ring seals (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
10. Install plugs in, or tape over the opened refrigerant system connections.
11. If the A/C accumulator is being replaced, remove the accumulator mounting bolts and the plastic wire harness bracket (if equipped) from the accumulator.

INSTALLATION

NOTE: If the A/C accumulator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.



1. If the A/C accumulator (9) is being replaced, loosely install the accumulator mounting bolts (8) and the plastic wire harness bracket (if equipped) on to the accumulator.
2. Position the A/C accumulator onto the bracket located on the dash panel (7) in the engine compartment. Do not tighten the accumulator mounting bolts at this time.
3. Remove the tape or plugs from the opened refrigerant system connections.
4. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the accumulator tube fittings (1 and 6). Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the spring-lock coupler that secures the accumulator inlet tube (3) to the evaporator outlet tube (5) and install the secondary retaining clip (4) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ COUPLER-REFRIGERANT LINE - INSTALLATION).
6. Tighten the accumulator mounting bolts to 4.5 N·m (40 in. lbs.).

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7. If equipped, engage the engine wire harness retaining clip to the plastic wire harness bracket located on the side of the A/C accumulator.
8. Connect the A/C suction line (10) to the accumulator outlet tube (2) and install the secondary retaining clip (11) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
9. Install the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM).
10. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
11. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).
12. Reconnect the battery negative cable.

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COMPRESSOR-A/C

DESCRIPTION

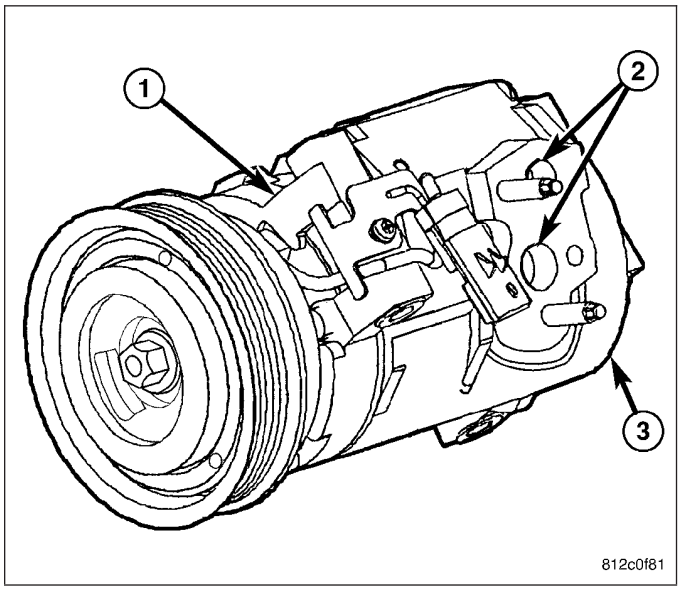
A/C COMPRESSOR

NOTE: Denso 10S17 compressor shown. Visteon HS-18 compressor similar.

The A/C system on models equipped with the 3.7L, 4.7L, 5.7L and 8.3L engines use a Denso 10S17 reciprocating swash plate-type compressor (1). This A/C compressor has a fixed displacement of 170 cubic centimeters (10.3 cubic inches).

The A/C system on models equipped with the 5.9L diesel engine use a Visteon HS-18 A/C compressor. This A/C compressor is a 10 cylinder reciprocating swash plate-type compressor with a fixed displacement of 180 cubic centimeters (10.9 cubic inches).

Both A/C compressors have the suction and discharge ports (2) located on the compressor cylinder head (3) at the rear of the compressor and have a label identifying the use of R-134a refrigerant.



HIGH PRESSURE RELIEF VALVE

A high pressure relief valve is located on the A/C compressor. This mechanical valve is designed to vent refrigerant from the A/C system to protect against damage to the A/C compressor and other A/C system components, caused by condenser air flow restriction or an overcharge of refrigerant.

OPERATION

A/C COMPRESSOR

The A/C compressor is driven by the engine through an electric clutch, drive pulley and belt arrangement. The A/C compressor is lubricated by refrigerant oil that is circulated throughout the refrigerant system with the refrigerant.

The A/C compressor draws in low-pressure refrigerant vapor from the A/C evaporator through its suction port. It then compresses the refrigerant into a high-pressure, high-temperature refrigerant vapor, which is then pumped to the A/C condenser through the compressor discharge port.

The A/C compressor cannot be repaired and, if faulty or damaged, it must be replaced. The compressor clutch, pulley and bearing assembly, and clutch field coil are available for service. If an internal failure of the A/C compressor has occurred, the A/C accumulator must also be replaced.

HIGH PRESSURE RELIEF VALVE

The high pressure relief valve vents refrigerant from the A/C system when a discharge pressure of 3445 to 4135 kPa (500 to 600 psi) or above is reached. The high pressure relief valve closes with a minimum discharge pressure of 2756 kPa (400 psi) is reached.

The high pressure relief valve vents only enough refrigerant to reduce the A/C system pressure, and then re-seats itself. The majority of the refrigerant is conserved in the A/C system. If the high pressure relief valve vents refrigerant, it does not mean the valve is faulty.

The high pressure relief valve is factory-calibrated and cannot be adjusted or repaired, and must not be removed or otherwise disturbed. The valve is only serviced as a part of the A/C compressor.

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DIAGNOSIS AND TESTING

A/C COMPRESSOR

When investigating an A/C system related noise, you must first know the conditions under which the noise occurs. These conditions include: weather, vehicle speed, transmission in gear or neutral, engine speed, engine temperature, and any other special conditions. Noises that develop during A/C operation can often be misleading. For example: What sounds like a failed front engine bearing or connecting rod, may be caused by loose bolts, nuts, mounting brackets or a loose compressor clutch assembly.

Drive belts are speed sensitive. At different engine speeds and depending upon drive belt tension, drive belts can develop noises that are mistaken for an A/C compressor noise. Improper drive belt tension can cause a misleading noise when the compressor clutch is engaged, which may not occur when the compressor clutch is disengaged. Check the accessory drive belt condition and tension as described in Cooling before beginning this procedure.

1. Select a quiet area for testing. Duplicate the complaint conditions as much as possible. Turn the A/C compressor On and Off several times to clearly identify the compressor noise. Listen to the A/C compressor while the clutch is engaged and disengaged. Probe the A/C compressor with an engine stethoscope or a long screwdriver with the handle held to your ear to better localize the source of the noise.
2. Loosen all of the compressor mounting hardware and retighten. Check the compressor clutch retainer. Be certain that the clutch field coil is mounted securely to the A/C compressor, and that the clutch plate and pulley are properly aligned and have the correct air gap (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/CLUTCH-A/C COMPRESSOR - INSTALLATION).
3. To duplicate high-ambient temperature conditions (high head pressure), restrict the air flow through the A/C condenser. Install a manifold gauge set or a scan tool to be certain that the discharge pressure does not exceed 2760 kPa (400 psi).
4. Check the refrigerant system plumbing for incorrect routing, rubbing or interference, which can cause unusual noises. Also check the refrigerant lines and hoses for kinks or sharp bends that will restrict refrigerant flow, which can cause noises (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - DESCRIPTION - REFRIGERANT LINES).
5. If the noise is from opening and closing of the high pressure relief valve, recover, evacuate and recharge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY), (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE). If the high pressure relief valve still does not seat properly, replace the A/C compressor (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COMPRESSOR-A/C - REMOVAL).
6. If the noise is from liquid refrigerant slugging in the A/C suction line, replace the A/C accumulator (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ACCUMULATOR-A/C - REMOVAL) and check the refrigerant oil level and the refrigerant system charge (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - STANDARD PROCEDURE - REFRIGERANT OIL LEVEL) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING- STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).
7. If a slugging condition still exists after replacing the A/C accumulator, then replace the A/C compressor (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COMPRESSOR-A/C - REMOVAL) and repeat Step 1.

REMOVAL

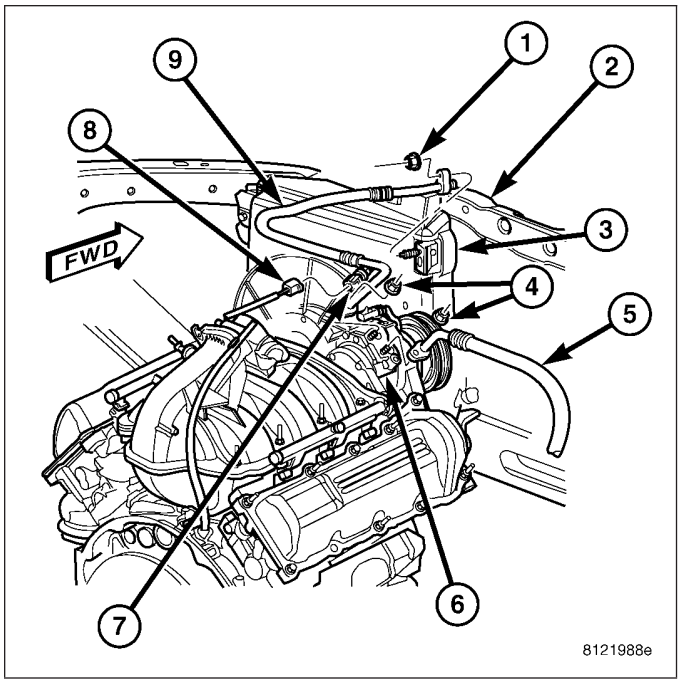
3.7L/4.7L ENGINES

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

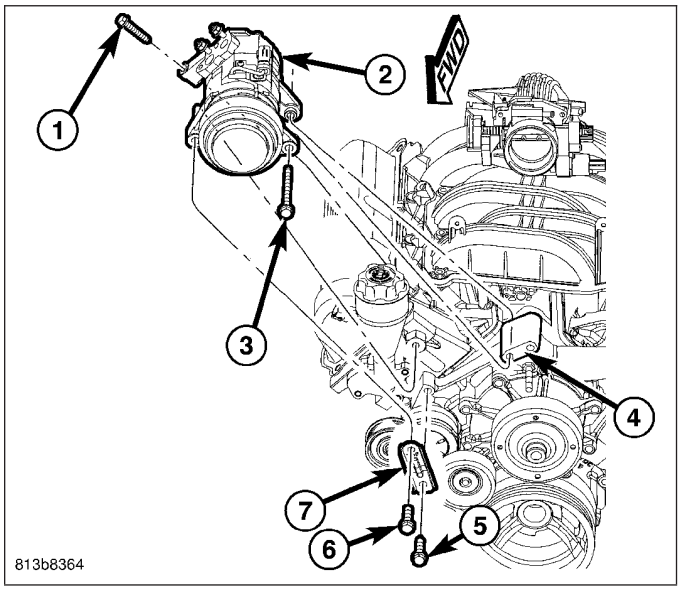
NOTE: The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the compressor clutch, clutch coil, engine, engine cylinder head or the generator.

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1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - REMOVAL).
4. Remove the nuts (4) that secure the A/C suction line (5) and the A/C discharge line (9) to the A/C compressor (6).
5. Disconnect the refrigerant lines from the A/C compressor and remove and discard the seals.
6. Install plugs in, or tape over all of the opened refrigerant line fittings and the compressor ports.



7. Loosen the bolt (5) that secures the bracket (7) to the accessory mounting bracket (4).
8. Remove the three bolts (1, 6 and 3) that secure the A/C compressor (2) to the accessory mounting bracket.
9. Remove the A/C compressor from the engine compartment.



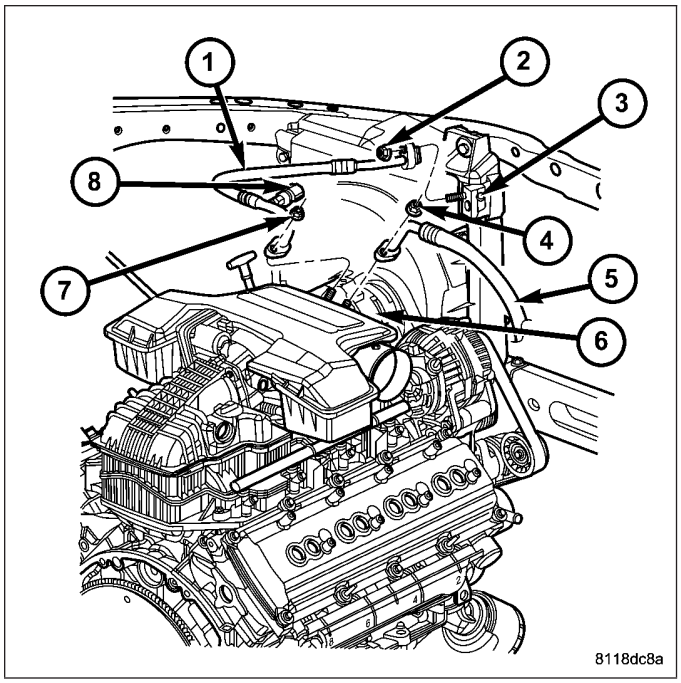
5.7L ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

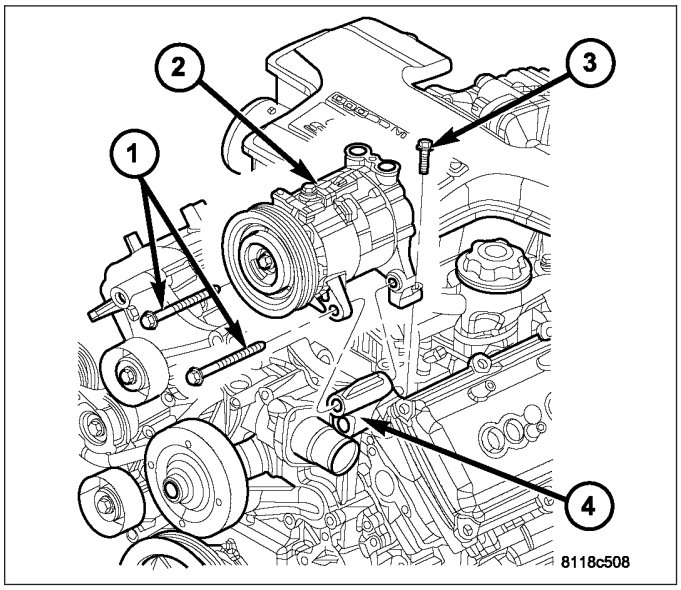
NOTE: The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the compressor clutch, clutch coil, engine, engine cylinder head or the generator.

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1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - REMOVAL).
4. Disconnect the wire harness connector from the clutch field coil connector on top of the A/C compressor (6) and the A/C pressure transducer (8) on the A/C discharge line (1).
5. Remove the nuts (4 and 7) that secure the A/C discharge line and the A/C suction line (5) to the A/C compressor.
6. Disconnect the refrigerant lines from the A/C compressor and remove and discard the O-rings and dual plane seals.
7. Install plugs in, or tape over all of the opened refrigerant line fittings and the compressor ports.



8. Remove the generator support bracket from the front of the engine (Refer to 8 - ELECTRICAL/ CHARGING/GENERATOR - REMOVAL).
9. Remove the three bolts (1 and 3) that secure the A/C compressor (2) to the mounting bracket (4).
10. Remove the A/C compressor from the engine compartment.



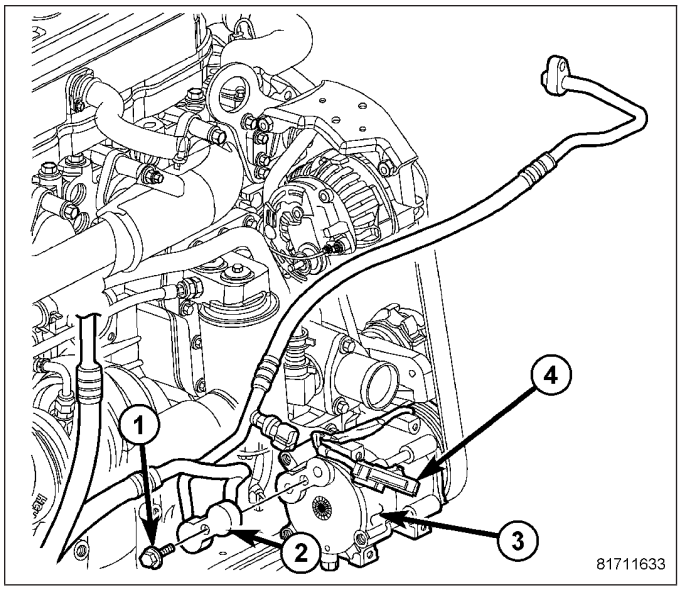
5.9L DIESEL ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

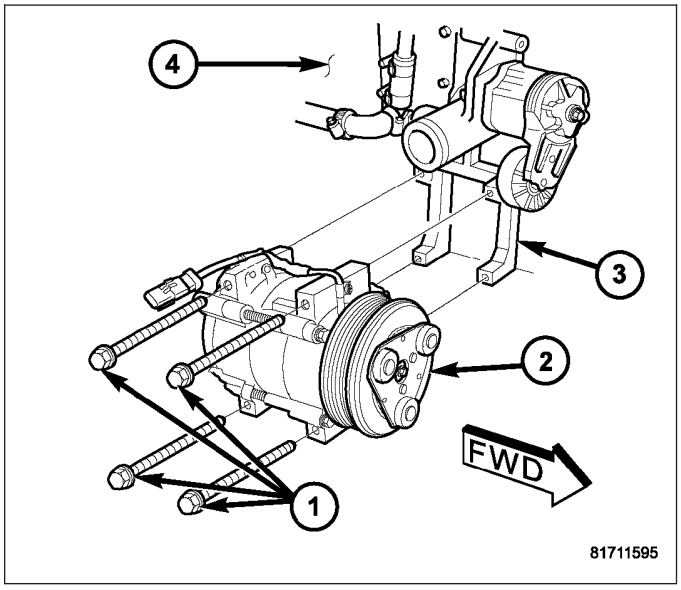
NOTE: The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the compressor clutch, clutch coil or engine.

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1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - REMOVAL).
4. Remove the bolt (1) that secures the A/C suction and discharge line assembly (2) to the A/C compressor (3).
5. Disconnect the refrigerant line assembly from the A/C compressor and remove and discard the seals.
6. Install plugs in, or tape over all of the opened refrigerant line fittings and compressor ports.
7. Disconnect the wire harness from the clutch field coil wire lead connector (4).



8. Remove the four bolts (1) that secure the A/C compressor (2) to the mounting bracket (3) located on the right side of the cylinder block (4).
9. Remove the A/C compressor from the engine compartment.



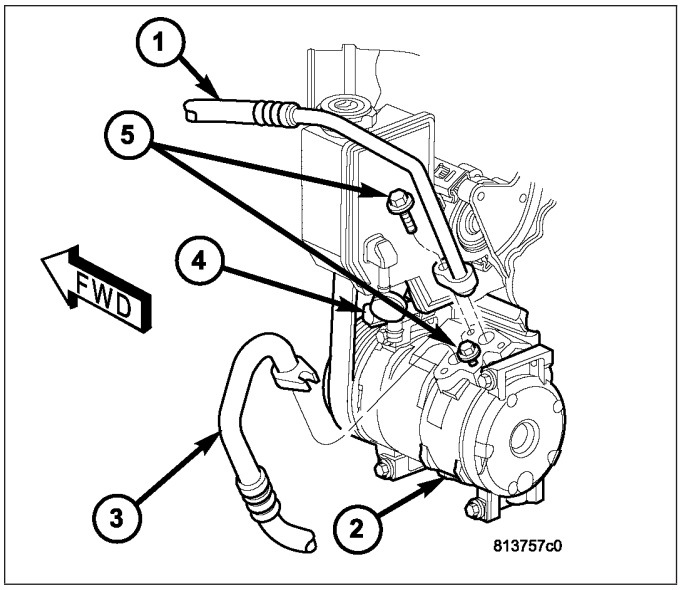
8.3L ENGINE

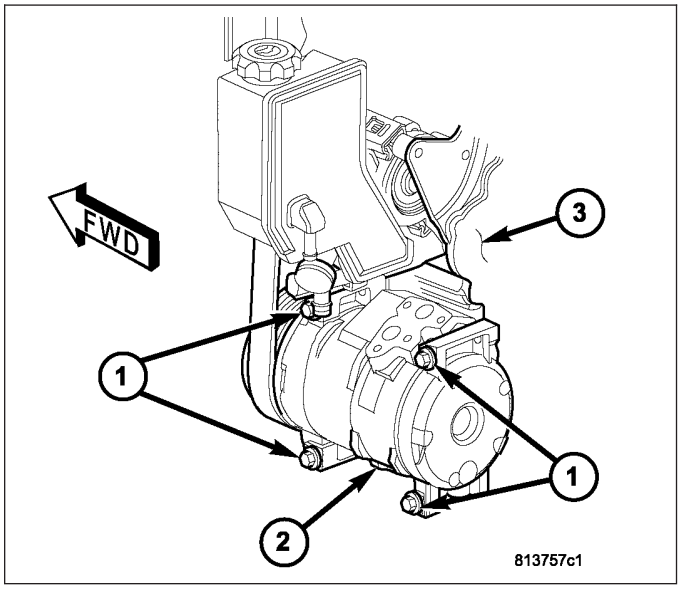
WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: The A/C compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the compressor clutch, clutch coil or the engine.

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1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - REMOVAL).
4. Disconnect the wire harness connector from the A/C compressor clutch coil connector (4).
5. Remove the bolts (5) that secure the A/C suction line (1) and the A/C discharge line (3) to the A/C compressor (2).
6. Disconnect the refrigerant lines from the A/C compressor and remove and discard the seals.
7. Install plugs in, or tape over all of the opened refrigerant line fittings and the compressor ports.
8. Remove the four bolts (1) that secure the A/C compressor (2) to the cylinder block (3).
9. Remove the A/C compressor from the engine compartment.





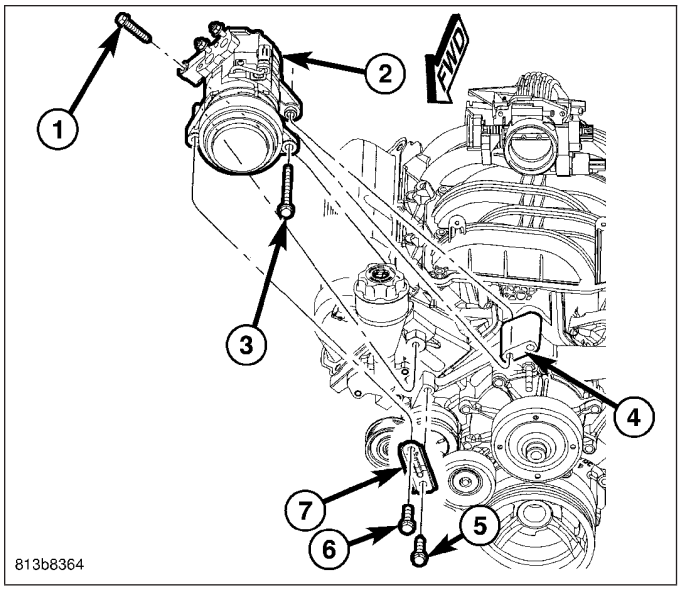
INSTALLATION

3.7L/4.7L ENGINES

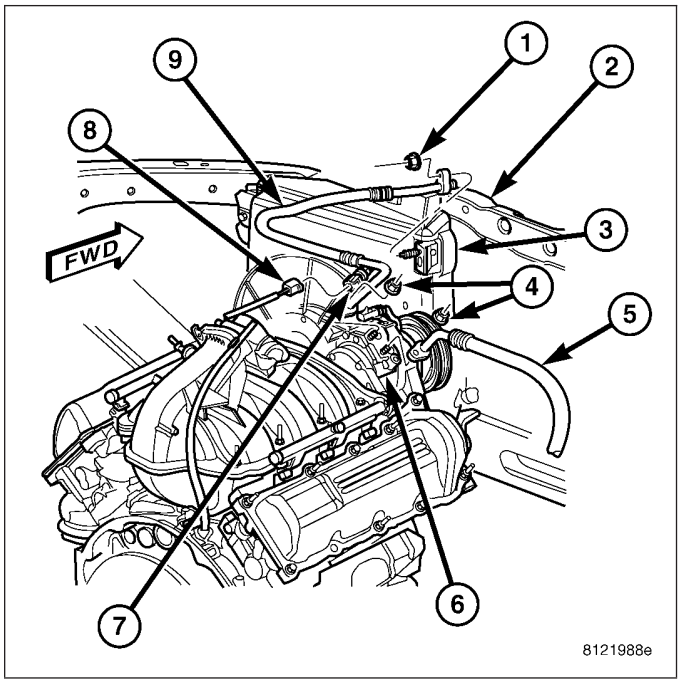
NOTE: If a replacement A/C compressor is being installed, be certain to check the refrigerant oil level. See Refrigerant Oil Level in this group for the procedures. Use only refrigerant oil of the type recommended for the compressor in the vehicle.

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1. Position the A/C compressor (2) onto the accessory mounting bracket (4).
2. Install and tighten the bolts in the following sequence:
   - Install bolt (3) and hand tighten.
   - Install bolt (6) and hand tighten.
   - Install bolt (1) and hand tighten.
   - Tightened bolt (3) to 40 N·m (30 ft. lbs.).
   - Tightened bolt (6) to 55 N·m (41 ft. lbs.).
   - Tightened bolt (1) to 55 N·m (41 ft. lbs.).
   - Tightened bolt (5) to 55 N·m (41 ft. lbs.).



3. Remove the tape or plugs from the opened refrigerant line fittings and the compressor ports.
4. Lubricate new seals with clean refrigerant oil and install them onto the refrigerant line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Install the A/C suction line (5) and the A/C discharge line (9) onto the A/C compressor (6).
6. Install the nuts (4) that secure the refrigerant lines to the A/C compressor. Tighten the nuts to 20 N·m (15 ft. lbs.).
7. Install the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - INSTALLATION).
8. Reconnect the negative battery cable.
9. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).



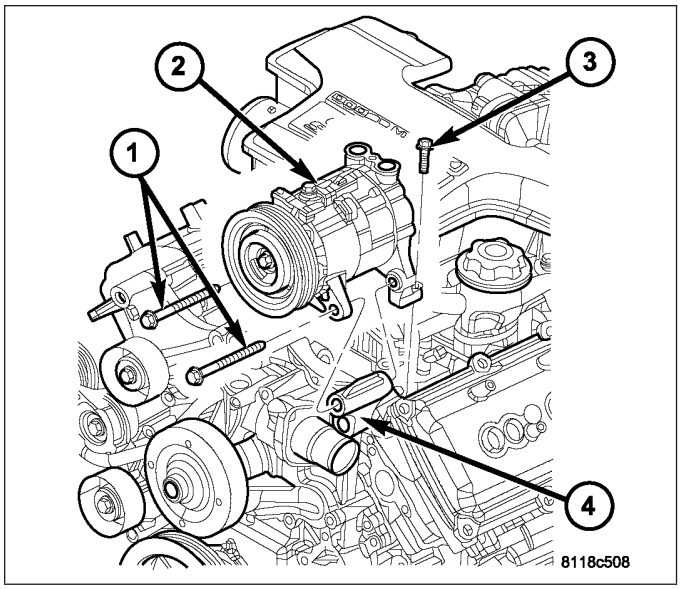
10. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

5.7L ENGINE

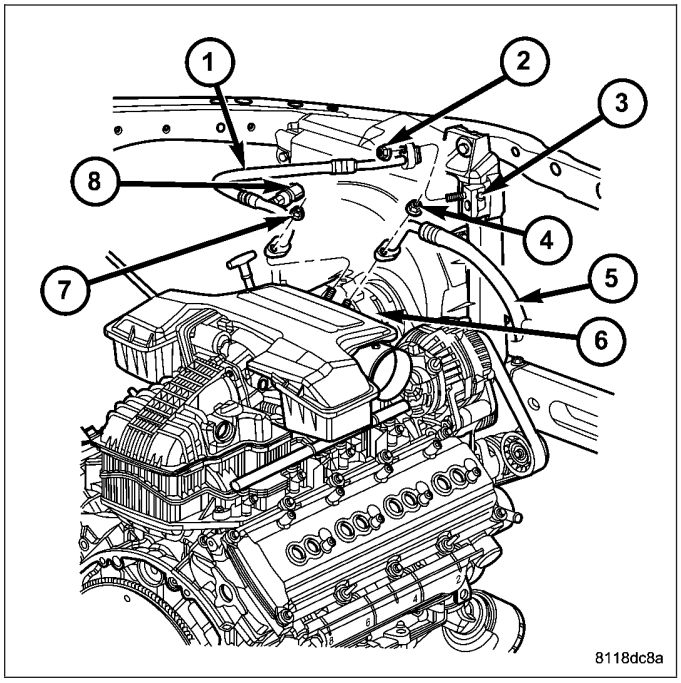
NOTE: Be certain to check the refrigerant oil level if the A/C compressor is being replaced. See Refrigerant Oil Level in this group for the procedures. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

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1. Position the A/C compressor (2) into the engine compartment.
2. Install and tighten the bolts that secure the A/C compressor to the mounting bracket (4) in the following sequence:
   - Install the two lower bolts (1) and hand tighten.
   - Install the rear bolt (3) and hand tighten.
   - Tighten the two lower bolts to 40 N·m (30 ft. lbs.).
   - Tighten the rear bolt to 55 N·m (41 ft. lbs.).
3. Install the generator support bracket (Refer to 8 - ELECTRICAL/CHARGING/GENERATOR - INSTALLATION).



4. Remove the tape or plugs from the opened refrigerant line fittings and the compressor ports.
5. Lubricate new O-rings and dual plane seals with clean refrigerant oil and install them onto the refrigerant line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
6. Install the A/C discharge line (1) and the A/C suction line (5) onto the A/C compressor (6).
7. Install the nuts (4 and 7) that secure the refrigerant lines to the A/C compressor. Tighten the nuts to 20 N·m (15 ft. lbs.).
8. Connect the wire harness connector to the clutch field coil connector and the A/C pressure transducer (8).
9. Install the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - INSTALLATION).
10. Reconnect the negative battery cable.



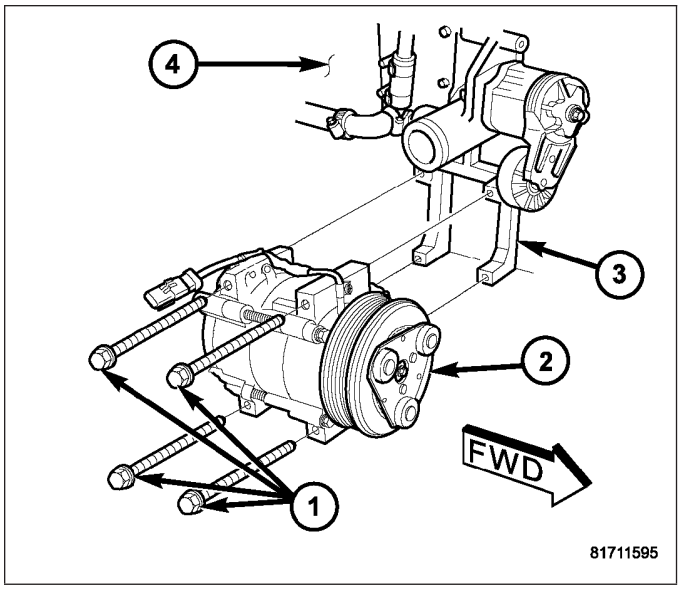
11. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
12. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

5.9L DIESEL ENGINE

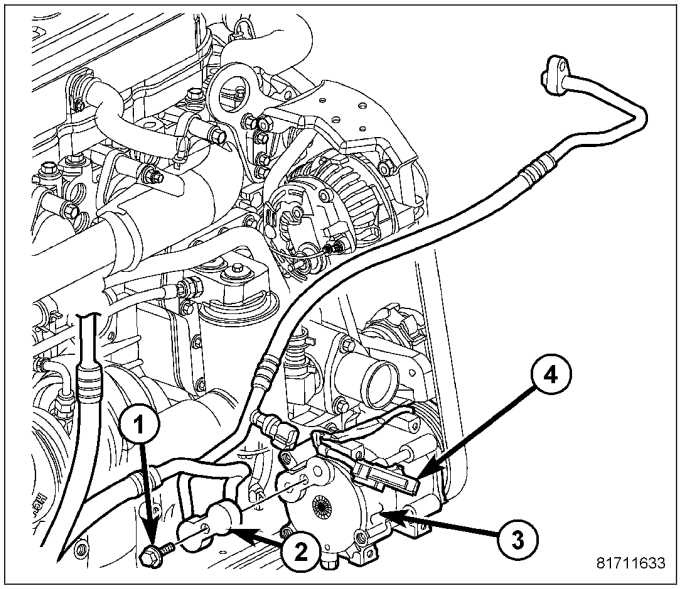
NOTE: Be certain to check the refrigerant oil level if the A/C compressor is being replaced. See Refrigerant Oil Level in this group for the procedures. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

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1. Position the A/C compressor (2) onto the mounting bracket (3) located on the right side of the cylinder block (4).
2. Install and hand tighten the four bolts (1) that secure the A/C compressor to the mounting bracket.
3. Tighten the bolts that secure the A/C compressor to the mounting bracket to 23 N·m (17 ft. lbs.).



4. Remove the tape or plugs from the opened refrigerant line fittings and the compressor ports.
5. Lubricate new seals with clean refrigerant oil and install them onto the refrigerant line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
6. Install the A/C suction and discharge line assembly (2) onto the A/C compressor (3).
7. Install the bolt (1) that secures the refrigerant line assembly to the A/C compressor. Tighten the bolt to 23 N·m (17 ft. lbs.).
8. Connect the wire harness to the clutch field coil wire lead connector (4).
9. Install the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - INSTALLATION).



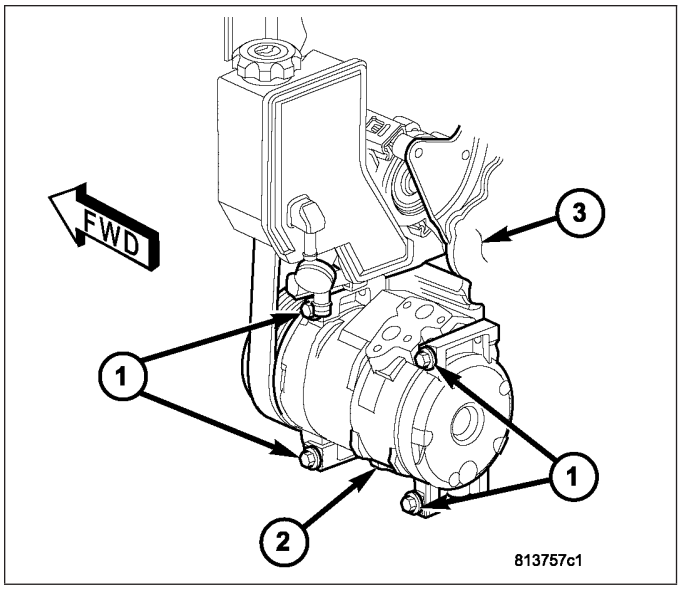
10. Reconnect the negative battery cable.
11. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
12. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

8.3L ENGINE

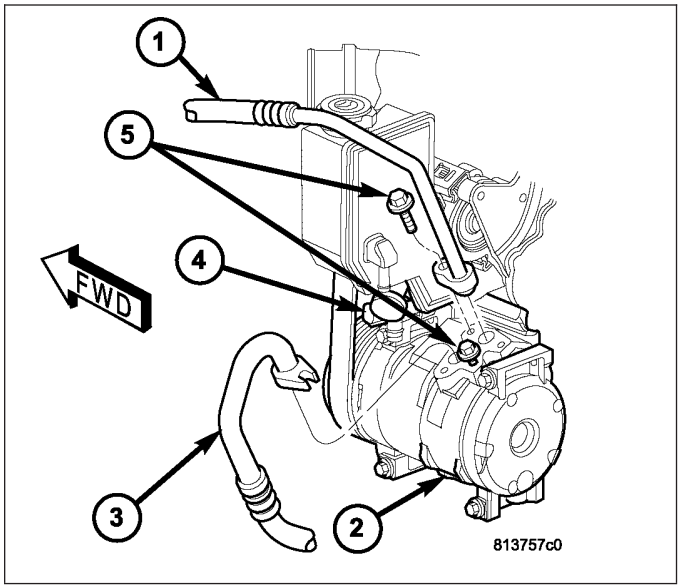
NOTE: Be certain to check the refrigerant oil level if the A/C compressor is being replaced. See Refrigerant Oil Level in this group for the procedures. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

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1. Position the A/C compressor (2) into the engine compartment.
2. Install and hand tighten the four bolts (1) that secure the A/C compressor to the cylinder block (3).
3. Tighten the bolts that secure the A/C compressor to the cylinder block to 23 N·m (17 ft. lbs.).



4. Remove the tape or plugs from the opened refrigerant line fittings and the compressor ports.
5. Lubricate new seals with clean refrigerant oil and install them onto the refrigerant line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
6. Install the A/C suction line (1) and the A/C discharge line (3) onto the A/C compressor (2).
7. Install the bolts (5) that secure the refrigerant lines to the A/C compressor. Tighten the bolts to 20 N·m (15 ft. lbs.).
8. Connect the wire harness connector to the A/C compressor clutch coil connector (4).
9. Install the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/BELTS-DRIVE - INSTALLATION).



10. Reconnect the negative battery cable.
11. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
12. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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CONDENSER-A/C

DESCRIPTION

The A/C condenser is located in the front of the engine compartment behind the grille. The A/C condenser is a heat exchanger that allows the high-pressure refrigerant gas being discharged by the A/C compressor to give up its heat to the air passing over the condenser fins, which causes the refrigerant to cool and change to a liquid state.

OPERATION

When air passes through the fins of the A/C condenser, the high-pressure refrigerant gas within the A/C condenser gives up its heat. The refrigerant then condenses as it leaves the A/C condenser and becomes a high-pressure liquid. The volume of air flowing over the condenser fins is critical to the proper cooling performance of the A/C system. Therefore, it is important that there are no objects placed in front of the radiator grille openings at the front of the vehicle or foreign material on the condenser fins that might obstruct proper air flow. Also, any factory-installed air seals or shrouds must be properly reinstalled following radiator or A/C condenser service.

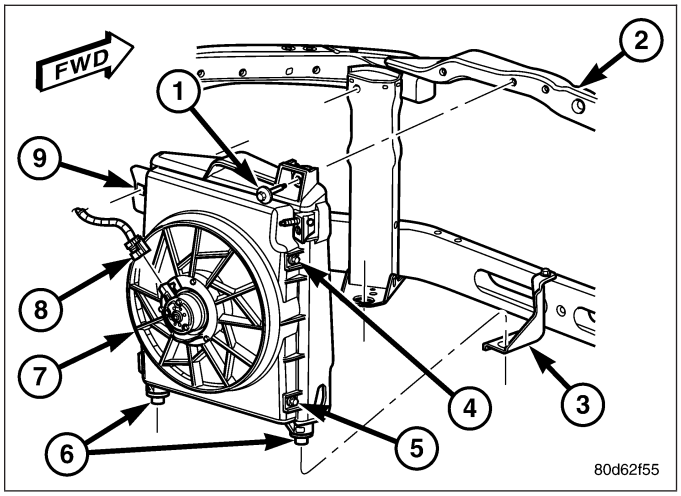
The A/C condenser cannot be repaired and, if faulty or damaged, it must be replaced.

REMOVAL

3.7L/4.7L/5.7L ENGINES

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Disconnect the A/C discharge line and the A/C liquid line from the A/C condenser (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ LINE-A/C DISCHARGE - REMOVAL) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ LINE-A/C LIQUID - REMOVAL).
4. Disconnect the wire harness connector (8) from the A/C condenser cooling fan motor (7).
5. Remove the two bolts (1 and 9) that secure the A/C condenser to the front upper crossmember (2).



6. Carefully lift the A/C condenser and cooling fan assembly to disconnect the lower mounting tabs (6) from the lower mounting flanges (3) and remove the assembly from the engine compartment.
7. If required, place the A/C condenser and the cooling fan assembly on a workbench and remove the four screws (4 and 5) that secure the cooling fan to the A/C condenser and separate the fan from the condenser.

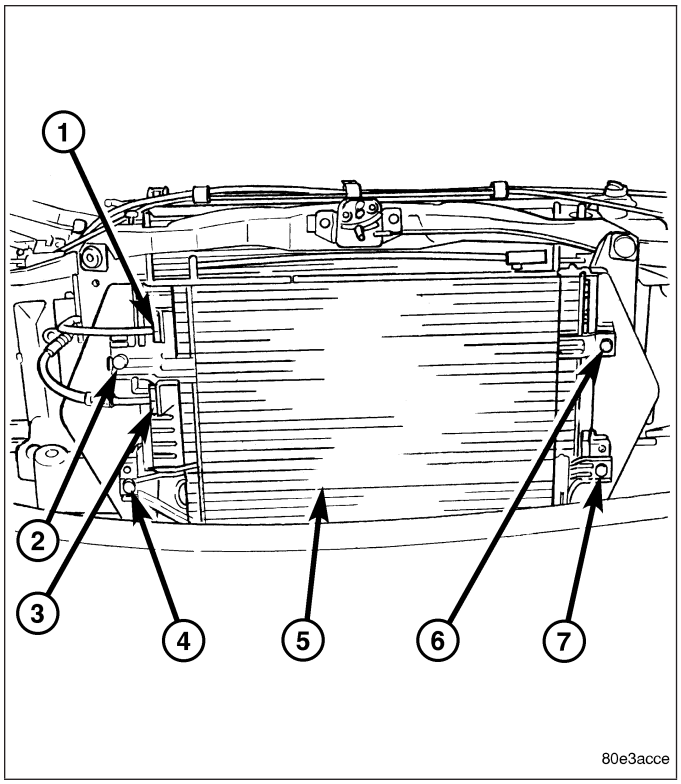
5.9L DIESEL ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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NOTE: Illustration shown with air seal removed for clarity.

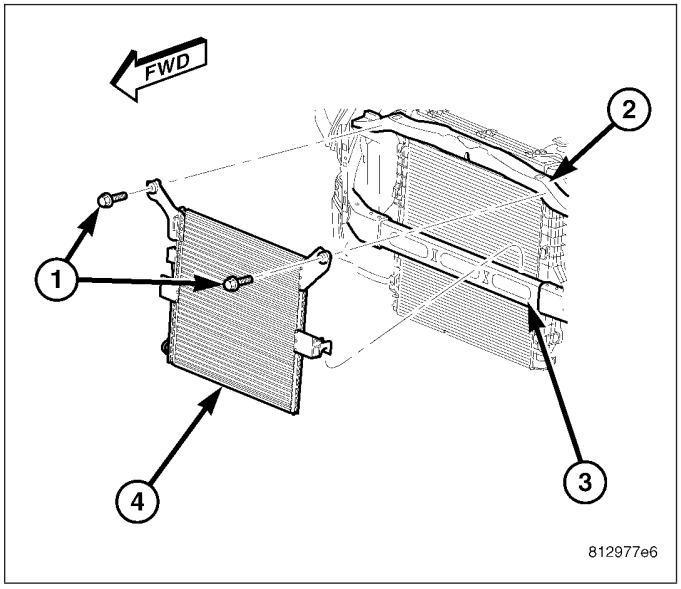
1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the air seal from the front passenger side of the A/C condenser (5) to gain access to the refrigerant line fittings.
4. Disconnect the A/C discharge line (1) and the A/C liquid line (3) from the A/C condenser (5) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ LINE-A/C LIQUID - REMOVAL) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ LINE-A/C DISCHARGE - REMOVAL).
5. Remove the four bolts (2, 4, 6 and 7) that secure the A/C condenser to the charge air cooler.
6. Remove the A/C condenser from the engine compartment.



8.3L ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Disconnect the A/C discharge line and the A/C liquid line from the A/C condenser (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ LINE-A/C LIQUID - REMOVAL) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ LINE-A/C DISCHARGE - REMOVAL).
4. Remove the two bolts (1) that secure the A/C condenser (4) to the upper radiator support (2).
5. Carefully lift the A/C condenser off of the front bumper support (3) and remove the condenser from the engine compartment.

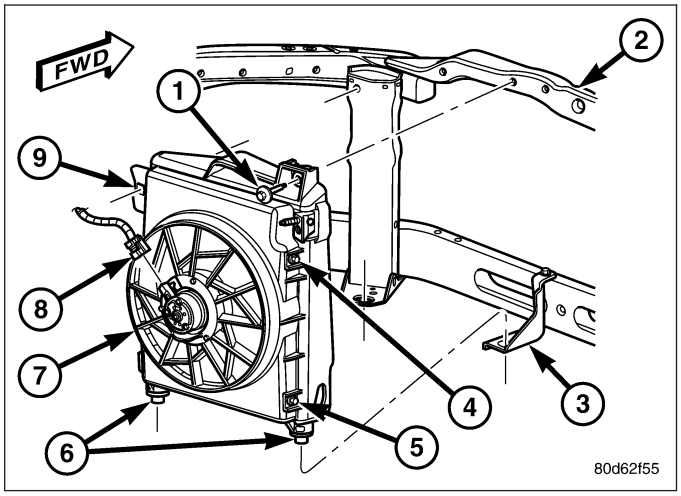


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INSTALLATION

3.7L/4.7L/5.7L ENGINES

NOTE: If the A/C condenser is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.



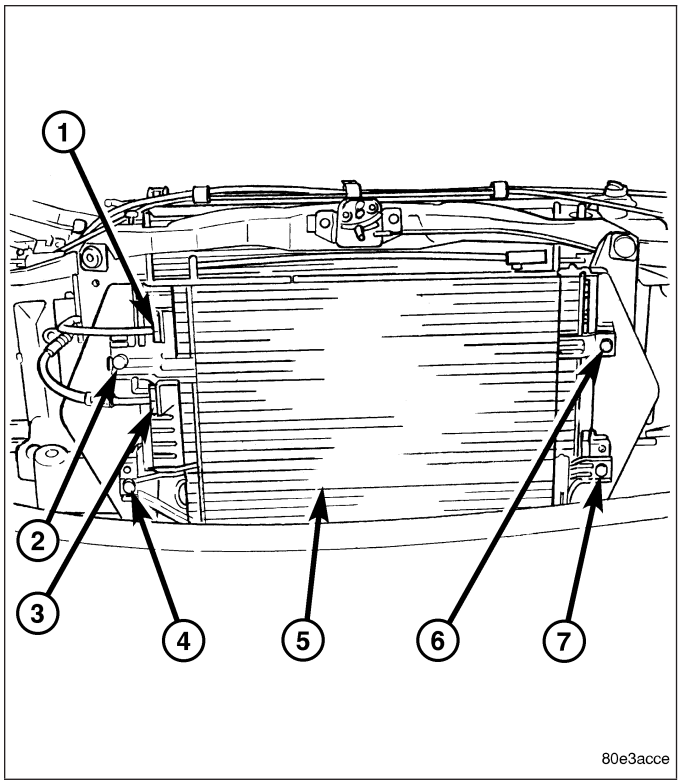
1. If removed, install the condenser cooling fan onto the A/C condenser.
2. Install the four screws (4 and 5) that secure the cooling fan to the A/C condenser. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Position the A/C condenser and cooling fan assembly into the engine compartment.
4. Install the lower mounting tabs (6) into the lower mounting flanges (3).
5. Install the two bolts (1 and 9) that secure the A/C condenser to the upper front crossmember (2). Tighten the bolts to 10.5 N·m (95 in. lbs.).
6. Connect the wire harness connector (8) to the A/C condenser cooling fan motor (7).
7. Connect the A/C discharge line and the A/C liquid line onto the A/C condenser (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C DISCHARGE - INSTALLATION) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C LIQUID - INSTALLATION).
8. Reconnect the negative battery cable.
9. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
10. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

5.9L DIESEL ENGINE

NOTE: If the A/C condenser is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

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NOTE: Illustration shown with air seal removed for clarity.



1. Position the A/C condenser (5) into the engine compartment.
2. Install the four bolts (2, 4, 6 and 7) that secure the A/C condenser to the charge air cooler. Tighten the bolts to 10.5 N·m (95 in. lbs.).
3. Remove the tape or plugs from the liquid line fitting and condenser outlet port.
4. Lubricate a new rubber O-ring seal with clean refrigerant oil and install it on the liquid line fitting. Use only the specified O-ring as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the A/C discharge line (1) and the A/C liquid line (3) onto the A/C condenser (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C DISCHARGE - INSTALLATION) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C LIQUID - INSTALLATION).
6. Position the air seal over the front passenger side of the A/C condenser and install the air seal retainers.
7. Reconnect the negative battery cable.
8. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
9. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

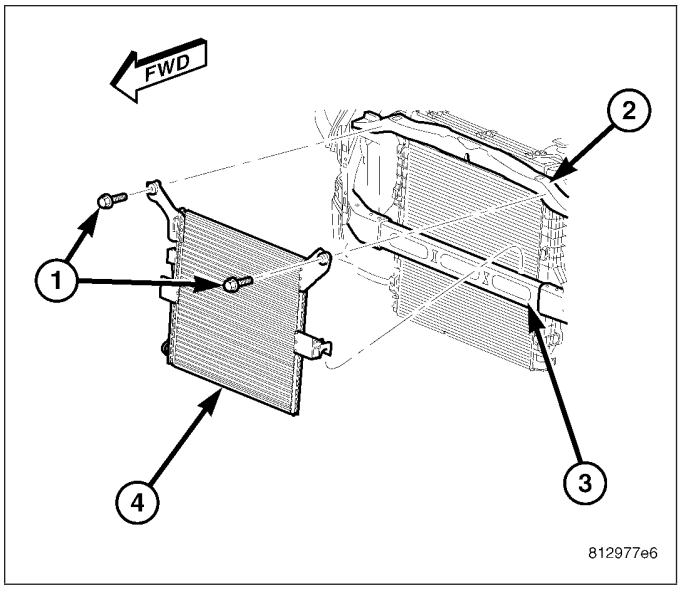
8.3L ENGINE

NOTE: If the A/C condenser is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Be certain that each of the radiator and condenser air seals are reinstalled in their proper locations. These air seals are required for the A/C and engine cooling systems to perform as designed.

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1. Position the A/C condenser (4) into the engine compartment and install the condenser onto the front bumper support (3).
2. Install the two bolts (1) that secure the A/C condenser to the upper radiator support (2). Tighten the bolts to 10.5 N·m (95 in. lbs.).
3. Connect the A/C discharge line and the A/C liquid line onto the A/C condenser (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C DISCHARGE - INSTALLATION) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C LIQUID - INSTALLATION).
4. Reconnect the negative battery cable.
5. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
6. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).



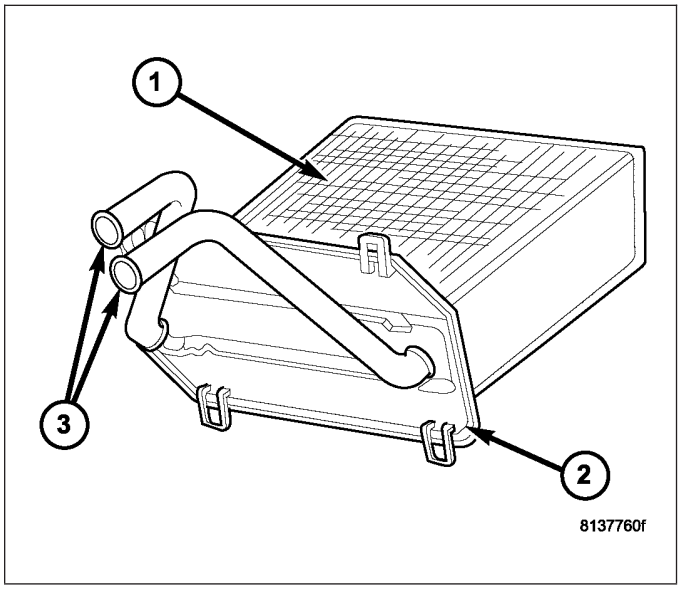
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CORE-HEATER

DESCRIPTION

The heater core (1) is a heat exchanger made of rows of tubes and fins. The heater core is positioned within the HVAC housing through the panel (2) located at the front of the HVAC housing. The heater core tubes (3) are attached to the front of the heater core and are secured to the HVAC housing by a bracket.

The heater core can be serviced by removing the HVAC housing assembly from the vehicle.



OPERATION

Engine coolant is circulated through the heater hoses to the heater core at all times. As the coolant flows through the heater core, heat is removed from the engine and is transferred to the heater core tubes and fins. Air directed through the heater core picks up the heat from the heater core fins. The blend-air door(s) allows control of the heater output air temperature by regulating the amount of air flowing through the heater core. The blower motor speed controls the volume of air flowing through the HVAC housing.

The heater core cannot be repaired and, if faulty or damaged, it must be replaced.

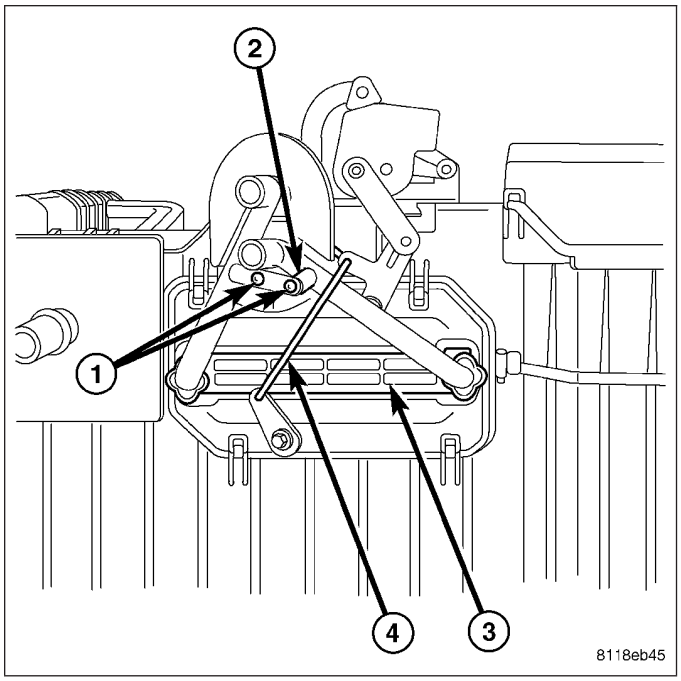
REMOVAL

WARNING: On vehicles equipped with airbags, disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury or death.

NOTE: Disassembly of the HVAC housing is not required to remove heater core.

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1. Remove the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - REMOVAL).
2. Remove the foam seal from the heater core tubes.
3. If equipped with the dual zone heating-A/C system, remove the linkage rod (4) to gain access to the heater core (3).
4. Remove the two screws (1) that secure the heater core tube bracket (2) to the HVAC housing and remove the bracket.
5. Carefully pull the heater core out of the front of the HVAC housing.
6. Inspect all foam seals and replace as required.

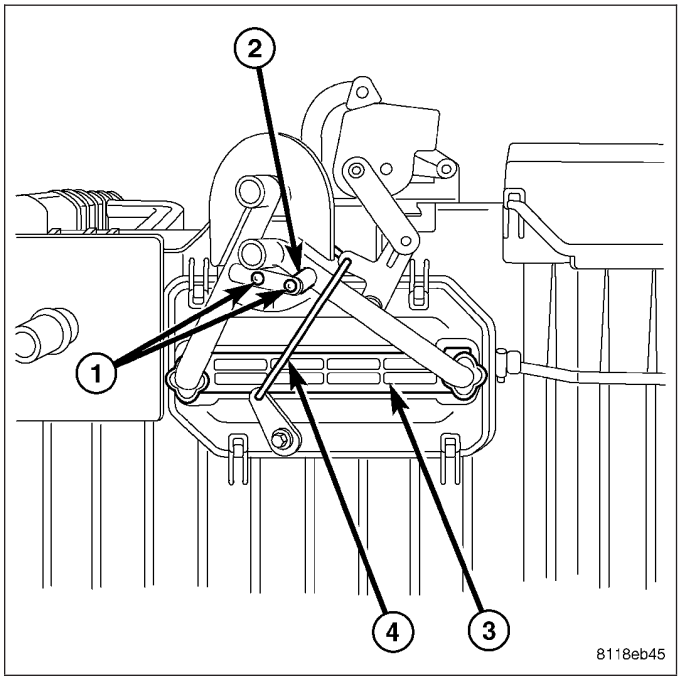


INSTALLATION

1. Carefully install the heater core (3) into the front of the HVAC housing.
2. Position the heater core tube bracket (2) onto the HVAC housing.
3. Install the two screws (1) that secures the heater core bracket to the HVAC housing. Tighten the screws to 2.2 N·m (20 in. lbs.).
4. If equipped with the dual zone heating-A/C system, install the linkage rod (4).
5. Install the foam seal onto the heater core tubes.

NOTE: If the heater core is being replaced, flush the cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - COOLING SYSTEM CLEANING/REVERSE FLUSHING).

6. Install the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - INSTALLATION).



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CORE-VALVE-SERVICE PORT

DESCRIPTION

Two refrigerant system service ports are used to recover/recycle/evacuate/charge and test the A/C refrigerant system. Unique sizes are used on the service ports for the R-134a refrigerant system to ensure the system is not accidentally contaminated with R-12 refrigerant or service equipment used for R-12 refrigerant.

The high side service port is located on the A/C discharge line. The A/C pressure transducer is mounted on the high side service port (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - DESCRIPTION). The low side service port is located either on the top of the A/C accumulator or on the A/C suction line near the accumulator, depending on engine application. Both the high side and low side A/C service port valve cores are serviceable.

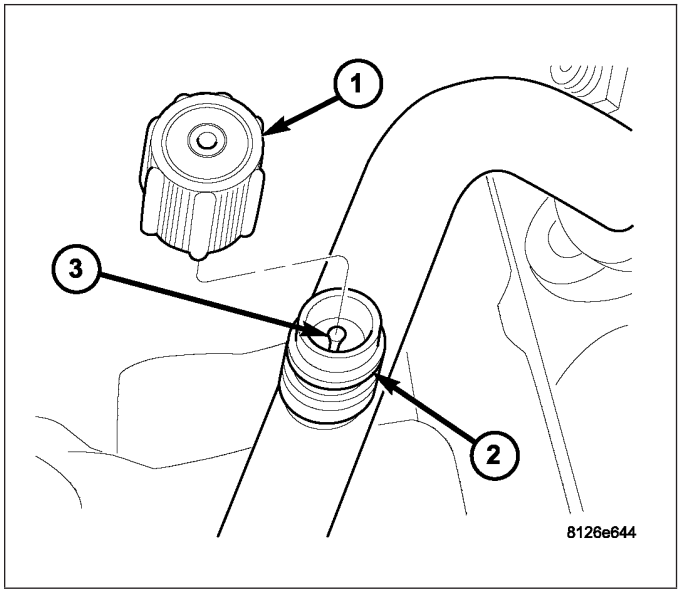
Each of the service ports has a threaded plastic protective cap installed over it from the factory. After servicing the refrigerant system, always reinstall both of the service port caps.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: Typical A/C service port shown.

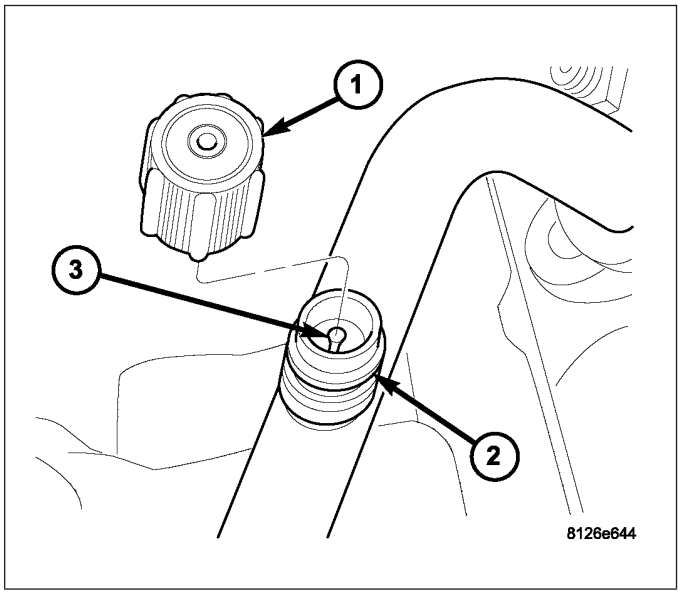
1. Remove the protective cap (1) from the service port (2).
2. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
3. Using a Schrader-type valve core tool, remove the valve core (3) from the service port.
4. Install a plug in or tape over the opened service port(s).



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INSTALLATION

NOTE: Typical A/C service port shown.



1. Lubricate the valve core (3) with clean refrigerant oil prior to installation. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Remove the tape or plug from the service port (2).

CAUTION: A valve core that is not fully seated in the A/C service port can result in damage to the valve during refrigerant system evacuation and charge. Such damage may result in a loss of system refrigerant while uncoupling the charge adapters.

3. Using a Schrader-type valve core tool, install and tighten the valve core into the service port(s).
4. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
5. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

NOTE: The protective cap helps aid in service port sealing and helps protect the refrigerant system from contamination. Remember to always reinstall the protective cap onto the service port when refrigerant system service is complete.

6. Install the protective cap (1) onto the service port.

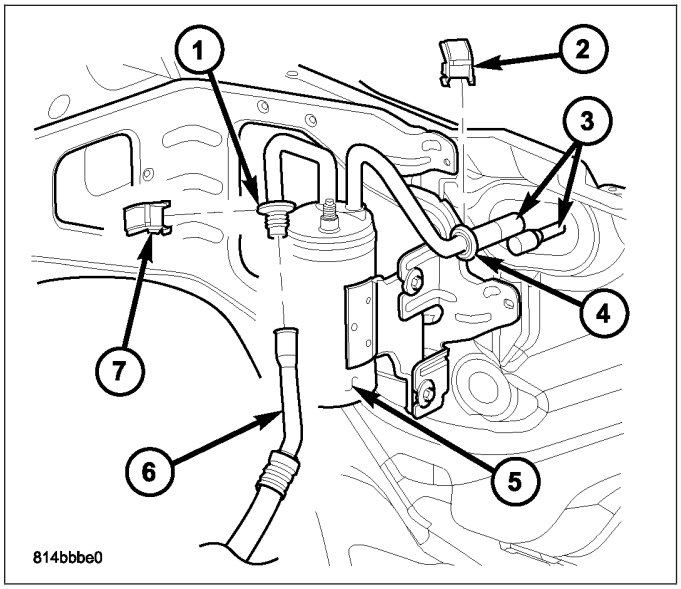
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COUPLER-REFRIGERANT LINE

DESCRIPTION

Spring-lock type refrigerant line couplers (1 and 4) are used to connect the A/C suction line (6) to the A/C accumulator (5) and, the A/C accumulator and the A/C liquid line to the A/C evaporator tubes (3). Secondary retaining clips (2 and 7) are installed over the connected couplers for added protection.

The spring-lock refrigerant line couplers require special disconnect tools for disengaging the two coupler halves.

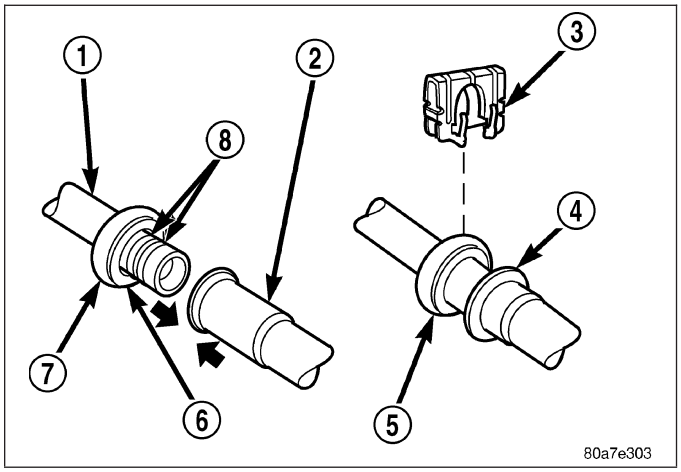


OPERATION

The spring-lock type refrigerant line coupler is held together by a garter spring (6) inside a circular cage (7) on the male half of the fitting (1). When the two coupler halves are connected, the flared end of the female fitting (2) slips behind the garter spring inside the cage on the male fitting. The garter spring and cage prevent the flared end of the female fitting from pulling out of the cage. Some applications use a connection indicator ring (4) to help indicate when the two coupler halves are fully connected.

Two O-rings (8) are used to seal the coupler connections. These O-rings are compatible with R-134a refrigerant and must be replaced with O-rings made of the same material.

A secondary retaining clip (3) is installed over the connected coupler (5) for added protection.

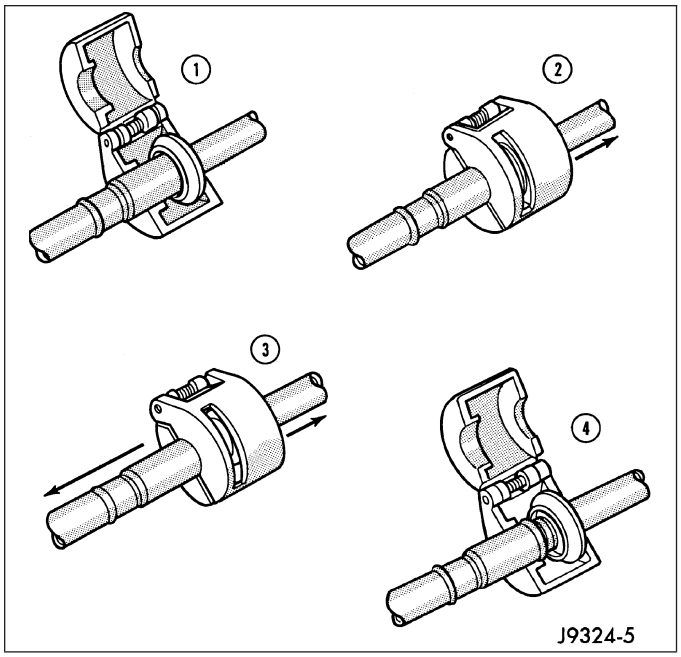


REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Remove the secondary retaining clip from the spring-lock type refrigerant line coupler.
3. Fit the proper size A/C line disconnect tool (Special Tool Kit 7193 or equivalent) over the coupler cage (1).
4. Close the two halves of the A/C line disconnect tool around the coupler (2).

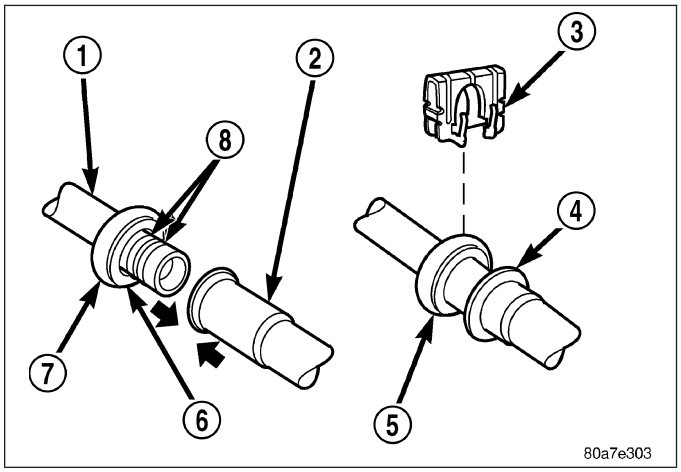


NOTE: The garter spring may not release if the A/C line disconnect tool is cocked while pushing it into the coupler cage opening.

5. Push the A/C line disconnect tool into the open side of the coupler cage to expand the garter spring (3). Once the garter spring is expanded, pull on the refrigerant line attached to the female half of the coupler until the flange on the female fitting is separated from the garter spring and cage on the male fitting.
6. Open and remove the A/C line disconnect tool from the refrigerant line coupler (4).

INSTALLATION

1. Clean any dirt or foreign material from the spring-lock type refrigerant line coupler.
2. Check to make sure that the garter spring (6) is located within the cage (7) of the male half of the refrigerant line coupler (1), and that the garter spring is not damaged.
   a. If the garter spring is missing, install a new spring by pushing it into the coupler cage opening.
   b. If the garter spring is damaged, remove it from the coupler cage with a small hook (DO NOT use a screwdriver) and install a new garter spring.



CAUTION: Use only the specified O-rings as they are made of a special material for the R-134a system. The use of any other O-rings may allow the connection to leak.

3. Install new O-rings (8) on the male half of the refrigerant line coupler.
4. Lubricate the O-rings, and the inside of the female half of the refrigerant line coupler (2) with clean R-134a refrigerant oil. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Position the female half of the coupler over the male half of the coupler.
6. Push together firmly on the two halves of the refrigerant line coupler until the garter spring in the cage on the male half of the coupler snaps over the flanged end on the female half of the coupler.
7. Make sure that the refrigerant line coupler is fully engaged by firmly pulling the refrigerant lines away from each other on both sides of the coupler.
8. Install the secondary retaining clip (3) over connected coupler cage (5).
9. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).

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10. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

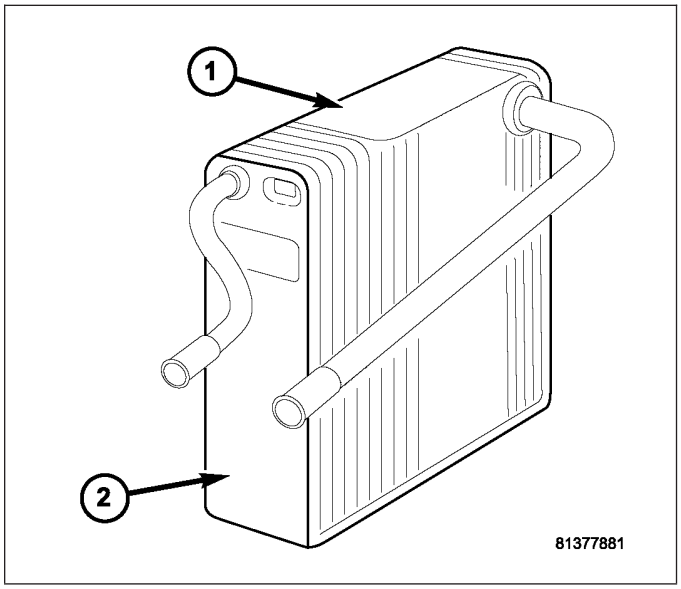
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EVAPORATOR-A/C

DESCRIPTION

The A/C evaporator (1) for the heating-A/C system is located within the HVAC housing, behind the instrument panel. The A/C evaporator and its insulator (2) are positioned in the HVAC housing so that all air entering the housing must pass over the evaporator fins before it is distributed through the heating-A/C system ducts and outlets. However, air passing over the evaporator fins will only be conditioned when the A/C compressor is engaged and circulating refrigerant through the A/C evaporator.

The A/C evaporator can be serviced by removing and disassembling the HVAC housing assembly.



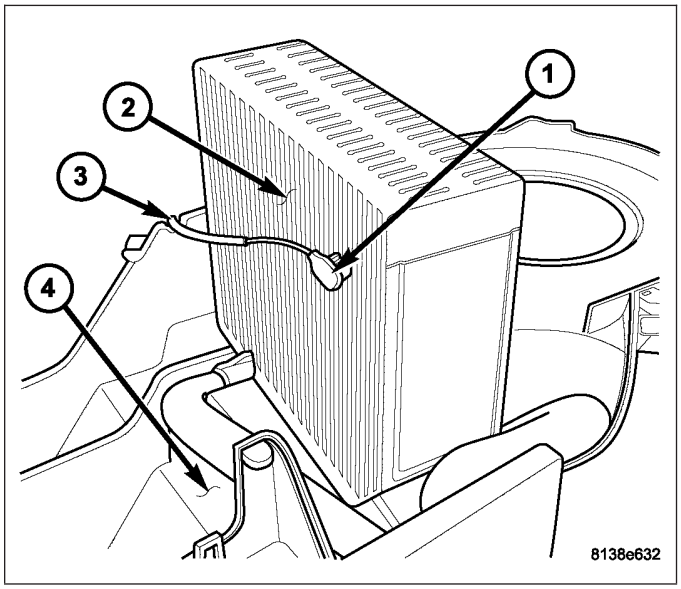
OPERATION

Refrigerant enters the A/C evaporator through the A/C orifice tube as a low-temperature, low-pressure mixture of liquid and gas. As air flows over the fins of the A/C evaporator, the humidity in the air condenses on the fins, and the heat from the air is absorbed by the refrigerant. Heat absorption causes the refrigerant to boil and vaporize. The refrigerant becomes a low-pressure gas when it leaves the A/C evaporator.

The A/C evaporator cannot be repaired and, if faulty or damaged, it must be replaced.

REMOVAL

1. Remove the HVAC housing and place it on a workbench (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - REMOVAL).
2. Disassemble the HVAC housing to access the A/C evaporator (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - DISASSEMBLY).
3. Remove the probe of the evaporator temperature sensor (1) from the fins of the A/C evaporator (2) and position the wire lead (3) out of the way.



NOTE: If the foam insulator around the A/C evaporator is deformed or damaged, the insulator must be replaced.

4. Carefully lift the A/C evaporator and the foam insulator out of the upper half of the HVAC housing (4).

NOTE: If the foam seal around the evaporator tapping block is deformed or damaged, the seal must be replaced.

5. If required, remove the foam seal from the inlet and outlet tubes of the A/C evaporator.

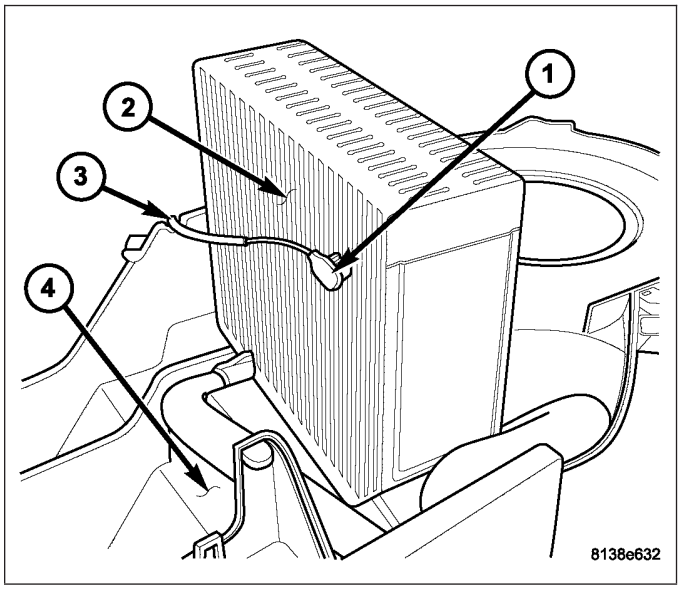
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INSTALLATION

NOTE: If the A/C evaporator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Make sure that the foam insulator is properly positioned in the HVAC housing.

1. Carefully install the A/C evaporator (2) and its foam insulator into the upper half of the HVAC housing (4).
2. Install the probe of the evaporator temperature sensor (1) between the fins of the A/C evaporator.
3. Route the wire lead (3) of the evaporator temperature sensor into the opening located on the upper half of the HVAC housing.
4. Assemble the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - ASSEMBLY).
5. Install the HVAC housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HOUSING-HVAC - INSTALLATION).



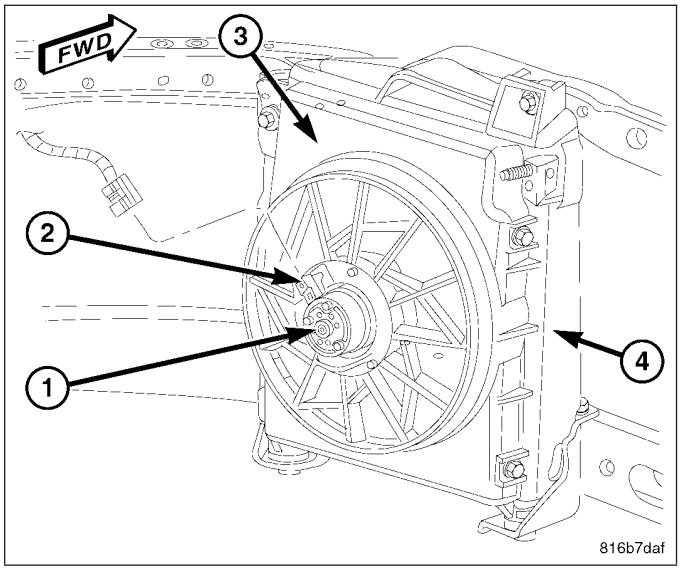
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FAN-A/C CONDENSER

DESCRIPTION

All models equipped with gasoline engines, except SRT 8, use an electric cooling fan to help pull heat out of the A/C system, especially during idle conditions. Without a cooling fan, A/C high side pressures would increase and A/C system performance would eventually deteriorate.

The A/C condenser fan consists of a plastic fan blade assembly which is driven by a 12-volt direct current (DC) motor (1) with an integral wire harness connector (2). The A/C condenser fan is mounted within a plastic shroud (3) behind the A/C condenser (4) located in the left front of the engine compartment.



OPERATION

The A/C condenser fan used in gasoline engine equipped models (except SRT 8) is controlled by the powertrain control module (PCM). When the A/C-heater control is set to any A/C position, it sends a request signal on the CAN-B bus to the totally integrated power module (TIPM), which then transfers the request on the CAN-C Bus to the PCM/ECM, which sends a signal on a dedicated hard-wired circuit to the totally integrated power module (TIPM) to energize the internal A/C condenser fan high side driver. When energized, the A/C condenser fan high side driver provides battery current to the condenser fan motor.

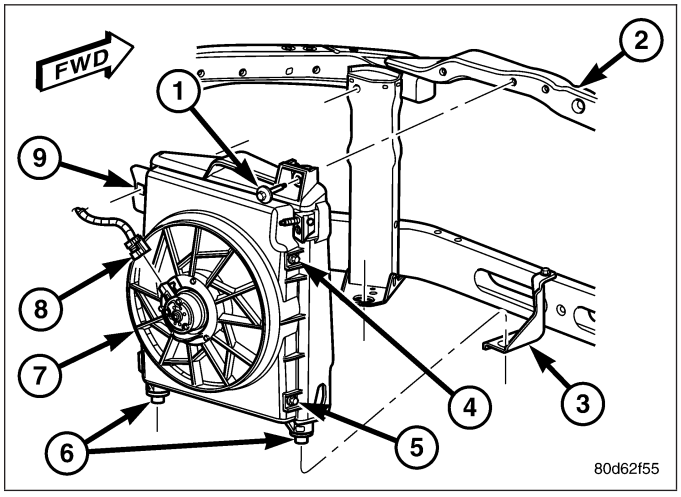
The A/C condenser fan control system is diagnosed using a scan tool (Refer to 24 - HVAC Electrical Diagnostics for more information).

The components of the A/C condenser fan cannot be repaired and, if faulty or damaged, they must be replaced as an assembly.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Disconnect the A/C discharge line and the A/C liquid line from the A/C condenser (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ LINE-A/C DISCHARGE - REMOVAL) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ LINE-A/C LIQUID - REMOVAL).
4. Disconnect the wire harness connector (8) from the A/C condenser cooling fan motor (7).

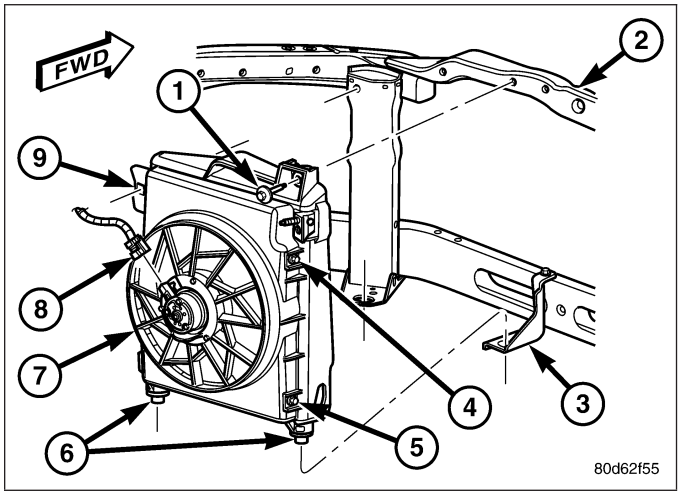


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5. Remove the two bolts (1 and 9) that secure the A/C condenser to the front upper crossmember (2).
6. Carefully lift the A/C condenser and cooling fan assembly to disconnect the lower mounting tabs (6) from the lower mounting flanges (3) and remove the assembly from the engine compartment.
7. Place the A/C condenser and the cooling fan assembly on a workbench and remove the four screws (4 and 5) that secure the cooling fan to the A/C condenser and separate the fan from the condenser.

INSTALLATION

1. Install the condenser cooling fan onto the A/C condenser.
2. Install the four screws (4 and 5) that secure the cooling fan to the A/C condenser. Tighten the screws to 2.2 N·m (20 in. lbs.).
3. Position the A/C condenser and cooling fan assembly into the engine compartment.
4. Install the lower mounting tabs (6) into the lower mounting flanges (3).
5. Install the two bolts (1 and 9) that secure the A/C condenser to the upper front crossmember (2). Tighten the bolts to 10.5 N·m (95 in. lbs.).
6. Connect the wire harness connector (8) to the A/C condenser cooling fan motor (7).



7. Connect the A/C discharge line and the A/C liquid line onto the A/C condenser (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C DISCHARGE - INSTALLATION) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C LIQUID - INSTALLATION).
8. Reconnect the negative battery cable.
9. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
10. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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LINE-A/C DISCHARGE

DESCRIPTION

The A/C discharge line is the refrigerant line that goes from the A/C compressor to the A/C condenser and has an integral fitting for the A/C pressure transducer (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - DESCRIPTION).

The A/C discharge line for the 5.9L Diesel engine is serviced as an assembly with the suction line.

The A/C discharge line for the 8.3L engine is secured to the top of fan shroud by two retainers.

CAUTION: Use only O-ring seals specified for the vehicle. Failure to use correct O-ring seal will cause the refrigerant system connection to leak.

The A/C discharge line has no serviceable parts except the rubber O-ring seals. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the A/C discharge line is removed and installed.

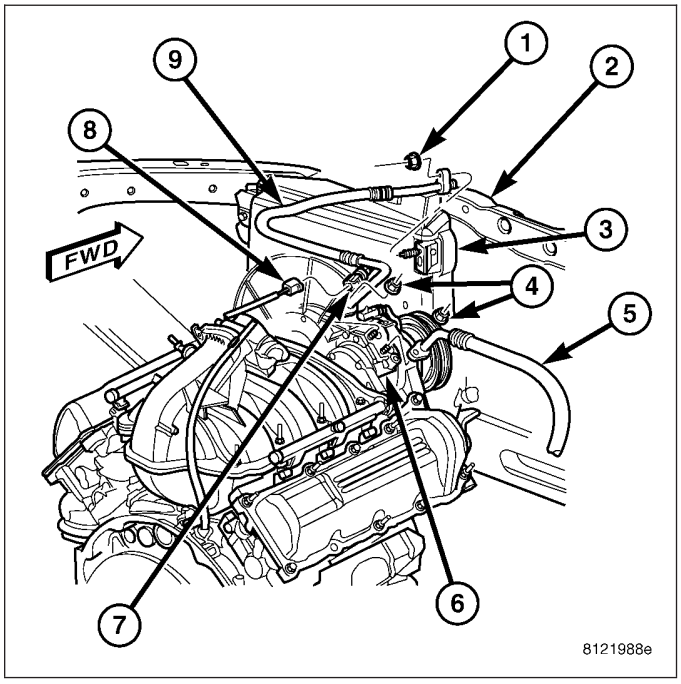
If the A/C discharge line is found to be leaking or is damaged, it must be replaced.

REMOVAL

3.7L/4.7L ENGINES

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: 3.7L engine shown, 4.7L engine similar.

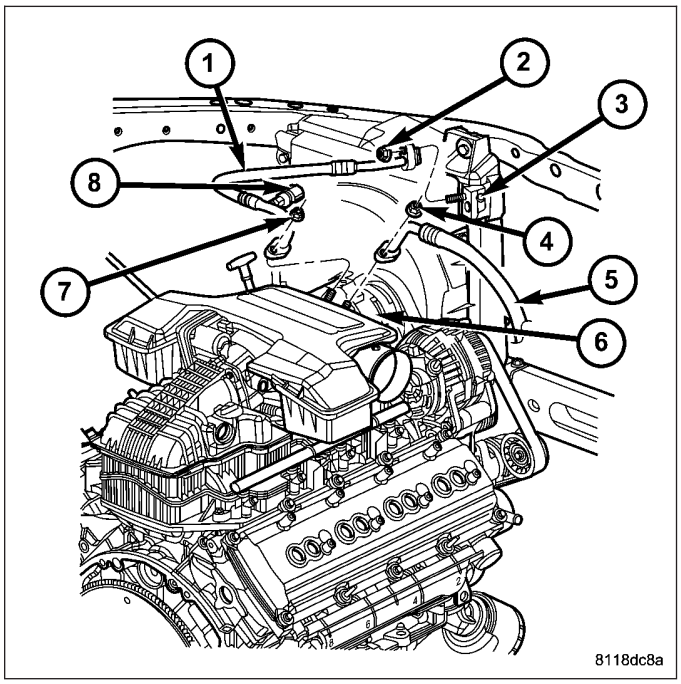


1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Disconnect the wire harness connector (8) from the A/C pressure transducer (7).
4. Remove the nut (1) that secures the A/C discharge line (9) to the condenser inlet port (3) located near the top of the A/C condenser (2).
5. Disconnect the A/C discharge line from the A/C condenser and remove and discard the seal.
6. Install plugs in, or tape over the discharge line fitting and condenser inlet port.
7. Remove the nut (4) that secures the A/C discharge line to the A/C compressor (6).
8. Disconnect the A/C discharge line from the A/C compressor and remove and discard the seal.
9. Install plugs in, or tape over the opened refrigerant line fitting and the compressor port.
10. Remove the A/C discharge line from the engine compartment.
11. If necessary, remove the A/C pressure transducer from the A/C discharge line (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - REMOVAL).

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5.7L ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.



1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Disconnect the wire harness connector from the A/C pressure transducer (8).
4. Remove the nut (2) that secures the A/C discharge line (1) to the A/C condenser (3).
5. Disconnect the A/C discharge line from the A/C condenser and remove and discard the O-ring and dual plan seal.
6. Install plugs in, or tape over the discharge line fitting and condenser inlet port.
7. Remove the nut (7) that secures the A/C discharge line to the A/C compressor (6).
8. Disconnect the A/C discharge line from the A/C compressor and remove and discard the O-ring and dual plan seal.
9. Install plugs in, or tape over the opened refrigerant line fitting and the compressor port.
10. Remove the A/C discharge line from the engine compartment.
11. If necessary, remove the A/C pressure transducer from the A/C discharge line (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - REMOVAL).

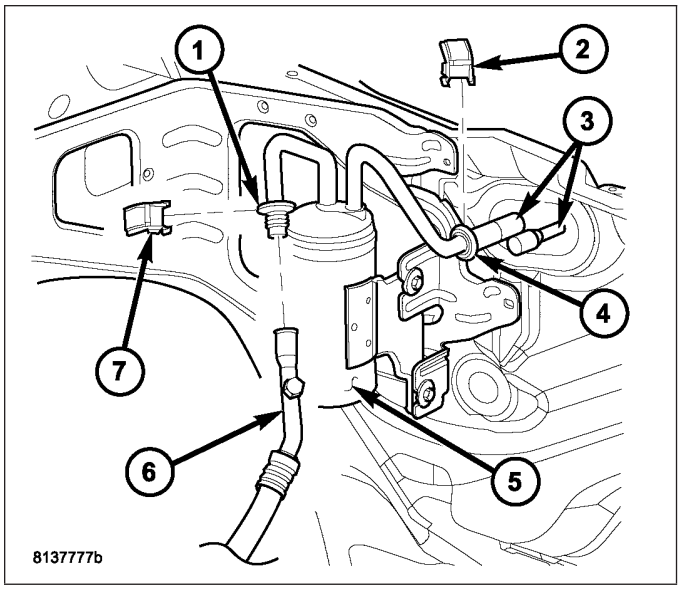
5.9L DIESEL ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

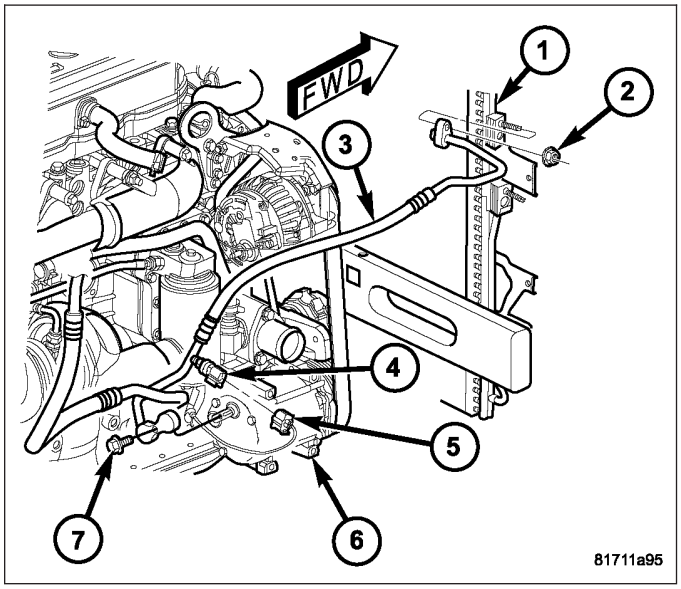
NOTE: The A/C discharge line for the 5.9L Diesel engine is serviced as an assembly with the suction line.

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1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM).
4. Remove the secondary retaining clip (7) from the spring-lock coupler (1) that secures the suction line (6) to the A/C accumulator (5).
5. Using the proper A/C line disconnect tool, disconnect the suction line from the A/C accumulator and remove and discard the seals (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
6. Install plugs in, or tape over the opened accumulator tube fitting.



7. Disconnect the wire harness connector (5) from the A/C pressure transducer (4).
8. Remove the nut (2) that secures the A/C suction and discharge line assembly (3) to the A/C condenser (1).
9. Disconnect the discharge line from the A/C condenser and remove and discard the seal.
10. Remove the bolt (7) that secures the A/C suction and discharge line assembly to the A/C compressor (6).
11. Disconnect the A/C suction and discharge line assembly from the A/C compressor and remove and discard the seals.
12. Remove the A/C suction and discharge line assembly from the engine compartment.
13. Install plugs in, or tape over the opened refrigerant line fittings and condenser and compressor ports.



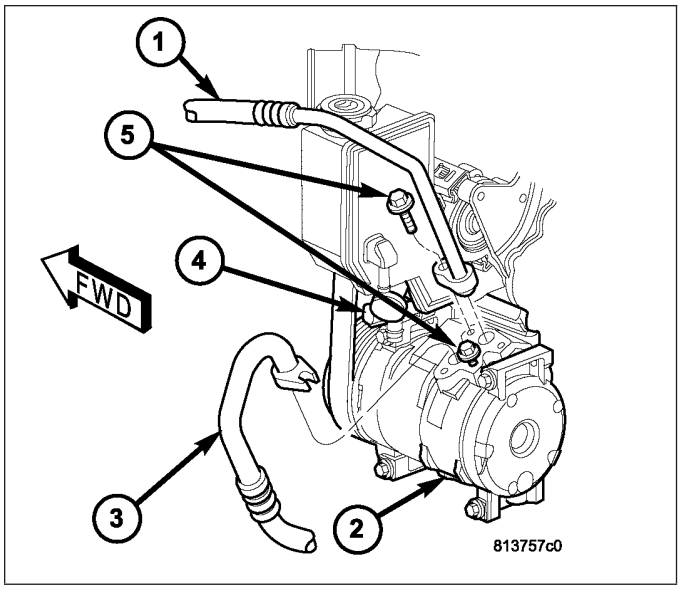
14. If necessary, remove the A/C pressure transducer from the A/C discharge line (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - REMOVAL).

8.3L ENGINE

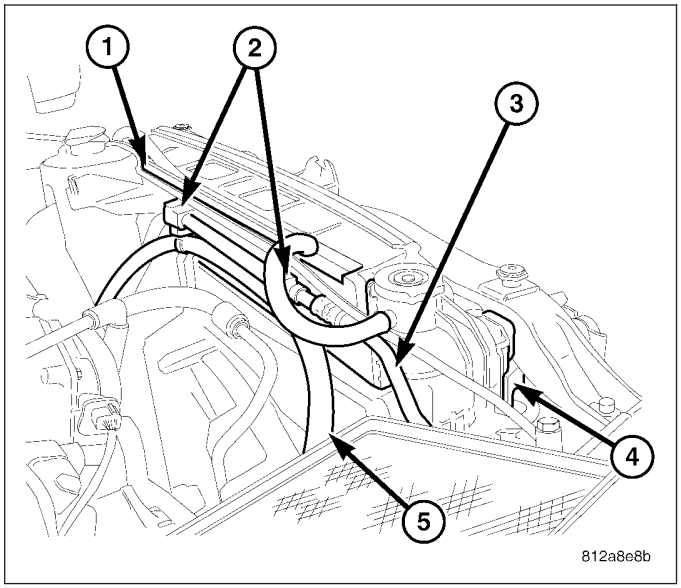
WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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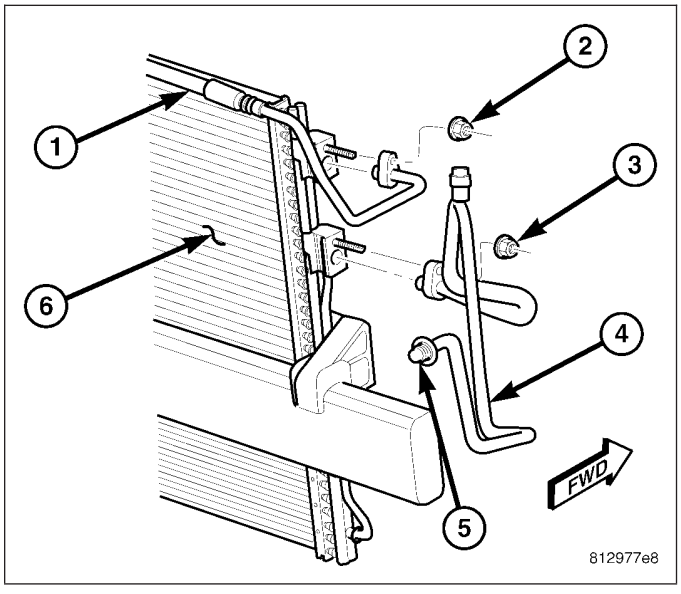
1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Disconnect the wire harness connector from the A/C pressure transducer.
4. Remove the bolt (5) that secures the A/C discharge line (3) to the A/C compressor (2).
5. Disconnect the A/C discharge line from the A/C compressor.
6. Remove the seal and gasket from the discharge line fitting and discard.
7. Install plugs in, or tape over the opened discharge line fitting and the compressor outlet port.



8. Remove the A/C discharge line (3) from the refrigerant line retainer clips (2) located at the top of the fan shroud (1).
9. Remove the plastic cover from the condenser inlet stud (4).



10. Remove the nut (2) that secures the A/C discharge line (1) to the A/C condenser (6).
11. Disconnect the A/C discharge line from the A/C condenser.
12. Remove the seal and gasket from the discharge line fitting and discard.
13. Install plugs in, or tape over the discharge line fitting and condenser inlet port.
14. Remove the A/C discharge line from the engine compartment.
15. If required, remove the A/C pressure transducer from the A/C discharge line (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER A/C PRESSURE - REMOVAL).

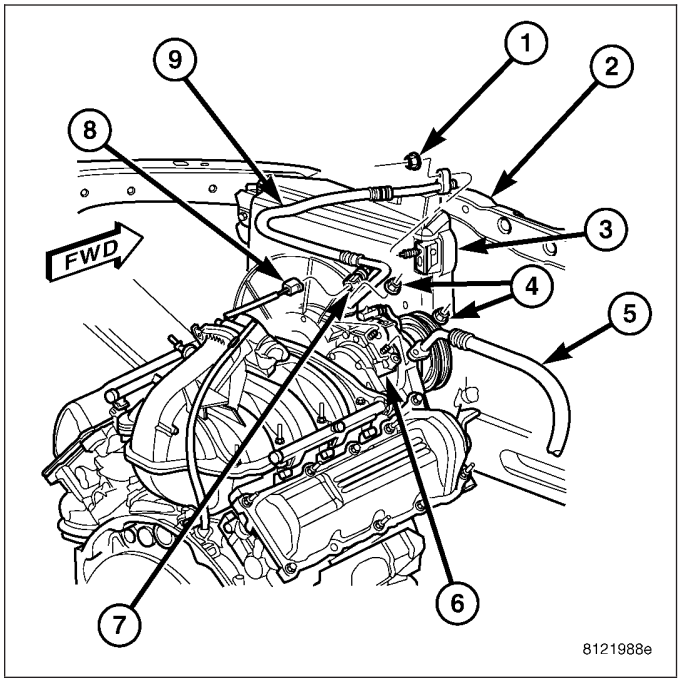


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INSTALLATION

3.7L/4.7L ENGINES

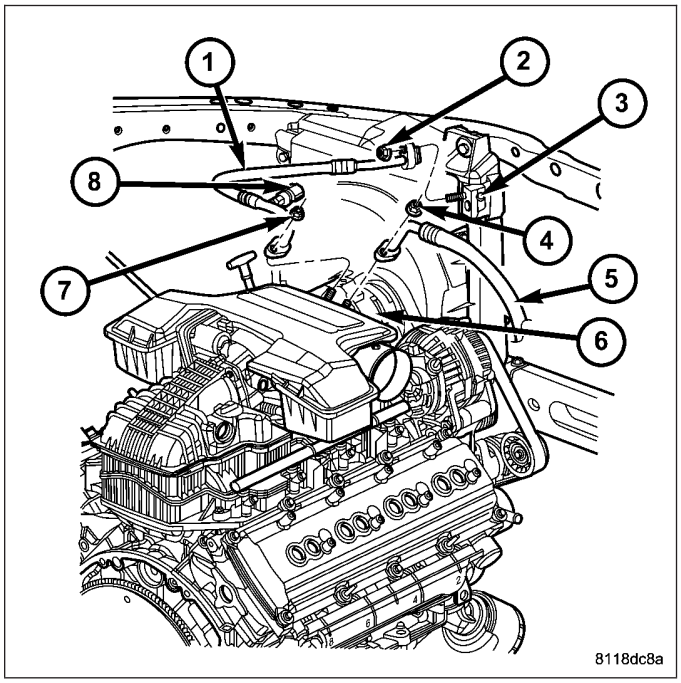
NOTE: 3.7L engine shown, 4.7L engine similar.



1. If removed, install the A/C pressure transducer (7) onto the A/C discharge line (9) (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/ TRANSDUCER-A/C PRESSURE - INSTALLATION).
2. Position the A/C discharge line into the engine compartment.
3. Remove the tape or plugs from the opened discharge line fitting and the condenser inlet port (3) on the A/C condenser (2).
4. Lubricate a new seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Install the A/C discharge line onto the A/C condenser.
6. Install the nut (1) that secures the A/C discharge line to the A/C condenser. Tighten the nut to 20 N·m (15 ft. lbs.).
7. Remove the tape or plugs from the opened fitting on the A/C discharge line and the outlet port on the A/C compressor (6).
8. Lubricate a new seal with clean refrigerant oil and install it onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
9. Install the A/C discharge line onto the A/C compressor.
10. Install the nut (4) that secures the A/C discharge line to the A/C compressor. Tighten the nut to 20 N·m (15 ft. lbs.).
11. Connect the wire harness connector (8) to the A/C pressure transducer.
12. Reconnect the negative battery cable.
13. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
14. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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5.7L ENGINE

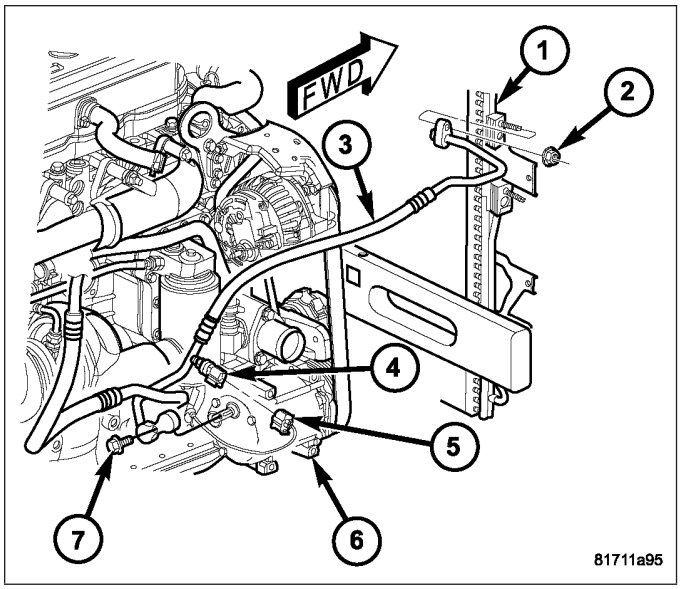


1. If removed, install the A/C pressure transducer (8) onto the A/C discharge line (1) (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/ TRANSDUCER-A/C PRESSURE - INSTALLATION).
2. Position the A/C discharge line into the engine compartment.
3. Remove the tape or plugs from the opened discharge line fitting and the inlet port on the A/C condenser (3).
4. Lubricate a new O-ring and dual plane seal with clean refrigerant oil and install them onto the discharge line fitting. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Install the A/C discharge line onto the A/C condenser.
6. Install the nut (2) that secures the A/C discharge line to the A/C condenser. Tighten the nut to 20 N·m (15 ft. lbs.).
7. Remove the tape or plugs from the opened discharge line fitting and the outlet port on the A/C compressor (6).
8. Lubricate a new O-ring and dual plane seal with clean refrigerant oil and install them onto the discharge line fitting. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
9. Install the A/C discharge line onto the A/C compressor.
10. Install the nut (7) that secures the A/C discharge line to the A/C compressor. Tighten the nut to 20 N·m (15 ft. lbs.).
11. Connect the wire harness connector to the A/C pressure transducer.
12. Reconnect the negative battery cable.
13. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
14. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

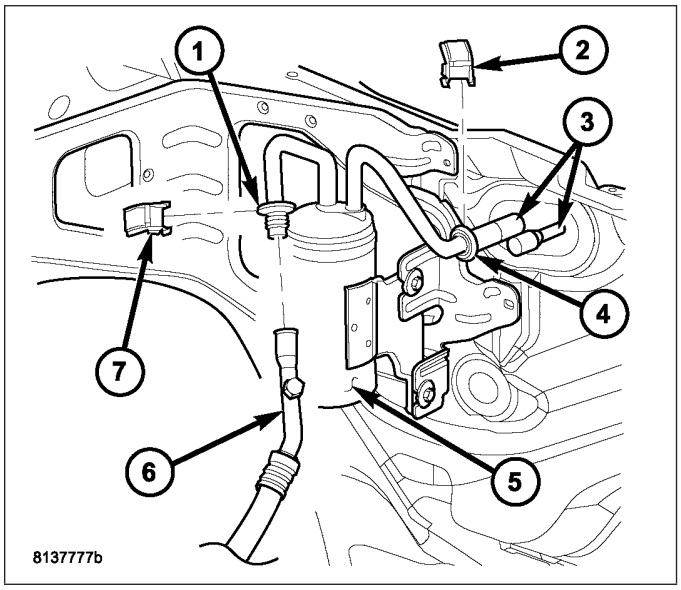
5.9L DIESEL ENGINE

NOTE: The A/C discharge line for the 5.9L Diesel engine is serviced as an assembly with the suction line.

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1. If removed, install the A/C pressure transducer (4) onto the A/C suction and discharge line assembly (3) (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - INSTALLATION).
2. Remove the tape or plugs from the opened refrigerant line fittings and the condenser and compressor ports.
3. Position the A/C suction and discharge line assembly into the engine compartment.
4. Lubricate new seals with clean refrigerant oil and install them onto the refrigerant line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the A/C suction and discharge line assembly to the A/C condenser (1).
6. Install the nut (2) that secures the discharge line to the A/C condenser. Tighten the nut to 20 N·m (15 ft. lbs.).
7. Connect the A/C suction and discharge line assembly to the A/C compressor (6).
8. Install the bolt (7) that secures the A/C suction and discharge line assembly to the A/C compressor. Tighten the bolt to 23 N·m (17 ft. lbs.).
9. Connect the wire harness connector (5) to the A/C pressure transducer.

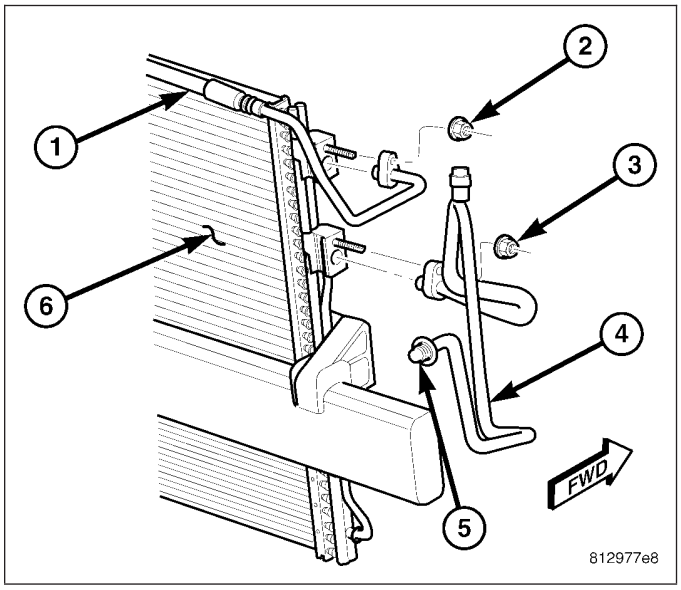


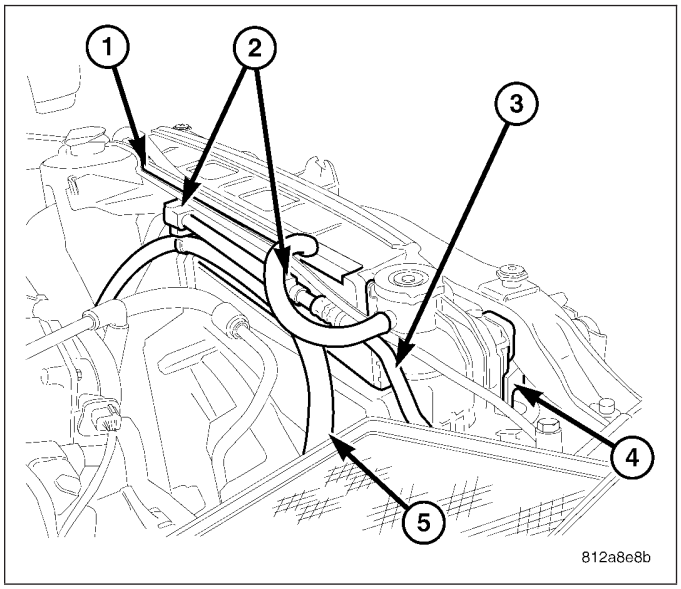
10. Remove the tape or plugs from the opened accumulator tube fitting.
11. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the accumulator tube fitting. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
12. Connect the suction line (6) to the spring-lock coupler (1) on the accumulator (5) and install the secondary retaining clip (7) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
13. Install the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM).
14. Reconnect the negative battery cable.
15. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
16. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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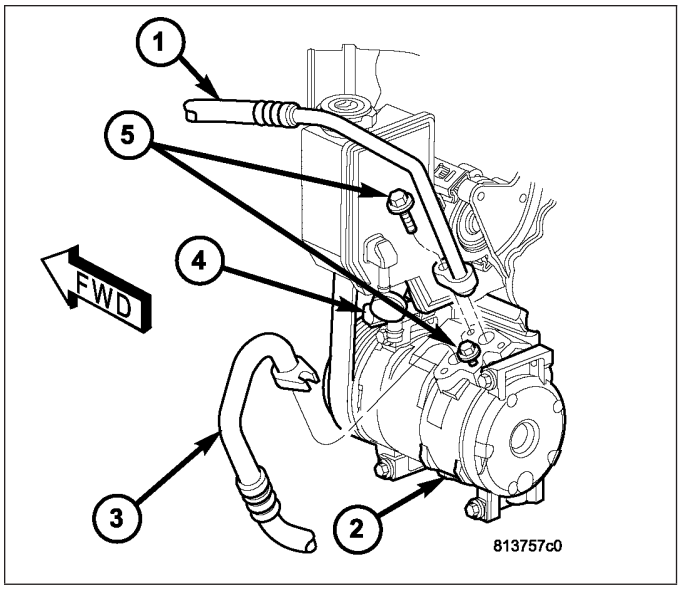
8.3L ENGINE

1. If removed, install the A/C pressure transducer onto the A/C discharge line (1) (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - INSTALLATION).
2. Position the A/C discharge line into the engine compartment.
3. Remove the tape or plugs from the opened discharge line fitting and the inlet port of the A/C condenser (6).
4. Lubricate a new seal with clean refrigerant oil and install it and a new gasket onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the A/C discharge line to the A/C condenser.
6. Install the nut (2) that secures the A/C discharge line to the A/C condenser. Tighten the nut to 20 N·m (15 ft. lbs.).
7. Install the A/C discharge line (3) into the two refrigerant line retainer clips (2) located at the top of the fan shroud (1).
8. Install the plastic cover (4) onto the condenser inlet stud.





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9. Remove the tape or plugs from the opened discharge line fitting and compressor outlet port.
10. Lubricate a new seal with clean refrigerant oil and install it and new gasket onto the discharge line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
11. Install the A/C discharge line (3) onto the A/C compressor (2).
12. Install the bolt (5) that secures the A/C discharge line to the A/C compressor. Tighten the bolt to 20 N·m (15 ft. lbs.).
13. Connect the wire harness connector to the A/C pressure transducer.
14. Reconnect the negative battery cable.
15. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
16. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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LINE-A/C LIQUID

DESCRIPTION

The liquid line is the refrigerant line that carries refrigerant from the A/C condenser to the A/C evaporator. The liquid line for this model consist of two separate lines that connect to each other using a spring-lock type refrigerant line coupler (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT LINE COUPLER - DESCRIPTION). The liquid lines are made from light-weight aluminum, and use braze-less fittings.

The front half of the liquid line includes the high-side service port and the rear half of the liquid line contains the fixed orifice tube.

CAUTION: Use only O-ring seals specified for the vehicle. Failure to use the correct O-ring seal will cause the refrigerant system connections to leak.

The liquid line has no serviceable parts except for the rubber O-ring seals, high-side service port valve, cap and secondary retaining clip. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the liquid line is removed and installed.

If the liquid line is found to be leaking or is damaged, it must be replaced.

REMOVAL

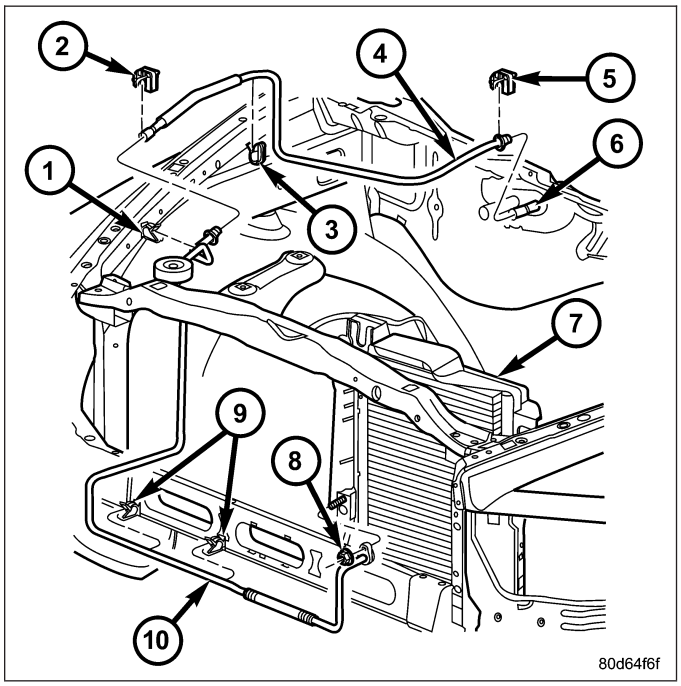
3.7L/4.7L/5.7L/5.9L ENGINES

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: The A/C liquid line is serviced in two sections.

FRONT SECTION

1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. If equipped with the diesel engine, remove the passenger side battery (Refer to 8 - ELECTRICAL/BATTERY SYSTEM/BATTERY - REMOVAL).
4. If equipped with a gasoline engine, remove the air filter housing and mounting bracket (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - REMOVAL).
5. Remove the plastic cover from the condenser outlet stud.
6. Remove the nut (8) that secures the front section of the A/C liquid line (10) to the A/C condenser (7).
7. Disconnect the A/C liquid line from the A/C condenser and remove and discard the O-ring and dual plane seal.
8. Disengage the A/C liquid line from the body retaining clips (1 and 9).

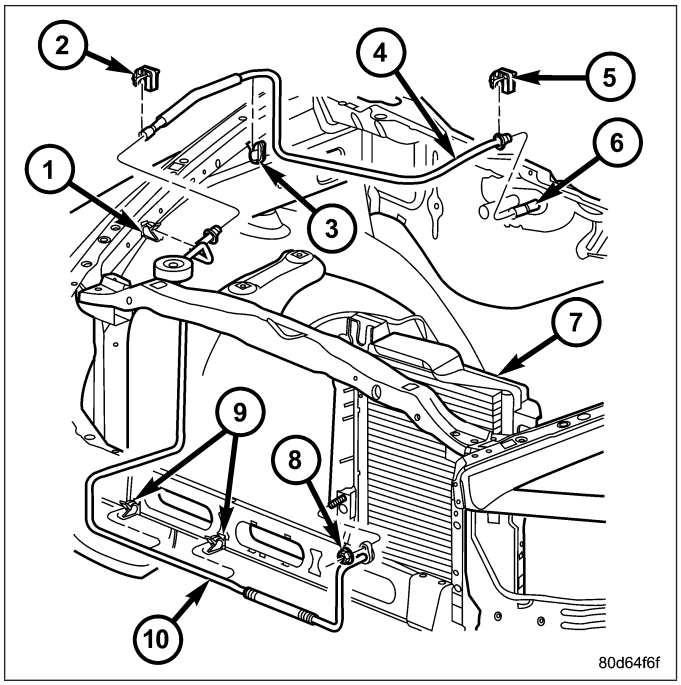


9. Remove the secondary retaining clip (2) from the spring-lock coupler that secures the front section of the A/C liquid line to the rear section of the liquid line (4).

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10. Using the proper A/C line disconnect tool, disconnect the front section of the A/C liquid line from the rear section of the liquid line and remove and discard the O-ring seals (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
11. Install plugs in, or tape over the opened ends of the A/C liquid lines and the condenser outlet port.
12. Remove the front section of the A/C liquid line from the engine compartment.

REAR SECTION



1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. If equipped with the diesel engine, remove the passenger side battery (Refer to 8 - ELECTRICAL/BATTERY SYSTEM/BATTERY - REMOVAL).
4. If equipped with a gasoline engine, remove the air filter housing and mounting bracket (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - REMOVAL).
5. Disengage the rear section of the A/C liquid line (4) from the body retaining clip (3).
6. Remove the secondary retaining clip (2) from the spring-lock coupler that secures the front section of the A/C liquid line (10) to the rear section of the liquid line.
7. Using the proper A/C line disconnect tool, disconnect the front section of the A/C liquid line from the rear section of the liquid line and remove and discard the seal (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
8. Remove the secondary retaining clip (5) from the spring-lock coupler that secures the rear section of the A/C liquid line to the evaporator inlet tube (6).
9. Using the proper A/C line disconnect tool, disconnect the A/C liquid line from the evaporator inlet tube and remove and discard the O-ring seals (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
10. Install plugs in, or tape over the opened ends of the A/C liquid lines and the evaporator inlet port.
11. Remove the rear section of the A/C liquid line from the engine compartment.

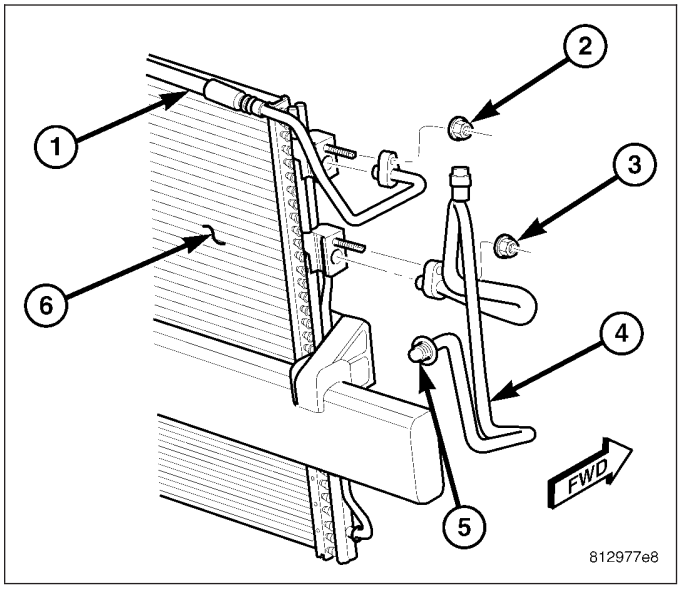
8.3L ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: The A/C liquid line is serviced in two sections. The front half of the liquid line includes the high side service port and the rear half of the liquid line contains the fixed orifice tube.

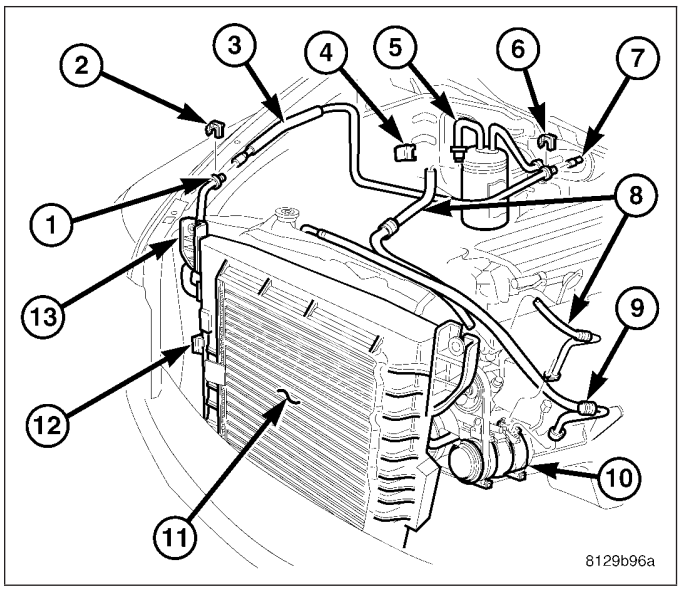
https://truckmanualshub.com/

FRONT SECTION



1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the air filter housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - REMOVAL).
4. Remove the plastic cover from the condenser outlet stud.
5. Remove the nut (3) that secures the front section of the A/C liquid line (4) to the A/C condenser (6).
6. Disconnect the A/C liquid line from the A/C condenser and remove and discard the seal and gasket.
7. Disengage the A/C liquid line from the body retaining clips.
8. Remove the secondary retaining clip from the spring-lock coupler (5) that secures the front section of the A/C liquid line to the rear section of the liquid line.
9. Using the proper A/C line disconnect tool, disconnect the front section of the A/C liquid line from the rear section of the liquid line and remove and discard the seal (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ COUPLER-REFRIGERANT LINE - REMOVAL).
10. Install plugs in, or tape over the opened ends of the A/C liquid lines and the condenser outlet port.
11. Remove the front section of the A/C liquid line from the engine compartment.

REAR SECTION



1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the air filter housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - REMOVAL).
4. Remove the secondary retaining clip (2) from the spring-lock coupler that secures the front section of the A/C liquid line (1) to the rear section of the liquid line (3).
5. Disengage the A/C liquid line from the body retaining clips.
6. Using the proper A/C line disconnect tool, disconnect the front section of the A/C liquid line from the rear section of the liquid line and remove and discard the seal (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
7. Remove the secondary retaining clip (6) from the spring-lock coupler that secures the rear section of the A/C liquid line to the evaporator inlet tube (7).
8. Using the proper A/C line disconnect tool, disconnect the A/C liquid line from the evaporator inlet tube and remove and discard the seal (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
9. Install plugs in, or tape over the opened ends of the A/C liquid lines and the evaporator inlet port.

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10. Remove the rear section of the A/C liquid line from the engine compartment.

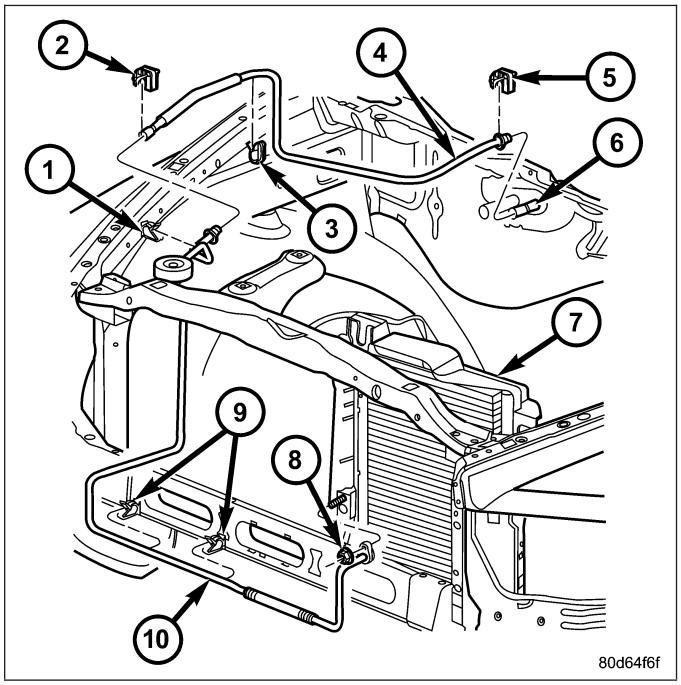
INSTALLATION

3.7L/4.7L/5.7L/5.9L ENGINES

NOTE: The A/C liquid line is serviced in two sections.

FRONT SECTION

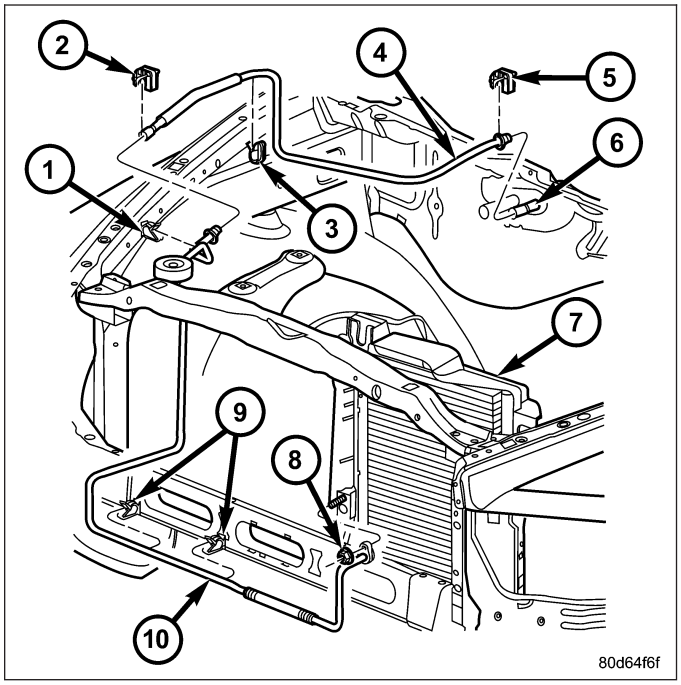
1. Position the front section of the A/C liquid line (10) into the engine compartment.
2. Remove the tape or plugs from the opened ends of the A/C liquid lines and the condenser outlet port.
3. Lubricate new O-ring seals with clean refrigerant oil and install them onto the front liquid line spring-lock coupler fitting. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the front section of the A/C liquid line to the rear section of the liquid line (4) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ COUPLER-REFRIGERANT LINE - INSTALLATION).
5. Install the secondary retaining clip (2) onto the spring-lock coupler that secures the front section of the A/C liquid line onto the rear section of the liquid line.
6. Engage the A/C liquid line into the body retaining clips (1 and 9).



7. Lubricate a new O-ring and dual plane seal with clean refrigerant oil and install them onto the front liquid line fitting. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Connect the front section of the A/C liquid line to the outlet port of the A/C condenser (7).
9. Install the nut (8) that secures the A/C liquid line to the A/C condenser. Tighten the nut to 20 N·m (15 ft. lbs.).
10. Install the plastic cover onto the condenser outlet stud.
11. If equipped with a gasoline engine, install the air filter housing mounting bracket and air filter housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - INSTALLATION).
12. If equipped with the diesel engine, install the passenger side battery tray (Refer to 8 - ELECTRICAL/BATTERY SYSTEM/TRAY - INSTALLATION).
13. Reconnect the negative battery cable(s).
14. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
15. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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REAR SECTION



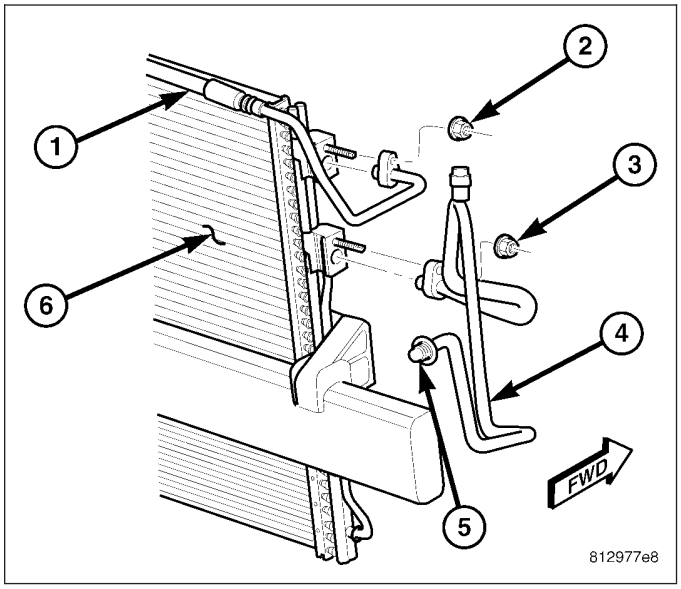
1. Position the rear section of the A/C liquid line (4) into the engine compartment.
2. Remove the tape or plugs from the opened ends of the A/C liquid lines and the evaporator inlet tube (6).
3. Lubricate new O-ring seals with clean refrigerant oil and install them onto the rear liquid line spring-lock coupler fitting. Use only the specified seas as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the rear section of the A/C liquid line to the evaporator inlet tube (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
5. Install the secondary retaining clip (5) onto the spring-lock coupler that secures the rear section of the A/C liquid line onto the evaporator inlet tube.
6. Engage the A/C liquid line into the body retaining clip (3).
7. Lubricate new O-ring seals with clean refrigerant oil and install them onto the front liquid line spring-lock coupler fitting. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Connect the rear section of the A/C liquid line to the front section of the liquid line (10) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
9. Install the secondary retaining clip (2) onto the spring-lock coupler that secures the front section of the A/C liquid line to the rear section of the liquid line.
10. If equipped with a gasoline engine, install the air filter housing mounting bracket and air filter housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - INSTALLATION).
11. If equipped with the diesel engine, install the passenger side battery tray (Refer to 8 - ELECTRICAL/BATTERY SYSTEM/TRAY - INSTALLATION).
12. Reconnect the negative battery cable(s).
13. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
14. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

8.3L ENGINE

NOTE: The A/C liquid line is serviced in two sections. The front half of the liquid line includes the high side service port and the rear half of the liquid line contains the fixed orifice tube.

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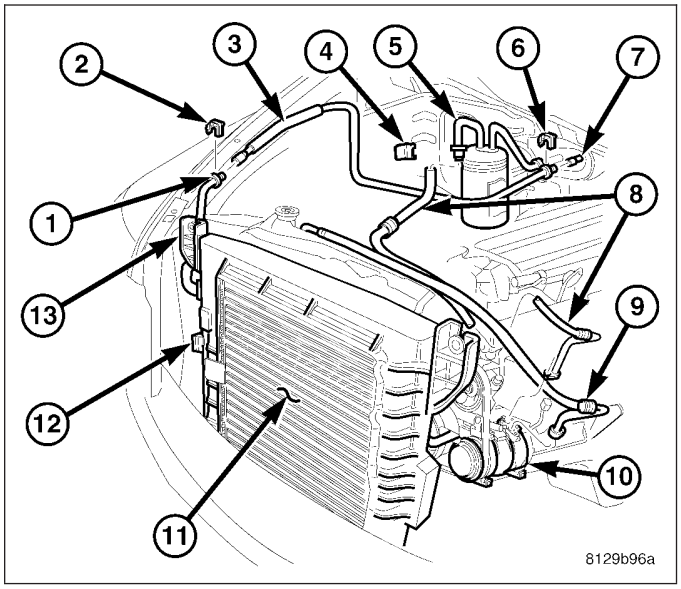
FRONT SECTION



1. Position the front section of the A/C liquid line (4) into the engine compartment.
2. Remove the tape or plugs from the opened ends of the A/C liquid lines and the condenser outlet port.
3. Lubricate a new seal with clean refrigerant oil and install it on the front liquid line spring-lock coupler fitting (5). Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the front section of the A/C liquid to the rear section of the liquid line (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
5. Install the secondary retaining clip onto the spring-lock coupler that secures the front section of the A/C liquid to the rear section of the liquid line.
6. Engage the A/C liquid line into the body retaining clips.
7. Lubricate a new seal with clean refrigerant oil and install it and a new gasket onto the front liquid line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Connect the front section of the A/C liquid line to the outlet port of the A/C condenser (6).
9. Install the nut (3) that secures the A/C liquid line to the condenser outlet port. Tighten the nut to 20 N·m (15 ft. lbs.).
10. Install the plastic cover onto the condenser outlet stud.
11. Install the air filter housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - INSTALLATION).
12. Reconnect the negative battery cable.
13. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
14. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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REAR SECTION



1. Position the rear section of the A/C liquid line (3) into the engine compartment.
2. Remove the tape or plugs from the opened ends of the A/C liquid lines and the evaporator inlet tube (7).
3. Lubricate a new seal with clean refrigerant oil and install it on the rear liquid line spring-lock coupler fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the rear section of the A/C liquid to the evaporator inlet tube (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
5. Install the secondary retaining clip (6) onto the spring-lock coupler that secures the rear section of the A/C liquid to the evaporator inlet tube.
6. Engage the A/C liquid line into the body retaining clips.
7. Lubricate a new seal with clean refrigerant oil and install it on the front liquid line spring-lock coupler fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Connect the rear section of the A/C liquid to the front section of the liquid line (1) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
9. Install the secondary retaining clip (2) onto the spring-lock coupler that secures the front section of the A/C liquid to the rear section of the liquid line.
10. Install the air filter housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - INSTALLATION).
11. Reconnect the negative battery cable.
12. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
13. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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LINE-A/C SUCTION

DESCRIPTION

The A/C suction line is the refrigerant line that goes from the A/C evaporator to the A/C compressor.

The A/C suction line for the 5.9L Diesel engine is serviced as an assembly with the discharge line.

The A/C discharge line for the 8.3L engine is secured to the top of fan shroud by two retainers.

CAUTION: Use only O-ring seals specified for the vehicle. Failure to use the correct O-ring seal will cause the refrigerant system connections to leak.

The A/C suction line has no serviceable parts except for the rubber O-ring seals and the secondary retaining clip. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the A/C suction line is removed and installed.

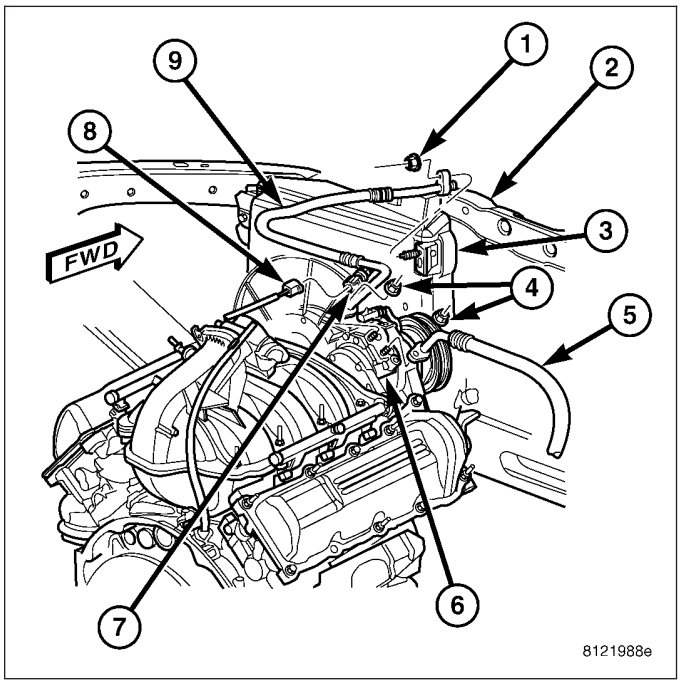
If the A/C suction line is found to be leaking or is damaged, it must be replaced.

REMOVAL

3.7L/4.7L ENGINES

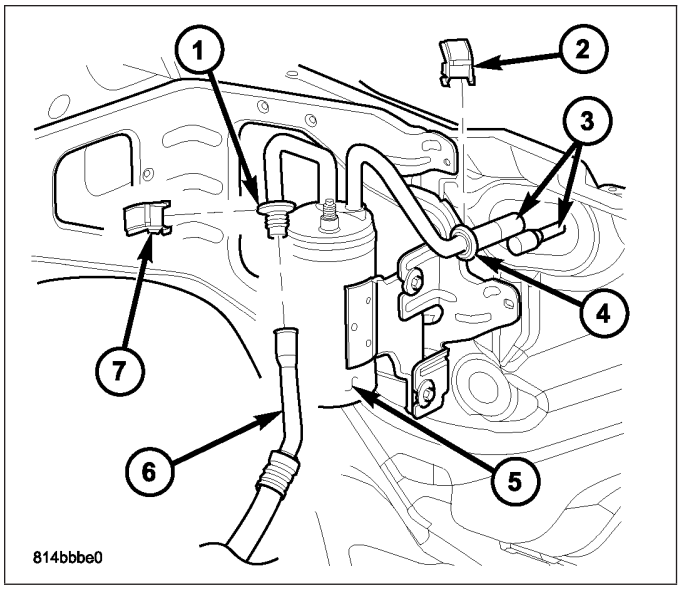
WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - REMOVAL).
4. Remove the nut (4) that secures the A/C suction line (5) to the A/C compressor (6).
5. Disconnect the A/C suction line from the A/C compressor and remove and discard the seal.
6. Install plugs in, or tape over the opened refrigerant line fitting and the compressor port.



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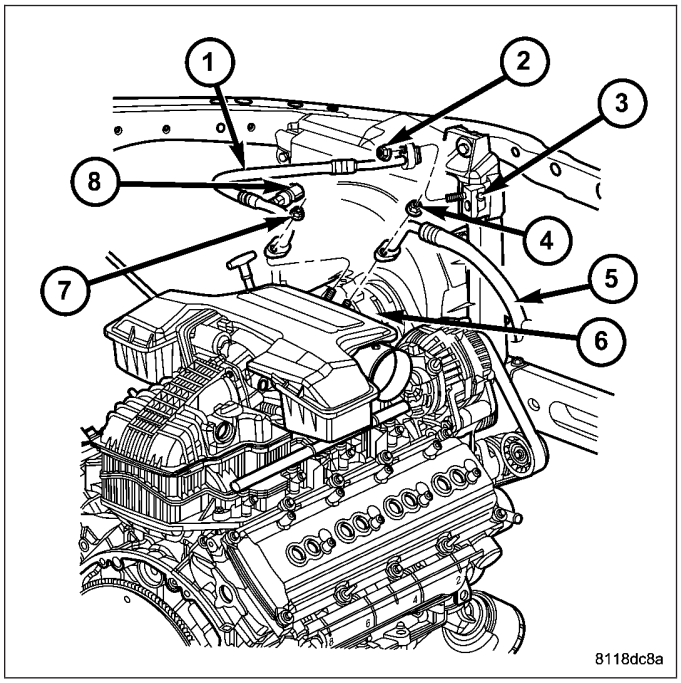
7. Remove the secondary retaining clip (7) from the spring-lock coupler (1) that secures the A/C suction line (6) to the accumulator (5).
8. Using the proper A/C line disconnect tool, disconnect the A/C suction line from the A/C accumulator (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
9. Remove the O-ring seals from the accumulator tube fitting and discard the seals.
10. Install plugs in, or tape over the opened suction line fitting and the accumulator outlet tube.
11. Remove the A/C suction line from the engine compartment.



5.7L ENGINE

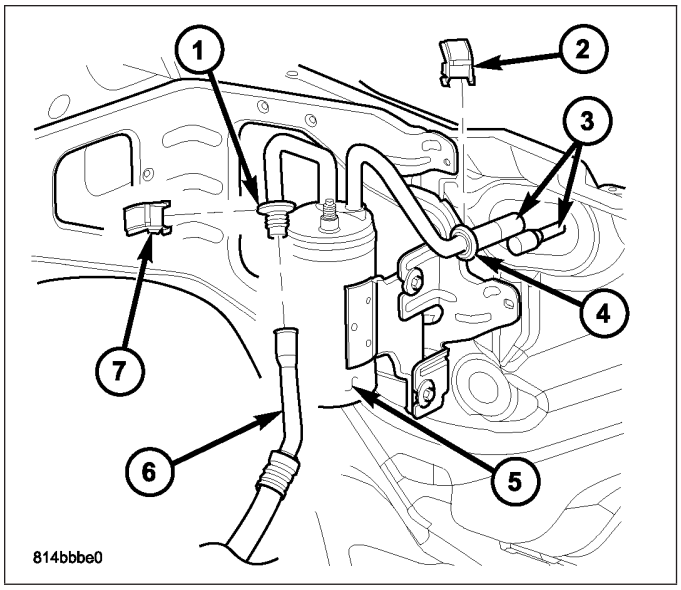
WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the air filter housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - REMOVAL).
4. Remove the nut (4) that secures the A/C suction line (5) to the A/C compressor (6).
5. Disconnect the A/C suction line from the A/C compressor and remove and discard the O-ring and dual plane seal.
6. Install plugs in, or tape over the opened refrigerant line fitting and the compressor port.



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7. Remove the secondary retaining clip (7) from the spring-lock coupler (1) that secures the A/C suction line (6) to the A/C accumulator (5).
8. Using the proper A/C line disconnect tool, disconnect the A/C suction line from the A/C accumulator and remove and discard the O-ring seals (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
9. Install plugs in, or tape over the opened suction line fitting and the accumulator outlet tube.
10. Remove the A/C suction line from the engine compartment.

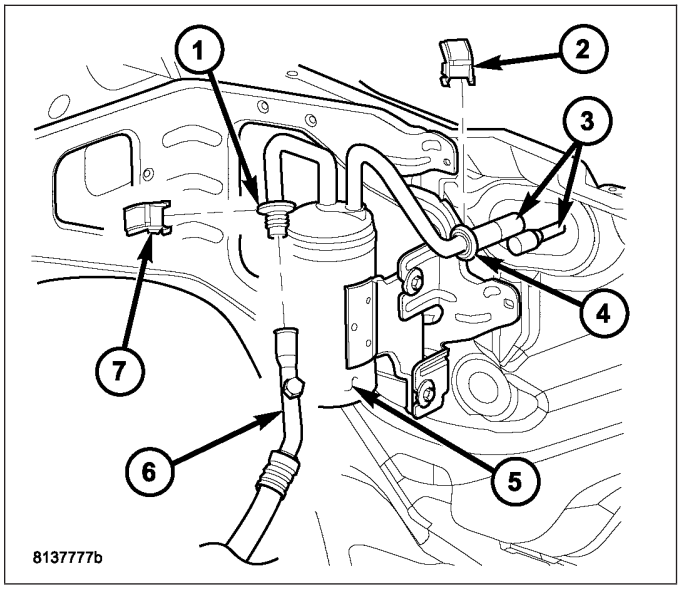


5.9L DIESEL ENGINE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

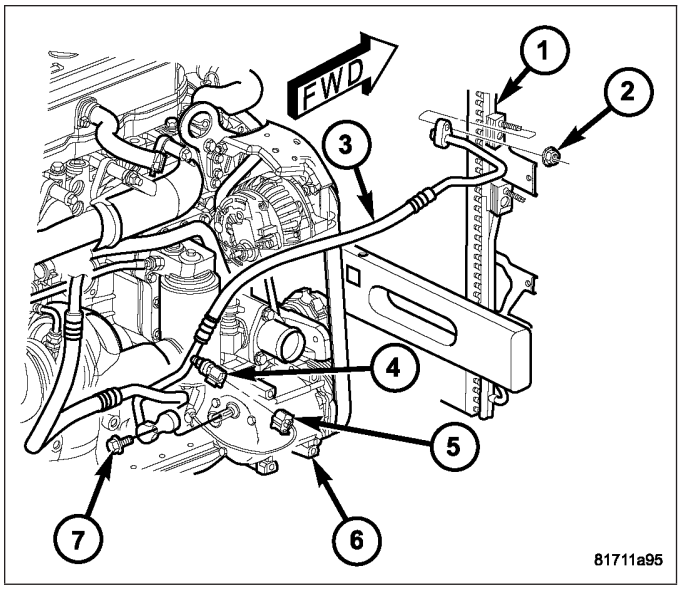
NOTE: The A/C suction line for the 5.9L Diesel engine is serviced as an assembly with the discharge line.

1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM).
4. Remove the secondary retaining clip (7) from the spring-lock coupler (1) that secures the suction line (6) to the A/C accumulator (5).
5. Using the proper A/C line disconnect tool, disconnect the suction line from the A/C accumulator and remove and discard the seals (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
6. Install plugs in, or tape over the opened accumulator tube fitting.



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7. Disconnect the wire harness connector (5) from the A/C pressure transducer (4).
8. Remove the nut (2) that secures the A/C suction and discharge line assembly (3) to the A/C condenser (1).
9. Disconnect the discharge line from the A/C condenser and remove and discard the seal.
10. Remove the bolt (7) that secures the A/C suction and discharge line assembly to the A/C compressor (6).
11. Disconnect the A/C suction and discharge line assembly from the A/C compressor and remove and discard the seals.
12. Remove the A/C suction and discharge line assembly from the engine compartment.
13. Install plugs in, or tape over the opened refrigerant line fittings and condenser and compressor ports.

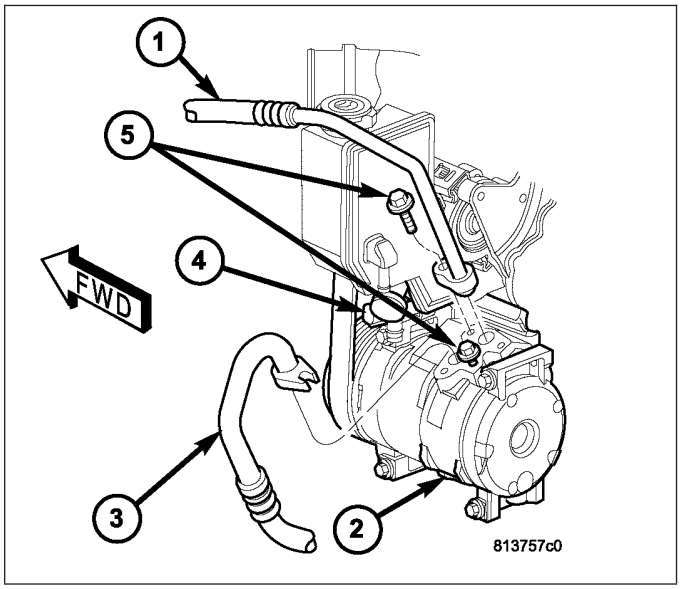


14. If necessary, remove the A/C pressure transducer from the A/C discharge line (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - REMOVAL).

8.3L ENGINE

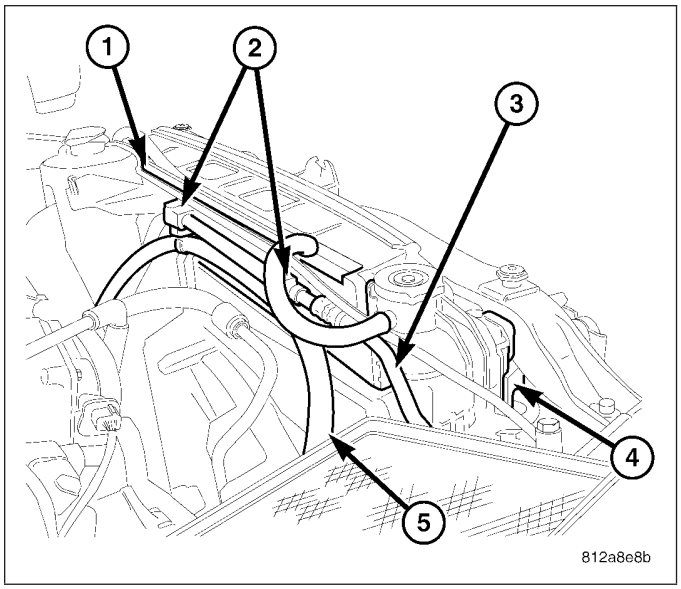
WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

1. Recover the refrigerant from the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM RECOVERY).
2. Disconnect and isolate the negative battery cable.
3. Remove the bolt (5) that secures the A/C suction line (1) to the A/C compressor (2).
4. Disconnect the A/C suction line from the A/C compressor.
5. Remove the seal and gasket from the suction line fitting and discard.
6. Install plugs in, or tape over the opened suction line fitting and the compressor inlet port.

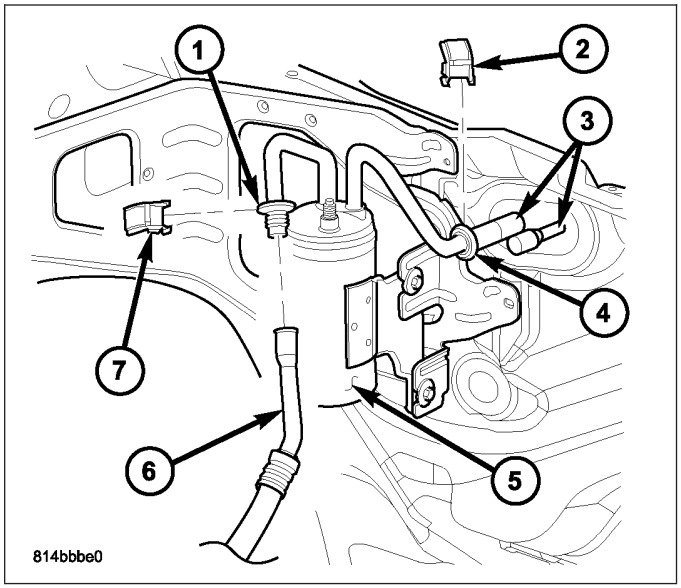


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7. Remove the A/C suction line (5) from the refrigerant line retainer clips (2) located at the top of the fan shroud (1).
8. Remove the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - REMOVAL).



9. Remove the secondary retaining clip (7) from the spring-lock coupler (1) that secures the A/C suction line (6) to the accumulator (5).
10. Using the proper A/C line disconnect tool, disconnect the A/C suction line from the A/C accumulator (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - REMOVAL).
11. Remove the O-ring seals from the accumulator tube fitting and discard the seals.
12. Install plugs in, or tape over the opened suction line fitting and the accumulator outlet tube.
13. Remove the A/C suction line from the engine compartment.

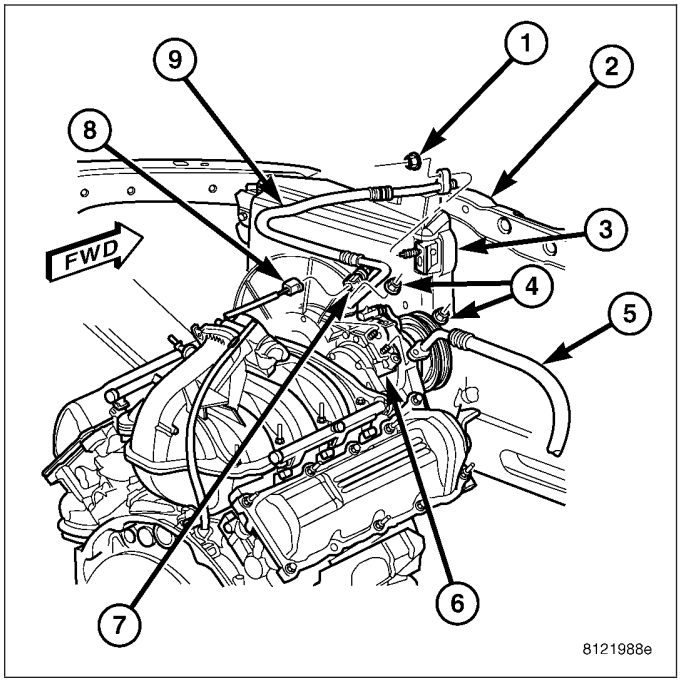


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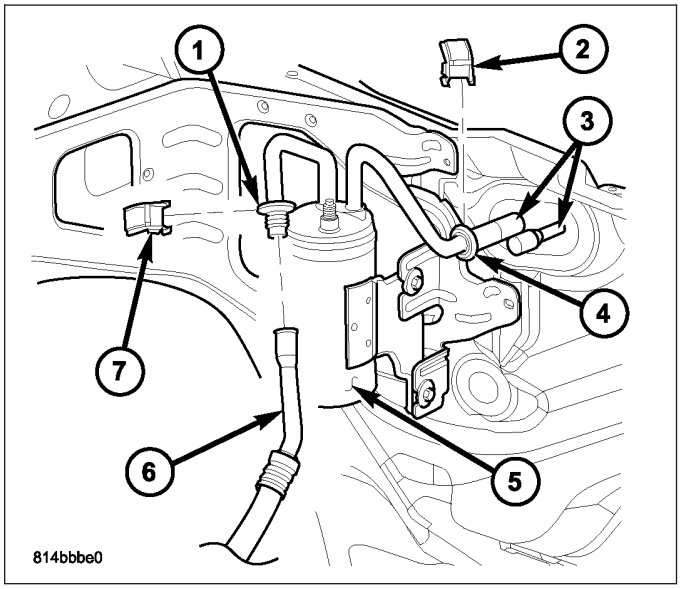
INSTALLATION

3.7L/4.7L ENGINES

1. Position the A/C suction line (5) into the engine compartment.
2. Remove the tape or plugs from the opened fitting on the A/C suction line and the inlet port on the A/C compressor (6).
3. Lubricate a new seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Install the A/C suction line onto the A/C compressor.
5. Install the nut (4) that secures the A/C discharge line to the A/C compressor. Tighten the nut to 20 N·m (15 ft. lbs.).



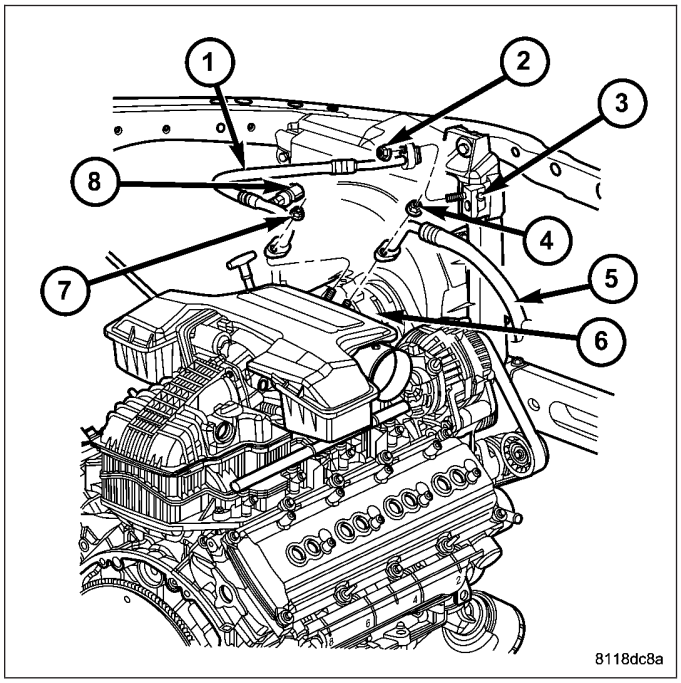
6. Remove the tape or plugs from the opened suction line fitting and the accumulator outlet tube.
7. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the accumulator tube fitting. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Connect the A/C suction line (6) to the spring-lock coupler (1) on the accumulator (5) and install the secondary retaining clip (7) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
9. Install the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - INSTALLATION).
10. Reconnect the negative battery cable.
11. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
12. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).



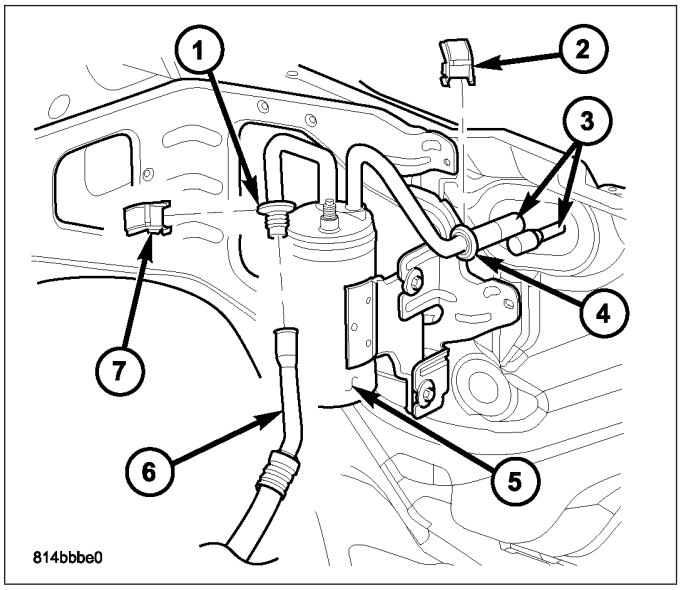
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5.7L ENGINE

1. Position the A/C suction line (5) into the engine compartment.
2. Remove the tape or plugs from the opened fitting on the A/C suction line and the inlet port on the A/C compressor (6).
3. Lubricate a new O-ring and dual plan seal with clean refrigerant oil and install them onto the suction line fitting. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Install the A/C suction line onto the A/C compressor.
5. Install the nut (4) that secures the A/C discharge line to the A/C compressor. Tighten the nut to 20 N·m (15 ft. lbs.).



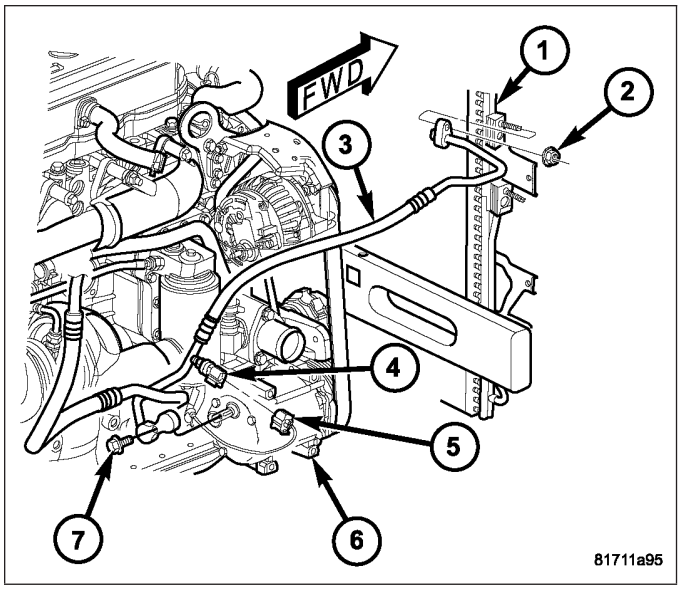
6. Remove the tape or plugs from the opened suction line fitting and the accumulator outlet tube.
7. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the accumulator tube fitting. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Connect the A/C suction line (6) to the spring-lock coupler (1) on the accumulator (5) and install the secondary retaining clip (7) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
9. Install the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - INSTALLATION).
10. Reconnect the negative battery cable.
11. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
12. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).



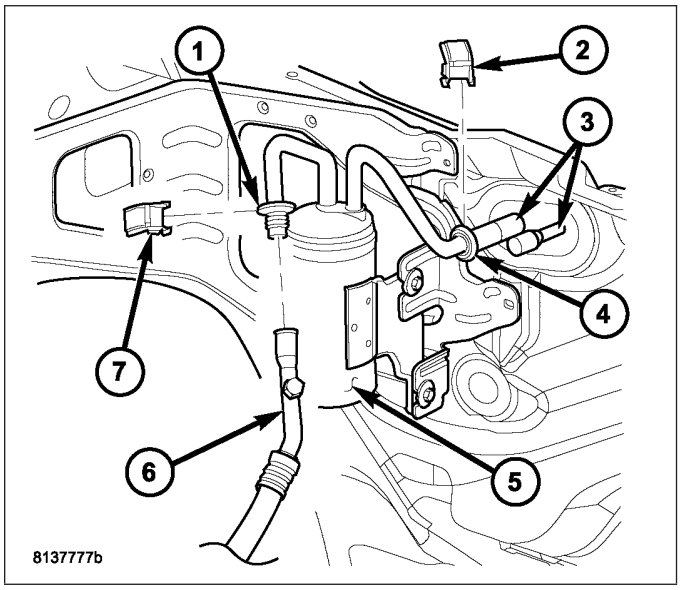
5.9L DIESEL ENGINE

NOTE: The A/C suction line for the 5.9L Diesel engine is serviced as an assembly with the discharge line.

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1. If removed, install the A/C pressure transducer (4) onto the A/C suction and discharge line assembly (3) (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/TRANSDUCER-A/C PRESSURE - INSTALLATION).
2. Remove the tape or plugs from the opened refrigerant line fittings and the condenser and compressor ports.
3. Position the A/C suction and discharge line assembly into the engine compartment.
4. Lubricate new seals with clean refrigerant oil and install them onto the refrigerant line fittings. Use only the specified seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the A/C suction and discharge line assembly to the A/C condenser (1).
6. Install the nut (2) that secures the discharge line to the A/C condenser. Tighten the nut to 20 N·m (15 ft. lbs.).
7. Connect the A/C suction and discharge line assembly to the A/C compressor (6).
8. Install the bolt (7) that secures the A/C suction and discharge line assembly to the A/C compressor. Tighten the bolt to 23 N·m (17 ft. lbs.).
9. Connect the wire harness connector (5) to the A/C pressure transducer.

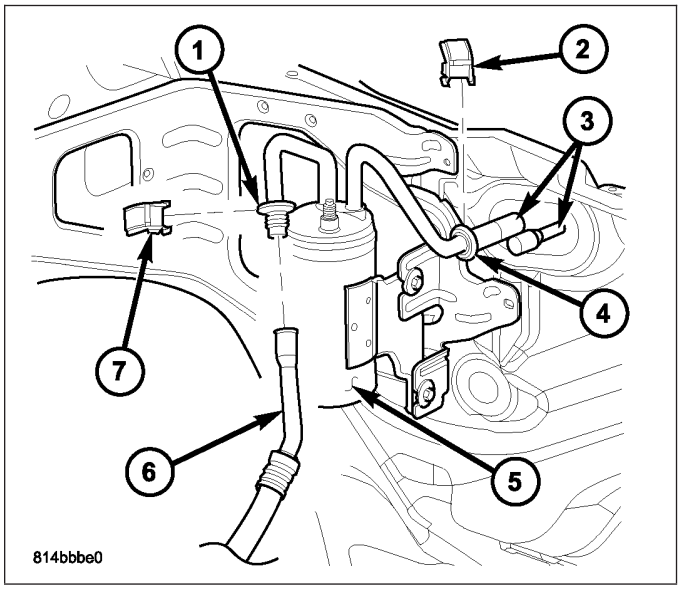


10. Remove the tape or plugs from the opened accumulator tube fitting.
11. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the accumulator tube fitting. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
12. Connect the suction line (6) to the spring-lock coupler (1) on the accumulator (5) and install the secondary retaining clip (7) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).
13. Install the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM).
14. Reconnect the negative battery cable.
15. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
16. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

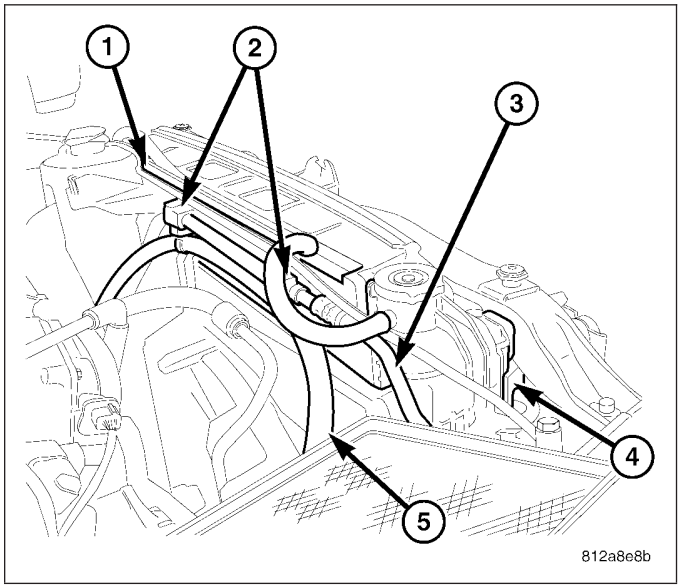
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8.3L ENGINE

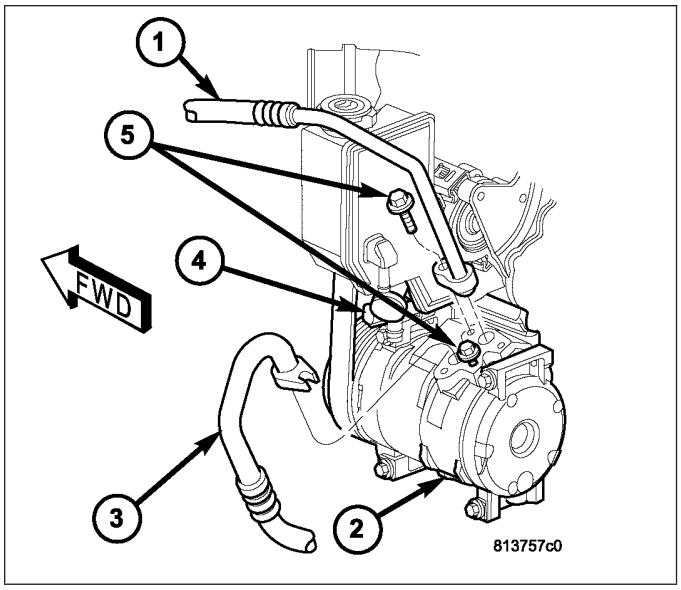
1. Remove the tape or plugs from the opened suction line fitting and the accumulator outlet tube.
2. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the accumulator tube fitting. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Connect the A/C suction line (6) to the spring-lock coupler (1) on the accumulator (5) and install the secondary retaining clip (7) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/COUPLER-REFRIGERANT LINE - INSTALLATION).



4. Install the A/C suction line (5) into the two refrigerant line retainer clips (2) located at the top of the fan shroud (1).
5. Install the air filter housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR FILTER HOUSING - INSTALLATION).



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6. Position the A/C suction line (1) into the engine compartment.
7. Remove the tape or plugs from the opened fitting on the A/C suction line and the inlet port on the A/C compressor (2).
8. Lubricate a new seal with clean refrigerant oil and install it onto the suction line fitting. Use only the specified seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
9. Install the A/C suction line onto the A/C compressor.
10. Install the bolt (5) that secures the A/C suction line to the A/C compressor. Tighten the bolt to 20 N·m (15 ft. lbs.).
11. Reconnect the negative battery cable.
12. Evacuate the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE).
13. Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE).

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OIL-A/C REFRIGERANT

DESCRIPTION

The refrigerant oil used in R-134a refrigerant systems is a synthetic-based, polyalkylene glycol (PAG), wax-free lubricant. Mineral-based R-12 refrigerant oils are not compatible with PAG oils, and should never be introduced to an R-134a refrigerant system.

There are different PAG oils available, and each contains a different additive package. Use **only** refrigerant oil of the same type as recommended to service the refrigerant system (**always refer to the specification tag** included with the replacement A/C compressor or the A/C Underhood Specification Label located in the engine compartment).

The Denso 10S17 A/C compressor used in this vehicle when equipped with the 3.7L, 4.7L, 5.7L or 8.3L engine is designed to use ND-8 PAG refrigerant oil. Use only this type of refrigerant oil when servicing the A/C compressor for these engines.

The Visteon HS-18 A/C compressor used in this vehicle when equipped with 5.9L diesel engine is designed to use VC-46 PAG refrigerant oil. Use only this type of refrigerant oil when servicing this A/C compressor.

OPERATION

After performing any refrigerant recovery or recycling operation, always replenish the refrigerant system with the same amount of the recommended refrigerant oil as was removed. Too little refrigerant oil can cause A/C compressor damage, and too much can reduce A/C system performance.

PAG refrigerant oil is more hygroscopic than mineral oil, and will absorb any moisture it comes into contact with, even moisture in the air. The PAG oil container should always be kept tightly capped until it is ready to be used. After use, recap the oil container immediately to prevent moisture contamination.

STANDARD PROCEDURE

REFRIGERANT OIL LEVEL

When an A/C system is assembled at the factory, all components except the A/C compressor are refrigerant oil free. After the refrigerant system has been charged and operated, the refrigerant oil in the A/C compressor is dispersed throughout the refrigerant system. The accumulator, A/C evaporator, A/C condenser and the A/C compressor will each retain a significant amount of the needed refrigerant oil.

It is important to have the correct amount of refrigerant oil in the A/C system. This ensures proper lubrication of the A/C compressor. Too little oil will result in damage to the A/C compressor, while too much oil will reduce the cooling capacity of the A/C system and consequently result in higher discharge air temperatures.

CAUTION: The refrigerant oil in the R-134a A/C system is unique depending on the A/C compressor used. Use only PAG oils that are designed to work with R-134a refrigerant and the A/C compressor in the vehicle. Always refer to the A/C Underhood Specification Label for the correct oil designation. The oil container should be kept tightly capped until it is ready for use and then tightly capped after use to prevent contamination from dirt and moisture. Refrigerant oil will quickly absorb any moisture it comes in contact with, therefore, special effort must be used to keep all R-134a system components moisture-free. Moisture in the refrigerant oil is very difficult to remove and will cause a reliability problem with the A/C compressor.

NOTE: Most reclaim/recycling equipment will measure the lubricant being removed during recovery. This amount of lubricant should be added back into the system. Refer to the reclaim/recycling equipment manufacturers instructions.

It will not be necessary to check the oil level in the A/C compressor or to add oil, unless there has been an oil loss. An oil loss may occur due to a rupture or leak from a refrigerant line, a connector fitting, a component, or a component seal. If a leak occurs, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system after the repair has been made. Refrigerant oil loss will be evident at the leak point by the presence of a wet, shiny surface around the leak.

Refrigerant oil must be added when an accumulator, A/C evaporator or A/C condenser is replaced. See the Refrigerant Oil Capacities chart. When an A/C compressor is replaced, the refrigerant oil must be drained from the old

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compressor and measured. Drain all of the refrigerant oil from the new A/C compressor, then fill the new compressor with the same amount of refrigerant oil that was drained out of the old compressor.

REFRIGERANT OIL CAPACITIES

Component Name	ml.	oz.
Total A/C System Fill	180	6
A/C Accumulator	60	2
A/C Condenser	30	1
A/C Evaporator	60	2
A/C Compressor	Drain and measure the oil from the old compressor - see previous text.	

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REFRIGERANT-A/C

DESCRIPTION

The refrigerant used in this air conditioning system is a HydroFluoroCarbon (HFC), type R-134a. Unlike R-12, which is a ChloroFluoroCarbon (CFC), R-134a refrigerant does not contain ozone-depleting chlorine. R-134a refrigerant is a non-toxic, non-flammable, clear, and colorless liquefied gas.

Even though R-134a does not contain chlorine, it must be reclaimed and recycled just like CFC-type refrigerants. This is because R-134a is a greenhouse gas and can contribute to global warming.

OPERATION

R-134a refrigerant is not compatible with R-12 refrigerant in an A/C system. Even a small amount of R-12 refrigerant added to an R-134a refrigerant system will cause A/C compressor failure, refrigerant oil sludge or poor A/C system performance. In addition, the polyalkylene glycol (PAG) synthetic refrigerant oils used in an R-134a refrigerant system are not compatible with the mineral-based refrigerant oils used in an R-12 refrigerant system.

R-134a refrigerant system service ports, service tool couplers and refrigerant dispensing bottles have all been designed with unique fittings to ensure that an R-134a refrigerant system is not accidentally contaminated with the wrong refrigerant (R-12). There are also labels posted in the engine compartment of the vehicle and on the A/C compressor to identify that the A/C system is equipped with R-134a refrigerant.

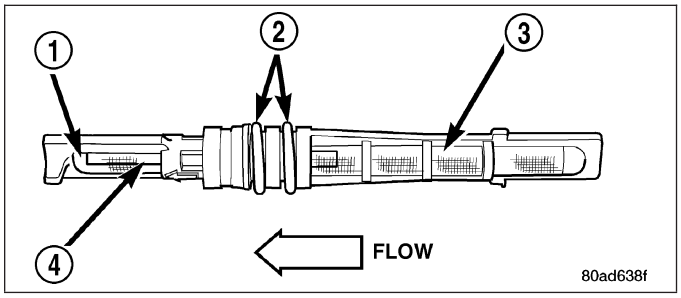
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TUBE-A/C ORIFICE

DESCRIPTION

The fixed A/C orifice tube is installed in the A/C liquid line and provides a restriction in the liquid refrigerant line between the A/C condenser and the A/C evaporator. This restriction established the pressure differential between the high and low-pressure sides of the A/C system.

The A/C orifice tube includes a diffuser screen (1), O-ring seals (2) to seal it to the inner wall of the A/C liquid line, an inlet filter screen (3) and the fixed orifice (4).



OPERATION

The fixed A/C orifice tube is used to meter the flow of liquid refrigerant into the A/C evaporator. The high-pressure liquid refrigerant from the A/C condenser expands into a low-pressure liquid as it passes through the metering orifice and diffuser screen of the A/C orifice tube.

The A/C orifice tube is not serviceable and cannot be repaired and, if faulty or plugged, the A/C liquid line must be replaced (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C LIQUID - DESCRIPTION).

DIAGNOSIS AND TESTING

A/C ORIFICE TUBE

WARNING: The A/C liquid line between the A/C condenser and the A/C orifice tube can become hot enough to burn the skin. Use extreme caution when performing the following test to prevent possible personal injury.

NOTE: The A/C orifice tube can be checked for proper operation using the following procedure. However, the A/C orifice tube is only serviced as a part of the A/C liquid line. If the results of this test indicate that the A/C orifice tube is obstructed or missing, the A/C liquid line must be replaced.

1. Confirm that the refrigerant system is properly charged (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING - A/C PERFORMANCE).
2. Start the engine. Turn on the A/C system and confirm that the compressor clutch is engaged.
3. Allow the A/C system to operate for five minutes.
4. Lightly and cautiously touch the A/C liquid line near the condenser outlet at the front of the engine compartment. The A/C liquid line should be hot to the touch.
5. Touch the A/C liquid line near the evaporator inlet at the rear of the engine compartment. The A/C liquid line should be cold to the touch.
6. If there is a distinct temperature differential between the two ends of the A/C liquid line, the A/C orifice tube is in good condition. If there is little or no detectable temperature differential between the two ends of the A/C liquid line, the A/C orifice tube is obstructed or missing and the A/C liquid line must be replaced (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LINE-A/C LIQUID - REMOVAL).