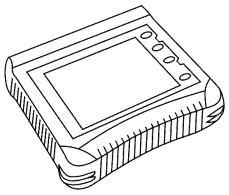
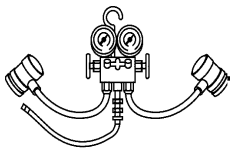
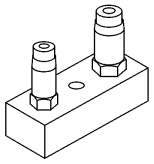
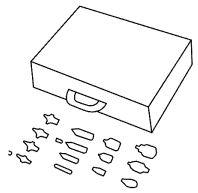
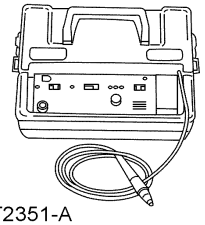
DIAGNOSIS AND TESTING

Climate Control System

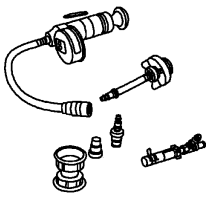
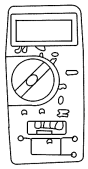
Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Special Tool(s)

 ST2332-A	Worldwide Diagnostic System (WDS) Vehicle Communication Module (VCM) with appropriate adapters, or equivalent diagnostic tool
 ST1928-A	R-134a Manifold Gauge Set 176-R032A or equivalent
 ST1501-A	Connector, Refrigerant Pressure Line 412-093 (T94P-19623-E)
 ST1252-A	Set, A/C Fittings 412-DS028 (D93L-19703-B) or equivalent
 ST2351-A	Refrigerant Leak Detector 216-00001 or equivalent

(Continued)

Special Tool(s)

 ST1474-A	Pressure Tester 014-R1072 or equivalent
 ST1137-A	Fluke 77 III Automotive Meter 105-R0056 or equivalent

Inspection and Verification

1. Verify the customer's concern by operating the climate control system to duplicate the condition.
2. Inspect to determine if one of the following mechanical or electrical concerns apply:

Visual Inspection Chart

Mechanical	Electrical
• Loose, missing or damaged A/C compressor drive belt • Loose or disconnected A/C clutch • Broken or binding door/actuator • Broken or leaking refrigerant lines	• Open fuses • Blower motor inoperative • A/C compressor inoperative • Circuitry open/shorted • Disconnected electrical connectors • Cooling fan inoperative

3. As pinpoint tests and measurements are being carried out, be sure to inspect for any disconnected, loose-fitting, or incorrectly installed components, module and in-line electrical connectors and pins.
4. If the inspection reveals obvious concern(s) that can be readily identified, repair as required.
5. If the concern remains after the inspection, connect the diagnostic tool to the data link connector (DLC) located beneath the instrument floor/panel and select the vehicle to be tested from the diagnostic tool menu. If the vehicle selection cannot be entered:
   - check that the program card is correctly installed.

DIAGNOSIS AND TESTING (Continued)

- check the connections to the vehicle.
- check the ignition switch position.

If the diagnostic tool still does not allow the vehicle selection to be entered, refer to the diagnostic tool manual.

6. Carry out the DATA LINK DIAGNOSTIC TEST using the diagnostic tool. If the diagnostic tool responds with:
   - SCP+, SCP- or UBP circuits fault = ALL MODULE NO RESPONSE/NOT EQUIPPED, go to Module Communication Network Diagnostics to diagnose the network concern.
   - If the powertrain control module (PCM) is not listed for a communication concern, turn the A/C controls to OFF and execute the self-test diagnostics for the PCM.

Symptom Chart

Symptom Chart

Condition	Possible Sources	Action
• Air inlet door inoperative	• Circuitry short/open. • Electronic manual temperature control (EMTC) module. • Air inlet door actuator/linkage.	• GO to Pinpoint Test A.
• Incorrect/erratic direction of airflow from outlets	• Circuitry. • Door actuator. • Mode door binding or stuck. • EMTC module. • Door actuator arm not connected to the door crank.	• GO to Pinpoint Test B.
• Insufficient, erratic or no heat	• Low engine coolant level. • Engine overheating. • Plugged or partially plugged heater core. • Temperature blend door is binding or stuck. • Temperature blend door actuator. • Heater hose is kinked or binding.	• GO to Pinpoint Test C.
• The air conditioning (A/C) is inoperative/does not operate correctly	• Open fuse. • Circuitry short/open. • A/C system discharged/low charge. • A/C dual function pressure switch. • PCM. • Smart Junction Box (SJB). • EMTC module. • A/C cycling switch. • A/C compressor clutch air gap. • A/C clutch relay.	• GO to Pinpoint Test D.

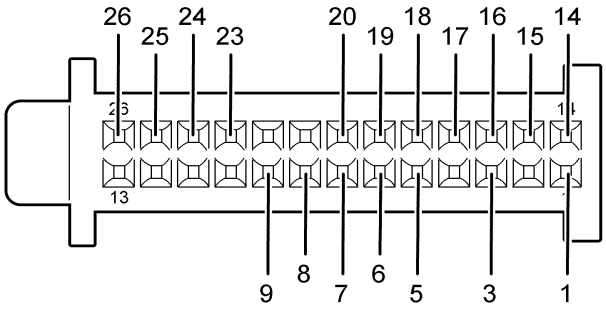
DIAGNOSIS AND TESTING (Continued)

Symptom Chart (Continued)

Condition	Possible Sources	Action
• The A/C is always ON	• Circuitry short. • PCM. • Smart Junction Box (SJB). • A/C compressor clutch air gap. • A/C clutch relay.	• GO to Pinpoint Test E.
• The temperature control is inoperative/does not operate correctly	• Circuitry open/shorted. • EMTC module. • Temperature blend door. • Temperature blend door actuator.	• GO to Pinpoint Test B.
• The blower motor is inoperative	• Fuse. • Circuitry open/shorted. • A/C blower motor switch. • Blower motor relay. • A/C blower motor.	• GO to Pinpoint Test F.
• The blower motor does not operate correctly	• Circuitry short. • A/C blower motor resistor. • A/C blower motor switch.	• GO to Pinpoint Test G.
• Insufficient air conditioning (A/C) cooling	• Low refrigerant level. • Temperature blend door actuator.	• GO to Pinpoint Test B.

Connector Circuit Reference

EMTC Module C294a



A0073160

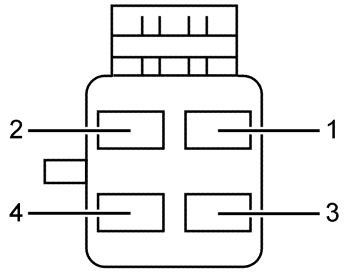
Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 1205 (BK) ground	Less than 5 ohms to chassis ground.
3	CKT 1397 (GY/RD) manual climate control module A/C request signal to instrument cluster	Greater than 10,000 ohms to chassis ground and 0 volts.
5	CKT 436 (RD/LG) manual climate control module reference voltage to mode door actuator	Greater than 10,000 ohms to chassis ground and 0 volts.
6	CKT 1375 (PK/YE) manual climate control module to temperature blend door actuator motor drive A circuit	Greater than 10,000 ohms to chassis ground and 0 volts.

DIAGNOSIS AND TESTING (Continued)

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
7	CKT 1376 (BK/LB) manual climate control module to temperature blend door actuator motor drive B circuit	Greater than 10,000 ohms to chassis ground and 0 volts.
8	CKT 1116 (DG) manual climate control module to air inlet door actuator motor drive A circuit	Greater than 10,000 ohms to chassis ground and 0 volts.
9	CKT 1117 (LG) manual climate control module to air inlet door actuator motor drive B circuit	Greater than 10,000 ohms to chassis ground and 0 volts.
14	CKT 1812 (BN/WH) ignition voltage	Greater than 10 volts with the ignition ON.
15	CKT 438 (RD/WH) manual climate control module return signal from mode door actuator	Greater than 10,000 ohms to chassis ground and 0 volts.
16	CKT 435 (YE/LB) manual climate control module feedback signal from floor/panel door actuator	Greater than 10,000 ohms to chassis ground and 0 volts.
17	CKT 1982 (LB/BK) manual climate control module feedback signal from defrost door actuator	Greater than 10,000 ohms to chassis ground and 0 volts.
18	CKT 437 (YE/LG) manual climate control module feedback signal from temperature blend door actuator	Greater than 10,000 ohms to chassis ground and 0 volts.
19	CKT 1128 (GY/LB) manual climate control module to floor/panel door actuator motor	Greater than 10,000 ohms to chassis ground and 0 volts.
20	CKT 1129 (BN/WH) manual climate control module to floor/panel door actuator motor	Greater than 10,000 ohms to chassis ground and 0 volts.
23	CKT 364 (BK/LG) manual climate control module to blower motor relay	Greater than 10 volts with the ignition ON.
24	CKT 1136 (RD/WH) manual climate control module to defrost door actuator motor	Greater than 10,000 ohms to chassis ground and 0 volts.
25	CKT 1137 (YE/LG) manual climate control module to defrost door actuator motor	Greater than 10,000 ohms to chassis ground and 0 volts.
26	CKT 1566 (RD/YE) battery voltage	Greater than 10 volts at all times.

DIAGNOSIS AND TESTING (Continued)

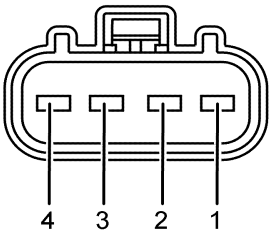
Blower Motor Switch C294b — Manual Climate Control



A0071491

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 1205 (BK) ground	Resistance of 0 ohms to chassis ground.
2	CKT 261 (DG/BK) HI blower motor speed	Less than 100 ohms to chassis ground.
3	CKT 754 (LG/WH) MED-HI blower motor speed	Less than 3 ohms to chassis ground.
4	CKT 752 (YE/RD) MED-LO blower motor speed	Less than 2 ohms to chassis ground.

Blower Motor Resistor C2185

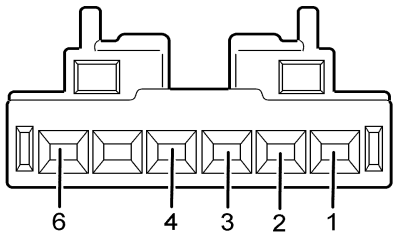


A0052184

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 752 (YE/RD) MED-LO blower resistor to blower switch	Resistance of 0 ohms to chassis ground with auxiliary blower switch in MED-LO.
2	CKT 261 (DG/BK) HI blower resistor to blower switch and to blower motor	Greater than 10 volts with the blower motor switch in any position except HI and the function selector switch in any position except OFF.
3	CKT 754 (LG/WH) MED-HI blower resistor to blower switch	Resistance of 0 ohms to chassis ground with auxiliary blower switch in MED-HI.
4	CKT 1205 (BK) blower resistor to ground	Resistance of 0 ohms to chassis ground.

DIAGNOSIS AND TESTING (Continued)

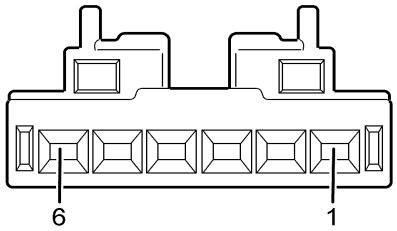
Temperature Blend Door Actuator C289



A0071494

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 1375 (PK/YE) temperature blend door actuator motor drive A circuit	Greater than 10,000 ohms to chassis ground and 0 volts.
2	CKT 438 (RD/WH) temperature blend door actuator potentiometer ground	Less than 5 ohms chassis ground.
3	CKT 436 (RD/LG) temperature blend door actuator potentiometer reference voltage	Greater than 4.5 volts to chassis ground with the EATC ON.
4	CKT 437 (YE/LG) temperature blend door actuator potentiometer feedback circuit	Less than 5 ohms chassis ground.
6	CKT 1376 (BK/LB) temperature blend door actuator motor drive B circuit	Greater than 10,000 ohms to chassis ground and 0 volts.

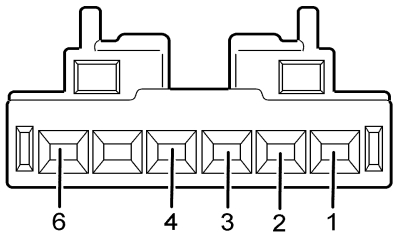
Air Inlet Actuator C2325



A0071495

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 1116 (DG) air inlet door actuator motor drive A circuit	Greater than 10,000 ohms to chassis ground and 0 volts.
6	CKT 1117 (LG) air inlet door actuator motor drive B circuit	Greater than 10,000 ohms to chassis ground and 0 volts.

Defrost Actuator C232

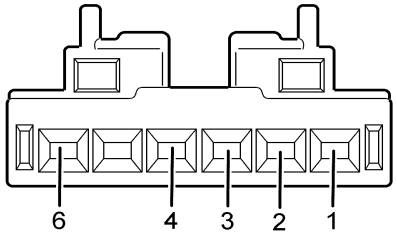


A0071494

DIAGNOSIS AND TESTING (Continued)

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 1136 (RD/WH) defrost door actuator motor drive A circuit	Greater than 10,000 ohms to chassis ground and 0 volts.
2	CKT 438 (RD/WH) defrost door actuator potentiometer ground	Less than 5 ohms to chassis ground.
3	CKT 436 (RD/LG) defrost door actuator potentiometer reference voltage	Greater than 4.5 volts to chassis ground with the EATC ON.
4	CKT 1982 (LB/BK) defrost actuator potentiometer feedback circuit	Less than 5 ohms to chassis ground.
6	CKT 1137 (YE/LG) defrost actuator motor drive B circuit	Greater than 10,000 ohms to chassis ground and 0 volts.

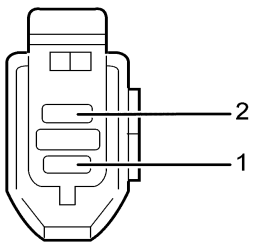
Floor/Panel Actuator C234



A0071494

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 1128 (GY/LB) floor/panel door actuator motor drive A circuit	Greater than 10,000 ohms to chassis ground and 0 volts.
2	CKT 438 (RD/WH) floor/panel door actuator potentiometer ground	Less than 5 ohms to chassis ground.
3	CKT 436 (RD/LG) floor/panel door actuator potentiometer reference voltage	Greater than 4.5 volts to chassis ground with the EATC ON.
4	CKT 435 (YE/LB) floor/panel actuator potentiometer feedback circuit	Less than 5 ohms to chassis ground.
6	CKT 1129 (BN/WH) floor/panel actuator motor drive B circuit	Greater than 10,000 ohms to chassis ground and 0 volts.

A/C Compressor Clutch Field Coil C100

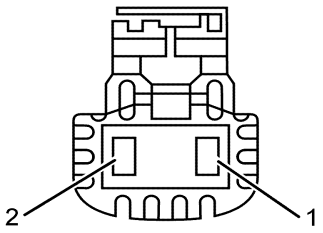


A0090788

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 1205 (BK) ground	Resistance of 0 ohms to chassis ground.
2	CKT 883 (PK/LB) A/C compressor clutch relay switched output	Greater than 10 volts with the A/C commanded ON.

DIAGNOSIS AND TESTING (Continued)

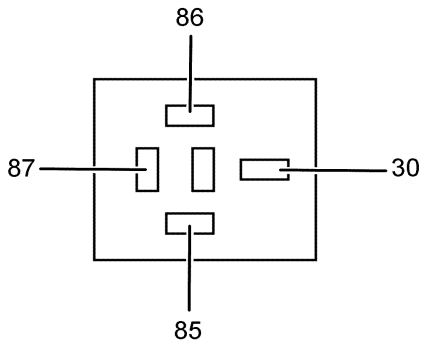
Blower Motor C2066



A0052186

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 371 (PK/WH)	Greater than 10 volts with the climate control in any position except OFF.
2	CKT 261 (DG/BK)	Resistance of 0 ohms to chassis ground with blower in the highest setting.

Blower Motor Relay

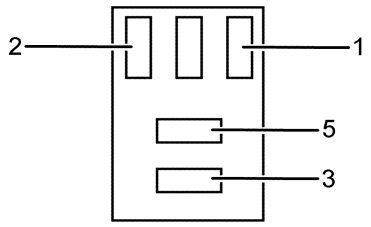


A0052191

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
30	Blower motor relay switch voltage circuit	Greater than 10 volts at all times.
85	CKT 364 (BK/LG) blower motor relay control from EMTC module	Less than 100 ohms to chassis ground with the blower in the lowest setting.
86	Blower motor relay coil voltage circuit	Greater than 10 volts at all times.
87	CKT 371 (PK/WH) blower motor relay switched output	Less than 5 ohms to chassis ground with the blower in the highest setting.

DIAGNOSIS AND TESTING (Continued)

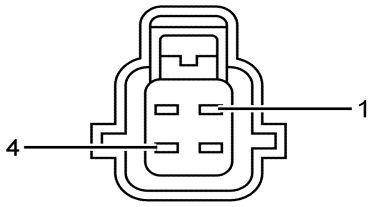
A/C Compressor Clutch Relay



A0052192

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 391 (RD/YE) voltage in start and run	Greater than 10 volts with the ignition ON.
2	CKT 321 (GY/WH) A/C compressor clutch relay control	Resistance of 0 ohms to chassis ground when the A/C is commanded ON.
3	A/C clutch relay switch voltage in run	Greater than 10 volts with the ignition ON.
5	CKT 883 (PK/LB) A/C compressor clutch relay switched output	Less than 100 ohms to chassis ground.

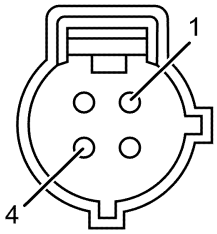
A/C Dual Function Pressure Switch C1078 (4.6L only)



N0007281

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	CKT 420 (DB/YE) A/C dual function pressure switch to A/C cycling switch	Greater than 10 volts with the ignition ON.
4	CKT 198 (DG/OG) dual function pressure switch to PCM	Greater than 10,000 ohms to chassis ground and 0 volts.

A/C Cycling Switch C130

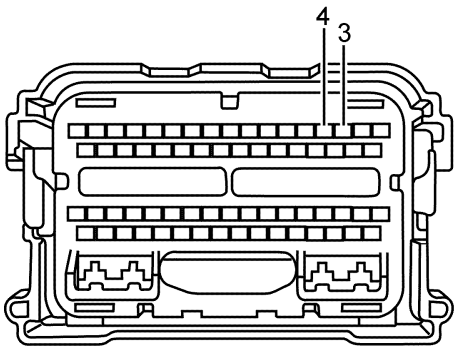


A0055375

DIAGNOSIS AND TESTING (Continued)

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
1	(Coupe) CKT 391 (RD/YE) voltage feed	Greater than 10 volts with the ignition ON.
1	(Convertible) CKT 298 (VT/OG) voltage feed	Greater than 10 volts with the ignition ON.
4	CKT 420 (DB/YE) voltage to A/C dual function pressure switch	Greater than 10,000 ohms to chassis ground and 0 volts.

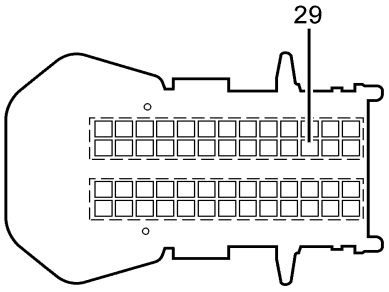
Powertrain Control Module C175e



N0007282

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
3	CKT 321 (GY/WH) A/C compressor clutch relay control	Greater than 10 volts with the ignition ON.
4	(4.6L) CKT 198 (DG/OG) ACCS input to PCM	Greater than 10 volts with the ignition ON and engine running.
4	(4.0L) CKT 420 (DB/YE) ACCS input to PCM	Greater than 10 volts with the ignition ON and engine running.

Smart Junction Box (SJB) C2280b



N0007283

Pin Number(s)	Circuit Designation/Description	Normal Condition/Measurement
29	CKT 1397 (GY/RD) manual climate control module A/C request signal to instrument cluster	Less than 5 ohms to chassis ground when the A/C is commanded ON.

DIAGNOSIS AND TESTING (Continued)

Pinpoint Tests

Pinpoint Test A: Air Inlet Door Inoperative

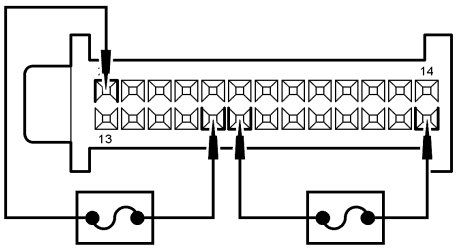
Normal Operation

Under normal operation, the air inlet door actuator motors are supplied voltage or ground on circuit 1116 (DG), depending on desired actuator rotation, by the electronic manual temperature control (EMTC) module. The EMTC module then supplies the appropriate voltage or ground to the other side of the actuator motor on circuit 1117 (LG).

Possible Causes

- An open, short to voltage, ground or together in circuits 1116 (DG) or 1117 (LG)
- Air inlet door actuator
- EMTC module
- Stuck or bound linkage or door

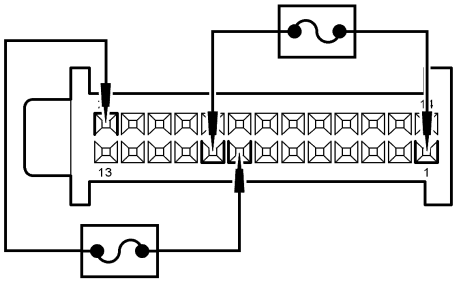
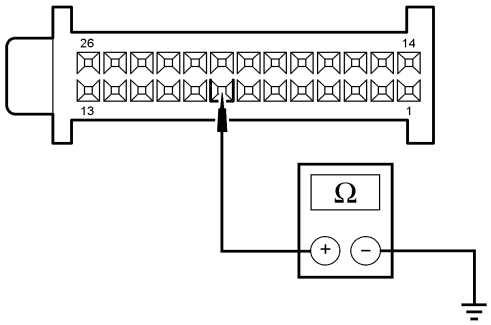
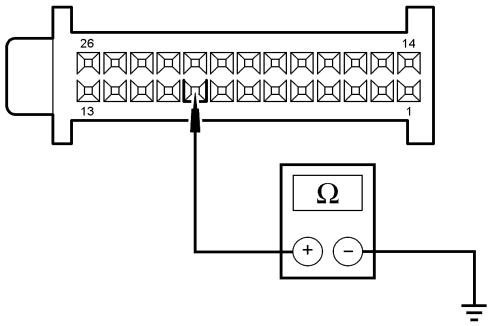
PINPOINT TEST A: AIR INLET DOOR INOPERATIVE

Test Step		Result / Action to Take
A1	**CHECK THE AIR INLET DOOR ACTUATOR CLOCKWISE OPERATION**	
	• Disconnect: EMTC Module C294a. • Remove the door actuator and disengage the actuator driveshaft from the actuator door. • Mark the door actuator driveshaft position. • Connect a fused jumper wire between EMTC module C294a-8, circuit 1116 (DG) and C294a-1, circuit 1205 (BK). Connect a second fused jumper wire between EMTC module C294a-9, circuit 1117 (LG) and C294a-26, circuit 1566 (RD/YE).  A0072894 • **Does the actuator motor move in the clockwise direction?**	**Yes** GO to **A2**. **No** GO to **A3**.

(Continued)

DIAGNOSIS AND TESTING (Continued)

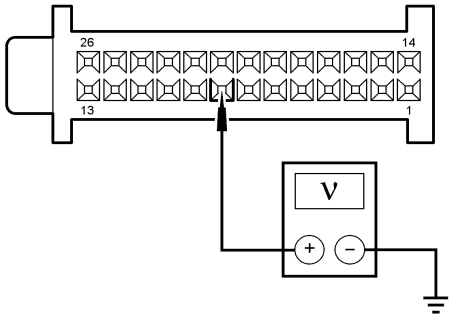
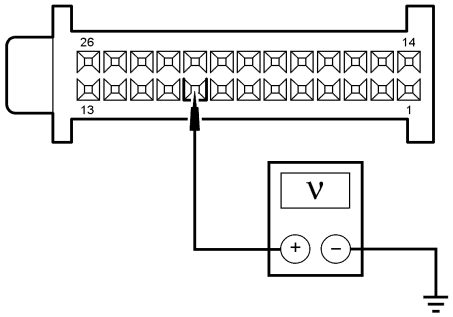
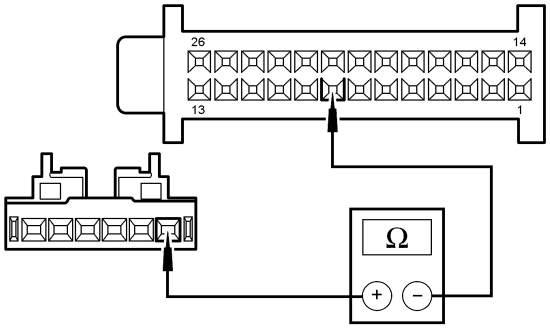
PINPOINT TEST A: AIR INLET DOOR INOPERATIVE (Continued)

Test Step		Result / Action to Take
A2	**CHECK THE AIR INLET DOOR ACTUATOR COUNTERCLOCKWISE OPERATION**	
	• Connect a fused jumper wire between EMTC module C294a-8, circuit 1116 (DG) and C294a-26, circuit 1566 (RD/YE). Connect a second fused jumper wire between EMTC module C294a-9, circuit 1117 (LG) and C294a-1, circuit 1205 (BK).  A0072895 • **Does the actuator motor move in the counterclockwise direction?**	**Yes** INSPECT for binding or broken door and linkage. If no condition is found, INSTALL a new EMTC module. TEST the system for normal operation. **No** GO to **A3**.
A3	**CHECK CIRCUIT 1116 (DG) FOR A SHORT TO GROUND**	
	• Disconnect: Recirc Door Actuator C2325. • Measure the resistance between ground and EMTC module C294a-8, circuit 1116 (DG).  A0072896 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to **A4**. **No** REPAIR circuit 1116 (DG) for a short to ground. TEST the system for normal operation.
A4	**CHECK CIRCUIT 1117 (LG) FOR A SHORT TO GROUND**	
	• Measure the resistance between ground and EMTC module C294a-9, circuit 1117 (LG).  A0072897 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to **A5**. **No** REPAIR circuit 1117 (LG) for a short to ground. TEST the system for normal operation.

(Continued)

DIAGNOSIS AND TESTING (Continued)

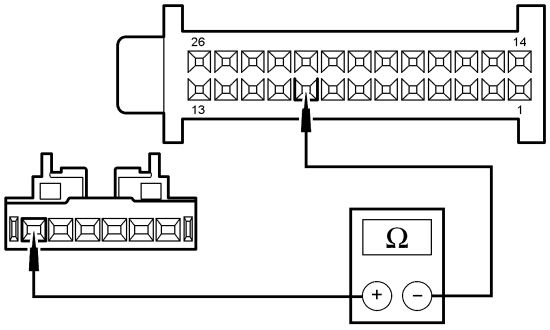
PINPOINT TEST A: AIR INLET DOOR INOPERATIVE (Continued)

Test Step		Result / Action to Take
A5	**CHECK CIRCUIT 1116 (DG) FOR A SHORT TO POWER**	
	• Key in ON position. • Measure the voltage between ground and EMTC module C294a-8, circuit 1116 (DG).  A0072898 • **Is voltage present?**	**Yes** REPAIR circuit 1116 (DG) for a short to power. TEST the system for normal operation. **No** GO to **A6**.
A6	**CHECK CIRCUIT 1117 (LG) FOR A SHORT TO POWER**	
	• Measure the voltage between ground and EMTC module C294a-9, circuit 1117 (LG).  A0072899 • **Is voltage present?**	**Yes** REPAIR circuit 1117 (LG) for a short to power. TEST the system for normal operation. **No** GO to **A7**.
A7	**CHECK CIRCUIT 1116 (DG) FOR AN OPEN**	
	• Key in OFF position. • Measure the resistance between EMTC module C294a-8, circuit 1116 (DG) and recirc door actuator C2325-1, circuit 1116 (DG).  A0072900 • **Is the resistance less than 5 ohms?**	**Yes** GO to **A8**. **No** REPAIR circuit 1116 (DG) for an open. TEST the system for normal operation.

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A: AIR INLET DOOR INOPERATIVE (Continued)

Test Step		Result / Action to Take
A8	**CHECK CIRCUIT 1117 (LG) FOR AN OPEN**	
•	Measure the resistance between EMTC module C294a-9, circuit 1117 (LG) and recirc door actuator C2325-6, circuit 1117 (LG).  A0072901	**Yes** INSPECT for binding or broken linkage. If no condition is found, INSTALL a new door actuator. TEST the system for normal operation.
•	**Is the resistance less than 5 ohms?**	**No** REPAIR circuit 1117 (LG) for an open. TEST the system for normal operation.

Pinpoint Test B: Incorrect/Erratic Direction Of Airflow From Outlet(s)

Normal Operation

Under normal operation, to rotate the mode door actuator clockwise, the EMTC module supplies voltage to the BLEND, DEFROST and FLOOR/PANEL mode door actuator motors through the door actuator feed B circuits, and supplies ground through the door actuator feed A circuits. To rotate the mode door actuator counterclockwise, the EMTC module reverses the voltage and ground circuits.

The mode door actuator feedback resistors are supplied a ground from the EMTC module by the mode door actuator return circuits and a 5-volt reference voltage on the mode door actuator reference circuits. The EMTC module reads the voltage on the mode door actuator feedback circuits to determine the mode door actuator position by the position of the actuator feedback resistor wiper arm.

Door actuator feed B circuits

— Blend — 1376 (BK/LB)

— Defrost — 1137 (YE/LG)

— Floor/Panel — 1129 (BN/WH)

Door actuator feed A circuits

— Blend — 1375 (PK/YE)

— Defrost — 1136 (RD/WH)

— Floor/Panel — 1128 (GY/LB)

Door actuator return circuits

— Blend — 438 (RD/WH)

— Defrost — 438 (RD/WH)

— Floor/Panel — 438 (RD/WH)

Door actuator reference circuits

— Blend — 436 (RD/LG)

— Defrost — 436 (RD/LG)

— Floor/Panel — 436 (RD/LG)

Door actuator feedback circuits

— Blend — 437 (YE/LG)

— Defrost — 1982 (LB/BK)

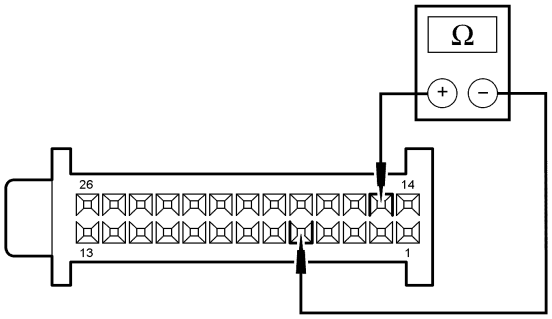
— Floor/Panel — 435 (YE/LB)

Possible Causes

- An open, short to voltage, ground or together in door actuator open, close, return, reference or feedback circuits
- Blend, air inlet, defrost and floor/panel mode door actuator motor
- EATC module
- Manual climate control module
- Stuck or bound linkage or door

DIAGNOSIS AND TESTING (Continued)

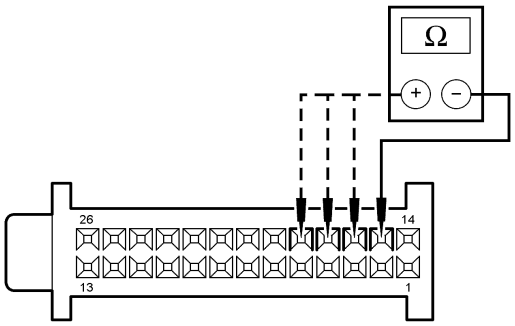
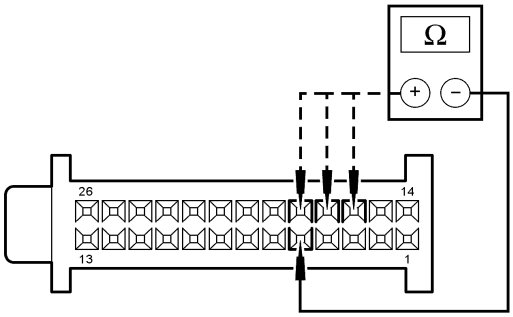
PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S)

Test Step		Result / Action to Take
B1	**CHECK THE AIRFLOW**	
	• Key in ON position. • Check the air discharge temperature in full COOL and full WARM and airflow in the PANEL, DEFROST and FLOOR modes. • **Is the air discharge temperature and airflow correct in each setting?**	**Yes** The system is operating normally. **No** If the airflow is from the floor only or panel only in any mode except OFF and DEFROST and airflow is from defrost only on DEFROST mode, follow diagnostics for floor/panel door actuator. GO to **B2**. If the airflow is from the defrost only in all modes except OFF or from floor/panel in DEFROST mode, follow diagnostics for defrost door actuator. GO to **B2**. If the temperature control is inoperative/does not operate correctly, follow diagnostics for the blend door actuator. GO to **B2**. If the RECIRC button does not change the air inlet door position, GO to Pinpoint Test A.
B2	**CHECK THE FEEDBACK POTENTIOMETER TOTAL RESISTANCE**	
	• Disconnect: EMTC Module C294a. • Disconnect: For Floor/Panel Door Actuator: Temperature Blend Door Actuator C289 and Defrost Door Actuator C232. • Disconnect: For Defrost Door Actuator: Temperature Blend Door Actuator C289 and Floor/Panel Door Actuator C234. • Disconnect: For Blend Door Actuator: Defrost Door Actuator C232 and Floor/Panel Door Actuator C234. • Remove the door actuator and disengage the actuator driveshaft from the actuator door. • Mark the door actuator driveshaft position. • Measure the resistance between EMTC module C294a-5, circuit 436 (RD/LG) and EMTC module C294a-15, circuit 438 (RD/WH).  A0072902 • **Is the resistance between 5,000 and 6,000 ohms?**	**Yes** GO to **B3**. **No** If the resistance is greater than 6,000 ohms, GO to **B5**. If the resistance is less than 5,000 ohms, GO to **B7**.

(Continued)

DIAGNOSIS AND TESTING (Continued)

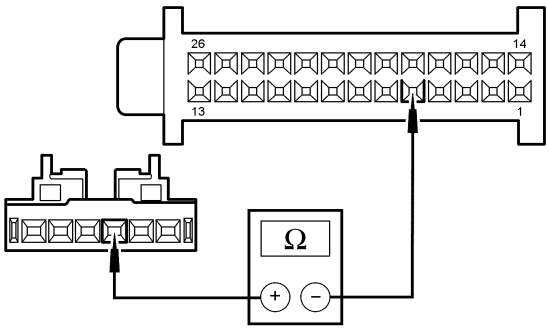
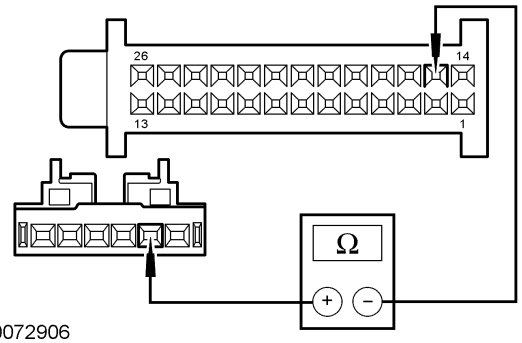
PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B3	**CHECK THE POTENTIOMETER LOW SIDE RESISTANCE**	
• Measure the resistance between EMTC module C294a-15, circuit 438 (RD/WH) and the following: — For floor/panel door actuator: EMTC module C294a-16, circuit 435 (YE/LB). — For defrost door actuator: EMTC module C294a-17, circuit 1982 (LB/BK). — For blend door actuator: EMTC module C294a-18, circuit 437 (YE/LG).  A0072903 • **Is the resistance between 250 and 5,500 ohms?**		**Yes** GO to **B4**. **No** If the resistance is greater than 5,500 ohms, GO to **B8**. If the resistance is less than 250 ohms, GO to **B9**.
B4	**CHECK THE POTENTIOMETER HIGH SIDE RESISTANCE**	
• Measure the resistance between EMTC module C294a-5, circuit 436 (RD/LG) and the following: — For floor/panel door actuator: EMTC module C294a-16, circuit 435 (YE/LB). — For defrost door actuator: EMTC module C294a-17, circuit 1982 (LB/BK). — For blend door actuator: EMTC module C294a-18, circuit 437 (YE/LG).  A0072904 • **Is the resistance between 250 and 5,500 ohms?**		**Yes** GO to **B11**. **No** If the resistance is greater than 5,500 ohms, INSTALL a new door actuator. TEST the system for normal operation. If the resistance is less than 250 ohms, GO to **B10**.
B5	**CHECK CIRCUIT 436 (RD/LG) FOR AN OPEN**	
• Disconnect: Floor/Panel Door Actuator C234, Defrost Door Actuator C232 or Blend Door Actuator C289.		

(Continued)

DIAGNOSIS AND TESTING (Continued)

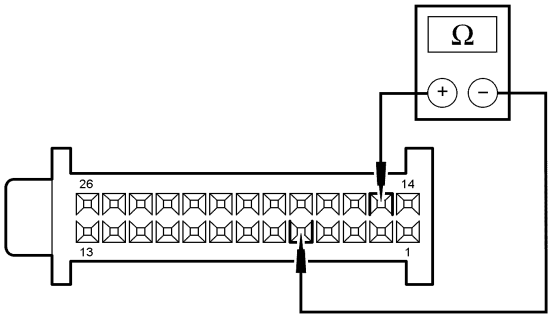
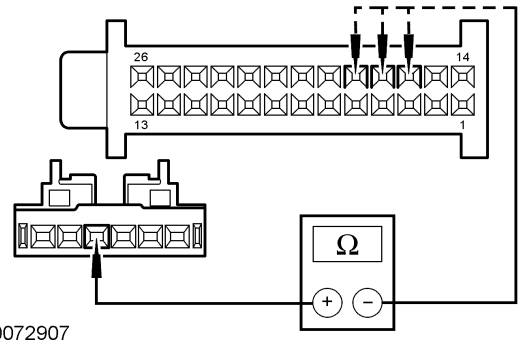
PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B5	**CHECK CIRCUIT 436 (RD/LG) FOR AN OPEN (Continued)**	
	• Measure the resistance between EMTC module C294a-5, circuit 436 (RD/LG) and the following: — For floor/panel: floor/panel door actuator C234-3, circuit 436 (RD/LG). — For defrost: defrost door actuator C232-3, circuit 436 (RD/LG). — For blend: blend door actuator C289-3, circuit 436 (RD/LG).  A0072905 • **Is the resistance less than 5 ohms?**	**Yes** GO to **B6**. **No** REPAIR circuit 436 (RD/LG) for an open. TEST the system for normal operation.
B6	**CHECK THE ACTUATOR RETURN CIRCUIT 438 (RD/WH) FOR AN OPEN**	
	• Measure the resistance between EMTC module C294a-15, circuit 438 (RD/WH) and the following: — For floor/panel: floor/panel door actuator C234-2, circuit 438 (RD/WH). — For defrost: defrost door actuator C232-2, circuit 438 (RD/WH). — For blend: blend door actuator C289-2, circuit 438 (RD/WH).  A0072906 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new door actuator. TEST the system for normal operation. **No** REPAIR circuit 438 (RD/WH) for an open. TEST the system for normal operation.
B7	**CHECK CIRCUITS 438 (RD/WH) AND 436 (RD/LG) FOR A SHORT TOGETHER**	
	• Disconnect: Floor/Panel Door Actuator C234, Defrost Door Actuator C232 or Blend Door Actuator C289.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

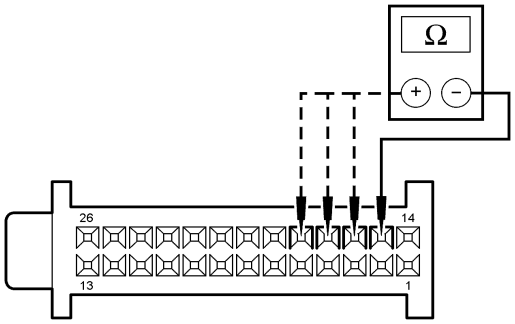
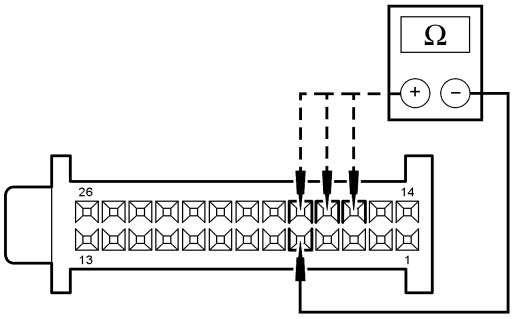
PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B7	**CHECK CIRCUITS 438 (RD/WH) AND 436 (RD/LG) FOR A SHORT TOGETHER (Continued)**	
	• Measure the resistance between EMTC module C294a-5, circuit 436 (RD/LG) and EMTC module C294a-15, circuit 438 (RD/WH).  A0072902 • **Is the resistance greater than 10,000 ohms?**	**Yes** INSTALL a new door actuator. TEST the system for normal operation. **No** REPAIR circuit 438 (RD/WH) and circuit 436 (RD/LG) for a short together. TEST the system for normal operation.
B8	**CHECK CIRCUITS 435 (YE/LB), 1982 (LB/BK) OR 437 (YE/LG) FOR AN OPEN**	
	• Disconnect: Floor/Panel Door Actuator C234, Defrost Door Actuator C232 or Blend Door Actuator C289. • Measure the resistance between the following: — For floor/panel door actuator: EMTC module C294a-16, circuit 435 (YE/LB) and floor/panel door actuator C234-4, circuit 435 (YE/LB). — For defrost door actuator: EMTC module C294a-17, circuit 1982 (LB/BK) and defrost door actuator C232-4, circuit 1982 (LB/BK). — For blend door actuator: EMTC module C294a-18, circuit 437 (YE/LG) and floor door actuator C289-4, circuit 437 (YE/LG).  A0072907 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new door actuator. TEST the system for normal operation. **No** REPAIR circuit 435 (YE/LB), 1982 (LB/BK) or 437 (YE/LG) for an open. TEST the system for normal operation.
B9	**CHECK CIRCUIT 438 (RD/WH) FOR A SHORT TO CIRCUITS 435 (YE/LB), 1982 (LB/BK) OR 437 (YE/LG)**	
	• Disconnect: Floor/Panel Door Actuator C234, Defrost Door Actuator C232 or Blend Door Actuator C289.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

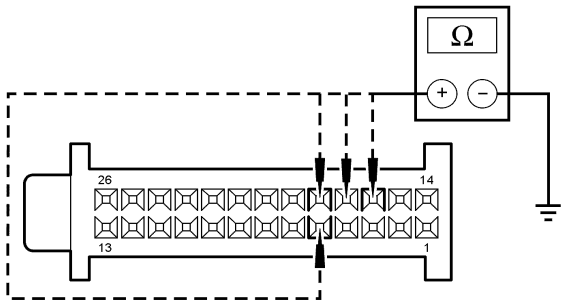
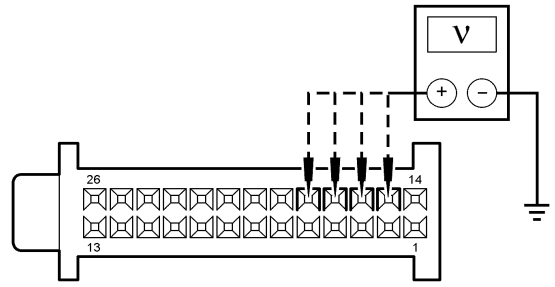
PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B9	**CHECK CIRCUIT 438 (RD/WH) FOR A SHORT TO CIRCUITS 435 (YE/LB), 1982 (LB/BK) OR 437 (YE/LG) (Continued)**	
	• Measure the resistance between EMTC module C294a-15, circuit 438 (RD/WH) and the following: — For floor/panel door actuator: EMTC module C294a-16, circuit 435 (YE/LB). — For defrost door actuator: EMTC module C294a-17, circuit 1982 (LB/BK). — For blend door actuator: EMTC module C294a-18, circuit 437 (YE/LG).  A0072903 • **Is the resistance greater than 10,000 ohms?**	**Yes** INSTALL a new door actuator. TEST the system for normal operation. **No** REPAIR circuit 438 (RD/WH) and circuits 435 (YE/LB), 1982 (LB/BK) or 437 (YE/LG) for a short together. TEST the system for normal operation.
B10	**CHECK CIRCUIT 436 (RD/LG) FOR A SHORT TO CIRCUITS 435 (YE/LB), 1982 (LB/BK) OR CIRCUIT 437 (YE/LG)**	
	• Disconnect: Floor/Panel Door Actuator C234, Defrost Door Actuator C232 or Blend Door Actuator C289. • Measure the resistance between EMTC module C294a-5, circuit 436 (RD/LG) and the following: — For floor/panel door actuator: EMTC module C294a-16, circuit 435 (YE/LB). — For defrost door actuator: EMTC module C294a-17, circuit 1982 (LB/BK). — For blend door actuator: EMTC module C294a-18, circuit 437 (YE/LG).  A0072904 • **Is the resistance greater than 10,000 ohms?**	**Yes** INSTALL a new door actuator. TEST the system for normal operation. **No** REPAIR circuits 436 (RD/LG) and circuits 435 (YE/LB), 1982 (LB/BK) or 437 (YE/LG) for a short together. TEST the system for normal operation.
B11	**CHECK CIRCUITS 436 (RD/LG), 437 (YE/LG), 435 (YE/LB) OR 1982 (LB/BK) FOR A SHORT TO GROUND**	
	• Disconnect: Floor/Panel Door Actuator C234, Defrost Door Actuator C232 or Blend Door Actuator C289.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

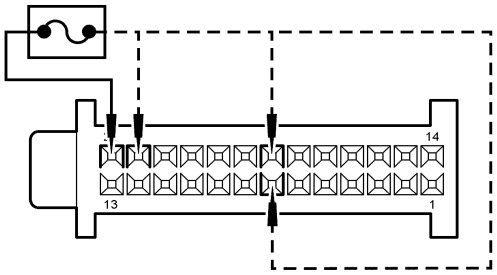
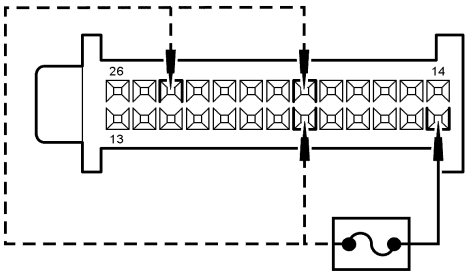
PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B11	**CHECK CIRCUITS 436 (RD/LG), 437 (YE/LG), 435 (YE/LB) OR 1982 (LB/BK) FOR A SHORT TO GROUND (Continued)**	
	• Measure the resistance between ground and the following: — EMTC module C294a-5, circuit 436 (RD/LG). — For floor/panel door actuator: EMTC module C294a-16, circuit 435 (YE/LB). — For defrost door actuator: EMTC module C294a-17, circuit 1982 (LB/BK). — For blend door actuator: EMTC module C294a-18, circuit 437 (YE/LG).  A0077341 • **Is the resistance greater than 10,000 ohms?**	**Yes** GO to **B12**. **No** REPAIR circuit(s) for a short to ground. TEST the system for normal operation.
B12	**CHECK CIRCUITS 438 (RD/WH), 437 (YE/LG), 435 (YE/LB) OR 1982 (LB/BK) FOR A SHORT TO POWER**	
	• Key in ON position. • Measure the voltage between ground and the following: — EMTC module C294a-15, circuit 438 (RD/WH). — For floor/panel door actuator: EMTC module C294a-16, circuit 435 (YE/LB). — For defrost door actuator: EMTC module C294a-17, circuit 1982 (LB/BK). — For blend door actuator: EMTC module C294a-18, circuit 437 (YE/LG).  A0072922 • **Is voltage present?**	**Yes** REPAIR circuit(s) for a short to power. TEST the system for normal operation. **No** GO to **B13**.

(Continued)

DIAGNOSIS AND TESTING (Continued)

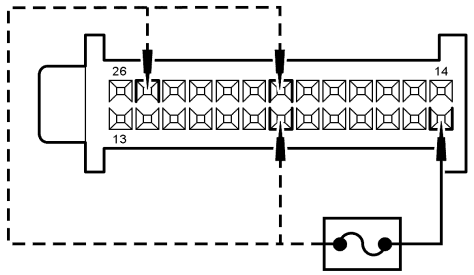
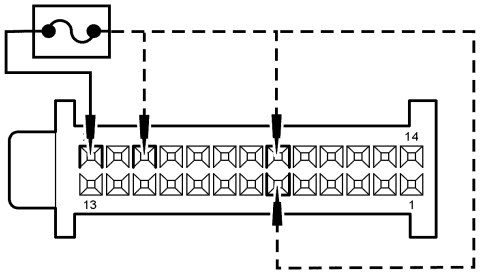
PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B13	CHECK THE DOOR ACTUATOR CLOCKWISE OPERATION	
	• Connect a fused jumper wire between EMTC module C294a-26, circuit 1566 (RD/YE) and: — For floor/panel door actuator: EMTC module C294a-20, circuit 1129 (BN/WH). — For defrost door actuator: EMTC module C294a-25, circuit 1137 (YE/LG). — For blend door actuator: EMTC module C294a-7, circuit 1376 (BK/LB).  A0072908 • Connect a second fused jumper wire between EMTC module C294a-1, circuit 1205 (BK) and: — For floor/panel door actuator: EMTC module C294a-19, circuit 1128 (GY/LB). — For defrost door actuator: EMTC module C294a-24, circuit 1136 (RD/WH). — For blend door actuator: EMTC module C294a-6, circuit 1375 (PK/YE).  A0072909 • **Does the actuator motor move in the clockwise direction?**	**Yes** GO to **B14**. **No** GO to **B15**.

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B14	**CHECK THE DOOR ACTUATOR COUNTERCLOCKWISE OPERATION**	
	• Connect a fused jumper wire between EMTC module C294a-1, circuit 1205 (BK) and: — For floor/panel door actuator: EMTC module C294a-20, circuit 1129 (BN/WH). — For defrost door actuator: EMTC module C294a-25, circuit 1137 (YE/LG). — For blend door actuator: EMTC module C294a-7, circuit 1376 (BK/LB).  A0072910 • Connect a second fused jumper wire between EMTC module C294a-26, circuit 1566 (RD/YE) and: — For floor/panel door actuator: EMTC module C294a-19, circuit 1128 (GY/LB). — For defrost door actuator: EMTC module C294a-24, circuit 1136 (RD/WH). — For blend door actuator: EMTC module C294a-6, circuit 1375 (PK/YE).  A0072911 • **Does the actuator motor move in the counterclockwise direction?**	**Yes** INSPECT for binding or broken door and linkage. If no condition is found, INSTALL a new EATC module or EMTC module. TEST the system for normal operation. **No** GO to **B15**.
B15	**CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR AN OPEN**	
	• Disconnect: Floor/Panel Door Actuator C234, Defrost Door Actuator C232 or Blend Door Actuator C289.	

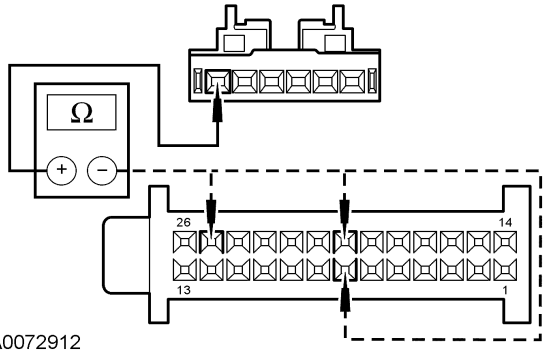
(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

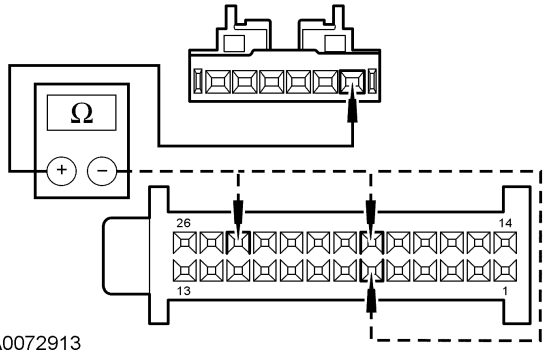
Test Step		Result / Action to Take
B15	CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR AN OPEN (Continued)	

- Measure the resistance between:
  - — For floor/panel door actuator: EMTC module C294a-20, circuit 1129 (BN/WH) and floor/panel door actuator C234-6, circuit 1129 (BN/WH).
  - — For defrost door actuator: EMTC module C294a-25, circuit 1137 (YE/LG) and defrost door actuator C232-6, circuit 1997 BN/YE).
  - — For blend door actuator: EMTC module C294a-7, circuit 1376 (BK/LB) and blend door actuator C289-6, circuit 1376 (BK/LB).



A0072912

- Measure the resistance between:
  - — For floor/panel door actuator: EMTC module C294a-19, circuit 1128 (GY/LB) and floor/panel door actuator C234-1, circuit 1128 (GY/LB).
  - — For defrost door actuator: EMTC module C294a-24, circuit 1136 (RD/WH) and defrost door actuator C232-1, circuit 1136 (RD/WH).
  - — For blend door actuator: EMTC module C294a-6, circuit 1375 (PK/YE) and blend door actuator C289-1, circuit 1375 (PK/YE).



A0072913

- **Are the resistances less than 5 ohms?**

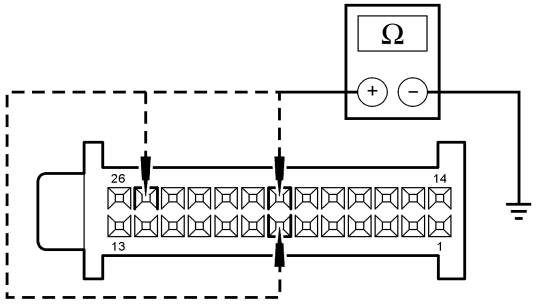
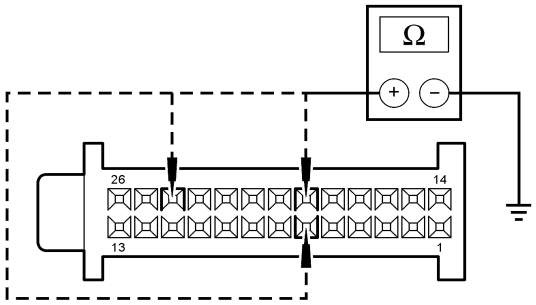
Yes
GO to **B16**.

No
REPAIR the circuit(s) for an open. TEST the system for normal operation.

(Continued)

DIAGNOSIS AND TESTING (Continued)

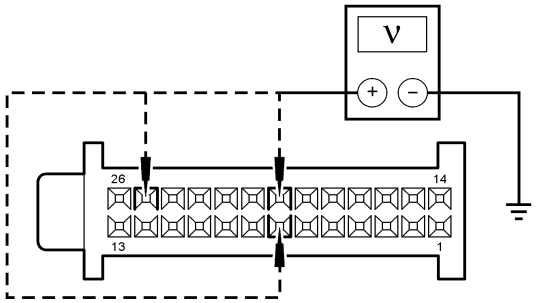
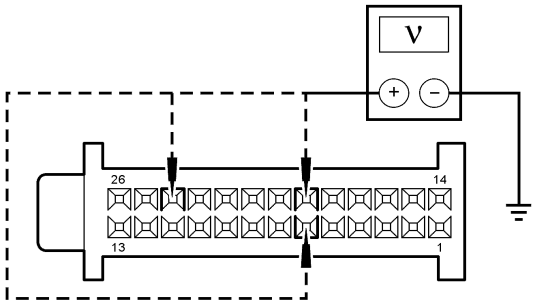
PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B16	**CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR A SHORT TO GROUND**	
	• Measure the resistance between ground and: — For floor/panel door actuator: EMTC module C294a-20, circuit 1129 (BN/WH). — For defrost door actuator: EMTC module C294a-25, circuit 1137 (YE/LG). — For blend door actuator: EMTC module C294a-7, circuit 1376 (BK/LB).	
	 A0072914	
	• Measure the resistance between ground and: — For floor/panel door actuator: EMTC module C294a-19, circuit 1128 (GY/LB). — For defrost door actuator: EMTC module C294a-24, circuit 1136 (RD/WH). — For blend door actuator: EMTC module C294a-6, circuit 1375 (PK/YE).	
	 A0072915	
	• **Are the resistances greater than 10,000 ohms?**	**Yes** GO to **B17**. **No** REPAIR the circuit(s) for a short to ground. TEST the system for normal operation.
B17	**CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR A SHORT TO POWER**	
	• Key in ON position.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

Test Step		Result / Action to Take
B17	**CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR A SHORT TO POWER (Continued)**	
	• Measure the voltage between ground and: — For floor/panel door actuator: EMTC module C294a-20, circuit 1129 (BN/WH). — For defrost door actuator: EMTC module C294a-25, circuit 1137 (YE/LG). — For blend door actuator: EMTC module C294a-7, circuit 1376 (BK/LB).	
	 A0072916	
	• Measure the voltage between ground and: — For floor/panel door actuator: EMTC module C294a-19, circuit 1128 (GY/LB). — For defrost door actuator: EMTC module C294a-24, circuit 1136 (RD/WH). — For blend door actuator: EMTC module C294a-6, circuit 1375 (PK/YE).	
	 A0072917	
	• **Is voltage present?**	**Yes** REPAIR the circuit(s) for a short to power. TEST the system for normal operation. **No** GO to **B18**.
B18	**CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR A SHORT TOGETHER**	
	• Key in OFF position.	

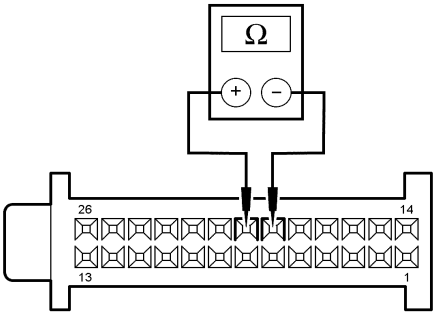
(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: INCORRECT/ERRATIC DIRECTION OF AIRFLOW FROM OUTLET(S) (Continued)

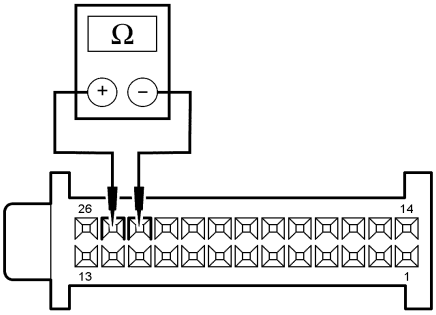
Test Step		Result / Action to Take
B18	CHECK THE ACTUATOR MOTOR DRIVE CIRCUITS FOR A SHORT TOGETHER (Continued)	

- **NOTE:** For floor/panel door actuator:
  Measure the resistance between EMTC module C294a-19, circuit 1128 (GY/LB) and EMTC module C294a-20, circuit 1129 (BN/WH).



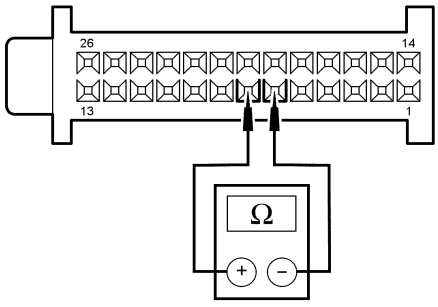
A0072918

- **NOTE:** For defrost door actuator:
  Measure the resistance between EMTC module C294a-24, circuit 1136 (RD/WH) and EMTC module C294a-25, circuit 1137 (YE/LG).



A0072919

- **NOTE:** For blend door actuator:
  Measure the resistance between EMTC Module C294a-6, circuit 1375 (PK/YE) and EMTC Module C294a-7, circuit 1376 (BK/LB).



A0072920

- **Is the resistance greater than 10,000 ohms?**

Yes
INSPECT for binding or broken linkage. If no condition is found, INSTALL a new door actuator. TEST the system for normal operation.

No
REPAIR circuit(s) for a short together. TEST the system for normal operation.

DIAGNOSIS AND TESTING (Continued)

Pinpoint Test C: Insufficient, Erratic Or No Heat

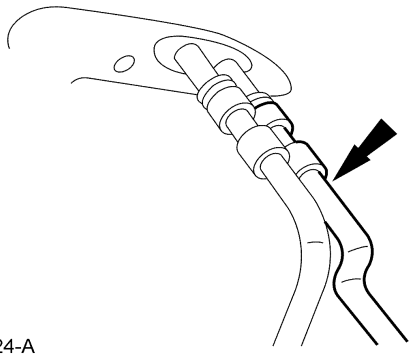
Normal Operation

Under normal operation, warm coolant flows from the engine through the heater core and back to the engine.

Possible Causes

- Plugged heater core
- Coolant level
- Temperature blend door

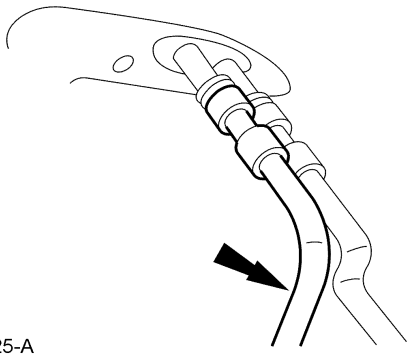
PINPOINT TEST C: INSUFFICIENT, ERRATIC OR NO HEAT

Test Step		Result / Action to Take
C1	**CHECK FOR CORRECT ENGINE COOLANT LEVEL**	
	• Key in OFF position. • Check the engine coolant level when hot and cold. • **Is the engine coolant at the correct level (hot/cold) as indicated on the engine coolant recovery reservoir?**	**Yes** GO to C3. **No** GO to C2.
C2	**CHECK THE ENGINE COOLING SYSTEM FOR LEAKS**	
	• Pressure test the cooling system for leaks. Refer to Section 303-03. • **Does the engine cooling system leak?**	**Yes** REPAIR the engine coolant leak. TEST the system for normal operation. **No** GO to C3.
C3	**CHECK FOR COOLANT FLOW TO THE HEATER CORE**	
	WARNING: The heater core inlet hose will become too hot to handle and may cause serious burns if the system is working correctly. • Run the engine until it reaches normal operating temperature. Select the FLOOR position on the control assembly. Set the temperature control to full WARM. • Feel the heater core inlet hose to see if it is hot.  GL1024-A • **Is the heater core inlet hose hot?**	**Yes** GO to C4. **No** REFER to Section 303-03 to check cooling system function.
C4	**CHECK FOR A PLUGGED OR RESTRICTED HEATER CORE**	
	WARNING: The heater core outlet hose will become too hot to handle and may cause serious burns if the system is operating correctly.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST C: INSUFFICIENT, ERRATIC OR NO HEAT (Continued)

Test Step		Result / Action to Take
C4	**CHECK FOR A PLUGGED OR RESTRICTED HEATER CORE (Continued)**	
	• Feel the heater core outlet hose to see if it is hot.  GL1025-A • **Is the heater core outlet hose hot?**	**Yes** GO to Pinpoint Test B and diagnose for a blend door actuator. **No** INSTALL a new heater core. TEST the system for normal operation.

Pinpoint Test D: The Air Conditioning (A/C) Is Inoperative/Does Not Operate Correctly

Normal Operation

Under normal operation, when A/C is requested, a ground signal is sent to the smart junction box (SJB) through circuit 1397 (GY/RD) then a message is sent from the SJB through the CAN bus to the PCM. Voltage is provided to the A/C cycling switch through circuit 391 (RD/YE). The PCM receives input from the A/C cycling switch through circuit 420 (DB/YE) and (4.6L only) through the dual function pressure switch to circuit 198 (DG/OG).

The PCM provides a ground for the A/C clutch relay coil through circuit 321 (GY/WH). When the relay is activated, ignition voltage is supplied to the A/C clutch solenoid through circuit 883 (PK/LB). Ground is supplied for the A/C clutch through circuit 1205 (BK).

Possible Causes

- An open in circuit 420 (DB/YE), 1397 (GY/RD), 883 (PK/LB), 198 (DG/OG), 1205 (BK), 391 (RD/YE) or 321 (GY/WH)
- A short to voltage in circuit 1397 (GY/RD)
- PCM
- EMTC module
- A/C cycling switch
- Dual function pressure switch
- A/C compressor clutch field coil
- A/C control relay
- A/C clutch air gap

PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

NOTE: Before carrying out the following test, diagnose any PCM DTCs.

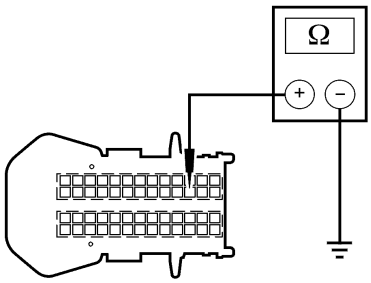
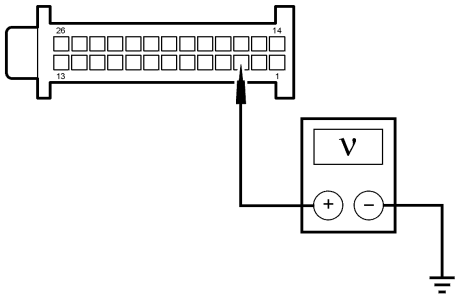
NOTE: Before carrying out the following test, check that the A/C system pressure is above 290 kPa (42 psi). If the pressure is below 290 kPa (42 psi), refer to Fluorescent Dye Leak Detection in this section.

Test Step		Result / Action to Take
D1	**CHECK THE A/C SWITCH PID WITH THE A/C ON**	
	• Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: SJB A/C Switch PID. • With the engine running, select PANEL mode and press the A/C button on the EMTC module. • **Does the SJB A/C switch PID read ACTIVE?**	**Yes** GO to **D5**. **No** GO to **D2**.

(Continued)

DIAGNOSIS AND TESTING (Continued)

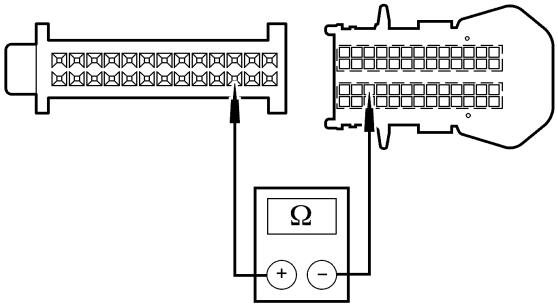
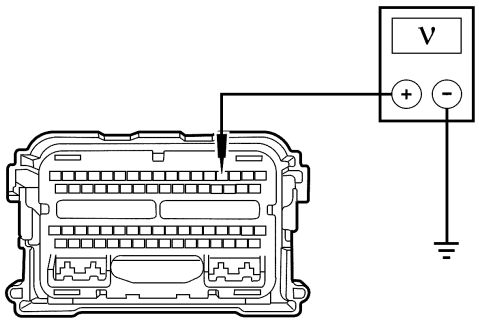
PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
D2	CHECK THE EMTC A/C SIGNAL WITH THE A/C ON	
	• Key in OFF position. • Disconnect: Smart Junction Box (SJB) C2280b. • Key in ON position. • Select PANEL mode and press the A/C button on the EMTC module. • Measure the resistance between SJB C2280b-29, circuit 1397 (GY/RD) and ground.  A0081866 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new SJB. TEST the system for normal operation. **No** GO to **D3**.
D3	CHECK CIRCUIT 1397 (GY/RD) FOR A SHORT TO VOLTAGE	
	• Key in OFF position. • Disconnect: EMTC Module C294a. • Key in ON position. • Measure the voltage between EMTC module C294a-3, circuit 1397 (GY/RD) and ground.  A0073157 • **Is voltage present?**	**Yes** REPAIR circuit 1397 (GY/RD) for a short to voltage. TEST the system for normal operation. **No** GO to **D4**.
D4	CHECK CIRCUIT 1397 (GY/RD) FOR AN OPEN	
	• Key in OFF position. • Disconnect: EMTC Module C294a.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

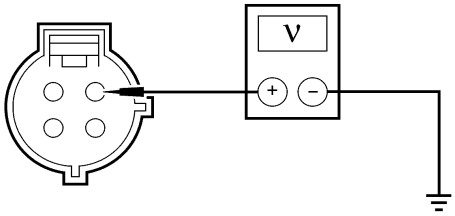
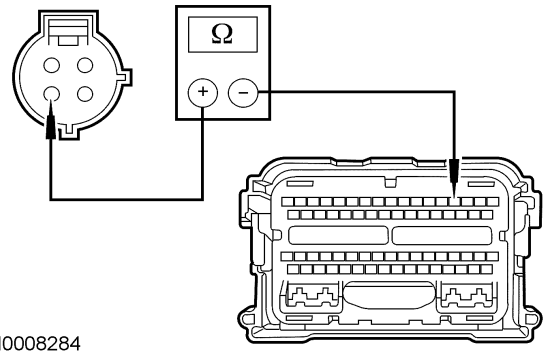
PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
D4	**CHECK CIRCUIT 1397 (GY/RD) FOR AN OPEN (Continued)**	
	• Measure the resistance between EMTC module C294a-3, circuit 1397 (GY/RD) and SJB C2280b-29, circuit 1397 (GY/RD).  A0081824 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new EMTC module. TEST the system for normal operation. **No** REPAIR circuit 1397 (GY/RD) for an open. TEST the system for normal operation.
D5	**CHECK THE ACCS PID WITH THE A/C ON**	
	• Enter the following diagnostic mode on the diagnostic tool: PCM ACCS PID. • Select PANEL mode and press the A/C button on the EMTC module. • **Does the PCM ACCS PID read ON?**	**Yes** GO to **D12**. **No** GO to **D6**.
D6	**CHECK THE ACCS PCM INPUT**	
	• Key in OFF position. • Disconnect: PCM C175e. • Key in ON position. • Measure the voltage between PCM C175e-4, circuit (4.0L) 420 (DB/YE) or (4.6L) 198 (DG/OG) and ground.  N0011289 • **Is the voltage greater than 10 volts?**	**Yes** For 4.0L, GO to **D7**. For 4.6L, INSTALL a new PCM module. TEST the system for normal operation. **No** GO to **D8**.
D7	**CHECK THE A/C PRESSURE PCM PID**	
	• Key in OFF position. • Connect: PCM C175e. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: A/C Pressure PCM PID. • With the manifold gauge set connected, compare the pressure readings of the manifold gauge set and the A/C pressure PID. • **Are the pressure values of the manifold gauge set and the A/C pressure PID similar?**	**Yes** INSTALL a new PCM. TEST the system for normal operation. **No** INSTALL a new A/C pressure transducer. TEST the system for normal operation.
D8	**CHECK THE A/C CYCLING SWITCH VOLTAGE**	
	• Key in OFF position. • Disconnect: A/C Cycling Switch C130. • Key in ON position.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

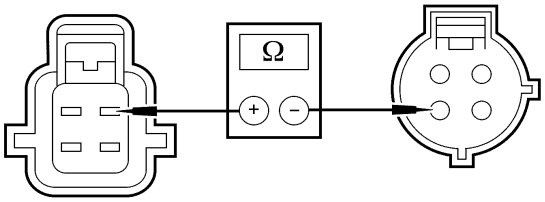
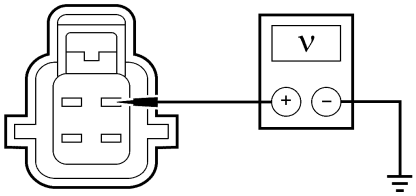
PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
D8	**CHECK THE A/C CYCLING SWITCH VOLTAGE (Continued)**	
• Measure the voltage between ground and A/C cycling switch C130-1, circuit (Coupe) 391 (RD/YE) or (Convertible) 298 (VT/OG).  A0013801 • **Is the voltage greater than 10 volts?**		**Yes** GO to **D9**. **No** REPAIR circuit 391 (RD/YE) for an open. TEST the system for normal operation.
D9	**CHECK CIRCUIT 420 (DB/YE) FOR AN OPEN**	
• Key in OFF position. • Disconnect: PCM C175e (4.0L only). • Disconnect: Dual Function Pressure Switch C1078 (4.6L only). • **NOTE:** 4.0L only. Measure the resistance between A/C cycling switch C130-4, circuit 420 (DB/YE) and PCM C175e-4, circuit 420 (DB/YE).  N0008284		

(Continued)

DIAGNOSIS AND TESTING (Continued)

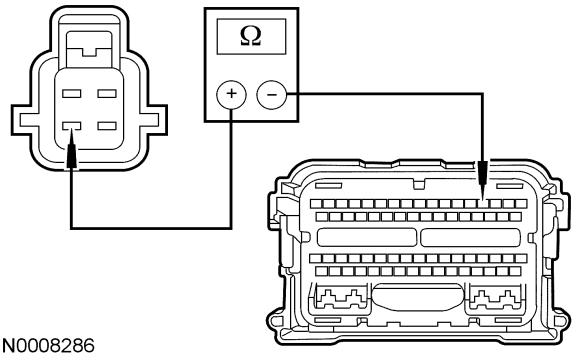
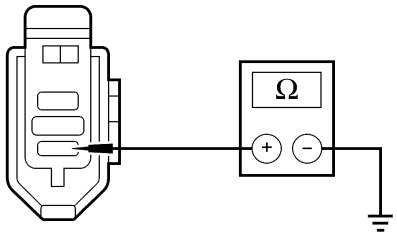
PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
D9	**CHECK CIRCUIT 420 (DB/YE) FOR AN OPEN (Continued)**	
	• **NOTE:** 4.6L only. Measure the resistance between A/C cycling switch C130-4, circuit 420 (DB/YE) and dual function pressure switch C1078-1, circuit 420 (DB/YE).  N0008285 • **Is the resistance less than 5 ohms?**	**Yes** For 4.0L, INSTALL a new A/C cycling switch. TEST the system for normal operation. For 4.6L, GO to **D10**. **No** REPAIR circuit 420 (DB/YE) for an open. TEST the system for normal operation.
D10	**CHECK VOLTAGE TO THE DUAL FUNCTION PRESSURE SWITCH**	
	• Key in OFF position. • Connect: A/C Cycling Switch C130. • Key in ON position. • Measure the voltage between dual function pressure switch C1078-1, circuit 420 (DB/YE) and ground.  A0042077 • **Is the voltage greater than 10 volts?**	**Yes** GO to **D11**. **No** INSTALL a new A/C cycling switch. TEST the system for normal operation.
D11	**CHECK CIRCUIT 198 (DG/OG) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: PCM C175e.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

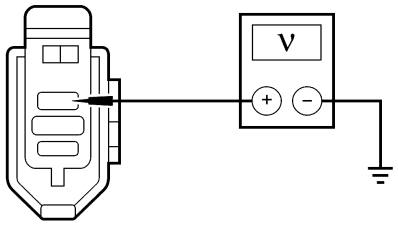
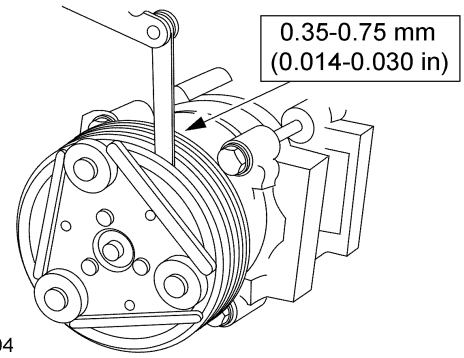
PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
D11	**CHECK CIRCUIT 198 (DG/OG) FOR AN OPEN (Continued)**	
	• Measure the resistance between dual function pressure switch C1078-4, circuit 198 (DG/OG) and PCM C175e-4, circuit 198 (DG/OG).  N0008286 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new dual function pressure switch. TEST the system for normal operation. **No** REPAIR circuit 198 (DG/OG) for an open. TEST the system for normal operation.
D12	**CHECK THE GROUND AT THE A/C COMPRESSOR CLUTCH FIELD COIL**	
	• Key in OFF position. • Disconnect: A/C Compressor Clutch Field Coil C100. • Measure the resistance between A/C compressor clutch field coil C100-1, circuit 1205 (BK) and ground.  A0013808 • **Is the resistance less than 5 ohms?**	**Yes** GO to **D13**. **No** REPAIR circuit 1205 (BK) for an open. TEST the system for normal operation.
D13	**CHECK THE VOLTAGE AT THE A/C COMPRESSOR CLUTCH FIELD COIL**	
	• Key in ON position. • Select PANEL mode and press the A/C button on the EMTC module.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

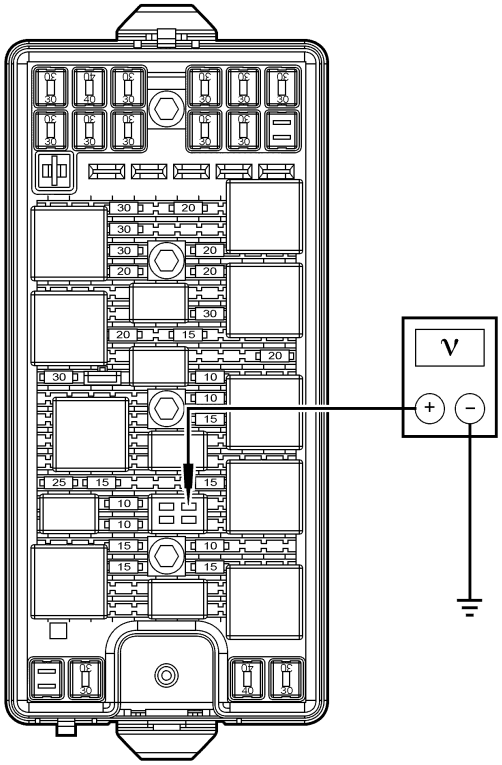
PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
D13	**CHECK THE VOLTAGE AT THE A/C COMPRESSOR CLUTCH FIELD COIL (Continued)**	
	• Measure the voltage between A/C compressor clutch field coil C100-2, circuit 883 (PK/LB) and ground.  A0013807 • **Is the voltage greater than 10 volts?**	**Yes** GO to **D14**. **No** GO to **D15**.
D14	**CHECK THE A/C COMPRESSOR CLUTCH AIR GAP**	
	• Measure the A/C compressor clutch air gap at 3 equally spaced locations between the clutch hub and the A/C compressor clutch pulley.  A0031504 • **Is the A/C compressor clutch air gap greater than 0.030 in (0.75 mm)?**	**Yes** ADJUST the A/C compressor clutch gap. REFER to Air Conditioning (A/C) Clutch Air Gap Adjustment in this section. TEST the system for normal operation. **No** INSTALL a new A/C compressor clutch field coil. TEST the system for normal operation.
D15	**CHECK VOLTAGE TO RELAY SWITCH**	
	• Key in OFF position. • Disconnect: A/C Clutch Relay. • Key in ON position.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

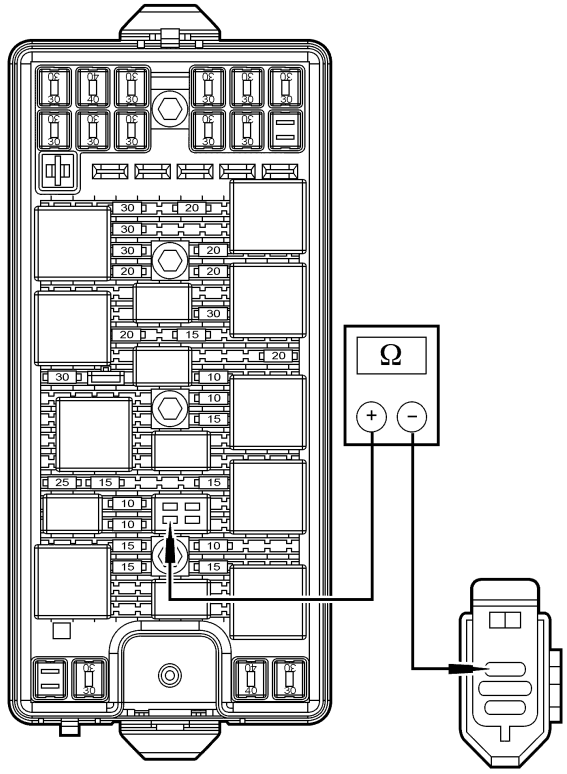
PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
D15	CHECK VOLTAGE TO RELAY SWITCH (Continued)	
• Measure the voltage between A/C control relay socket pin 30 and ground.  N0040282 • **Is the voltage greater than 10 volts?**		**Yes** GO to **D16**. **No** INSTALL a new bussed electrical center (BEC). TEST the system for normal operation.

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST D: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
D16	**CHECK CIRCUIT 883 (PK/LB)**	
	• Measure the resistance between A/C control relay socket pin 87, circuit 883 (PK/LB) and A/C compressor clutch field coil C100-2, circuit 883 (PK/LB).  N0040283 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new A/C control relay. TEST the system for normal operation. **No** REPAIR circuit 883 (PK/LB) for an open. TEST the system for normal operation.

Pinpoint Test E: The Air Conditioning (A/C) Is Always On

Normal Operation

Under normal operation, when A/C is requested, a ground signal is sent to the smart junction box (SJB) through circuit 1397 (GY/RD) then a message is sent from the SJB through the CAN bus to the PCM. Voltage is provided to the A/C cycling switch through circuit 391 (RD/YE). The PCM receives input from the A/C cycling switch through circuit 420 (DB/YE) and (4.6L only) through the dual function pressure switch to circuit 198 (DG/OG).

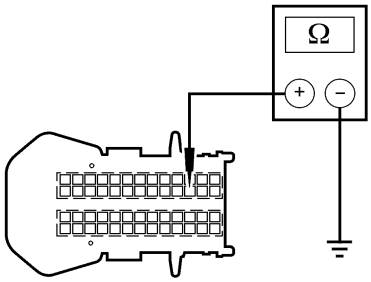
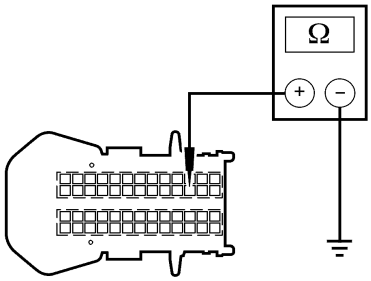
The PCM provides a ground for the A/C clutch relay coil through circuit 321 (GY/WH). When the relay is activated, ignition voltage is supplied to the A/C clutch solenoid through circuit 883 (PK/LB). Ground is supplied for the A/C clutch through circuit 1205 (BK).

Possible Causes

- A short to voltage in circuit 883 (PK/LB), 198 (DG/OG) or 420 (DB/YE)
- A short to ground in circuit 1397 (GY/RD)
- PCM
- Smart junction box (SJB)
- EMTC module
- A/C cycling switch
- A/C control relay
- A/C clutch air gap

DIAGNOSIS AND TESTING (Continued)

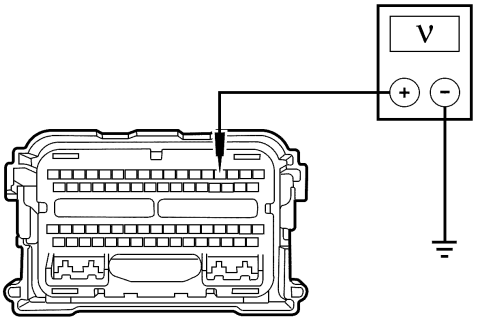
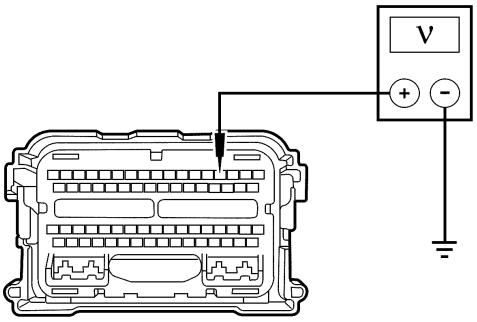
PINPOINT TEST E: THE AIR CONDITIONING (A/C) IS ALWAYS ON

Test Step		Result / Action to Take
E1	**CHECK THE A/C SWITCH PID WITH THE A/C OFF**	
	• Enter the following diagnostic mode on the diagnostic tool: PCM A/C Switch PID. • **Does the PCM A/C switch PID read ON?**	**Yes** GO to **E2**. **No** GO to **E4**.
E2	**CHECK THE EMTC A/C SIGNAL WITH THE A/C OFF**	
	• Key in OFF position. • Disconnect: Smart Junction Box (SJB) C2280e. • Key in ON position. • Select the OFF position on the EMTC module. • Measure the resistance between SJB C2280e-29, circuit 1397 (GY/RD) and ground.  A0081866 • **Is the resistance less than 5 ohms?**	**Yes** GO to **E3**. **No** INSTALL a new SJB. TEST the system for normal operation.
E3	**CHECK CIRCUIT 1397 (GY/RD) FOR A SHORT TO GROUND**	
	• Key in OFF position. • Disconnect: EMTC Module C294a. • Measure the resistance between SJB C2280e-29, circuit 1397 (GY/RD) and ground.  A0081866 • **Is the resistance greater than 10,000 ohms?**	**Yes** INSTALL a new EMTC module. TEST the system for normal operation. **No** REPAIR circuit 1397 (GY/RD) for a short to ground. TEST the system for normal operation.
E4	**CHECK THE ACCS PID WITH THE A/C OFF**	
	• Select the OFF position on the EMTC module. • Enter the following diagnostic mode on the diagnostic tool: PCM ACCS PID. • **Does the PCM ACCS PID read ON?**	**Yes** GO to **E5**. **No** GO to **E9**.
E5	**CHECK THE A/C CYCLING SWITCH**	
	• Key in OFF position. • Disconnect: A/C Cycling Switch C130. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: PCM ACCS PID. • **Does the PCM ACCS PID read ON?**	**Yes** For 4.0L, GO to **E6**. For 4.6L, GO to **E7**. **No** INSTALL a new A/C cycling switch. TEST the system for normal operation.

(Continued)

DIAGNOSIS AND TESTING (Continued)

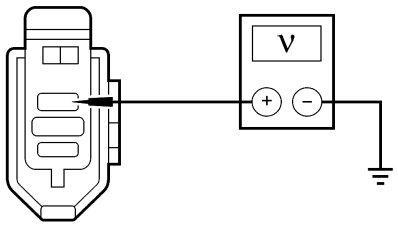
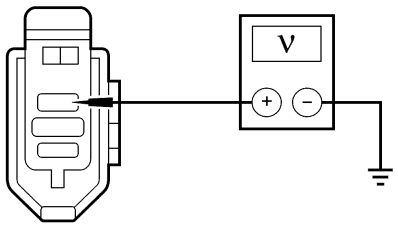
PINPOINT TEST E: THE AIR CONDITIONING (A/C) IS ALWAYS ON (Continued)

Test Step		Result / Action to Take
E6	**CHECK CIRCUIT 420 (DB/YE) FOR A SHORT TO VOLTAGE**	
	• Key in OFF position. • Disconnect: PCM C175e. • Key in ON position. • Measure the voltage between PCM C175e-4, circuit 420 (DB/YE) and ground.  N0011289 • **Is voltage present?**	**Yes** INSTALL a new PCM module. TEST the system for normal operation. **No** REPAIR circuit 420 (DB/YE) for a short to voltage. TEST the system for normal operation.
E7	**CHECK THE DUAL FUNCTION SWITCH**	
	• Key in OFF position. • Disconnect: Dual Function Pressure Switch C1078. • Key in ON position. • Enter the following diagnostic mode on the diagnostic tool: PCM ACCS PID. • **Does the PCM ACCS PID read ON?**	**Yes** GO to **E8**. **No** REPAIR circuit 420 (DB/YE) for a short to voltage. TEST the system for normal operation.
E8	**CHECK CIRCUIT 198 (DG/OG) FOR A SHORT TO VOLTAGE**	
	• Key in OFF position. • Disconnect: PCM C175e. • Key in ON position. • Measure the voltage between PCM C175e-4, circuit 198 (DG/OG) and ground.  N0011289 • **Is voltage present?**	**Yes** INSTALL a new PCM module. TEST the system for normal operation. **No** REPAIR circuit 198 (DG/OG) for a short to voltage. TEST the system for normal operation.
E9	**CHECK FOR VOLTAGE TO THE A/C COMPRESSOR CLUTCH FIELD COIL**	
	• Key in OFF position. • Disconnect: A/C Compressor Clutch Field Coil C100. • Key in ON position. • Select the OFF position on the EMTC module.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST E: THE AIR CONDITIONING (A/C) IS ALWAYS ON (Continued)

Test Step		Result / Action to Take
E9	**CHECK FOR VOLTAGE TO THE A/C COMPRESSOR CLUTCH FIELD COIL (Continued)**	
	• Measure the voltage between A/C compressor clutch field coil C100-2, circuit 883 (PK/LB) and ground.  A0013807 • **Is the voltage greater than 10 volts?**	**Yes** GO to **E10**. **No** ADJUST the A/C compressor clutch gap. REFER to Air Conditioning (A/C) Clutch Air Gap Adjustment in this section. TEST the system for normal operation.
E10	**CHECK CIRCUIT 883 (PK/LB) FOR A SHORT TO VOLTAGE**	
	• Key in OFF position. • Disconnect: A/C Control Relay. • Key in ON position. • Measure the voltage between A/C compressor clutch field coil C100-2, circuit 883 (PK/LB) and ground.  A0013807 • **Is voltage present?**	**Yes** REPAIR circuit 883 (PK/LB) for a short to voltage. TEST the system for normal operation. **No** INSTALL a new A/C clutch relay. Check the A/C clutch diode. INSTALL a new diode if necessary. TEST the system for normal operation.

Pinpoint Test F: The Blower Motor Is Inoperative

Normal Operation

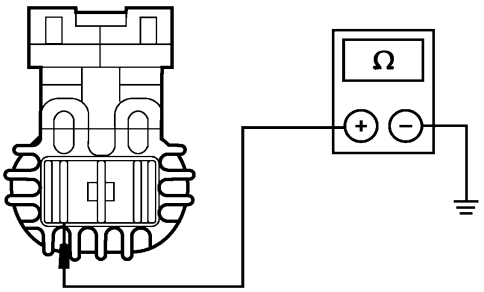
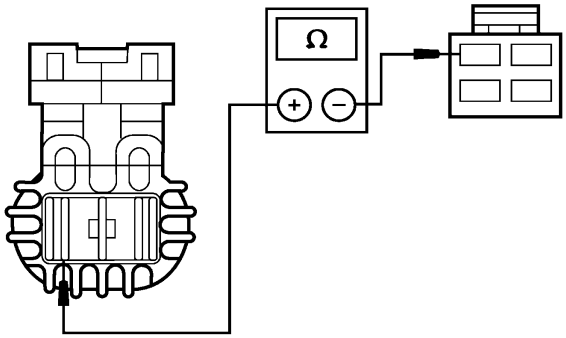
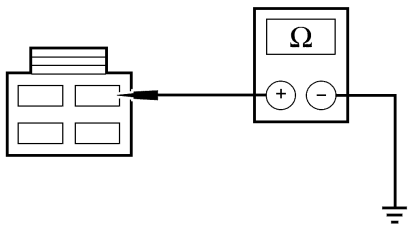
Under normal operation, the blower motor relay coil receives ignition voltage. The coil receives ground from the EMTC module through circuit 364 (BK/LG) if any position but OFF is selected. Voltage is supplied to the relay switch contact. When the relay coil is energized, voltage is delivered to the blower motor through circuit 371 (PK/WH). Ground for the blower motor is provided through circuit 261 (DG/BK) from the blower resistor or the blower switch (HI). The blower resistor and blower switch is grounded through circuit 1205 (BK).

Possible Causes

- An open in circuit 261 (DG/BK), 1205 (BK), 371 (PK/WH), 364 (BK/LG) or the relay coil and switch supply voltage circuit
- Blower motor
- Blower motor relay
- EMTC module

DIAGNOSIS AND TESTING (Continued)

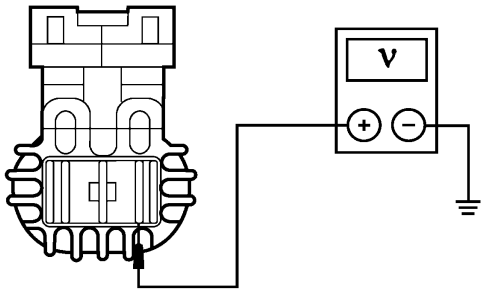
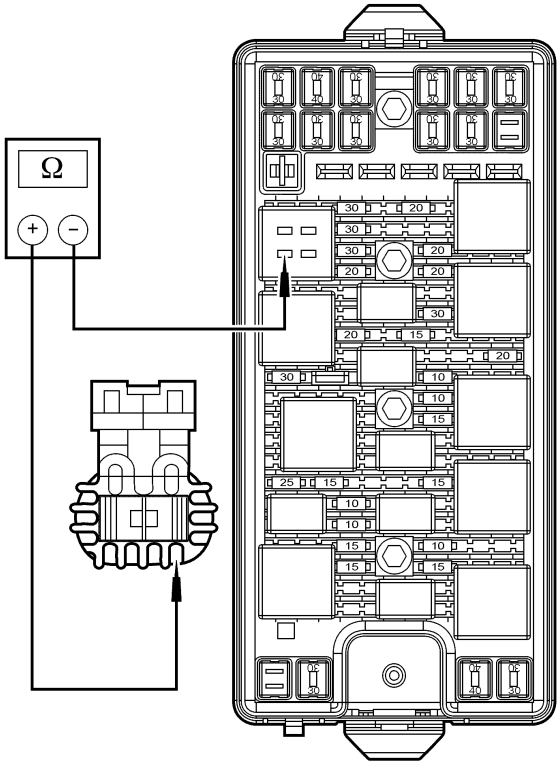
PINPOINT TEST F: THE BLOWER MOTOR IS INOPERATIVE

Test Step		Result / Action to Take
F1	**CHECK CIRCUIT 261 (DG/BK) FOR GROUND**	
	• Disconnect: Blower Motor C2066. • Turn the function selector switch to the PANEL position. • Turn the blower motor switch to the HIGH position. • Measure the resistance between A/C blower motor connector C2066-2, circuit 261 (DG/BK) and ground.  AM0420-A • **Is the resistance less than 5 ohms?**	**Yes** GO to **F4**. **No** GO to **F2**.
F2	**CHECK CIRCUIT 261 (DG/BK) FOR AN OPEN**	
	• Disconnect: Blower Motor Switch C294b. • Measure the resistance between blower motor switch C294b-2, circuit 261 (DG/BK) and blower motor C2066-2, circuit 261 (DG/BK).  AM0415-A • **Is the resistance less than 5 ohms?**	**Yes** GO to **F3**. **No** REPAIR circuit 261 (DG/BK) for an open. TEST the system for normal operation.
F3	**CHECK CIRCUIT 1205 (BK) FOR AN OPEN**	
	• Measure the resistance between blower motor switch C294b-1, circuit 1205 (BK) and ground.  A0040182 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new blower motor switch. TEST the system for normal operation. **No** REPAIR circuit 1205 (BK) for an open. TEST the system for normal operation.

(Continued)

DIAGNOSIS AND TESTING (Continued)

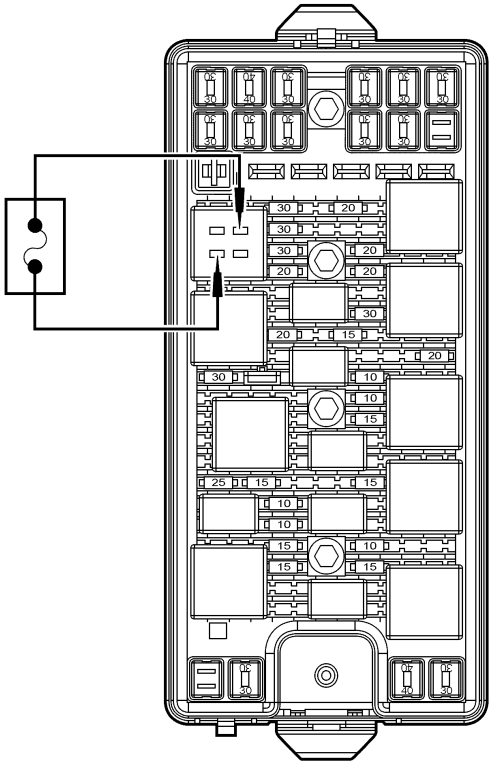
PINPOINT TEST F: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F4	**CHECK A/C BLOWER MOTOR CIRCUIT 371 (PK/WH) FOR VOLTAGE**	
	• Key in ON position. • Measure the voltage between A/C blower motor connector C2066-1, circuit 371 (PK/WH) and ground.  AM0416-A • **Is the voltage greater than 10 volts?**	**Yes** INSTALL a new blower motor. TEST the system for normal operation. **No** GO to **F5**.
F5	**CHECK CIRCUIT 371 (PK/WH) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: Blower Motor Relay. • Measure the resistance between blower motor relay connector pin 30, circuit 371 (PK/WH) and blower motor C2066-1, circuit 371 (PK/WH).  N0040284 • **Is the resistance less than 5 ohms?**	**Yes** GO to **F6**. **No** REPAIR circuit 371 (PK/WH) for an open. TEST the system for normal operation.
F6	**CHECK THE BLOWER MOTOR RELAY**	
	• Connect: Blower Motor C2066.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

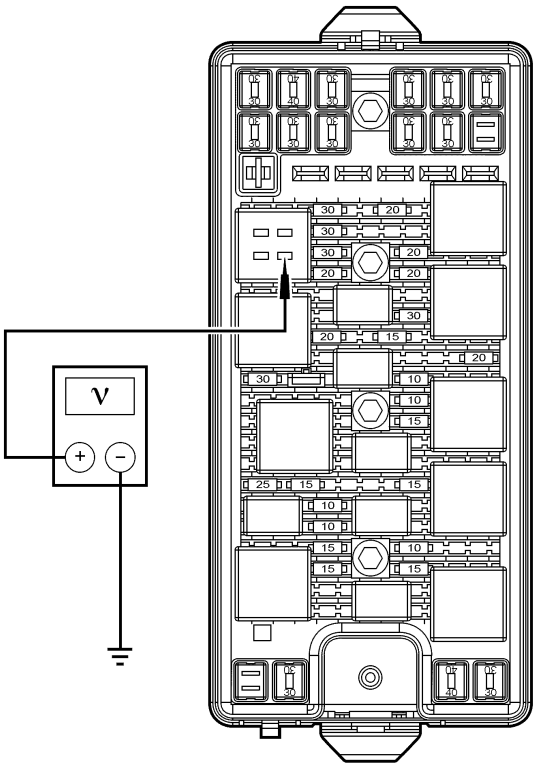
PINPOINT TEST F: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F6	CHECK THE BLOWER MOTOR RELAY (Continued)	
	• Key in ON position. • Connect a fused jumper lead between blower motor relay socket pin 87 and pin 30, circuit 371 (PK/WH).  N0040285 • **Does the blower motor operate?**	**Yes** GO to **F7**. **No** REPAIR the relay power circuit. TEST the system for normal operation.
F7	CHECK THE RELAY COIL SUPPLY VOLTAGE	
	• Key in OFF position.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

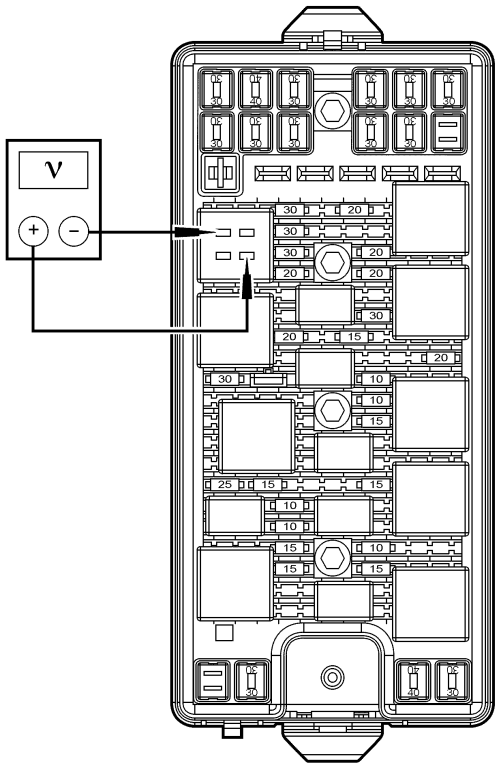
PINPOINT TEST F: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F7	CHECK THE RELAY COIL SUPPLY VOLTAGE (Continued)	
	• Measure the voltage between blower motor relay socket pin 86, circuit 1322 (BN/WH) and ground.  N0040286 • **Is the voltage greater than 10 volts?**	**Yes** GO to **F8**. **No** REPAIR circuit 1322 (BN/WH) for an open. TEST the system for normal operation.
F8	CHECK THE BLOWER MOTOR RELAY	
	• Key in ON position.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

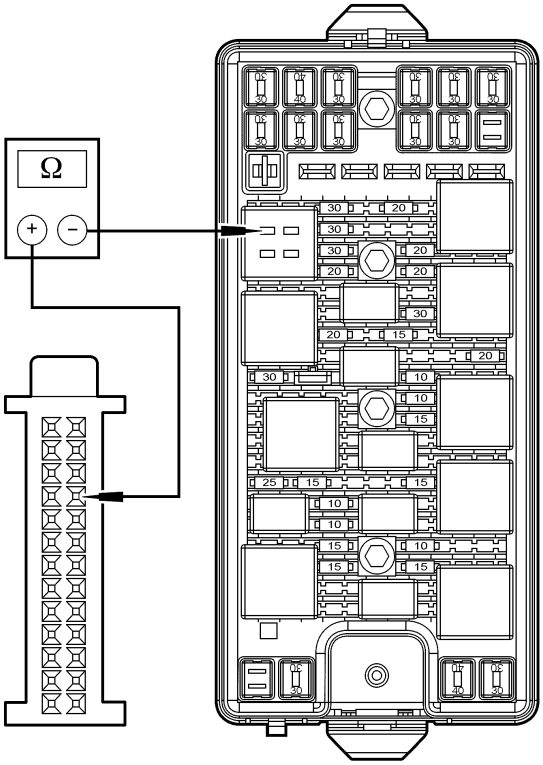
PINPOINT TEST F: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F8	**CHECK THE BLOWER MOTOR RELAY (Continued)**	
	• Measure the voltage between blower motor relay socket pin 85, circuit 364 (BK/LG) and socket pin 86, circuit 1322 (BN/WH).  N0040287 • **Is the voltage greater than 10 volts?**	**Yes** INSTALL a new blower motor relay. TEST the system for normal operation. **No** GO to **F9**.
F9	**CHECK CIRCUIT 364 (BK/LG) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: EMTC module C294a.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST F: THE BLOWER MOTOR IS INOPERATIVE (Continued)

Test Step		Result / Action to Take
F9	CHECK CIRCUIT 364 (BK/LG) FOR AN OPEN (Continued)	
• Measure the resistance between blower motor relay connector pin 85, circuit 364 (BK/LG) and EMTC module C294a-23, circuit 364 (BK/LG).  N0040288 • **Is the resistance less than 5 ohms?**		**Yes** INSTALL a new EMTC module. TEST the system for normal operation. **No** REPAIR circuit 364 (BK/LG) for an open. TEST the system for normal operation.

Pinpoint Test G: The Blower motor Does Not Operate Correctly

Normal Operation

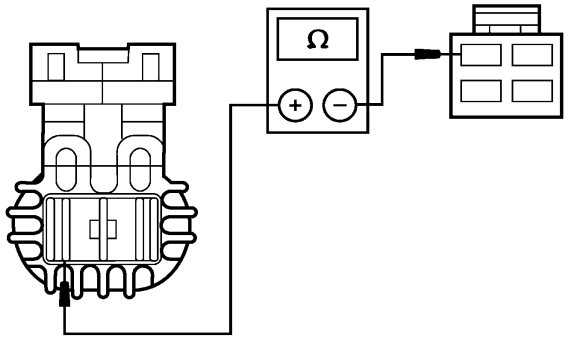
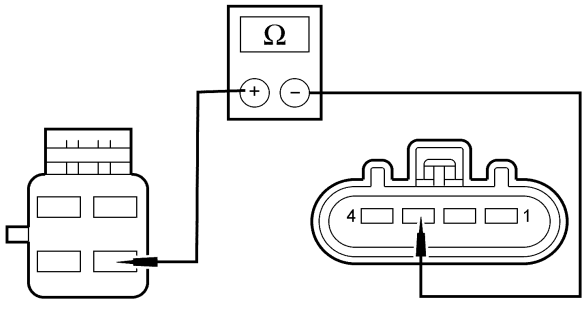
Under normal operation, the blower motor is provided a ground from the blower resistor through circuit 261 (DG/BK). The resistor gets a ground from circuit 1205 (BK) in the lowest blower setting. In MED-LO and MED-HI the resistor gets a ground through circuit 754 (LG/WH) or 752 (YE/RD), depending on selected speed. In HI, the blower motor is grounded directly through the blower switch from circuit 261 (DG/BK) to circuit 1205 (BK). The blower switch receives its ground from circuit 1205 (BK).

Possible Causes

- An open in circuit 1205 (BK), 261 (DG/BK), 754 (LG/WH) or 752 (YE/RD)
- A short to ground in circuit 261 (DG/BK), 754 (LG/WH) or 752 (YE/RD)
- A short together circuits 261 (DG/BK), 754 (LG/WH) or 752 (YE/RD)
- Blower motor resistor
- Blower motor switch

DIAGNOSIS AND TESTING (Continued)

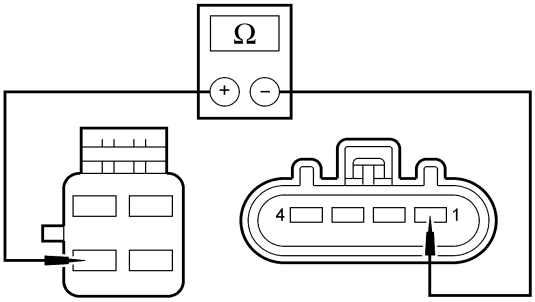
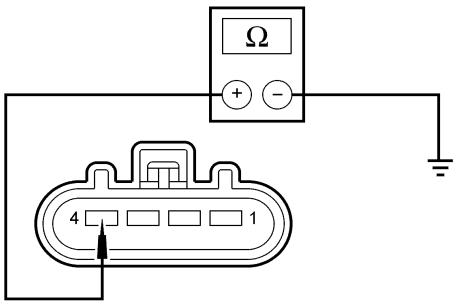
PINPOINT TEST G: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY

Test Step		Result / Action to Take
G1	**CHECK THE BLOWER MOTOR OPERATION**	
	• Key in ON position. • Turn the function selector switch to the FLOOR position. • Select all blower speed positions. • **Does the blower motor operate in any position?**	**Yes** If the blower motor does not operate in HI, GO to **G2**. If the blower motor does not operate in MED-HI, GO to **G3**. If the blower motor does not operate in MED-LO, GO to **G4**. If the blower motor does not operate in LO, GO to **G5**. For all other symptoms, GO to **G9**. **No** GO to Pinpoint Test F.
G2	**CHECK CIRCUIT 261 (DG/BK) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: Blower Motor Switch C294b. • Disconnect: Blower Motor C2066. • Measure the resistance between blower motor switch C294b-2, circuit 261 (DG/BK) and blower motor C2066-2, circuit 261 (DG/BK).  AM0415-A • **Is the resistance less than 5 ohms?**	**Yes** GO to **G6**. **No** REPAIR circuit 261 (DG/BK) for an open. TEST the system for normal operation.
G3	**CHECK CIRCUIT 754 (LG/WH) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: Blower Motor Switch C294b. • Disconnect: Blower Motor Resistor C2185. • Measure the resistance between blower motor switch C294b-3, circuit 754 (LG/WH) and blower motor resistor C2185-3, circuit 754 (LG/WH).  A0071487 • **Is the resistance less than 5 ohms?**	**Yes** GO to **G6**. **No** REPAIR circuit 754 (LG/WH) for an open. TEST the system for normal operation.
G4	**CHECK CIRCUIT 752 (YE/RD) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: Blower Motor Switch C294b.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

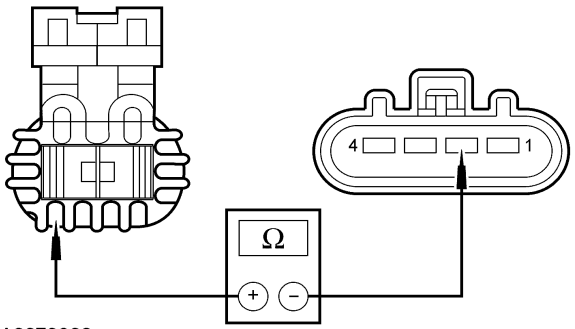
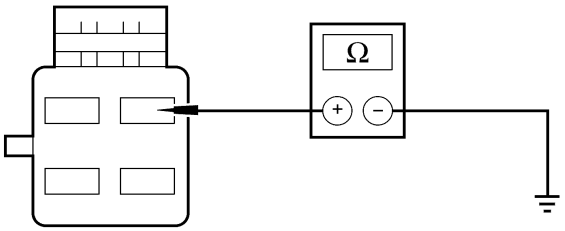
PINPOINT TEST G: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
G4	**CHECK CIRCUIT 752 (YE/RD) FOR AN OPEN (Continued)**	
	• Disconnect: Blower Motor Resistor C2185. • Measure the resistance between blower motor switch C294b-4, circuit 752 (YE/RD) and blower motor resistor C2185-1, circuit 752 (YE/RD).  A0071488 • **Is the resistance less than 5 ohms?**	**Yes** GO to **G6**. **No** REPAIR circuit 752 (YE/RD) for an open. TEST the system for normal operation.
G5	**CHECK BLOWER MOTOR RESISTOR GROUND CIRCUIT 1205 (BK) FOR AN OPEN**	
	• Measure the resistance between blower motor resistor C2185-4, circuit 1205 (BK) and ground.  A0035320 • **Is the resistance less than 5 ohms?**	**Yes** GO to **G6**. **No** REPAIR circuit 1205 (BK) for an open. TEST the system for normal operation.
G6	**CHECK BLOWER MOTOR RESISTOR CIRCUIT 261 (DG/BK) FOR AN OPEN**	
	• Connect: Blower Motor C2066.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

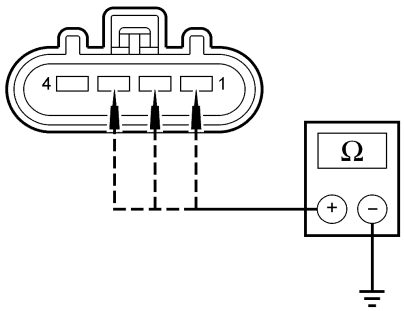
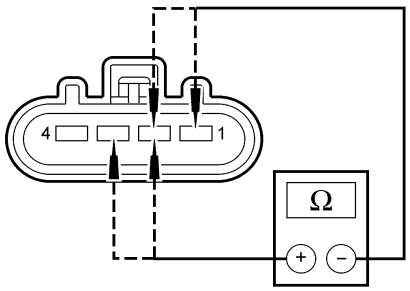
PINPOINT TEST G: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
G6	**CHECK BLOWER MOTOR RESISTOR CIRCUIT 261 (DG/BK) FOR AN OPEN (Continued)**	
	• Measure the resistance between blower motor resistor C2185-2, circuit 261 (DG/BK) and blower motor C2066-2, circuit 261 (DG/BK).  A0073902 • **Is the resistance less than 5 ohms?**	**Yes** GO to **G7**. **No** REPAIR circuit 261 (DG/BK) for an open. TEST the system for normal operation.
G7	**CHECK THE BLOWER MOTOR RESISTOR**	
	• Carry out the blower motor resistor component test in this section. • **Does the blower motor resistor test good?**	**Yes** GO to **G8**. **No** INSTALL a new blower motor resistor. TEST the system for normal operation.
G8	**CHECK BLOWER MOTOR SWITCH CIRCUIT 1205 (BK) FOR AN OPEN**	
	• Measure the resistance between blower motor switch C294b-1, circuit 1205 (BK) and ground.  A0020414 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new blower motor switch. TEST the system for normal operation. **No** REPAIR circuit 1205 (BK) for an open. TEST the system for normal operation.
G9	**CHECK CIRCUITS 261 (DG/BK), 752 (YE/RD) AND 754 (LG/WH) FOR A SHORT TO GROUND**	
	• Key in OFF position. • Disconnect: Blower Motor C2066. • Disconnect: Blower Motor Resistor C2185. • Place the blower switch in the lowest setting.	

(Continued)

DIAGNOSIS AND TESTING (Continued)

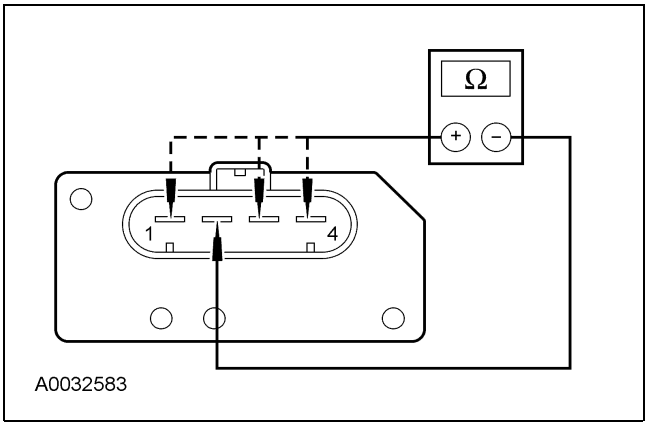
PINPOINT TEST G: THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
G9	**CHECK CIRCUITS 261 (DG/BK), 752 (YE/RD) AND 754 (LG/WH) FOR A SHORT TO GROUND (Continued)**	
	• Measure the resistance between ground and blower motor resistor C2185, circuit: — 752 (YE/RD) pin 1 — 261 (DG/BK) pin 2 — 754 (LG/WH) pin 3  A0051664 • **Are the resistances less than 5 ohms?**	**Yes** GO to **G10**. **No** REPAIR the affected circuit. TEST the system for normal operation.
G10	**CHECK THE BLOWER MOTOR CIRCUITS FOR SHORTS TOGETHER**	
	• Measure the resistance between blower motor resistor C2185: — pin 1, circuit 752 (YE/RD) and pin 2, circuit 261 (DG/BK). — pin 1, circuit 752 (YE/RD) and pin 3, circuit 754 (LG/WH). — pin 2, circuit 261 (DG/BK) and pin 3, circuit 754 (LG/WH).  A0051665 • **Are the resistances greater than 10,000 ohms?**	**Yes** INSTALL a new blower motor switch. TEST the system for normal operation. **No** REPAIR the affected circuits. TEST the system for normal operation.

DIAGNOSIS AND TESTING (Continued)

Component Tests

Blower Motor Resistor



Blower Motor Resistor Pins	Resistance
4 and 2	2.0-2.6 ohms
2 and 3	0.2-0.4 ohms
2 and 1	0.8-1.1 ohms

Heater Core

⚠ WARNING: Carbon monoxide is colorless, odorless and dangerous. If it is necessary to operate the engine with the vehicle in a closed area such as a garage, always use an exhaust collector to vent the exhaust gases outside the closed area.

1. **NOTE:** Testing of returned heater cores reveals that a large percentage of heater cores were good and did not require replacement. If a heater core leak is suspected, the heater core must be tested by carrying out the plugged heater core component test before the heater core pressure test. Carry out a system inspection by checking the heater system thoroughly as follows:

   Inspect for evidence of coolant leakage at the heater water hose to heater core attachments. A coolant leak in the heater water hose could follow the heater core tube to the heater core and appear as a leak in the heater core.

2. **NOTE:** Spring-type clamps are installed as original equipment. Installation and overtightening of non-specification clamps can cause leakage at the heater water hose connection and damage the heater core.

   Check the integrity of the heater water hose clamps.

Heater Core—Plugged

⚠ WARNING: The heater core inlet hose will become too hot to handle if the system is working correctly.

1. Check to see that the engine coolant is at the correct level.
2. Start the engine and turn on the heater.
3. When the engine coolant reaches operating temperature, feel the heater core inlet and outlet hose to see if they are hot.

If the inlet hose is not hot:

- the thermostat is not working correctly.

If the outlet hose is not hot:

- the heater core may have an air pocket.
- the heater core may be restricted or plugged.

Heater Core — Pressure Test

Use the Radiator/Heater Core Pressure Tester to carry out the pressure test.

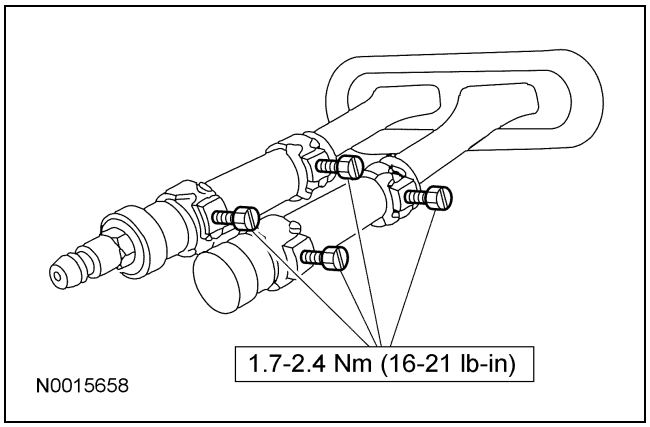
1. **NOTE:** Due to space limitations, a bench test may be necessary for pressure testing.

   Clamp off the heater hoses.

2. Disconnect the heater water hoses from the heater core.
3. Install a short piece of heater water hose, approximately 101 mm (4 inches) long on each heater core tube.

DIAGNOSIS AND TESTING (Continued)

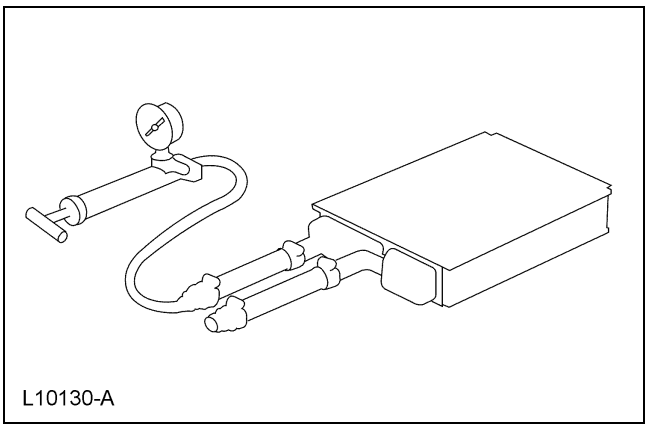
4. Fill the heater core and heater water hoses with water and install Plug BT-7422-B and Adapter BT-7422-A from the Radiator/Heater Core Pressure Tester in the heater water hose ends. Secure the heater water hoses, plug and adapter with hose clamps.



5. Attach the pump and gauge assembly from the Radiator/Heater Core Pressure Tester to the adapter.
6. Close the bleed valve at the base of the gauge. Pump 138 kPa (20 psi) of air pressure into the heater core.
7. Observe the pressure gauge for a minimum of 3 minutes.
8. If the pressure drops, check the heater water hose connections to the core tubes for leaks. If the heater water hoses do not leak, remove the heater core from the vehicle and carry out the bench test.

Heater Core — Bench Test

1. Remove the heater core from the vehicle. For additional information, refer to Section 412-02.
2. Drain all of the coolant from the heater core.
3. Connect the 101-mm (4-inch) test heater water hoses with plug and adapter to the core tubes. Then connect the Radiator/Heater Core Pressure Tester to the adapter.
4. Apply 138 kPa (20 psi) of air pressure to the heater core. Submerge the heater core in water.
5. If a leak is observed, install a new heater core.



A/C Evaporator/Condenser Core — On Vehicle Leak Test

1. Recover the refrigerant. For additional information, refer to Air Conditioning (A/C) System Recovery, Evacuation and Charging in this section.
2. **NOTE:** DO NOT leak test an A/C evaporator core with the suction accumulator/drier attached to the core tubes.

   Disconnect the suspect A/C evaporator core or A/C condenser core from the A/C system. For additional information, refer to Section 412-03.
3. Clean the spring lock couplings. For additional information, refer to Spring Lock Coupling in this section.
4. Connect the appropriate test fittings from the R-12/R-134a Air Conditioning Test Fitting Set to the evaporator or condenser tube connections.
5. **NOTE:** The automatic shut-off valves on some gauge set hoses do not open when connected to the test fittings. If available, use hoses without shut-off valves. If hoses with shut-off valves are used, make sure the valve opens when attached to the test fittings or install an adapter which will activate the valve. The test is not valid if the shut-off valve does not open.

   Connect the red and blue hoses from the R-134a Manifold Gauge Set to the test fittings on the A/C evaporator core or A/C condenser core. Connect the yellow hose to a known good vacuum pump.

DIAGNOSIS AND TESTING (Continued)

6. Open both gauge set valves and start the vacuum pump. Allow the vacuum pump to operate for a minimum of 45 minutes after the gauge set low pressure gauge indicates 101 kPa (30 in-Hg). The 45 minute evacuation is necessary to remove any refrigerant from oil left in the A/C evaporator core or A/C condenser core. If the refrigerant is not completely removed from the oil, outgassing will degrade the vacuum and appear as a refrigerant leak.
7. If the low pressure gauge reading will not drop to 101 kPa (30 in-Hg) when the valves on the gauge and manifold set are open and the vacuum pump is operating, close the gauge set valves and observe the low pressure gauge. If the pressure rises rapidly to zero, a large leak is indicated. Recheck the test fitting connections and gauge set connections before installing a new A/C evaporator core or A/C condenser core.
8. After evacuating for 45 minutes, close the gauge set valves and stop the vacuum pump. Observe the low pressure gauge; it should remain at the 101 kPa (30 in-Hg) mark.
   - If the low pressure gauge reading rises 34 or more kPa (10 or more in-Hg) of vacuum from the 101 kPa (30 in-Hg) position in 10 minutes, a leak is indicated.
   - If a very small leak is suspected, wait 30 minutes and observe the vacuum gauge.
   - If a small amount of vacuum is lost, operate the vacuum pump with gauge valves open for an additional 30 minutes to remove any remaining refrigerant from the oil in the A/C evaporator core or A/C condenser core. Then recheck for loss of vacuum.
   - If a very small leak is suspected, allow the system to set overnight with vacuum applied and check for vacuum loss.
9. If the A/C evaporator core or A/C condenser core does leak, as verified by the above procedure, install a new A/C evaporator core or A/C condenser core. For additional information, refer to Section 412-03.

A/C Compressor — External Leak Test

1. Install the A/C Pressure Test Adapter on the rear head of the A/C compressor, using the existing manifold retaining bolt.
2. Connect the high and low pressure lines of a manifold gauge set or a refrigerant recovery/recycling station such as the R-134a A/C Service Center to the corresponding fittings on the A/C Pressure Test Adapter.
3. Attach the center hose of the manifold gauge set to a refrigerant container standing in an upright position.
4. Hand-rotate the compressor shaft 10 complete revolutions to distribute the oil inside the A/C compressor.
5. Open the low pressure gauge valve, the high pressure gauge valve and the valve on the refrigerant container to allow the refrigerant vapor to flow into the A/C compressor.
6. Using the Automatic Calibration Halogen Leak Detector, check the entire A/C compressor for leaks.
7. If an external leak is found, install a new A/C compressor. For additional information, refer to Section 412-03.
8. When the leak test is complete, recover the refrigerant from the compressor.