





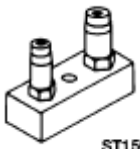

SECTION 412-00: Climate Control System — General Information
DIAGNOSIS AND TESTING




1998 Mark VIII Workshop Manual

Climate Control

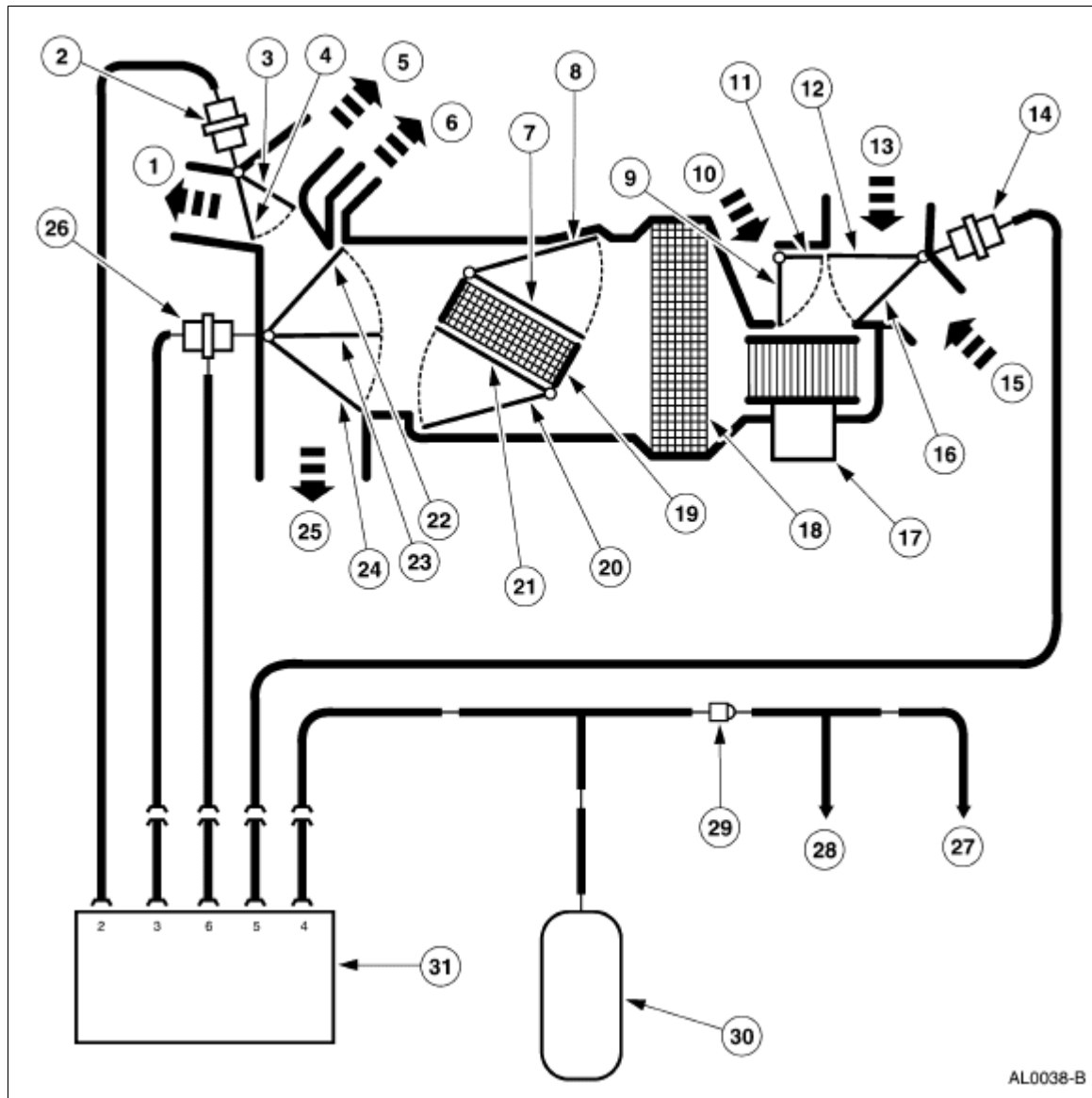
Refer to Wiring Diagrams Cell [55](#), Electronic Automatic Temperature Control (EATC) for schematic and connector information.

Special Tool(s)

 <p>ST1137-A</p>	<p>Rotunda 73 Digital Multimeter 105-R0051 or equivalent</p>
 <p>ST1217-A</p>	<p>New Generation Star (NGS) Tester 418-F048 (007-00500) or equivalent</p>
 <p>ST1928-A</p>	<p>R-134a Manifold Gauge Set 176-R032A or equivalent</p>
 <p>ST1176-A</p>	<p>Vacuum Pump 416-D002 (D95L-7559-A) or equivalent</p>
 <p>ST1501-A</p>	<p>A/C Pressure Test Adapter 412-093 (T94P-19623-E)</p>
 <p>ST1252-A</p>	<p>R-12/R-134a Air Conditioning Test Fitting Set 412-DS028 (014-00333) or equivalent</p>
	<p>Automatic Calibration Halogen Leak Detector 023-R1003 or equivalent</p>

 <p>ST1245-A</p>	
 <p>ST1474-A</p>	<p>Radiator/Heater Core Pressure Tester 014-R1072 or equivalent</p>
 <p>ST1179-A</p>	<p>Alternator, Regulator, Battery and Starter Tester (ARBST) 010-00725 or equivalent</p>

Vacuum Schematic—Electronic Automatic Temperature Control

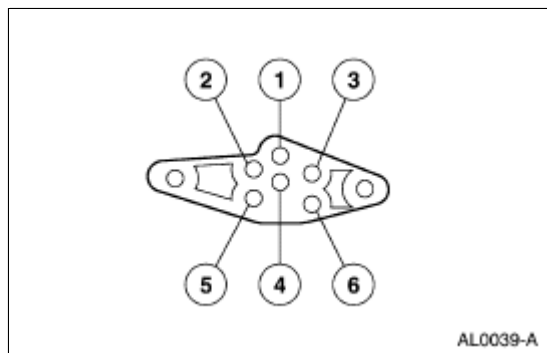


AL0038-B

Item	Part Number	Description
1	—	Panel Vent Air Flow
2	(Windshield Defroster Door)18A318	Vacuum Control Motor
3	—	Windshield Defroster Door (Full Vacuum Position)
4	—	Windshield Defroster Door (No Vacuum Position)
5	—	Defrost Air Flow
6	—	Side Window Demister Air Flow
7	—	Primary Air Temperature Control Door (Full Cool Position)
8	—	Primary Air Temperature Control Door (Full Hot Position)
9	—	Secondary Air Inlet Duct Door (No

		Vacuum Position)
10	—	Recirc Air Inlet
11	—	Secondary Air Inlet Duct Door (Full Vacuum Position)
12	—	Primary Air Inlet Duct Door (Full Vacuum Position)
13	—	Outside Air Inlet
14	18A318	Vacuum Control Motor— (Air Inlet Duct Doors)
15	—	Recirc Air Inlet
16	—	Primary Air Inlet Duct Door (No Vacuum Position)
17	18527	Blower Motor
18	19860	A/C Evaporator Core
19	18476	Heater Core
20	—	Secondary Air Temperature Control Door (Full Hot Position)
21	—	Secondary Air Temperature Control Door (Full Cool Position)
22	—	Heater Air Damper Door (Full Vacuum Position)
23	—	Heater Air Damper Door (Partial Vacuum Position)
24	—	Heater Air Damper Door (No Vacuum Position)
25	—	Floor Airflow
26	18A318	Vacuum Control Motor— (Heater Air Damper Door)
27	—	To Engine Intake Manifold
28	—	To Emission Control
29	19A563	A/C Vacuum Check Valve
30	19A566	A/C Vacuum Reservoir Tank and Bracket
31	19980	Electronic Automatic Temperature Control Module

Vacuum Connector End View — Electronic Automatic Temperature Control



Port Number	Circuit	Circuit Function
1	—	Not Used
2	Yellow	Windshield Defroster Door
3	Blue	Heater Air Damper Door
4	Black	Source Vacuum
5	White	A/C Air Inlet Duct Door
6	Red	Heater Air Damper Door

VACUUM APPLICATION CHART — ELECTRONIC AUTOMATIC TEMPERATURE CONTROL

Vacuum Harness Hose Color	Function	Manual Override Selector Buttons						
		OFF	MAX A/C	VENT	PNL & FLR	FLOOR	FLR & DEF	DEFROST
White	Outside-Recirc	V	V	NV	NV	NV	NV	NV
Red	Full Floor	NV	NV	NV	NV	V	NV	NV
Blue	Floor-Panel (Partial)	NV	NV	NV	V	V	V	NV
Yellow	Panel-Defrost	NV	V	V	V	NV	NV	NV
Black	Source	V	V	V	V	V	V	V

V = vacuum

NV = no vacuum

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
<ul style="list-style-type: none"> ● Loose, missing or damaged A/C compressor drive belt. ● Loose or disconnected A/C clutch. ● Loose, misrouted or damaged vacuum lines ^a. ● Broken or leaking vacuum control motor. ● Broken or leaking refrigerant lines. ● Obstructed in-car temperature sensor. 	<ul style="list-style-type: none"> ● Open fuses. ● Blower motor inoperative. ● A/C compressor inoperative. ● Cooling fan inoperative. ● Circuitry open/shorted. ● Disconnected electrical connectors.

^a A leak in the vacuum control circuit will send all airflow to the defroster outlets. This condition may occur during acceleration (slow leak), may exist at all times (large leak), and may exist only when specific functions are selected (indicating a leak in that portion of the circuit). The vacuum hoses used in the passenger compartment control circuit are constructed from PVC plastic material. The vacuum hoses used in the engine compartment are constructed of Hytrel®. Because of the materials used, never pinch the vacuum hoses off during diagnosis to locate a leak. A wood golf tee can be used as a plug when it is necessary to plug one end of the vacuum hose for leak test purposes.

3. If the inspection reveals obvious concern(s) that can be readily identified, service as required.
4. If the concern remains after the inspection, connect the New Generation Star (NGS) Tester to the data link connector (DLC) located beneath the instrument panel to perform the DATA LINK DIAGNOSTICS test. If the NGS responds with NO RESPONSE/NOT EQUIPPED for the electronic automatic temperature control module, go to Pinpoint Test A. If the DATA LINK DIAGNOSTICS test is passed for the electronic automatic temperature control module, retrieve the continuous DTCs and execute the Self Test Diagnostics for the electronic automatic temperature control module to retrieve the current DTCs. This is the only way DTC's related to the ECT and vehicle speed can be retrieved.
5. If the self test is passed and no DTCs are retrieved, go to the Symptom Chart to continue diagnostics.
6. If DTCs are retrieved, go to the Electronic Automatic Temperature Control (EATC) Module Diagnostic Trouble Code (DTC) Index to continue diagnostics.
7. If the electronic automatic temperature control module cannot be accessed by the NGS, go to Pinpoint Test A.

Electronic Automatic Temperature Control Module Self-Test

- The EATC module self-test will not detect concerns associated with data link messages like engine coolant temperature or vehicle speed signals. A NGS tester must be used to retrieve these concerns.
- The EATC module self-test will detect concerns in the system control functions and will display hard diagnostic trouble codes (DTC) in addition to intermittent diagnostic trouble codes for concerns that occur during system operation. The vehicle interior temperature should be between 4°-32°C (40-90° F) when performing the self-test. If the temperatures are not within the specified ranges, false in-car temperature sensor DTCs will be displayed.
- The self-test can be initiated at any time. Normal operation of the system stops when the self-test is activated.
- To enter the self-test, press the OFF and FLOOR buttons simultaneously and then press the AUTOMATIC button within two seconds. The display will show a pulse tracer going around the center of the display window. The test may run as long as 30 seconds. Record all DTCs displayed.
- If any DTCs appear during the self-test, follow the diagnostics procedure given under ACTION for each DTC given.
- If a condition exists but no DTCs appear during the self-test, refer to the Symptom Chart Condition: The EATC System Is Inoperative, Intermittent or Improper Operation.
- To exit self-test and retain all intermittent DTCs, push the blue (cooler) button. The control will exit self-test, retain all intermittent diagnostic trouble codes and then turn OFF (display blank).
- To exit self-test and clear all diagnostic trouble codes, press the DEFROST button. The vacuum

fluorescent display window will show 888 and all function symbols for one second. Then, the EATC control assembly will turn OFF (display blank) and all DTCs will be cleared.

Always exit the self-test before powering the system down (system turned OFF).

- Intermittent DTCs will be deleted after 80 ignition switch ON cycles after the intermittent condition occurs.

ELECTRONIC AUTOMATIC TEMPERATURE CONTROL (EATC) MODULE DIAGNOSTIC TROUBLE CODE (DTC) INDEX

NGS DTC	EATC		Description	Action to Take
	(Hard) Self-Test Faults	(Intermittent) Run-Time Faults		
B1249-	024	022 025	Blend Door Short Blend Door Failure	GO to DTC B1249-.
B1251	031	N/A	A/C In-Car Temperature Sensor Open Circuit	GO to DTC B1251.
B1253	030	N/A	A/C In-Car Temperature Sensor Short to Ground	GO to DTC B1253.
B1255	041	043	A/C Ambient Temperature Sensor Open Circuit	GO to DTC B1255.
B1257	040	042	A/C Ambient Temperature Sensor Short to Ground	GO to DTC B1257.
B1261	050	052	A/C Solar Radiation Sensor Circuit Short to Ground	GO to DTC B1261.
U1041	N/A	N/A	SCP Invalid or Missing Data for Function Read Vehicle Speed	Refer to Powertrain Control/Emissions Diagnosis (PC/ED) manual.
U1073	N/A	N/A	SCP Invalid or Missing Data for Engine Coolant	Refer to Powertrain Control/Emissions Diagnosis (PC/ED) manual.
U1222	N/A	N/A	SCP Invalid or Missing Data for Interior Lamps	GO to Section 417-02 , Inspection and Verification to continue diagnosis.
U1235	N/A	N/A	SCP Invalid or Missing Data for Displays	Invalid code. Do not service.

Symptom Chart

SYMPTOM CHART



Condition	Possible Sources	Action
<ul style="list-style-type: none"> • No Communication With the Electronic 	<ul style="list-style-type: none"> • Circuitry short/open. • EATC module 	<ul style="list-style-type: none"> • GO to Pinpoint Test A.

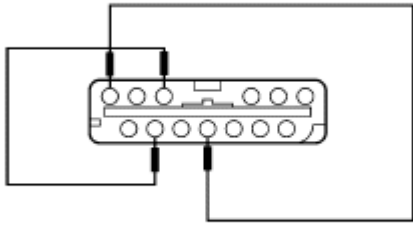
Automatic Temperature Control Module	communication network.	
<ul style="list-style-type: none"> The EATC System is Inoperative, Intermittent or Improper Operation 	<ul style="list-style-type: none"> Circuitry open/shorted. Input sensor(s)/erratic input signals. Charging system. Automatic temperature control sensor hose and elbow. 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> Improper/Erratic Direction of Air Flow from Outlets 	<ul style="list-style-type: none"> No vacuum to the A/C control. A/C control leaks vacuum. Kinked/pinched vacuum hose. Air flow door binding/stuck/broken. Leaking vacuum control motor. Mode selection buttons. Leaking A/C vacuum check valve. Leaking A/C vacuum reservoir tank and bracket. Vacuum actuator arm not connected to the door crank. 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> Insufficient, Erratic, or No Heat 	<ul style="list-style-type: none"> Low engine coolant level. Engine overheating. Blend door binding/stuck/broken. Plugged or partially plugged heater core. Inoperative A/C electric blend door actuator. Blend door circuitry open/shorted. 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> The A/C Does Not Operate/Does Not Operate Properly 	<ul style="list-style-type: none"> Open fuse. Variable Load Control Module. Circuitry short/open. A/C cycling switch. A/C system discharged/low charge. A/C control. 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> A/C Always On 	<ul style="list-style-type: none"> Circuitry short/open. A/C cycling switch. A/C control. Variable Load Control Module. 	<ul style="list-style-type: none"> REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual.
<ul style="list-style-type: none"> Insufficient A/C Cooling 	<ul style="list-style-type: none"> Restricted A/C evaporator core orifice. Blend door actuator control. 	<ul style="list-style-type: none"> GO to Pinpoint Test F.

	<ul style="list-style-type: none"> • Low refrigerant level. • Inoperative A/C cycling switch. • A/C cycling switch. 	
<ul style="list-style-type: none"> • The Blower Motor Does Not Operate 	<ul style="list-style-type: none"> • Circuitry open/shorted. • Blower motor. • A/C blower motor speed control. • Blower relay. 	<ul style="list-style-type: none"> • GO to Pinpoint Test G.
<ul style="list-style-type: none"> • The Blower Motor Operates Continuously in High Speed 	<ul style="list-style-type: none"> • A/C blower motor speed control. • EATC module. 	<ul style="list-style-type: none"> • GO to Pinpoint Test H.
<ul style="list-style-type: none"> • No Operation In Some Blower Settings 	<ul style="list-style-type: none"> • A/C blower motor speed control. • EATC module. • Blower motor. 	<ul style="list-style-type: none"> • GO to Pinpoint Test J.
<ul style="list-style-type: none"> • The Temperature Set Point Does Not Repeat After Turning the Ignition Switch Off 	<ul style="list-style-type: none"> • Open fuse. • Circuitry short/open. • EATC module. 	<ul style="list-style-type: none"> • GO to Pinpoint Test K.
<ul style="list-style-type: none"> • The Temperature Display Will Not Switch <input type="checkbox"/>etween Celsius and Fahrenheit 	<ul style="list-style-type: none"> • Circuitry short/open. • EATC module. 	<ul style="list-style-type: none"> • GO to Pinpoint Test L.

Pinpoint Tests

PINPOINT TEST B1249: DTC B1249: BLEND DOOR FAILURE

CONDITIONS	DETAILS/RESULTS/ACTIONS
B1249 CHECK THE ACTUATOR CLOCKWISE OPERATION (FULL COOL)	
<p>1 </p> <p>2  EATC Module C272</p> <p>3</p>	<p>3 Connect a jumper lead between the EATC module connector Pins C272-13, Circuit 245 (BR/LG) and C272-24, Circuit 973 (R). Connect a second jumper lead between the EATC module connector Pins C272-26, Circuit 246 (P) and C272-11, Circuit 57 (BK).</p>



AL0175-B

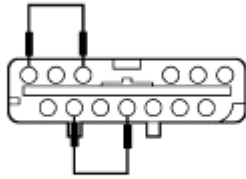
- Does the blend door actuator motor drive clockwise?

→ **Yes**
GO to [B12492](#).

→ **No**
GO to [B12493](#).

B12492 CHECK THE ACTUATOR COUNTERCLOCKWISE OPERATION (FULL HOT)

1



AL0040-B

1 Connect a jumper lead between the EATC module connector Pins C272-26, Circuit 246 (P) and C272-24, Circuit 973 (R). Connect a second jumper lead between the EATC module connector Pins C272-13, Circuit 245 (BR/LG) and C272-11, Circuit 57 (BK).

- Does the blend door actuator motor drive counterclockwise?

→ **Yes**
GO to [B12498](#).

→ **No**
GO to [B12493](#).

B12493 CHECK CIRCUIT 246 (P) FOR A SHORT

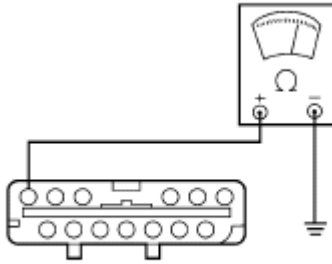
1



Electronic Blend Door Actuator C224

2

2 Measure the resistance between the EATC module connector Pin C272-26, Circuit 246 (P) and ground.



AL0041-B

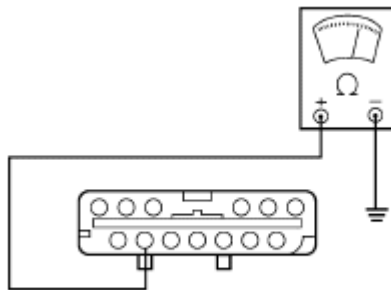
- Is the resistance greater than 10,000 ohms?

→ **Yes**
GO to [B12494](#).

→ **No**
REPAIR Circuit 246 (P) for a short to ground.
TEST the system for normal operation.

B12494 CHECK CIRCUIT 245 (BR/LG) FOR A SHORT

1



AL0042-B

- 1 Measure the resistance between the EATC module connector Pin C272-13, Circuit 245 (BR/LG) and ground.

- Is the resistance greater than 10,000 ohms?

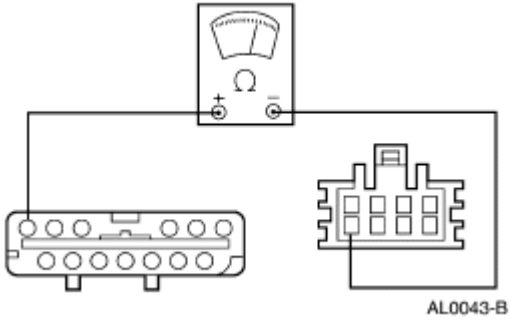
→ **Yes**
GO to [B12495](#).

→ **No**
REPAIR Circuit 245 (BR/LG) for a short to ground. TEST the system for normal operation.

B12495 CHECK CIRCUIT 246 (P) FOR AN OPEN

1

- 1 Measure the resistance between the EATC module connector Pin C272-26, Circuit 246 (P) and the electric blend door actuator connector Pin C224-8.



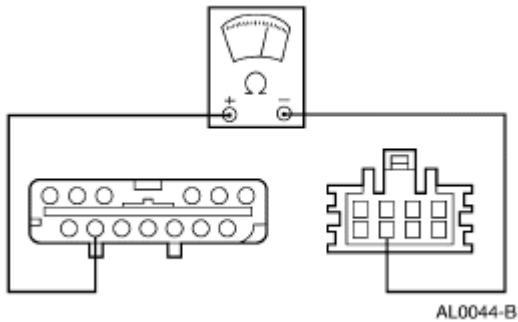
• Is the resistance less than 5 ohms?

→ **Yes**
GO to [B12496](#).

→ **No**
REPAIR Circuit 246 (P) for an open. TEST the system for normal operation.

B12496 CHECK CIRCUIT 245 (BR/LG) FOR AN OPEN

1



1 Measure the resistance between the EATC connector Pin C272-13, Circuit 245 (BR/LG) and the electric blend door actuator connector Pin C224-7.

• Is the resistance less than 5 ohms?

→ **Yes**
GO to [B12497](#).

→ **No**
REPAIR Circuit 245 (BR/LG) for an open. TEST the system or normal operation.

B12497 CHECK THE ACTUATOR OPERATION

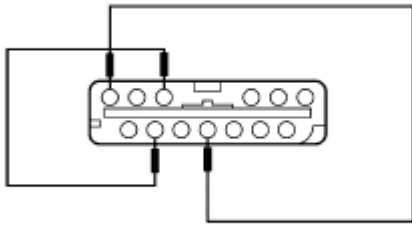
2



Electric Blend Door Actuator C224

1 Remove the electronic blend door actuator; refer to [Section 412-04](#).

3

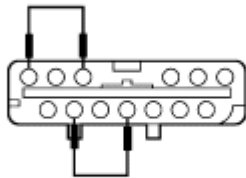


AL0175-B

3

With the actuator drive shaft disengaged from the temperature blend door, drive the electronic blend door actuator full clockwise; refer to Step B1249-1.

4



AL0040-B

4

With the actuator drive shaft disengaged from the temperature blend door, drive the electronic blend door actuator full counterclockwise; refer to Step B1249-2.

- Does the blend door actuator drive both clockwise and counterclockwise?

→ **Yes**

REPAIR the temperature blend door for a blocked or binding condition. TEST the system for normal operation.

→ **No**

REPLACE the A/C electronic blend door actuator. TEST the system for normal operation.

B12498 CHECK THE FEEDBACK POTENTIOMETER TOTAL RESISTANCE

1

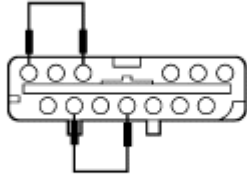


EATC Module C273

2

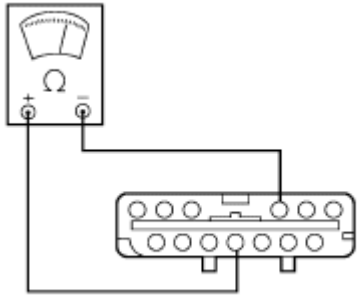
2

Drive the electric blend door actuator full counterclockwise; refer to Step B1249-2.



AL0040-B

3



AL0045-B

3

Measure the resistance between the EATC module connector Pins C273-17, Circuit 436 (R/LG) and C273-4, Circuit 438 (R/W).

- Is the resistance between 5000 and 7000 ohms?

→ Yes
GO to [B124913](#).

→ No
GO to [B12499](#).

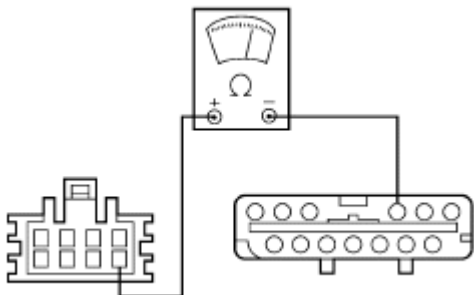
B12499 CHECK CIRCUIT 436 (R/LG) FOR AN OPEN

1



Electric Blend Door Actuator C224

2



AL0046-B

2

Measure the resistance between the EATC module connector Pin C273-17, Circuit 436 (R/LG) and the electric blend door actuator connector Pin C224-5.

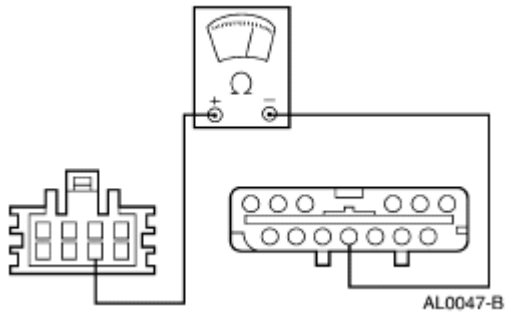
- Is the resistance less than 5 ohms?

→ **Yes**
GO to [B124910](#).

→ **No**
REPAIR Circuit 436 (R/LG) for an open. TEST the system for normal operation.

B124910 CHECK CIRCUIT 438 (R/W) FOR AN OPEN

1



1 Measure the resistance between the EATC connector Pin C273-4, Circuit 438 (R/W) and the electric blend door actuator connector Pin C224-6.

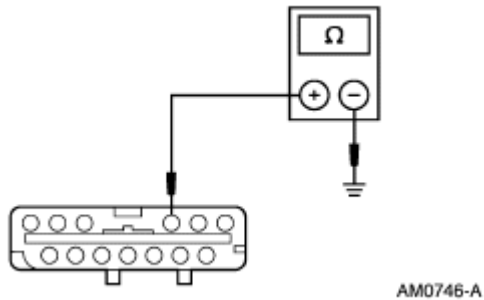
- Is the resistance less than 5 ohms?

→ **Yes**
GO to [B124911](#).

→ **No**
REPAIR Circuit 438 (R/W) for an open. TEST the system for normal operation.

B124911 CHECK CIRCUIT 436 (R/LG) FOR A SHORT TO GROUND

1



1 Measure the resistance between the EATC module connector Pin C273-17, Circuit 436 (R/LG) and ground.

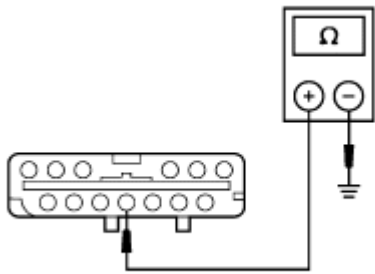
- Is the resistance greater than 10,000 ohms?

→ **Yes**
GO to [B124912](#).

→ **No**
REPAIR Circuit 436 (R/LG) for a short to ground. TEST the system for normal operation.

B124912 CHECK CIRCUIT 438 (R/W) FOR A SHORT TO GROUND

1



AM0747-A

1

Measure the resistance between the EATC module connector Pin C273-4, Circuit 438 (R/W) and ground.

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

→ **Yes**

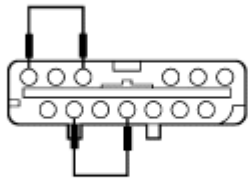
REPLACE the A/C electronic blend door actuator. TEST the system for normal operation.

→ **No**

REPAIR Circuit 438 (R/W) for a short to ground. TEST the system for normal operation.

B124913 CHECK THE FEEDBACK POTENTIOMETER LOW SIDE RESISTANCE

1

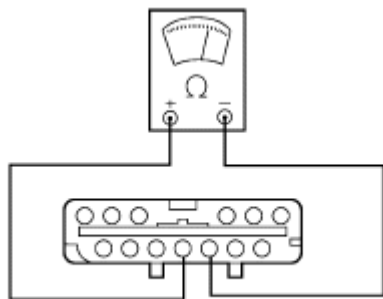


AL0040-B

1

Drive the electric blend door actuator full counterclockwise; refer to Step B1249-2.

2



AL0048-B

2

Measure the resistance between the EATC module connector Pins C273-3, Circuit 437 (Y/LG) and C273-4, Circuit 438 (R/W).

- **Is the resistance between 250 and 1,500 ohms?**

→ **Yes**
GO to [B124916](#).

→ **No**
GO to [B124914](#).

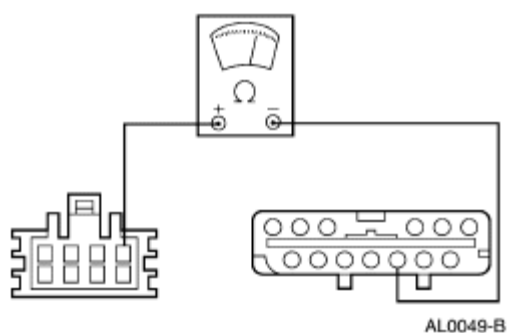
B124914 CHECK CIRCUIT 437 (Y/LG) FOR AN OPEN

1



Electric Blend Door Actuator C224

2



2 Measure the resistance between the EATC module connector Pin C273-3, Circuit 437 (Y/LG) and the electric blend door actuator connector Pin C224-1.

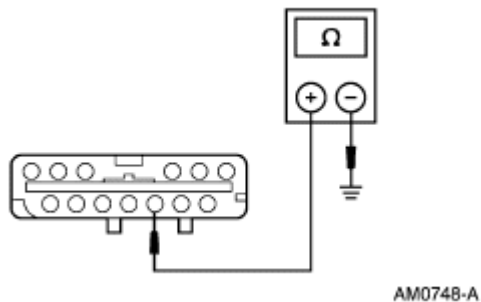
- Is the resistance less than 5 ohms?

→ **Yes**
GO to [B124915](#).

→ **No**
REPAIR Circuit 437 (Y/LG) for an open. TEST the system for normal operation.

B124915 CHECK CIRCUIT 437 (Y/LG) FOR A SHORT TO GROUND

1



1 Measure the resistance between the EATC module connector Pin C273-3, Circuit 437 (Y/LG) and ground.

- Is the resistance greater than 10,000 ohms?

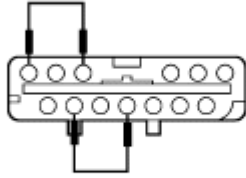
→ **Yes**

REPLACE the A/C electronic blend door actuator. TEST the system for normal operation.

→ **No**
REPAIR Circuit 437 (Y/LG) for a short to ground. TEST the system for normal operation.

B124916 CHECK THE FEEDBACK POTENTIOMETER HIGH SIDE RESISTANCE

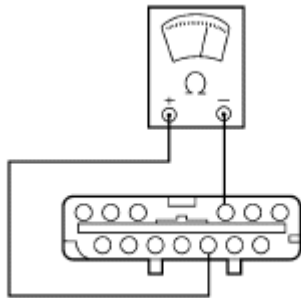
1



AL0040-B

1 Drive the electric blend door actuator full counterclockwise; refer to Step B1249-2.

2



AL0050-B

2 Measure the resistance between the EATC module connector Pins C273-17, Circuit 436 (R/LG) and C273-3, Circuit 437 (Y/LG).

- Is the resistance between 3,500 and 6,000 ohms?

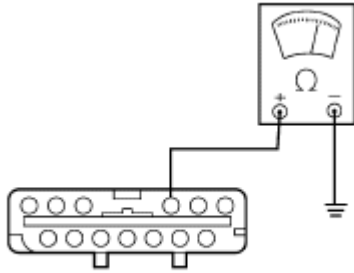
→ **Yes**
GO to [B124917](#).

→ **No**
REPLACE the A/C electric blend door actuator. TEST the system for normal operation.

B124917 CHECK CIRCUIT 436 (R/LG) FOR A SHORT

1

1 Measure the resistance between the EATC module connector Pin C273-17, Circuit 436 (R/LG) and ground.



AL0051-B

- Is the resistance greater than 10,000 ohms?

→ **Yes**

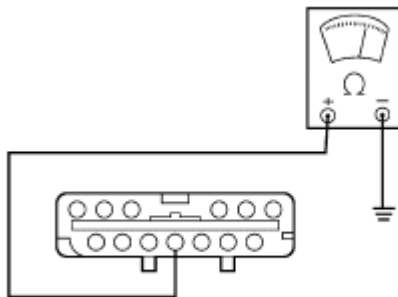
GO to [B124918](#).

→ **No**

REPAIR Circuit 436 (R/LG) for a short to ground. TEST the system for normal operation.

B124918 CHECK CIRCUIT 438 (R/W) FOR A SHORT

1



AL0052-B

1

Measure the resistance between the EATC module connector Pin C273-4, Circuit 438 (R/W) and ground.

- Is the resistance greater than 10,000 ohms?

→ **Yes**

GO to [B124919](#).

→ **No**

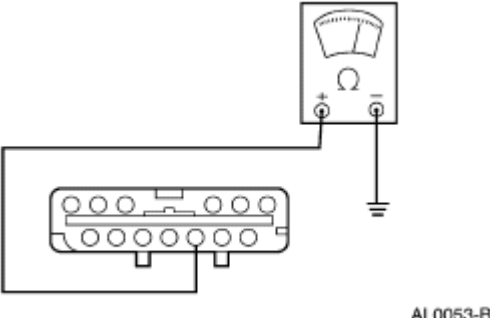
REPAIR Circuit 438 (R/W) for a short to ground. TEST the system for normal operation.

B124919 CHECK CIRCUIT 437 (Y/LG) FOR A SHORT

1

1

Measure the resistance between the EATC module connector Pin C273-3, Circuit 437 (Y/LG) and ground.





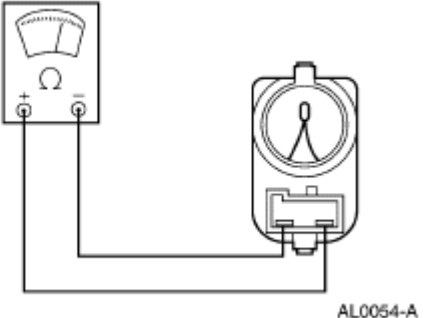
AL0053-B

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

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR Circuit 437 (Y/LG) for a short to ground. TEST the system for normal operation.

PINPOINT TEST B1251: DTC B1251: A/C IN-CAR TEMPERATURE SENSOR OPEN CIRCUIT

CONDITIONS	DETAILS/RESULTS/ACTIONS
B12511 CHECK THE SENSOR RESISTANCE	
<div style="margin-bottom: 10px;"> <p>1</p>  </div> <div style="margin-bottom: 10px;"> <p>2</p>  <p style="text-align: center;">In-Car Temperature Sensor C250</p> </div> <div> <p>3</p>  <p style="text-align: right;">AL0054-A</p> </div>	<div style="margin-top: 100px;"> <p>3</p> <p>Measure the resistance between the in-car temperature sensor terminals.</p> </div> <ul style="list-style-type: none"> ● Is the resistance within the specified

values for these temperature ranges: 10-20°C (50-68°F) 37,000-58,000 ohms, 20-30°C (68-86°F) 24,000-37,000 ohms, 30-40°C (86-104°F) 16,000-24,000 ohms?

→ **Yes**
GO to [B12512](#).

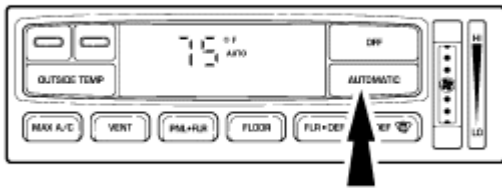
→ **No**
REPLACE the in-car temperature sensor.
TEST the system for normal operation.

B12512 CHECK THE EATC SENSOR OUTPUT VOLTAGE

1



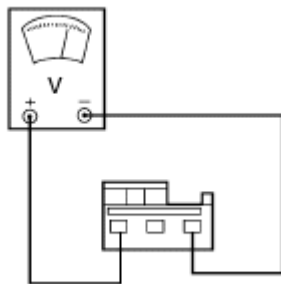
2



AL0055-A

2 Press the AUTOMATIC button.

3



AL0056-A

3 Measure the voltage between the in-car temperature sensor connector C250, Circuits 790 (W/O) and 470 (PK/BK).

• Is the voltage between 4.7 and 5.1 volts?

→ **Yes**
GO to [B12515](#).

→ **No**
GO to [B12513](#).

B12513 CHECK CIRCUIT 790 (W/O) FOR AN OPEN

1

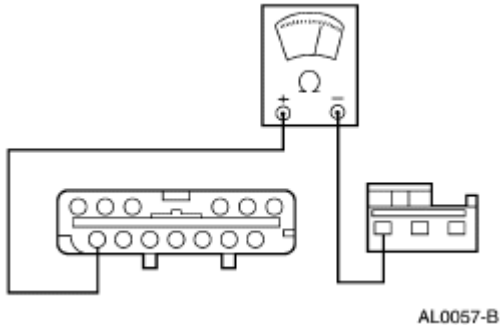


2



EATC Module C273

3



- 3 Measure the resistance between the EATC module connector Pin C273-7, Circuit 790 (W/O) and the in-car temperature sensor connector C250.

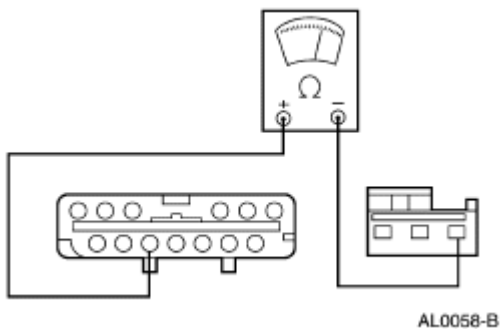
- Is the resistance less than 5 ohms?

→ **Yes**
GO to [B12514](#).

→ **No**
REPAIR Circuit 790 (W/O) for an open. TEST the system for normal operation.

B12514 CHECK CIRCUIT 470 (PK/BK) FOR AN OPEN

1




- 1 Measure the resistance between the EATC connector Pin C273-5, Circuit 470 (PK/BK) and the in-car temperature sensor connector C250.



- Is the resistance less than 5 ohms?

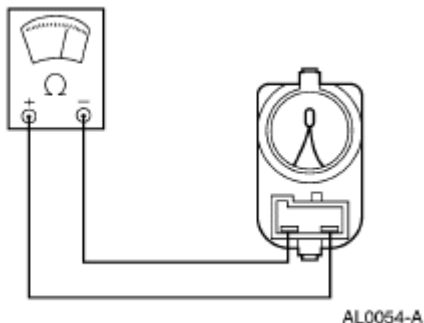
→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR Circuit 470 (PK/BK) for an open.

TEST the system for normal operation.	
B12515 INSPECT THE CONNECTIONS	
<p>1</p>  <p>EATC Module C273</p>	<p>2</p> <p>Inspect the in-car temperature sensor connector C250 pins and the EATC connector Pins C273-5, Circuit 470 (PK/BK) and C273-7, Circuit 790 (W/O) for signs of damage, loose fits, or improper installation.</p> <ul style="list-style-type: none"> • Are the connector pins undamaged and installed properly? <p>→ Yes REPLACE the EATC module. TEST the system for normal operation.</p> <p>→ No REPAIR damaged or loose connector pins. TEST the system for normal operation.</p>

PINPOINT TEST B1253: DTC B1253: A/C IN-CAR TEMPERATURE SENSOR SHORT TO GROUND

CONDITIONS	DETAILS/RESULTS/ACTIONS
B12531 CHECK THE IN-CAR TEMPERATURE SENSOR RESISTANCE	
<p>1</p>  <p>2</p>  <p>In-Car Temperature Sensor C250</p> <p>3</p>	<p>3</p> <p>Measure the resistance between the in-car temperature sensor terminals.</p>



- Is the resistance within the specified values for these temperature ranges: 10-20°C (50-68°F) 37,000-58,000 ohms, 20-30°C (68-86°F) 24,000-37,000 ohms, 30-40°C (86-104°F) 16,000-24,000 ohms?

→ **Yes**
GO to [B12532](#).

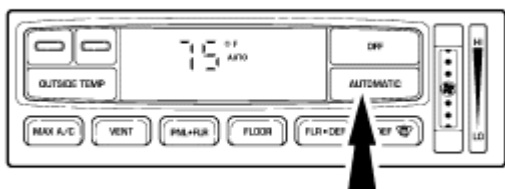
→ **No**
REPLACE the in-car temperature sensor.
TEST the system for normal operation.

B12532 CHECK THE IN-CAR TEMPERATURE SENSOR OUTPUT VOLTAGE

1



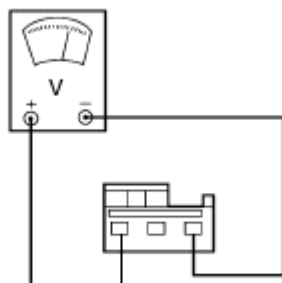
2



AL0055-A

2 Press the AUTOMATIC button.

3



AL0056-A

3 Measure the voltage between the in-car temperature sensor connector C250 Pins at Circuits 790 (W/O) and 470 (PK/BK).

- Is the voltage between 4.7 and 5.1 volts?

→ **Yes**
GO to [B12534](#).

→ **No**
GO to [B12533](#).

B12533 CHECK CIRCUIT 790 (W/O) FOR A SHORT

1

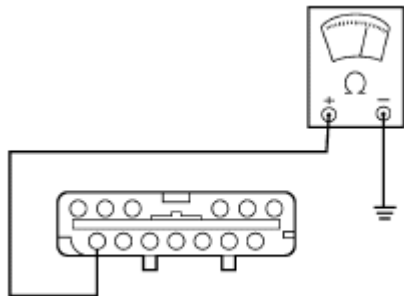


2



EATC Module C273

3



AL0059-B

- 3 Measure the resistance between the EATC module connector Pin C273-7, Circuit 790 (W/O) and ground.

- Is the resistance greater than 10,000 ohms?

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR Circuit 790 (W/O) for a short to ground. TEST the system for normal operation.

B12534 INSPECT THE CONNECTIONS

1



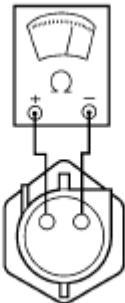


EATC Module C273

- 2 Inspect the in-car temperature sensor connector C250 pins and the EATC connector

	<p>Pins C273-5, Circuit 470 (PK/BK) and C273-7, Circuit 790 (W/O) for signs of damage, loose fits or improper installation.</p> <ul style="list-style-type: none"> • Are the connector pins undamaged and installed properly? <p>→ Yes REPLACE the EATC module. TEST the system for normal operation.</p> <p>→ No REPAIR damaged or loose connector pins. TEST the system for normal operation.</p>
--	---

PINPOINT TEST B1255: DTC B1255: A/C AMBIENT TEMPERATURE SENSOR OPEN CIRCUIT

CONDITIONS	DETAILS/RESULTS/ACTIONS
B12551 CHECK THE AMBIENT TEMPERATURE SENSOR RESISTANCE	
<p>1 </p> <p>2  Ambient Temperature Sensor C191</p> <p>3 </p> <p style="text-align: right;">AL0061-A</p>	<p>3 Measure the resistance between the ambient temperature sensor terminals.</p> <ul style="list-style-type: none"> • Is the resistance within the specified values for these temperature ranges: 10-20°C (50-68°F) 37,000-58,000 ohms, 20-30°C (68-86°F) 24,000-37,000 ohms, 30-40°C (86-104°F) 16,000-24,000 ohms? <p>→ Yes GO to B12552.</p>

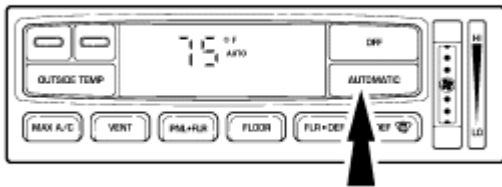
→ **No**
 REPLACE the A/C ambient air temperature sensor and bracket (19E702). TEST the system for normal operation.

B12552 CHECK THE EATC SENSOR OUTPUT VOLTAGE

1

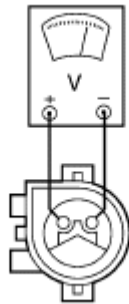


2



AL0055-A

3



AL0062-A

2 Press the AUTOMATIC button.

3 Measure the voltage between the ambient temperature sensor connector C191 Pins at Circuits 788 (R/O) and 470 (PK/BK).

• Is the voltage between 4.7 and 5.1 volts?

→ **Yes**
 GO to [B12555](#).

→ **No**
 GO to [B12553](#).

B12553 CHECK CIRCUIT 788 (R/O) FOR AN OPEN

1

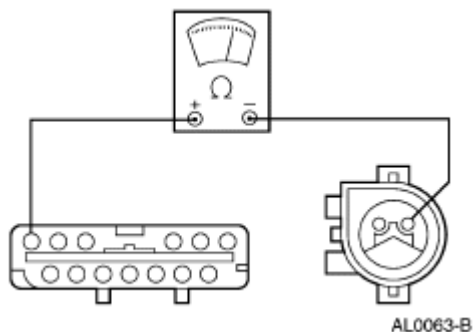


2



EATC Module C273

3



3

Measure the resistance between the EATC module connector Pin C273-20, Circuit 788 (R/O) and the ambient temperature sensor connector C191.

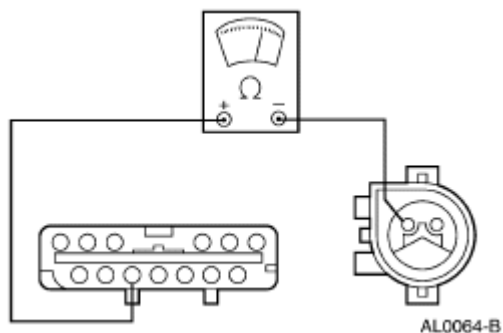
- Is the resistance less than 5 ohms?

→ **Yes**
GO to [B12554](#).

→ **No**
REPAIR Circuit 788 (R/O) for an open. TEST the system for normal operation.

B12554 CHECK CIRCUIT 470 (PK/BK) FOR AN OPEN

1



1

Measure the resistance between the EATC module connector Pin C273-5, Circuit 470 (PK/BK) and the ambient temperature sensor connector C191.


- Is the resistance less than 5 ohms?

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.



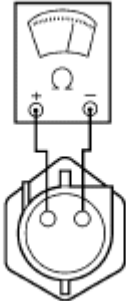
→ **No**
REPAIR Circuit 470 (PK/BK) for an open. TEST the system for normal operation.

B12555 INSPECT THE CONNECTIONS

1

 <p>EATC Module C273</p>	<p>2 Inspect the ambient temperature sensor connector C191 pins and the EATC connector Pins C273-5, Circuit 470 (PK/BK) and C273-20, Circuit 788 (R/O) for signs of damage, loose fits or improper installation.</p> <ul style="list-style-type: none"> • Are the connector pins undamaged and installed properly? <p>→ Yes REPLACE the EATC module. TEST the system for normal operation.</p> <p>→ No REPAIR damaged or loose connector pins. TEST the system for normal operation.</p>
---	--

PINPOINT TEST B1257: DTC B1257: A/C AMBIENT TEMPERATURE SENSOR SHORT TO GROUND

CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>B12571 CHECK THE AMBIENT TEMPERATURE SENSOR RESISTANCE</p>	
<p>1</p>  <p>2</p>  <p>Ambient Temperature Sensor C191</p> <p>3</p>  <p>AL0061-A</p>	<p>3 Measure the resistance between the ambient temperature sensor terminals.</p> <ul style="list-style-type: none"> • Is the resistance within the specified

values for these temperature ranges: 10-20°C (50-68°F) 27,000-58,000 ohms, 20-30°C (68-86°F) 24,000-37,000 ohms, 30-40°C (86-104°F) 16,000-24,000 ohms?

→ **Yes**
GO to [B12572](#).

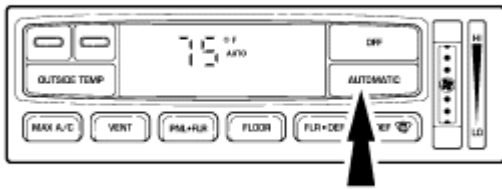
→ **No**
REPLACE the A/C ambient air temperature sensor and bracket. TEST the system for normal operation.

B12572 CHECK THE AMBIENT TEMPERATURE SENSOR OUTPUT VOLTAGE

1



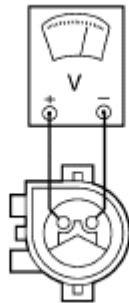
2



AL0055-A

2 Press the AUTOMATIC button.

3



AL0062-A

3 Measure the voltage between the ambient temperature sensor connector C191 Pins at Circuits 788 (R/O) and 470 (PK/BK).

• Is the voltage between 4.7 and 5.1 volts?

→ **Yes**
GO to [B12574](#).

→ **No**
GO to [B12573](#).

B12573 CHECK CIRCUIT 788 (R/O) FOR A SHORT

1

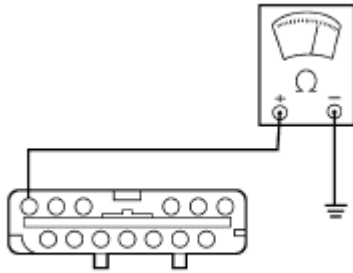


2



EATC Module C273

3



AL0065-B

- 3 Measure the resistance between the EATC connector Pin C273-20, Circuit 788 (R/O) and ground.

- Is the resistance greater than 10,000 ohms?

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR Circuit 788 (R/O) for a short to ground. TEST the system for normal operation.

B12574 INSPECT THE CONNECTIONS

1



EATC Module C273



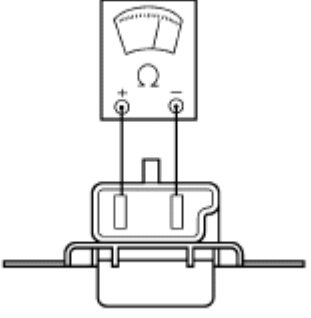

- 2 Inspect the A/C ambient temperature sensor connector C191 pins and the EATC connector Pins C273-5, Circuit 470 (PK/BK) and C273-20, Circuit 788 (R/O) for signs of damage, loose fits or improper installation.

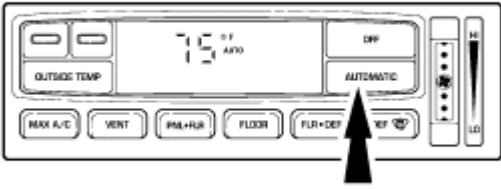
- Are the connector pins undamaged and installed properly?

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR damaged or loose connector pins.
TEST the system for normal operation.

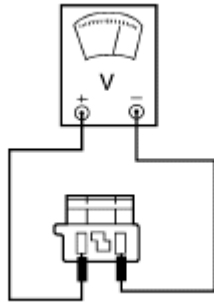
PINPOINT TEST B1261: DTC B1261: A/C SOLAR RADIATION SENSOR CIRCUIT SHORT TO GROUND

CONDITIONS	DETAILS/RESULTS/ACTIONS
B12611 CHECK THE SUNLOAD SENSOR RESISTANCE	
<p>1 </p> <p>2  Sunload Sensor C251</p> <p>3  AL0067-A</p>	<p>3 NOTE: Connect the ground lead of the multimeter to ground on the sensor, Circuit 470 (PK/BK).</p> <p>Measure the resistance between the sunload sensor terminals.</p> <p>• Is the resistance greater than 0 ohms?</p> <p>→ Yes GO to B12612.</p> <p>→ No REPLACE the A/C sunload sensor (19E663). TEST the system for normal operation.</p>
B12612 CHECK THE SUNLOAD SENSOR OUTPUT VOLTAGE	
<p>1 </p> <p>2</p>	<p>2 Press the AUTOMATIC button.</p>



AL0055-A

3



AL0068-A

3

Measure the voltage between the sunload sensor connector C251 Pins at Circuits 468 (BR) and 470 (PK/BK).

- Is the voltage between 4.7 and 5.1 volts?

→ **Yes**
GO to [B12616](#).

→ **No**
GO to [B12613](#).

B12613 CHECK CIRCUIT 468 (BR) FOR A SHORT

1



2

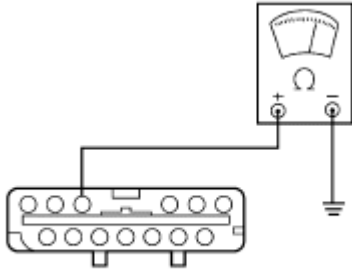


EATC Module C273

3

3

Measure the resistance between the EATC module connector Pin C273-18, Circuit 468 (BR) and ground.



AL0069-B

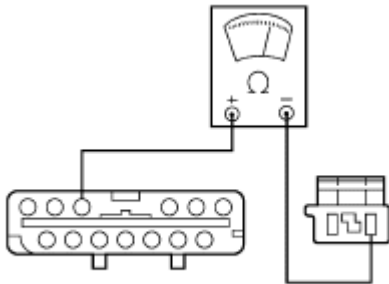
- Is the resistance greater than 10,000 ohms?

→ **Yes**
GO to [B12614](#).

→ **No**
REPAIR Circuit 468 (BR) for a short to ground. TEST the system for normal operation.

B12614 CHECK CIRCUIT 468 (BR) FOR AN OPEN

1



AL0070-B

- 1 Measure the resistance between the EATC module connector Pin C273-18, Circuit 468 (BR) and the sunload sensor connector C251.

- Is the resistance less than 5 ohms?

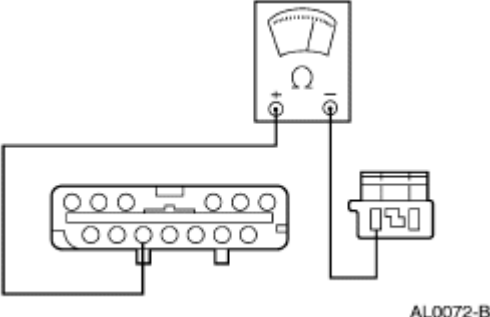
→ **Yes**
GO to [B12615](#).

→ **No**
REPAIR Circuit 468 (BR) for an open. TEST the system for normal operation.

B12615 CHECK CIRCUIT 470 (PK/BK) FOR AN OPEN

1

- 1 Measure the resistance between the EATC module connector Pin C273-5, Circuit 470 (PK/BK) and the sunload sensor connector C251.



AL0072-B


- **Is the resistance less than 5 ohms?**

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR Circuit 470 (PK/BK) for an open. TEST the system for normal operation.

B12616 INSPECT THE CONNECTIONS

1



EATC Module C273

2

Inspect the sun load sensor connector C251 pins and the EATC connector Pins C273-5, Circuit 470 (PK/BK) and C273-18 Circuit 468 (BR) for signs of damage, loose fits or improper installation.

- **Are the connector pins undamaged and installed properly?**

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR damaged or loose connector pins. TEST the system for normal operation.

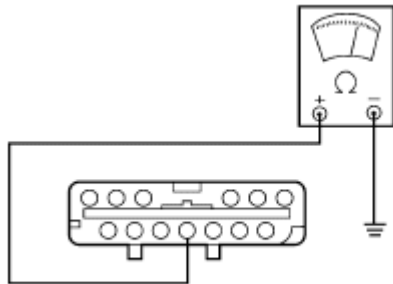
PINPOINT TEST A: NO COMMUNICATION WITH THE ELECTRONIC AUTOMATIC TEMPERATURE CONTROL MODULE

CONDITIONS	DETAILS/RESULTS/ACTIONS
A1 CHECK CIRCUIT 57 (BK) FOR AN OPEN	
1	



EATC Module C272

2



AL0073-B

- 2 Measure the resistance between the EATC module connector Pin C272-11, Circuit 57 (BK) and ground.

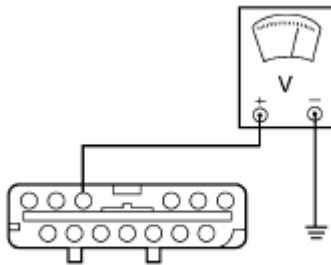
- Is the resistance less than 5 ohms?

→ **Yes**
GO to [A2](#).

→ **No**
REPAIR Circuit 57 (BK) for an open. TEST the system for normal operation.

A2 CHECK CIRCUIT 973 (R) FOR B+

1



AL0074-B

- 1 Measure the voltage between the EATC module connector Pin C272-24, Circuit 973 (R) and ground.

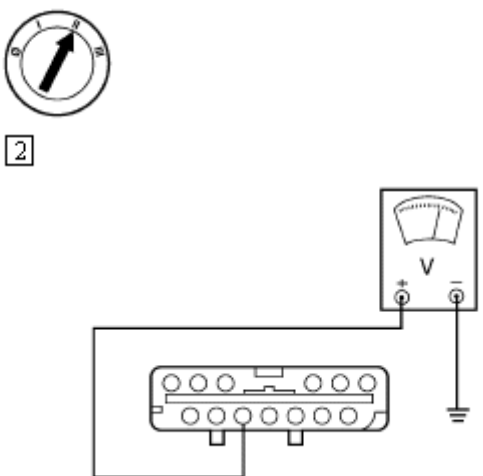
- Is the voltage B+?

→ **Yes**
GO to [A3](#).

→ **No**
REPAIR Circuit 973 (R) for an open. TEST the system for normal operation.

A3 CHECK CIRCUIT 364 (BK/LG) FOR B+

1



AL0075-B


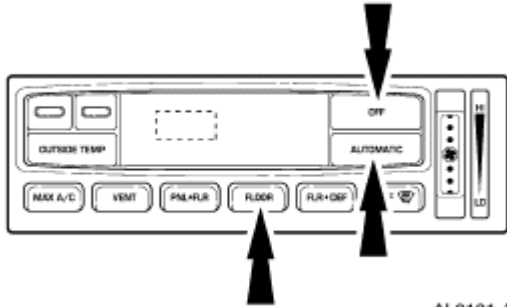
2 Measure the voltage between the EATC module connector Pin C272-12, Circuit 364 (BK/LG) and ground.

- **Is the voltage B+?**

→ **Yes**
GO to [Section 418-00](#) to diagnose a network concern.

→ **No**
REPAIR Circuit 364 (BK/LG) for an open. TEST the system for normal operation.

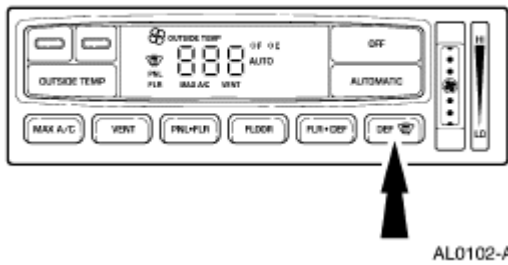
PINPOINT TEST B: THE EATC SYSTEM IS INOPERATIVE, INTERMITTENT OR IMPROPER OPERATION

CONDITIONS	DETAILS/RESULTS/ACTIONS
B1 PERFORM THE EATC MODULE SELF-TEST	
<p>1</p>  <p>2</p>  <p style="text-align: right;">AL0101-A</p>	<p>2 Perform the EATC module self-test; refer to Electronic Automatic Temperature Control Module Self-Test in this section. Record the DTCs displayed, if any.</p> <ul style="list-style-type: none"> • Were any DTCs displayed as a result of the EATC self-test?

- **Yes**
REFER to the Electronic Automatic Temperature Control (EATC) Module Diagnostic Trouble Code (DTC) Index. PERFORM the necessary diagnosis and REPAIR as required.
- **No**
GO to [B2](#).

B2 CHECK THE VACUUM FLUORESCENT DISPLAY

1



1 Exit self-test by pressing the DEFROST button. Observe the function symbols displayed on the vacuum fluorescent display.

- Is the display correct and complete without any missing elements?

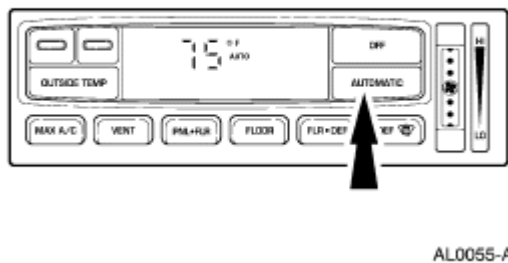
- **Yes**
GO to [B3](#).
- **No**
REPLACE the EATC module. TEST the system for normal operation.

B3 VERIFY AUTOMATIC OPERATION

1



2



2 Press the AUTOMATIC button.

- Does AUTO and the selected

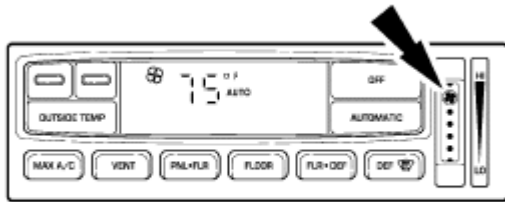
temperature appear in the display window?

→ **Yes**
GO to [B4](#).

→ **No**
GO to [Pinpoint Test K](#).

B4 CHECK THE BLOWER MANUAL OVERRIDE HIGH SPEED OPERATION

1



AL0104-A

1 Slowly rotate the blower motor speed override control fully up.

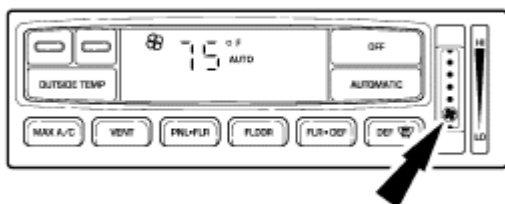
- Does the blower motor speed increase smoothly and go to high speed?

→ **Yes**
GO to [B5](#).

→ **No**
GO to [Pinpoint Test J](#).

B5 CHECK THE BLOWER MANUAL OVERRIDE LOW SPEED OPERATION

1



AL0103-A

1 Rotate the blower motor speed override control fully down.

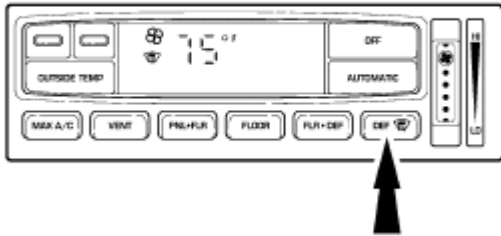
- Does the blower motor remain in high speed?

→ **Yes**
GO to [Pinpoint Test H](#).

→ **No**
GO to [B6](#).

B6 VERIFY THE DEFROST OVERRIDE OPERATION

1



AL0105-A

1 Press the override button for DEFROST operation.

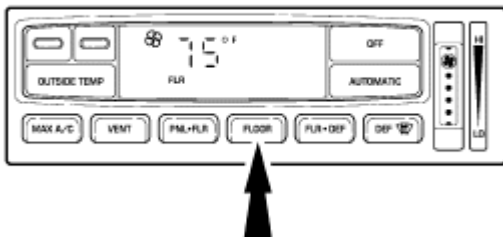
- Is outside air being discharged from the windshield defroster nozzle and the side window demisters?

→ **Yes**
GO to [B7](#).

→ **No**
GO to [Pinpoint Test C](#).

B7 VERIFY THE FLOOR OVERRIDE OPERATION

1



AL0106-A

1 Press the override button for FLOOR operation.

- Is outside air being discharged from the floor duct?

→ **Yes**
GO to [B8](#).

→ **No**
GO to [Pinpoint Test C](#).

B8 VERIFY THE VENT OVERRIDE OPERATION

1

1 Press the override button for VENT operation.



AL0107-A

- Is outside air being discharged from the instrument panel registers?

→ **Yes**
GO to [B9](#).

→ **No**
GO to [Pinpoint Test C](#).

B9 VERIFY THE A/C CLUTCH DOES NOT ENGAGE IN THE VENT MODE

1



AL0107-A

1 Press the override button for VENT operation.

- Does the A/C clutch engage when VENT override button is pressed?

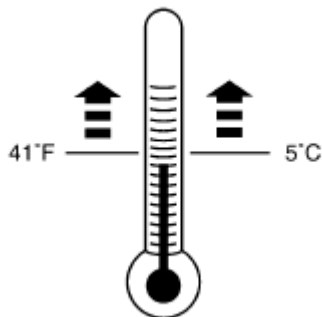
→ **Yes**
REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual.

→ **No**
GO to [B10](#).

B10 VERIFY THE MAX A/C OVERRIDE OPERATION

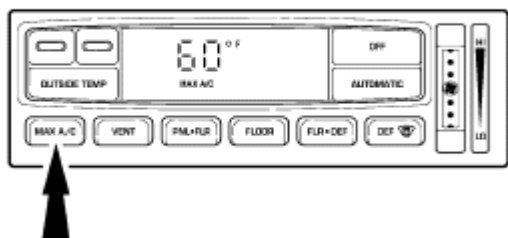
1

1 Make sure the ambient air temperature is above 5°C (41°F).



AL0108-B

2



AL0109-A

2

Press the override button for MAX A/C operation.

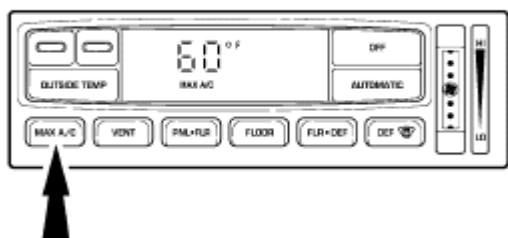
- Is recirculated air being discharged from the instrument panel registers?

→ **Yes**
GO to [B11](#).

→ **No**
GO to [Pinpoint Test C](#).

B11 VERIFY A/C CLUTCH ENGAGEMENT IN THE MAX A/C MODE

1



AL0109-A

1


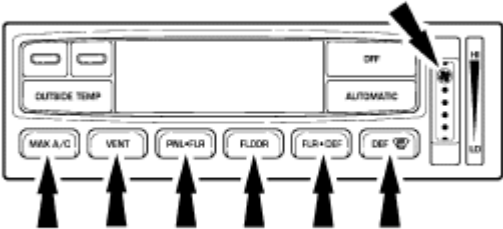

Press the override button for MAX A/C operation.

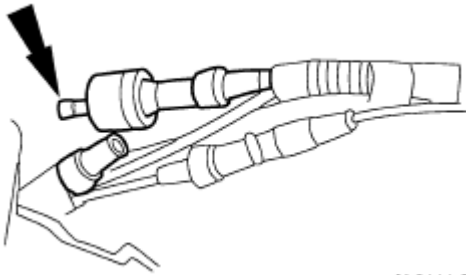
- Does the A/C clutch engage when the MAX A/C override button is pressed.

→ **Yes**
The test is complete. The system is functioning normally.

→ **No**
GO to [Pinpoint Test E](#).

PINPOINT TEST C: IMPROPER/ERRATIC DIRECTION OF AIR FLOW FROM OUTLET(S)

CONDITIONS	DETAILS/RESULTS/ACTIONS
C1 CHECK THE SYSTEM AIR FLOW	
<p>1 </p> <p>Start Engine</p> <p>2 </p> <p>AL0110-A</p>	<p>2 Turn the blower motor speed override control to the HI position. Check for proper air flow in each manual override button at engine idle speed.</p> <p>• Is there air flow only from the defroster outlets under all conditions?</p> <p>→ Yes GO to C2.</p> <p>→ No GO to C13.</p>
C2 CHECK THE VACUUM SUPPLY HOSE	
<p>1 </p> <p>2</p>	<p>2 Check for a disconnected vacuum supply hose between the engine intake manifold and the A/C vacuum check valve.</p>



AL0111-B

- Is the hose disconnected?

→ **Yes**
 RECONNECT the hose. TEST the system for normal operation.

→ **No**
 GO to [C3](#).

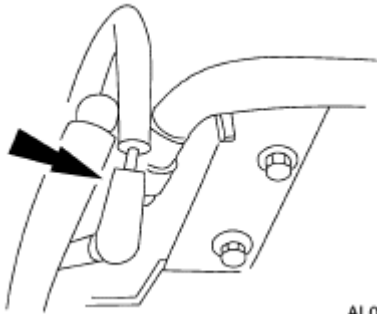
C3 LEAK CHECK THE VACUUM SUPPLY HOSE

1



Vacuum Supply Hose

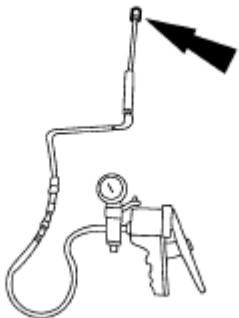
2



AL0146-A

2 Disconnect and plug the vacuum supply hose at the vacuum canister purge valve.

3

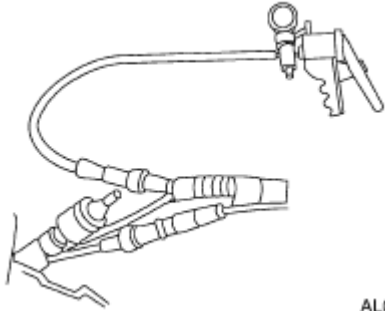


AL0147-B

3 Plug the intake manifold end of the supply hose and leak test with a vacuum pump at the check valve end.

- Does the hose leak?

- **Yes**
REPAIR or REPLACE the vacuum hose. TEST the system for normal operation.
- **No**
RECONNECT the vacuum supply hose to the intake manifold. GO to [C4](#).

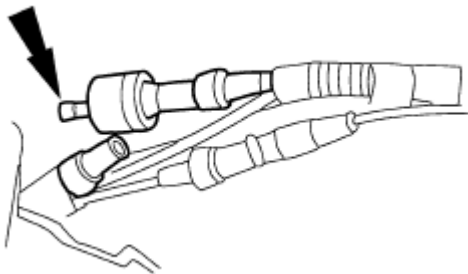
C4 CHECK THE SUPPLY HOSE FOR BLOCKAGE**1**

AL0403-A

- 1** Connect a vacuum tester to the supply hose and try to pull a vacuum. If the tester can pull a vacuum, the hose is plugged. If the tester pulls a partial vacuum, the hose is restricted.

- **Is the hose plugged or restricted?**

- **Yes**
REPAIR or REPLACE the supply hose. TEST the system for normal operation.
- **No**
RECONNECT the vacuum canister purge valve and the vacuum check valve. GO to [C5](#).

C5 CHECK THE VACUUM CHECK VALVE**2**

AL0111-B

- 1** Start the engine and run at idle.
- 2** Check the A/C vacuum check valve for blockage by removing the reservoir hose from the A/C vacuum check valve. Check for vacuum.

- **Is vacuum available at the check valve port?**

- **Yes**
GO to [C6](#).

→ **No**
 REPLACE the A/C vacuum check valve (19A563). TEST the system for normal operation.

C6 LEAK TEST THE VACUUM CHECK VALVE

1

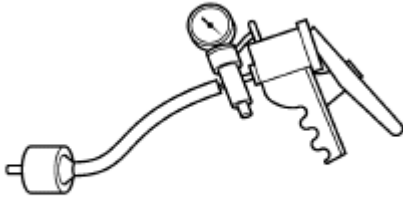


2



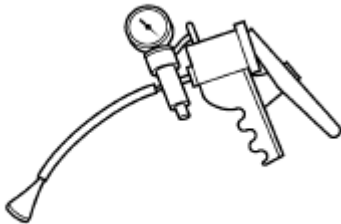
A/C Vacuum Check Valve

3



AL0149-A

5



AL0150-A

3 Connect the A/C vacuum check valve to a vacuum pump.

4 Pump 51 kPa (15 inches-Hg) vacuum on the A/C vacuum check valve and observe the gauge reading.

5 If the vacuum loss exceeds 3.37 kPa (1 inch-Hg) per minute, remove the A/C vacuum check valve from the vacuum pump and plug the vacuum hose. Pull a vacuum with the vacuum pump to be certain that the hose and vacuum pump are not the cause of the leak.

- Does the A/C vacuum check valve lose more than 3.37 kPa (1 inch-Hg) of vacuum in one minute?

→ **Yes**
 REPLACE the A/C vacuum check valve. TEST the system for normal operation.

→ **No**
 RECONNECT the A/C vacuum check valve.
 GO to [C7](#).

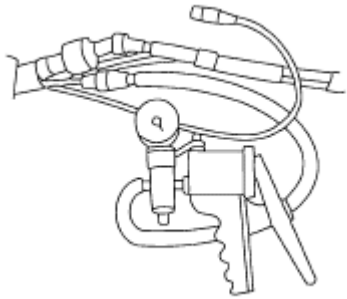
C7 CHECK THE VACUUM RESERVOIR

1



A/C Vacuum Reservoir Tank

2



AL0151-A

2 Use a vacuum pump to leak test the A/C vacuum reservoir tank.

- Does the reservoir leak?

→ **Yes**
 REPLACE the A/C vacuum reservoir tank and bracket (19A566). TEST the system for normal operation.

→ **No**
 GO to [C8](#).

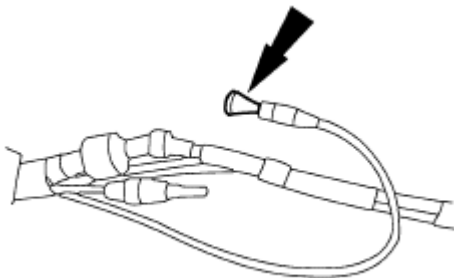
C8 CHECK THE SUPPLY HOSE

1



EATC Vacuum Harness

2

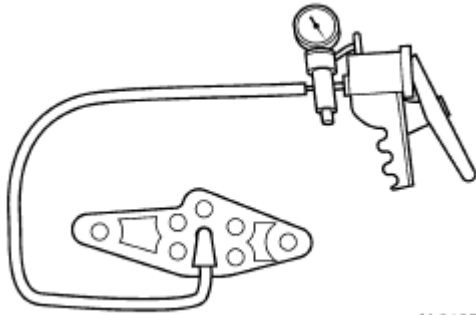


AL0152-B

2 Plug the vacuum supply hose at the vacuum reservoir tank connection.

3

3 Use a vacuum pump to leak test the vacuum



AL0135-A

harness.

- Does the vacuum harness leak?

→ **Yes**
REPAIR or REPLACE the vacuum harness.
TEST the system for normal operation.

→ **No**
RECONNECT the vacuum harness. GO to [C9](#).

C9 CHECK THE CONTROL ASSEMBLY

1

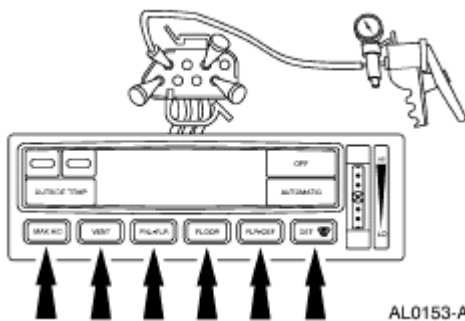


2



Inline Vacuum Harness

3



AL0153-A

3 Connect a vacuum pump to the black hose and plug the other hoses.

- At each manual override mode, apply 51 kPa (15 inches-Hg) of vacuum and check for vacuum leakage.

- Does the vacuum leakage exceed 3.37 kPa (1 inch-Hg) per minute?

→ **Yes**
NOTE the manual override selection where the vacuum leaks and GO to [C10](#).

→ **No**

RECONNECT the inline vacuum harness connector. GO to [C11](#).

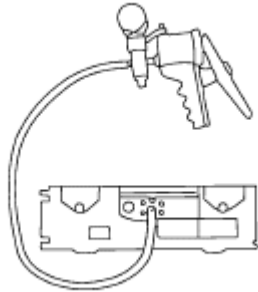
C10 LEAK TEST THE CONTROL ASSEMBLY

1



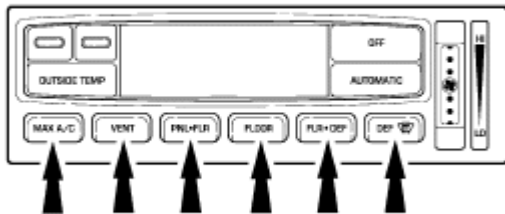
EATC Vacuum Harness

2



AL0154-A

3



AL0155-A

2

Connect a vacuum pump to the EATC vacuum supply port and plug the control port that indicated a leak in Step C9.

3

Select the manual override button that indicated a leak in Step C9 and then apply 51 kPa (15 inches-Hg) of vacuum.

- Does the vacuum drop exceed 1.68 kPa (0.5 in-Hg) per minute?

→ **Yes**

REPLACE the EATC module. TEST the system for normal operation.

→ **No**

GO to [C12](#).

C11 CHECK THE VACUUM HARNESS FOR BLOCKAGE

1

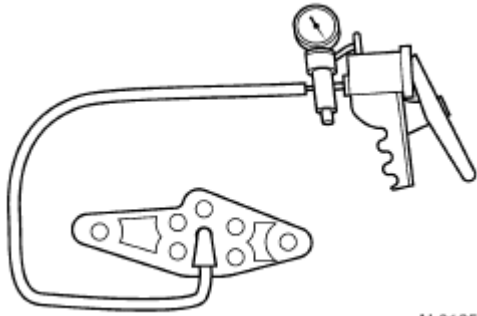


2



EATC Vacuum Harness

3



AL0135-A

3

Connect a vacuum pump to the EATC supply hose and try to pull a vacuum. If the vacuum pump can pull a vacuum, the hose is plugged. If the vacuum pump pulls a partial vacuum, the hose is restricted.

- Is the hose plugged or restricted?

→ **Yes**
REPAIR or REPLACE the vacuum harness.
TEST the system for normal operation.

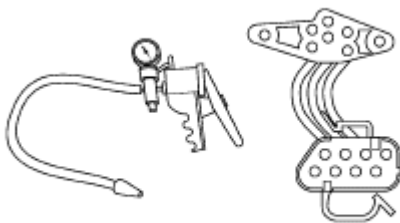
→ **No**
RECONNECT the EATC vacuum harness. GO to [C15](#).

C12 LEAK TEST THE JUMPER VACUUM HARNESS

1



2



AL0156-A

2

Plug one end of the suspect hose and attach a vacuum tester to the other end. Apply 51 kPa (15 inches-Hg) of vacuum to the hose.

- Is there vacuum leakage?

→ **Yes**
REPAIR or REPLACE the vacuum jumper harness. TEST the system for normal operation.

→ **No**
 REPLACE the EATC module. TEST the system for normal operation.

C13 EVALUATE THE SYSTEM AIR FLOW

1 Evaluate the system air flow; refer to the system air flow description in this section.

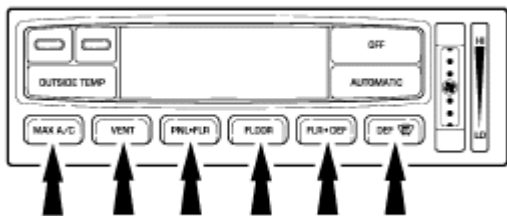
- Is the air flow in Step C1 correct for each manual override button pressed?

→ **Yes**
 GO to [C14](#).

→ **No**
 GO to [C15](#).

C14 ISOLATE THE LEAKING VACUUM CIRCUIT

1



AL0155-A

1 Check for proper air flow from each manual override button during engine speed acceleration.

- Does the air flow go to the defroster outlets during acceleration?

→ **Yes**
 GO to [C19](#).

→ **No**
 GO to [C15](#).

C15 REVIEW THE VEHICLE HISTORY

1



2 Review the vehicle history.

- Did the climate control system function properly prior to this complaint?

→ **Yes**
 GO to [C18](#).

→ **No**
GO to [C16](#).

C16 CHECK THE VACUUM MOTOR HOSES

1



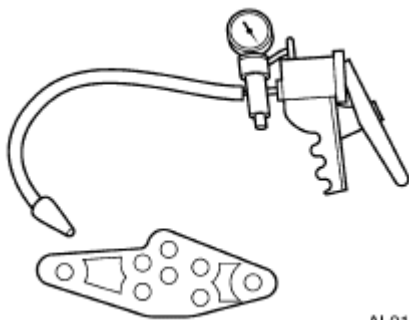
Vacuum Motors

2



EATC Vacuum Harness

3



AL0157-A

3 Connect a vacuum pump to each hose and try to pull a vacuum. If the pump can pull a vacuum, the hose is plugged. If the pump pulls a partial vacuum, the hose is restricted.

- **Is the hose plugged or restricted?**

→ **Yes**
REPAIR or REPLACE the vacuum hose. TEST the system for normal operation.

→ **No**
GO to [C17](#).

C17 CHECK THE VACUUM HARNESS

1 Compare the vacuum hose color in each vacuum harness to the electronic automatic temperature control vacuum connector end view.

- **Does the hose color agree with the chart?**

→ **Yes**
GO to [C18](#).

→ **No**
REPLACE the vacuum harness. TEST the system for normal operation.

C18 CHECK THE A/C VACUUM CIRCUIT

1 Check the A/C vacuum circuit for indications of a pinched or kinked vacuum hose.

- **Are there indications that the hose is pinched or kinked?**

→ **Yes**
REPOSITION the vacuum hose. TEST the system for normal operation.

→ **No**
GO to [C19](#).

C19 CHECK THE VACUUM CIRCUIT CONNECTIONS

1 Check each vacuum hose connection to determine if it is partially connected or disconnected.

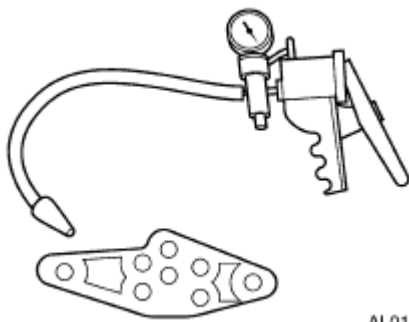
- **Is a vacuum hose disconnected or partially connected?**

→ **Yes**
RECONNECT the hose. TEST the system for normal operation.

→ **No**
GO to [C20](#).

C20 CHECK THE VACUUM HOSE

2



AL0157-A

1 Disconnect the suspect hose.

2 Plug one end of the hose and attach a vacuum pump to the other end. Check for a leak in the hose.

- **Does the vacuum hose leak?**

→ **Yes**
REPAIR or REPLACE the hose. TEST the system for normal operation.

→ **No**
GO to [C21](#).

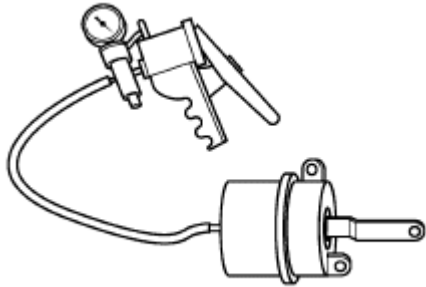
C21 CHECK THE VACUUM CONTROL MOTOR

1



Vacuum Control Motor

2



AL0136-A

- 2 Check the vacuum control motor for leaks with a vacuum pump.

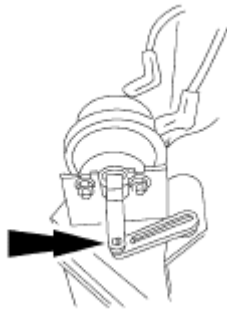
- Does the vacuum control motor hold a vacuum?

→ **Yes**
GO to [C22](#).

→ **No**
REPLACE the vacuum control motor. TEST the system for normal operation.

C22 CHECK THE VACUUM CONTROL MOTOR INSTALLATION

1



AL0158-A

- 1 Check the attachment of the vacuum control motor arm to the damper door.


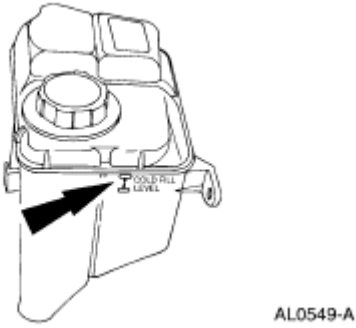


- Is the vacuum control motor arm attached to the door or door crank arm?

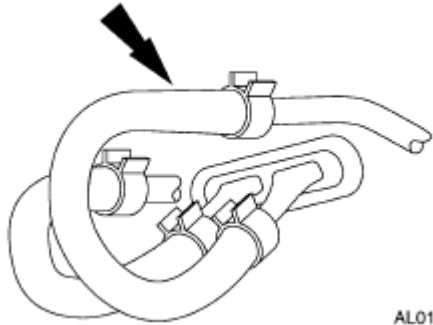
→ **Yes**
REPAIR the damper door. TEST the system for normal operation.

→ **No**
CONNECT the vacuum control motor arm to

the door crank arm. TEST the system for normal operation.

PINPOINT TEST D: INSUFFICIENT, ERRATIC OR NO HEAT

CONDITIONS	DETAILS/RESULTS/ACTIONS
D1 CHECK FOR PROPER ENGINE COOLANT LEVEL	
<p>1 </p> <p>2 </p>	<p>2 Check the engine coolant level when hot and cold.</p> <ul style="list-style-type: none"> • Is the engine coolant at proper level (hot/cold) as indicated on the engine coolant recovery reservoir? <p>→ Yes GO to D2.</p> <p>→ No GO to D3.</p>
D2 CHECK FOR HOT WATER TO THE HEATER CORE INLET HOSE	
<p> WARNING: The heater core inlet hose will become too hot to handle and may cause serious burns if the system is working correctly.</p> <p>NOTE: Be sure that the inlet hose flow restrictor is in place and is undamaged.</p>	
<p>1 </p> <p>Start Engine</p> <p>3</p>	<p>2 Allow the engine to reach normal operating temperature.</p> <p>3 Feel the heater core inlet hose.</p>



AL0159-A

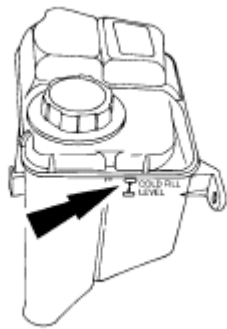
- Is the heater core inlet hose too hot to handle?

→ **Yes**
GO to [D4](#).

→ **No**
GO to [Section 303-03](#).

D3 CHECK THE COOLANT SYSTEM INCLUDING THE RADIATOR CAP FOR LEAKS

1



AL0549-A

1 Fill the engine cooling system to the specified level.

2 Pressure check the engine cooling system; refer to [Section 303-03](#). It is not necessary to check the components separately at this time.

- Does the engine cooling system, including the radiator cap, hold pressure?

→ **Yes**
GO to [D4](#).

→ **No**
Pressure test the heater core.

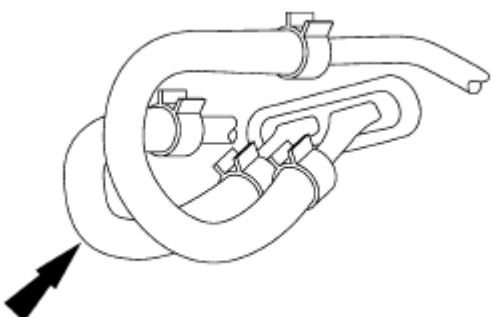
D4 CHECK THE HEATER CORE OUTLET HOSE FOR HOT WATER

1



Start Engine

3



AL0160-A

2 Allow the engine to reach normal operating temperature.


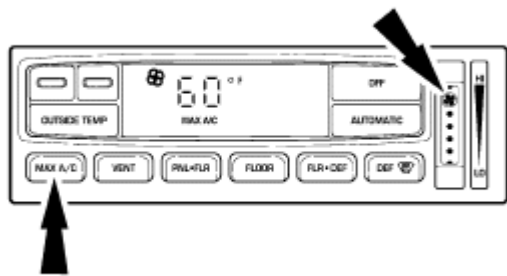
3 Feel the heater core outlet hose.

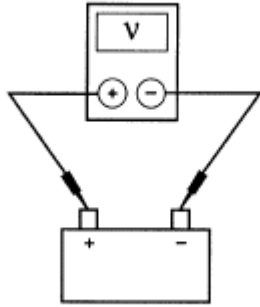
- **Is the heater core outlet hose cool or cold?**

→ **Yes**
TEST the heater core for a plugged or partial plugged condition.

→ **No**
[Go To Pinpoint Test B1249.](#)

PINPOINT TEST E: THE A/C DOES NOT OPERATE/DOES NOT OPERATE PROPERLY

CONDITIONS	DETAILS/RESULTS/ACTIONS
E1 CHECK THE A/C CLUTCH OPERATION	
NOTE: Outside temperature must be above 10°C (50°F) for A/C compressor operation.	
<p>1</p>  <p style="text-align: center;">Start Engine</p> <p>2</p>  <p style="text-align: right;">AL0137-A</p> <p>3</p>	<p>2 Press the override button for MAX A/C operation and rotate the blower motor speed control fully up.</p> <p>3 Check the voltage at the battery (if not 12 or</p>



L10084-A

greater volts, refer to [Section 414-00](#) for diagnosis and testing of the charging system).

- Does the A/C clutch engage?

→ **Yes**
The A/C clutch circuit is functioning properly. RETURN to the Symptom Chart.

→ **No**
GO to [E2](#).

E2 BYPASS THE A/C CYCLING SWITCH

1

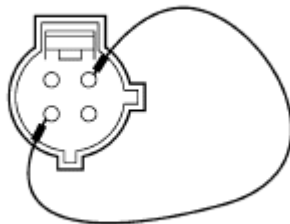


2



A/C Cycling Switch C169

3



AL0112-A

4

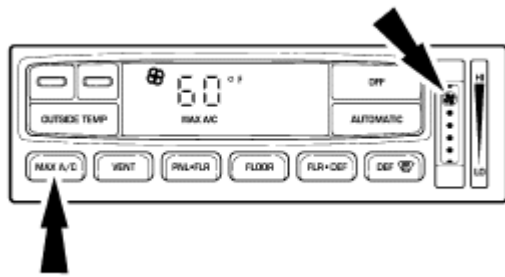


Start Engine

5

3 Connect a jumper lead between the A/C cycling switch connector C169, Circuit 1040 (R/BK) and Circuit 198 (DG/O).

5 Press the override button for MAX A/C operation and rotate the blower motor speed control fully up.



AL0137-A

- Does the A/C compressor clutch engage?

- **Yes**
RECONNECT the A/C cycling switch (19E561).
GO to [E3](#).
- **No**
GO to [E4](#).

E3 CHECK THE REFRIGERANT SYSTEM PRESSURE

1



- 2 Connect the manifold set to the service ports; refer to Manifold Gauge Set Connection in this section.

- Is the pressure between 345 kPa (50 psi) and 2758 kPa (400 psi)?

- **Yes**
REPLACE the A/C cycling switch. TEST the system for normal operation.
- **No**
CHECK the system for refrigerant system leaks; refer to Leak Detection — Using the Automatic Calibration Halogen Leak Detector or Leak Detection — Using Tracer Dye in this section.

E4 CHECK THE VOLTAGE AT THE A/C CYCLING SWITCH

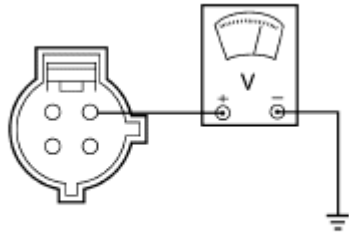
1



2



3



AL0113-A

3

Measure the voltage between the A/C cycling switch connector C169 at Circuit 1040 (R/BK) and ground.

• Is the voltage greater than 10 volts?

→ **Yes**
GO to [E8](#).

→ **No**
GO to [E5](#).

E5 CHECK FUSE 34 (15A)

1



2



Junction Panel Fuse 34 (15A)

3



Junction Panel Fuse 34 (15A)

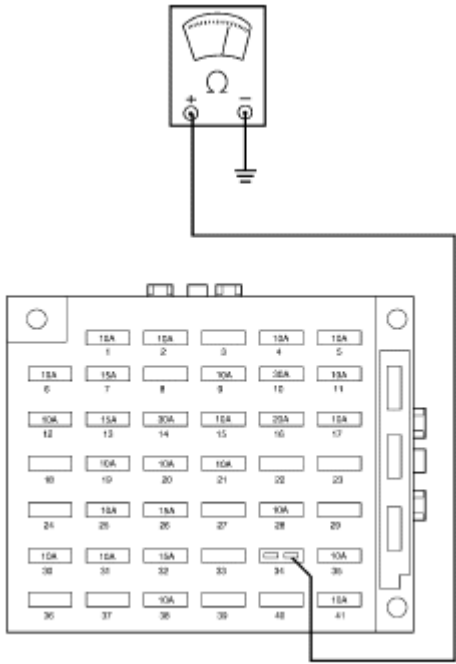
• Is Fuse 34 (15A) OK?

→ **Yes**
REPAIR Circuit 1040 (R/BK) for an open. TEST the system for normal operation.

→ **No**
GO to [E6](#).

E6 CHECK CIRCUIT 1040 (R/BK) FOR A SHORT

1



AL0117-B

1

Measure the resistance between the fuse junction panel Fuse 34 socket at Circuit 1040 (R/BK) and ground.

- Is the resistance greater than 10,000 ohms?

→ **Yes**
GO to [E7](#).

→ **No**
REPAIR Circuit 1040 (R/BK) for a short to ground. TEST the system for normal operation.

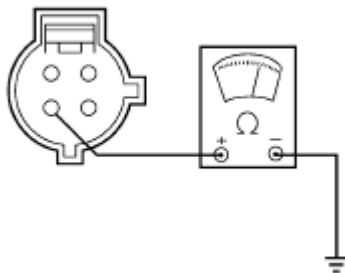
E7 CHECK CIRCUIT 198 (DG/O) FOR A SHORT

1



EATC Module C272

2



AL0162-A

2

Measure the resistance between the A/C cycling switch connector C169, Circuit 198 (DG/O) and ground.

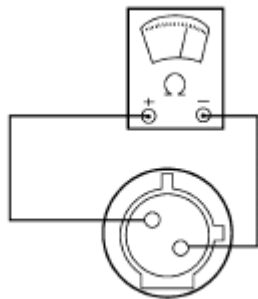
- Is the resistance greater than 10,000 ohms?

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR Circuit 198 (DG/O) for a short to ground. TEST the system for normal operation.

E8 CHECK THE A/C CYCLING SWITCH

1



AL0114-A

1 Measure the resistance between the A/C cycling switch terminals.

- Is the resistance less than 5 ohms?

→ **Yes**
GO to [E9](#).

→ **No**
REPLACE the A/C cycling switch. TEST the system for normal operation.

E9 CHECK THE VOLTAGE AT THE EATC MODULE

1



EATC Module C272

2



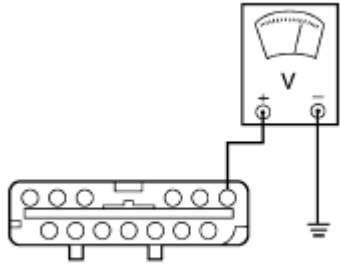
A/C Cycling Switch C169

3



4

4 Measure the voltage between the EATC



AL0115-B

module connector Pin C272-21, Circuit 198 (DG/O) and ground.

- Is the voltage greater than 10 volts?

→ **Yes**
GO to [E10](#).

→ **No**
REPAIR Circuit 198 (DG/O) for an open. TEST the system for normal operation.

E10 CHECK THE VOLTAGE TO THE A/C CLUTCH

1

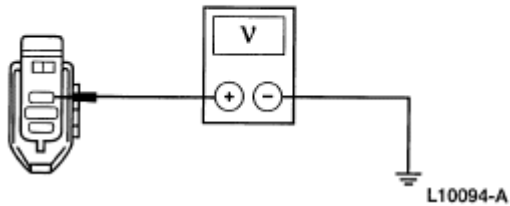


2



A/C Compressor Clutch C180

3



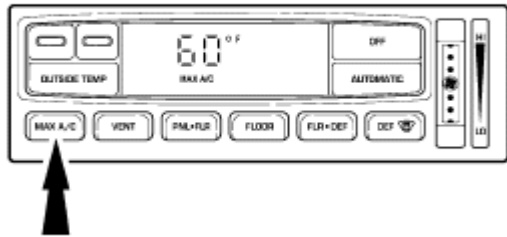
4



5

3 Measure the voltage between the A/C compressor clutch connector C180, Circuit 348 (P) and ground.

5 Press the override button for MAX A/C operation.



AL0109-A

- Is the voltage greater than 10 volts?

→ **Yes**
GO to [E11](#).

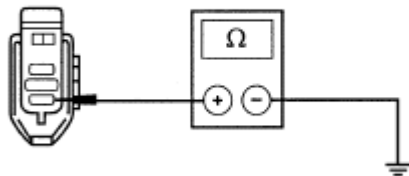
→ **No**
GO to [E14](#).

E11 CHECK THE A/C CLUTCH GROUND CIRCUIT FOR AN OPEN

1



2



L10095-A

- 2 Measure the resistance between the A/C clutch connector C180, Circuit 57 (BK) and ground.

- Is the resistance 1 ohm or less?

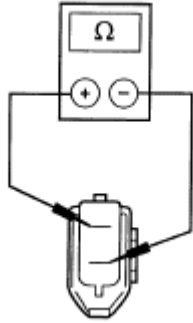
→ **Yes**
GO to [E12](#).

→ **No**
REPAIR Circuit 57 (BK) for an open. TEST the system for normal operation.

E12 CHECK THE A/C CLUTCH COIL RESISTANCE

1

- 1 Measure the resistance between the A/C clutch terminals.



L10096-A

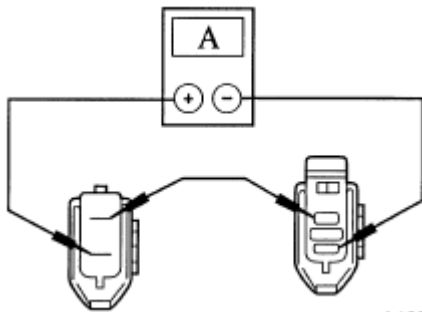
- Is the resistance greater than 6 ohms?

→ **Yes**
REPLACE the A/C clutch. TEST the system for normal operation.

→ **No**
GO to [E13](#).

E13 CHECK THE A/C CLUTCH FIELD COIL CURRENT DRAW

1



L10097-A

1

Connect an ammeter between the A/C clutch field coil terminal and the A/C clutch connector C180, Circuit 57 (BK). Connect a jumper wire between the A/C clutch field coil terminal and the A/C clutch connector C180, Circuit 348 (P) to complete the circuit.

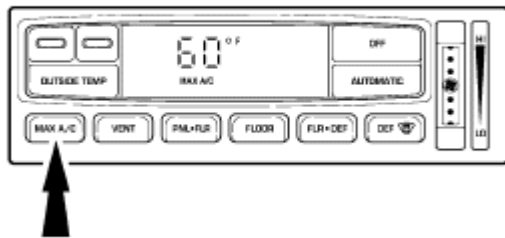
2



3

Press the override button for MAX A/C operation.

3



AL0109-A

- Is the current draw between 2.5 and 4.5 amps?

→ **Yes**
 ADJUST the A/C clutch air gap; refer to A/C Clutch Air Gap Adjustment in this section.
 TEST the system for normal operation.

→ **No**
 REPLACE the A/C clutch. TEST the system for normal operation.

E14 CHECK THE INPUT VOLTAGE TO THE VARIABLE LOAD CONTROL MODULE PIN C106-4

1

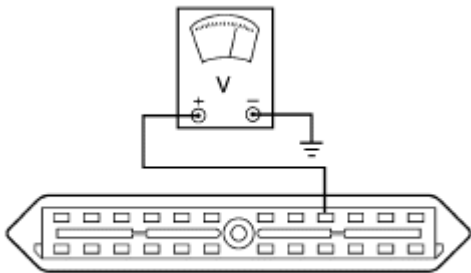


2



Variable Load Control Module C106

3



AL0116-B

3 Measure the voltage between the variable load control module connector Pin C106-4, Circuit 228 (DB) and ground.

- Is voltage greater than 10 volts?

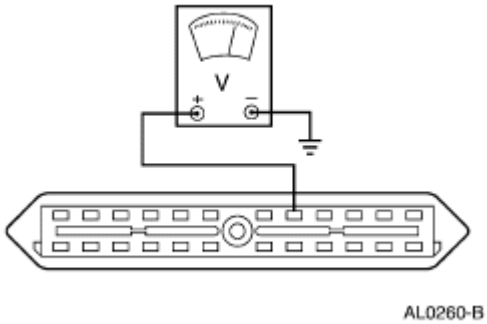
→ **Yes**
 GO to [E15](#).

→ **No**
 GO to [E17](#).

E15 CHECK THE INPUT VOLTAGE TO THE VARIABLE LOAD CONTROL MODULE PIN C106-5

1

1 Measure the voltage between the variable load control module connector Pin C106-5, Circuit 228 (DB) and ground.



- Is the voltage greater than 10 volts?

→ **Yes**

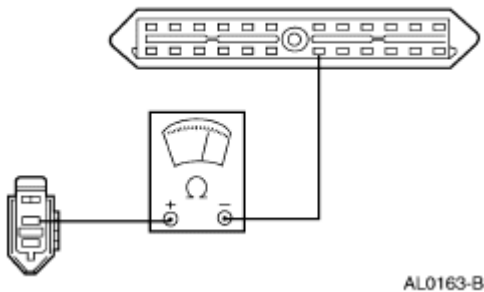
GO to [E16](#).

→ **No**

REPAIR Circuit 228 (DB) for an open between the VLCM connector Pin C106-5 and the splice. TEST the system for normal operation.

E16 CHECK CIRCUIT 348 (P) FOR AN OPEN

1



1

Measure the resistance between the variable load control module connector Pin C106-18, Circuit 348 (P) and the A/C clutch connector C180.

- Is the resistance less than 5 ohms?

→ **Yes**

GO to [E20](#).

→ **No**

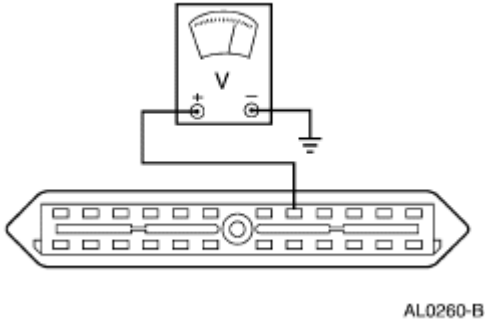
REPAIR Circuit 348 (P) for an open. TEST the system for normal operation.

E17 CHECK CIRCUIT 228 (DB) FOR AN OPEN

1

1

Measure the voltage between the variable load control module connector Pin C106-5, Circuit 228 (DB) and ground.



- Is the voltage greater than 10 volts?

→ **Yes**
REPAIR Circuit 228 (DB) for an open between the VLCM connector Pin C106-4 and the splice. TEST the system for normal operation.

→ **No**
GO to [E18](#).

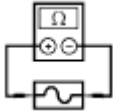
E18 CHECK FUSE 23 (40A)

1



Power Distribution Box Fuse 23 (40A)

2



Power Distribution Box Fuse 23 (40A)

- Is Fuse 23 (40A) OK?

→ **Yes**
REPAIR Circuit 228 (DB) for an open. TEST the system for normal operation.

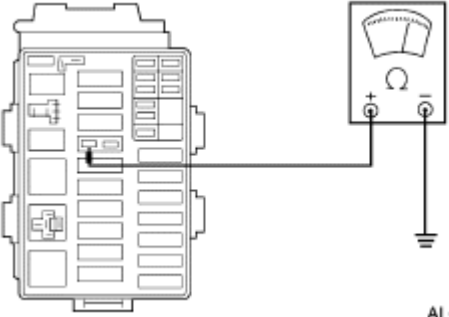
→ **No**
GO to [E19](#).

E19 CHECK CIRCUIT 228 (DB) FOR A SHORT

1

1

Measure the resistance between the power distribution box Fuse 23 socket at Circuit 228 (DB) and ground.



AL0164-A

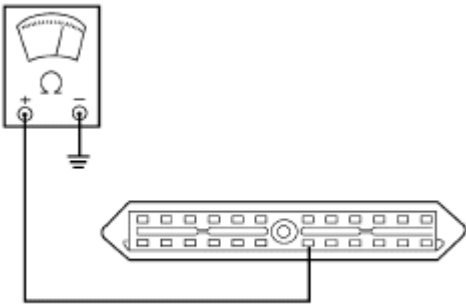
- Is the resistance greater than 10,000 ohms?

→ **Yes**
GO to [E20](#).

→ **No**
REPAIR Circuit 228 (DB) for a short to ground.
TEST the system for normal operation.

E20 CHECK CIRCUIT 348 (P) FOR A SHORT

1



AL0165-B

1 Measure the resistance between the variable load control module connector Pin C106-18, Circuit 348 (P) and ground.

- Is the resistance greater than 10,000 ohms?

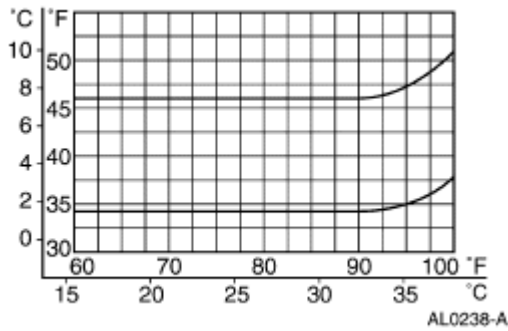
→ **Yes**
REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual.

→ **No**
REPAIR Circuit 348 (P) for a short to ground.
TEST the system for normal operation.

PINPOINT TEST F: INSUFFICIENT A/C COOLING

CONDITIONS	DETAILS/RESULTS/ACTIONS
F1 CHECK THE CENTER A/C REGISTER DISCHARGE TEMPERATURE	

2



1 Perform the Refrigerant System Tests; refer to General Procedures in this section.

2 Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for center A/C register discharge temperature.

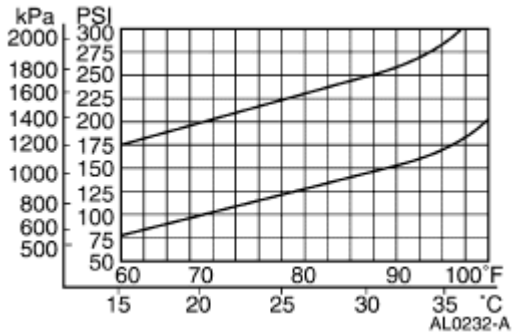
- Is the intersection of the two lines within the upper and lower limits?

→ **Yes**
The tests indicate that the system is functioning normally.

→ **No**
GO to [F2](#).

F2 CHECK FOR NORMAL DISCHARGE PRESSURE

1



1 Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for compressor discharge (high) pressure.

- Is the intersection of the two lines within the upper and lower limits?

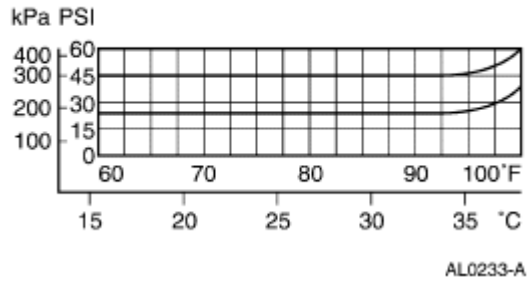
→ **Yes**
GO to [F3](#).

→ **No**
GO to [F8](#).

F3 EVALUATE THE SYSTEM LOW PRESSURE PERFORMANCE

1

1 Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for compressor suction (low) pressure.



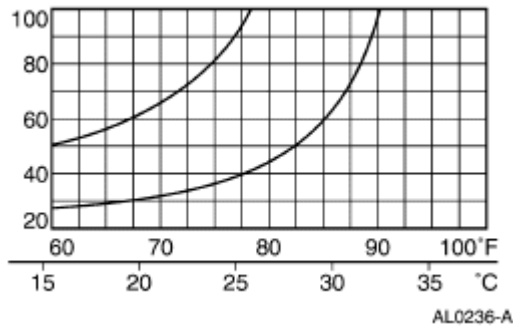
- Is the intersection of the two lines within the upper and lower limits?

→ **Yes**
GO to [F4](#).

→ **No**
GO to [F6](#).

F4 CHECK FOR A SLOW OR CONTINUOUS RUN A/C CLUTCH CYCLE RATE

1



1

Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for total A/C clutch cycle time (time ON plus time OFF) in seconds.

- Is the intersection of the two lines above the upper limit?

→ **Yes**
GO to [F5](#).

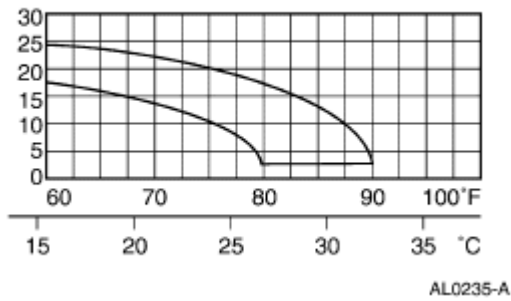
→ **No**
REPAIR the A/C evaporator core (19860) due to a partially restricted or plugged condition.
TEST the system for normal operation.

F5 CHECK FOR A LONG OR CONTINUOUS A/C CLUTCH OFF TIME

1

1

Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for A/C clutch OFF time in seconds.



- Is the intersection of the two lines above the upper limit?

→ **Yes**

DISCHARGE and RECOVER the system to remove excessive moisture or refrigerant oil. TEST the system for normal operation.

→ **No**

GO to [F7](#).

F6 CHECK FOR A HIGH SUCTION PRESSURE

1 Refer to the data plot used to evaluate the system low pressure performance in Step F3.

- Is the intersection of the two lines above the upper limit?

→ **Yes**

REMOVE the A/C evaporator core orifice (19D990) to replace the missing or damaged (leaking) O-ring seals. TEST the system for normal operation.

→ **No**

REPLACE the A/C cycling switch when the intersection of the two lines is below the lower limit. TEST the system for normal operation.

F7 CHECK THE AMBIENT TEMPERATURE

1 Refer to the data plot used to evaluate the system A/C clutch OFF time in Step F5.

- Is the ambient temperature above 26°C (80°F)?

→ **Yes**

This is normal operation for the refrigerant system in high humidity conditions.

→ **No**

DISCHARGE and RECOVER the system to correct an overcharge condition. TEST the system for normal operation.

F8 CHECK FOR A HIGH DISCHARGE PRESSURE

1 Refer to the data plot used to evaluate the system high pressure performance in Step F2.

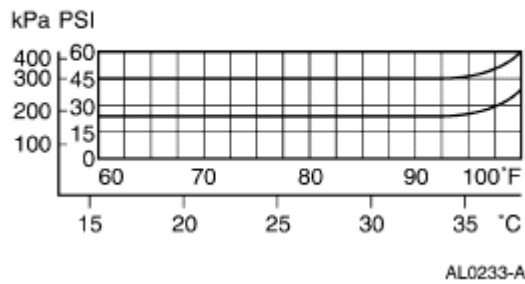
- Is the intersection of the two lines above the upper limit?

→ **Yes**
GO to [F9](#).

→ **No**
GO to [F11](#).

F9 CHECK FOR A NORMAL LOW PRESSURE

1



1 Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for compressor suction (low) pressure.

- Is the intersection of the two lines within the upper and lower limits?

→ **Yes**
REFER to [Section 303-03](#) to diagnose the engine for an overheating condition. TEST the system for normal operation.

→ **No**
GO to [F10](#).

F10 CHECK FOR A NORMAL-TO-LOW SUCTION PRESSURE

1 Refer the to data plot used to evaluate the system low pressure performance in Step F9.

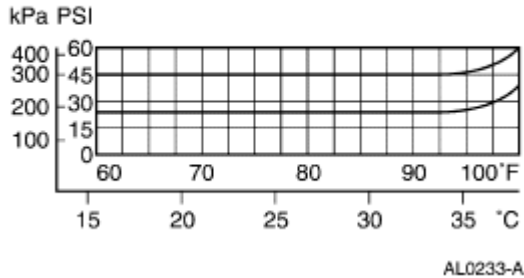
- Is the intersection of the two lines below the lower limit?

→ **Yes**
REPLACE the A/C evaporator core orifice due to a partially restricted or plugged condition. TEST the system for normal operation.

→ **No**
 INSPECT the A/C condenser core (19712) for partially blocked or inadequate air flow. TEST the system for normal operation.

F11 CHECK FOR A NORMAL SUCTION PRESSURE

1



1 Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for compressor suction (low) pressure.

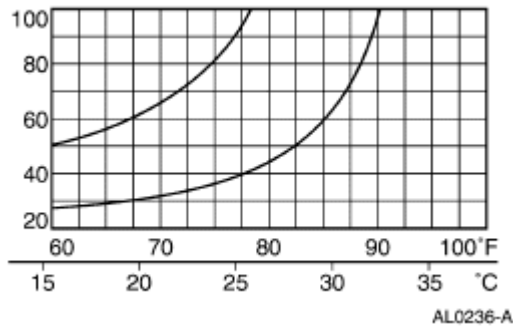
- Is the intersection of the two lines within the upper and lower limits?

→ **Yes**
 GO to [F12](#).

→ **No**
 GO to [F15](#).

F12 CHECK FOR A SLOW A/C CLUTCH CYCLE RATE

1



1 Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for total A/C clutch cycle time (time ON plus time OFF) in seconds.

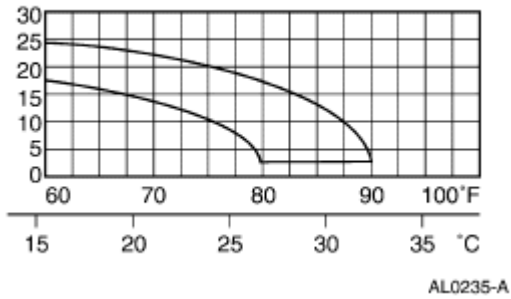
- Is the intersection of the two lines above the upper limit?

→ **Yes**
 REPLACE the evaporator to compressor suction line (19D742) due to a partially restricted or plugged condition. TEST the system for normal operation.

→ **No**
 GO to [F13](#).

F13 CHECK FOR A NORMAL A/C CLUTCH OFF TIME

1



1

Use the recorded data from the refrigerant system tests to plot a vertical line for ambient temperature and a horizontal line for A/C clutch OFF time in seconds.

- **Is the intersection of the two lines within the upper and lower limits?**

→ **Yes**

INSPECT the A/C evaporator core for low or restricted air flow. TEST the system for normal operation.

→ **No**

GO to [F14](#).

F14 CHECK FOR A LONG A/C CLUTCH OFF TIME

1

Refer to the data plot used to evaluate the system A/C clutch OFF time performance in Step F13.

- **Is the intersection of the two lines above the upper limit?**

→ **Yes**

REPLACE the A/C condenser core due to a partially restricted or plugged condition. TEST the system for normal operation.

→ **No**

EVACUATE and RECHARGE the system when the intersection of the two lines is below the lower limit. TEST the system for normal operation.

F15 CHECK FOR A MISSING A/C EVAPORATOR CORE ORIFICE

1

Remove the A/C evaporator core orifice; refer to [Section 412-03](#).



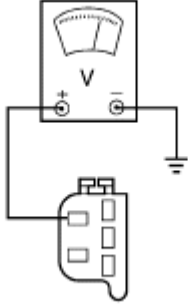


- **Is the A/C evaporator core orifice missing?**

→ **Yes**

REPLACE the A/C evaporator core orifice. TEST the system for normal operation.

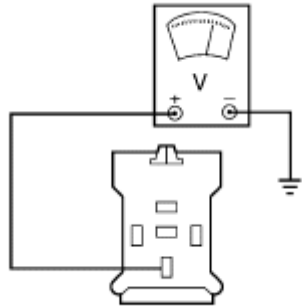
→ **No**
 REPLACE the A/C compressor due to low performance. TEST the system for normal operation.

PINPOINT TEST G: THE BLOWER MOTOR DOES NOT OPERATE

CONDITIONS	DETAILS/RESULTS/ACTIONS
<p>G1 CHECK THE BLOWER MOTOR SPEED CONTROL SUPPLY VOLTAGE</p>	
<p>1 </p> <p>Blower Motor Speed Control C210</p> <p>2 </p> <p>3 </p> <p>AL0118-A</p>	<p>3 Measure the voltage between the blower motor speed control connector Pin C210-1, Circuit 536 (BK/LG) and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 9 volts? <p>→ Yes GO to G15.</p> <p>→ No GO to G2.</p>
<p>G2 CHECK THE BLOWER MOTOR RELAY VOLTAGE</p>	
<p>1 </p> <p>2 </p>	

Blower Motor Relay C2002

3



AL0119-B

3

Measure the voltage between the blower motor relay connector Pin C2002-30, Circuit 181 (BR/O) and ground.

- Is the voltage greater than 9 volts?

→ **Yes**
GO to [G8](#).

→ **No**
GO to [G3](#).

G3 CHECK FUSE 29 (40A)

1



Power Distribution Box Fuse 29 (40A)

2



Power Distribution Box Fuse 29 (40A)

- Is Fuse 29 (40A) OK?

→ **Yes**
REPAIR Circuit 181 (BR/O) for an open. TEST the system for normal operation.

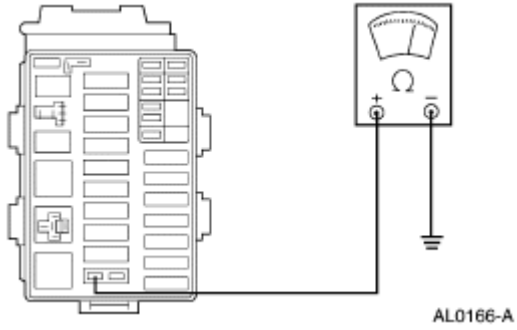
→ **No**
GO to [G4](#).

G4 CHECK CIRCUIT 181 (BR/O) FOR A SHORT

1

1

Measure the resistance between the power distribution box Fuse 29 socket at Circuit 181 (BR/O) and ground.



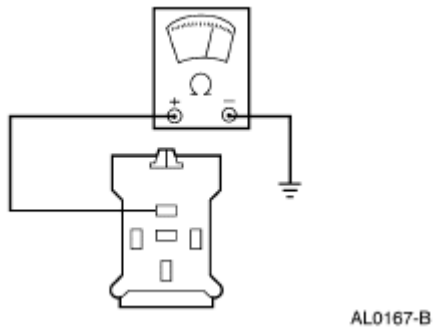
• Is the resistance greater than 10,000 ohms?

→ **Yes**
GO to [G5](#).

→ **No**
REPAIR Circuit 181 (BR/O) for a short to ground. TEST the system for normal operation.

G5 CHECK CIRCUIT 536 (BK/LG) FOR A SHORT

1



1 Measure the resistance between the blower motor relay connector Pin C2002-87, Circuit 536 (BK/LG) and ground.

• Is the resistance greater than 10,000 ohms?

→ **Yes**
GO to [G6](#).

→ **No**
REPAIR Circuit 536 (BK/LG) for a short to ground. TEST the system for normal operation.

G6 CHECK THE BLOWER MOTOR CURRENT DRAW

1



Blower Motor C265

2 Measure the current draw using the

Alternator, Regulator, Battery and Starter Tester (ARBST) between the blower motor connector C265 and a known good battery.

- **Is the current draw 9.2 amps or less?**

→ **Yes**
GO to [G7](#).

→ **No**
REPLACE the blower motor. TEST the system for normal operation.

G7 BYPASS THE BLOWER MOTOR RELAY

1



Blower Motor

2



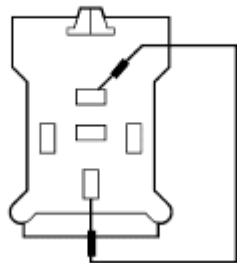
Blower Motor Speed Control C210

3



Power Distribution Box Fuse 29 (40A)

4



AL0171-B

4 Connect a 12-gauge jumper wire between the blower motor relay connector Pin C2002-30, Circuit 181 (BR/O) and Pin C2002-87, Circuit 536 (BK/LG).

- **Does the power distribution box Fuse 29 (40A) open?**

→ **Yes**
REPLACE the A/C blower motor speed control (19E624). TEST the system for normal operation.

→ **No**

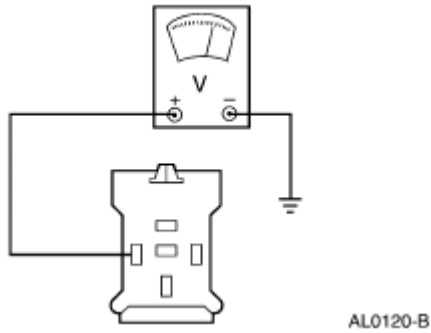
REPLACE the blower motor relay. TEST the system for normal operation.

G8 CHECK THE RELAY SUPPLY VOLTAGE

1



2



2

Measure the voltage between the blower motor relay connector Pin C2002-85, Circuit 364 (BK/LG) and ground.

• Is the voltage greater than 9 volts?

→ **Yes**
GO to [G9](#).

→ **No**
GO to [G12](#).

G9 CHECK CIRCUIT 1423 (W/BK) FOR AN OPEN

1

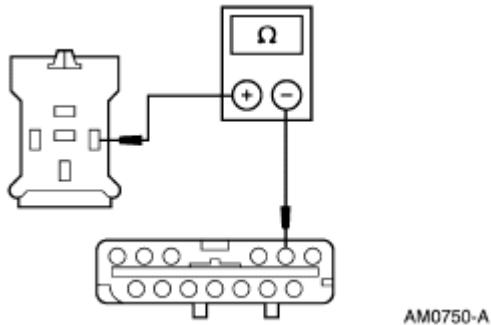


2



EATC Module C273

3



3

Measure the resistance between the blower motor relay connector Pin C2002-86, Circuit 1423 (W/BK) and EATC module connector Pin C273-16.

- Is the resistance less than 5 ohms?

→ **Yes**

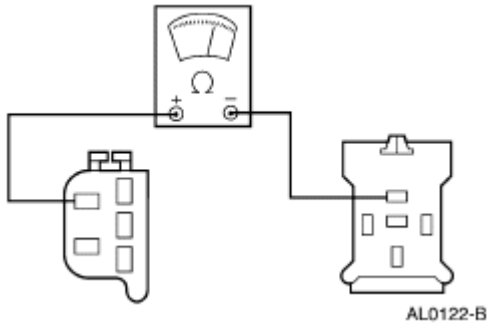
GO to [G10](#).

→ **No**

REPAIR Circuit 1423 (W/BK) for an open.
TEST the system for normal operation.

G10 CHECK CIRCUIT 536 (BK/LG) FOR AN OPEN

1



1

Measure the resistance between the blower motor relay connector Pin C2002-87, Circuit 536 (BK/LG) and the blower motor speed control connector Pin C210-1.

- Is the resistance less than 5 ohms?

→ **Yes**

GO to [G11](#).

→ **No**

REPAIR Circuit 536 (BK/LG) for an open.
TEST the system for normal operation.

G11 BYPASS THE EATC MODULE

1



Blower Motor Relay C2002

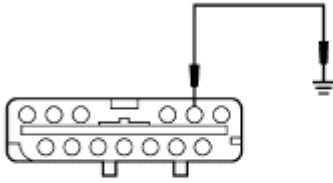
2



3

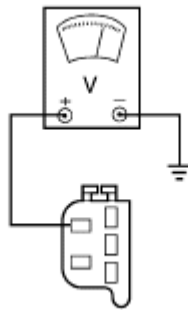
3

Connect a jumper wire between the EATC module connector Pin C273-16, Circuit 1423 (W/BK) and ground.



AM0751-A

4



AL0118-A

4 Measure the voltage between the blower motor speed control connector Pin C210-1, Circuit 536 (BK/LG) and ground.

- Is the voltage greater than 9 volts?

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPLACE the blower motor relay. TEST the system for normal operation.

G12 CHECK FUSE 9 (10A)

1



Fuse Junction Panel Fuse 9 (10A)

2



Fuse Junction Panel Fuse 9 (10A)

- Is Fuse 9 (10A) OK?

→ **Yes**
REPAIR Circuit 364 (BK/LG) for an open. TEST the system for normal operation.

→ **No**
GO to [G13](#).

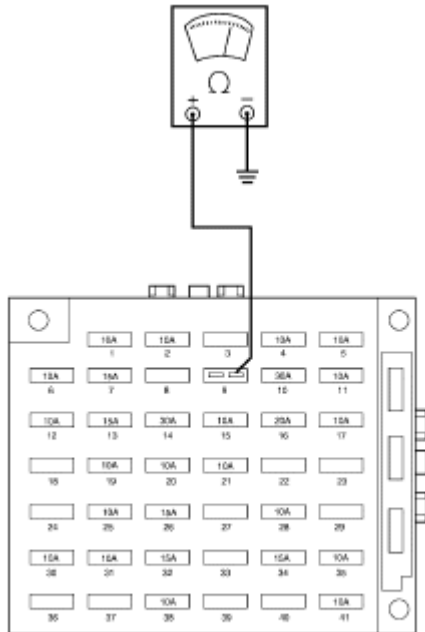
G13 CHECK CIRCUIT 364 (BK/LG) FOR A SHORT

1



EATC Module C272

2



AL0172-B

2

Measure the resistance between the fuse junction panel Fuse 9 socket at Circuit 364 (BK/LG) and ground.

• Is the resistance greater than 10,000 ohms?

→ **Yes**
GO to [G14](#).

→ **No**
REPAIR Circuit 364 (BK/LG) for a short to ground. TEST the system for normal operation.

G14 CHECK THE BLOWER MOTOR RELAY FOR A SHORT

1



Fuse Junction Panel Fuse 9 (10A)

2



EATC Module C272

3



- Does the fuse junction panel Fuse 9 (10A) open?

→ **Yes**

REPLACE the EATC module. TEST the system for normal operation.

→ **No**

REPLACE the blower motor relay. TEST the system for normal operation.

G15 BYPASS THE BLOWER MOTOR SPEED CONTROL

1



2

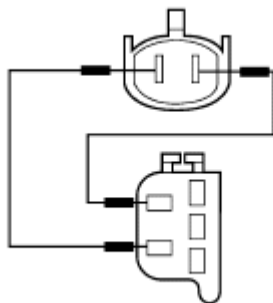


Blower Motor C265

3



4



AL0123-B

4

Using 12-gauge jumper leads, connect the blower motor speed control connector Pin C210-1, Circuit 536 (BK/LG) and Pin C210-2, Circuit 57 (BK) to the blower motor connector C265.

- Does the blower motor run at high speed?

→ **Yes**
GO to [G19](#).

→ **No**
GO to [G16](#).

G16 CHECK THE BLOWER MOTOR SUPPLY CIRCUIT FOR AN OPEN

1

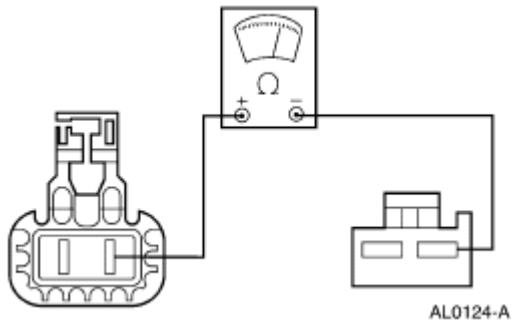


2



Blower Motor Speed Control C264

3



3 Measure the resistance between the blower motor speed control connector C264, Circuit 515 (O) and the blower motor connector C265.

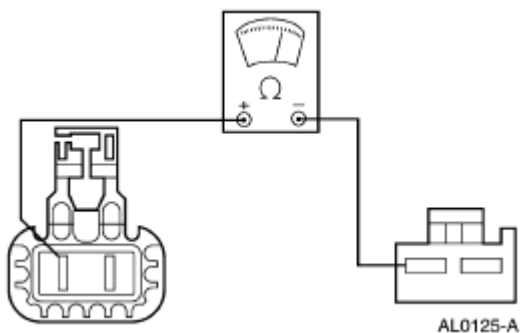
• **Is the resistance less than 5 ohms?**

→ **Yes**
GO to [G17](#).

→ **No**
REPAIR Circuit 515 (O) for an open. TEST the system for normal operation.

G17 CHECK THE BLOWER MOTOR GROUND CIRCUIT FOR AN OPEN

1



1 Measure the resistance between the blower motor speed control connector C264, Circuit 57 (BK) and the blower motor connector C265.

• Is the resistance less than 5 ohms?

→ **Yes**

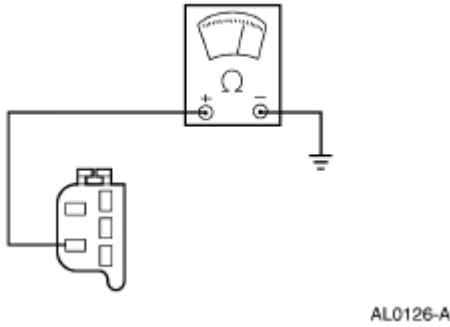
GO to [G18](#).

→ **No**

REPAIR Circuit 57 (BK) for an open. TEST the system for normal operation.

G18 CHECK THE BLOWER MOTOR SPEED CONTROL GROUND CIRCUIT FOR AN OPEN

1



1

Measure the resistance between the blower motor speed control connector Pin C210-2, Circuit 57 (BK) and ground.

• Is the resistance less than 5 ohms?

→ **Yes**

REPLACE the blower motor. TEST the system for normal operation.

→ **No**

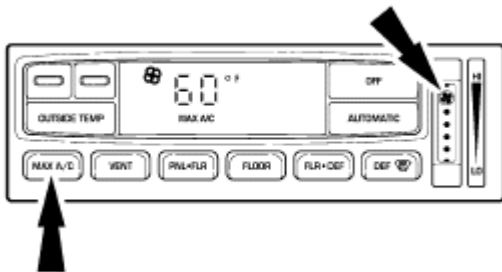
REPAIR Circuit 57 (BK) for an open. TEST the system for normal operation.

G19 CHECK THE EATC BLOWER SPEED SIGNAL

1



2



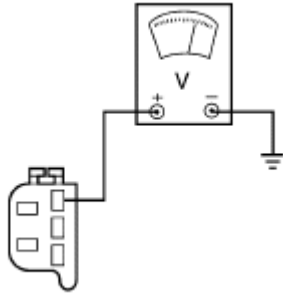
2

Press the override button for MAX A/C operation and adjust the blower motor speed override control to maximum.

3

3

Measure the voltage between the blower motor speed control connector Pin C210-3, Circuit 184 (T/O) and ground.



AL0127-A

- Is the voltage greater than 4 volts?

→ **Yes**
REPLACE the A/C blower motor speed control.
TEST the system for normal operation.

→ **No**
GO to [G20](#).

G20 CHECK CIRCUIT 184 (T/O) FOR AN OPEN

1

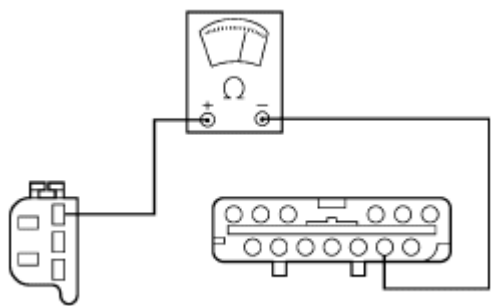


2



EATC Module C272

3



AL0128-B

- 3 Measure the resistance between the EATC module connector Pin C272-9, Circuit 184 (T/O) and the blower motor speed control connector Pin C210-3.

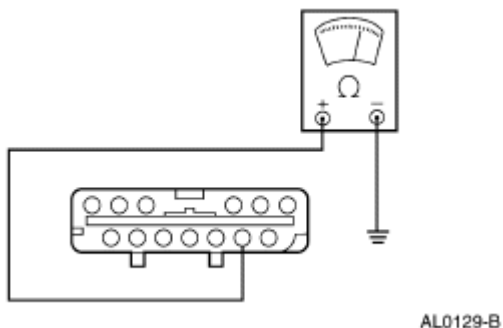
- Is the resistance less than 5 ohms?

→ **Yes**
GO to [G21](#).

→ **No**
REPAIR Circuit 184 (T/O) for an open. TEST the system for normal operation.

G21 CHECK CIRCUIT 184 (T/O) FOR A SHORT

1



1



Measure the resistance between the EATC connector Pin C272-9, Circuit 184 (T/O) and ground.

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

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR Circuit 184 (T/O) for a short to ground. TEST the system for normal operation.

PINPOINT TEST H: THE BLOWER MOTOR OPERATES CONTINUOUSLY IN HIGH SPEED

CONDITIONS	DETAILS/RESULTS/ACTIONS
H1 CHECK BLOWER OPERATION	
<p>1</p>  <p>2</p>  <p>AL0139-A</p>	<p>2</p> <p>Press the override button for MAX A/C operation and adjust the blower motor speed to minimum.</p> <ul style="list-style-type: none"> • Does the blower speed reduce? <p>→ Yes The system is functioning normally.</p>

→ **No**
GO to [H2](#).

H2 CHECK CIRCUIT 184 (T/O) FOR A SHORT TO POWER

1



2

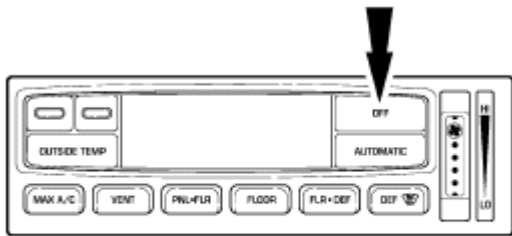


Blower Motor Speed Control C210

3

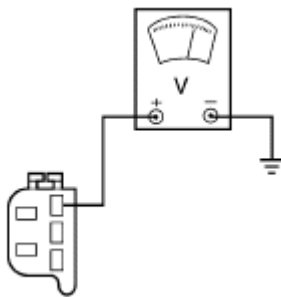


4



AM0694-A

5



AL0127-A

4 Turn the EATC module off by pressing the OFF button.

5 Measure the voltage between the blower motor speed control connector Pin C210-3, Circuit 184 (T/O) and ground.

- Is the voltage greater than 0 volt?

→ **Yes**
REPAIR Circuit 184 (T/O) for a short to B+. TEST the system for normal operation.

→ **No**
GO to [H3](#).

H3 CHECK THE BLOWER MOTOR SPEED CONTROL

1



2



Blower Motor Speed Control C210

3

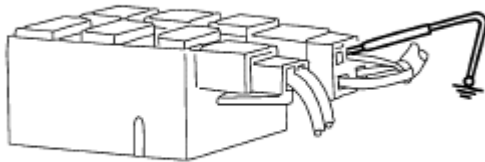


4



AL0139-A

5



AL0145-B

4 Press the override button for MAX A/C operation and adjust the blower motor speed to minimum.

5 Without disconnecting the blower motor speed control connector C210 from the blower motor speed control, use a jumper lead to connect Pin C210-3, Circuit 184 (T/O) to ground.


- Does the blower motor operation stop or decrease substantially?

→ **Yes**
GO to [H4](#).


→ **No**
REPLACE the A/C blower motor speed control.
TEST the system for normal operation.

H4 CHECK CIRCUIT 184 (T/O) FOR AN OPEN

1




2



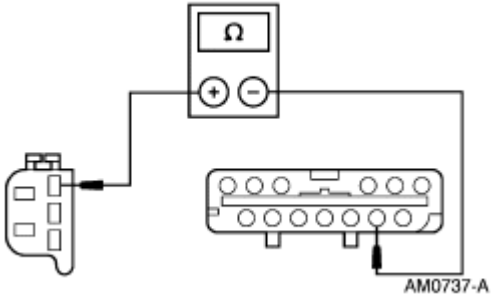
EATC Module C272

3



Blower Motor Speed Control C210

4




4 Measure the resistance between the EATC module connector Pin C272-9, Circuit 184 (T/O) and the blower motor speed control connector Pin C210-3.

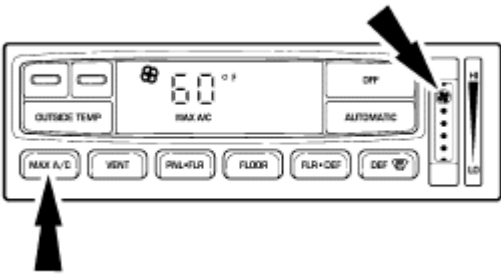
- Is the resistance less than 5 ohms?

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

→ **No**
REPAIR Circuit 184 (T/O) for an open. TEST the system for normal operation.

PINPOINT TEST J: NO OPERATION IN SOME BLOWER SETTINGS

CONDITIONS	DETAILS/RESULTS/ACTIONS
J1 CHECK THE BLOWER OPERATION	
<p>1</p>  <p>2</p>	<p>2 Press the override button for MAX A/C operation and rotate the blower motor speed override control to HI.</p>



AL0137-A

- Does the blower speed increase as you rotate the blower motor speed override control toward HI?

→ **Yes**
The system is functioning properly.

→ **No**
GO to [J2](#).

J2 CHECK THE BLOWER MOTOR SPEED CONTROL INPUT VOLTAGE

1



2

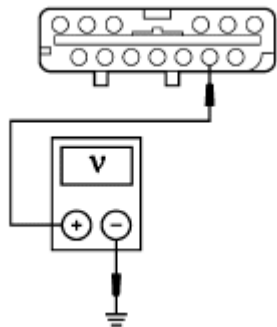


EATC Module C272

3



4



AM0735-A

- 4 Measure the voltage between the EATC module connector Pin C272-9, Circuit 184 (T/O) and ground.

- Is the voltage greater than 4.6 volts?

→ **Yes**
GO to [J5](#).

→ **No**
GO to [J3](#).

J3 CHECK CIRCUIT 184 (T/O) FOR A SHORT TO GROUND

1

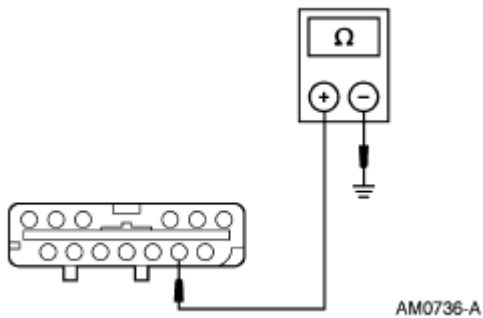


2



Blower Motor Speed Control C210

3



3 Measure the resistance between the EATC module connector Pin C272-9, Circuit 184 (T/O) and ground.

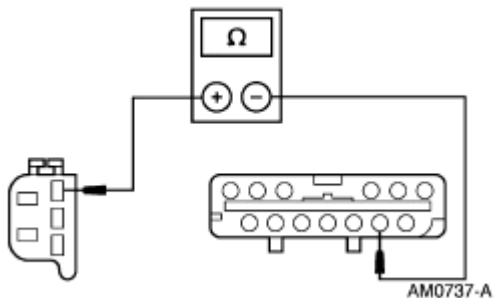
• **Is the resistance greater than 10,000 ohms?**

→ **Yes**
GO to [J4](#).

→ **No**
REPAIR Circuit 184 (T/O) for a short to ground.
TEST the system for normal operation.

J4 CHECK CIRCUIT 184 (T/O) FOR AN OPEN

1



1 Measure the resistance between the EATC module connector Pin C272-9, Circuit 184 (T/O) and the blower motor speed control connector Pin C210-3.

- Is the resistance less than 5 ohms?

→ **Yes**
 REPLACE the A/C blower motor speed control.
 TEST the system for normal operation.

→ **No**
 REPAIR Circuit 184 (T/O) for an open. TEST the system for normal operation.

J5 CHECK FOR DISCONTINUITIES IN THE CONTROL SIGNAL

1

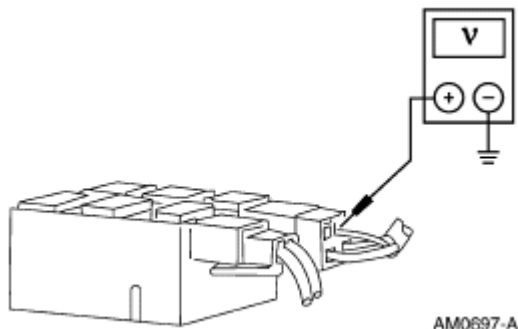


2



EATC Module C272

3

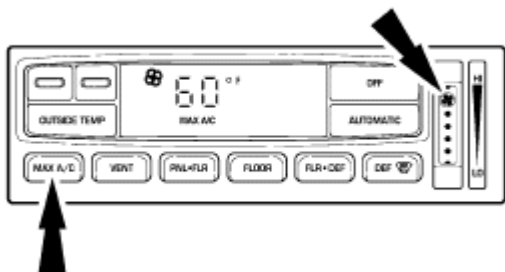


3 Without disconnecting the blower motor speed control connector C210 from the blower motor speed control, measure the voltage between the blower motor speed control Pin C210-3, Circuit 184 (T/O) and ground.

4



5



5 Press the override button for MAX A/C operation and adjust the blower motor speed to maximum.

6

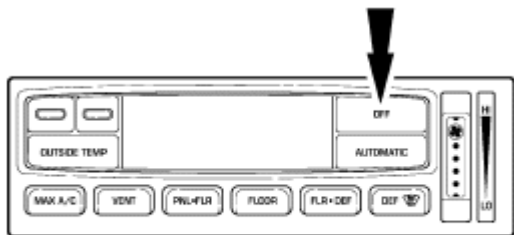
6 Slowly adjust the blower motor speed to minimum while observing the voltmeter.

AL0137-A



AM0696-A

7



AM0694-A

Watch for discontinuities in the voltage as it decreases. The voltage should decrease in steps to a point less than 5 volts.

7 Press the OFF button while observing the voltmeter. It should go to 0 volts and the blower motor should go off.

- Did the voltage continually decrease without discontinuities?

→ **Yes**
GO to [J6](#).

→ **No**
REPLACE the EATC module. TEST the system for normal operation.

J6 INSPECT THE CONNECTIONS

1



2



EATC Module C272

3



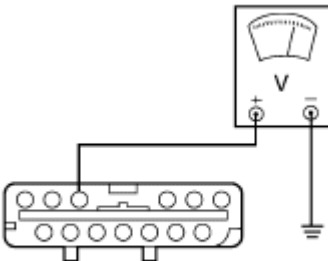


Blower Motor Speed Control C210

4 Inspect the blower motor speed control connector Pin C210-3, Circuit 184 (T/O) and

	<p>the EATC connector Pin C272-9 for signs of damage, loose fits, or improper installation.</p> <ul style="list-style-type: none"> • Are the connector pins undamaged and installed properly? <p>→ Yes REPLACE the EATC module. TEST the system for normal operation.</p> <p>→ No REPAIR the damaged or loose connector pins. TEST the system for normal operation.</p>
--	---

PINPOINT TEST K: THE TEMPERATURE SET POINT DOES NOT REPEAT AFTER THE TURNING IGNITION SWITCH OFF

CONDITIONS	DETAILS/RESULTS/ACTIONS
K1 CHECK THE MEMORY BACKUP SUPPLY TO THE EATC MODULE	
<p>1 </p> <p>2  EATC Module C272</p> <p>3  AL0074-B</p>	<p>3 Measure the voltage between the EATC module connector Pin C272-24, Circuit 973 (R) and ground.</p> <ul style="list-style-type: none"> • Is the voltage greater than 10 volts? <p>→ Yes REPLACE the EATC module. TEST the system for normal operation.</p> <p>→ No GO to K2.</p>

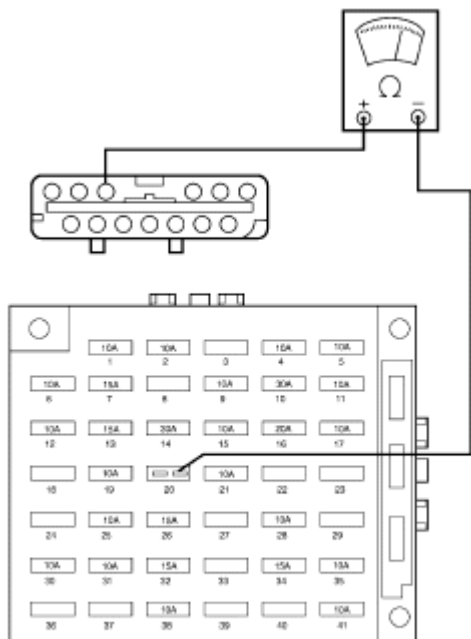
K2 CHECK CIRCUIT 973 (R) FOR AN OPEN

1



Junction Panel Fuse 20 (10A)

2



AL0144-B

2

Measure the resistance between the fuse junction panel Fuse 20 socket at Circuit 973 (R) and the EATC connector Pin C272-24.

• **Is the resistance less than 5 ohms?**

→ **Yes**
REPLACE the EATC module. TEST the system for normal operation.

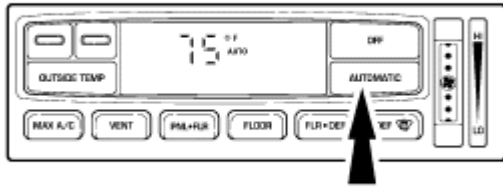
→ **No**
REPAIR Circuit 973 (R) for an open. TEST the system for normal operation.

PINPOINT TEST L: THE TEMPERATURE DISPLAY WILL NOT SWITCH BETWEEN CELSIUS AND FAHRENHEIT

CONDITIONS	DETAILS/RESULTS/ACTIONS
L1 CHECK THE EATC °C TO °F DISPLAY	
1	



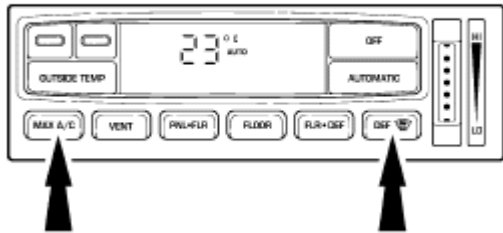
2



AL0055-A

2 Press the AUTOMATIC button.

3



AL0142-A

3 Press the MAX A/C and DEFROST buttons simultaneously for at least 0.75 second.

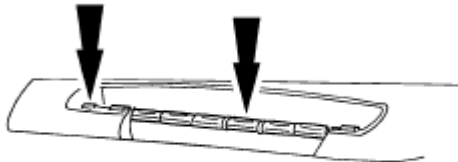
- Did the display change between °C and °F?

→ **Yes**
GO to [L2](#).

→ **No**
REPLACE the EATC module. TEST the system for normal operation.

L2 CHECK THE ENGLISH/METRIC FUNCTION

1



AL0134-A

1 Press the vehicle setting button on the message center to select MODE. Press the RESET button to change MODE.

- Did the EATC module display change

	<p>between °C and °F?</p> <p>→ Yes The system is functioning properly.</p> <p>→ No GO to the Module Communication Network Diagnostics in Section 418-00.</p>
--	---

Component Tests

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 are good and did not require replacement. If a heater core leak is suspected, the heater core must be tested by following the plugged heater core component test before the heater core pressure test. Perform 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.

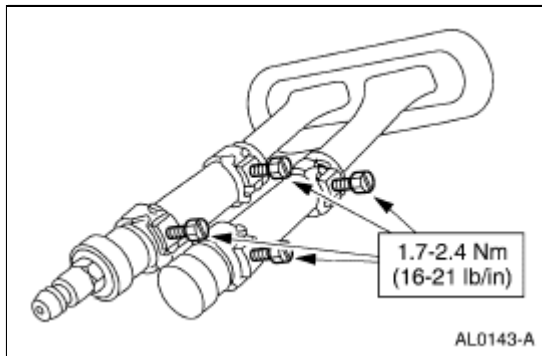
1. Check to see that the engine coolant is at the proper level.
2. Start the engine and turn on the heater.
3. When the engine coolant reaches operating temperature, feel the heater core outlet hose to see if it is hot.
If it is not hot:
 - the heater core may have an air pocket
 - the heater core may be plugged, or
 - the thermostat is not working properly.

Heater Core—Pressure Test

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

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

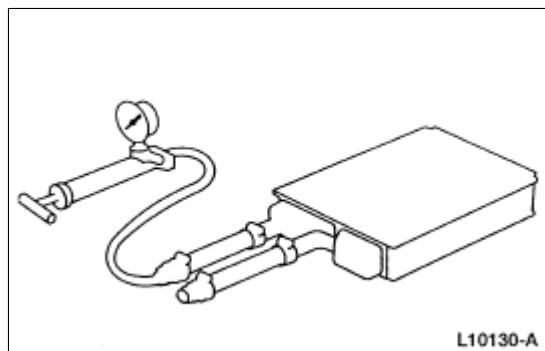
Drain the coolant from the cooling system.
2. Disconnect the heater water hoses from the heater core; refer to [Section 412-02](#).
3. Install a short piece of heater water hose, approximately 101 mm (4 inches) long on each heater core tube.
4. Fill the heater core and heater water hoses with water and 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 241 kPa (35 psi) of air pressure into the heater core.
7. Observe the pressure gauge for a minimum of three 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 perform the bench test.

Heater Core—Bench Test

1. Remove the heater core from the vehicle; 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 241 kPa (35 psi) of air pressure to the heater core. Submerge the heater core in water.
5. If a leak is observed, replace the heater core.



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

1. Discharge and recover the refrigerant; refer to Discharging and Recovery in this section.
2. **NOTE:** DO NOT leak test an A/C evaporator core with the suction accumulator/drier (19C836) attached to the core tubes.

Disconnect the suspect A/C evaporator core or A/C condenser core from the A/C system; refer to [Section 412-03](#).

3. Clean the spring lock couplings; 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.

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 replacing the 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; 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 for leaks at the compressor shaft seal and the compressor center seal.
7. If a shaft seal leak is found, install a new shaft seal; refer to [Section 412-03](#). If an external leak is found at the center joint of the A/C compressor, install a new A/C compressor.
8. When the leak test is complete, recover the refrigerant from the compressor.

A/C Compressor—Rotating Torque Check

Check the rotational torque of a used A/C compressor if excessive drag is suspected.

1. Recover the refrigerant; refer to Discharging and Recovery in this section. Observe all safety precautions.
2.  **CAUTION: Use care not to allow dirt to enter the A/C compressor. Contamination can result in component failure and damage to the A/C system.**

Remove the A/C manifold and tube (19D734) from the A/C compressor.

3. With the A/C clutch disengaged, rotate the compressor shaft and note the torque required to rotate the shaft one complete revolution. Do not measure the starting torque.
4. If the rotational torque exceeds 10 Nm (7 lb-ft), replace the A/C compressor.
5. If the rotational torque is less than specified, excessive drag does not exist in the A/C compressor. Install the A/C manifold and tube and leak test, evacuate and charge the system; refer to Evacuation and Charging in this section.
6. Check the system for normal operation.

