Heater and Air Conditioning

This vehicle has a compact heater assembly with the heater and evaporator together.
Also refer to 22 section (Air Conditioning).

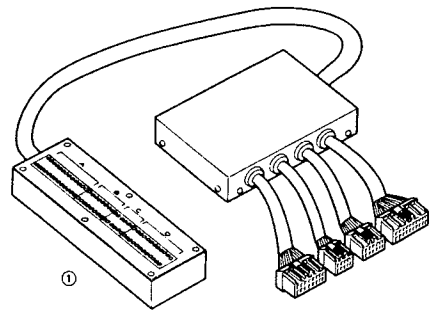
Section 21 -
All information
in Section 22

Air Conditioning

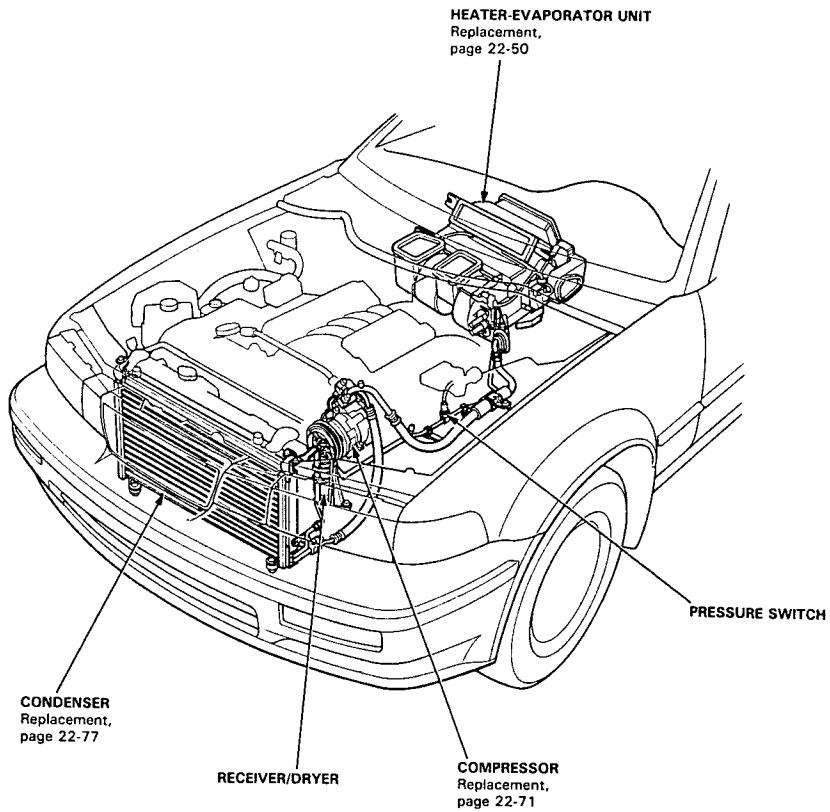
*: Read SRS precautions before working in these areas.

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAJ–PT3010A	Test harness	1	22-39, 22-43, 22-45

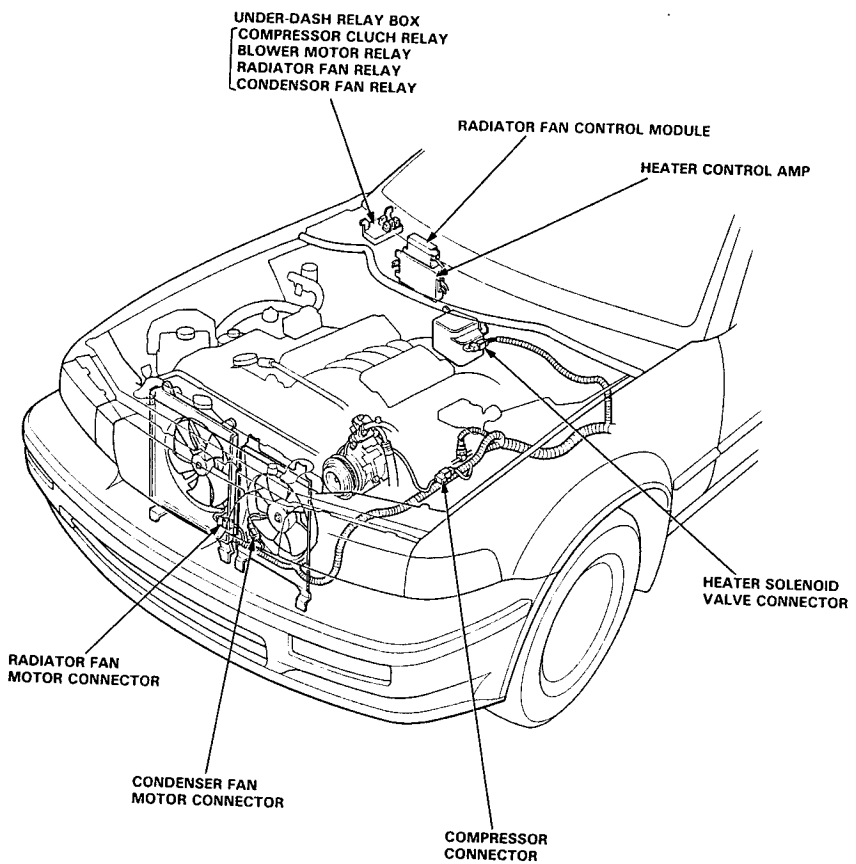


Illustrated Index

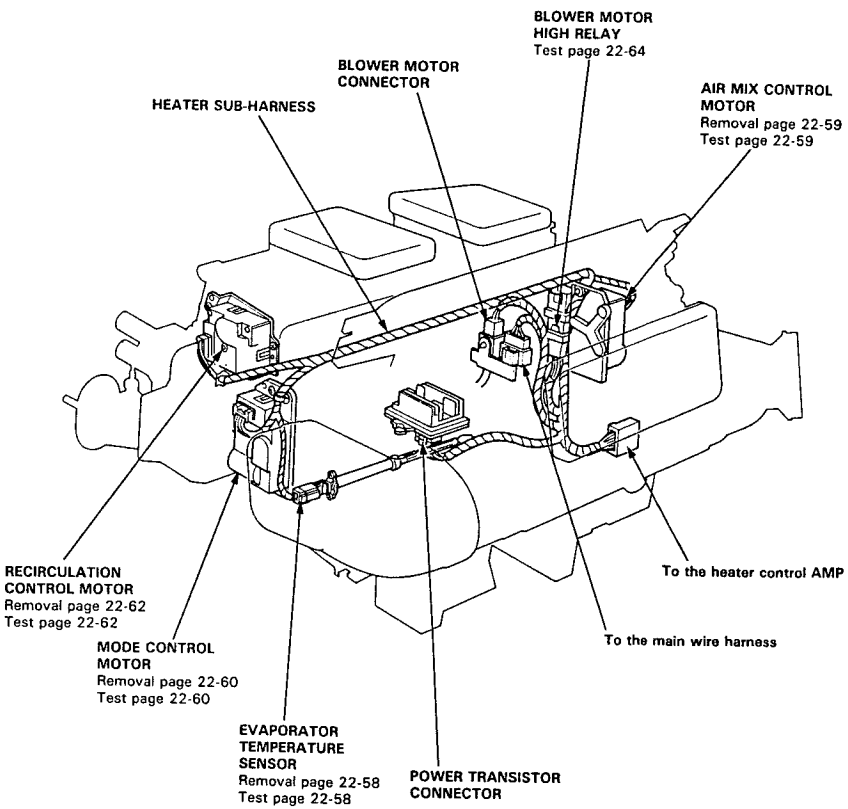


Wiring/Connector Locations

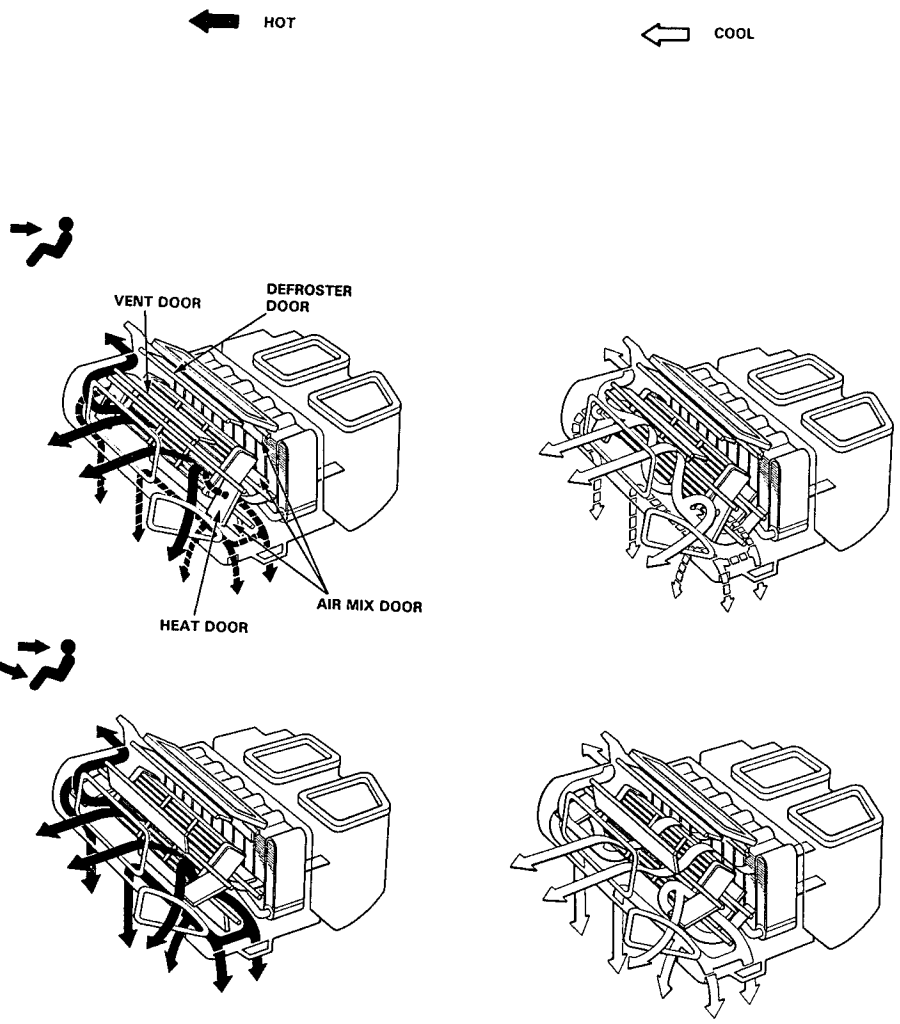
Engine Compartment

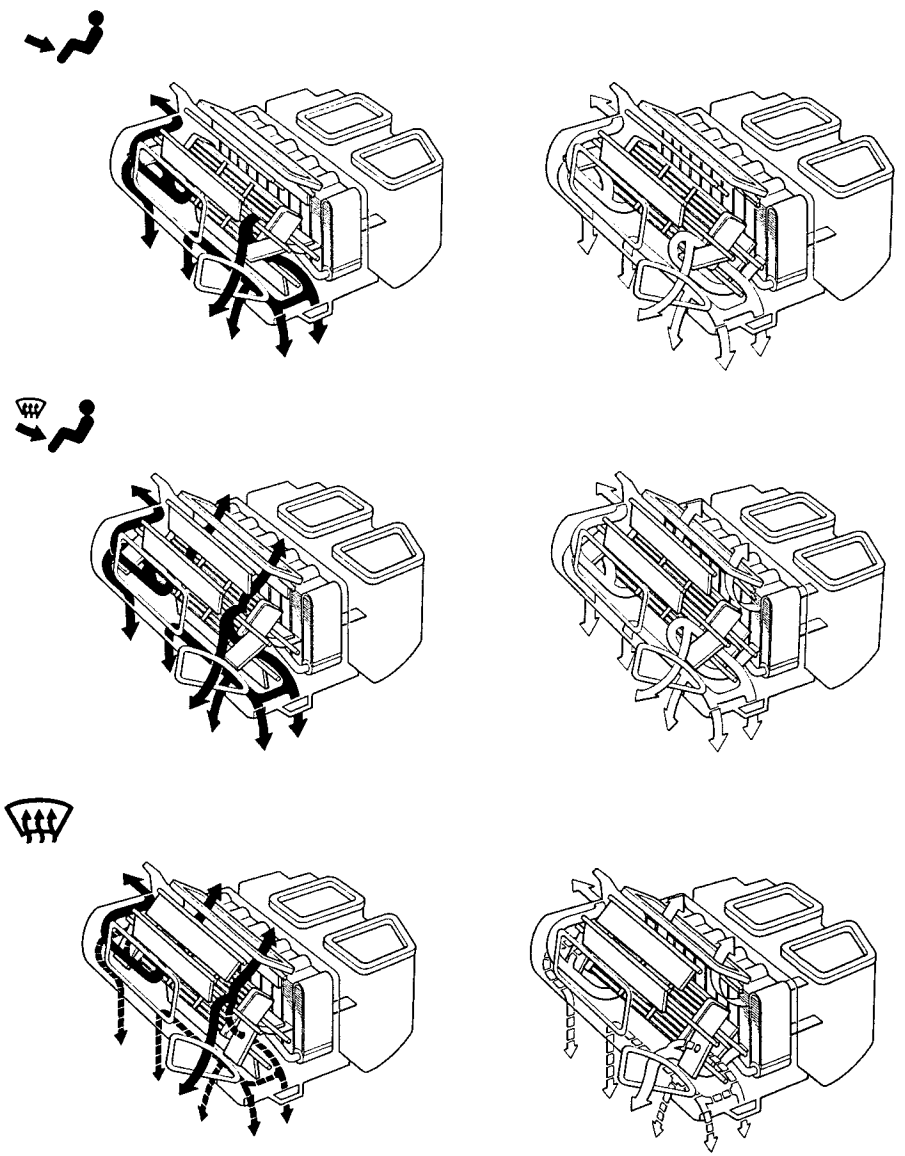


Heater-Evaporator Unit

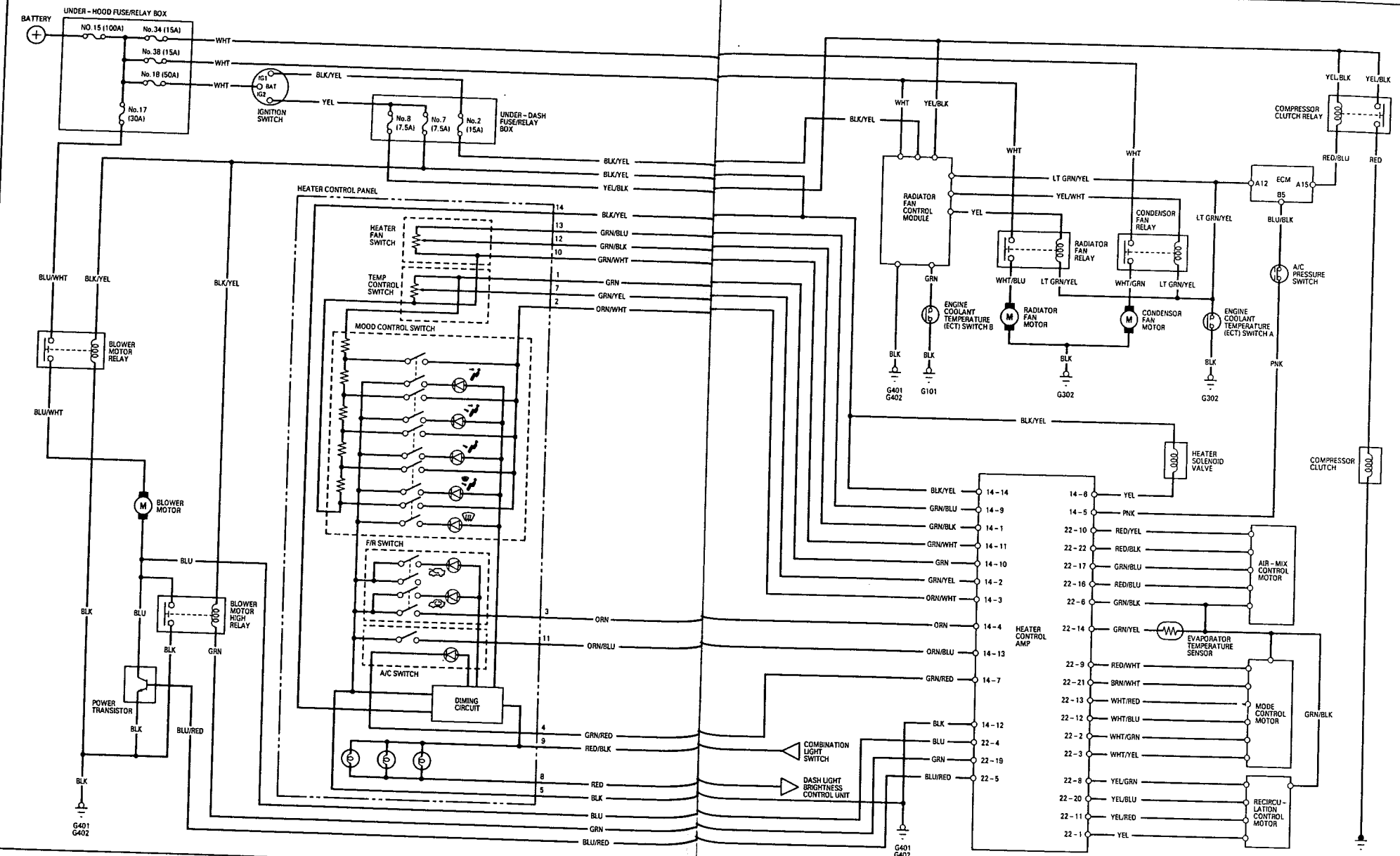


Heater-Evaporator Door Positions





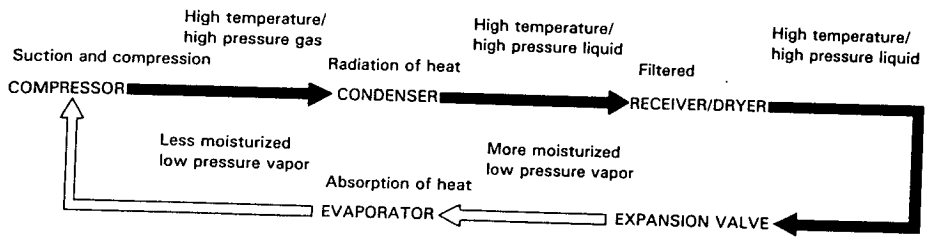
Circuit Diagram

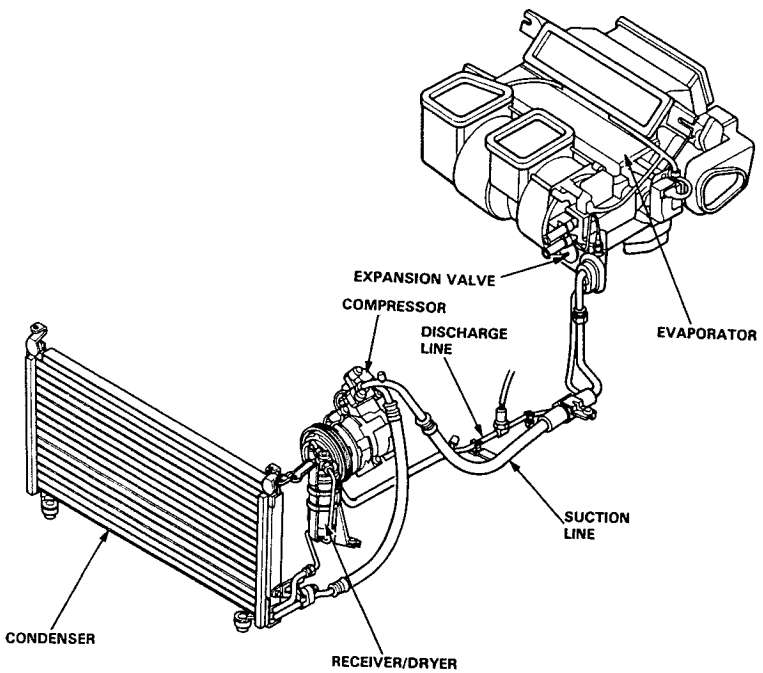


Description

Outline

The air conditioning system delivers cooled air into the passenger compartment by circulating refrigerant through the system as shown below.



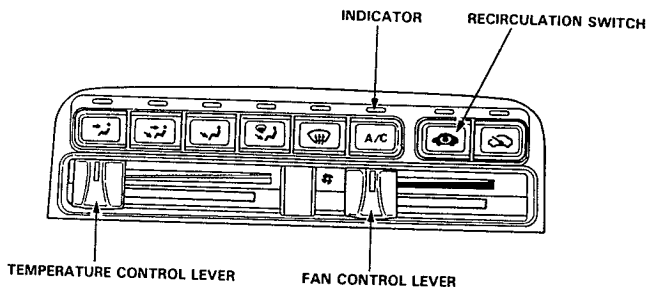


Troubleshooting

Self-diagnosis Circuit Check

This air conditioner system has a built-in self-diagnosis feature. To run it, set the controls in the following positions:

- TEMPERATURE CONTROL LEVER ——→ MAX HOT
- FAN CONTROL LEVER ——→ OFF
- RECIRCULATION SWITCH ——→ RECIRCULATE



Turn the ignition switch ON, then alternate the RECIRCULATION SWITCH between FRESH and RECIRCULATE three times within five seconds after turning the ignition switch ON. The A/C indicator light will come on for an instant, and then go off. Wait for at least one minute to see if any problem codes are displayed.

If any problems are found in the component circuits listed below, the A/C indicator light will flash the code, stop, then repeat the code. The number of times the indicator light flashes indicates the problem code. (See code chart below.)

NOTE: If there are two or more problems simultaneously, the indicator light will flash only the lowest number code.

CODE	COMPONENT CIRCUIT WITH PROBLEM	POSSIBLE CAUSE	Refer to PAGE
1	EVAPORATOR TEMPERATURE SENSOR	Open or short circuit	22-16
2	AIR MIX CONTROL MOTOR	Open or short circuit	22-18
3	MODE CONTROL MOTOR	Open or short circuit	22-20
4	RECIRCULATION CONTROL MOTOR	Open or short circuit	22-22
5	BLOWER MOTOR	Open circuit	22-24

To turn the self-diagnosis function OFF, change any of the following controls:

- TEMPERATURE CONTROL LEVER ——→ COLD
- FAN CONTROL SWITCH ——→ ON
- IGNITION SWITCH ——→ OFF

Troubleshooting

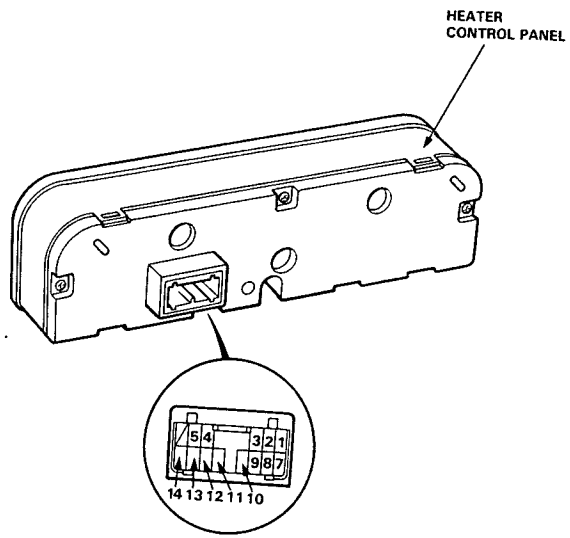
Reference Chart

Use this chart if the self-diagnosis checks don't identify any cause for the symptom.
Across each row in the chart, the potential sources of a symptom are ranked in the order they should be inspected, in starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the component is OK, try component ②, etc.

SYSTEM / SYMPTOM	BLOWER MOTOR	POWER TRANSISTOR	RECIRCULATION CONTROL MOTOR	MODE CONTROL MOTOR	AIR MIX CONTROL MOTOR	EVAPORATOR TEMPERATURE SENSOR	HEATER CONTROL AMP	PAGE
System does not work at all.							①	22-34
Blower motor does not run at all.	①						②	22-24
No voltage is indicated on the BLU/WHT wire at the blower motor.	①							22-26
Blower motor does not opereate on all speeds.	①							22-28
Blower motor only runs in TOP speed position; does not run in any other speed position.		①					②	22-32
Recirculation function does not work properly.			①				②	22-22
No air direction control.				①			②	22-20
No hot air from blower.					①		②	22-18
No cold air from blower.					①	②	③	22-18

SYSTEM / SYMPTOM	FAN MOTOR	RADIATOR FAN CONTROL MODULE	A/C SYSTEM PRESSURE	HEATER CONTROL AMP	ENGINE COOLANT TEMPERATURE (ECT) SWITCH A	PAGE
Both fans do not run for engine cooling, but they both run with A/C ON.					①	22-41
Both fans do not run at all.	②	①				22-42
Condenser fan motor does not run with A/C system ON.	①	②				22-38
Radiator fan motor does not run with A/C system ON.	①	②				22-35
A/C compressor clutch does not engage.			①	②		22-44
A/C system does not work (Compressor and both fan motors)			①	②		22-46

Heater Control Panel Input/Output Signals

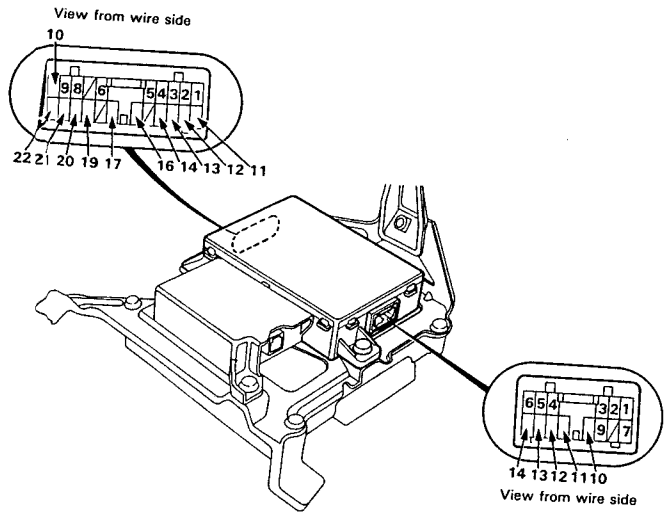


View from wire side

Wire Position		Signal		Wire Position		Signal	
1	GRN	+5 V	INPUT	8	RED	DASH LIGHT BRIGHTNESS CONTROL UNIT	OUTPUT
2	ORN/WHT	MODE	OUTPUT	9	RED/BLK	COMBINATION LIGHT SWITCH	INPUT
3	ORN	RECIRC	OUTPUT	10	GRN/WHT	SENSOR GND	——
4	GRN/RED	A/C LED	OUTPUT	11	ORN/BLU	A/C ON	INPUT
5	BLK	GND	——	12	GRN/BLK	BLOWER CONTROL	OUTPUT
6				13	GRN/BLU	HEATER FAN SWITCH	INPUT
7	GRN/YEL	TEMP CONTROL	OUTPUT	14	BLK/YEL	IG2	INPUT

Troubleshooting

Heater Control AMP Input/Output Signals



22P

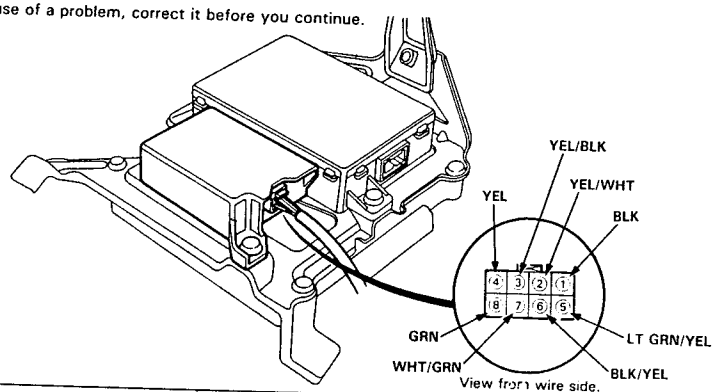
Wire Position		Signal		Wire Position		Signal	
1	YEL	FRESH POSITION	OUTPUT	12	WHT/BLU	MODE 2	OUTPUT
2	WHT/GRN	MODE 3	OUTPUT	13	WHT/RED	MODE 1	OUTPUT
3	WHT/YEL	MODE 4	OUTPUT	14	GRN/YEL	EVAPORATOR SENSOR	OUTPUT
4	BLU	BLOWER FEEDBACK	INPUT	15			
5	BLU/RED	POWER TRANSISTOR BASE	OUTPUT	16	RED/BLU	AIR MIX POSITION	INPUT
6	GRN/BLK	SENSOR GND	——	17	GRN/BLU	+5 V	OUTPUT
7				18			
8	YEL/GRN	RECIRC.	OUTPUT	19	GRN	BLOWER HIGH RELAY	INPUT
9	RED/WHT	MODE DEF	OUTPUT	20	YEL/BLU	FRESH	OUTPUT
10	RED/YEL	AIR MIX HOT	OUTPUT	21	BRN/WHT	MODE VENT	OUTPUT
11	YEL/RED	RECIRC. PSITION	OUTPUT	22	RED/BLK	AIR MIX COOL	OUTPUT

14P

Wire Position		Signal		Wire Position		Signal	
1	GRN/BLK	FAN CONTROL POSITION	INPUT	8			
2	GRN/YEL	TEMP CONTROL POSITION	INPUT	9	GRN/BLU	HEATER FAN SWITCH	OUTPUT
3	ORN/BLU	MODE POSITION	INPUT	10	GRN	+5 V	OUTPUT
4	ORN	RECIRC.	OUTPUT	11	GRN/WHT	SENSO GND	——
5	PNK	ECM (ACS)	INPUT	12	BLK	GND	——
6	YEL	HEATER VALVE SOLENOID	INPUT	13	ORN/BLU	A/C SWITCH	OUTPUT
7	GRN/RED	A/C SWITCH LED	INPUT	14	BLK/YEL	IG2	INPUT

Radiator Fan Control Module Input Tests

NOTE: Perform the following tests with the radiator fan control module connected and the ignition switch ON and th
A/C switch OFF.
If you find the cause of a problem, correct it before you continue.



WIRE POSITION	TEST CONDITION	DESIRED RESULTS	CORRECTIVE ACTION IF DESIRED RESULTS ARE NOT OBTAINED
① BLK	Check for voltage to body ground.	Should have less than 1 volt.	Repair open to body ground.
⑦ WHT/GRN	Check for battery voltage.	Should have battery voltage.	Check No. 39 fuse, if OK repair open in WHT wire.
⑥ BLK/YEL	Check for battery voltage (Ignition switch—ON)		Check No. 2 fuse, if OK repair open in BLK/YEL wire.
③ YEL/BLK	Check for battery voltage (Ignition switch—ON)		Check No. 8 fuse, if OK repair open in YEL/BLK wire.
② YEL/WHT	Check for battery voltage (Ignition switch—ON)		Replace the radiator fan control module. Before you connect the new radiator fan control module, check continuity between the YEL/WHT (or YEL) wire and ground, using the 20 k scale on your ohmmeter. There should be no continuity. If there is continuity, the new radiator fan control module will be damaged when you connect it.
④ YEL	Check for battery voltage (Ignition switch—ON)		
⑤ LT GRN/YEL	Connect to body ground.	Condenser fan and cooling fan should come on.	Check for open in the LT GRN/YEL between the radiator fan control module and condenser fan relay or radiator fan relay. If OK, check for open in the YEL/WHT between the radiator fan control module and condenser fan relay or YEL between radiator fan control moduel and radiator fan relay. If OK, test condenser fan relay or radiator fan relay.
⑧ GRN	Check for voltage.	Approx 11 V (engine coolant temperature below 108°C)	Faulty engine coolant temperature (ECT) switch, short to body ground or fauly radiator fan control module.

Troubleshooting

Flowchart—Evaporator Temperature Sensor

Self-diagnosis A/C LED light indicates code 1: A problem in the evaporator sensor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

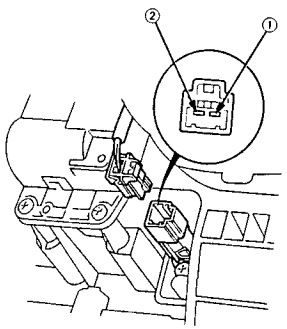
The evaporator temperature sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the evaporator outlet air temperature increases.

Self-diagnosis circuit check indicates a problem in the evaporator temperature sensor.

Disconnect 2P connector from the evaporator temperature sensor.

Measure resistance between the No. ① and No. ② terminal of sensor.

*Dip the sensor in icy water and measure the resistance. Then poor hot water on the sensor and check for change in resistance



Sensor resistance should be within specification as shown.

NO → **Replace the evaporator temperature sensor.**

YES

Turn the ignition switch ON.

Measure voltage between GRN/YEL wire terminal (+) in the other half of the connector and body ground.

Is there 4–6 V?

NO → To page 22-17

YES

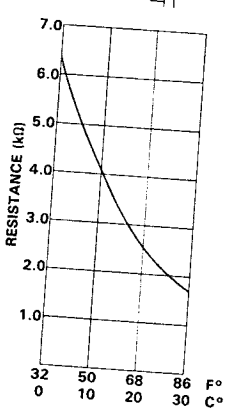
Measure voltage between GRN/YEL wire terminal (+) and GRN/BLK wire terminal (–).

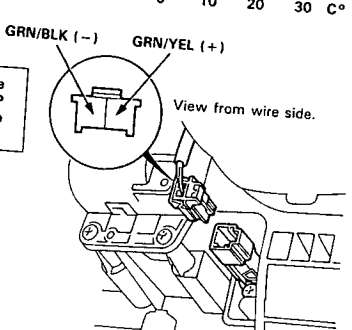
Is there 4–6 V?

NO → **Repair open in the GRN/BLK wire between the heater control AMP and the evaporator temperature sensor.**

YES

Substitute a known-good heater control AMP and recheck. If symptom/ indication goes away, replace the original heater control AMP.





From page 22-16

Turn the ignition switch OFF.

Remove the heater control AMP.

Disconnect the 22P connector from the heater control AMP.

Check the GRN/YEL wire for continuity to body ground.

Is there continuity?

YES → **Repair short in the GRN/YEL wire between the evaporator temperature sensor and the heater control AMP.**

NO

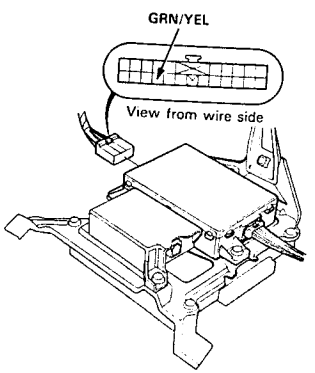
Check for continuity in the GRN/YEL wire between the evaporator temperature sensor and heater control AMP.

Is there continuity?

NO → **Repair open in the GRN/YEL wire between the evaporator temperature sensor and the heater control AMP.**

YES

Substitute a known-good heater control AMP and recheck. If symptom/indication goes away, replace the original heater control AMP.



Troubleshooting

Flowchart—Air Mix Control Motor

Self-diagnosis A/C LED light Indicates code 2: A problem in the air mix control motor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The air mix control motor regulates the mixture of cool/hot air according to output from the heater control AMP.

Self-diagnosis circuit check indicates a problem in the air mix control motor.

Disconnect the 7P connector from the air mix control motor.

Test the air mix control motor. (see page 22-59)

Is the motor OK? NO → **Replace the air mix control motor. If the air mix control door is stuck, repair it.**

YES

Remove the heater control AMP.

Disconnect the 22P connector from the heater control AMP

Check each wire for continuity between the air mix motor and the heater control AMP:
- GRN/BLU wire
- RED/BLU wire
- GRN/BLK wire
- RED/YEL wire
- RED/BLK wire

Is there continuity? NO → **Repair any open in the wire(s) between the air mix control motor and the heater control AMP.**

YES

At either connector, check each wire for continuity to body ground.
- GRN/BLU wire
- RED/BLU wire
- RED/YEL wire
- RED/BLK wire

Is there continuity? YES → **Repair any short in the wire(s) between the air mix control motor and the heater control AMP.**

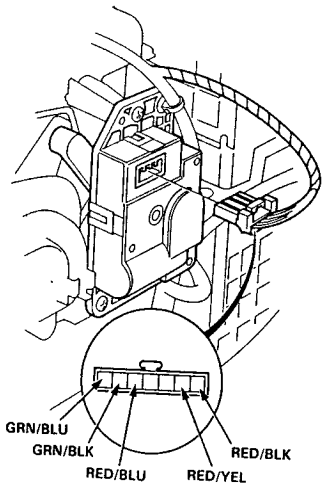
NO

Disconnect the 14P connector from the heater control AMP.

Remove the heater control panel. (see page 22-49).

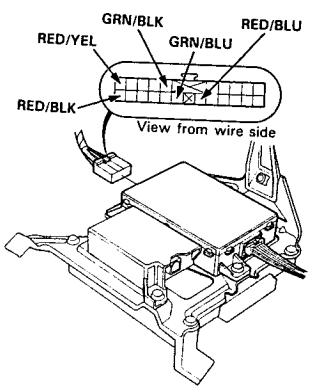
Disconnect the 14P connector from the heater control panel.

To page 22-19



View from wire side.

22P CONNECTOR



View from wire side

From page 22-18

Check each wire for continuity between the heater control AMP and the heater control panel.
- GRN/YEL wire
- GRN/WHT wire
- GRN wire

Is there continuity? NO → **Repair any open in the wire(s) between the heater control AMP and the heater control panel.**

YES

At either connector, check each wire for continuity to body ground and to each other.
- GRN/YEL wire
- GRN/WHT wire
- GRN wire

Is there continuity? YES → **Repair any short in the wire(s) between the heater control AMP and the heater control panel.**

NO

Reconnect the 14P connector to the heater control AMP.

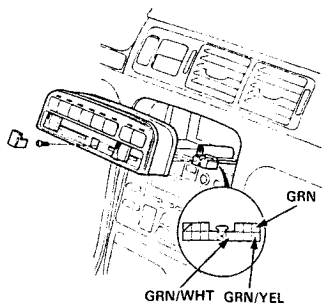
Turn the ignition switch ON.

Measure voltage between the GRN wire terminal heater control panel connector harness half and body ground.

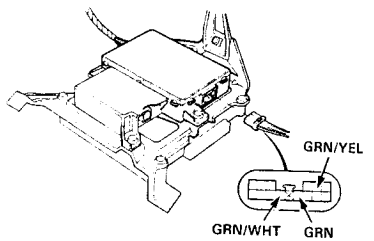
Is there 4—6 V? NO → **Substitute a known-good heater control AMP and recheck. If symptom/indication goes away, replace original heater control AMP.**

YES

Substitute a known-good heater control panel and recheck. If symptom/indication goes away, replace original heater control panel.



View from wire side



View from wire side

14P CONNECTOR

Troubleshooting

Flowchart—Mode Control Motor

Self-diagnosis A/C LED light indicates code 3: A problem in the mode control motor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The mode control motor controls the outlet air direction and volume according to output from the heater control AMP.

Self-diagnosis circuit check indicates a problem in the mode control motor.

Disconnect the 7P connector from the mode control motor.

Test the mode control motor. (see page 22-60)

Is the motor OK?

NO → **Replace the mode control motor. If any mode control door is stuck, repair it.**

YES

Remove the heater control AMP.

Disconnect the 22P connector from the heater control AMP.

Check each wire for continuity between the mode control motor and the heater control AMP:
- WHT/RED wire
- WHT/BLU wire
- WHT/GRN wire
- WHT/YEL wire
- GRN/BLK wire
- BRN/WHT wire
- RED/WHT wire

Is there continuity?

NO → **Repair any open in the wire(s) between the mode control motor and the heater control AMP.**

YES

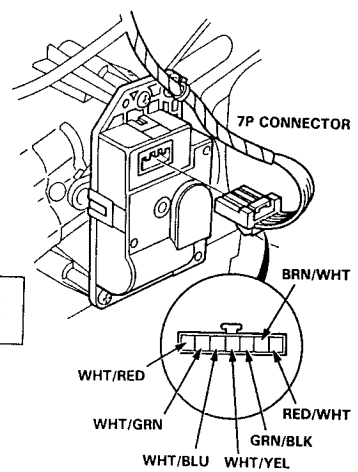
At either connector, check each wire for continuity to body ground and to each other.
- WHT/RED wire
- WHT/BLU wire
- WHT/GRN wire
- WHT/YEL wire
- GRN/BLK wire
- BRN/WHT wire
- RED/WHT wire

Is there continuity?

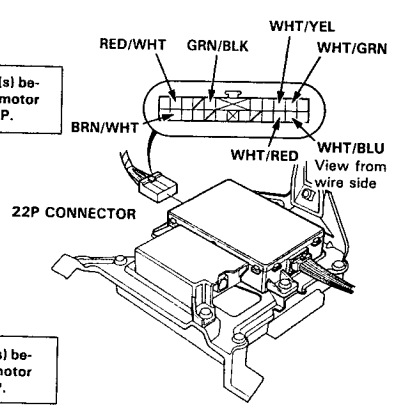
YES → **Repair any short in the wire(s) between the mode control motor and the heater control AMP.**

NO

To page 22-21



View from wire side



View from wire side

From page 22-20

Disconnect the 14P connector from the heater control AMP.

Remove the heater control panel (see page 22-49).

Disconnect the 14P connector from the heater control panel.

Check each wire for continuity between the heater control AMP and the heater control panel.
- ORN/WHT wire
- GRN wire

Is there continuity?

NO → **Repair any open in the wire(s) between the heater control AMP and the heater control panel.**

YES

At either connector, check each wire for continuity to body ground.
- ORN/WHT wire
- GRN wire

Is there continuity?

YES → **Repair any short in the wire(s) between the heater control AMP and the heater control panel.**

NO

Reconnect the 14P connector to the heater control AMP.

Turn the ignition switch ON.

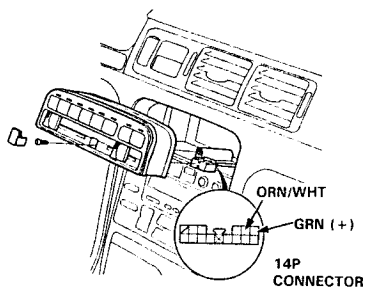
Measure voltage between the GRN wire terminal heater control panel connector harness half and body ground.

Is there 4—6 V?

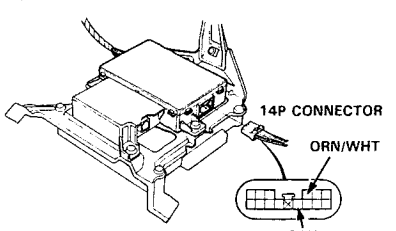
NO → **Substitute a known-good heater control AMP and recheck. If symptom/indication goes away, replace original heater control AMP.**

YES

Substitute a known-good heater control panel and recheck. If symptom/indication goes away, replace original heater control panel.



View from wire side



View from wire side

Troubleshooting

Flowchart—Recirculation Control Motor

Self-diagnosis A/C LED light indicates code 4: A problem in the recirculation control motor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The recirculation control motor regulates the fresh/recirc door according to output from the heater control AMP.

Self-diagnosis circuit check indicates a problem in the recirculation control motor.

Disconnect the 7P connector from the recirculation control motor.

Test the recirculation control motor (see page 22-62).

Is the motor OK?

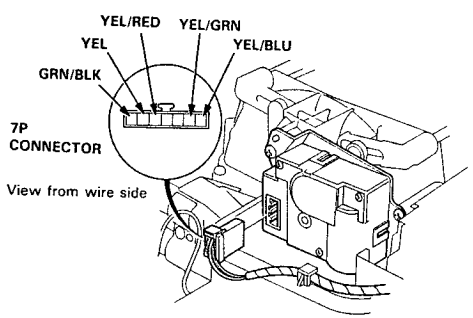
NO — **Replace the recirculation control motor. If any recirculation control door is stuck, repair it.**

YES

Remove the heater control AMP.

Disconnect the 22P connector from the heater control AMP.

Check each wire for continuity between the recirculation control motor and the heater control AMP.
- YEL/RED wire
- YEL wire
- GRN/BLK wire
- YEL/GRN wire
- YEL/BLU wire

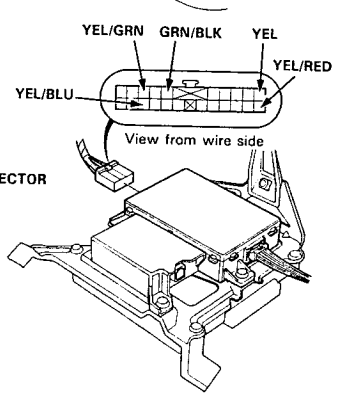


Is there continuity?

NO — **Repair any open in the wire(s) between the recirculation control motor and the heater control AMP.**

YES

At either connector, check each wire for continuity to body ground.
- YEL/RED wire
- YEL wire
- GRN/BLK wire
- YEL/GRN wire
- YEL/BLU wire



Is there continuity?

YES — **Repair any short in the wire(s) between the recirculation control motor and the heater control AMP.**

NO

To page 22-23

From page 22-22

Disconnect the 14P connector from the heater control AMP.

Remove the heater control panel (see page 22-49).

Disconnect the 14P connector from the heater control panel.

Check for continuity in the ORN wire between the heater control AMP and the heater control panel.

Is there continuity?

NO — **Repair open in the ORN wire between the heater control AMP and the heater control panel.**

YES

At either connector, check for continuity between the ORN wire and body ground.

Is there continuity?

YES — **Repair short in the ORN wire between the heater control AMP and the heater control panel.**

NO

Reconnect the 14P connector to the heater control panel.

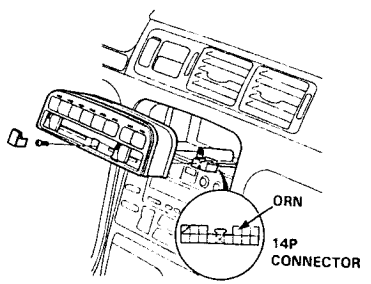
Push the recirculation switch, then check for continuity between the ORN wire terminal and body ground.

Is there continuity?

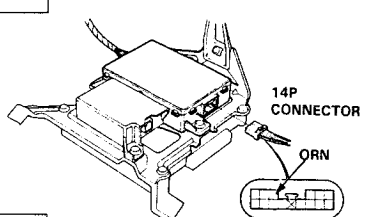
NO — **Substitute a known-good heater control panel and recheck. If symptom/indication goes away, replace the original heater control panel.**

YES

Substitute a known-good heater control AMP and recheck. If symptom/indication goes away, replace the original heater control AMP.



View from wire side



View from wire side

14P CONNECTOR

Troubleshooting

Flowchart—Blower Motor

Self-diagnosis A/C LED light indicates code 5: A problem in the blower motor circuit.
Use a digital multimeter (KS-AHM-32-003) to check it.
The speed of the blower motor is controlled by signals sent from the heater control AMP.

Self-diagnosis circuit check indicates a problem in the blower motor.

Does the blower motor run on any speed?
- YES → **Go to blower motor speed troubleshooting (see page 22-28).**
- NO →

Check No. 17 (30 A), No. 7 (7.5 A) fuses.*

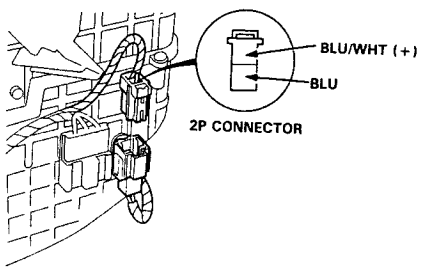
*No. 17 (30 A) fuse: In the under-hood fuse/relay box
No. 7 (7.5 A) fuse: In the under-dash fuse/relay box

Are fuses OK?
- NO → **Replace the fuses.**
- YES →

Disconnect the 2P connector from blower motor.

Turn the ignition switch ON.

Measure voltage between the BLU/WHT wire terminal (+) blower motor connector harness half and body ground.



Is there battery voltage?
- NO → **Go to blower motor relay troubleshooting (see page 22-26)**
- YES →

Turn the ignition switch OFF.

Reconnect the 2P connector to the blower motor.

To page 22-25

From page 22-24

Turn the ignition switch ON.

Connect a jumper wire between the BLU wire of blower motor and body ground.

Does the blower motor run?
- NO → **Replace the blower motor.**
- YES →

Repair open in the BLU wire.

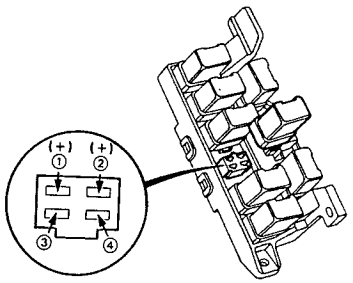
Troubleshooting

Flowchart—Blower Motor Relay

No voltage is indicated on the BLU/WHT wire at the blower motor.

Remove the blower motor relay.

Measure voltage between the No. ① terminal (+) of under-dash relay box and body ground.



Is there battery voltage?

NO → Repair open in the BLU/WHT wire between the under-hood relay box and No. 17 (30 A) fuse.

YES

Turn the ignition switch ON.

Measure voltage between the No. ② terminal (+) of under-dash relay box and body ground.

Is there battery voltage?

NO → Repair open in the BLK/YEL wire between the under-dash relay box and No. 7 (7.5 A) fuse.

YES

Turn the ignition switch OFF.

Check for continuity between the No. ④ terminal of under-dash relay box and body ground.

Is there continuity?

NO → Check for an open in the BLK wire between the under-dash relay box and body ground. If wire is OK, check for poor ground at G401, 402.

YES

Replace the blower motor relay.

Troubleshooting

Blower Motor Speed

Blower motor does not operate on all speeds.

Does blower motor operate on top speed only?
- YES → **Go to blower motor top speed troubleshooting (see page 22-32).**
- NO →

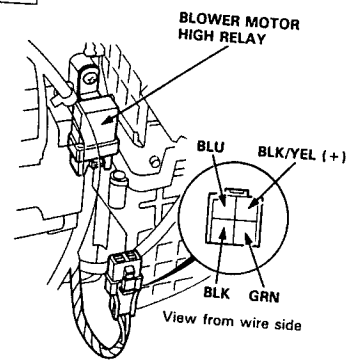
Test the blower motor relay (see page 22-64).

Is the relay OK?
- NO → **Replace the relay.**
- YES →

Disconnect the 4P connector from blower motor HIGH relay.

Turn the ignition switch ON.

Measure voltage between the BLK/YEL wire terminal (+) and body ground.



View from wire side

Is there battery voltage?
- NO → **Repair open in the BLK/YEL wire between the under-dash fuse/relay box and the blower motor HIGH relay.**
- YES →

Turn the ignition switch OFF.

Check for continuity in the BLK wire terminal and body ground.

Is there continuity?
- NO → **Check for an open in the BLK wire between the blower motor HIGH relay and body ground. If wire is OK, check for poor ground at G401, G402.**
- YES →

Turn the ignition switch ON.

To page 22-29

From page 22-28

Connect the BLU and BLK terminals with a jumper wire.

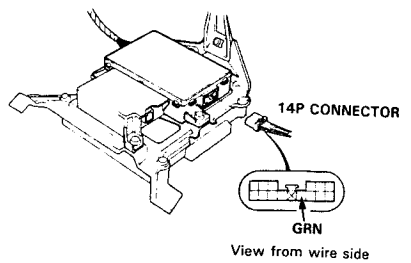
Does the blower run?
- NO → **Repair open in the BLU wire between the blower motor and the blower motor HIGH relay.**
- YES →

Test the blower motor HIGH relay. (see page 22-64).

Is the relay OK?
- NO → **Replace the relay.**
- YES →

Reinstall the blower motor relay.

Remove the heater control AMP. and disconnect the 14P connector.



View from wire side

Connect the GRN wire at the heater control AMP to body ground with a jumper wire.

Does the blower run?
- NO → **Repair open in the GRN wire between the heater control AMP and the blower motor HIGH relay.**
- YES →

Turn the ignition switch OFF.

To page 22-30

(cont'd)

Troubleshooting

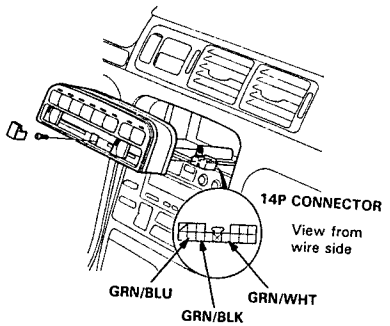
Flowchart—Blower Motor Speed (cont'd)

From page 22-29

Remove the heater control panel.

Disconnect the 14P connector from heater control panel.

Check each wire for continuity between the heater control panel and the heater control AMP.
- GRN/BLU wire
- GRN/BLK wire
- GRN/WHT wire



Is there continuity?

NO → **Repair any open in the wire(s) between the heater control panel and the heater control AMP.**

YES

Check each wire for continuity between the heater control panel and body ground.
- GRN/BLU wire
- GRN/BLK wire

Is there continuity?

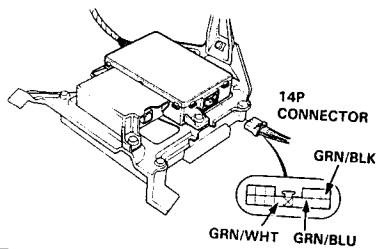
YES → **Repair any short in the wire(s) between the heater control panel and the heater control AMP.**

NO

Reconnect the 14P connector to the heater control AMP.

Turn the ignition switch ON.

Measure voltage between the GRN/BLU wire terminal of heater control panel and body ground.



Is there approx. 5 V?

NO → **Substitute a known-good heater control AMP and recheck. If symptom/indication goes away, replace the original heater control AMP.**

YES

Substitute a known-good heater control panel and recheck. If symptom/indication goes away, replace the original heater control panel.

Troubleshooting

Flowchart—Blower Motor Top Speed

Blower motor only runs in TOP speed position; does not run in any other speed position.

Disconnect the 3P connector from power transistor.

Connect a jumper wire between the BLU wire at the power transistor connector and body ground.

Turn the ignition switch ON.

Does the blower motor run at HIGH speed?

NO → **Repair open in the BLU wire between the power transistor and the blower motor.**

YES

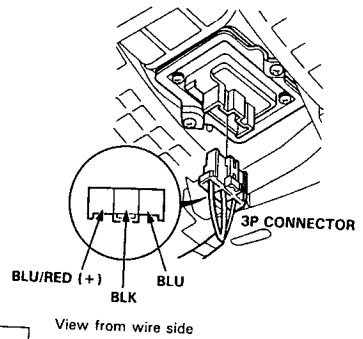
Connect a jumper wire between the BLU and BLK wires of the power transistor.

Does the blower motor run at HIGH speed?

NO → **Check for an open in the BLK wire between the power transistor and body ground. If wire is OK, check for poor ground at G401, 402.**

YES

To page 22-33



View from wire side

From page 22-32

Turn the ignition switch OFF.

Remove the heater control AMP.

Disconnect the 22P connector from the heater control AMP.

Check for continuity in the BLU/RED wire between the power transistor and the heater control AMP.

Is there continuity?

NO → **Repair open in the BLU/RED wire between the power transistor and the heater control AMP.**

YES

Turn the ignition switch ON.

Measure voltage between the BLU wire terminal (+) of the heater control AMP 22P connector and body ground.

Is there battery voltage?

NO → **Repair open in the BLU wire between the blower motor and the heater control AMP.**

YES

Turn the heater fan control lever to the middle of its range.

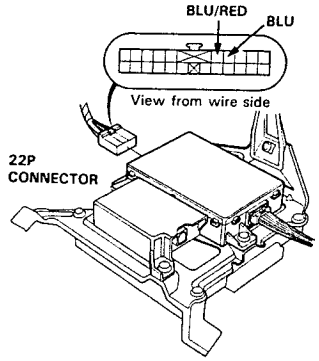
Measure voltage between the BLU/RED wire terminal (+) and body ground.

Is there 6.0—7.0 V?

NO → **Substitute a known-good heater control AMP and recheck. If symptom/indication goes away, replace the original heater control AMP.**

YES

Replace the power transistor.



Troubleshooting

Flowchart—Power Circuits to Heater Control AMP

System does not work at all.

Check fuse No. 7 (7.5 A) in the under-dash fuse/relay box.

Are fuses OK? — NO → Replace the fuse.

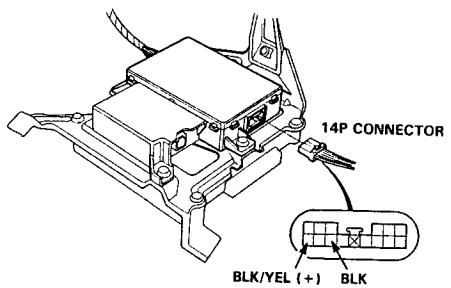
YES

Remove the heater control AMP.

Disconnect the 14P connector from the heater control AMP.

Turn the ignition switch ON.

Measure voltage between the BLK/YEL wire terminal (+) and body ground.



View from wire side

Is there battery voltage? — NO → Repair open in the BLK/YEL wire between the heater control AMP and the under-dash fuse/relay box.

YES

Turn the ignition switch OFF.

Check for continuity between the BLK wire terminal and body ground.

Is there continuity? — NO → Check for an open in the BLK wire between the heater control AMP and body ground. If wire is OK, check for poor ground at G401, 402.

YES

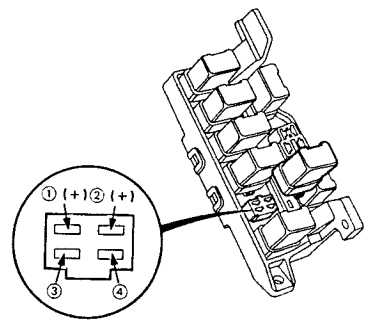
Substitute a known-good heater control AMP and recheck. If symptom/indication goes away, replace the original heater control AMP.

Flowchart—Radiator Fan

Radiator fan motor does not run with A/C system ON.

Remove the radiator fan relay from the under-dash relay box.

Measure voltage between the No. ① terminal (+) of the under-dash relay box and body ground.

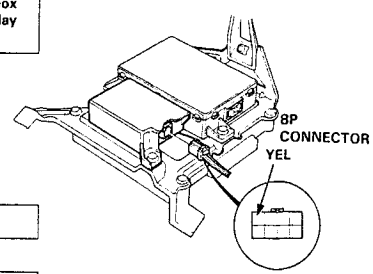


Is there battery voltage? — NO → Repair open in the WHT wire between the under-dash relay box and the under-hood fuse/relay box.

YES

Turn the ignition switch ON.

Measure voltage between the No. ② terminal (+) of the under-dash relay box and body ground.



View from wire side.

Is there battery voltage? — NO → Turn the ignition switch OFF.

YES

Turn the ignition switch OFF.

Disconnect the 8P connector from the radiator fan control module.

Test the radiator fan relay (see page 22-64).

Check for continuity in the YEL wire between the radiator fan control module and the under-dash relay box No. ②.

Is there continuity? — NO → Repair open in the YEL wire between the radiator fan control module and the under-dash relay box.

YES

Test the radiator fan control module (see page 22-15).

Is the relay OK? — NO → Replace the radiator fan relay.

YES

To page 22-36

(cont'd)

Troubleshooting

Flowchart—Radiator Fan (cont'd)

From page 22-35

Reinstall the radiator fan relay.

Connect the test harness "A" connector to the wire harness only, not the ECM. (see section 11).

Turn the ignition switch ON.

Using a jumper wire, connect A12 test harness terminal to body ground.

Does radiator fan motor run?

YES → **Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.**

NO

Measure battery voltage between test harness terminal A12 and body ground.

Is there battery voltage?

NO → **Repair open in the LT GRN/YEL wire between the under-dash relay box and the ECM.**

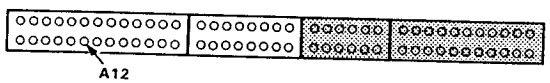
YES

Turn the ignition switch OFF.

Using a jumper wire connect A12 test harness terminal to body ground.

To page 22-37

TEST HARNESS
07LAJ—PT3010A



From page 22-36

Disconnect the 2P connect from radiator fan motor.

Turn the ignition switch ON.

Measure voltage between the WHT/BLU wire terminal (+) and body ground.

Is there battery voltage?

NO → **Repair open in the WHT/BLU wire between the under-dash relay box and the radiator fan motor.**

YES

Turn the ignition switch OFF.

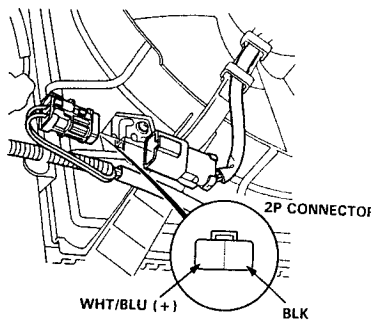
Test the radiator fan motor: connect the battery power to the No. ① wire terminal (+) and connect the No. ② wire terminal to body ground. The radiator fan motor should run.

Is the motor OK?

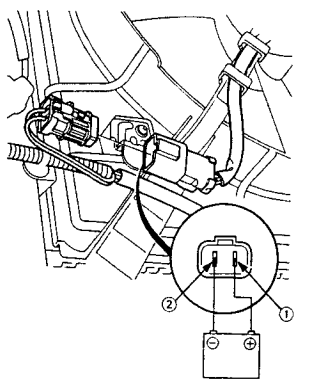
NO → **Replace the radiator fan motor.**

YES

Check for an open in the BLK wire between the radiator fan motor and body ground. If wire is OK, check for poor ground at G302.



View from terminal side



View from terminal side

Troubleshooting

Flowchart—Condenser Fan

Condenser fan motor does not run with A/C system ON.

Remove the condenser fan relay from the under-dash relay box.

Measure voltage between the No. ① terminal (+) of the under-dash relay box and body ground.

Is there battery voltage?

NO → **Repair open in the WHT wire between the under-dash relay box and under-hood fuse/relay box.**

YES

Turn the ignition switch ON.

Measure voltage between the No. ② terminal (+) of the under-dash relay box and body ground.

Is there battery voltage?

NO → Turn the ignition switch OFF.

YES

Turn the ignition switch OFF.

Test the condenser fan relay (see page 22-64).

Is the relay OK?

NO → **Replace the condenser fan relay.**

YES

To page 22-39

Disconnect the 8P connector from the radiator fan control module.

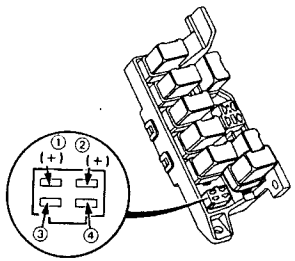
Check for continuity in the YEL/WHT wire between the radiator fan control module and the under-dash relay box No. ②

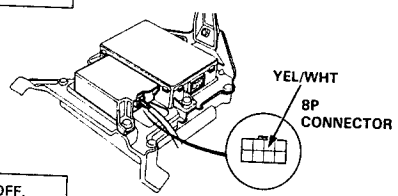
Is there continuity?

NO → **Repair open in the YEL/WHT wire between the radiator fan control module and the under-dash relay box.**

YES

Test the radiator fan control module (see page 22-15).





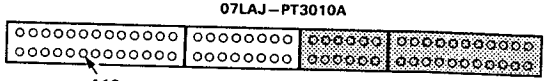
View from wire side

From page 22-38

Reinstall the condenser fan relay.

Connect the test harness "A" connector to the wire harness only, not the ECM (see section 11).

TEST HARNESS
07LAJ—PT3010A



Turn the ignition switch ON.

Using a jumper wire connect A12 test harness terminal to body ground.

Does condenser fan motor run?

YES → **Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.**

NO

Measure battery voltage between test harness terminal A12 and body ground.

Is there battery voltage?

NO → **Repair open in the LT GRN/YEL wire between the relay box and the ECM.**

YES

Turn the ignition switch OFF.

Using a jumper wire connect A12 test harness terminal to body ground.

To page 22-40

(cont'd)

Troubleshooting

Flowchart—Condenser Fan (cont'd)

From page 22-39

Disconnect the 2P connect from condenser fan motor.

Turn the ignition switch ON.

Measure voltage between the WHT/GRN terminal (+) and body ground.

Is there battery voltage?

NO → **Repair open in the WHT/GRN wire between the under-dash relay box and the condenser fan motor.**

YES

Turn the ignition switch OFF.

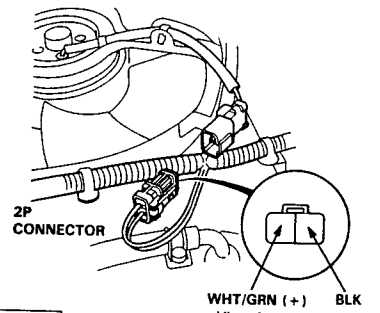
Test the condenser fan motor: Connect the battery power to the No. ① wire terminal (+) and connect the No. ② wire terminal to body ground. The condenser fan motor should run.

Is the motor OK?

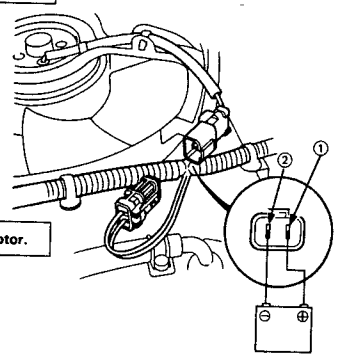
NO → **Replace the condenser fan motor.**

YES

Check for an open in the BLK wire between the condenser fan motor and body ground. If wire is OK, check for poor ground at G302.



View from terminal side



View from terminal side

Flowchart—Engine Coolant Temperature (ECT) Switch A

Both fans do not run for engine cooling, but they both run with the A/C system on.

Disconnect the 2P connector from the engine coolant temperature (ECT) switch A.

Connect a voltmeter between the LT GRN/YEL wire and body ground.

Turn the ignition switch ON.

Is there battery voltage?

NO → **Repair open in the LT GRN/YEL wire to the ECT switch A.**

YES

Turn the ignition switch OFF.

Connect a jumper wire between the LT GRN/YEL wire and the BLK wire.

Turn the ignition switch ON.

Do the both fans run?

NO → **Repair open in the BLK wire between the ECT switch A and body ground.**

YES

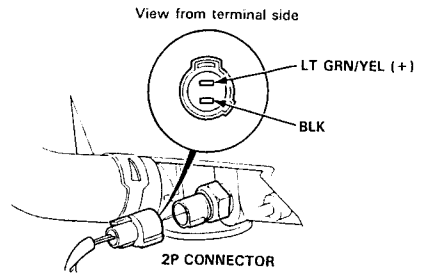
Check the temperature gauge.

Does it read above normal?

NO → **Repair the cooling system.**

YES

Replace the ECT switch A.



Troubleshooting

Flowchart—Both Fans

Both fans do not run at all.

Check fuse No. 8 (7.5 A), No. 34 (15 A) and No. 38 (15 A).*

*No. 8 (7.5 A) fuse: In the under-dash fuse box
No. 34 (15 A), 38 (15 A) fuses: In the under-hood fuse/relay box

Are fuses OK?
- NO → **Replace the fuses.**
- YES ↓

Remove the radiator fan control module.

Disconnect the 8P connector from the radiator fan control module.

Turn the ignition switch ON.

Measure voltage between the YEL/BLK wire terminal (+) and body ground.

Is there battery voltage?
- NO → **Repair open in the YEL/BLK wire between the radiator fan control module and the under-dash fuse box.**
- YES ↓

Turn the ignition switch OFF.

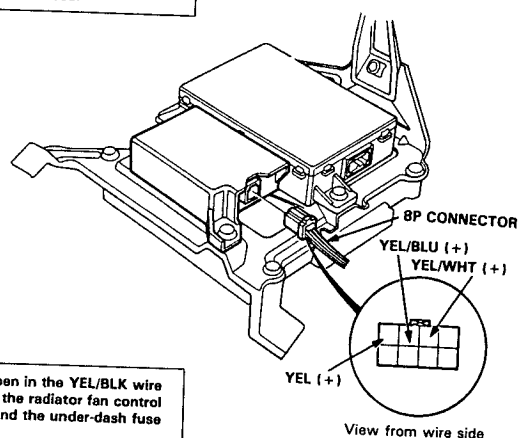
Reconnect the 8P connector to the radiator fan control module.

Turn the ignition switch ON.

Measure voltage between the YEL/WHT, YEL wire terminal and body ground.

Is there battery voltage?
- NO → **Test the radiator fan control module (see page 22-15).**
- YES ↓

To page 22-43



View from wire side

From page 22-42

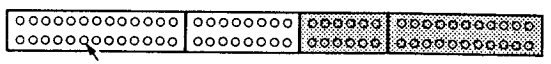
Turn the ignition switch OFF.

Connect the test harness "A" connector to the wire harness only, not the ECM. (see section 11).

Turn the ignition switch ON.

Using a jumper wire connect A12 test harness terminal to body ground.

TEST HARNESS
07LAJ—PT3010A



Does radiator, condenser fan motors run?
- YES → **Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.**
- NO ↓

Measure battery voltage between test harness terminal A12 and body ground.

Is there battery voltage?
- NO → **Repair open in the LT GRN/YEL wire between the under-dash relay box and the ECM.**
- YES ↓

Check for an open in the BLK wire between the radiator, condenser fan motors and body ground. If wire is OK, check for poor ground at G302.

Troubleshooting

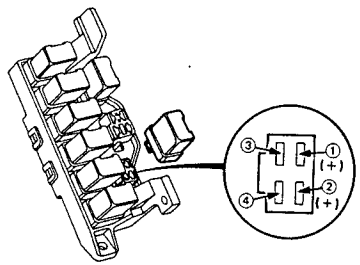
Flowchart—Compressor

Compressor clutch does not engage.

Remove the compressor clutch relay from the under-dash relay box.

Turn the ignition switch ON.

Measure voltage between the No. ①, No. ② terminal ⊕ of the under-dash relay box and body ground.



Is there battery voltage?

NO → **Repair open in the YEL/BLK wire between the compressor clutch relay and under-dash fuse/relay box.**

YES

Turn the ignition switch OFF.

Test the compressor clutch relay (see page 22-64).

Is the relay OK?

NO → **Replace the compressor clutch relay.**

YES

Disconnect the 1P connector from A/C compressor clutch.

Check for continuity in the No. ③ terminal of the under-dash relay box and the 1P connector of compressor clutch.

Is there continuity?

NO → **Repair open in the RED wire between the compressor clutch relay and the compressor clutch.**

YES

To page 22-45

From page 22-44

Reconnect the 1P connector to the compressor clutch.

Using a jumper wire, connect the No. ① and No. ③ terminal of the under-dash relay box.

Turn the ignition switch ON.

Does the compressor clutch engage?

NO → Measure the compressor clutch clearance (see page 22-73).

Is the clearance with specification?

NO → **Adjust the clearance and recheck.**

YES

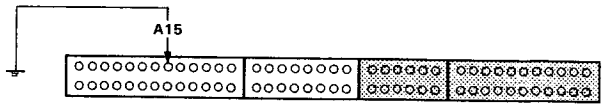
Replace the compressor clutch.

YES

Turn the ignition switch OFF.

Install the compressor clutch relay.

Connect the test harness "A" connector to the wire harness only, not the ECM. (see section 11).



TEST HARNESS
07LAJ—PT3010A

Turn the ignition switch ON.

Using a jumper wire, connect A15 test harness terminal to body ground.

Does the compressor clutch engage?

NO → **Repair open in the RED/BLU wire between the compressor clutch relay and the ECM.**

YES

Substitute a known-good the ECM and recheck.
If symptom/indication goes away, replace original the ECM.

Troubleshooting

Flowchart—A/C System

A/C system does not work (compressor and both fan motors).

Check fuses No. 7 (7.5 A), No. 34 (15 A), No. 38 (15 A).

*No. 7 (7.5 A) fuse: In the under-dash fuse/relay box.
No. 34 (15 A), No. 38 (15 A) fuses: In the under-hood fuse/relay box.

Are fuses OK? NO → Replace the fuse.

YES

Check the self-diagnosis circuit (see page 22-11).

Does the A/C LED light indicates code 1? YES → Go to evaporator temperature sensor troubleshooting (see page 22-16).

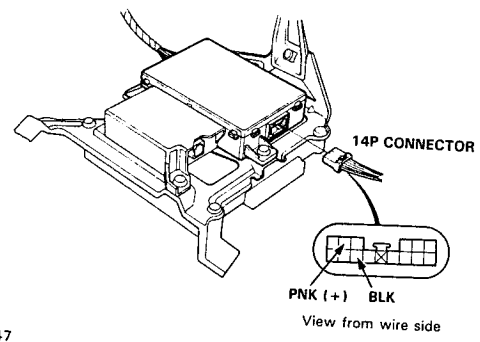
NO

Remove the heater control AMP.

Disconnect the 14P connector from heater control AMP.

Turn the ignition switch ON.

Measure voltage between the PNK wire terminal (+) and body ground (−).



View from wire side

Is there battery voltage? NO → To page 22-47

YES

Turn the ignition switch OFF.

Check for continuity between the BLK wire terminal and body ground.

Is there continuity? NO → Check for an open in one of the two BLK wires between the heater control AMP and body ground. If the wires are OK, check for a poor ground at G401.

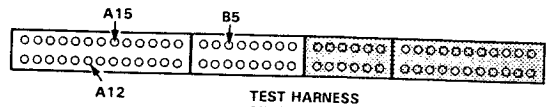
YES

Substitute a known-good heater control AMP and recheck. If symptom/indication goes away, replace original heater control AMP.

From page 22-46

Turn the ignition switch OFF.

Connect the test harness between the ECM and connector. (see section 11)



TEST HARNESS
07JGG—001010A

Turn the ignition switch ON.

Measure voltage between test harness terminal B5 and body ground.

Is there battery voltage? NO → Using a jumper wire, connect A12 test harness terminal to body ground.

YES

Turn the ignition switch OFF.

Reconnect the four connectors to the ECM.

Disconnect the 2P connector from A/C pressure switch.

Turn the ignition switch ON.

Measure voltage between the BLU/BLK wire terminal (+) and body ground.

Is there battery voltage? NO → Repair open in the BLU/BLK wire between the A/C pressure switch and the ECM.

YES

Check for continuity between the No. ① and No. ② terminal of A/C pressure switch.

Is there continuity? NO → Check the A/C system pressure. If pressure is OK, replace the A/C pressure switch.

YES

Repair open in the PNK wire between the A/C pressure switch and the heater control AMP.

Do both fan motors run? NO → See page 22-42

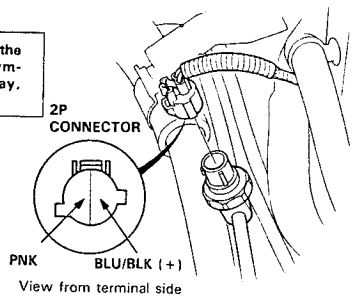
YES

Using a jumper wire, connect A15 test harness terminal to body ground.

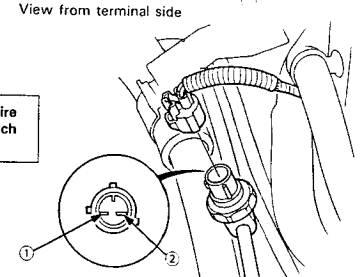
Does the compressor clutch engage? NO → See page 22-44

YES

Substitute a known-good the ECM and recheck. If symptom/indication goes away, replace original the ECM.



View from terminal side

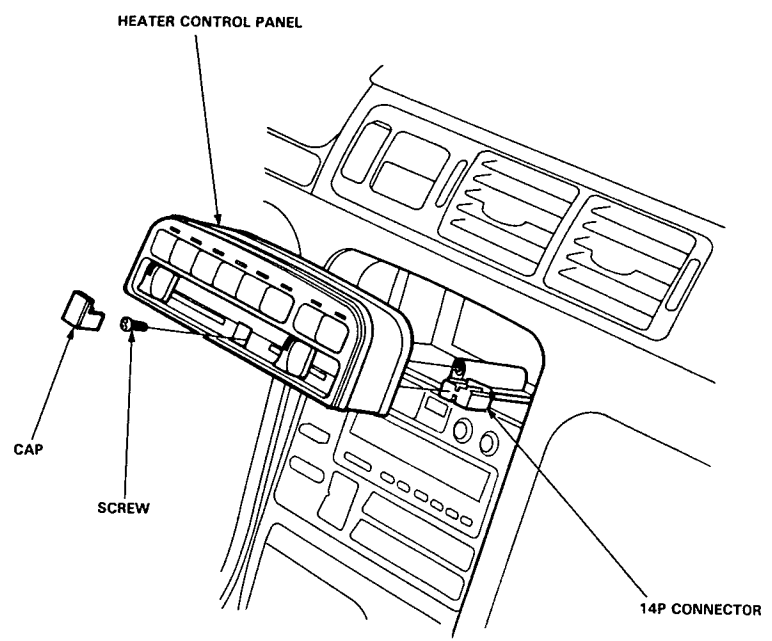


Heater Control Panel

Removal

1. Remove the cap and screw, then pull out the heater control panel.
2. Disconnect the heater control panel connector.

   CAUTION: Be careful not to damage the dashboard.

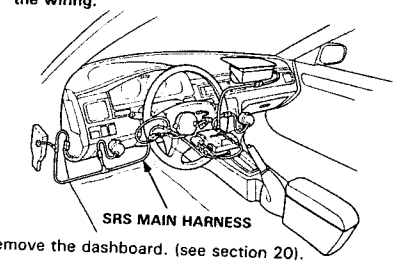


Heater-Evaporator Unit

Replacement

SRS wire harness is routed near the heater-evaporator.

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow outer insulation.**
- **When disconnecting the SRS wire harness install the short connector on the airbag then disconnect the wire harness (see page 23-330).**
- **Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.**

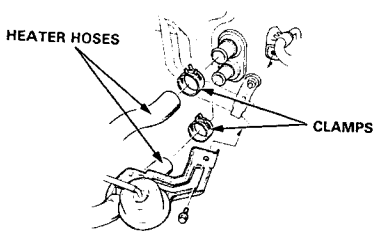


1. Remove the dashboard. (see section 20).
2. When the engine is cool, drain the engine coolant from the radiator. (see section 10).

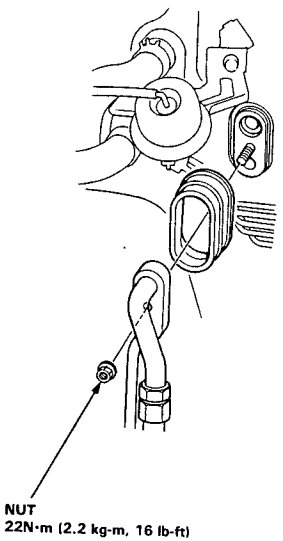
⚠ WARNING
- **Do not remove the radiator cap when the engine is hot; the engine coolant is under pressure and could severely scald you.**
- **Keep hands away from the radiator fan. The fan may start automatically without warning and run for up to 30 minutes, even after the engine is turned off.**

CAUTION: Engine coolant will damage paint. Quickly rinse any spilled engine coolant off painted surfaces.

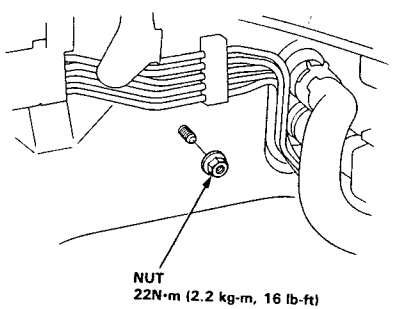
3. Disconnect the heater hoses at the heater. Engine coolant will run out when the hoses are disconnected; drain it into a clean drip pan.
4. Release the clamps, then disconnect the heater hoses.



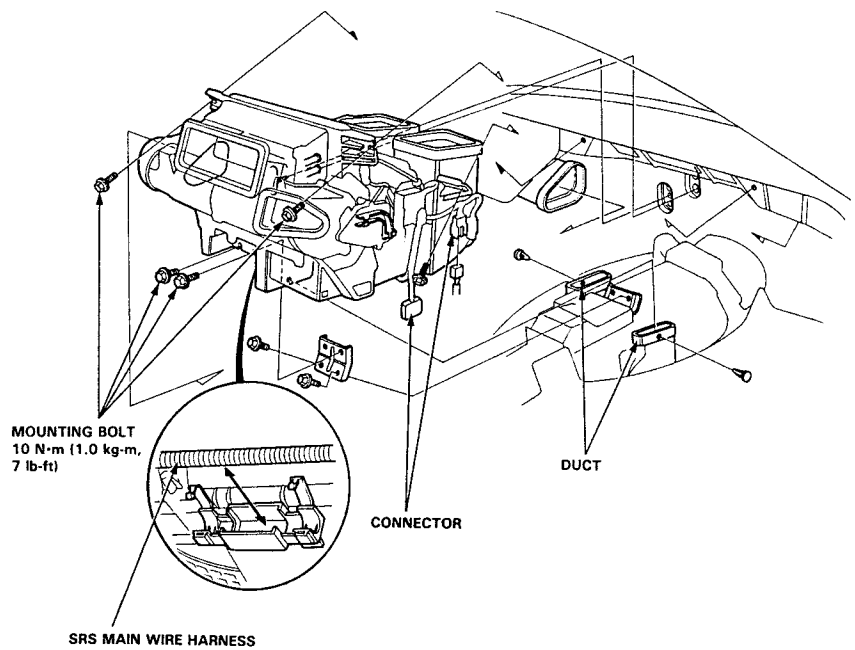
5. Remove all refrigerant from the A/C system with a refrigerant recovery system (see page 22-66).
6. Disconnect the receiver line and the suction line from the evaporator.



7. Remove the heater-evaporator unit mounting nut from the engine compartment side.



8. Remove the duct and disconnect the connector, then remove the heater-evaparator unit mounting bolts.



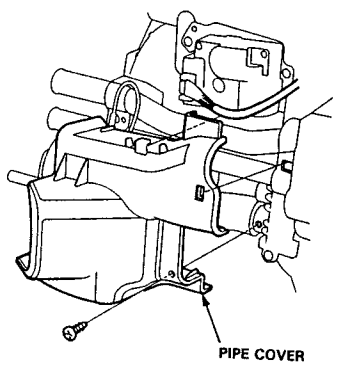
9. Install in the reverse order of removal, and:
   - Apply sealant to the A/C line grommets.
   - Do not interchange the inlet and outlet heater hoses. Make sure that the hose clamps are tight.

CAUTION: After reinstalling the heater-evaporator unit, follow the sequence described in the air bleed procedure. If you don't, you may leave air in the system which could damage the engine.

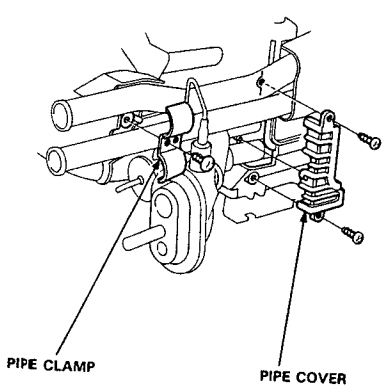
Blower Motor

Replacement

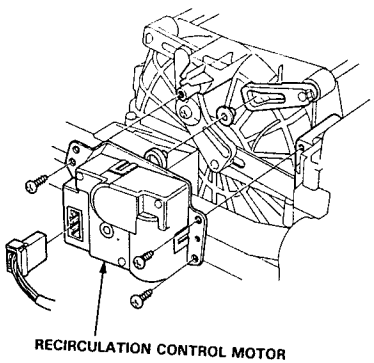
1. Remove the heater-evaporator unit. (see page 22-50)
2. Remove the mounting screw, then remove the pipe cover.



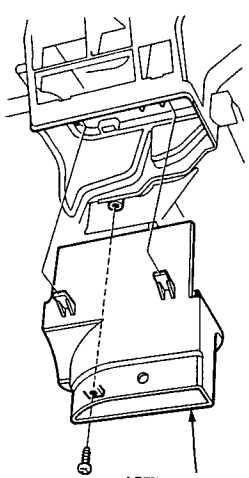
3. Remove the mounting screws. then remove the pipe clamp and pipe cover.



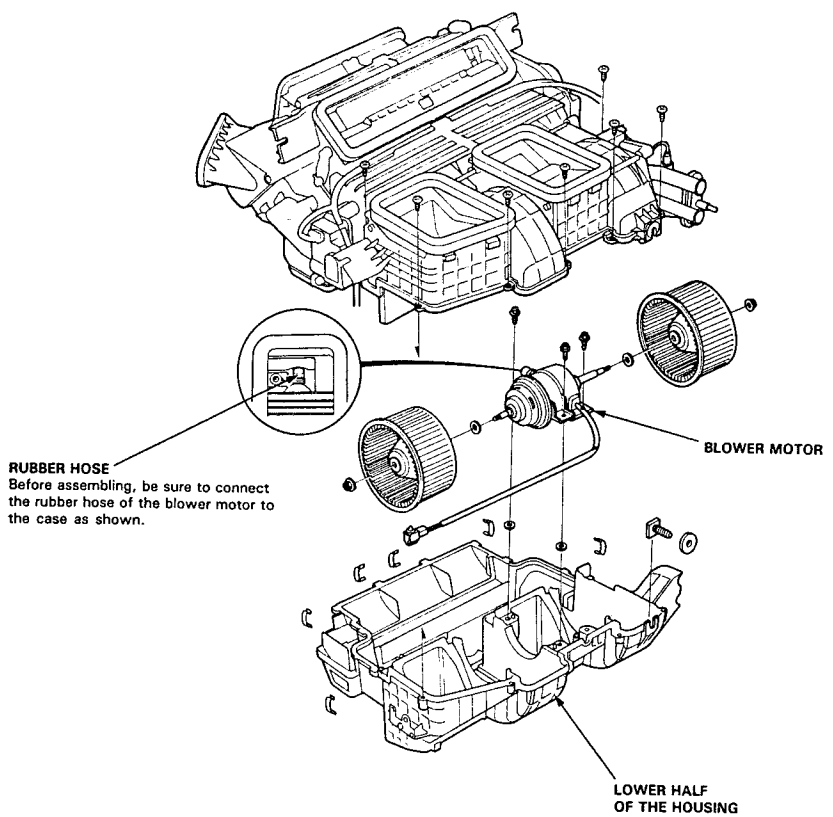
4. Disconnect the recirculation control motor connector.
   Remove the mounting screws, then remove the recirculation control motor.



5. Remove the mounting screw, then remove the left side heater duct.



6. Disconnect the blower motor connector.
7. Remove the lower half of the housing, then remove the blower motor.

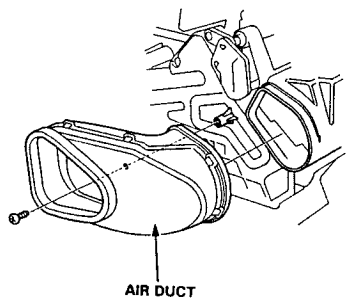


8. Install the blower motor in the reverse order of removal, then make sure it runs and doesn't leak any air.

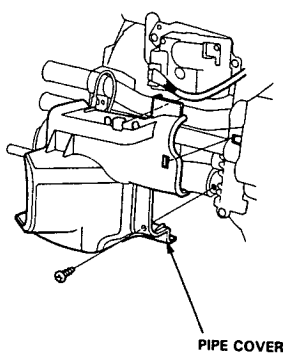
Heater Core

Replacement

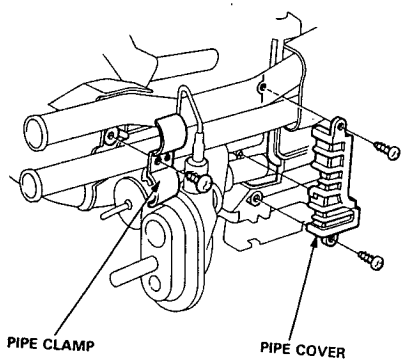
1. Remove the heater-evaporator unit. (see page 22-50)
2. Remove the mounting screw, then remove the air duct.



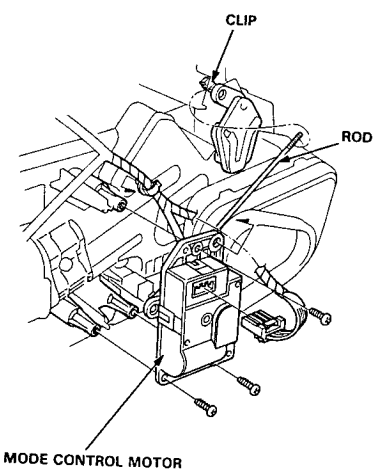
3. Remove the mounting screw, then remove the pipe cover.



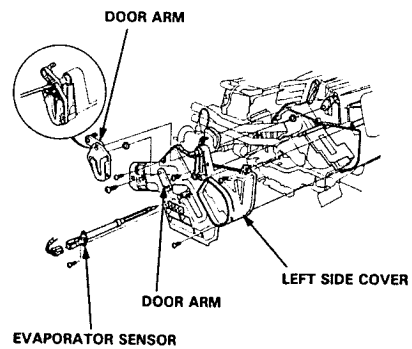
4. Remove the mounting screws, then remove the pipe clamp and pipe cover.



5. Unhook the clip from mode control motor rod, then remove its mounting screws and mode control motor.

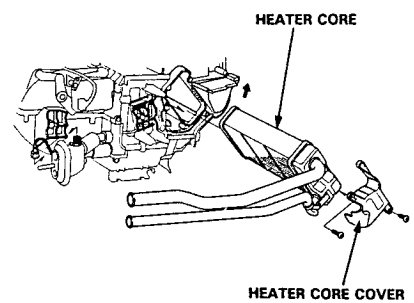


6. Remove the mounting screw, then remove the evaporator sensor.
7. Remove the mode door arms, then remove its mounting screws and left side cover.



8. Remove the heater core cover, then pull out the heater core.

   NOTE: Be careful not to bend the inlet and outlet pipes during heater core removal.



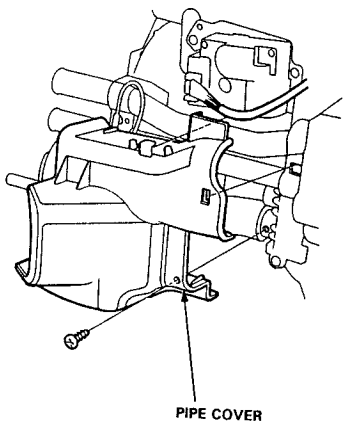
9. Install in the reverse order of removal and:
   - Loosen the bleed bolt on the engine, and refill the radiator and reservoir tank with the proper engine coolant mixture (see section 10).
   - Tighten the bleed bolt when all the trapped air has escaped and engine coolant begins to flow from it.

   NOTE: Be sure to bleed the cooling system with the heater valve fully open.

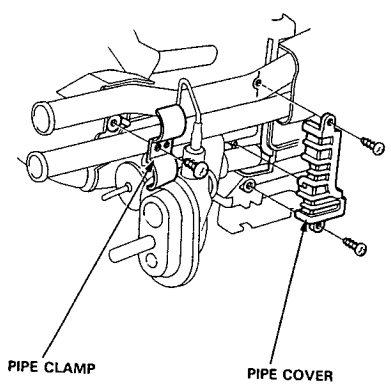
Evaporator

Replacement

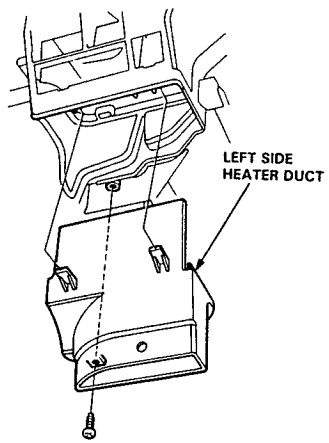
1. Remove the heater-evaporator unit. (see page 22-50)
2. Remove the mounting screw, then remove the pipe cover.



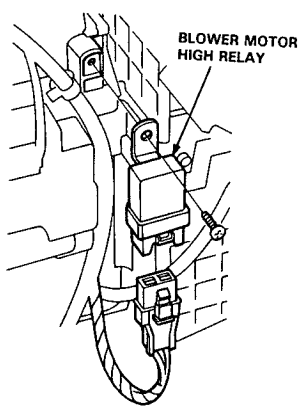
3. Remove the mounting screws, then remove the pipe clamp and pipe cover.



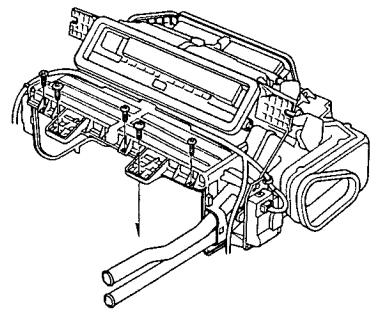
4. Remove the mounting screw, then remove the left side heater duct.

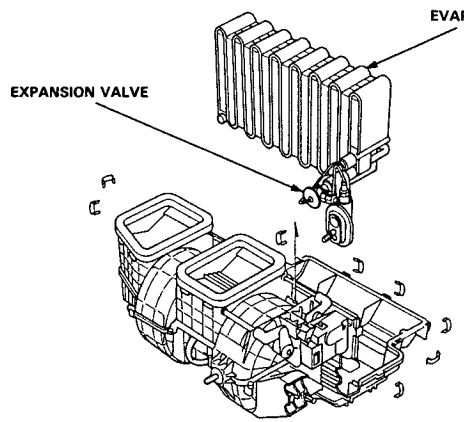


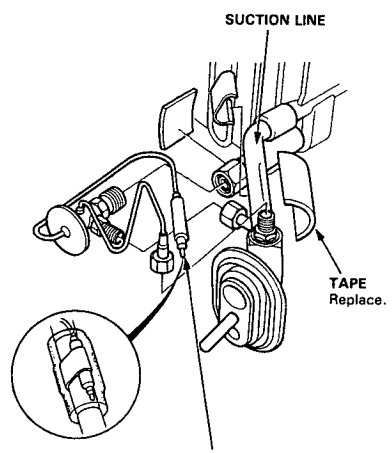
5. Remove the blower motor HIGH relay.



6. Remove the self-tapping screws and clips, then carefully separate the heater-evaporator housings and remove the evaporator.
7. Remove the expansion valve if necessary.
8. Assemble the heater-evaporator unit the reverse order of disassembly. Hold the expansion valve capillary tube down against the suction line, and wrap tape hold it there.



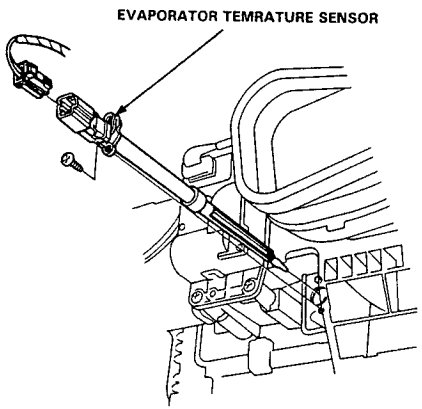




Evaporator Temperature Sensor

Removal

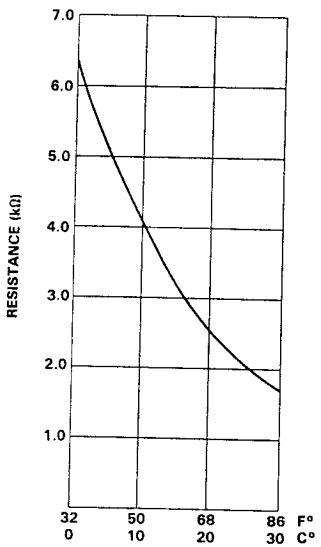
1. Disconnect the evaporator temperature sensor connector.
   Remove the evaporator temperature sensor by removing the screw.



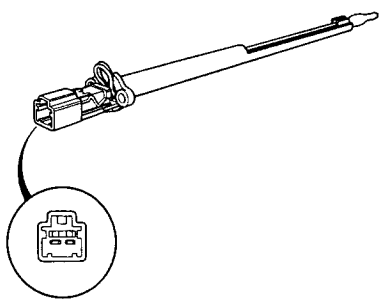
Test

Compare the resistance reading between terminals of the evaporator temperature sensor with the specification shown in the following graph: It should be within specification.

NOTE: Dip the sensor in ice water and measure the resistance, then pour hot water on the sensor and check for change in resistance.



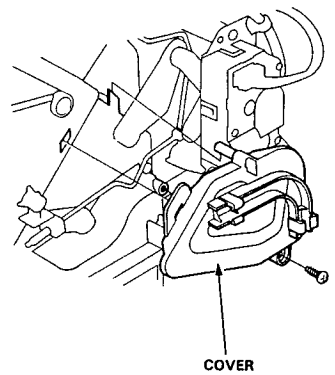
CAUTION: The sensor uses a thermistor which can be damaged if high current is applied to it during testing. Therefore, use a circuit tester that puts out a measuring current of 1 mA or less.



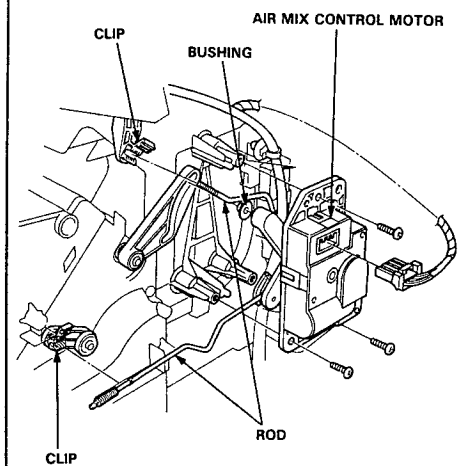
Air Mix Control Motor

Removal

1. Remove the screw and cover.



2. Disconnect the air mix control motor connector.
3. Unhook the clips from the air mix control motor rod, then remove its mounting screws and air mix control motor.

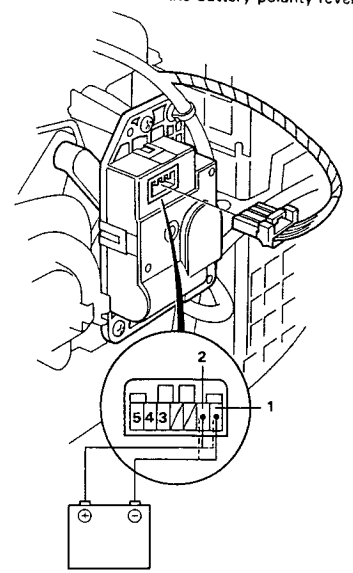


Test

1. Measure the resistance between the No. 3 and 5 terminals.
   - Resistance: approx. 10 KΩ
2. Check the air mix control motor operation by briefly connection the battery (12 V) positive to the No. 2 terminal and negative to the No. 1 terminal.

   NOTE: If the air mix control motor does not run, remove it, and check the air mix control motor links for smooth operation. If the air mix control motor links operate normally, replace the air mix control motor.
3. Reverse the wires to be sure the air mix control motor will run in both directions.

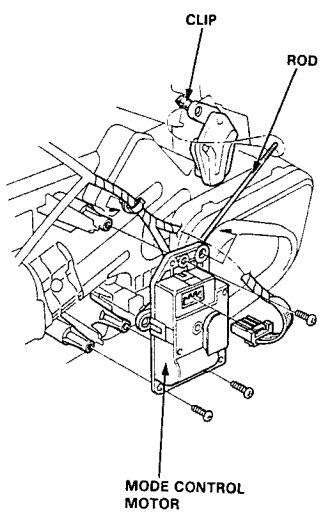
   CAUTION: Be sure to disconnect the battery from the air mix control motor as soon as the air mix control motor has started. Failure to do so will damage air mix control motor.
4. Connect a battery (12 V) to the air mix control motor (positive to No. 2 and negative to No. 1), and measure the resistance between the terminals No. 4 and No. 5.
   Resistance should be approximately approx. 8.7 KΩ at COOL an approx. 1.0 KΩ at HOT. Also check the resistances with the battery polarity reversed.



Mode Control Motor

Removal

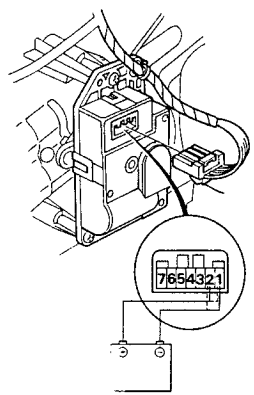
1. Disconnect the mode control motor connecter.
2. Unhook the clip from the mode control motor rod, then remove its mounting screws and mode control motor.



Test

1. Disconnect the mode control motor connector, turn the ignition switch ON and move the blower switch to the middle setting.
2. Connect battery power to the No. 1 terminal of the mode control motor, and connect ground to the No. 2 terminal. The mode control motor should run, and stop at VENT.
   If it doesn't, reverse the connections; the mode control motor should run, and stop at DEF.

   NOTE: If the mode control motor does not run, remove it, and check the mode control linkage and doors for smooth movement. If the mode control linkage and doors move smoothly, replace the mode control motor.



3. Plug the connector back into the motor. Operate the mode switch on the heater control panel to each mode. Verify that the mode control motor has moved to the selected position by checking the air flow for the mode selected.

   NOTE: If the motor did not move, turn the ignition switch OFF and disconnect the mode control motor connector. Turn the ignition switch ON and connect battery power to No. 1 and No. 2 terminals as shown in step 2. Power the mode control motor to move the doors to the mode selected.

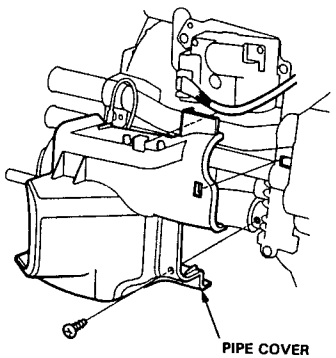
4. Disconnect the mode control motor connector at each mode selected and check for continuity between the motor terminals according to the table below.
5. Replace the mode control motor if there is no continuity for any one mode selected.

Terminal / LED symbol	3	4	5	6	7
	○	○	○	○	
	○	○			
	○			○	
	○		○		
	○				○

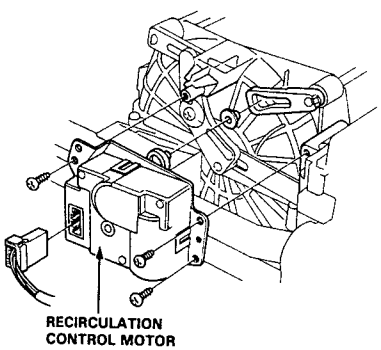
Recirculation Control Motor

Removal

1. Remove the mounting scew, then remove the pipe cover.



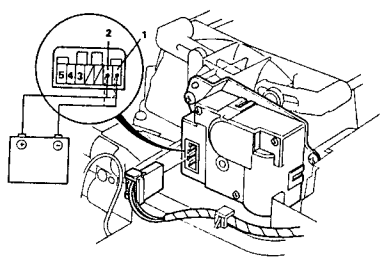
2. Disconnect the recirculation control motor connector.
3. Remove its mounting screws and the recirculation control motor.



Test

1. Connect battery power to No. 1 terminal of the recirculation control motor, and connect the No. 2 terminal to ground.
   The motor should run. If it doesn't, reverse the connections; the motor should then run.

   NOTE: If the recirculation control motor does not run remove it, and check the recirclation control motor links for smooth operation. If the recirculation control motor links operate normally, replace the recirclation control motor.



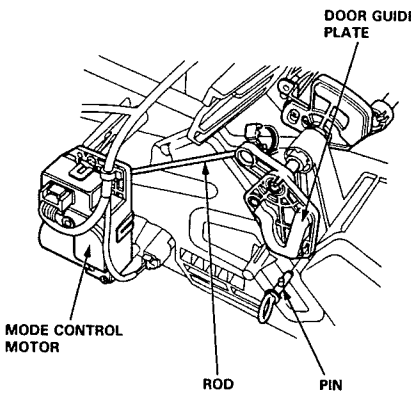
2. Check for continuity between the terminals of the recirculation control motor according to this table.

Position \ Terminal	3	4	5
	○	○	
	○		○

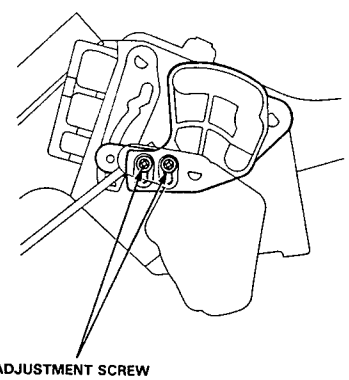
Heater-Evaporator Door Adjustments

Mode Door

1. To adjust the mode control motor rod, locate the door guide plate with pin, then secure the rod with a clip as shown.

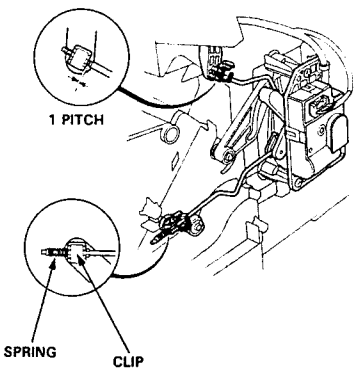


2. After adjusting the rod, adjust the defroster door as shown.



Air Mix Door

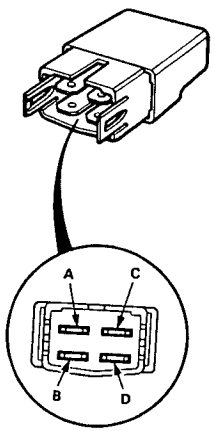
Adjust the air-mix control motor rod so the linkage looks like this in the cold position.

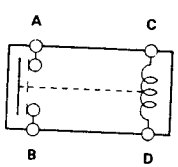


Relay

Test

There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
There should be no continuity when the battery is disconnected.

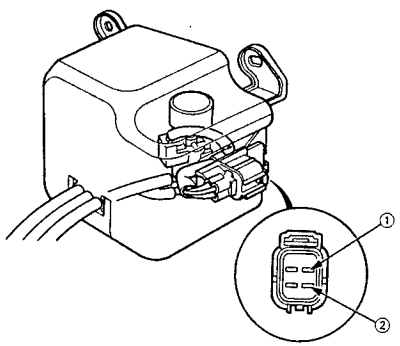




Heater Valve

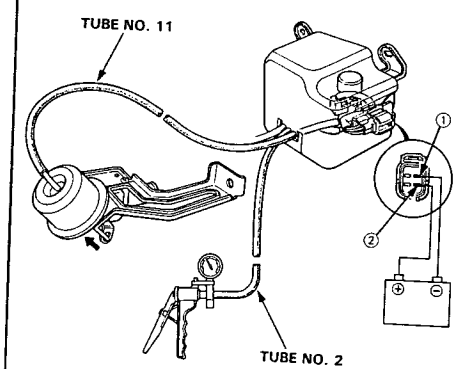
Test

1. Check for continuity between No. ① and No. ② terminals at the heater valve solenoid 4P connector.



2. After assembling the heater valve solenoid and heater valve, perform the following to check that they are assembled properly:

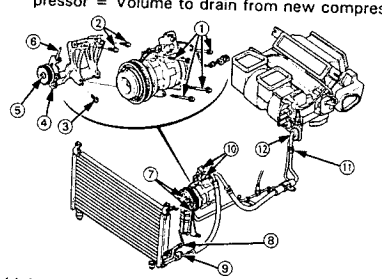
   (1) Connect the heater valve solenoid to the heater valve with a tube.
   (2) Connect the positive cable of a battery to No. ② terminal of the heater valve solenoid valve, and the negative cable to No. ① terminal.
   (3) Check that the rod of the heater valve is pulled toward the diaphragm when negative pressure is applied to the heater valve solenoid with a vacuum pump.
   (4) Check that the rod is returned to the original position when the battery cables are disconnected from the terminals.



A/C Service Trips and Precautions

⚠WARNING
When handling refrigerant (R-12):
- **Always wear eye protection.**
- **Do not let refrigerant get on your skin or in your eyes. If it does:**
  - **Do not rub your eyes or skin.**
  - **Splash large quantities of cool water in your eyes or on your skin.**
  - **Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.**
- **Keep refrigerant containers stored below 104°F (40°C).**
- **Do not handle or discharge refrigerant in an enclosed area near an open flame; it may ignite and produce a poisonous gas.**
- **Chlorine from chemicals called chlorofluorocarbons (CFCs) destroy the ozone in the stratosphere. Automotive air conditioning systems currently use chlorofluorocarbons as the refrigerant. Auto air conditioning service equipment has been developed to minimize the release of CFCs to the atmosphere. All service procedures should be performed using this equipment and the manufacturer's instructions.**

1. Always disconnect the negative cable from the battery whenever replacing air conditioning parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before you reconnect each line.
3. Before connecting any hose or line, apply a few drops of refrigerant oil (ND OIL 6) to the O-ring.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, use a Refrigerant Recovery/Recycling System; don't release refrigerant into the atmosphere.
6. Add refrigerant oil (ND OIL 6) after replacing the following parts:
   Condenser ..... 15 cc (2/3 fl oz)
   Evaporator ..... 30 cc (1/2 fl oz)
   Line or hose ..... 10 cc (1/3 fl oz)
   Receiver/dryer ..... 10 cc (1/3 fl oz)
   Compressor ..... On compressor replacement, subtract the volume of oil drained from the removed compressor from 140 cc (4-2/3 fl oz), and drain the calculated volume of oil from the new compressor: 140 cc (4-2/3 fl oz)—Volume of oil from removed compressor = Volume to drain from new compressor.



Don't overtighten fittings; you could damage them. Leaks are caused by faulty O-rings; overtightening won't stop them.

①	Compressor mounting bolts ..... 25 N·m (2.5 kg-m, 18 lb-ft)	⑦	Receiver/dryer ..... 14 N·m (1.4 kg-m, 10 lb-ft)
②	Compressor bracket mounting bolts (10 x 30) ..... 48 N·m (4.8 kg-m, 35 lb-ft)	⑧	Condenser pipe to condenser ..... 14 N·m (1.4 kg-m, 10 lb-ft)
③	Compressor bracket mounting bolt (10 x 60) ..... 48 N·m (4.8 kg-m, 35 lb-ft)	⑨	Discharge hose to condenser ..... 22 N·m (2.2 kg-m, 16 lb-ft)
④	Idler pulley bracket bolts (8 x 16) ..... 35 N·m (3.5 kg-m, 25 lb-ft)	⑩	Compressor hose mounting bolt ..... 22 N·m (2.2 kg-m, 16 lb-ft)
⑤	Idler pulley center nut ..... 48 N·m (4.8 kg-m, 35 lb-ft)	⑪	Suction hose line ..... 33 N·m (3.3 kg-m, 24 lb-ft)
⑥	Adjusting bolts (8 x 115) ..... 8 N·m (0.8 kg-m, 5.8 lb-ft)		

A/C System Service

Recovery

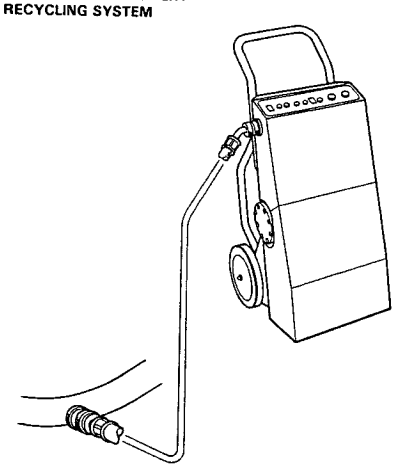
⚠ WARNING

- **Keep away from open flames. The refrigerant, although nonflammable, will produce a poisonous gas if burned.**
- **Work in a well-ventilanted area. Refrigerant evaporates quickly, and can ferce all the air out of a small enclosed area.**

1. Connect a Refrigerant Recovery/Recycling System to the A/C system.
2. Operate the Refrigerant Recovery/Recycling System according to the manufacturer's instructions.

IMPORTANT: Do not vent refrigerant to the atmosphere. The chlorofluorocarbons (CFCs) used in conventional refrigerant (R-12) may damage the earth's ozone layer.
Always use UL-listed, refrigerant recovery/recycling equipment to extract the refrigerant before you open an A/C system to make repairs. Follow the equipment manufacturer's instructions.

REFRIGERANT RECOVERY
RECYCLING SYSTEM

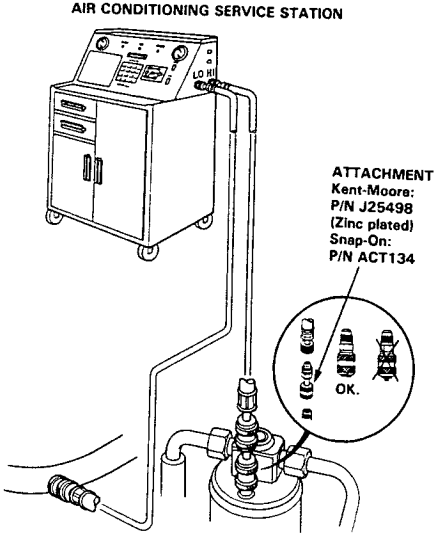


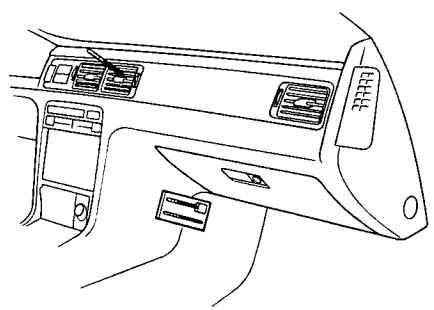
Performance Test

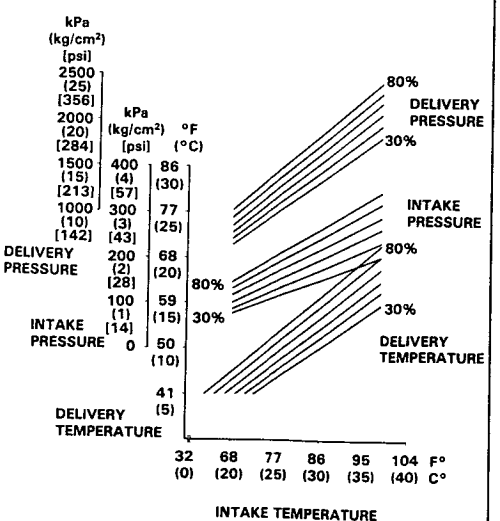
The performance test will help determine if the air conditioning system is operating within specifications.

1. Connect the hoses as shown.
2. Insert a thermometer in the center vent outlet. Determine the relative humidity and air temperature by calling the local weather information line.
3. Test conditions:
   - Avoid direct sunlight.
   - Open hood.
   - Open front doors.
   - Set the temperature control lever to MAX COOL and push the VENT and FRESH air buttons.
   - Turn the fan control lever to MAX.
   - Run the engine at 1,500 RPM.
   - No driver or passengers in vehicle.
4. After running the air conditioning for 10 minutes under the above conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the Air Conditioning Service Station.
5. To complete the charts:
   - Mark the delivery temperature along the vertical line.
   - Mark the intake temperature (air temperature) along the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point one line above and one line below the humidity level. (10% above and 10% below the humidity level)
   - From each point, draw a horizontal line across to the delivery temperature.
   - The delivery temperature should fall between the two lines.
   - Complete the low side pressure test and high side pressure test in the same way.

AIR CONDITIONING SERVICE STATION







A/C System Service

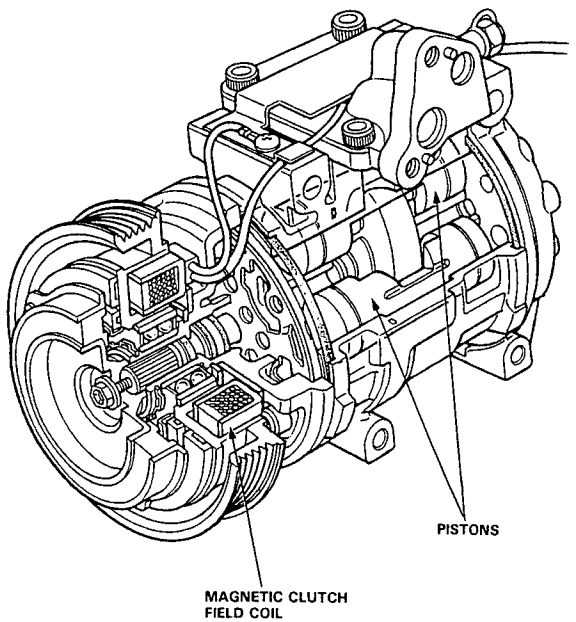
Pressure Test Chart

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 200 kPa (2.0 kg/cm², 28 psi) quickly, and then falls gradually	Air in system	Evacuate system: then recharge Evacuation: page 22-78 Recharging: page 22-79
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Recover, evacuate and recharge with specified amount.
	Reduced or no air flow through condenser	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean • Check voltage and fan rpm
	Line to condenser is excessively hot	Restricted flow of refrigerant in system	• Expansion valve • Restricted lines
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot	Insufficient refrigerant in system	• Check for leak • Charge system
	High and low pressures are balanced soon after stopping compressor	• Faulty compressor discharge or inlet valve • Faulty compressor seal	Replace
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum	• Faulty expansion valve • Moisture in system	• Replace • Flush and evacuate
Suction (low) pressure abnormally low	Excessive bubbles in sight glass: condenser is not hot	Insufficient refrigerant	Check for leaks. Charge as required.
	Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum	• Frozen expansion valve • Faulty expansion valve	Replace expansion valve
	Discharge temperature is low and the air flow from vents is restricted	Frozen evaporator	Run the fan with compressor off then check capillary tube.
	Expansion valve frosted	Clogged expansion valve	Clean or Replace
	Receiver dryer is cool (should be warm during operation)	Clogged receiver dryer	Replace
Suction pressure abnormally high	Low pressure hose and check joint are cooler than around evaporator	• Expansion valve open too long • Loose expansion valve	Repair or Replace.
	Suction pressure is lowered when condenser is cooled by water	Excessive refrigerant is system	Recover, evacuate and recharge with specified amount.
	High and low pressure are equalized as soon as the compressor is stopped and both gauges fluctuate while running	• Faulty gasket • Faulty high pressure valve • Foreign particle stuck in high pressure valve	Replace compressor
Suction and discharge pressures abnormally high	Reduced air flow through condenser	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean condenser and radiator • Check voltage and fan rpm
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Recover, evacuate and recharge with specified amount.
Suction and discharge pressure abnormally low	Low pressure hose and metal end areas are cooler than evaporator	Clogged or kinked low pressure hose parts	Repair or Replace
	Temperature around expansion valve is too low compared with that around receiver dryer	Clogged high pressure line	Repair or Replace
Refrigerant leaks	Compressor clutch is dirty	Compressor shaft seal leaking	Replace compressor
	Compressor bolt(s) are dirty	Leaking around bolt(s)	Tighten bolt(s) or replace compressor
	Compressor gasket is wet with oil	Gasket leaking	Replace compressor

Compressor

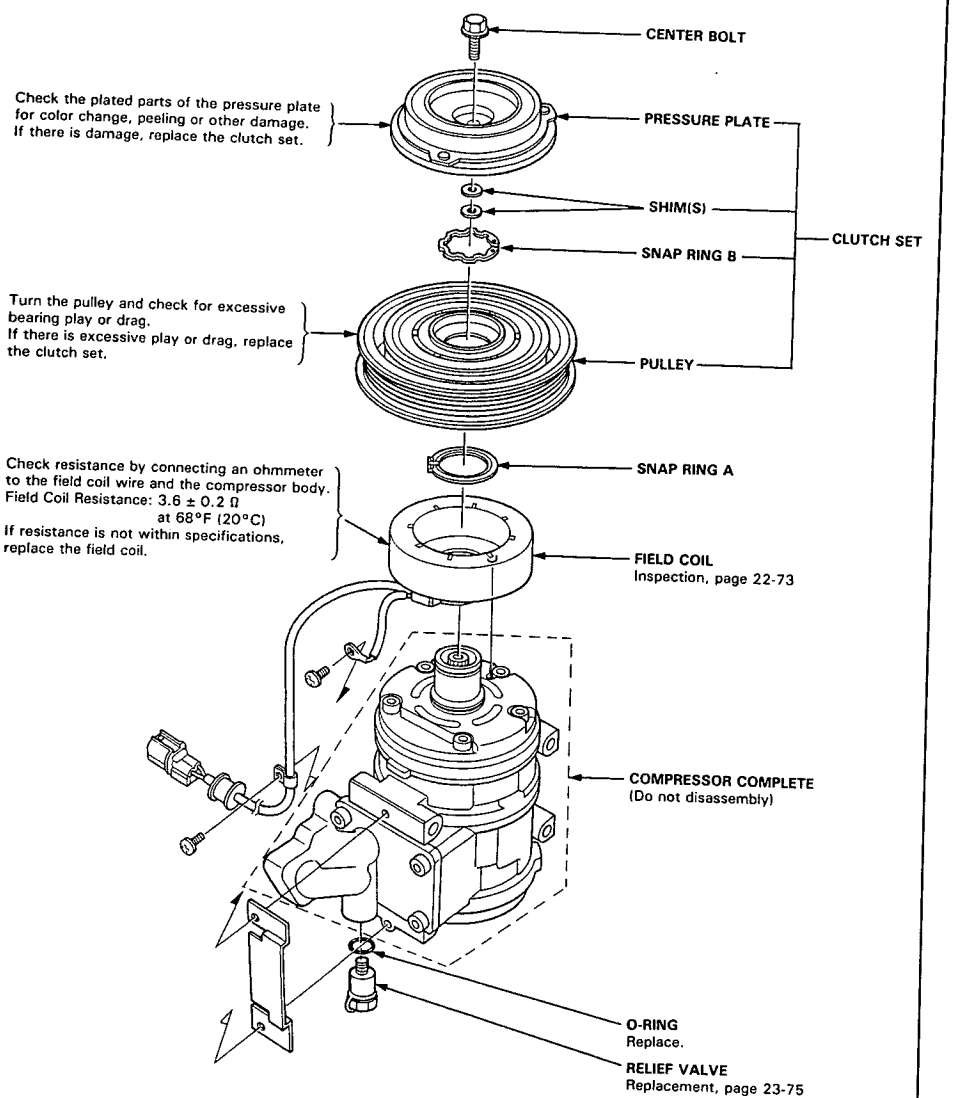
Description

This compressor is a Nippondenso piston type. A revolving inclined disc drives the surrounding 10 reciprocating pistons. As the inclined disc revolved, it pushes the pistons, protected by a ceramic shoe, thus compressing the refrigerant.



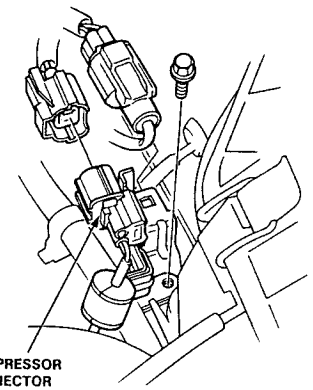
Compressor

Illustrated Index

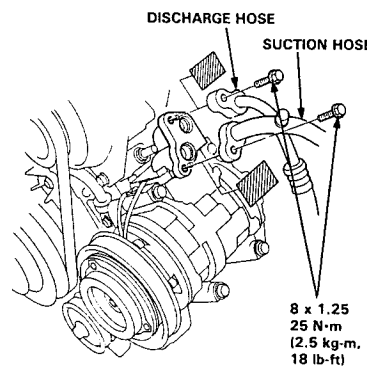


Replacement

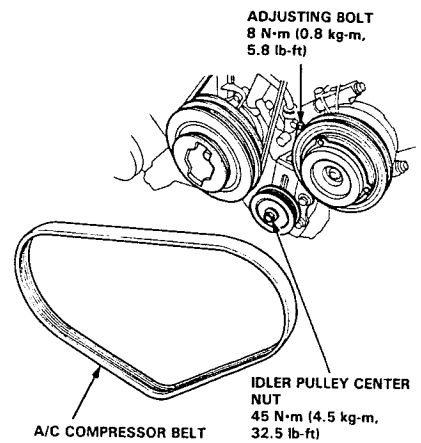
1. If the compressor still works, run the engine at idle for a few minutes with the A/C on, then shut the engine off and disconnect the negative cable from the battery.
2. Use a Refrigerant Recovery/Recycling System to recover the refrigerant from the system (see page 22-66).
3. Disconnect the compressor connector.



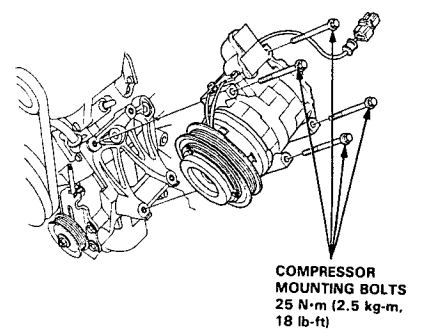
4. Disconnect the suction and discharge hoses from the compressor. Cap the open fittings immediately to keep moisture and dirt out of the system.



5. Loosen the idle pulley center nut and adjusting bolt, and remove the power steering oil pump belt (see section 17).
6. Loosen the idler pulley center nut and adjusting bolt, then remove the belt from compressor.



7. Remove the four compressor mounting bolts and compressor.



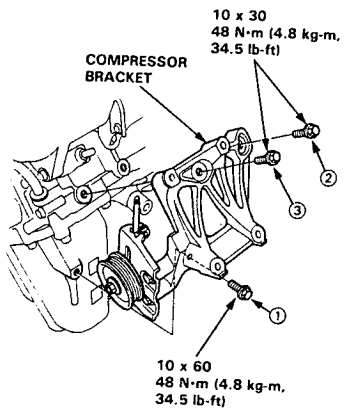
(cont'd)

Compressor

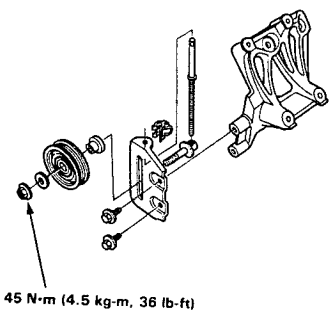
Replacement (cont'd)

8. If necessary, remove the three compressor bracket mounting bolts.

   NOTE: Before assembling, tighten the compressor bracket mounting bolts in the order of ① thru ③ and in two steps; first tighten temporarily, then torque to the specified tension after making sure that there is no clearance between the bracket and its mounting face.



9. If necessary remove the idler pulley.



- Check the idler pulley bearing for play and drag. Replace it with a new one if it's noisy or has excessive play or drag.

10. Install in the reverse order of removal.
    If you're installing a new compressor, drain all the refrigerant oil out of the old compressor and measure its volume. Subtract the volume of old oil from 140 cc (4-2/3 oz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).

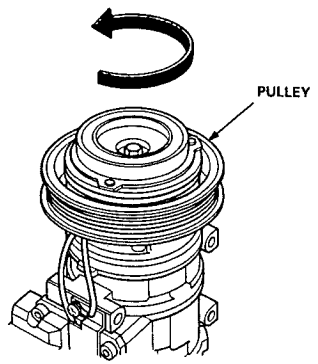
11. Adjust the compressor belt (see page 22-76).
    After adjusting the belt, tighten the pulley center nut.
    Then tighten the adjusting bolt securely.

12. Charge the system (see page 22-79).

13. Test system performance (see page 22-67).

Clutch Inspection

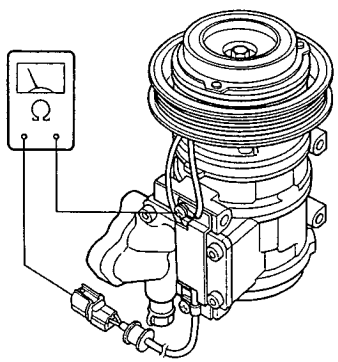
1. Check pulley bearing play and drag by rotating the pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



2. Check resistance of the field coil:

   Field Coil Resistance: 3.6 ± 0.2 ohm at 68°F (20°C)

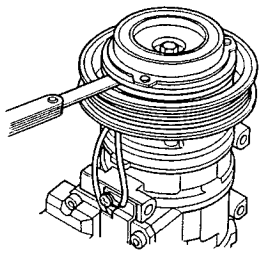
   If resistance is not within specifications, replace the field coil.



3. Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required, following the procedure on the next page.

   CLEARANCE: 0.5 ± 0.15 mm (0.020 ± 0.006 in)

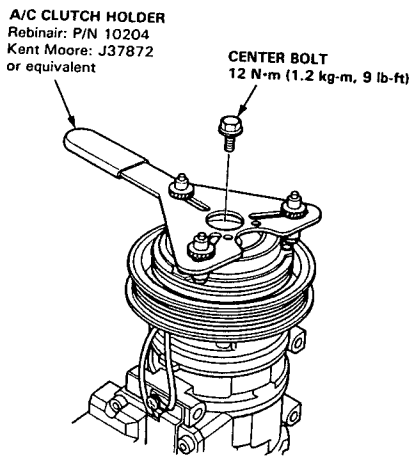
   NOTE: The shims are available in three sizes: 0.1 mm, 0.3 mm and 0.5 mm of thickness.



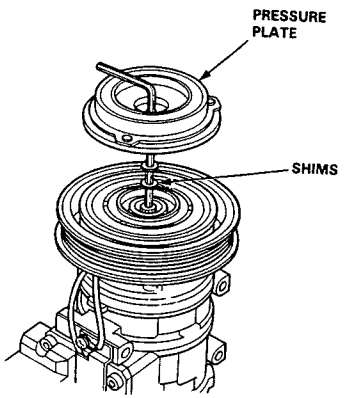
Compressor

Clutch Overhaul

1. Remove the center bolt.

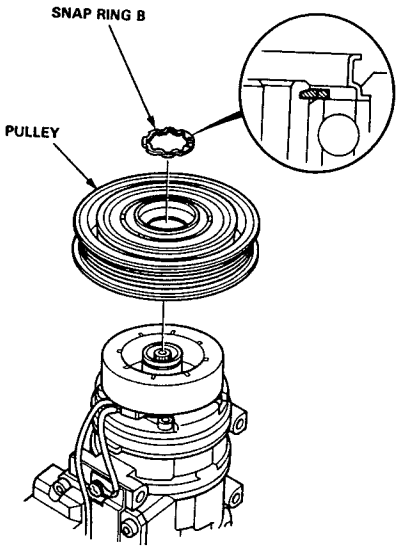


2. Remove the pressure plate and shim(s) taking care not to lose the shims.



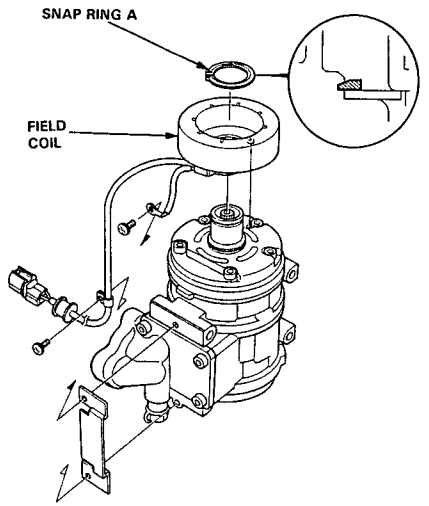
3. Use snap ring pliers to remove snap ring B, then remove the pulley.

NOTE:
- Be careful not to damage the pulley and compressor during removal/installation.
- Once the snap ring B is removed, replace it with a new one.



4. Remove snap ring A and the field coil.

NOTE:
- Be careful not to damage the field coil and compressor during removal/installation.
- Once the snap ring A is removed, replace it with a new one.

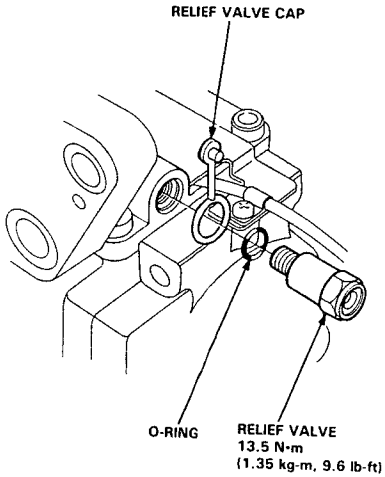


5. Install parts in the reverse order of removal, and:
   - Install the field coil with the wire side facing up (see above).
   - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
   - Check the pulley bearings for excessive play.
   - Make sure the snap rings are in the groove properly.
   - Apply locking agent to the threads on the center bolt.
   - Make sure that the pulley turns smoothly, after it's reassembled.

Relief Valve Replacement

1. Remove the relief valve and O-ring.

   NOTE: Avoid letting any compressor oil run out.



2. Clean off the mating surface.
3. Replace the relif valve O-ring with new one, and apply refrigerant oil to it.
4. Install and tighten the relief valve.
5. Charge the system and check for leaks, then push the cap into the valve.

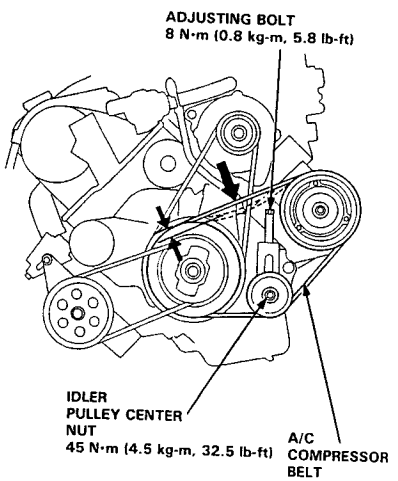
Belt Adjustment

Compressor Belt

- "New belt" refers to a belt which has been used less than five minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for five minutes or more.

NOTE: Check for belt damage. If necessary, replace the belt.

Belt movement under 100 N (10 kg, 22 lbs) force	
New belt	Used belt
0.14–0.22 in (3.5–5.5 mm)	0.24–0.35 in (6.0–9.0 mm)

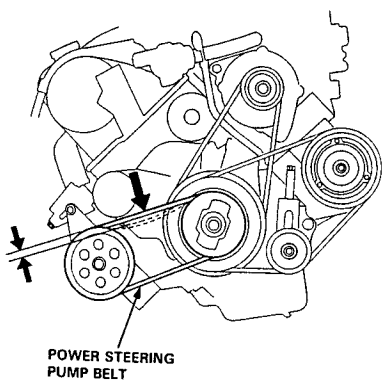


Power Steering Belt

- "New belt" refers to a belt which has been used less than five minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for five minutes or more.

NOTE: Check for belt damage. If necessary, replace the belt.

Belt movement under 100 N (10 kg, 22 lbs) force	
New belt	Used belt
0.18–0.26 in (4.5–6.5 mm)	0.26–0.35 in (6.0–9.0 mm)

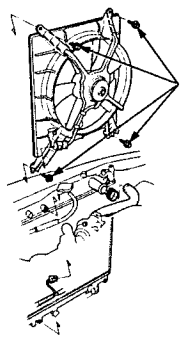


Condenser

Replacement

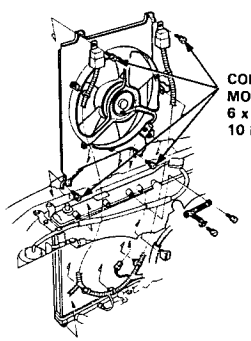
1. Use a Refrigerant Recovery/Recycling System to recover the refrigerant (see page 22-66).
2. Disconnect the connector from the radiator fan motor, remove the four mounting bolts and remove the radiator fan shroud.

   CAUTION: Do not damage the radiator fins when removing the fan shroud.

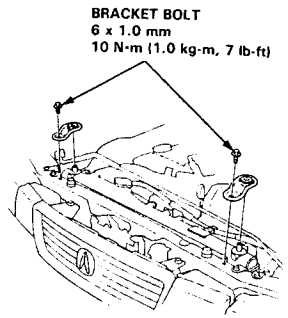


3. Disconnect the connector from the condenser fan motor, remove the four mounting bolts and remove the condenser fan shroud.

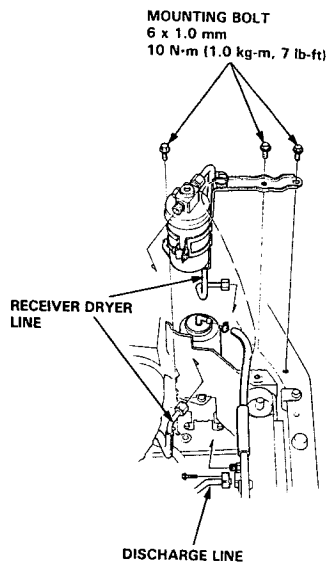
   CAUTION: Do not damage the radiator fins when removing the fan shroud.



4. Remove the radiator upper mount brackets.



5. Disconnect the receiver dryer line and remove the three mounting bolts, then remove the receiver dryer.
6. Disconnect the discharge line from the condenser.



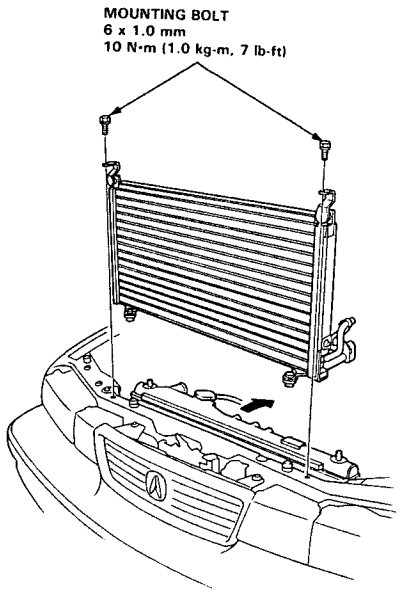
(cont'd)

Condenser

Replacement (cont'd)

7. Remove the two condenser mounting bolts, then lift out the condenser as shown.

CAUTION: Do not damage the radiator and condenser fins when removing the condenser.



8. Install the condenser in reverse order of removal, and:
   - Replace all O-rings with new ones at the pipe joints, and apply refrigerant oil to them.
   - Charge the system (see page 22-79) and test its performance (see page 22-67).

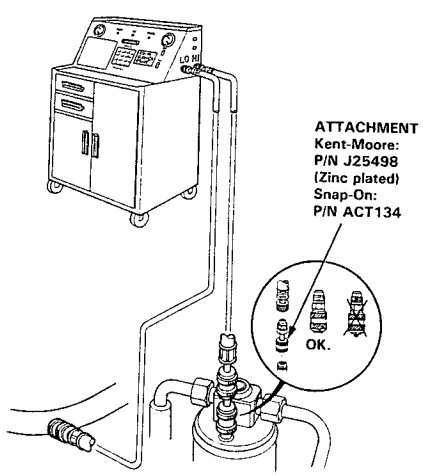
A/C System Service

Evacuation

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a vacuum pump. (If the system has been open for several days, the receiver/dryer should be replaced).
2. Connect the Air Conditioning Service Station as shown. Follow the equipment manufacturer's instructions.

NOTE:
- Connect the high-side adapter to the high pressure hose first, then connect the hoses to the car as shown. When testing is completed, disconnect the high-side adapter from the highside fitting; do not disconnect the hose from the adapter, or refrigerant may escape from the system.
- If low pressure does not reach more than 700 mmHg (27 in-Hg) in 15 minutes, there is probably a leak in the system. Partially charge the system and check for leaks (see Leak Test).

AIR CONDITIONING SERVICE STATION



Charging

Refrigerant capacity: 800–850 g (28–30 oz)

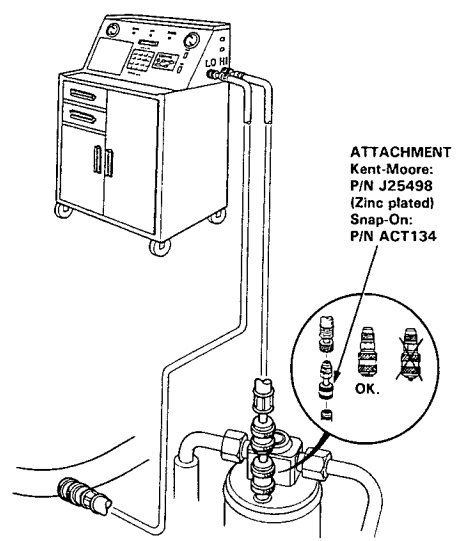
⚠WARNING Always wear eye protection when charging the system.

CAUTION: Do not overcharge the system; the compressor will be damaged.

Connect the Air Conditioning Service Station as shown. Follow the equipment manufacturer's instructions.

NOTE: Connect the high-side adapter to the high pressure hose first, then connect the hoses to the car as shown. When testing is completed, disconnect the high-side adapter from the high-side fitting; do not disconnect the hose from the adapter, or refrigerant may escape from the system.

AIR CONDITIONING SERVICE STATION



A/C System Service

Leak Test

⚠WARNING When handling refrigerant (R-12):

- Always wear eye protection.
- Do not let refrigerant get on your skin or in your eyes. If it does:
  - Do not rub your eyes or skin.
  - Splash large quantities of cool water in your eyes or on your skin.
  - Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.
- Keep away from open flame. Refrigerant, although non-flammable, will produce poisonous gas if burned.
- Work in well-ventiated area. Refrigerant evaporates quickly, and can force all the air out of a small, enclosed area.

IMPORTANT: Do not vent refrigerant to the atmosphere. The chlorofluorocarbons (CFCs) used in conventional refrigerant (R-12) may damge the earth's ozone layer. Always use UL-listed, refrigerant recovery/recycling equipment to extract the refrigerant before you open an A/C system to make repairs. Follow the equipment manufacturer's instructions.

1. Connect the Air Conditioning Service Station as shown.

   NOTE: Connect the high-side adapter to the high pressure hose first, then connect the hoses to the car as shown. When testing is completed, disconnect the high-side adapter from the high-side fitting; do not disconnect the hose from the adapter, or refrigerant may escape from the system.

2. Open high pressure valve to charge the system to about 100 kPa (1 kg/cm², 14 psi), then close the supply valve.

3. Check the system for leaks using an electronic leak detector.
   Follow the manufacturer's instructions.

4. If you find leaks that require the system to be opened (to repair or replace hoses, fitting, etc.), recover the system according to the Recovery Procedure on page 22-66.

5. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 22-78).

AIR CONDITIONING SERVICE STATION