

RODEO

# HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

## HVAC SYSTEMS

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## 1A-2 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

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### Service Precaution

**WARNING: THIS VEHICLE HAS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS). REFER TO THE SRS COMPONENT AND WIRING LOCATION VIEW IN ORDER TO DETERMINE WHETHER YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING. WHEN YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING, REFER TO THE SRS SERVICE INFORMATION. FAILURE TO FOLLOW WARNINGS COULD RESULT IN POSSIBLE AIR BAG DEPLOYMENT, PERSONAL INJURY, OR OTHERWISE UNNEEDED SRS SYSTEM REPAIRS.**

**CAUTION: Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (Paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.**

## Heating and Ventilation System

### General Description

#### Heater

When the engine is warming up, the warmed engine coolant is sent into the heater core. The heater system supplies warm air into the passenger compartment to warm it up.

Outside air is circulated through the heater core of the heater unit and then into the passenger compartment. By controlling the mixture of outside air and heater core air, the most comfortable passenger compartment temperature can be selected and maintained.

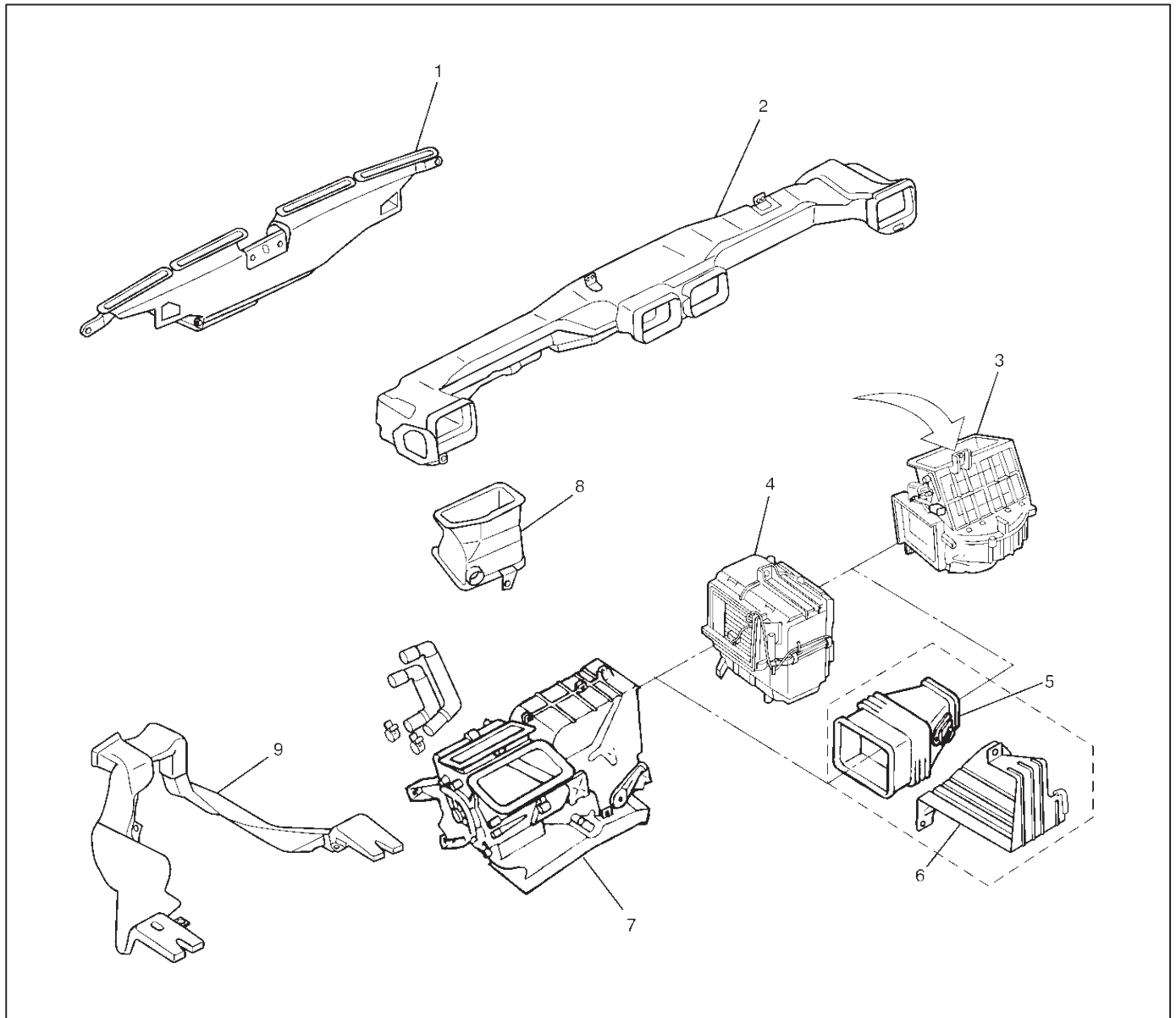
The temperature of warm air sent to the passenger compartment is controlled by the temperature control knob. This knob acts to open and close the air mix door,

thus controlling the amount of air passed through the heater core.

The air selector knob, with its different modes, also allows you to select and maintain the most comfortable passenger compartment temperature.

The air source select lever is used to select either "FRESH" for the introduction of the outside air, or "CIRC" for the circulation of the inside air. When the lever is set to "FRESH", the outside air is always taken into the passenger compartment. When setting the lever to "CIRC" position, the circulation of air is restricted only to the inside air with no introduction of the outside air and the air in the passenger compartment gets warm quickly.

However, the lever is normally set to "FRESH" to prevent the windshield from clouding.



840R100002

### Legend

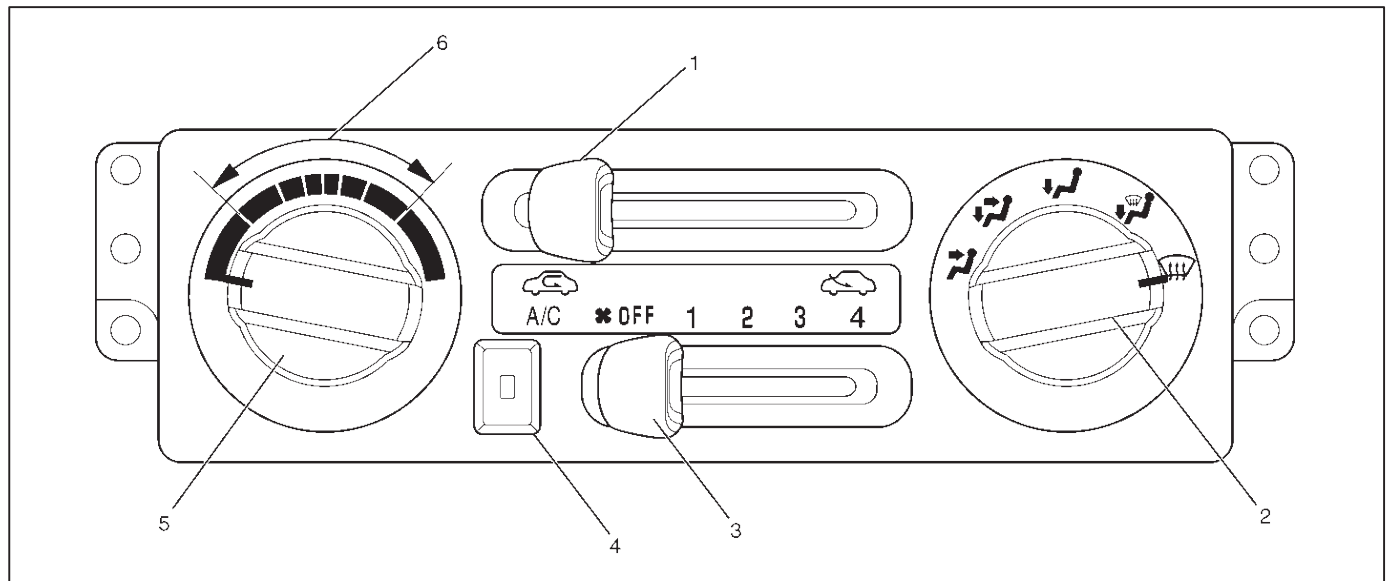
- |                                    |                                      |
|------------------------------------|--------------------------------------|
| (1) Defroster Nozzle               | (5) Duct (W/O A/C)                   |
| (2) Ventilation Duct               | (6) Knee Protector Bracket (W/O A/C) |
| (3) Blower Assembly                | (7) Heater Unit                      |
| (4) Evaporator Assembly (With A/C) | (8) Ventilation Lower Duct           |
|                                    | (9) Rear Heater Duct                 |

## 1A-4 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

### Control Lever Assembly

The control lever assembly has some cables to control the mode and temperature of the heater unit and the mode door for the air source of the blower assembly.

The fan control is used to control the amount of air sent out by the resistor at four levels from “LOW” to “HIGH”.



865RW006

#### Legend

- (1) Air Source Select Lever
- (2) Air Select Knob
- (3) Fan Control Lever (Fan Switch)

- (4) Air Conditioning (A/C) Switch (W/ A/C)
- (5) Temperature Control Knob
- (6) Middle Position

### Ventilation

Setting the air source select lever to “FRESH” position allows the heating system to work with sending the fresh air from outside.

The blower fan also serves to deliver fresh outside air to the passenger compartment to assure adequate ventilation.

#### Air Select Knob

The air select knob allows you to direct heated air into the passenger compartment through different outlets.

1. **Vent** – In this position, air is discharged from the upper air outlet. Air quantity is controlled by the fan control lever.
2. **Bi-Level** – In this position, air flow is divided between the upper air outlets and the floor air outlets, with warmer air delivered to the floor outlets than the air delivered to the upper air outlets when the temp lever is in middle position.
3. **Foot** – In this position, air flow is delivered to the foot, while sending a small amount of air to the windshield.

4. **Def/Foot** – In this position, air flow is delivered to the foot, while sending approx. 40% of total amount of air to the windshield.

Selecting this mode allows air conditioning system to work while the fan switch is turned to on position, even if the A/C switch is off.

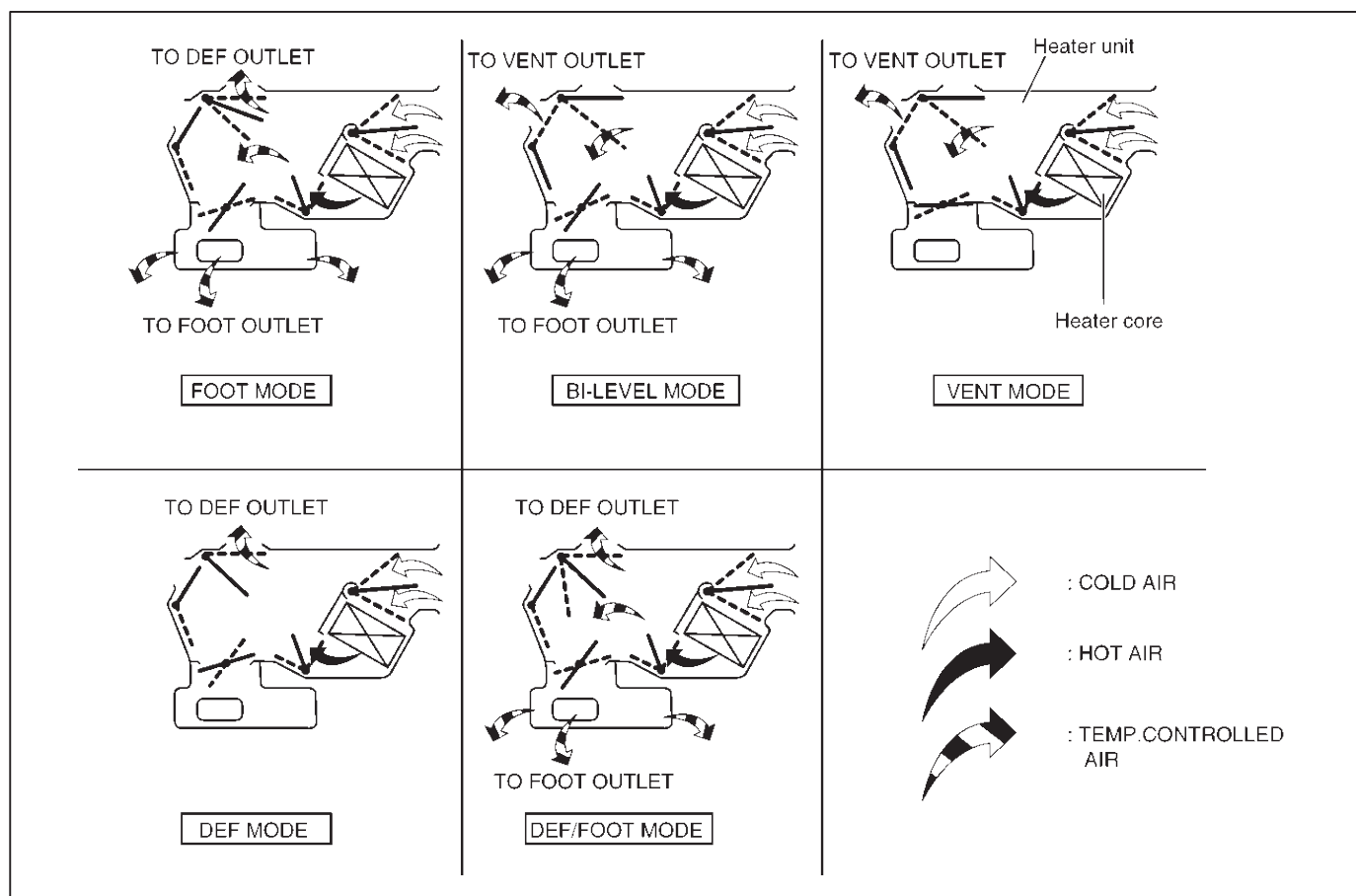
Also the fresh air can be delivered even when the circ position is selected.

5. **Defrost** – In this position, most of the air is delivered to the windshield and a small amount is delivered to the side windows.

Selecting this mode allows air conditioning system to work while the fan switch is turned to on position, even if the A/C switch is off.

Also the fresh air can be delivered even when the circ position is selected.

Moving the air source select lever to the “CIRC” position provides quickest heat delivery by closing the blower assembly mode door. In this position, outside air is not delivered to the passenger compartment.



C01RW001

### Air Source Select Lever

The intake of outside air and the circulation of inside air are controlled by sliding this lever left or right. And even though the circ position is selected, the fresh air can be delivered while the DEF or DEF/FOOT position is selected.

### Fan Control Lever

This lever controls the blower motor speed to regulate the amount of air delivered to the defrost, foot, and ventilation ducts:

1. Low
2. Medium Low
3. Medium High
4. High

### Temperature Control Knob

When the temperature control knob is in the "COLD" position, the air mix door closes to block the flow air to the heater core.

When the temperature control knob is in the "HOT" position, the air mix door opens to allow air to pass through the heater core and heat the passenger compartment.

Placing the knob in an intermediate position will cause a lesser or greater amount of air to reach the heater core. In this mode the passenger compartment temperature can be regulated.



## Diagnosis

### Heating Cycle diagnosis

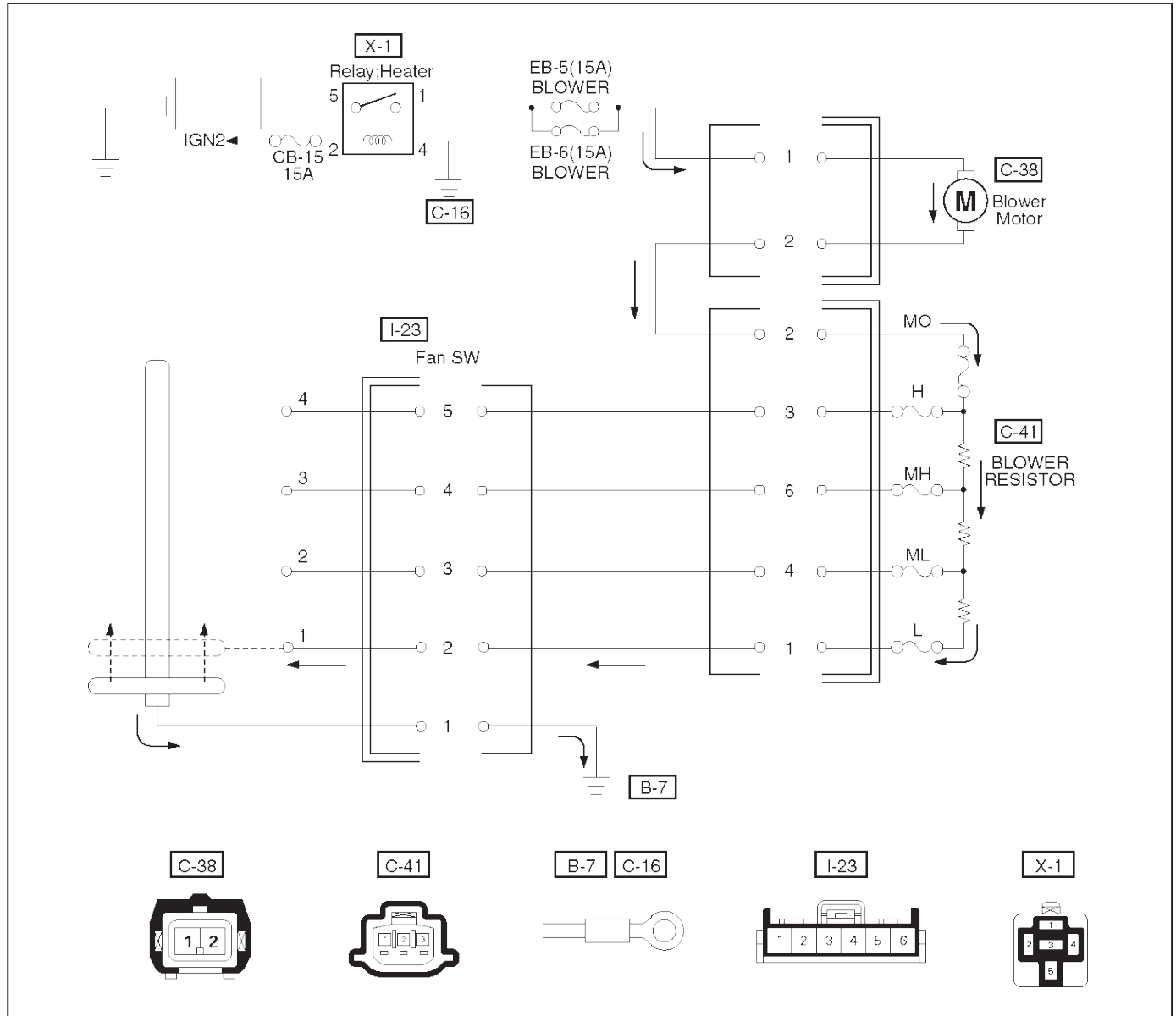
| Condition                                           | Possible cause                                                        | Correction                                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| No heating or insufficient heating.                 | Blower motor does not run or runs improperly.                         | Refer to "FAN CONTROL LEVER (FAN SWITCH) DIAGNOSIS".                                                             |
|                                                     | Engine coolant temperature is low.                                    | Check the engine coolant temperature after warming up the engine and check the thermostat. Replace as necessary. |
|                                                     | Insufficient engine coolant.                                          | Add engine coolant as required.                                                                                  |
|                                                     | Circulation volume of engine coolant is insufficient.                 | Check if the water hose to the heater core is clogged, collapsed or twisted. Repair or replace as necessary.     |
|                                                     | Heater core clogged or collapsed.                                     | Clean or replace as necessary.                                                                                   |
|                                                     | The heater cores is not provided with air sent from the blower motor. | Repair the temperature control link unit or mode doors.                                                          |
|                                                     | Duct connections defective or unsealing.                              | Repair or replace as necessary.                                                                                  |
| Control lever moves but mode door does not operate. | Cable attaching clip is not correct.                                  | Repair                                                                                                           |
|                                                     | Link unit of heater or blower assembly defective.                     | Repair                                                                                                           |
|                                                     | The intake actuator is inoperative.                                   | Refer to "AIR SOURCE SELECT LEVER DIAGNOSIS"                                                                     |
| The mode door cannot be set to the mode selected.   | Link unit of heater unit.                                             | Repair.                                                                                                          |
|                                                     | Control cable is not adjusted.                                        | Adjust.                                                                                                          |

## 1A-8 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

### Fan Control Lever (Fan Switch) Diagnosis

Current flows to the blower motor through the heater relay (X-1) to activate the rotation of the blower motor by turning "ON" the fan control knob (fan switch). Blower motor speed is controlled in stages by the resistor, by operating the switch from "LOW" to "HIGH".

For the inspection of the relays, switches and units in each table, refer to "INDIVIDUAL INSPECTION" in this section.



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| Condition                                          | Possible cause | Correction                   |
|----------------------------------------------------|----------------|------------------------------|
| Blower motor does not run.                         | —              | Refer to Chart A             |
| Blower motor does not run in certain position (s). | —              | Refer to Chart B, C, D and E |
| Blower motor does not stop at "OFF" position.      | —              | Refer to Chart F             |

**Chart "A" Blower Motor Does Not Run**

| Step | Action                                                                                                                                                                                                | Yes                                                                                                                                        | No                                                                   |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| 1    | Is relay (X-1) OK?                                                                                                                                                                                    | Go to Step 2                                                                                                                               | Replace                                                              |
| 2    | Is fuse EB-5 (15A) OK?                                                                                                                                                                                | Go to Step 3                                                                                                                               | Replace                                                              |
| 3    | Is fuse EB-6 (15A) OK?                                                                                                                                                                                | Go to Step 4                                                                                                                               | Replace                                                              |
| 4    | Is resistor OK?                                                                                                                                                                                       | Go to Step 5                                                                                                                               | Replace                                                              |
| 5    | Is fan control lever OK?                                                                                                                                                                              | Go to Step 6                                                                                                                               | Replace control lever assembly.                                      |
| 6    | Is blower motor OK?                                                                                                                                                                                   | Go to Step 7                                                                                                                               | Replace                                                              |
| 7    | 1. Turn the ignition switch "ON".<br>2. Turn fan control lever "ON".<br>3. Check to see if battery voltage is present at chassis side connector terminal No. C38-1<br><br>Is there a battery voltage? | Poor ground or open circuit either between chassis side connector terminal No. C38-2 and No. C41-2 or No. I23-1 and body ground (No. B-7). | Open circuit between No. EB-5 (15A) / EB-6 (15A) fuse and No. C38-1. |

**Chart "B" Blower Motor Does Not Run At Low Position**

| Step | Action                                | Yes                                                                           | No                              |
|------|---------------------------------------|-------------------------------------------------------------------------------|---------------------------------|
| 1    | Is resistor OK?                       | Go to Step 2                                                                  | Replace                         |
| 2    | Is fan control lever (Fan Switch) OK? | Open circuit between chassis side connector terminal No. C41-1 and No. I23-2. | Replace control lever assembly. |

**Chart "C" Blower Motor Does Not Run At Medium Low Position**

| Step | Action                                | Yes                                                                               | No                              |
|------|---------------------------------------|-----------------------------------------------------------------------------------|---------------------------------|
| 1    | Is resistor OK?                       | Go to Step 2                                                                      | Replace                         |
| 2    | Is fan control lever (Fan Switch) OK? | Open circuit between the chassis side connector terminal No. C41-4 and No. I23-3. | Replace control lever assembly. |

**Chart "D" Blower Motor Does Not Run At Medium High Position**

| Step | Action                                | Yes                                                                           | No                              |
|------|---------------------------------------|-------------------------------------------------------------------------------|---------------------------------|
| 1    | Is resistor OK?                       | Go to Step 2                                                                  | Replace                         |
| 2    | Is fan control lever (Fan Switch) OK? | Open circuit between chassis side connector terminal No. C41-6 and No. I23-4. | Replace control lever assembly. |

## 1A-10 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

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**Chart “E” Blower Motor Does Not Run At High Position**

| Step | Action                                | Yes                                                                           | No                              |
|------|---------------------------------------|-------------------------------------------------------------------------------|---------------------------------|
| 1    | Is resistor OK?                       | Go to Step 2                                                                  | Replace                         |
| 2    | Is fan control lever (Fan Switch) OK? | Open circuit between Chassis side connector terminal No. C41-3 and No. I23-5. | Replace control lever assembly. |

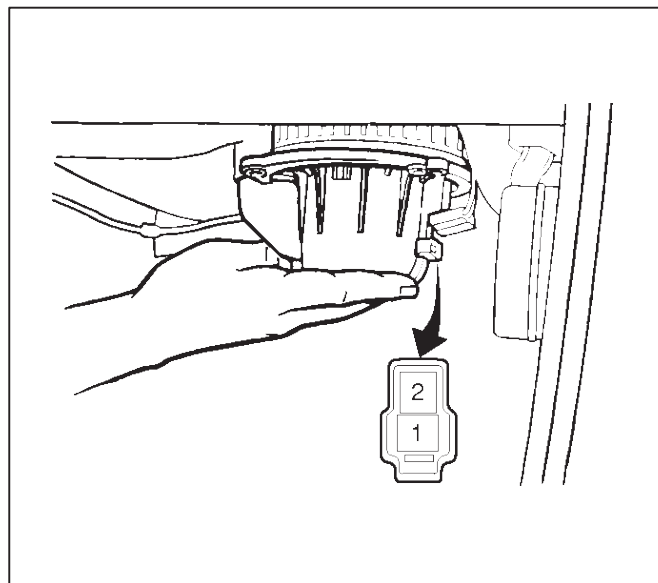
**Chart “F” Blower Motor Does Not Stop In The “OFF” Position**

| Step | Action                                    | Yes                                                                                                                                                                                 | No                              |
|------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| 1    | Is the fan control lever (Fan Switch) OK? | Short circuit between chassis side connector terminal No. C38-2 and No. C41-2, No. C41-3 and No. I23-5, No. C41-6 and No. I23-4, No. C41-4 and No. I23-3 or No. C41-1 and No. I23-2 | Replace control lever assembly. |

## Individual Inspection

### Blower Motor

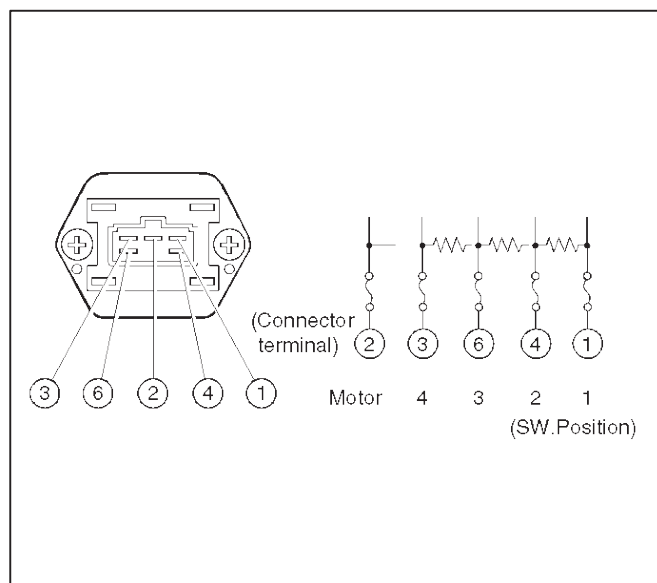
1. Disconnect the blower motor (C-38) connector from the blower motor.
2. Connect the battery positive terminal to the No. 1 terminal of the blower motor and the negative to the No. 2.
3. Be sure to check to see if the blower motor operates correctly.



873RS005

### Resistor

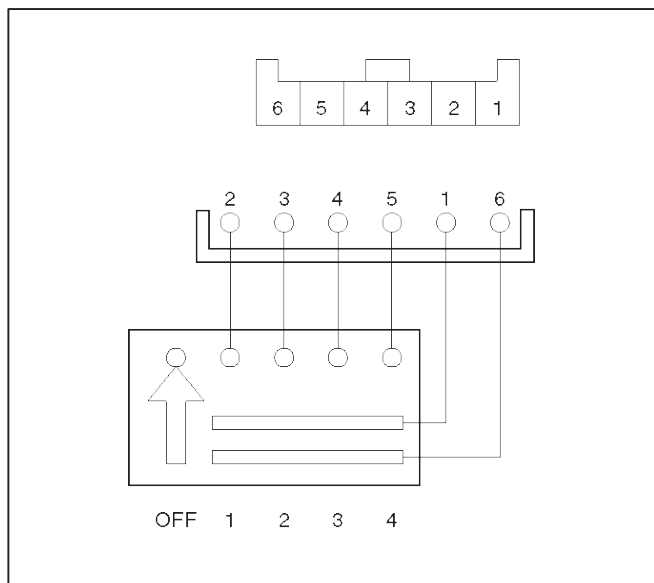
1. Disconnect the resistor (C-41) connector.
2. Check for continuity and resistance between the terminals of the resistor.



840RS001

### Fan Control Lever (Fan Switch)

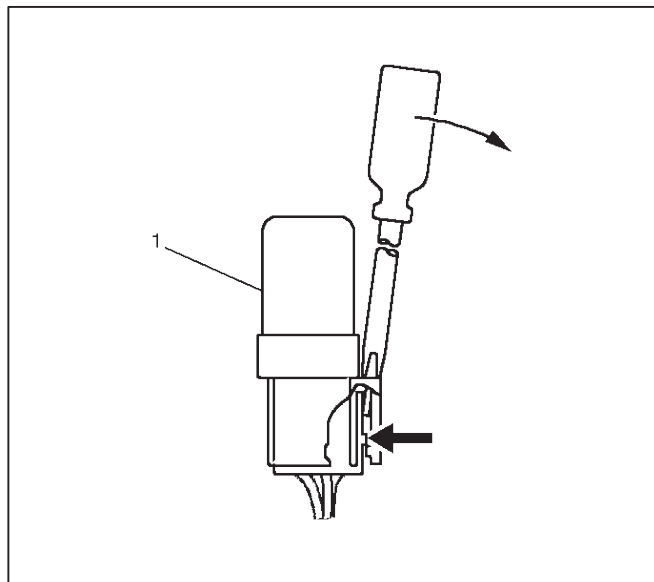
1. Check for continuity between the terminals of the fan switch.



D08RW058

### Heater Relay

1. Disconnect the heater relay (X-1).
  - When removing the connector for relay, unfasten the tank lock of the connector by using a screwdriver, then pull the relay (1) out.

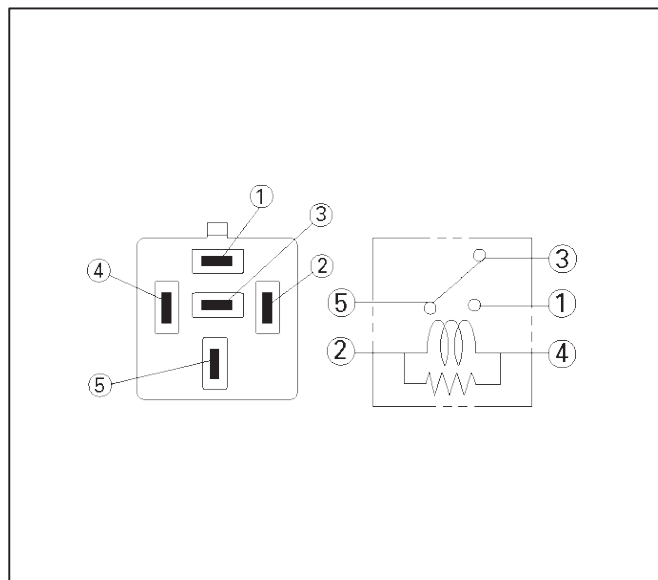


825RS001

## 1A-12 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

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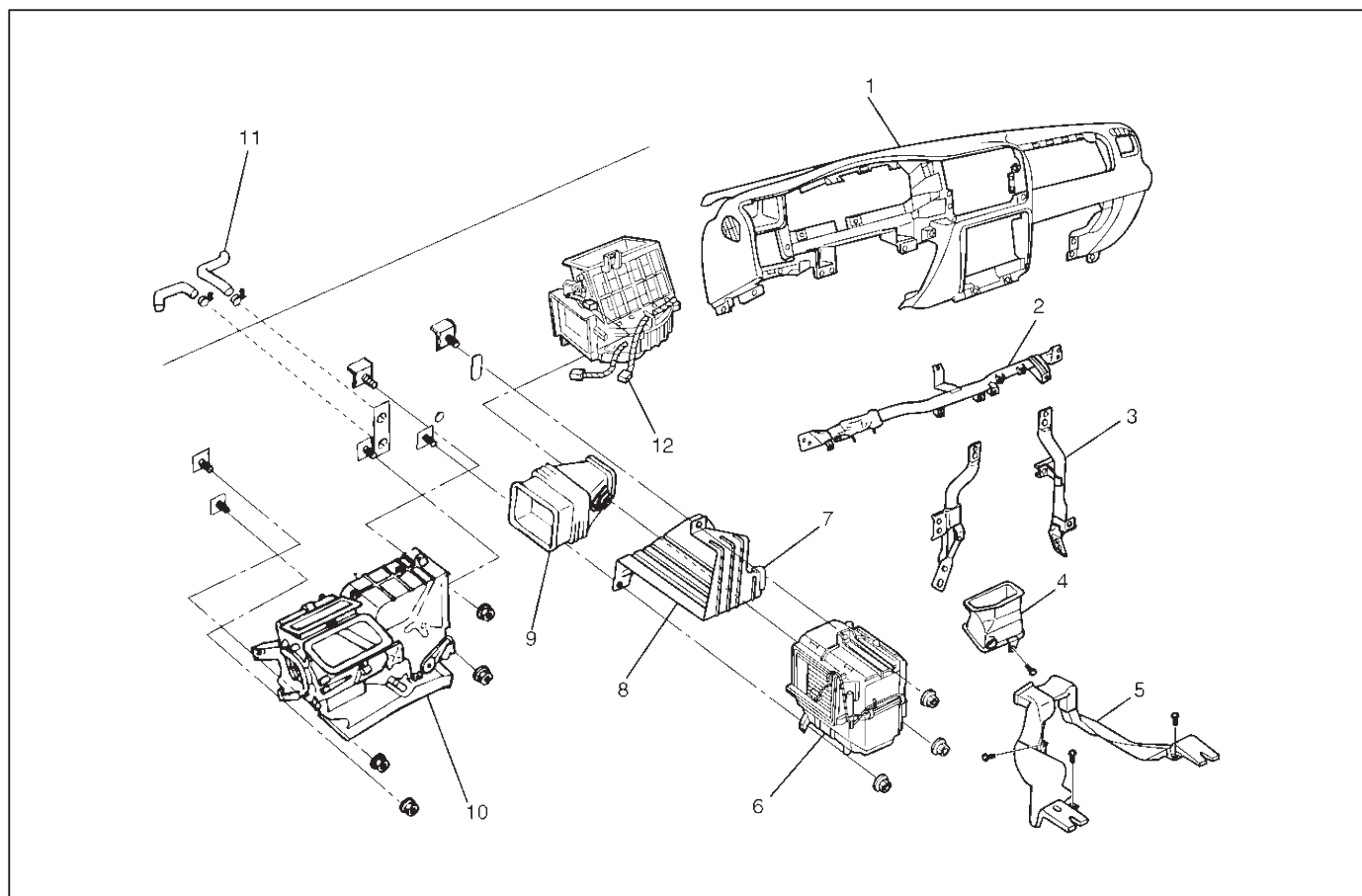
2. Check for continuity between the heater relay (X-1) terminals.



825RS179

## Heater Unit

### Heater Unit and Associated Parts



840R100001

#### Legend

- |                                    |                                 |
|------------------------------------|---------------------------------|
| (1) Instrument Panel Assembly      | (7) Edge Protector Knee Bolster |
| (2) Cross Beam Assembly            | (8) Knee Bolster Bracket        |
| (3) Instrument Panel Bracket       | (9) Duct                        |
| (4) Ventilation Lower Duct         | (10) Heater Unit Assembly       |
| (5) Rear Heater Duct               | (11) Heater Hose                |
| (6) Evaporator Assembly (A/C only) | (12) Resistor Connector         |

### Removal

1. Disconnect the battery ground cable.
2. Drain the engine coolant.
3. Discharge and recover refrigerant (with air conditioning).
  - Refer to Refrigerant Recovery in this section.
4. Remove the Instrument panel assembly.
  - Refer to Instrument Panel Assembly in Body and Accessories section.
5. Remove instrument panel bracket.
  - Refer to Cross Beam Assembly in Body and Accessories section.
6. Cross Beam Assembly.
  - Refer to Cross Beam Assembly in Body and Accessories section.
7. Disconnect resistor connector.
8. Remove knee bolster bracket.
9. Remove duct.
10. Remove evaporator assembly (A/C only).
  - Refer to Evaporator Assembly in this section.
11. Remove ventilation lower duct.
12. Remove rear heater duct.
  - Remove foot rest, carpet and 3 clips.
13. Remove heater unit assembly.
  - Disconnect heater hoses at heater unit.

## 1A-14 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

### Installation

To install, follow the removal steps in the reverse order, noting the following points:

1. When handling the PCM and the control unit, be careful not to make any improper connection of the connectors.

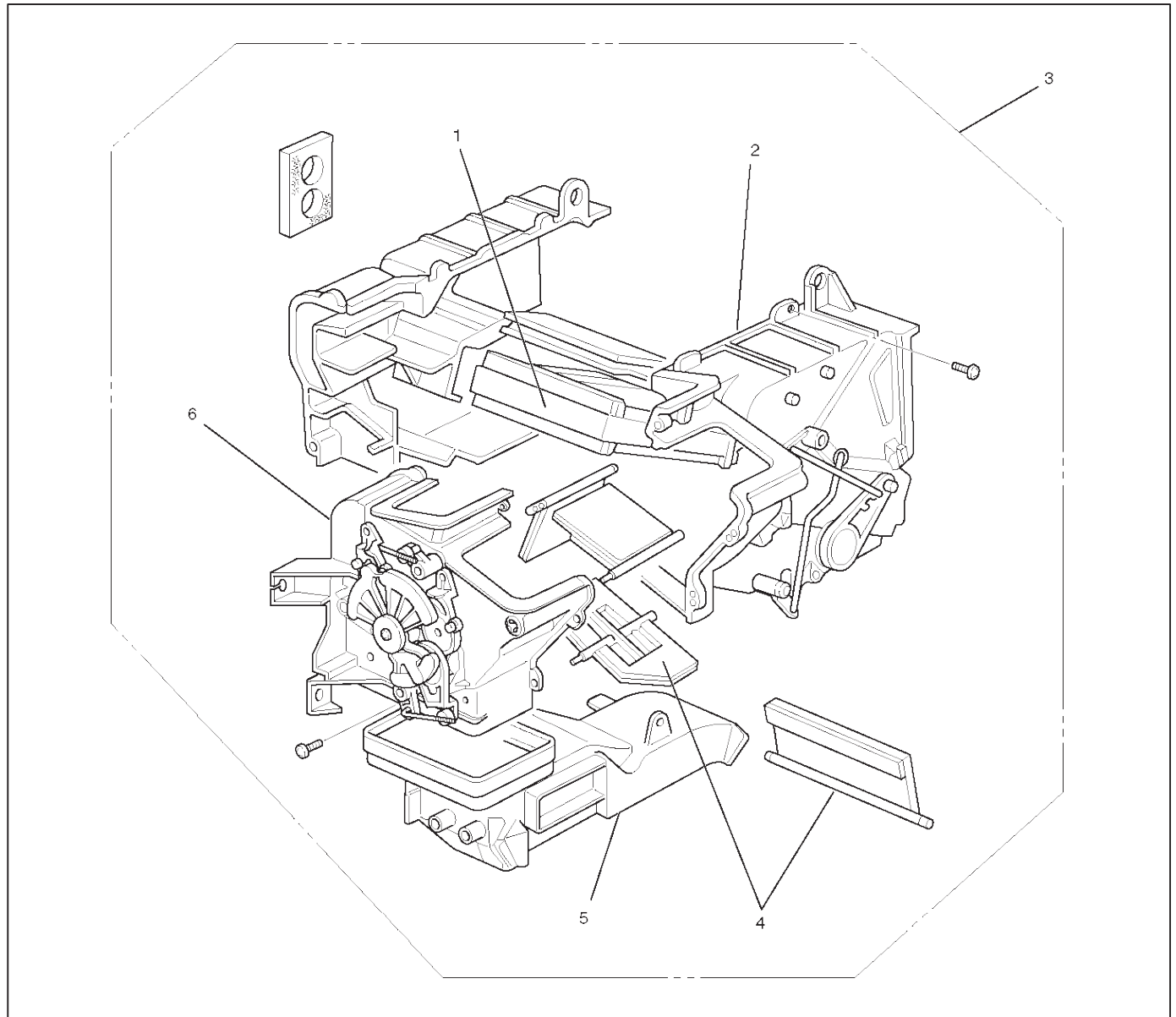
2. Adjust the control cables.

- Refer to Control Lever Assembly in this section.

3. When installing the heater unit, defroster nozzle and center vent duct, be sure that the proper seal is made, without any gap between them.

### Heater Core and / or Mode Door

#### Disassembled View



860RW001

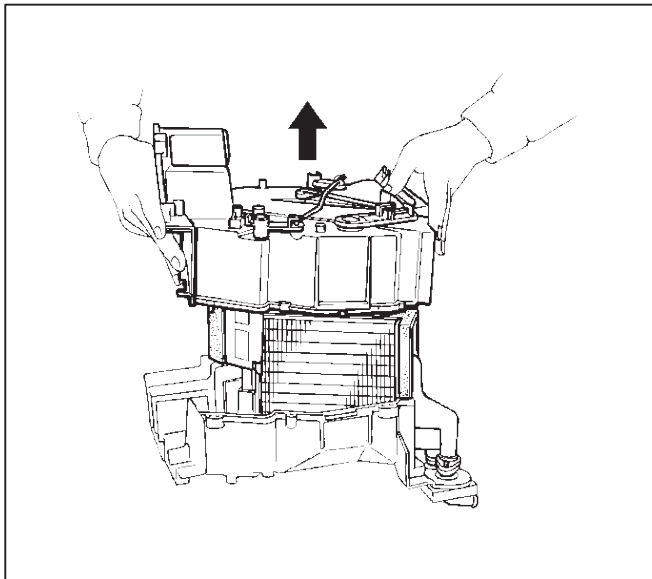
#### Legend

- (1) Heater Core
- (2) Case (Temperature Control)
- (3) Heater Unit

- (4) Mode Door
- (5) Duct
- (6) Case (Mode Control)

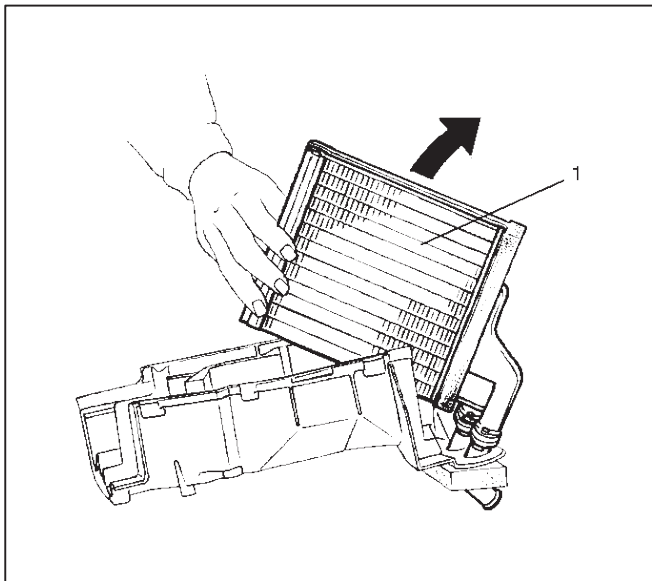
## Removal

1. Disconnect the battery ground cable.
2. Drain the engine coolant.
3. Discharge and recover refrigerant (with air conditioning).
  - Refer to Refrigerant Recovery in this section.
4. Remove heater unit.
  - Refer to Heater Unit in this section.
5. Remove duct.
6. Remove case (Mode control) and do not remove link unit at this step.
7. Remove case (Temperature control) separate two halves of core case.



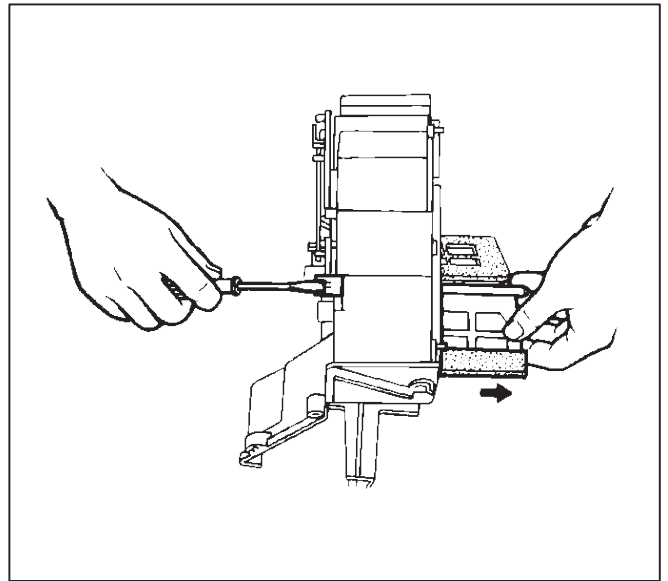
860RS002

8. Remove heater core (1).



860RS003

9. Pull out the mode door while raising up the catch of the door lever.



860RS004

## Inspection

Check for foreign matter in the heater core, stain or the core fin defacement.

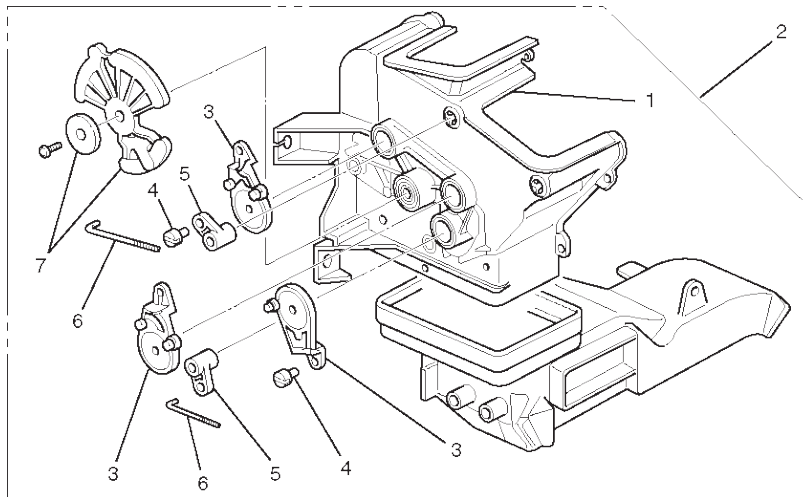
## Installation

To install, follow the removal steps in the reverse order, noting the following point:

1. Check that each mode door operates properly.

## Heater Mode Control Link Unit

### Disassembled View



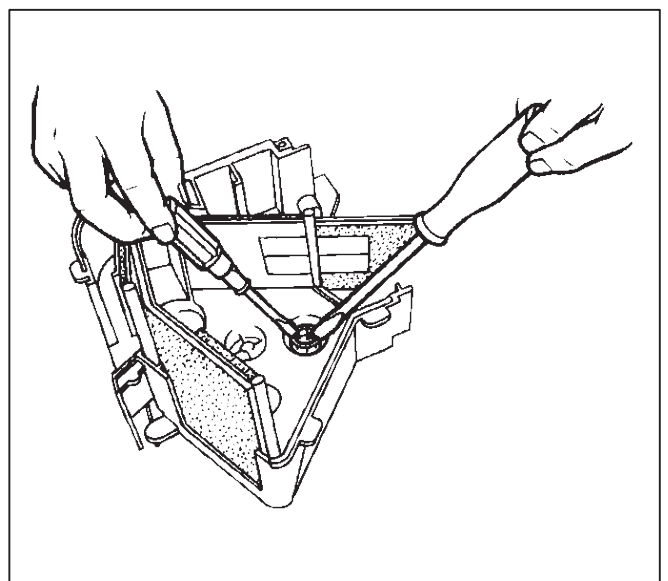
860RW002

#### Legend

- |                         |                                |
|-------------------------|--------------------------------|
| (1) Case (Mode Control) | (4) Clip                       |
| (2) Heater Unit         | (5) Door Lever                 |
| (3) Mode Sub-lever      | (6) Rod                        |
|                         | (7) Washer and Mode Main Lever |

### Removal

1. Disconnect the battery ground cable.
2. Drain engine coolant.
3. Discharge and recover refrigerant (with air conditioning)
  - Refer to Refrigerant Recovery in this section.
4. Remove heater unit.
  - Refer to Heater Unit in this section.
5. Remove the case (Mode control) from heater unit.
6. Remove washer and the mode main lever.
7. Remove rod.
8. Press the tab of the sub-lever inward, and take out the sub-lever.



860RS006

9. Pull out the door lever while raising up the catch of the door lever.
10. Remove clip.

2. After installing the link unit, check to see if the link unit operates correctly.

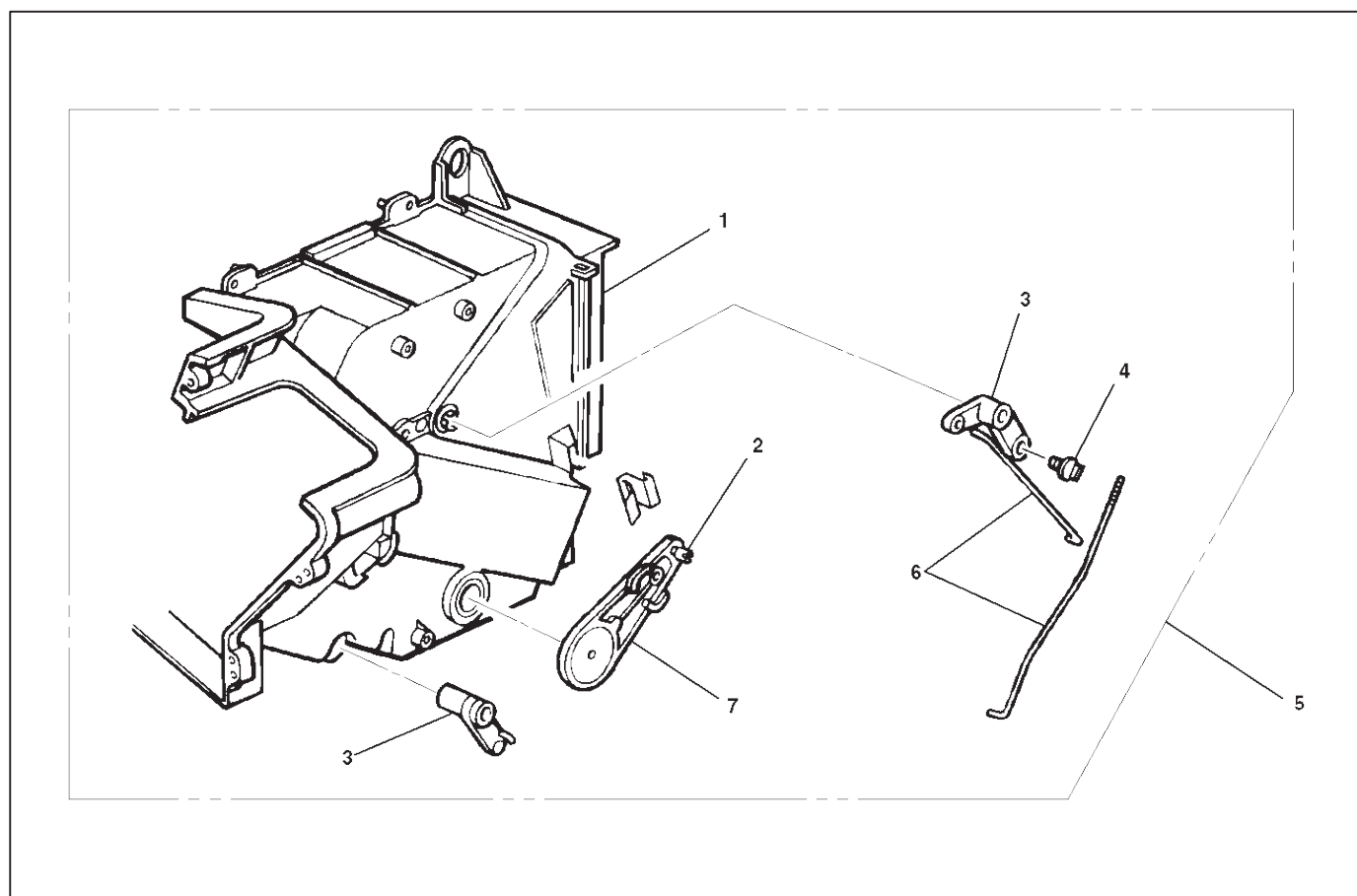
## Installation

To install, follow the remove steps in the reverse order, noting the following points:

1. Apply grease to the mode sub-lever and to the abrasive surface of the heater unit.

## Heater Temperature Control Link Unit

### Disassembled View



860RS007

#### Legend

- (1) Case (Temperature control)
- (2) Clip
- (3) Door Lever

- (4) Clip
- (5) Heater Unit
- (6) Rod
- (7) Sub-lever

## Removal

1. Disconnect the battery ground cable.
2. Drain engine coolant.
3. Discharge and recover refrigerant (with air conditioning).
  - Refer to Refrigerant Recovery in this section.
4. Remove heater unit.
  - Refer to Heater Unit in this section.

5. Remove the case (Temperature control) from the heater unit.
6. Remove rod.
7. Remove sub-lever.
8. Pull out the door lever while raising up the catch of the door lever.
9. Remove clip.

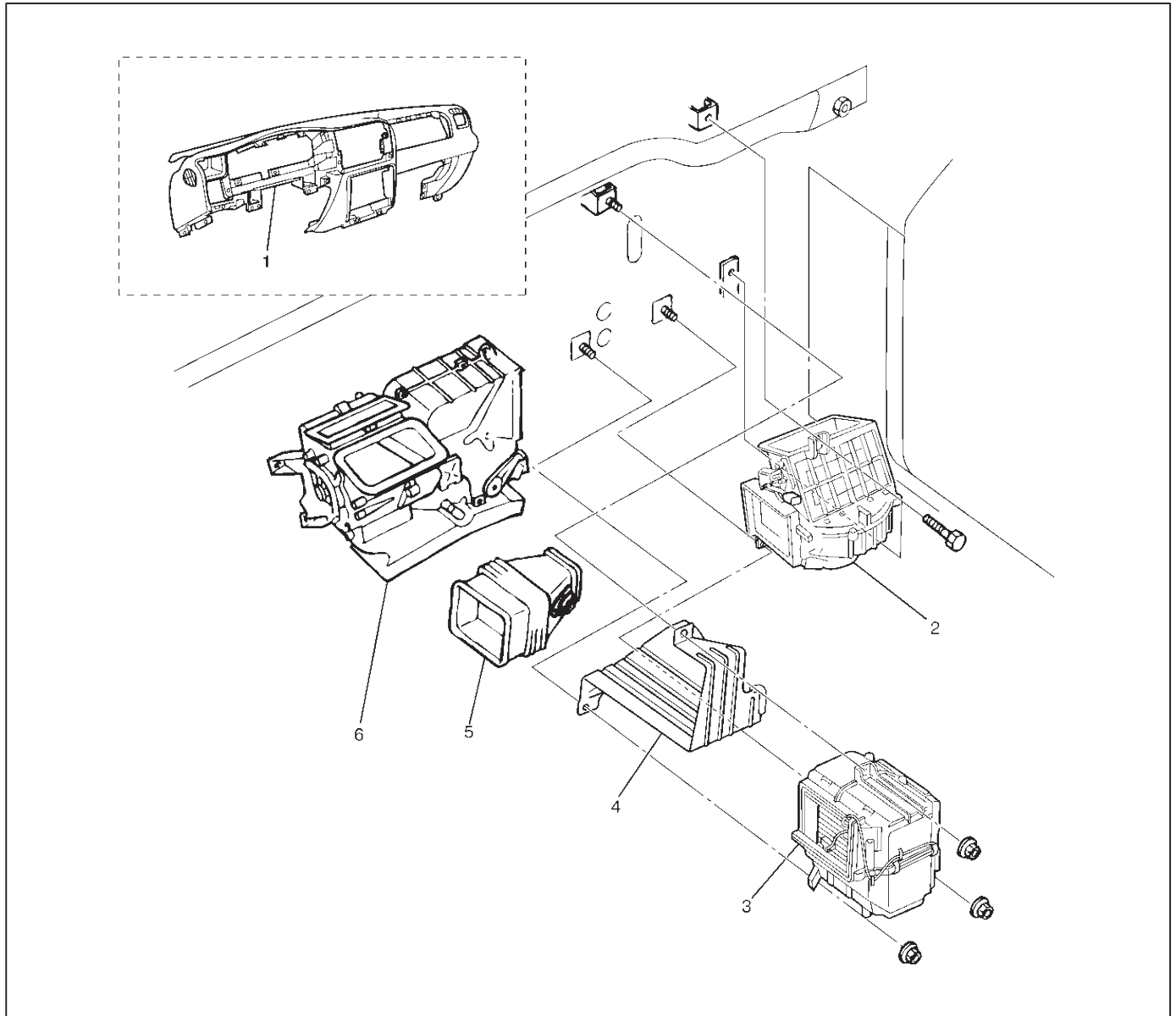
## Installation

To install, follow the removal steps in the reverse order, noting the following points:

1. Apply grease to the sub-lever and to the abrasive surface of the heater unit.
2. After installing the link unit, check to see if the link unit operates correctly.

## Blower Assembly

### Blower Assembly and Associated Parts



873R100001

#### Legend

- |                               |                                    |
|-------------------------------|------------------------------------|
| (1) Instrument Panel Assembly | (3) Evaporator Assembly (A/C only) |
| (2) Blower Assembly           | (4) Knee Bolster Bracket           |
| (2) Blower Assembly           | (5) Duct                           |
|                               | (6) Heater Unit                    |

## Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant (with air conditioning).
  - Refer to Refrigerant Recovery in this section.
3. Remove instrument panel assembly.
  - Refer to Instrument Panel Assembly in Body and Accessories section.
4. Disconnect resistor connector.

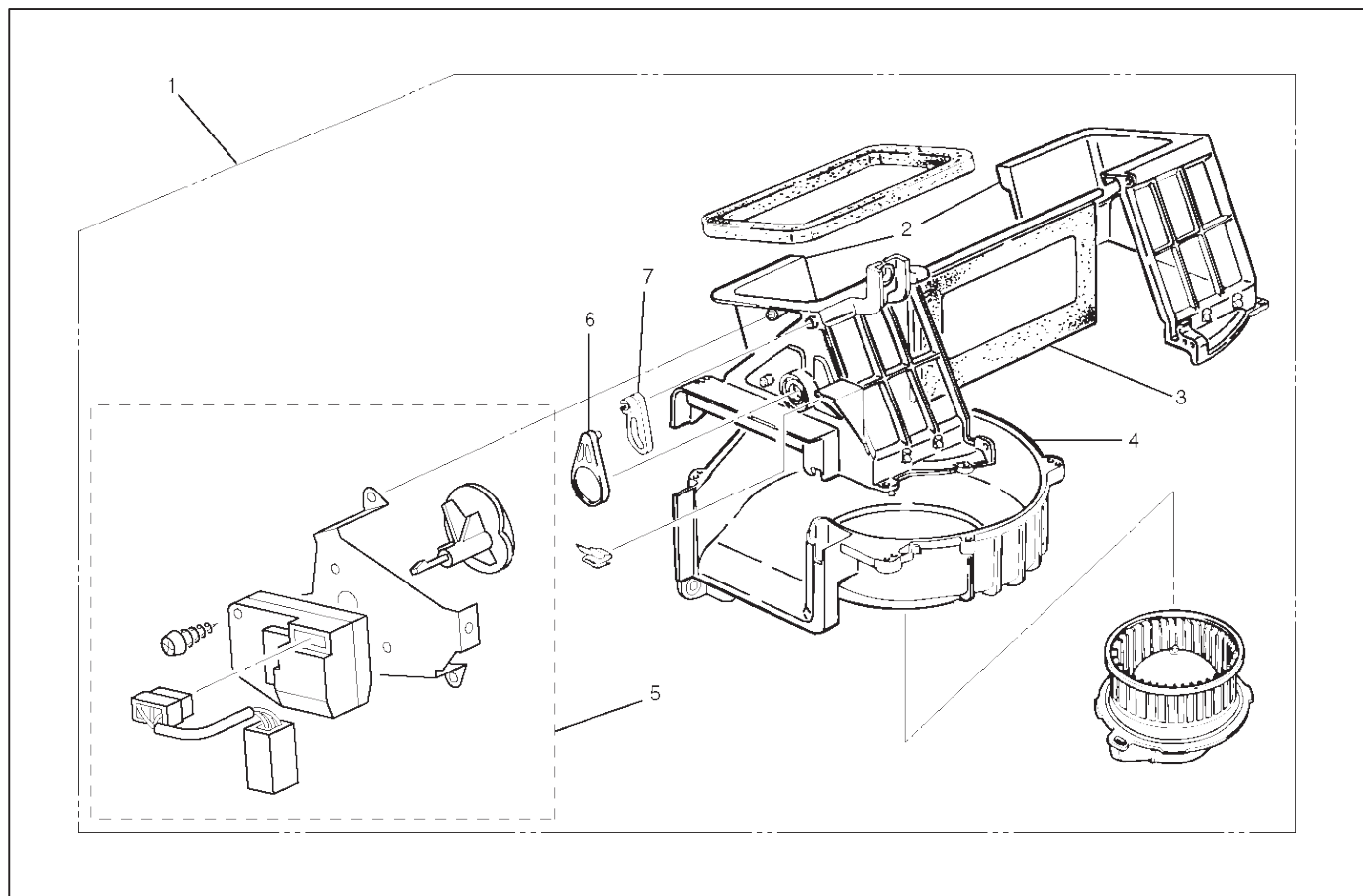
5. Remove knee bolster bracket.
6. Remove duct.
7. Remove evaporator assembly (A/C only).
  - Refer to Evaporator Assembly in this section.
8. Disconnect blower motor connector.
9. Remove blower assembly.

## Installation

To install, follow the removal steps in the reverse order.

## Blower Link Unit and / or Mode door

### Disassembled View



873RY00007

### Legend

- (1) Blower Assembly
- (2) Upper Case
- (3) Mode Door

- (4) Lower Case
- (5) Intake Actuator
- (6) Sub Lever
- (7) Door Lever

## Removal

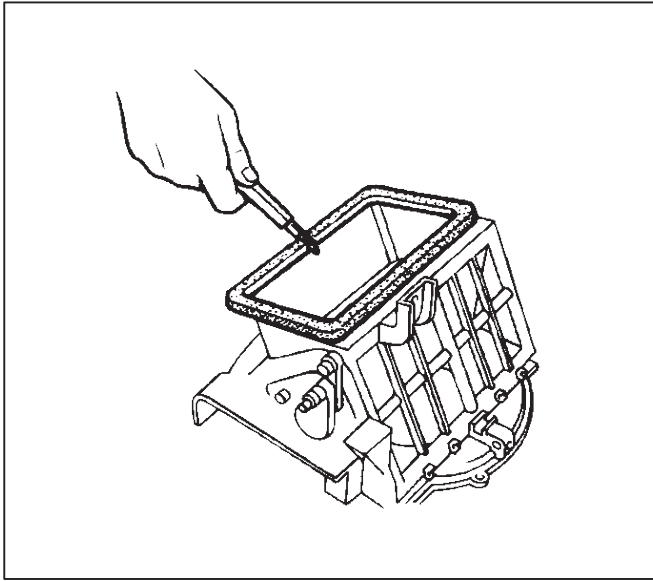
1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant (with air conditioning).
  - Refer to Refrigerant Recovery in this section.
3. Remove blower assembly.
  - Refer to Blower Assembly in this section.
4. Remove intake actuator.

5. Remove lower case.

## 1A-20 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

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6. Separate the upper case and slit the lining parting face with a knife.



873RS002

7. Pull out the mode door while raising up the catch of door lever.
8. Remove sub-lever.
9. Remove door lever.

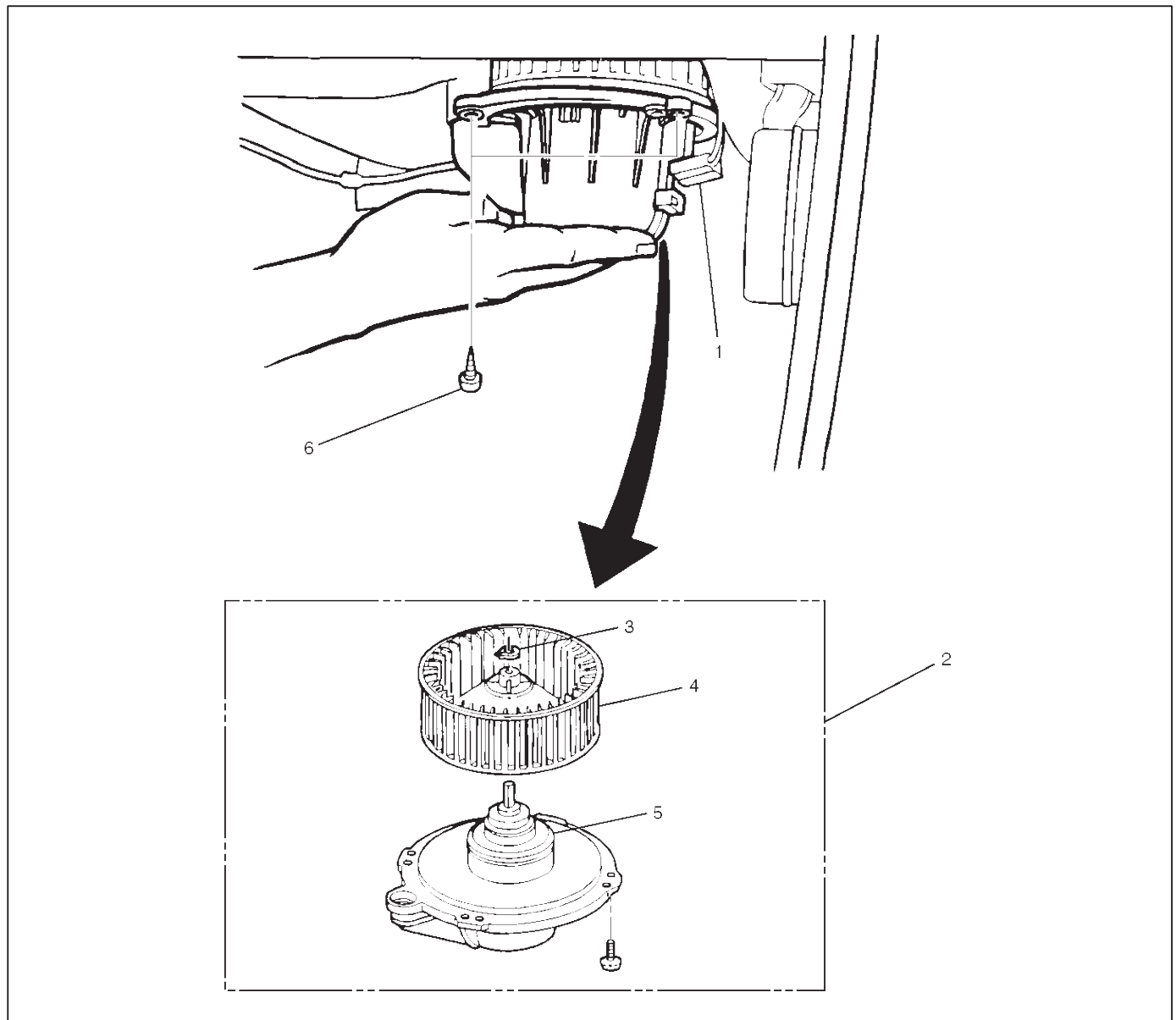
### Installation

To install, follow the removal steps in the reverse order, noting the following points:

1. Apply grease to the door lever and to the abrasive surface of the upper case.
2. Apply an adhesive to the parting face of the lining when assembling the upper case.

## Blower Motor

### Blower Motor and Associated Parts



873RS004

#### Legend

- |                            |                     |
|----------------------------|---------------------|
| (1) Blower Motor Connector | (4) Fan             |
| (2) Blower Motor Assembly  | (5) Blower Motor    |
| (3) Clip                   | (6) Attaching Screw |

### Removal

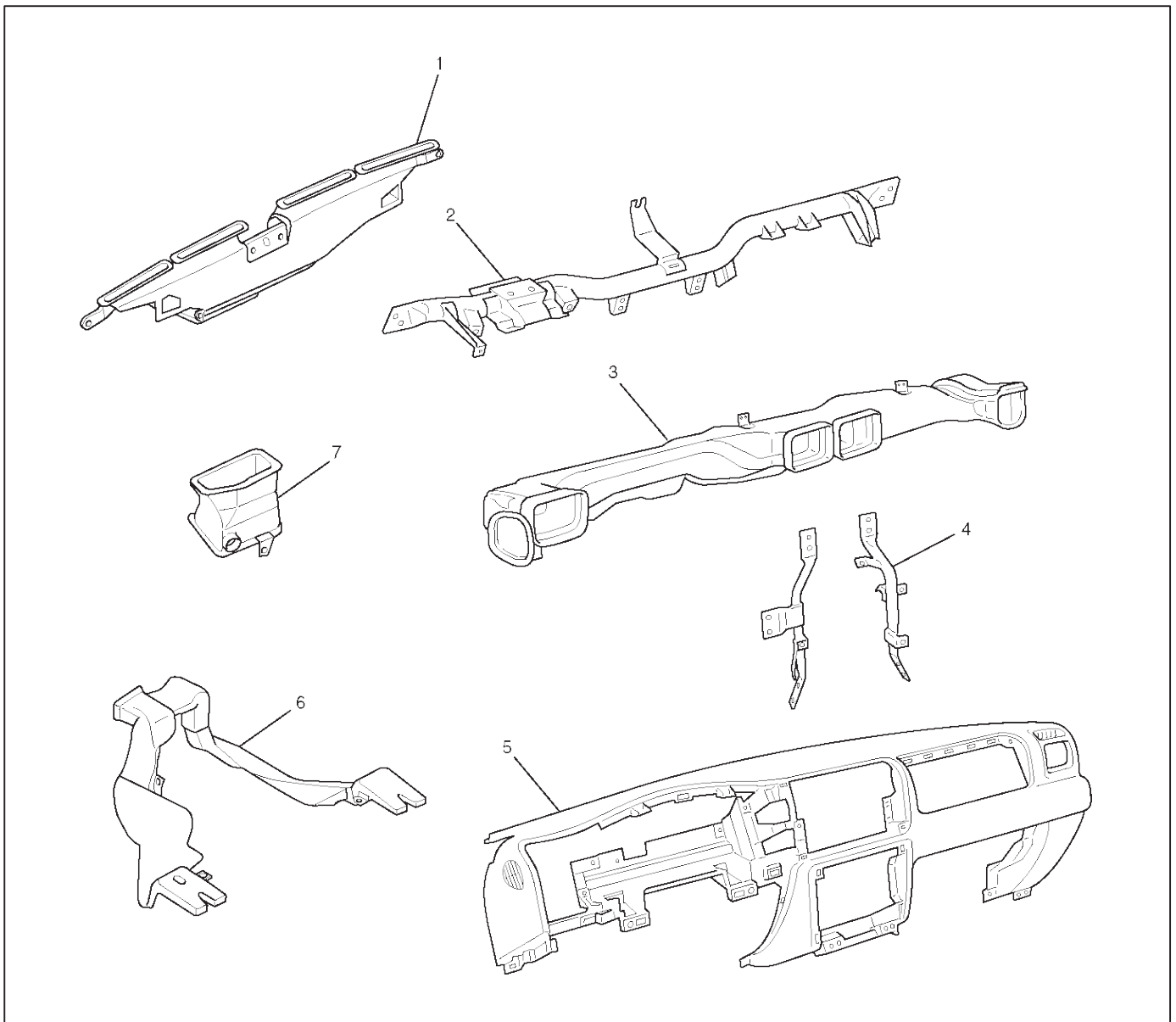
1. Disconnect the battery ground cable.
2. Remove blower motor connector.
3. Remove attaching screw.
4. Remove blower motor assembly.
5. Remove clip.
6. Remove fan.
7. Remove blower motor.

### Installation

To install, follow the removal steps in the reverse order.

## Rear Heater Duct, Defroster Nozzle and Ventilation Duct

### Rear Heater Duct, Defroster Nozzle, Ventilation Duct and Associated Parts



#### Legend

- |                                                     |                               |
|-----------------------------------------------------|-------------------------------|
| (1) Defroster Nozzle                                | (4) Instrument Panel Bracket  |
| (2) Cross Beam Assembly                             | (5) Instrument Panel Assembly |
| (3) Center Ventilation Duct and Side Defroster Duct | (6) Rear Heater Duct          |
|                                                     | (7) Ventilation Lower Duct    |

#### Removal

1. Disconnect the battery ground cable.
2. Remove instrument panel assembly.
  - Refer to Instrument Panel Assembly in Body and Accessories section.
3. Remove center ventilation duct and side defroster duct.
  - Remove 5 screws.
4. Remove instrument panel brackets.
  - Refer to Cross Beam Assembly in Body and Accessories section.
5. Remove cross beam assembly.
  - Refer to Cross Beam Assembly in Body and Accessories section.
6. Remove ventilation lower duct.
7. Remove rear heater duct.
  - Remove foot rest carpet and 3 clips.

8. Remove defroster nozzle.

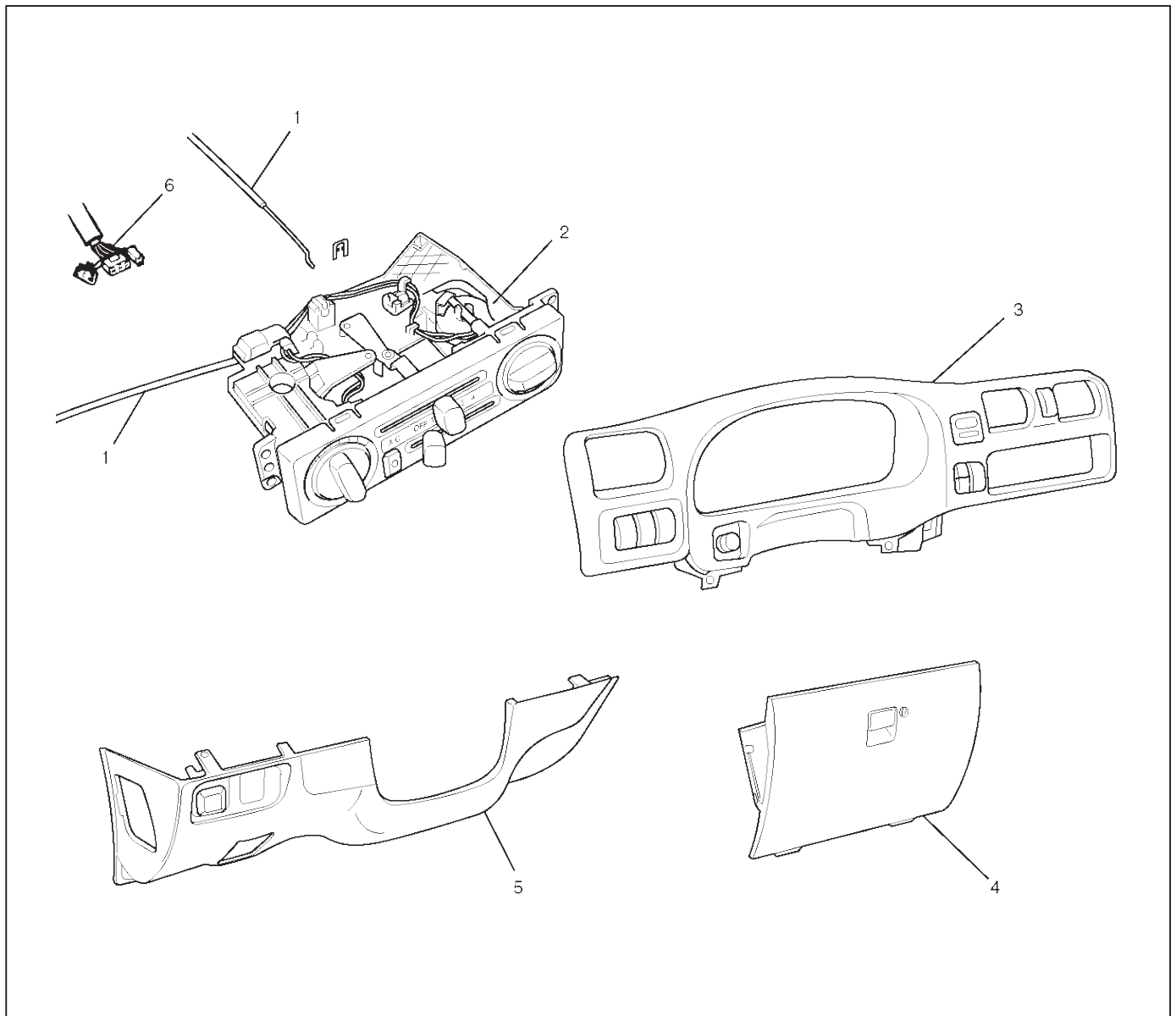
## Installation

To install, follow the removal steps in the reverse order, noting the following point:

1. Connect each duct and nozzle securely leaving no clearance between them and making no improper matching.

## Control Lever Assembly and / or Control Cable

### Control Lever Assembly, Control Cable and Associated Parts



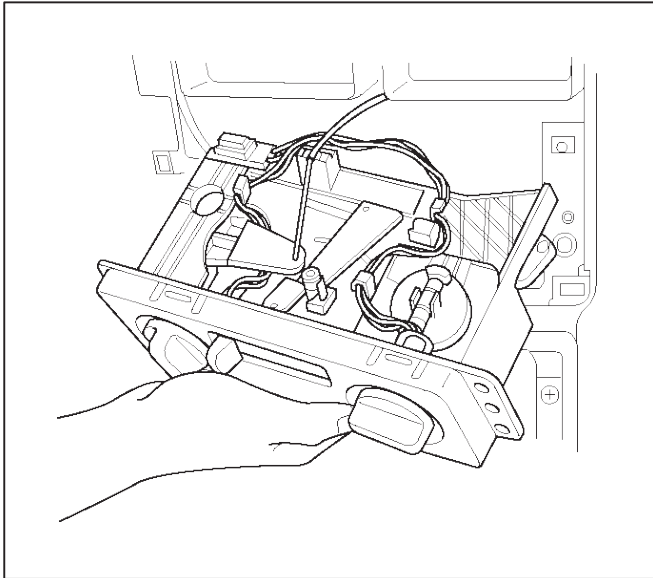
865RY00014

#### Legend

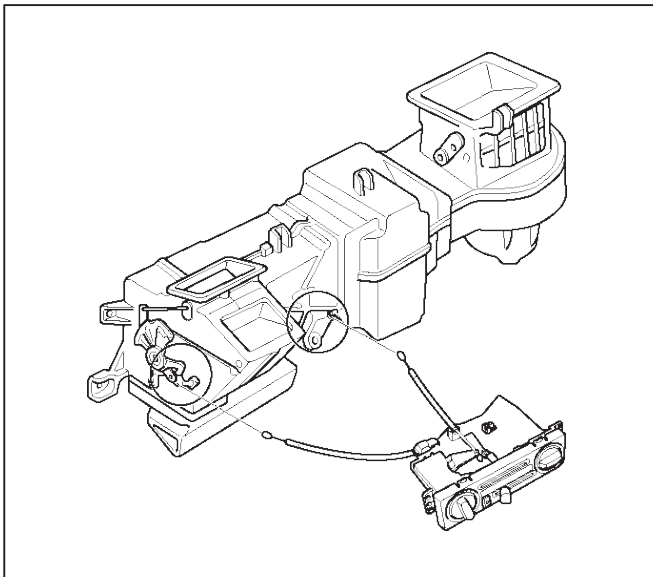
- |                            |                                                  |
|----------------------------|--------------------------------------------------|
| (1) Control Cable          | (4) Glove Box                                    |
| (2) Control Lever Assembly | (5) Instrument Panel Driver Lower Cover Assembly |
| (3) Meter Cluster Assembly | (6) Fan Switch Air Conditioning Switch Connector |

### Removal

1. Disconnect the battery ground cable.
2. Remove instrument panel driver lower cover assembly.
3. Remove meter cluster assembly.
  - Refer to Instrument Panel Assembly in Body and Accessories section.
4. Remove glove box.
5. Remove the control lever attaching screws.
6. Pull the control lever assembly out and disconnect the fan switch and air conditioning switch connectors.



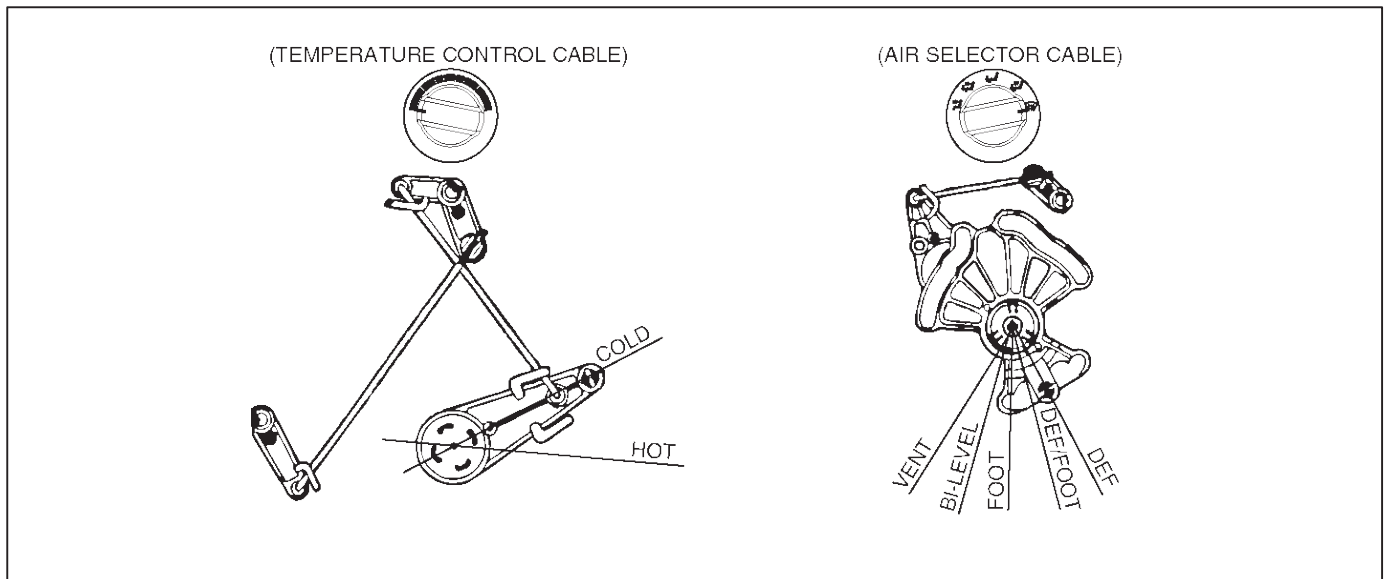
7. Remove control level assembly.
8. Disconnect control cables at each unit side.



## Installation

To install, follow the removal steps in the reverse order, noting the following points:

1. Adjust the control cable.

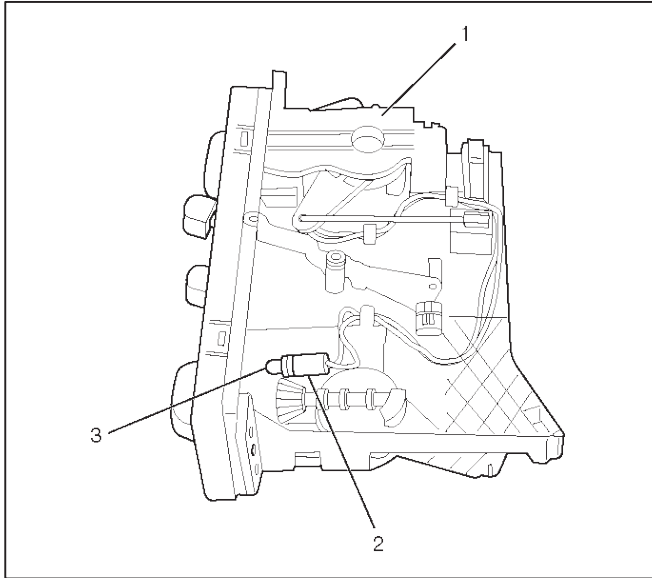


865RY00017

- Temperature control cable.
    1. Turn the control knob to the left ("MAX COLD" position).
    2. Connect the control cable at the "COLD" position of the temperature control link of the heater unit and secure it with the clip.
  - Air select control cable
    1. Turn the control knob to the right ("DEFROST" position).
    2. Connect the control cable at the "DEFROST" position of the mode control link of the heater unit and secure it with the clip.
2. Check the control cable operation.

## Control Panel Illumination Bulb

### Control Panel Illumination Bulb and Associated Parts



865RY00018

#### Legend

- (1) Control Lever Assembly
- (2) Bulb Socket
- (3) Illumination Bulb

### Removal

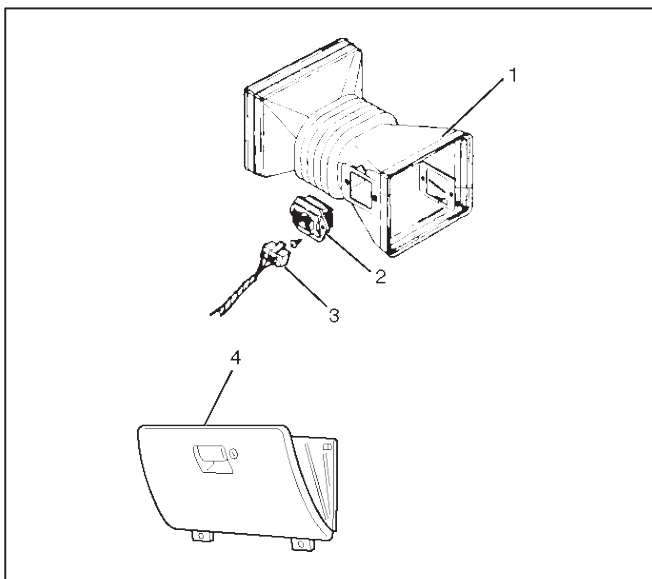
1. Disconnect the battery ground cable.
2. Remove control lever assembly.
  - Refer to Control Lever Assembly in this section.
3. Pull out the bulb socket from the panel by turning it counterclockwise.
4. Pull the illumination bulb from the socket.

### Installation

To install, follow the removal steps in the reverse order.

## Resistor

### Resistor and Associated Parts



840RW001

#### Legend

- (1) Duct (Heater only)
- (2) Resistor
- (3) Resistor Connector
- (4) Glove Box

### Removal

1. Disconnect the battery ground cable.
2. Remove glove box.
3. Remove resistor connector.
4. Remove duct (heater only).
5. Remove resistor.

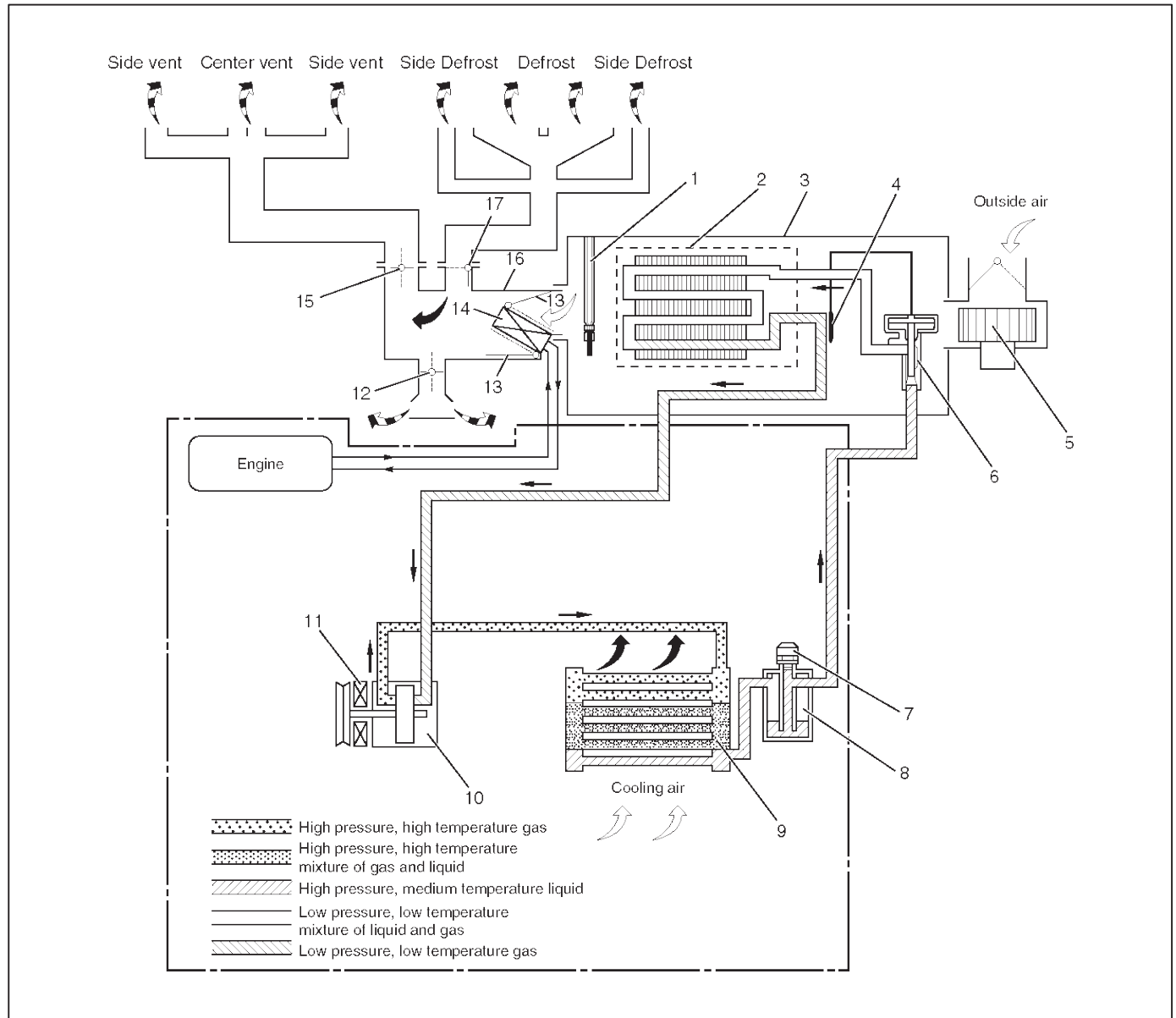
### Installation

To install, follow the removal steps in the reverse order.

## Air Conditioning System

### General Description

#### Air Conditioning Refrigerant Cycle Construction



C01RY00013

#### Legend

- |                                        |                                        |
|----------------------------------------|----------------------------------------|
| (1) Electronic Thermostat              | (9) Condenser                          |
| (2) Evaporator Core                    | (10) Compressor                        |
| (3) Evaporator Assembly                | (11) Magnetic Clutch                   |
| (4) Temperature Sensor                 | (12) Mode (HEAT) Control Door          |
| (5) Blower Motor                       | (13) Temp. Control Door (Air Mix Door) |
| (6) Expansion Valve                    | (14) Heater Core                       |
| (7) Pressure Switch or Pressure Sensor | (15) Mode (VENT) Control Door          |
| (8) Receiver/Drier                     | (16) Heater Unit                       |
|                                        | (17) Mode (DEF) Control Door           |

The refrigeration cycle includes the following four processes as the refrigerant changes repeatedly from liquid to gas and back to liquid while circulating.

## 1A-28 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

### Evaporation

The refrigerant is changed from a liquid to a gas inside the evaporator. The refrigerant mist that enters the evaporator vaporizes readily. The liquid refrigerant removes the required quantity of heat (latent heat of vaporization) from the air around the evaporator core cooling fins and rapidly vaporizes. Removing the heat cools the air, which is then radiated from the fins and lowers the temperature of the air inside the vehicle.

The refrigerant liquid sent from the expansion valve and the vaporized refrigerant gas are both present inside the evaporator as the liquid is converted to gas.

With this change from liquid to gas, the pressure inside the evaporator must be kept low enough for vaporization to occur at a lower temperature. Because of that, the vaporized refrigerant is sucked into the compressor.

### Compression

The refrigerant is compressed by the compressor until it is easily liquefied at normal temperature.

The vaporized refrigerant in the evaporator is sucked into the compressor. This action maintains the refrigerant inside the evaporator at a low pressure so that it can easily vaporize, even at low temperatures close to 0°C (32°F).

Also, the refrigerant sucked into the compressor is compressed inside the cylinder to increase the pressure and temperature to values such that the refrigerant can easily liquefy at normal ambient temperatures.

### Condensation

The refrigerant inside the condenser is cooled by the outside air and changes from gas to liquid.

The high temperature, high pressure gas coming from the compressor is cooled and liquefied by the condenser with outside air and accumulated in the receiver/drier. The heat radiated to the outside air by the high temperature, high pressure gas in the compressor is called heat of condensation. This is the total quantity of heat (heat of vaporization) the refrigerant removes from the vehicle interior via the evaporator and the work (calculated as the quantity of heat) performed for compression.

### Expansion

The expansion valve lowers the pressure of the refrigerant liquid so that it can easily vaporize.

The process of lowering the pressure to encourage vaporization before the liquefied refrigerant is sent to the evaporator is called expansion. In addition, the expansion valve controls the flow rate of the refrigerant liquid while decreasing the pressure.

That is, the quantity of refrigerant liquid vaporized inside the evaporator is determined by the quantity of heat which must be removed at a prescribed vaporization temperature. It is important that the quantity of refrigerant be controlled to exactly the right value.

### Compressor

The compressor performs two main functions:

It compresses low-pressure and low-temperature refrigerant vapor from the evaporator into high-pressure and high-temperature refrigerant vapor to the condenser. It pumps refrigerant and refrigerant oil through the air conditioning system.

This vehicle is equipped with a five-vane rotary compressor.

The specified amount of the compressor oil is 150cc (5.0 fl. oz.).

The oil used in the HFC-134a system compressor differs from that used in R-12 systems.

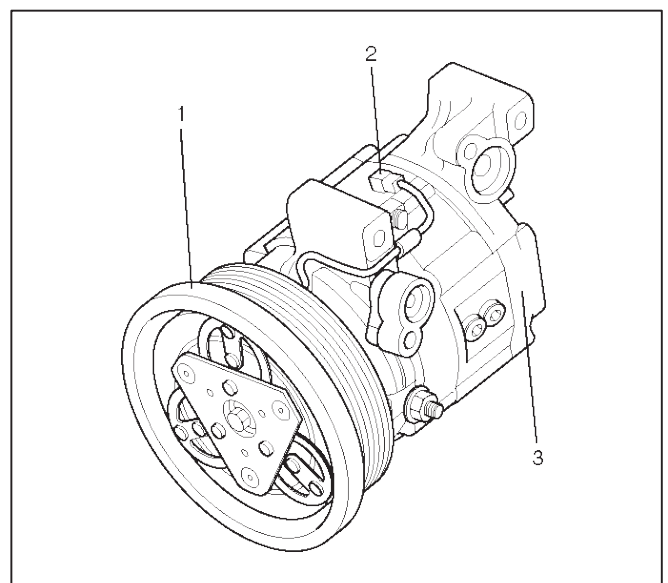
Also, compressor oil to be used varies according to the compressor model. Be sure to avoid mixing two or more different types of oil.

If the wrong oil is used, lubrication will be poor and the compressor will seize or malfunction.

The magnetic clutch connector is a waterproof type.

### Magnetic Clutch

The compressor is driven by the drive belt from the crank pulley of the engine. If the compressor is activated each time the engine is started, this causes too much load to the engine. The magnetic clutch transmits the power from the engine to the compressor and activates it when the air conditioning is ON. Also, it cuts off the power from the engine to the compressor when the air conditioning is OFF. Refer to Compressor in this section for magnetic clutch repair procedure.



#### Legend

- (1) Magnetic Clutch
- (2) Magnetic Clutch Connector
- (3) Compressor

### Condenser

The condenser assembly is located in front of the radiator. It provides rapid heat transfer from the refrigerant to the cooling fins.

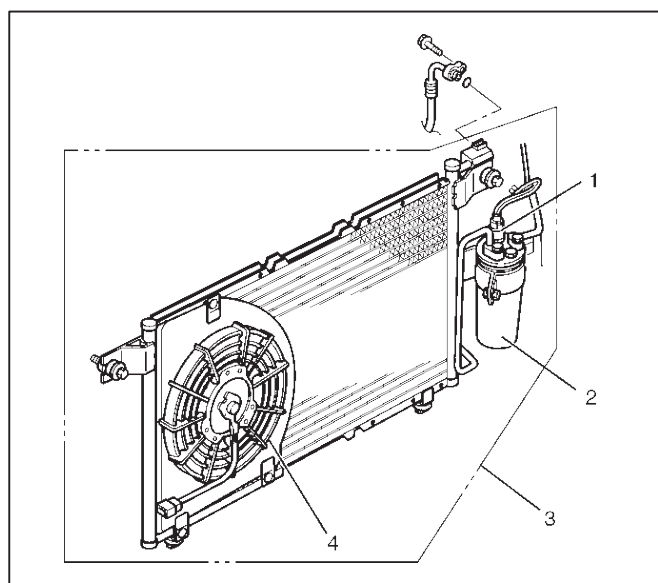
Also, it functions to cool and liquefy the high-pressure and high-temperature vapor sent from the compressor by the radiator fan or outside air.

A condenser may malfunction in two ways: it may leak, or it may be restricted. A condenser restriction will result in excessive compressor discharge pressure. If a partial restriction is present, the refrigerant expands after passing through the restriction.

Thus, ice or frost may form immediately after the restriction. If air flow through the condenser or radiator is blocked, high discharge pressures will result. During normal condenser operation, the refrigerant outlet line will be slightly cooler than the inlet line.

The vehicle is equipped with the parallel flow type condenser. A larger thermal transmission area on the inner surface of the tube allows the radiant heat to increase and the ventilation resistance to decrease.

The refrigerant line connection has a bolt at the block joint, for easy servicing.



875R100001

#### Legend

- (1) Pressure Switch
- (2) Receiver Drier
- (3) Condenser & Receiver Tank Assembly
- (4) Condenser Fan (6VD1 A/T)

### Receiver / Drier

The receiver/drier performs four functions:

- As the quantity of refrigerant circulated varies depending on the refrigeration cycle conditions, sufficient refrigerant is stored for the refrigeration cycle to operate smoothly in accordance with fluctuations in the quantity circulated.
- The liquefied refrigerant from the condenser is mixed with refrigerant gas containing air bubbles. If refrigerant containing air bubbles is sent to the expansion valve, the cooling capacity will decrease considerably. Therefore, the liquid and air bubbles are separated and only the liquid is sent to the expansion valve.
- The receiver/drier utilizes a filter and drier to remove the dirt and water mixed in the cycling refrigerant.

A receiver/drier may fail due to a restriction inside the body of the unit. A restriction at the inlet to the receiver/drier will cause high pressure.

Outlet restrictions will be indicated by low pressure and little or no cooling. An excessively cold receiver/drier outlet may indicate a restriction.

The receiver/drier of this vehicle is made of aluminum with a smaller tank. It has a 300cc refrigerant capacity.

The refrigerant line connection has a bolt at the block joint, for easy servicing.

### Dual Pressure Switch (V6,M/T)

The pressure switch (Dual pressure switch) is installed on the upper part of the receiver/drier, to detect excessively high pressure (high pressure switch) and prevent compressor seizure due to the refrigerant leaking (low pressure switch), so that the compressor is able to be turned "ON" or "OFF".

| Compressor            | ON<br>(kPa/psi)              | OFF<br>(kPa/psi)             |
|-----------------------|------------------------------|------------------------------|
| Low-pressure control  | 205.9±29.4<br>(29.9±4.3)     | 176.5±19.6<br>(25.6±2.8)     |
| High-pressure control | 2059.4±196.1<br>(341.3±28.4) | 2942.0±196.1<br>(426.6±28.4) |

### Triple Pressure Switch (V6, A/T)

Triple pressure switch is installed on the upper part of the receiver/drier. This switch is constructed with a unitized type of two switches. One of them is a low and high pressure switch (Dual pressure switch) to switch "ON" or "OFF" the magnetic clutch as a result of irregularly high-pressure or low pressure of the refrigerant. The other one is a medium pressure switch (Cycling switch) to switch "ON" or "OFF" the condenser fan sensing the condenser high side pressure.

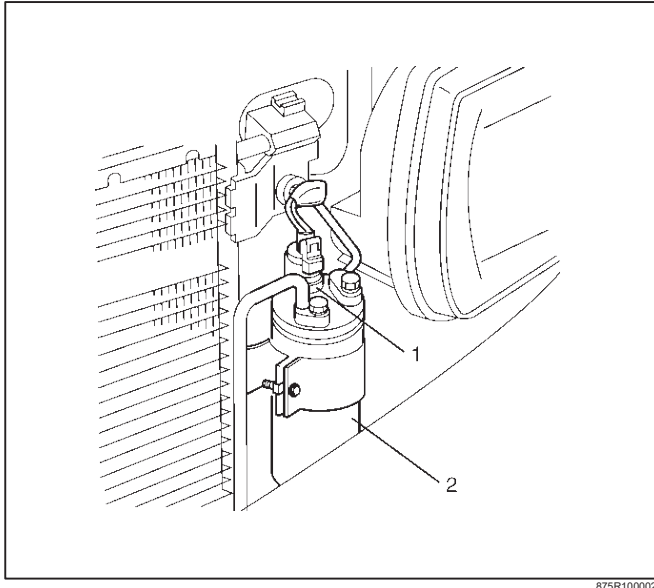
| Compressor            | ON<br>(kPa/psi)              | OFF<br>(kPa/psi)             |
|-----------------------|------------------------------|------------------------------|
| Low-pressure control  | 186.3±29.4<br>(27.0±4.3)     | 176.5±24.5<br>(25.6±3.6)     |
| High-pressure control | 2353.6±196.1<br>(341.3±28.4) | 2942.0±196.1<br>(426.6±28.4) |

| Condenser fan           | ON<br>(kPa/psi)             | OFF<br>(kPa/psi)             |
|-------------------------|-----------------------------|------------------------------|
| Medium-pressure control | 1471.0±98.1<br>(213.3±14.2) | 1078.7±117.7<br>(156.4±17.1) |

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### Pressure Sensor (L4, X22SE)

The pressure sensor is installed on the upper part of the receiver/drier. This sensor converts high pressure detection of refrigerant to an electrical voltage signal and supplies it to the ECM. The ECM controls switching compressor idle speed and cooling fan operation by the electrical voltage signal.



875R10002

#### Legend

- (1) Pressure Switch
- (2) Receiver Drier

### Expansion Valve

This expansion valve is an external pressure type and it is installed at the evaporator intake port.

The expansion valve converts the high pressure liquid refrigerant sent from the receiver/drier to a low pressure liquid refrigerant by forcing it through a tiny port before sending it to the evaporator.

This type of expansion valve consists of a temperature sensor, diaphragm, ball valve, ball seat, spring adjustment screw, etc.

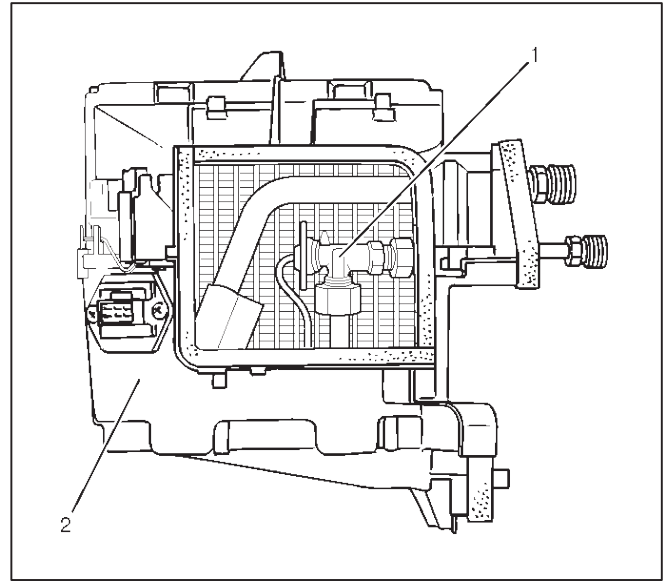
The temperature sensor contacts the evaporator outlet pipe, and converts changes in temperature to pressure. It then transmits these to the top chamber of the diaphragm.

The refrigerant pressure is transmitted to the diaphragm's bottom chamber through the external equalizing pressure tube.

The ball valve is connected to the diaphragm. The opening angle of the expansion valve is determined by the force acting on the diaphragm and the spring pressure.

The expansion valve regulates the flow rate of the refrigerant. Accordingly, when a malfunction occurs to this expansion valve, both discharge and suction pressure decreases, resulting in insufficient cooling capacity of the evaporator.

The calibration has been changed to match the characteristics of HFC-134a.



874RY00019

#### Legend

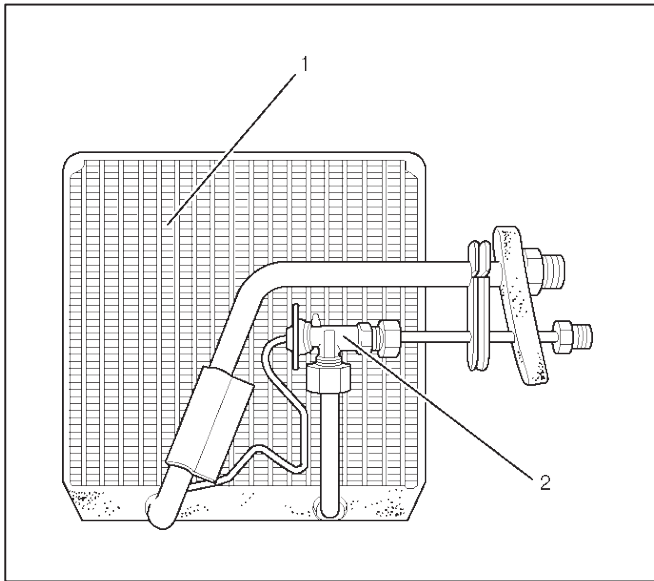
- (1) Expansion Valve
- (2) Evaporator Assembly

### Evaporator

The evaporator cools and dehumidifies the air before the air enters the passenger compartment. High-pressure liquid refrigerant flows through the expansion valve into the low-pressure area of the evaporator. The heat in the air passing through the evaporator core is lost to the cooler surface of the core, thereby cooling the air.

As heat is lost between the air and the evaporator core surface, moisture in the vehicle condenses on the outside surface of the evaporator core and is drained off as water. When the evaporator malfunctions, the trouble will show up as an inadequate supply of cool air. The cause is typically a partially plugged core due to dirt, or a malfunctioning blower motor.

The evaporator core with a laminate louver fin is a single-sided tank type where only one tank is provided under the core.



874RY00015

#### Legend

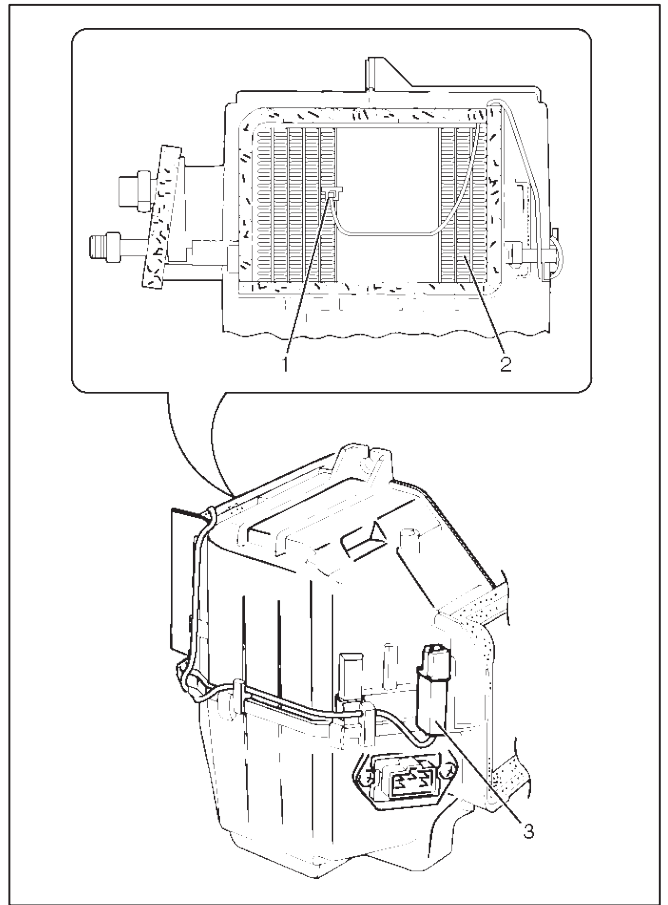
- (1) Evaporator Core
- (2) Expansion Valve

### Electronic Thermostat

The thermostat consists of the duct sensor and thermostat assembly which functions electrically to reduce the noises being generated while the system is in operation.

The electronic duct sensor is mounted at the evaporator core outlet and senses the surface temperature of the evaporator core. Temperature signals are input to the thermostat unit. This information is compared by the thermo assembly and results in the output to operate the A/C thermostat relay and turn the magnetic clutch ON or OFF to prevent evaporator freeze-up.

A characteristic of the sensor is that the resistance decreases as the temperature increases and the resistance increases as the temperature decreases.



874RY00018

#### Legend

- (1) Duct Sensor
- (2) Evaporator Core
- (3) Thermostat Assembly

### Refrigerant Line

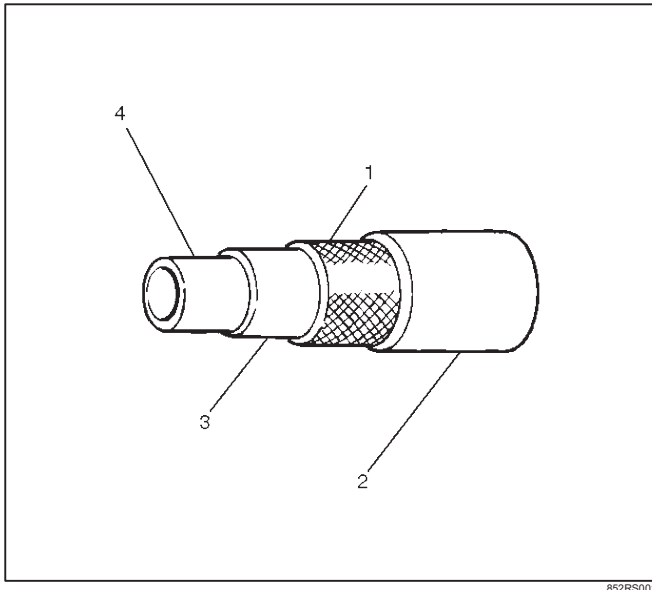
Restriction in the refrigerant line will be indicated by:

1. Suction line — A restricted suction line will cause low suction pressure at the compressor, low discharge pressure and little or no cooling.
2. Discharge line — A restriction in the discharge line generally will cause the discharge line to leak.
3. Liquid line — A liquid line restriction will be evidenced by low discharge and suction pressure and insufficient cooling.

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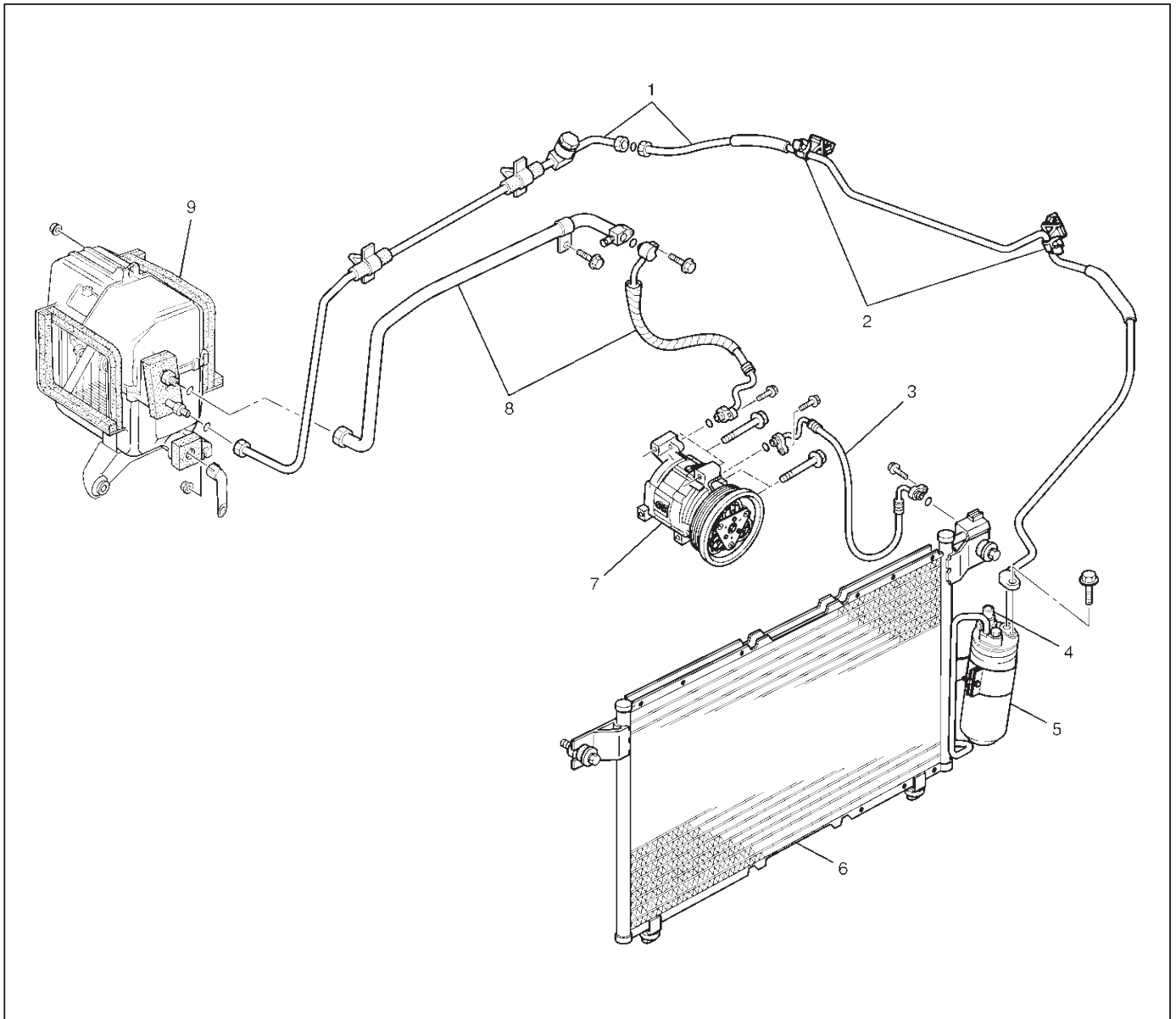
Refrigerant flexible hoses that have a low permeability to refrigerant and moisture are used. These low permeability hoses have a special nylon layer on the inside.



### Legend

- (1) Reinforcement Layer (Polyester)
  - (2) External Rubber Layer
  - (3) Internal Rubber Layer
  - (4) Resin Layer (Nylon)
-

## Air Conditioning Parts

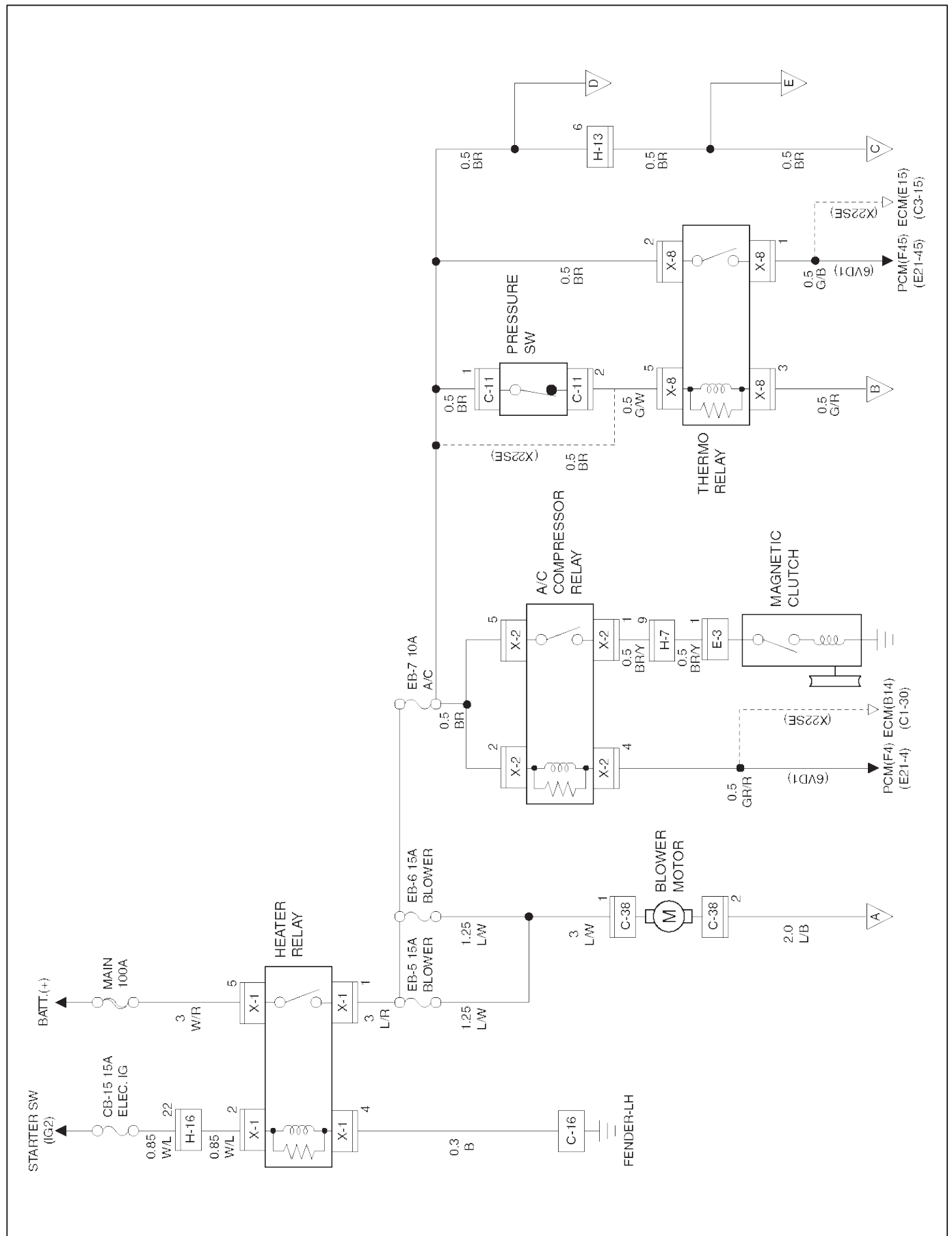


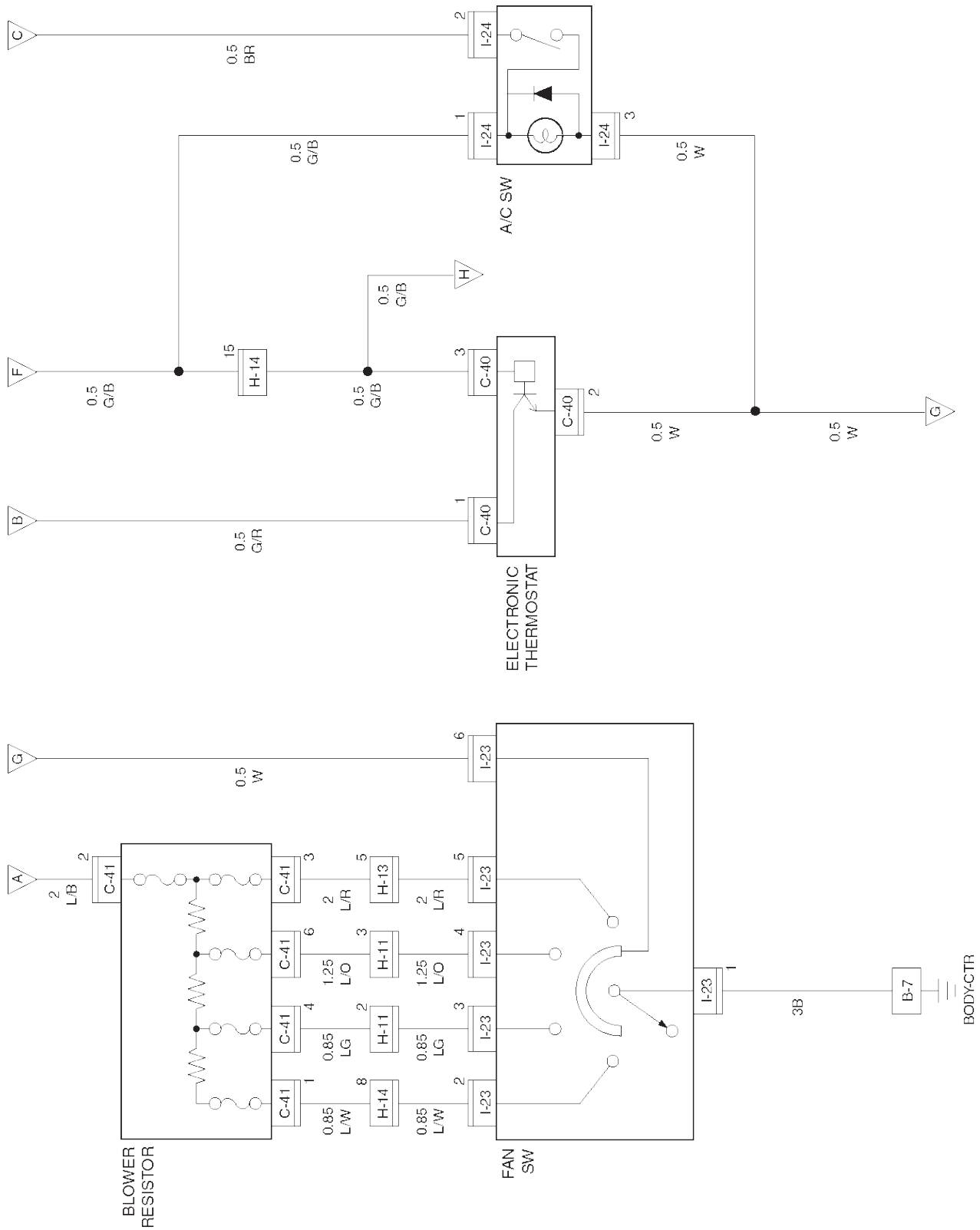
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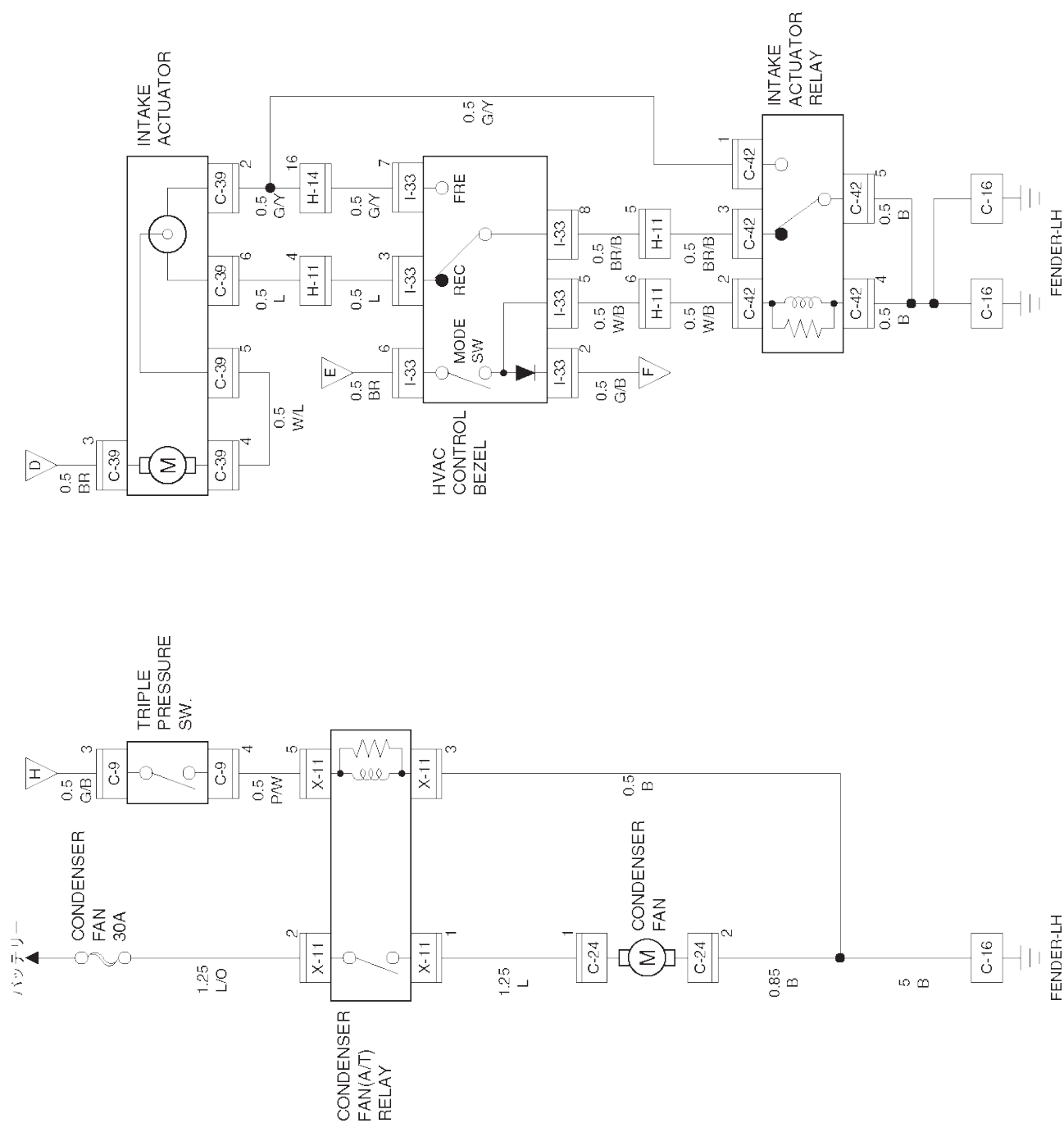
**Legend**

- |                                         |                                      |
|-----------------------------------------|--------------------------------------|
| (1) Liquid Line (High-Pressure Pipe)    | (5) Receiver/Drier                   |
| (2) Clip                                | (6) Condenser Assembly               |
| (3) Discharge Line (High-Pressure Hose) | (7) Compressor                       |
| (4) Pressure Switch                     | (8) Suction Line (Low-Pressure Hose) |
|                                         | (9) Evaporator Assembly              |

# Wiring Diagram







## Diagnosis

### Air Conditioning Cycle Diagnosis

| Condition                             | Possible cause                                                                                    | Correction                                                                                                                               |
|---------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| No cooling or insufficient cooling.   | Magnetic clutch does not run.                                                                     | Refer to "Magnetic Clutch Diagnosis" in this section.                                                                                    |
|                                       | Compressor is not rotating properly. Drive belt is loose or broken.                               | Adjust the drive belt to the specified tension or replace the drive belt.                                                                |
|                                       | Compressor is not rotating properly. Magnetic clutch face is not clean and slips.                 | Clean the magnetic clutch face or replace.                                                                                               |
|                                       | Compressor is not rotating properly. Incorrect clearance between magnetic drive plate and pulley. | Adjust the clearance. Refer to Compressor in this section.                                                                               |
|                                       | Compressor is not rotating properly. Compressor oil leaks from the shaft seal or shell.           | Replace the compressor                                                                                                                   |
|                                       | Compressor is not rotating properly. Compressor is seized.                                        | Replace the compressor                                                                                                                   |
|                                       | Insufficient or excessive charge of refrigerant.                                                  | Discharge and recover the refrigerant. Recharge to the specified amount.                                                                 |
|                                       | Leaks in the refrigerant system.                                                                  | Check the refrigerant system for leaks and repair as necessary. Discharge and recover the refrigerant. Recharge to the specified amount. |
|                                       | Condenser is clogged or insufficient radiation.                                                   | Clean the condenser or replace as necessary.                                                                                             |
|                                       | Temperature control link unit of the heat unit is defective.                                      | Repair the link unit.                                                                                                                    |
|                                       | Unsteady operation due to a foreign substance in the expansion valve.                             | Replace the expansion valve.                                                                                                             |
|                                       | Poor operation of the electronic thermostat.                                                      | Check the electronic thermostat and replace as necessary.                                                                                |
| Insufficient velocity of cooling air. | Evaporator clogged or frosted.                                                                    | Check the evaporator core and replace or clean the core.                                                                                 |
|                                       | Air leaking from the cooling unit or air duct.                                                    | Check the evaporator and duct connection, then repair as necessary.                                                                      |
|                                       | Blower motor does not rotate properly.                                                            | Refer to Fan Control Lever (Fan Switch) Diagnosis in this section.                                                                       |

\*For the execution of the charging and discharging operation in the table above, refer to Recovery, Recycling, Evacuating and Charging in this section.

## Checking The Refrigerant System With Manifold Gauge

Since Refrigerant-134a (HFC-134a) is used in the air conditioning system in this vehicle, be sure to use manifold gauges, charging hoses and other air conditioning service tools for HFC-134a when checking the refrigerant system.

### Conditions:

- Run the engine at idle
- Air conditioning switch is "ON"
- Run the blower motor at "HIGH" position
- Temperature control lever set to "MAX COLD"
- Air source selector lever at "CIRC"
- Open the engine hood
- Close all the doors

### Normal Pressure:

- At ambient temperature: approx. 25–30°C (77–86°F).
- At low-pressure side: approx. 147.1–294.2 kPa (21.3–42.7 psi).
- At high-pressure side: approx. 1372.9–1863.3 kPa (199.1–270.2 psi).

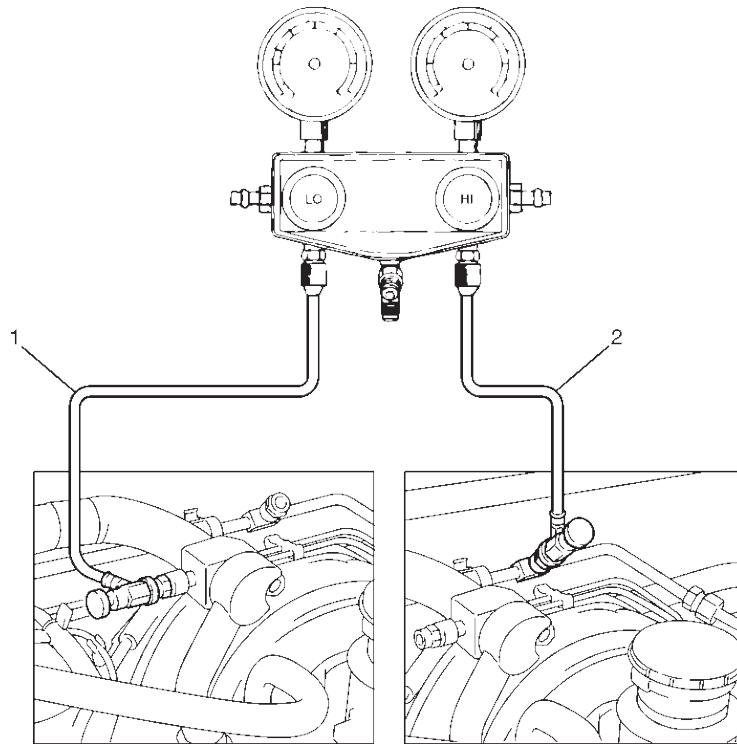
Refer to the table on the refrigerant pressure-temperature relationship.

| HFC-134a Pressure-Temperature Relationship |       |             |      |
|--------------------------------------------|-------|-------------|------|
| Pressure                                   |       | Temperature |      |
| (kPa)                                      | (psi) | (°C)        | (°F) |
| 36                                         | 5.3   | –20         | –4.4 |
| 67                                         | 9.7   | –15         | 5    |
| 104                                        | 15    | –10         | 14   |
| 147                                        | 21    | –5          | 23   |
| 196                                        | 28    | 0           | 32   |
| 255                                        | 37    | 5           | 41   |
| 314                                        | 45    | 10          | 50   |
| 392                                        | 57    | 15          | 59   |
| 471                                        | 68    | 20          | 68   |
| 569                                        | 82    | 25          | 77   |
| 677                                        | 98    | 30          | 86   |
| 785                                        | 114   | 35          | 95   |
| 912                                        | 132   | 40          | 104  |
| 1059                                       | 154   | 45          | 113  |
| 1216                                       | 176   | 50          | 122  |

**Connect The Manifold Gauge**

Low-pressure hose (LOW) — Suction side

High pressure hose (HI) — Discharge side



901R100020

**Legend**

- (1) Low Side
- (2) High Side

**1A-40 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)**

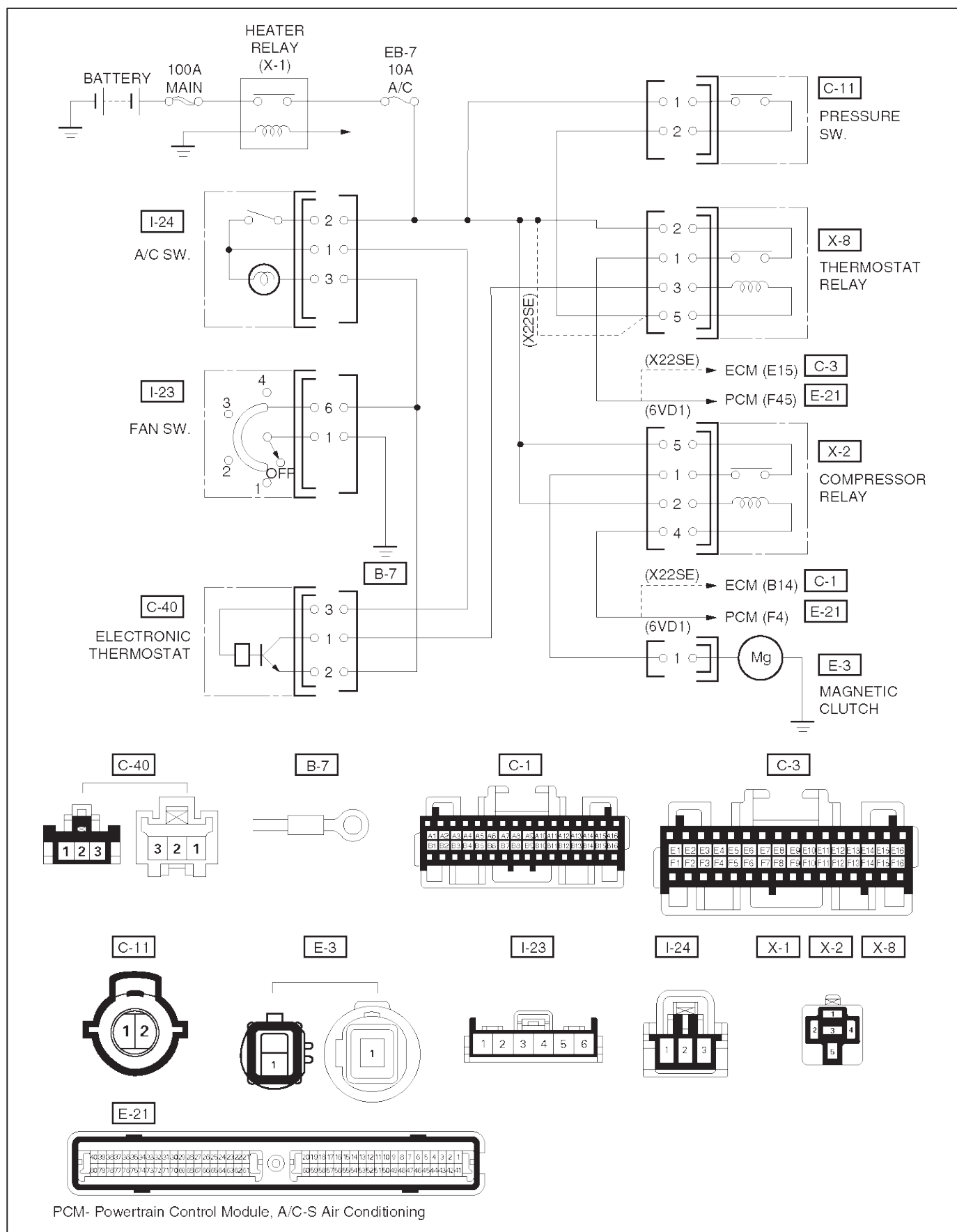
| Condition                                                                                                                                                                                         | Possible cause                                                                         | Correction                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Discharge (High Gauge) Pressure Abnormally High                                                                                                                                                   | Condenser clogged or dirty.                                                            | Clean the condenser fins                                                                  |
|                                                                                                                                                                                                   | Cooling fan does not operate properly.                                                 | Check the cooling fan operation.                                                          |
| Discharge (High Gauge) Pressure Abnormally High.<br>Insufficient cooling.                                                                                                                         | Excessive refrigerant in system.                                                       | Discharge and recover refrigerant. Recharge to specified amount.                          |
| Discharge (High Gauge) Pressure Abnormally High.<br>High pressure gauge drop. (After stopping A/C, the pressure drops approx. 196 kPa (28 psi) quickly)                                           | Air in system.                                                                         | Evacuate and charge refrigerant system.                                                   |
| Discharge (High Gauge) Pressure Abnormally Low.<br>Insufficient cooling                                                                                                                           | Insufficient refrigerant in system.                                                    | Check for leaks. Discharge and recover the refrigerant. Recharge to the specified amount. |
| Discharge (High Gauge) Pressure Abnormally Low.<br>Low pressure gauge indicates vacuum.                                                                                                           | Clogged or defective expansion valve.                                                  | Replace the expansion valve.                                                              |
| Discharge (High Gauge) Pressure Abnormally Low.<br>Frost or dew on refrigerant line before and after the receiver/drier or expansion valve, and low pressure gauge indicates vacuum.              | Restriction caused by debris or moisture in the receiver/drier.                        | Check system for restriction and replace the receiver/drier.                              |
| Discharge (High Gauge) Pressure Abnormally Low.<br>High and low pressure gauge balanced quickly. (After turned off A/C)                                                                           | Compressor seal defective                                                              | Repair or replace the compressor.                                                         |
|                                                                                                                                                                                                   | Poor compression due to a defective compressor gasket.                                 | Repair or replace the compressor.                                                         |
| Suction (Low Gauge) Pressure Abnormally High.<br>Low pressure gauge (Low pressure gauge is lowered after condenser is cooled by water.)                                                           | Excessive refrigerant in system.                                                       | Discharge and recover refrigerant. Recharge to specified amount.                          |
| Suction (Low Gauge) Pressure Abnormally High.<br>Low pressure hose temperature. (Low pressure hose temperature around the compressor refrigerant line connector is lower than around evaporator.) | Unsatisfactory valve operation due to defective temperature sensor of expansion valve. | Replace the expansion valve.                                                              |
|                                                                                                                                                                                                   | Expansion valve opens too long.                                                        | Replace the expansion valve.                                                              |
| Suction (Low Gauge) Pressure Abnormally High.<br>High and low pressure gauge balanced quickly. (After turned off A/C)                                                                             | Compressor gasket is defective.                                                        | Repair or replace the compressor.                                                         |
| Suction (Low Gauge) Pressure Abnormally Low.<br>Insufficient cooling.                                                                                                                             | Insufficient refrigerant in system.                                                    | Check for leaks. Discharge and recover the refrigerant. Recharge to specified amount.     |
| Suction (Low Gauge) Pressure Abnormally Low.<br>Frost on the expansion valve inlet line                                                                                                           | Expansion valve clogged.                                                               | Replace the expansion valve.                                                              |

| Condition                                                                                                                                                                        | Possible cause                                   | Correction                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------|
| Suction (Low Gauge) Pressure Abnormally Low<br>Receiver/drier inlet and outlet refrigerant line temperature. (A distinct difference in temperature develops.)                    | Receiver/Drier clogged.                          | Replace the receiver/drier.                                                       |
| Suction (Low Gauge) Pressure Abnormally Low.<br>Expansion valve outlet refrigerant line. (Not cold and low pressure gauge indicates vacuum.)                                     | Expansion valve temperature sensor is defective. | Replace the expansion valve.                                                      |
| Suction (Low Gauge) Pressure Abnormally Low.<br>When the refrigerant line is clogged or blocked, the low pressure gauge reading will decrease, or a vacuum reading may be shown. | Clogged or blocked refrigerant line.             | Replace refrigerant line.                                                         |
| Suction (Low Gauge) Pressure Abnormally Low.<br>Evaporator core is frozen.                                                                                                       | Thermo switch defective.                         | Replace thermo switch.                                                            |
| Suction (Low Gauge) and Discharge (High Gauge) Pressure Abnormally High.<br>Insufficient cooling.                                                                                | Excessive refrigerant in system.                 | Discharge and recover the refrigerant, the Recharge to the specified amount.      |
|                                                                                                                                                                                  | Condenser clogged or dirty.                      | Clean the condenser fin.                                                          |
| Suction (Low Gauge) and Discharge (High Gauge) Pressure Abnormally High.<br>Suction (Low) pressure hose (Not cold).                                                              | Air in system.                                   | Evacuate and charge refrigerant.                                                  |
| Suction (Low Gauge) and Discharge (High Gauge) Pressure Abnormally Low.<br>Insufficient cooling                                                                                  | Insufficient refrigerant in system.              | Check for leaks. Discharge and recover refrigerant. Recharge to specified amount. |

A/C — Air Conditioning

# 1A-42 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

## Magnetic Clutch Diagnosis



When the air conditioning switch and the fan control knob (fan switch) are turned on with the engine running, current flows through the thermostat and the compressor relay to activate the magnetic clutch.

The air conditioning can be stopped by turning of the air conditioning switch or the fan control knob (fan switch). However, even when the air conditioning is in operation, the electronic thermostat, the pressure switch or the

Powertrain Control Module (PCM;V6-3.2L)/ Engine Control Module (ECM;L4-2.2L) is used to stop the air conditioning temporarily by turning off the magnetic clutch in the prearranged conditions to reduce the engine load which is being caused by the rise in the engine coolant temperature, and the acceleration of the vehicle, etc.

For the inspection of the relays, switches and units in the table, refer to "Individual Inspection" in this section.

### Magnetic Clutch Does Not Run

| Step | Action                                                                                                                                                                                                                                                    | Yes                        | No                                                               |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------|
| 1    | Are No. EB-7 (10A) fuse and No. EB-5 (15A) / EB-6 (15A) fuse OK?                                                                                                                                                                                          | Go to Step 2               | Replace                                                          |
| 2    | Are heater (X-1), thermostat (X-8), and compressor (X-2) relays OK?                                                                                                                                                                                       | Go to Step 3               | Replace                                                          |
| 3    | Is pressure switch OK?                                                                                                                                                                                                                                    | Go to Step 4               | Switch defective or insufficient refrigerant.                    |
| 4    | Are air conditioning switch and fan control lever (Fan Switch) OK?                                                                                                                                                                                        | Go to Step 5               | Replace                                                          |
| 5    | 1. Turn the ignition switch "ON" (Engine is running).<br>2. Air conditioning switch and fan control lever (Fan Switch) "ON".<br>3. Check to see if battery voltage is present at chassis side connector terminal No. E3-1.<br>Is there a battery voltage? | Go to Step 6               | Go to Step 7                                                     |
| 6    | Check to see if continuity between compressor side connector terminal No. E3-1 and the magnetic clutch side connector terminal.<br>Is there a continuity?                                                                                                 | Magnetic clutch defective. | Compressor defective.                                            |
| 7    | Check to see if battery voltage is present at chassis side connector terminal No. I24-2.<br>Is there a battery voltage?                                                                                                                                   | Go to Step 8               | Open circuit between No. EB-7 (10A) fuse and No. I24-2.          |
| 8    | Check to see if battery voltage is present at chassis side connector terminal No. C11-1<br>Is there a battery voltage?                                                                                                                                    | Go to Step 9               | Open circuit between No. I24-1 and No. C11-1.                    |
| 9    | 1. Disconnect thermostat relay (X-8).<br>2. Check to see if battery voltage is present at the chassis side relay terminal NO. X8-2<br>Is there a battery voltage?                                                                                         | Go to Step 10              | Open circuit between No. EB-7 and C11-2 (10A) fuse and No. X8-2. |
| 10   | Check to see if voltage (approx. 10V) is present between chassis side relay terminal No. X8-5 and No. X8-3.<br>Is there a battery voltage?                                                                                                                | Go to Step 11              | Go to Step 17                                                    |
| 11   | 1. Reconnect thermostat relay and disconnect compressor relay (X-2).<br>2. Check to see if battery voltage is present at the chassis side relay terminal No. X2-5.<br>Is there a battery voltage?                                                         | Go to Step 12              | Open circuit between No. EB-7 (10A) fuse and No. X2-5.           |
| 12   | Check to see if continuity between chassis side relay terminal No. X2-1 and the chassis side connector terminal No. E3-1.<br>Is there a continuity?                                                                                                       | Go to Step 13              | Open circuit.                                                    |

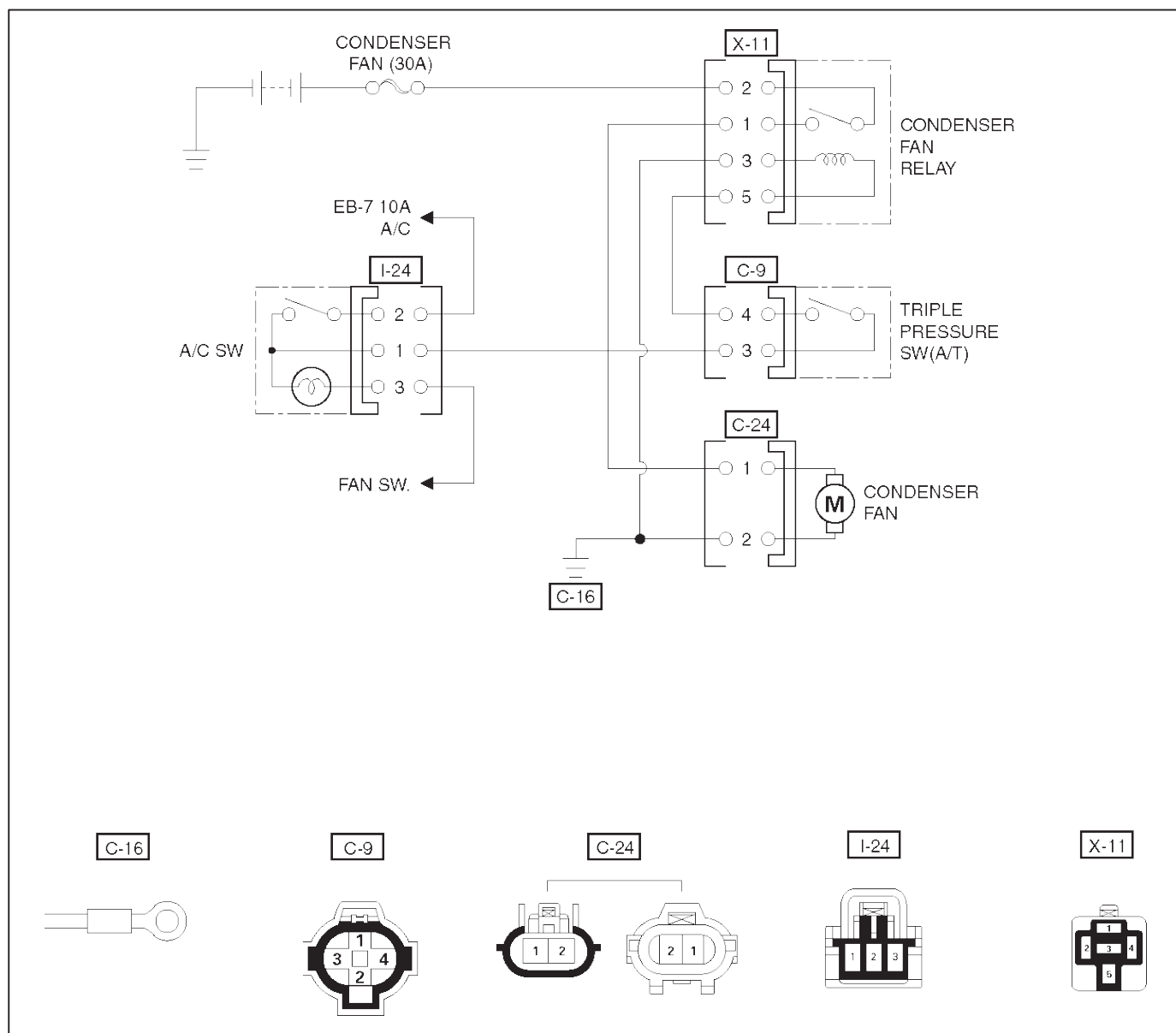
**1A-44 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)****Magnetic Clutch Does Not Run (Cont'd)**

| Step | Action                                                                                                                                                       | Yes                                                                                                   | No                                                                                       |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 13   | Check to see if battery voltage is present between chassis side relay terminal No. X2-2 and No. X2-4.<br>Is there a battery voltage?                         | Go to Step 14                                                                                         | Go to Step 15                                                                            |
| 14   | Check to see if battery voltage is present at chassis side relay terminal No. X2-2.<br>Is there a battery voltage?                                           | Go to Step 16                                                                                         | Open circuit between No. EB-7 (10A) fuse and No. X2-2.                                   |
| 15   | Check to see if battery voltage is present at chassis side connector terminal No. E21-F4 / C1-B14.<br>Is there a battery voltage?                            | Power train control module (PCM) defective.<br>Refer to Driveability and Emissions in Engine section. | Open circuit between No. X2-4 and No. E21-F4 / C1-B14.                                   |
| 16   | Check to see if continuity between chassis side relay terminal No. X8-1 and chassis side connector terminal No. E21-F45 / C3-E15.<br>Is there a continuity?  | Power train control module (PCM) defective.<br>Refer to Driveability and Emissions in Engine section. | Open circuit                                                                             |
| 17   | Check to see if battery voltage is present at chassis side relay terminal No. X8-5.<br>Is there a battery voltage?                                           | Go to Step 18                                                                                         | Open circuit between No. X8-5 and C11-2.                                                 |
| 18   | 1. Reconnect thermostat relay.<br>2. Check to see if battery voltage is present at chassis side connector terminal No. C40-3.<br>Is there a battery voltage? | Go to Step 19                                                                                         | Open circuit between No. I24-1 and No. C40-3.                                            |
| 19   | Check to see if battery voltage (approx 10V) is present at chassis side connector terminal No. C40-1.<br>Is there a battery voltage?                         | Go to Step 20                                                                                         | Open circuit between No. X8-3 and No. C40-1.                                             |
| 20   | Check to see if continuity between chassis side connector terminal No. C40-2 and No. I23-6.<br>Is there a continuity?                                        | Electronic thermostat defective.                                                                      | Open circuit between No. C40-2 and No. I23-6 or poor ground (Fan Switch Ground Circuit). |

## Condenser Fan Diagnosis

While the air conditioning is ON, the cycling switch in the triple pressure switch senses the refrigerant pressure, and activates the condenser fan to improve the cooling capacity of the condenser when the refrigerant pressure

exceeds a set pressure value. The condenser fan stops when the air conditioning is turned "OFF" or when the pressure goes down below the set pressure value.



| Condition                   | Possible cause | Correction          |
|-----------------------------|----------------|---------------------|
| Condenser fan does not run. | —              | Refer to “Chart A”. |
|                             | —              | Refer to “Chart B”. |

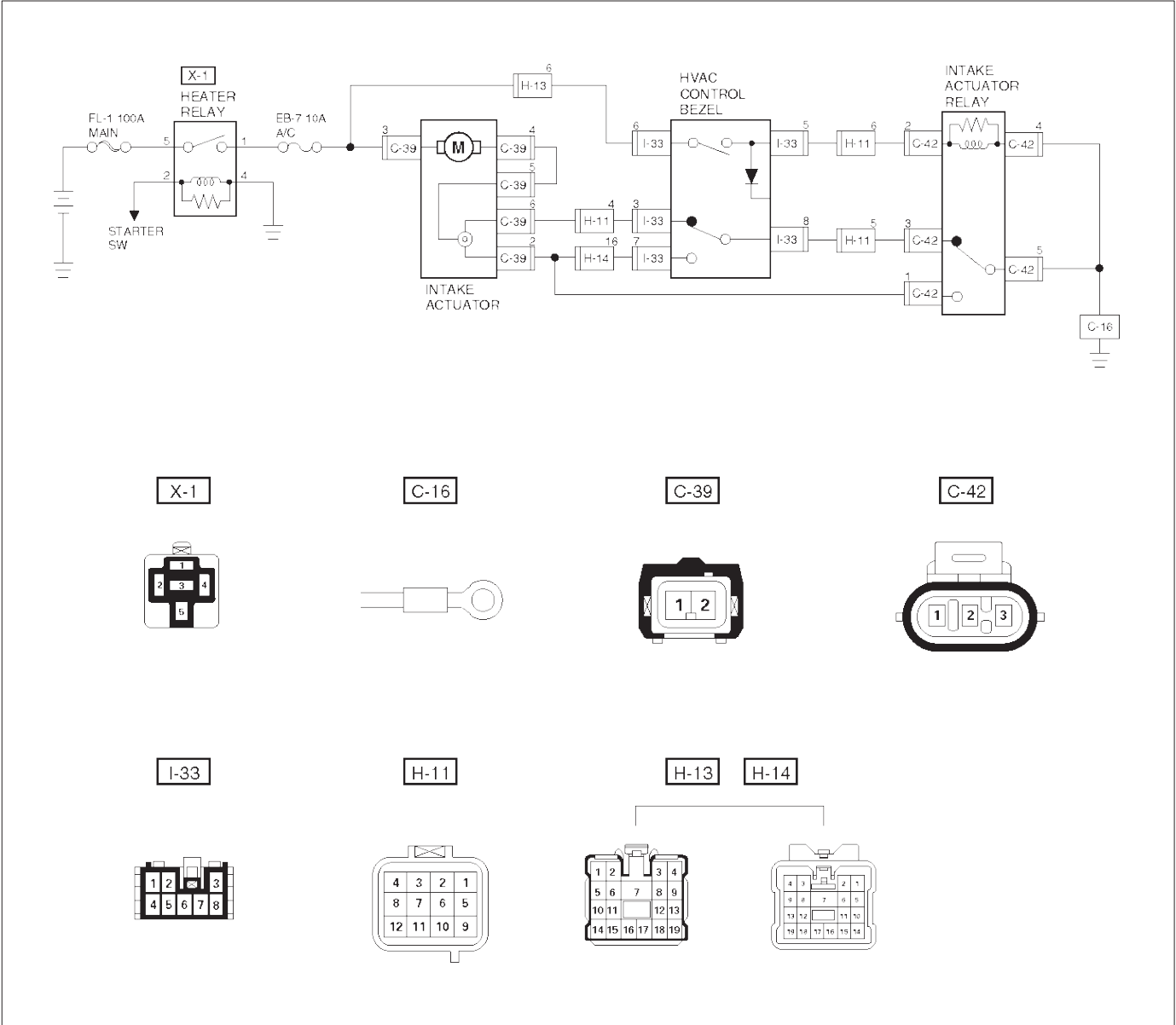
**Chart "A" Condenser Fan Does Not Run**

| Step | Action                                                                                                                                                                                                       | Yes                                                                                                                  | No                                                          |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| 1    | Are 30A fuse OK?                                                                                                                                                                                             | Go to Step 2                                                                                                         | Replace                                                     |
| 2    | Is relay (X-11) OK?                                                                                                                                                                                          | Go to Step 3                                                                                                         | Replace                                                     |
| 3    | Is pressure switch OK?                                                                                                                                                                                       | Go to Step 4                                                                                                         | Switch defective or insufficient refrigerant.               |
| 4    | Is air conditioning switch OK?                                                                                                                                                                               | Go to Step 5                                                                                                         | Replace                                                     |
| 5    | Is fan motor OK?                                                                                                                                                                                             | Go to Step 6                                                                                                         | Replace                                                     |
| 6    | 1. Disconnect condenser fan relay (X-11).<br>2. Check to see if battery voltage is present at the chassis side relay terminal NO. X11-2<br><br>Is there a battery voltage?                                   | Go to Step 7                                                                                                         | Open circuit between Condenser Fan fuse (30A) and No.X11-2. |
| 7    | 1. Reconnect condenser fan relay (X-11).<br>2. Air conditioning switch "ON".<br>3. Check to see if battery voltage is present at chassis side connector terminal No.C9-3.<br><br>Is there a battery voltage? | Go to Step 8                                                                                                         | Open circuit between I-24-1 and C9-3.                       |
| 8    | 1. Air conditioning switch "OFF".<br>2. Check to see if continuity between chassis side relay terminal No.X11-5 and the chassis side connector terminal No.C9-4.<br><br>Is there a continuity?               | Go to Step 9                                                                                                         | Open circuit.                                               |
| 9    | Check to see if continuity between chassis side connector terminal No. C24-1 and chassis side relay terminal No.X11-1.<br><br>Is there a continuity?                                                         | Poor ground or open circuit between chassis side connector terminal No.X11-3 (or No.C24-2) and body ground (No.C16). | Open circuit.                                               |

**Chart "B" Condenser Fan Does Not Stop**

| Step | Action                                                            | Yes                               | No                                   |
|------|-------------------------------------------------------------------|-----------------------------------|--------------------------------------|
| 1    | 1. Air conditioning switch "OFF".<br><br>Does condenser fan stop? | Triple pressure switch defective. | Condenser fan relay (X11) defective. |

Air Source Select Lever Diagnosis



D08RY00549

| Condition               | Possible cause | Correction       |
|-------------------------|----------------|------------------|
| FRESH mode inoperative  | —              | Refer to Chart A |
| RECIRC mode inoperative | —              | Refer to Chart B |

Chart "A": FRESH Mode Inoperative

| Step | Action                                                                                                                                                                                                                                        | Value(s)    | Yes           | No                          |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|-----------------------------|
| 1    | Is the fuse EB-7 normal?                                                                                                                                                                                                                      | —           | Go to Step 2  | Replace the fuse            |
| 2    | Is C-16 grounded securely?                                                                                                                                                                                                                    | —           | Go to Step 3  | Ground it securely          |
| 3    | Remove the intake actuator relay.<br>Is the relay normal?                                                                                                                                                                                     | —           | Go to Step 4  | Replace the relay           |
| 4    | Is there continuity between the intake actuator relay harness side connector C-42 terminal 4/5 and the ground C-16?                                                                                                                           | —           | Go to Step 5  | Repair an open circuit      |
| 5    | 1. Set the HVAC control bezel to DEF/FOOT or DEF position.<br>2. Turn the starter switch on and keep the engine running.<br>Is the battery voltage applied between the intake actuator harness side connector C-42 terminal 2 and the ground? | Approx. 12V | Go to Step 10 | Go to Step 6                |
| 6    | Disconnect the HVAC control bezel.<br>Is the battery voltage applied between the bezel harness side connector I-33 terminal 6 and the ground?                                                                                                 | Approx. 12V | Go to Step 8  | Go to Step 7                |
| 7    | Repair an open circuit between the fuse EB-7 and the connector I-33 terminal 6.<br>Is the action complete?                                                                                                                                    | —           | Go to Step 6  | —                           |
| 8    | Is there continuity between the HVAC control bezel side connector terminal 5 and 6?                                                                                                                                                           | —           | Go to Step 9  | Repair or replace the bezel |
| 9    | Is there continuity between the harness side connector I-33 terminal 5 and C-42 terminal 2?                                                                                                                                                   | —           | Go to Step 10 | Repair an open circuit      |
| 10   | Disconnect the intake actuator connector C-39.<br>Is the battery voltage applied between the harness side connector C-39 terminal 3 and the ground?                                                                                           | Approx. 12V | Go to Step 11 | Repair an open circuit      |
| 11   | Is there continuity between the harness side connector C-39 terminal 2 and C-42 terminal 1                                                                                                                                                    | Approx. 12V | Go to Step 12 | Repair an open circuit      |
| 12   | Is there continuity between the harness side connector C-39 terminal 4 and 5?                                                                                                                                                                 | —           | Go to Step 13 | Repair an open circuit      |
| 13   | Replace the intake actuator.<br>Is the action complete?                                                                                                                                                                                       | —           | Verify repair | —                           |

**Chart “B”: RECIRC Mode Inoperative**

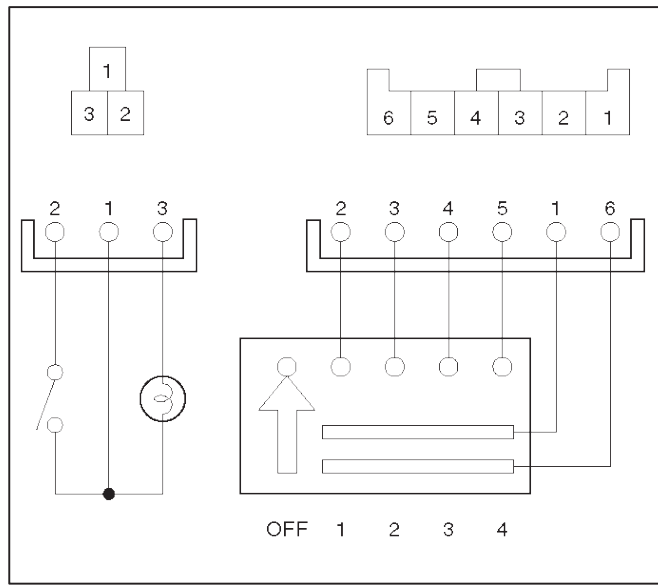
| Step | Action                                                                                                                                                                                                                                                                                                   | Value(s)   | Yes           | No                                  |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|-------------------------------------|
| 1    | Is the fuse EB-7 normal?                                                                                                                                                                                                                                                                                 | —          | Go to Step 2  | Replace the fuse                    |
| 2    | Is C-16 grounded securely?                                                                                                                                                                                                                                                                               | —          | Go to Step 3  | Ground it securely                  |
| 3    | Is the Intake actuator relay normal?                                                                                                                                                                                                                                                                     | —          | Go to Step 4  | Replace the relay                   |
| 4    | 1. Disconnect the Intake actuator connector C-39<br>2. Connect the battery positive terminal to the Intake actuator side connector terminal No.3 and the battery negative terminal to terminal No.6.<br>3. Connect the switch side connector terminal No.4 and No.5.<br>Does the actuator work normally? | —          | Go to Step 5  | Replace the actuator                |
| 5    | Turn the Starter switch on.<br>Is the battery voltage applied to the harness side connector C-39 terminal 3?                                                                                                                                                                                             | Approx.12V | Go to Step 6  | Repair an open circuit              |
| 6    | Is there continuity between harness side connector C-42 terminal No.5 and the ground?                                                                                                                                                                                                                    | —          | Go to Step 7  | Repair an open circuit              |
| 7    | 1. Remove the HVAC control bezel.<br>2. Move the air source select lever to REC position.<br>Is there continuity between the control bezel side terminal No.3 and 8?                                                                                                                                     | —          | Go to Step 8  | Repair or replace the control bezel |
| 8    | Is there continuity between harness side connector C-39 terminal 6 and connector I-33 terminal 3?                                                                                                                                                                                                        | —          | Go to Step 9  | Repair an open circuit              |
| 9    | Repair an open circuit between connector I-33 terminal 8 and connector C-42 terminal 3.<br>Is the action complete?                                                                                                                                                                                       | —          | Verify repair | —                                   |

## Air Conditioning System

### Individual Inspection

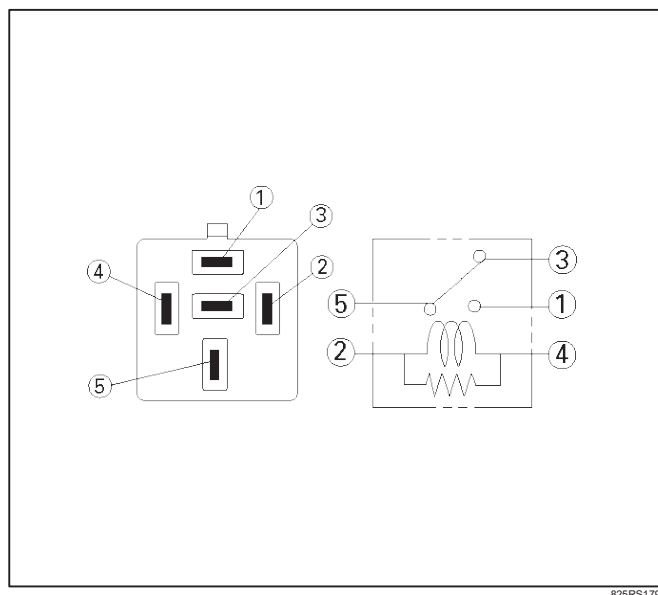
#### Fan Control Knob (Fan Switch) And Air Conditioning (A/C) Switch

1. Check for continuity between the fan switch and the A/C switch side connector terminals.



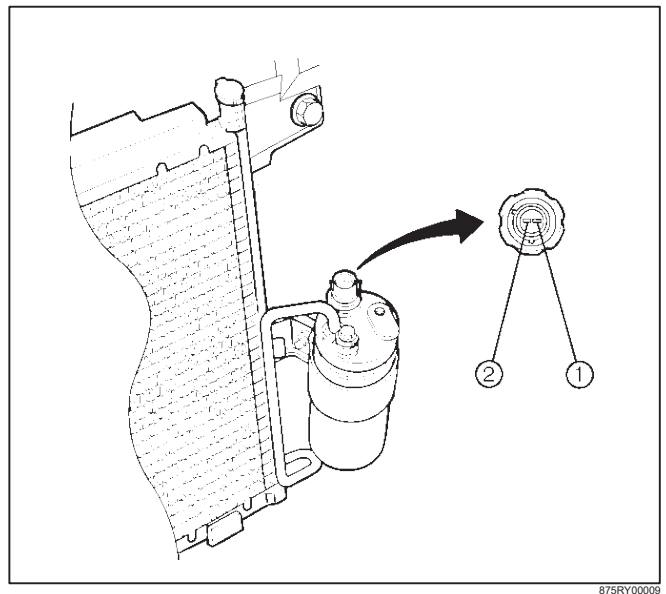
#### Heater (X-1), Thermostat (X-8), Condenser Fan (X-11) And Compressor (X-2) Relay

1. Disconnect relays and check for continuity and resistance between relay terminals.
  - For handling of these relays, refer to Heater Relay in this section.



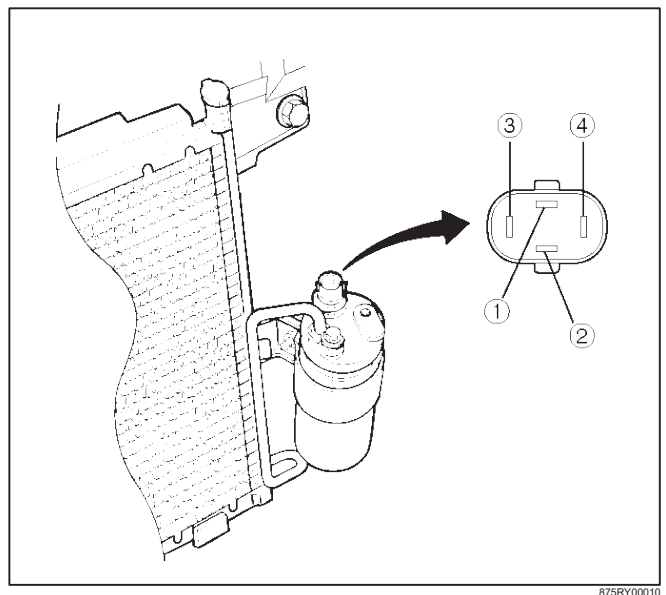
### Pressure Switch

1. Disconnect pressure switch connector and check for continuity between pressure switch side connector terminals (1) and (2).



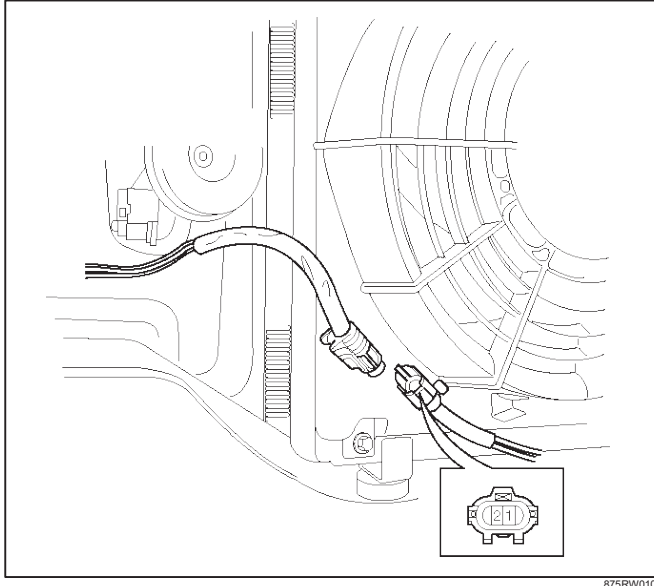
### Triple Pressure Switch (V6, A/T)

1. Disconnect the connector and check for continuity between pressure switch side connector terminals (1) and (2).
2. Reconnect the connector to activate the A/C switch, and check to see if there is continuity between the chassis side connector terminals (3) and (4) and the fan operates.



## Condenser Fan

1. Disconnect the condenser fan connector.
2. Connect the battery positive terminal to the condenser fan side connector terminal No.C-24-1 and negative to the No.C-24-2.
3. Check that condenser fan is rotating correctly.



## General Repair Procedure

### Precautions For Replacement or Repair of Air Conditioning Parts

There are certain procedures, practices and precautions that should be followed when servicing air conditioning systems:

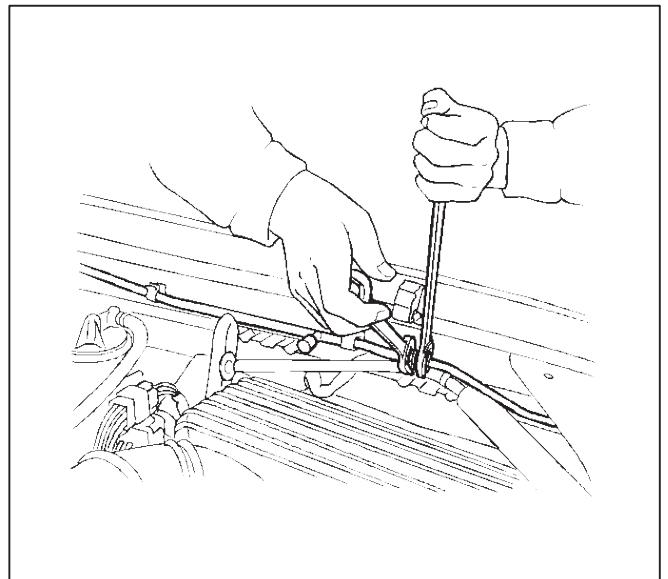
- Keep your work area clean.
- Always wear safety goggles and protective gloves when working on refrigerant systems.
- Beware of the danger of carbon monoxide fumes caused by running the engine.
- Beware of discharged refrigerant in enclosed or improperly ventilated garages.
- Always disconnect the negative battery cable and discharge and recover the refrigerant whenever repairing the air conditioning system.
- When discharging and recovering the refrigerant, do not allow refrigerant to discharge too fast; it will draw compressor oil out of the system.
- Keep moisture and contaminants out of the system. When disconnecting or removing any lines or parts, use plugs or caps to close the fittings immediately. Never remove the caps or plugs until the lines or parts are reconnected or installed.

- When disconnecting or reconnecting the lines, use two wrenches to support the line fitting, to prevent from twisting or other damage.
- Always install new O-rings whenever a connection is disassembled.
- Before connecting any hoses or lines, apply new specified compressor oil to the O-rings.
- When removing and replacing any parts which require discharging the refrigerant circuit, the operations described in this section must be performed in the following sequence:
  1. Use the J-39500 (ACR<sup>4</sup>: HFC-134a Refrigerant Recovery / Recycling / Recharging / System) or equivalent to thoroughly discharge and recover the refrigerant.
  2. Remove and replace the defective part.
  3. After evacuation, charge the air conditioning system and check for leaks.

## Repair Of Refrigerant Leaks

### Refrigerant Line Connections

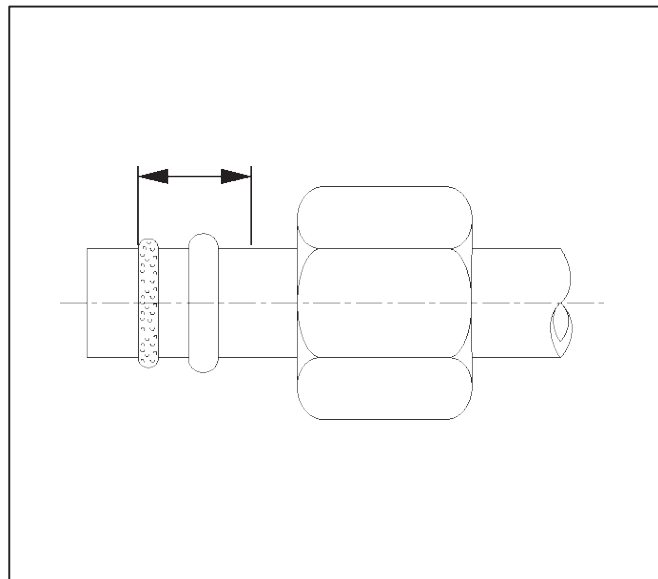
Install new O-rings, if required. When disconnecting or connecting lines, use two wrenches to prevent the connecting portion from twisting or becoming damaged.



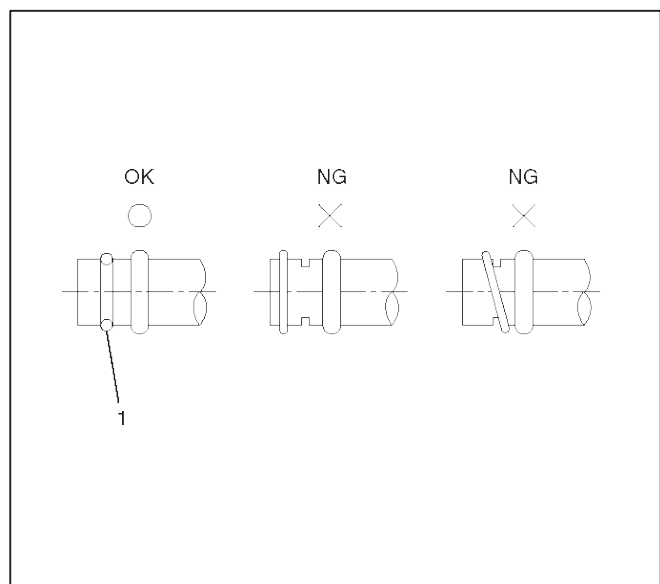
When connecting the refrigerant line at a block joint, securely insert the projecting portion of the joint portion into the connecting hole on the unit side and secure with a bolt. Apply the specified compressor oil to the O-rings prior to connecting.

## 1A-52 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

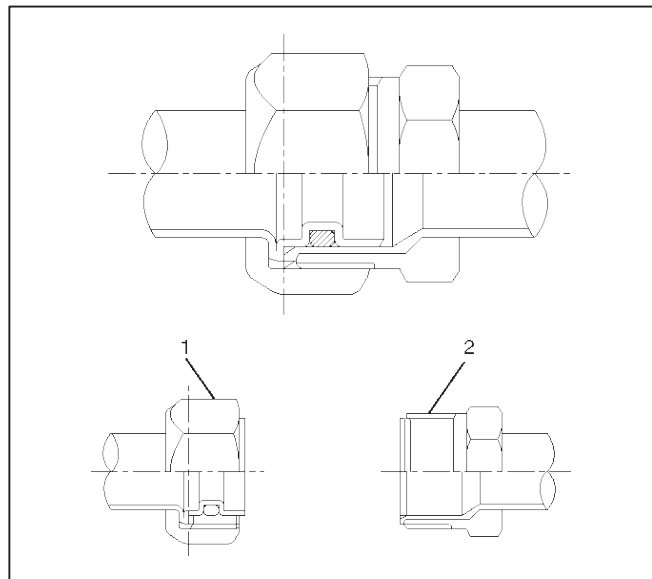
**CAUTION:** Compressor (PAG) oil to be used varies according to the compressor model. Be sure to apply oil specified for the model of compressor.



O-rings (2) must be fitted in the groove (1) of refrigerant line.



Insert the nut into the union.  
First, tighten the nut by hand as much as possible, then tighten the nut to the specified torque.



## Leak Check

### Inspection of refrigerant leak

Refrigerant leak may cause an adverse effect not only on the performance and durability of each component of the air-conditioner, but also on the global atmosphere.

Therefore, it is most important to repair refrigerant leak when there is any leak found.

### Inspection flow of refrigerant leak

| Step | Action                                                                                                                                                           | Yes                        | No                                    |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------|
| 1    | 1. Evacuate the refrigerant system.<br>2. Charge the refrigerant.<br>Is there any refrigerant leak?                                                              | Repair refrigerant system. | Go to Step 2.                         |
| 2    | 1. Operate the compressor for more than 5 minutes to raise the pressure on the high pressure side.<br>Is there any refrigerant leak at high pressure components? | Repair refrigerant system. | Compressor operation to be confirmed. |

### Inspection Steps

Check the components of air-conditioner to see if there occurs any refrigerant leak along the flow of refrigerant.

NOTE:

- To avoid refrigerant leak detection error, avoid refrigerant vapor and cigarette smoke presence when performing the inspection. Also, select a location that is not susceptible to wind, in case refrigerant vapor is found it will not be blown off.
- Inspection should be conducted chiefly on the pipe connections and sections where a marked oil contamination is found. When refrigerant is leaking, oil inside is also leaking at the same time.
- It is possible to visually check the leak from inside the cooling unit. Follow the method below when performing the inspection. Remove the drain hose or resistor of the cooling unit, and insert a leak detector to see if there are signs of leakage.

#### High Pressure Side

1. Discharger section of compressor.
2. Inlet/outlet section of condenser.
3. Inlet/outlet section of receiver driver.
4. Inlet section of cooling unit.

#### Low Pressure Side

1. Outlet section of cooling unit.
2. Intake section of compressor.

### Major Checking Points of Refrigerant Leak

#### Compressor

- Pipe connection
- Sealing section of shaft
- Mating section or cylinder

#### Condenser

- Pipe connection
- Welds of condenser body

#### Receiver driver

- Pipe connection
- Attaching section of pressure switch
- Section around the sight glass

#### Evaporator unit (cooling unit)

- Pipe connections
- Connections of expansion valve
- Brazed sections of evaporator

NOTE:

- The evaporator and expansion valve are contained in the case. Remove the drain hose or the resistor of the cooling unit and insert a leak detector when checking for any leak.

#### Flexible hose

- Pipe connection
- Caulking section of the hose
- Hose (cracks, pinholes, flaws)

#### Pipe

- Pipe connection
- Pipe (cracks, flaws)

#### Charge valve

NOTE:

- The charge valve, which is used to connect the gauge manifold, is normally provided with a resin cap. When the valve inside gets deteriorated, refrigerant will leak out.

### Leak at Refrigerant Line Connections

1. Check the torque on the refrigerant line fitting and, if too loose, tighten to the specified torque.
  - Use two wrenches to prevent twisting and damage to the line.
  - Do not over tighten.
2. Perform a leak test on the refrigerant line fitting.

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3. If the leak is still present, discharge and recover the refrigerant from the system.
4. Replace the O-rings.
  - O-rings cannot be reused. Always replace with new ones.
  - Be sure to apply the specified compressor oil to the new O-rings.
5. Retighten the refrigerant line fitting to the specified torque.
  - Use two wrenches to prevent twisting and damage to the line.
6. Evacuate, charge and retest the system.

### Leaks In The Hose

If the compressor inlet or outlet hose is leaking, the entire hose must be replaced. The refrigerant hose must not be cut or spliced for repair.

1. Locate the leak.
2. Discharge and recover the refrigerant.
3. Remove the hose assembly.
  - Cap the open connections at once.
4. Connect the new hose assembly.
  - Use two wrenches to prevent twisting or damage to the hose fitting.
  - Tighten the hose fitting to the specified torque.
5. Evacuate, charge and test the system.

### Compressor Leaks

If leaks are located around the compressor shaft seal or shell, replace or repair the compressor.

### Recovery, Recycling, Evacuation and Charging of HFC-134a

Air conditioning systems contain HFC-134a. This is a chemical mixture which requires special handling procedures to avoid personal injury.

- Always wear safety goggles and protective gloves.
- Always work in a well-ventilated area. Do not weld or steam clean on or near any vehicle-installed air conditioning lines or components.
- If HFC-134a should come in contact with any part of the body, flush the exposed area with cold water and immediately seek medical help.
- If it is necessary to transport or carry any container of HFC-134a in a vehicle, do not carry it in the passenger compartment.
- If it is necessary to fill a small HFC-134a container from a large one, never fill the container completely. Space should always be allowed above the liquid for expansion.
- HFC-134a and R-12 should never be mixed as their compositions are not the same.
- HFC-134a PAG oil tends to absorb moisture more quickly than R-12 mineral oil and, therefore, should be handled more carefully.
- Keep HFC-134a containers stored below 40°C (104°F).

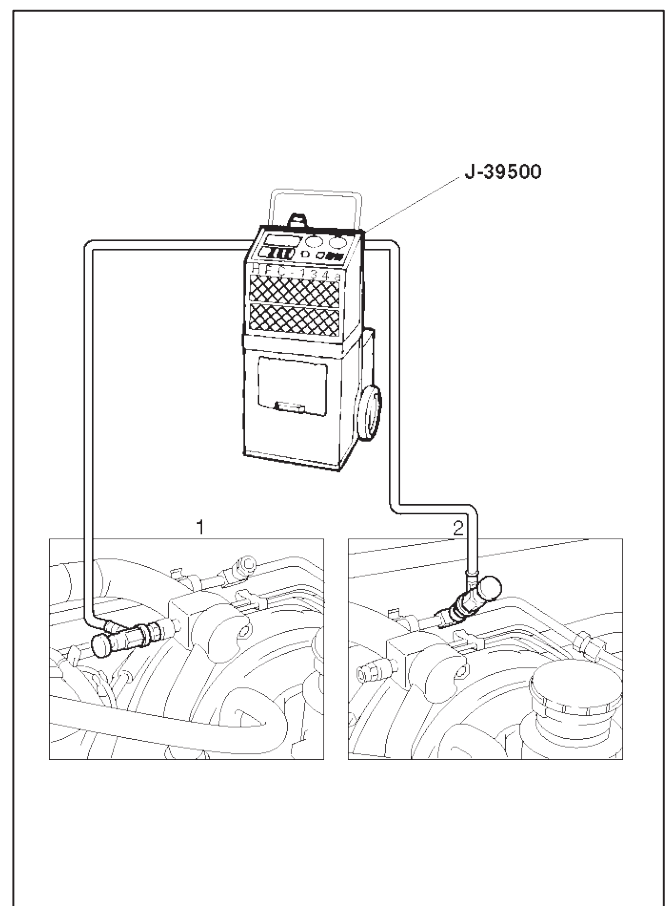
### WARNING:

- **SHOULD HFC-134A CONTACT YOUR EYE(S), CONSULT A DOCTOR IMMEDIATELY.**
- **DO NOT RUB THE AFFECTED EYE(S). INSTEAD, SPLASH QUANTITIES OF FRESH COLD WATER OVER THE AFFECTED AREA TO GRADUALLY RAISE THE TEMPERATURE OF THE REFRIGERANT ABOVE THE FREEZING POINT.**
- **OBTAIN PROPER MEDICAL TREATMENT AS SOON AS POSSIBLE. SHOULD THE HFC-134A TOUCH THE SKIN, THE INJURY MUST BE TREATED THE SAME AS SKIN WHICH HAS BEEN FROSTBITTEN OR FROZEN.**

### Refrigerant Recovery

The refrigerant must be discharged and recovered by using the J-39500 (ACR<sup>4</sup>:HFC-134a Refrigerant Recovery/Recycling/Recharging/System) or equivalent before removing or mounting air conditioning parts.

1. Connect the high and low charging hoses of the ACR<sup>4</sup>(or equivalent) as shown below.



901R100022

### Legend

- (1) Low Side
- (2) High Side

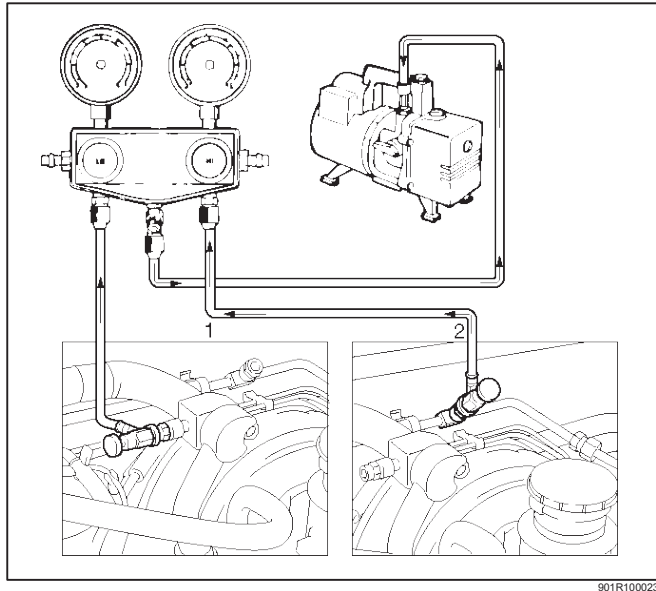
2. Recover the refrigerant by following the Manufacturer's Instructions.
3. When a part is removed, put a cap or a plug on the connecting portion so that dust, dirt or moisture cannot get into it.

## Refrigerant Recycling

Recycle the refrigerant recovered by J-39500 (ACR<sup>4</sup>:HFC-134a Refrigerant Recovery / Recycling / Recharging / System) or equivalent.

For the details of the actual operation, follow the steps in the ACR<sup>4</sup>(or equivalent) Manufacturer's Instructions.

## Evacuation of The Refrigerant System



901R100023

### Legend

- (1) Low Side
- (2) High Side

NOTE: Explained below is a method using a vacuum pump. Refer to the ACR<sup>4</sup>(or equivalent) manufacturer's instructions when evacuating the system with a ACR<sup>4</sup>(or equivalent).

Air and moisture in the refrigerant will cause problems in the air conditioning system. Therefore, before charging the refrigerant, be sure to evacuate air and moisture thoroughly from the system.

1. Connect the gauge manifold.
  - High-pressure valve (HI) — Discharge-side.
  - Low-pressure valve (LOW) — Suction-side.
2. Discharge and recover the refrigerant.
3. Connect the center hose of the gauge manifold set to the vacuum pump inlet.
4. Operate the vacuum pump, open shutoff valve and then open both hand valves.
5. When the low-pressure gauge indicates approximately 750 mmHg (30 inHg), continue the evacuation for 5 minutes or more.
6. Close both hand valves and stop the vacuum pump.
7. Check to ensure that the pressure does not change after 10 minutes or more.
  - If the pressure changes, check the system for leaks.
  - If leaks occur, retighten the refrigerant line connections and repeat the evacuation steps.

8. If no leaks are found, again operate the vacuum pump for 20 minutes or more. After confirming that the gauge manifold pressure is at 750 mmHg (30 inHg), close both hand valves.

9. Close positive shutoff valve. Stop the vacuum pump and disconnect the center hose from the vacuum pump.

## Charging The Refrigerant System

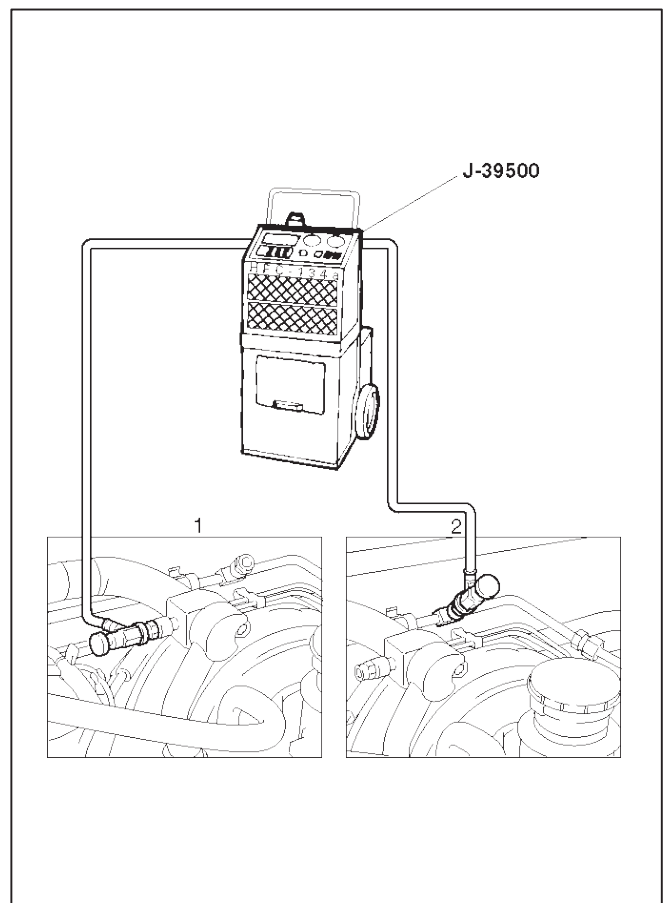
There are various methods of charging refrigerant into the air conditioning system.

These include using J-39500 (ACR<sup>4</sup>:HFC-134a Refrigerant Recovery/Recycling/Recharging/System) or equivalent and direct charging with a weight scale charging station.

### Charging Procedure

#### • ACR<sup>4</sup>(or equivalent) Method

For the charging of refrigerant recovered by ACR<sup>4</sup>(or equivalent), follow the manufacturer's instruction.



901R100022

### Legend

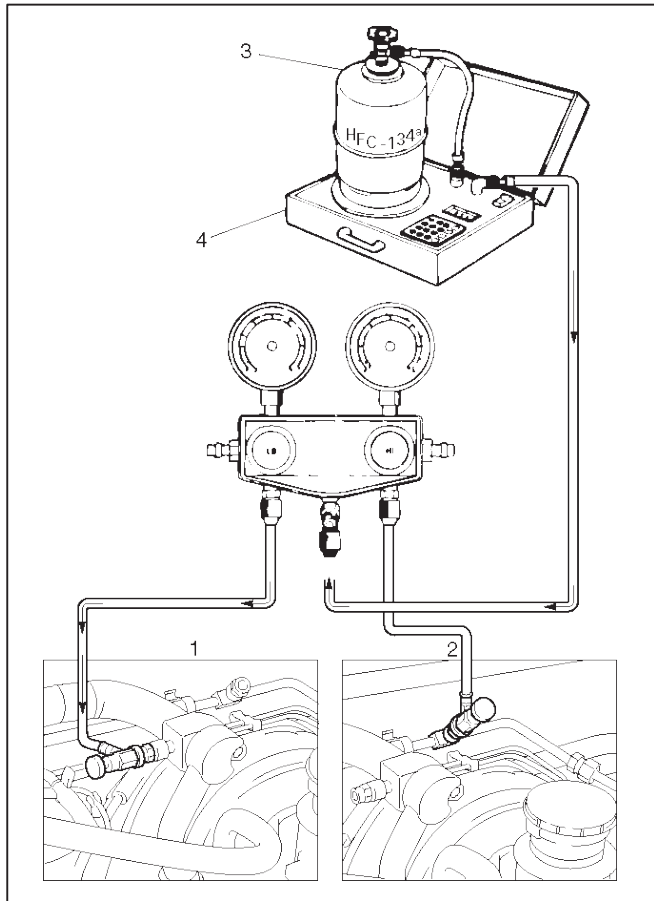
- (1) Low Side
- (2) High Side

#### • Direct charging with a weight scale charging station method

1. Make sure the evacuation process is correctly completed.
2. Connect the center hose of the manifold gauge to the weight scale.

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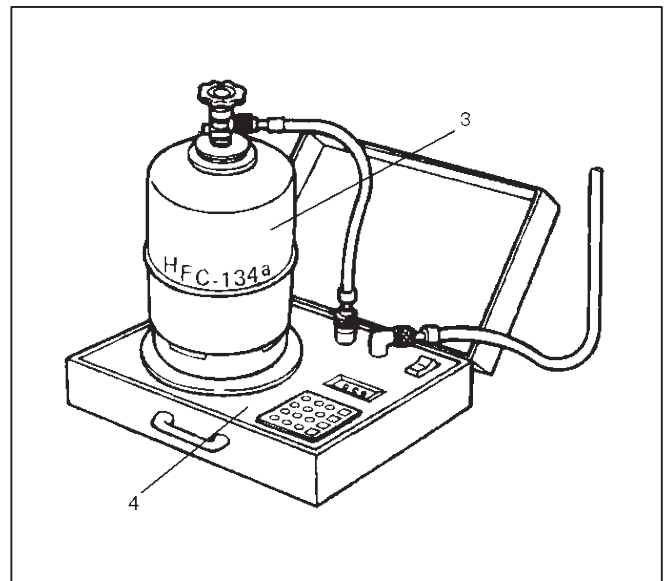
3. Connect the low pressure charging hose of the manifold gauge to the low pressure side service valve of the vehicle.
4. Connect the high pressure charging hose of the manifold gauge to the high pressure side service valve of the vehicle.



### Legend

- (1) Low Side
- (2) High Side
- (3) Refrigerant Container
- (4) Weight Scale

5. Place the refrigerant container(3) up right on a weight scale(4).  
Note the total weight before charging the refrigerant.
  - a. Open the refrigerant container valve.
  - b. Open the low side valve on the manifold gauge set. Refer to the manufacturer's instructions for a weight scale charging station.



6. Perform a system leak test:

- Charge the system with approximately 200 g (0.44 lbs) of HFC-134a.
- Make sure the high pressure valve of the manifold gauge is closed.
- Check to ensure that the degree of pressure does not change.
- Check for refrigerant leaks by using a HFC-134a leak detector.
- If a leak occurs, recover the refrigerant. Repair the leak and start all over again from the first step of evacuation.

7. If no leaks are found, continue charging refrigerant to the air conditioning system.

- Charge the refrigerant until the scale reading decreases by the amount of the charge specified.

### Specified amount: 650 g (1.43 lbs)

- If charging the system becomes difficult:

1. Run the engine at idle and close all the vehicle doors.
2. Turn A/C switch "ON".
3. Set the fan switch to its highest position.
4. Set the air source selector lever to "CIRC".
5. Slowly open the low side valve on the manifold gauge set.

**WARNING: BE ABSOLUTELY SURE NOT TO OPEN THE HIGH PRESSURE VALVE OF THE MANIFOLD GAUGE. SHOULD THE HIGH PRESSURE VALVE BE OPENED, THE HIGH PRESSURE REFRIGERANT WOULD FLOW BACKWARD, AND THIS MAY CAUSE THE REFRIGERANT CONTAINER TO BURST.**

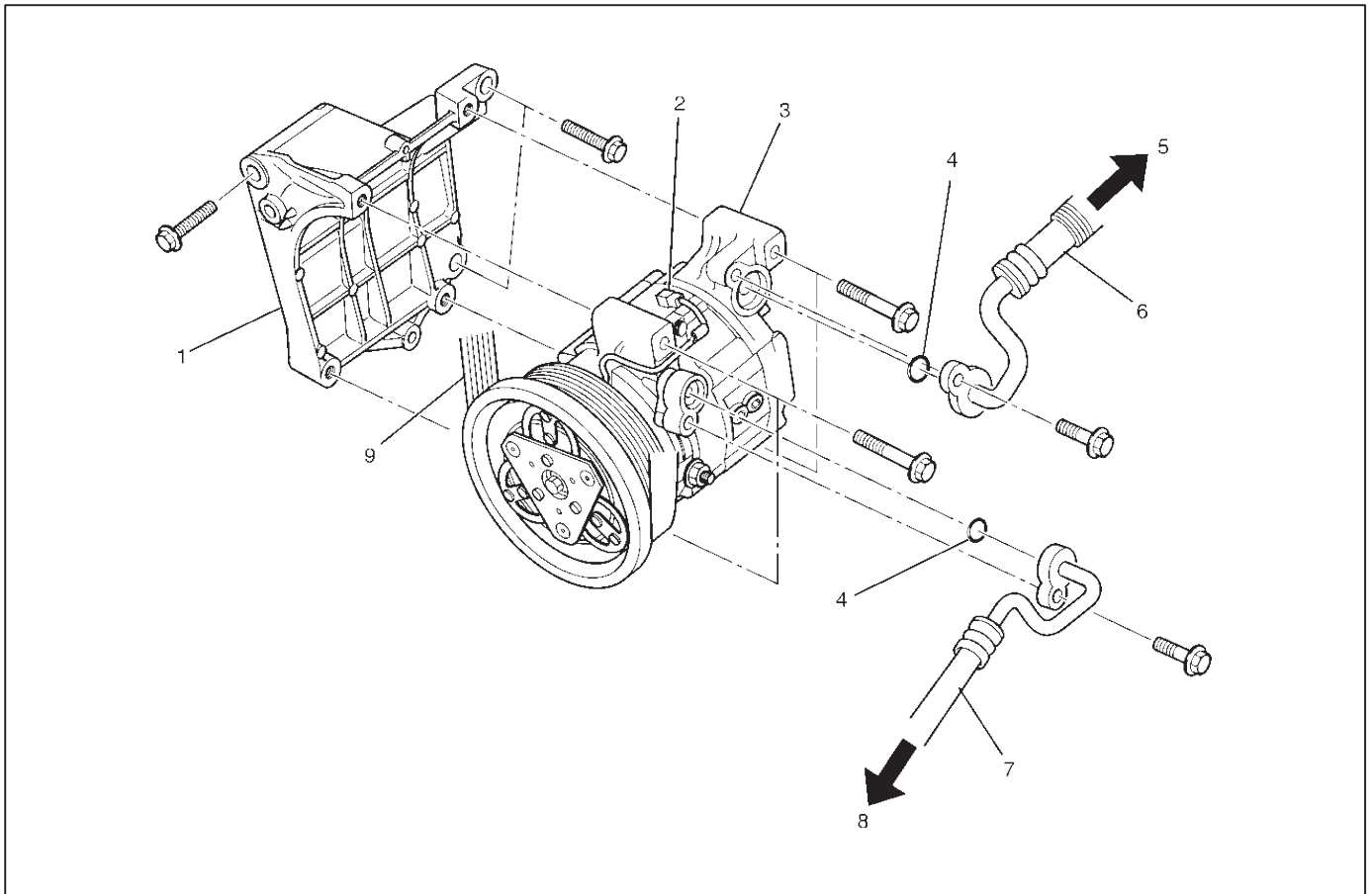
8. When finished with the refrigerant charging, close the low pressure valve of the manifold gauge and container valve.
9. Check for refrigerant leaks.

### Checking The A/C System

1. Run the engine and close all the vehicle doors.
2. Turn A/C switch "ON", set the fan switch to its highest position.
3. Set the air source lever to "CIRC", set the temperature lever to the full cool position.
4. Check the high and low pressure of the manifold gauge.
  - Immediately after charging refrigerant, both high and low pressures might be slightly high, but they settle down to the pressure guidelines shown below:
  - The ambient temperature should be between 25–30°C (77–86°F).
  - The pressure guideline for the high-pressure side is approximately 1372.9–1863.3 kPa (199.1–270.2 psi).
  - The pressure guideline for the low-pressure side is approximately 147.1–294.2 kPa (21.3–42.7 psi).
  - If an abnormal pressure is found, refer to Checking The Refrigerant System With Manifold Gauge in this section.
5. Put your hand in front of the air outlet and move the temperature control lever of the control panel to different positions. Check if the outlet temperature changes as selected by the control knob.

## Compressor Assembly

### Compressor Assembly and Associated Parts (6VD1)



852R100002

#### Legend

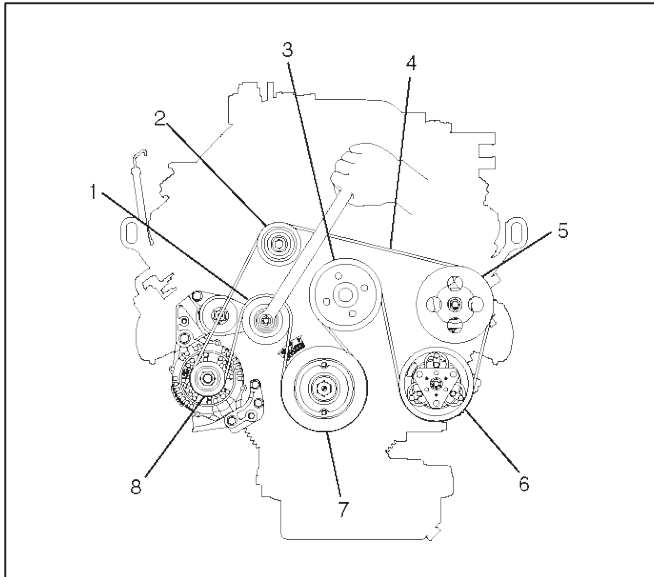
- |                                       |                                         |
|---------------------------------------|-----------------------------------------|
| (1) Compressor Bracket                | (5) To Evaporator                       |
| (2) Magnetic Clutch Harness Connector | (6) Suction Line (Low-Pressure Hose)    |
| (3) Compressor                        | (7) Discharge Line (High-Pressure Hose) |
| (4) O-ring                            | (8) To Condenser                        |
|                                       | (9) Serpentine Belt                     |

## Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant
  - Refer to Refrigerant Recovery in this section.
3. Disconnect magnetic clutch harness connector.

## 4. Remove serpentine belt.

- Move serpentine belt tensioner to loose side using wrench then remove serpentine belt.



850RY00005

**Legend**

- (1) Auto Tensioner
- (2) Idle Pulley
- (3) Cooling Fan Pulley
- (4) Serpentine Belt
- (5) Power Steering Oil Pump
- (6) Air Conditioner Compressor
- (7) Crankshaft Pulley
- (8) Generator

## 5. Disconnect refrigerant line connector.

- When removing the line connector, the connecting part should immediately be plugged or capped to prevent foreign matter from being mixed into the line.

## 6. Remove compressor.

**Installation**

## 1. Install compressor.

- Tighten the compressor fixing bolts to the specified torque.

**Torque: 19 N•m (14 lb•ft)**

## 2. Connect refrigerant line connector.

- Tighten the refrigerant line connector fixing bolts to the specified torque.

**Torque: 15 N•m (11 lb•ft)**

- O-rings cannot be reused. Always replace with new ones.
- Be sure to apply new compressor oil to the O-rings when connecting refrigerant lines.

## 3. Install serpentine belt.

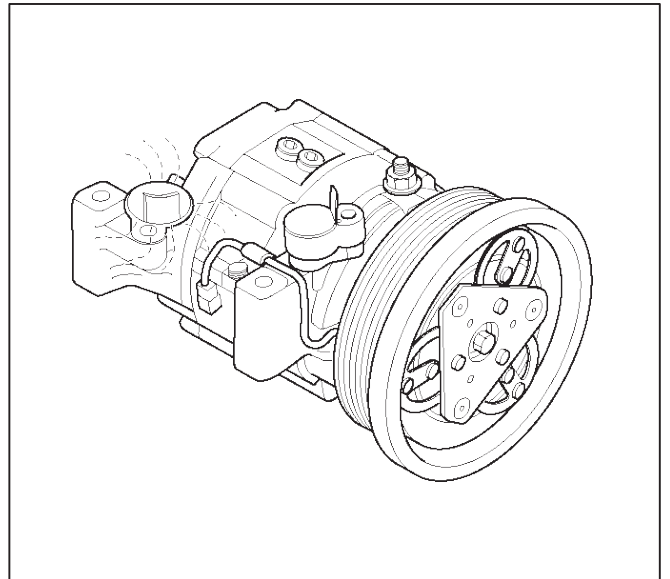
- Move serpentine belt tensioner to loose side using wrench, then install serpentine belt to normal position.

## 4. Connect magnetic clutch harness connector.

**New Compressor Installation**

The new compressor is filled with 150cc (5.0fl.oz.) of compressor oil and nitrogen gas. When mounting the compressor on the vehicle, perform the following steps;

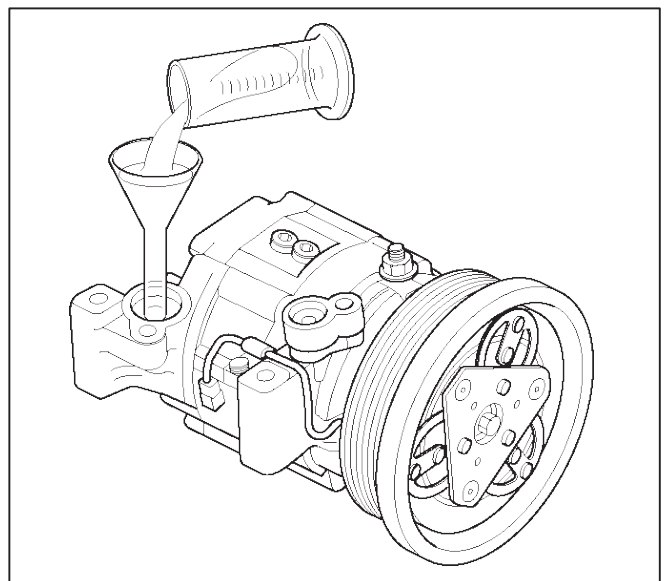
1. Gently release nitrogen gas from the new compressor.
  - Take care not to let the compressor oil flow out.
  - Inspect O-rings and replace if necessary.



871RX033

2. Turn the compressor several times by hand and release the compressor oil in the rotor.

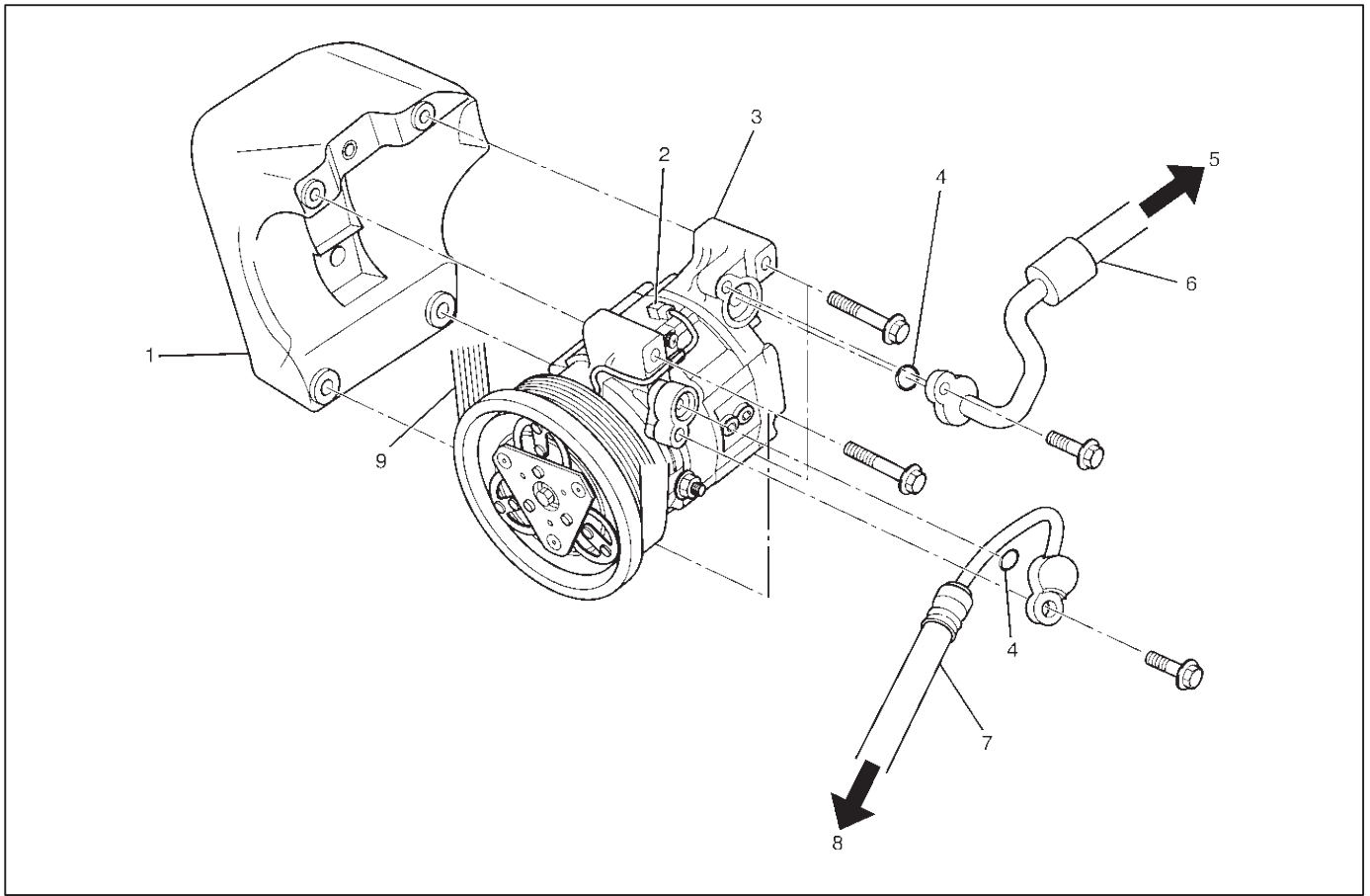
3. When installing on a new system, the compressor should be installed as it is. When installing on a used system, the compressor should be installed after adjusting the amount of compressor oil. (Refer to Compressor in this section)



871RX035

## Compressor Assembly

### Compressor Assembly and Associated Parts (X22SE)



#### Legend

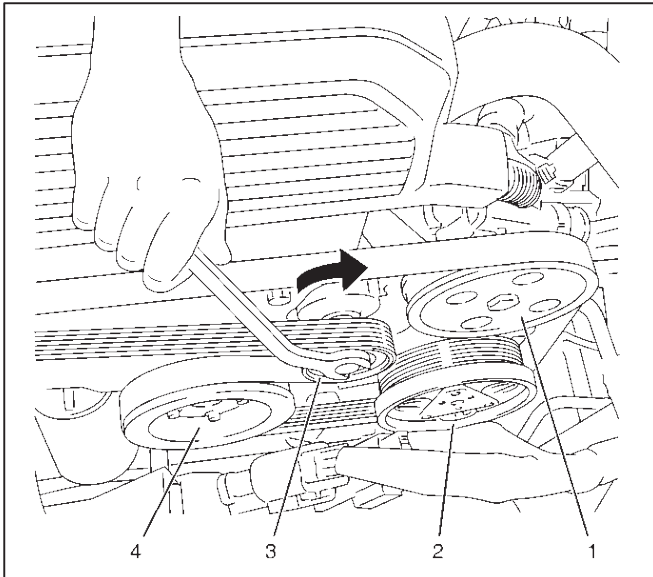
- |                                       |                                         |
|---------------------------------------|-----------------------------------------|
| (1) Compressor Bracket                | (5) To Evaporator                       |
| (2) Magnetic Clutch Harness Connector | (6) Suction Line (Low-Pressure Hose)    |
| (3) Compressor                        | (7) Discharge Line (High-Pressure Hose) |
| (4) O-ring                            | (8) To Condenser                        |
|                                       | (9) Serpentine Belt                     |

### Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant
  - Refer to Refrigerant Recovery in this section.
3. Disconnect magnetic clutch harness connector.

## 4. Remove serpentine belt.

- Move serpentine belt tensioner to loose side using wrench then remove serpentine belt.



850R100001

**Legend**

- (1) Power Steering Oil Pump
- (2) Air Conditioner Compressor
- (3) Tensioner
- (4) Crankshaft Pulley

## 5. Disconnect refrigerant line connector.

- When removing the line connector, the connecting part should immediately be plugged or capped to prevent foreign matter from being mixed into the line.

## 6. Remove compressor.

**Installation**

## 1. Install compressor.

- Tighten the compressor fixing bolts to the specified torque.

**Torque: 19 N•m (14 lb•ft)**

## 2. Connect refrigerant line connector.

- Tighten the refrigerant line connector fixing bolts to the specified torque.

**Torque: 15 N•m (11 lb•ft)**

- O-rings cannot be reused. Always replace with new ones.
- Be sure to apply new compressor oil to the O-rings when connecting refrigerant lines.

## 3. Install serpentine belt.

- Move serpentine belt tensioner to loose side using wrench, then install serpentine belt to normal position.

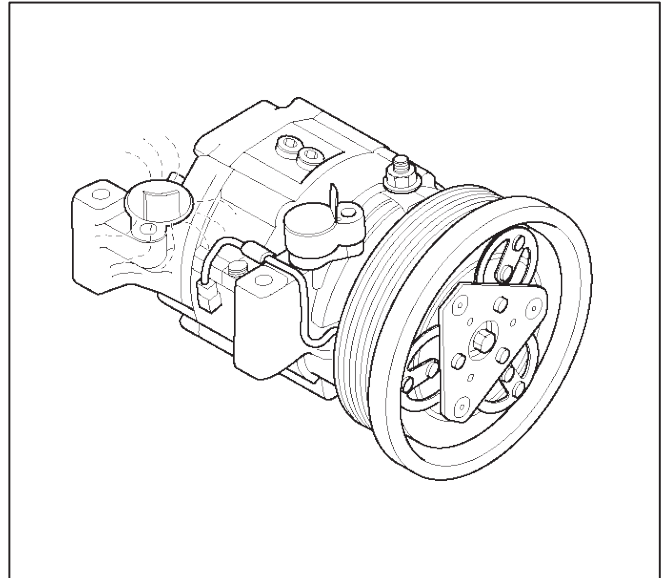
## 4. Connect magnetic clutch harness connector.

**New Compressor Installation**

The new compressor is filled with 150cc (5.0fl.oz.) of compressor oil and nitrogen gas. When mounting the compressor on the vehicle, perform the following steps;

## 1. Gently release nitrogen gas from the new compressor.

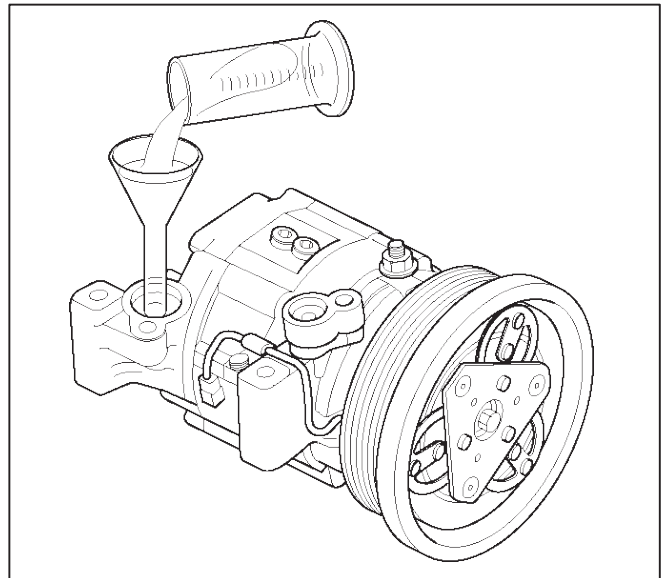
- Take care not to let the compressor oil flow out.
- Inspect O-rings and replace if necessary.



871RX033

## 2. Turn the compressor several times by hand and release the compressor oil in the rotor.

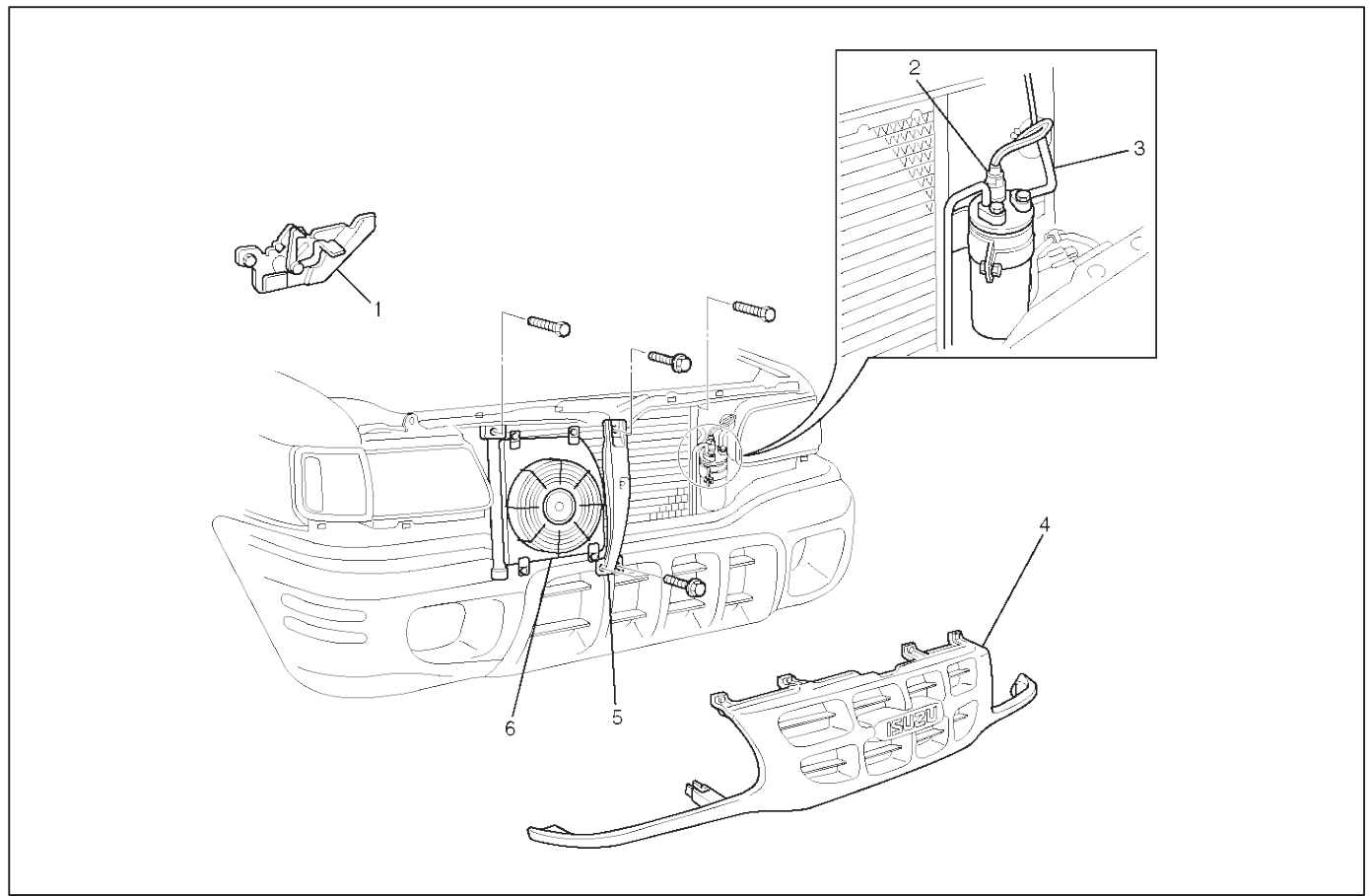
## 3. When installing on a new system, the compressor should be installed as it is. When installing on a used system, the compressor should be installed after adjusting the amount of compressor oil. (Refer to Compressor in this section)



871RX035

## Condenser Assembly

### Condenser Assembly and Associated Parts



875RY00008

#### Legend

- |                               |                                |
|-------------------------------|--------------------------------|
| (1) Engine Hood Lock          | (4) Radiator Grille            |
| (2) Pressure Switch Connector | (5) Engine Hood Front End Stay |
| (3) Refrigerant Line          | (6) Condenser Assembly         |

### Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
  - Refer to Refrigerant Recovery in this section.
3. Remove radiator grille.
4. Remove engine hood front end stay.
5. Remove engine hood lock.
  - Apply setting mark to the engine hood lock fixing position before removing it.
6. Disconnect pressure switch connector.
7. Disconnect refrigerant line.
  - When removing the line connector, the connecting part should immediately be plugged or capped to prevent foreign matter from being mixed into the line.
8. Remove condenser assembly.
  - Handle with care to prevent damaging the condenser or radiator fin.

### Installation

1. Install condenser assembly.
  - If installing a new condenser, be sure to add 30cc (1.0 fl. oz.) of new compressor oil to a new one.
  - Tighten the condenser fixing bolts to the specified torque.

**Torque: 6 N•m (52 lb in)**
2. Connect refrigerant line.
  - Tighten the inlet line connector fixing bolt to the specified torque.

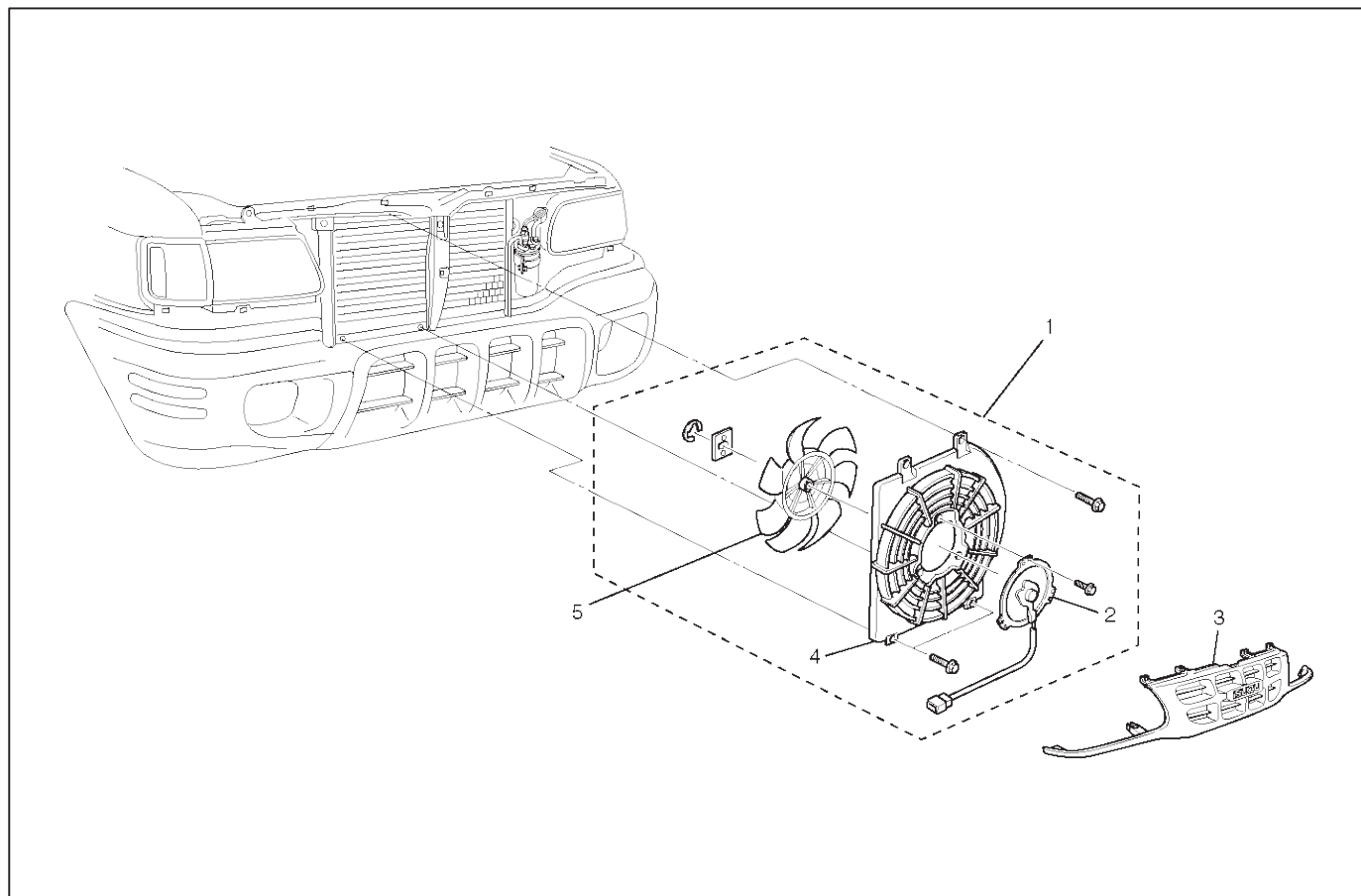
**Torque: 15 N•m (11 lb ft)**
- Tighten the outlet line connector fixing bolt to the specified torque.

**Torque: 6 N•m (52 lb in)**- O-rings cannot be reused. Always replace with new ones.

- Be sure to apply new compressor oil to the O-rings when connecting the refrigerant line.
3. Connect pressure switch connector.
  4. Install engine hood lock.
  5. Install engine hood front end stay.
  6. Install radiator grille.

## Condenser Fan Motor

### Condenser Fan Motor and Associated Parts



875RY00007

#### Legend

- |                            |                     |
|----------------------------|---------------------|
| (1) Condenser Fan Assembly | (3) Radiator Grille |
| (2) Condenser Fan Motor    | (4) Shroud          |
|                            | (5) Fan             |

### Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
  - Refer to Refrigerant Recovery in this section.
3. Remove radiator grille.
4. Remove condenser fan assembly.
  - Disconnect the fan motor connector and remove the 4 fixing bolts.
5. Remove shroud.
  - Remove the 3 fixing nuts.
  - Loosen the condenser fixing nut and disconnect the fan motor connector from bracket.
6. Remove fan.
  - Remove the fan fixing C-ring and plate.
7. Remove condenser fan motor.

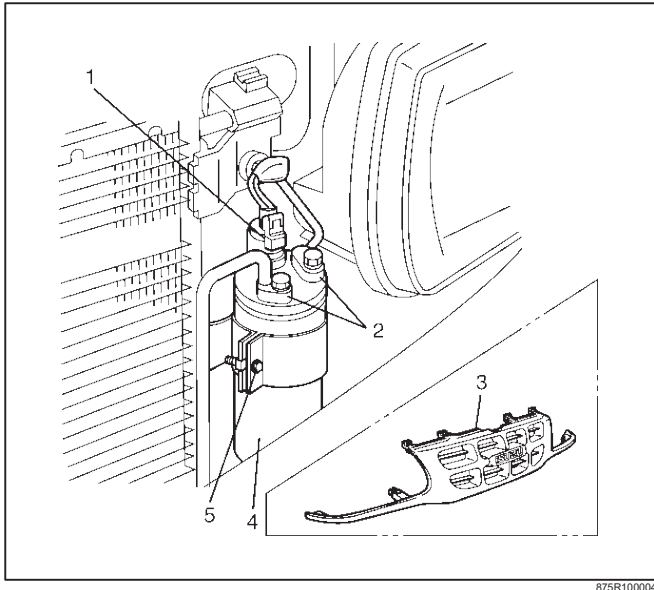
### Installation

To install, follow the removal steps in the reverse order, noting the following point.

1. Route the fan motor harness in its previous position, and fix it securely with clip and bracket.

## Receiver / Drier

### Receiver / Drier and Associated Parts



#### Legend

- (1) Pressure Switch Connector
- (2) Refrigerant Line
- (3) Radiator Grille
- (4) Receiver / Drier
- (5) Bracket Bolt

### Installation

To install, follow the removal steps in the reverse order, noting the following points:

1. If installing a new receiver/drier, be sure to add 30cc (1.0 fl. oz.) of new compressor oil to a new one.
2. Put the receiver/drier in the bracket and connect with the refrigerant line. Check that no excessive force is imposed on the line. Fasten the bracket bolt to the receiver/drier.
3. Tighten the refrigerant line to the specified torque.

**Torque: 6 N•m (52 lb in)**

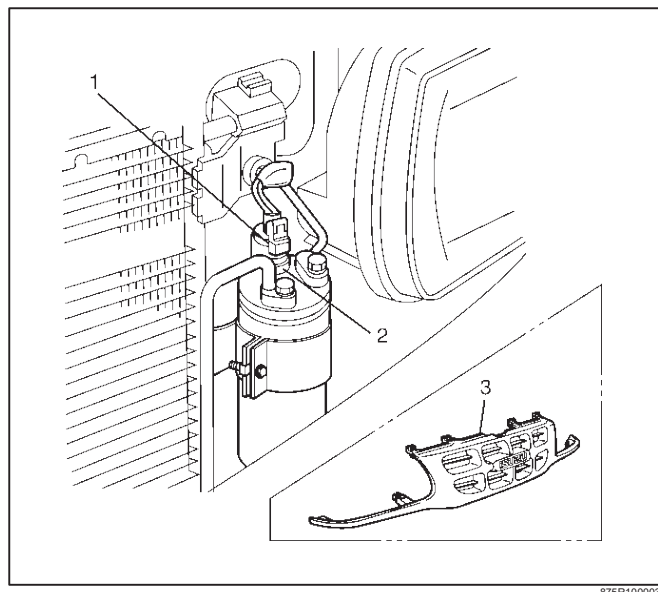
4. O-rings cannot be reused. Always replace with new ones.
5. Be sure to apply new compressor oil to the O-rings when connecting the refrigerant line.

### Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
  - Refer to Refrigerant Recovery in this section.
3. Remove radiator grille.
4. Disconnect pressure switch connector.
5. Disconnect refrigerant line.
  - When removing the line connected part, the connecting part should immediately be plugged or capped to prevent foreign matter from being mixed into the line.
6. Remove bracket bolt.
7. Remove receiver/drier.
  - Loosen the bolt, then, using care not to touch or bend the refrigerant line, carefully pull out the receiver/drier.

## Pressure Switch

### Pressure Switch and Associated Parts



#### Legend

- (1) Pressure Switch Connector
- (2) Pressure Switch
- (3) Radiator Grille

### Installation

To install, follow the removal steps in the reverse order, noting the following point:

1. O-ring cannot be reused. Always replace with a new one.
2. Be sure to apply new compressor oil to the O-ring when connecting pressure switch.
3. Tighten the pressure switch to the specified torque.

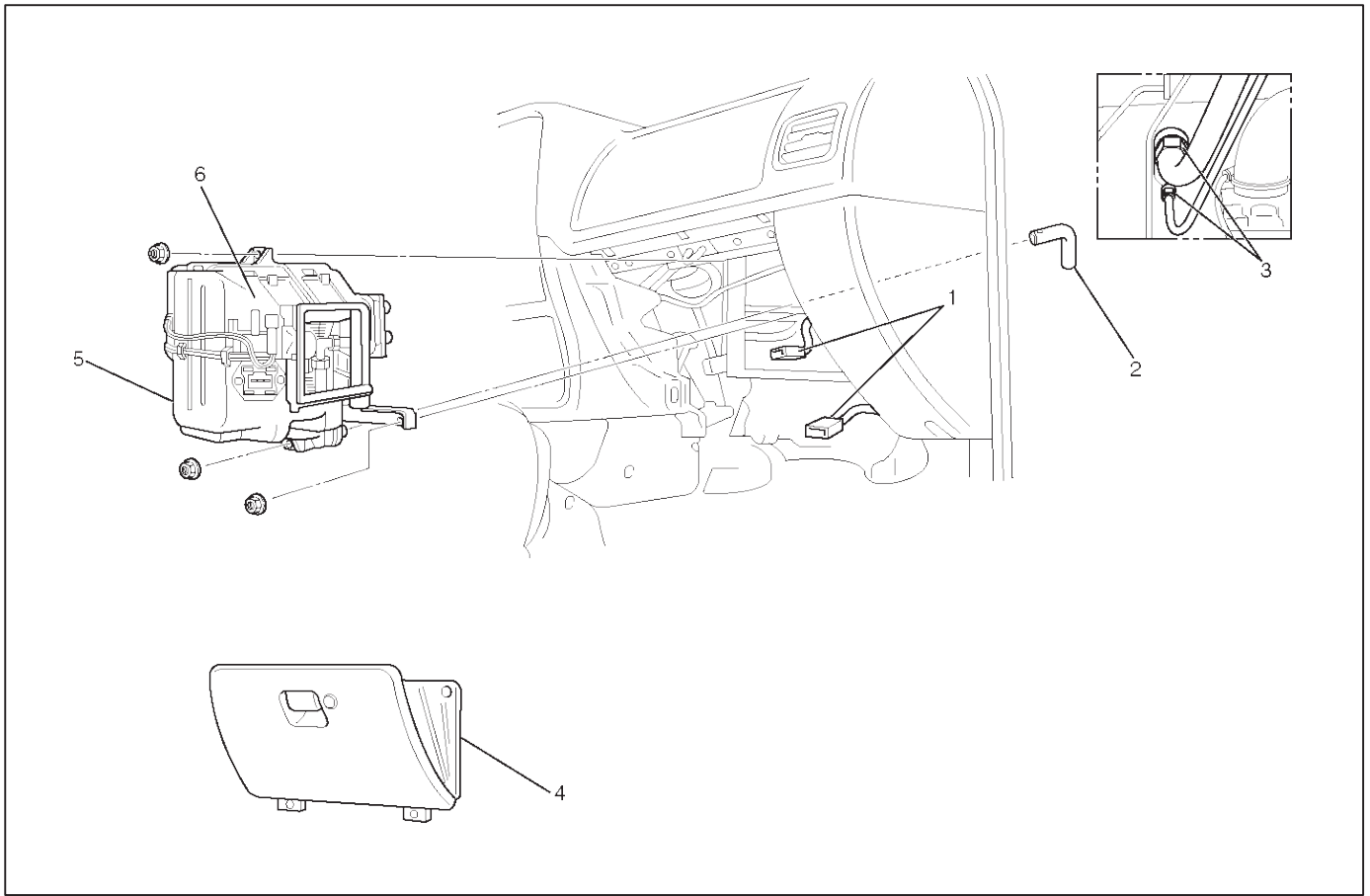
**Torque: 13 N•m (113 lb in)**

### Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
  - Refer to "Refrigerant Recovery in this section.
3. Remove radiator grille.
4. Disconnect pressure switch connector.
5. Disconnect pressure switch.
  - When removing the switch connected part, the connecting part should immediately be plugged or capped to prevent foreign matter from being mixed into the line.

## Evaporator Assembly

### Evaporator Assembly and Associated Parts



874RY00017

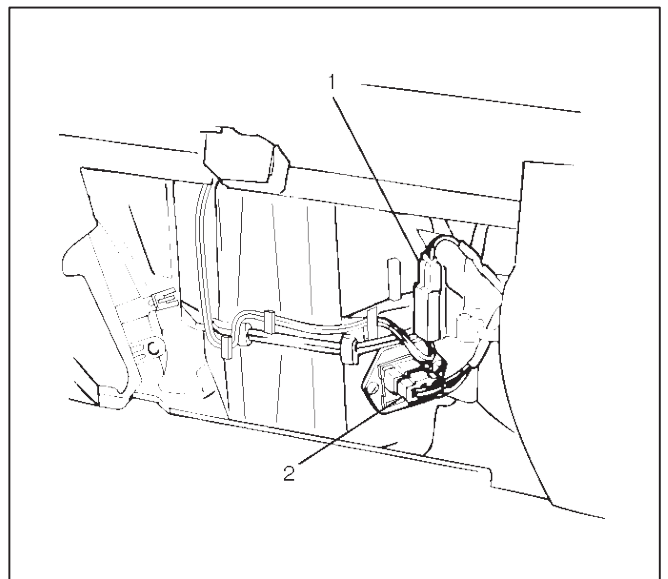
#### Legend

- (1) Resistor and Electronic Thermostat Connector
- (2) Drain Hose

- (3) Refrigerant Line
- (4) Glove Box
- (5) Evaporator Assembly

### Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
  - Refer to Refrigerant Recovery in this section.
3. Remove glove box.
4. Disconnect resistor (2) and electronic thermostat connector (1).



874RY00021

5. Disconnect drain hose.
6. Disconnect refrigerant line.
  - Use a back-up wrench when disconnecting and reconnecting the refrigerant lines.
  - When removing the refrigerant line connected part, the connecting part should immediately be plugged or capped to prevent foreign matter from being mixed into the line.
7. Remove evaporator assembly.

## Installation

To install, follow the removal steps in the reverse order, noting the following points:

1. To install a new evaporator assembly, add 50cc (1.7 fl. oz.) of new compressor oil to the new core.
2. Tighten the refrigerant outlet line to the specified torque.

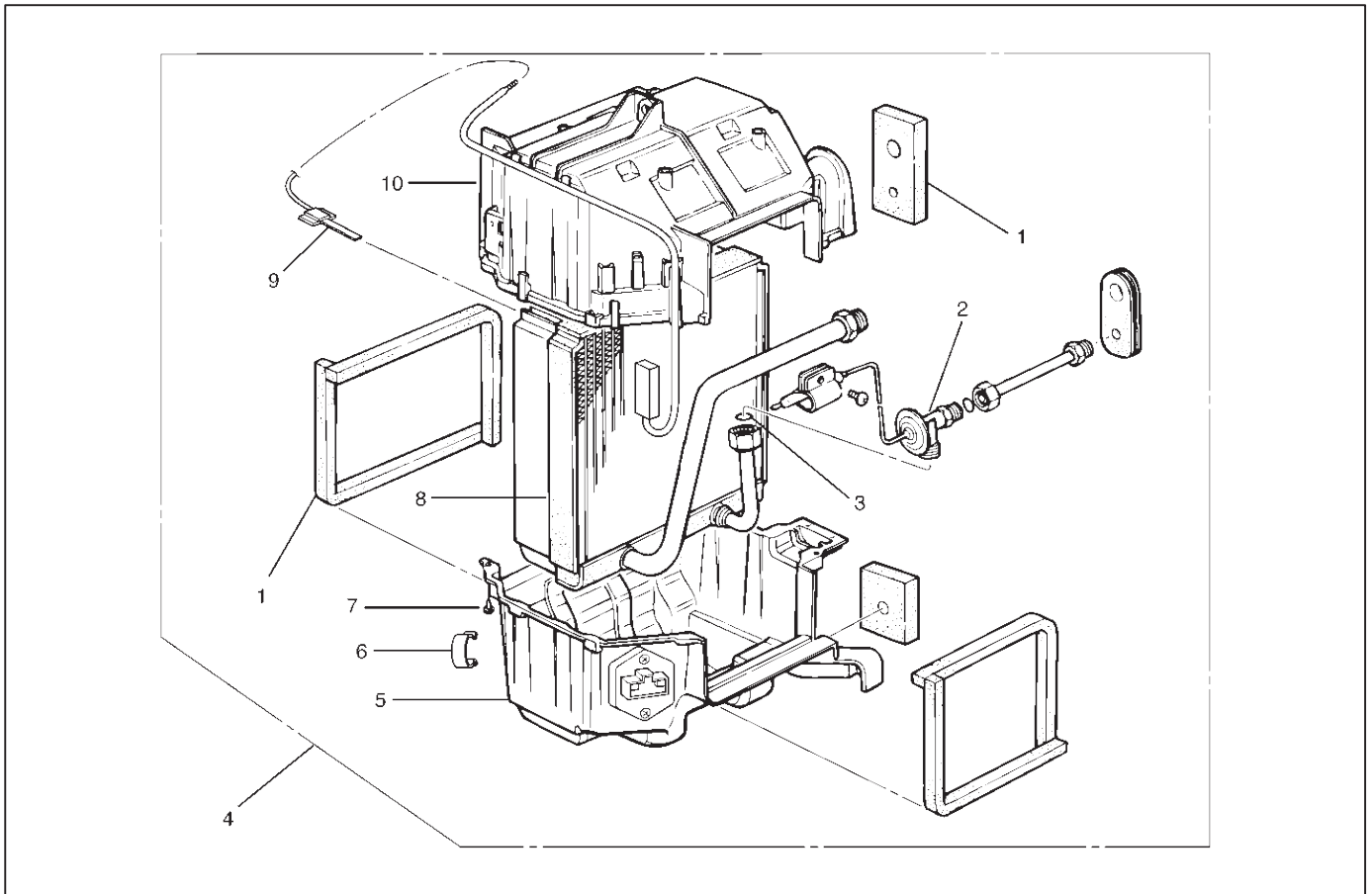
**Torque: 25 N•m (18 lb ft)**

3. Tighten the refrigerant inlet line to the specified torque.

**Torque: 15 N•m (11 lb ft)**

4. O-rings cannot be reused. Always replace with new ones.
5. Be sure to apply new compressor oil to the O-rings when connecting lines.

## Electronic Thermostat, Evaporator Core and/or Expansion Valve Disassembled View

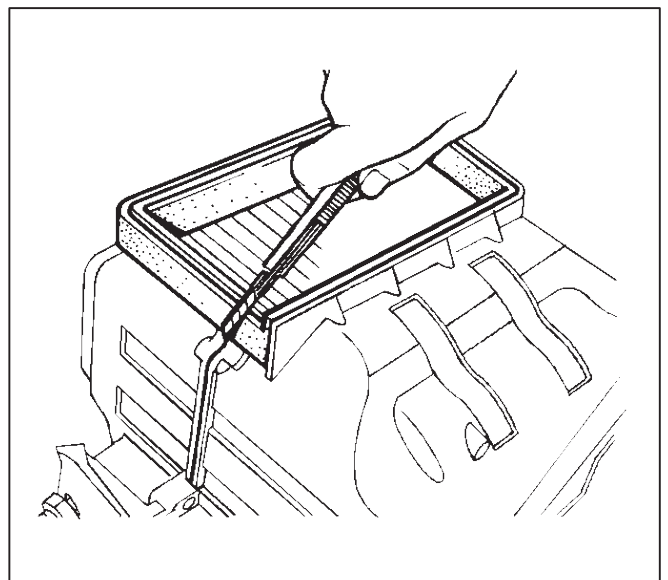


### Legend

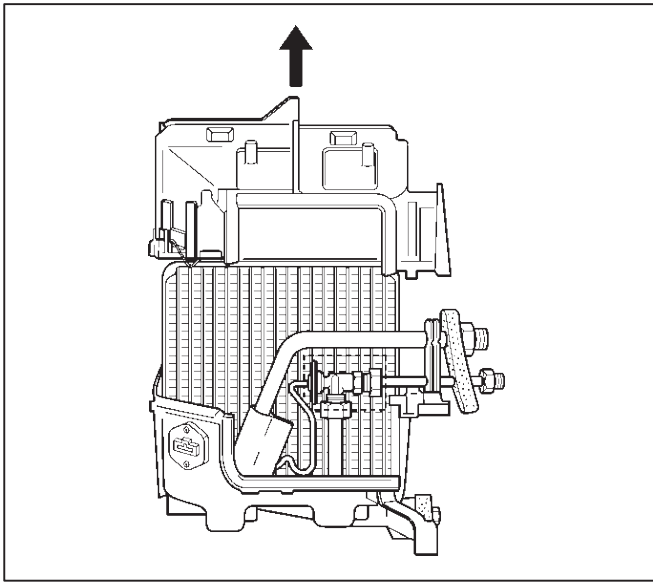
- |                         |                           |
|-------------------------|---------------------------|
| (1) Lining              | (6) Clip                  |
| (2) Expansion Valve     | (7) Attaching Screw       |
| (3) O-ring              | (8) Evaporator Core       |
| (4) Evaporator Assembly | (9) Electronic Thermostat |
| (5) Lower Case          | (10) Upper Case           |

## Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
  - Refer to Refrigerant Recovery in this section.
3. Remove evaporator assembly.
  - Refer to Evaporator Assembly in this section.
4. Remove the electronic thermostat sensor fixing clip.  
Pull the sensor from the evaporator assembly.
5. Remove clip.
6. Remove attaching screw.
7. Remove upper case.
8. Remove lower case.
  - Slit the case parting face with a knife since the lining is separated when removing the evaporator.

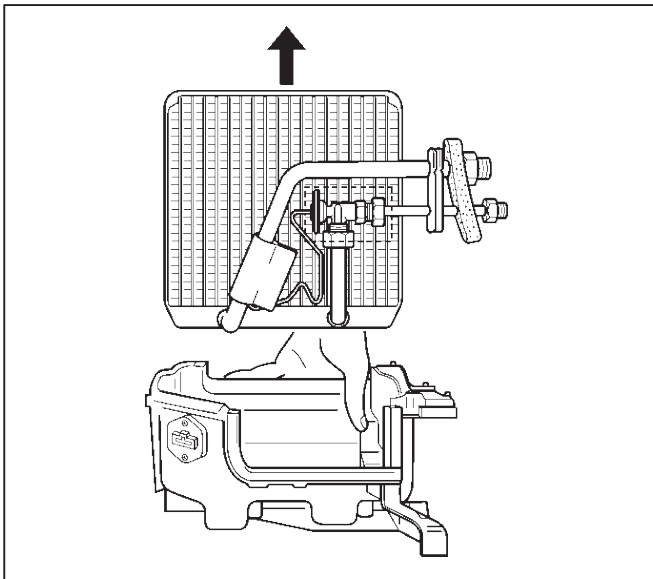


- Lift to remove the upper case.



874R100002

### 9. Remove evaporator core.



874R100001

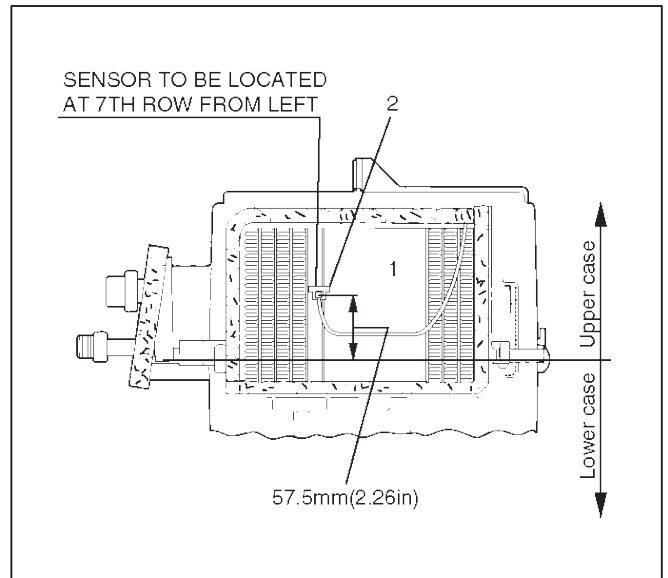
### 10. Remove expansion valve.

- Tear off the insulator carefully.
- Remove the sensor fixing clip.
- Use a back-up wrench when disconnecting all refrigerant pipes.

## Installation

To install, follow the removal steps in the reverse order, noting the following points:

1. The sensor is installed on the core with the clip.
2. The sensor must not interfere with the evaporator core.
3. When installing the new evaporator core, install the duct sensor (2) to the evaporator core (1) specified position with the clip in the illustration.

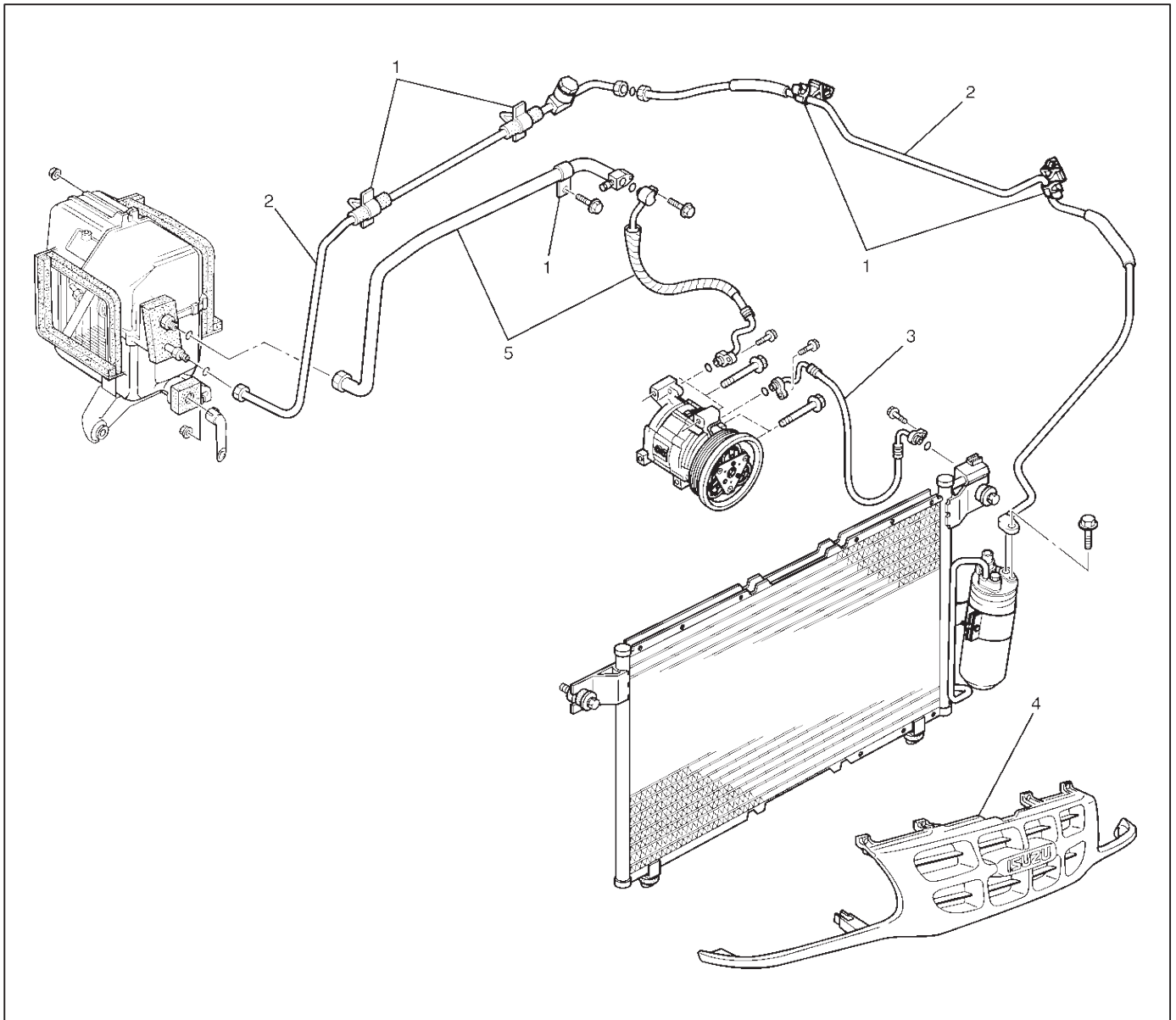


874RY00016

4. O-rings cannot be reused. Always replace with new ones.
5. Be sure to apply new compressor oil to the O-rings when connecting lines.
6. Be sure to install the sensor and the insulator on the place where they were before.
7. To install a new evaporator core, add 50cc (1.7 fl. oz.) of new compressor oil to the new core.
8. Tighten the refrigerant lines to the specified torque. Refer to Main Data and Specifications for Torque Specifications in this section.
9. Apply an adhesive to the parting face of the lining when assembling the evaporator assembly.

## Refrigerant Line

### Refrigerant Line and Associated Parts



852R100003

#### Legend

- |                                      |                                         |
|--------------------------------------|-----------------------------------------|
| (1) Clip and Clamp                   | (3) Discharge Line (High-Pressure Hose) |
| (2) Liquid Line (High-Pressure Pipe) | (4) Radiator Grille                     |
|                                      | (5) Suction Line (Low-Pressure Pipe)    |

### Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
  - Refer to Refrigerant Recovery in this section.
3. Remove radiator grille.
4. Remove clip and clamp.
5. Disconnect liquid line (High-pressure pipe).
6. Disconnect suction line (Low-pressure pipe) using a back-up wrench.
7. Disconnect suction line (Low-pressure hose) using a back-up wrench.
8. Disconnect discharge line (High-pressure hose) using a back-up wrench.
  - Use a backup wrench when disconnecting and reconnecting the refrigerant lines.
  - When removing the refrigerant line connecting part, the connecting part should immediately be plugged or capped to prevent foreign matter from being mixed into the line.

## Installation

To install, follow the removal steps in the reverse order, noting the following point:

1. O-rings cannot be reused. Always replace with new ones.
2. Be sure to apply new compressor oil to the O-rings when connecting lines.
3. Tighten the refrigerant line to the specified torque.  
Refer to Main Data and Specifications for Torque Specifications in this section.

## 1A-72 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

### Main Data And Specifications

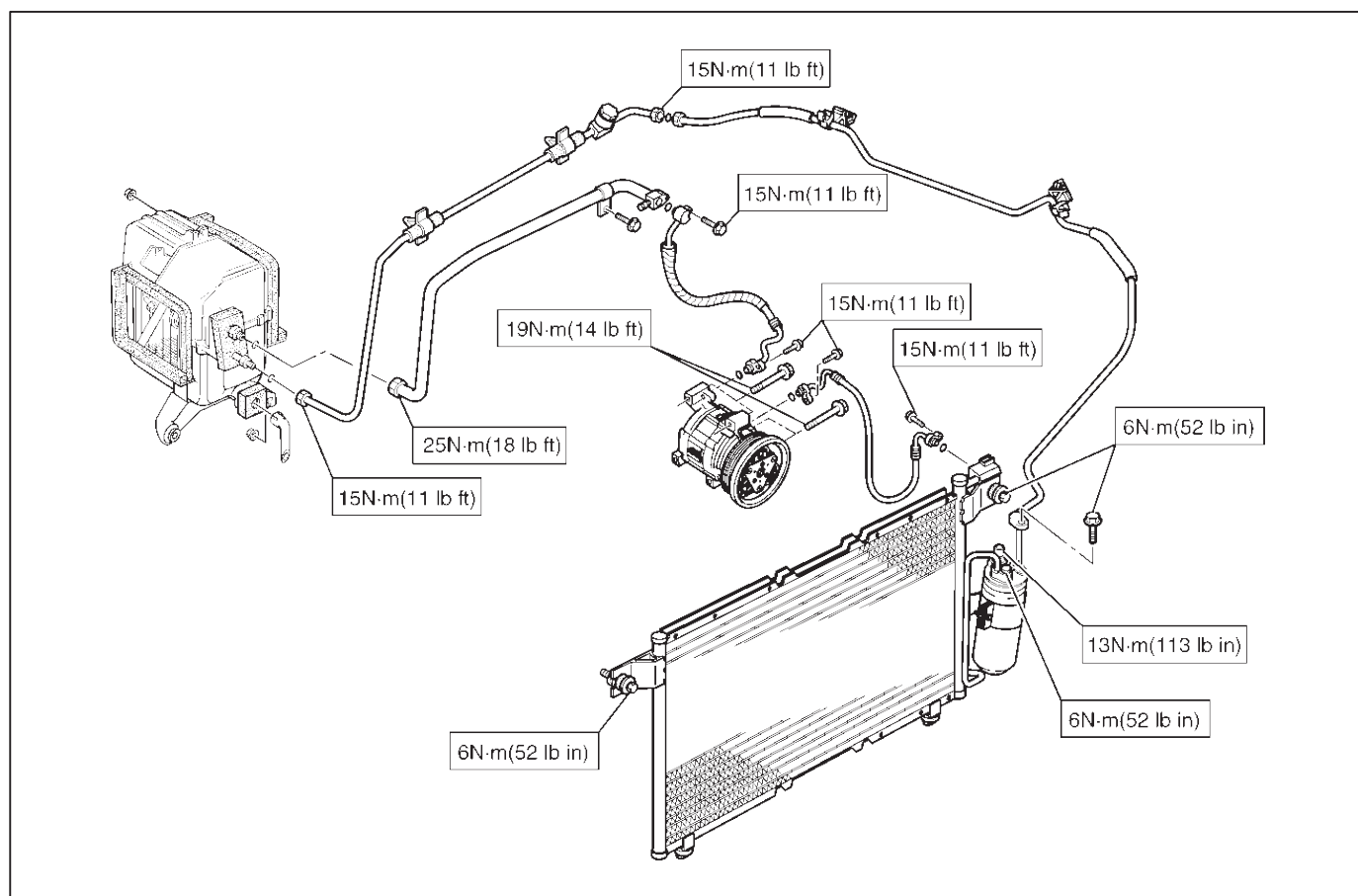
#### General Specifications

|                            |                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Heater Unit</b>         |                                                                                                           |
| Temperature control        | Reheat air mix system                                                                                     |
| Capacity                   | 4.3 kw (3700 Kcal./hr.)                                                                                   |
| Air flow                   | 280 m <sup>3</sup> /h                                                                                     |
| <b>HEATER CORE</b>         |                                                                                                           |
| Type                       | Fin and tube type                                                                                         |
| Element dimension          | 167 mm (6.6 in.) × 151 mm (5.9 in.) × 35 mm (1.4 in.)                                                     |
| Radiating area             | Approx. 2.4 m <sup>2</sup>                                                                                |
| <b>EVAPORATOR ASSEMBLY</b> |                                                                                                           |
| Capacity                   | 4.8 kw (4100 Kcal./hr.)                                                                                   |
| Air flow                   | 430 m <sup>3</sup> /hr                                                                                    |
| <b>EVAPORATOR CORE</b>     |                                                                                                           |
| Type                       | Al-laminate louver fin type                                                                               |
| Element dimension          | 235 mm (9.3 in.) × 224 mm (8.8 in.) × 60 mm (2.4 in.)                                                     |
| <b>EXPANSION VALVE</b>     |                                                                                                           |
| Type                       | External pressure equalizer type                                                                          |
| <b>THERMOSTAT SWITCH</b>   |                                                                                                           |
| Type                       | Electronic thermostat<br>OFF: Below 1.0 ± 0.5 °C (33.8 ± 0.9 °F)<br>ON: Above 2.0 ± 0.3 °C (3.6 ± 0.5 °F) |
| <b>CONDENSER</b>           |                                                                                                           |
| Type                       | Parallel flow type                                                                                        |
| Radiation performance      | 14.8 kw (12,700 Kcal./hr.)                                                                                |
| <b>RECEIVER/DRIER</b>      |                                                                                                           |
| Type                       | Assembly includes sight glass with dual (triple) pressure switch (V6) or pressure sensor (L4)             |
| Internal volume            | 300 cc (10 fl.oz.)                                                                                        |
| <b>PRESSURE SWITCH</b>     |                                                                                                           |

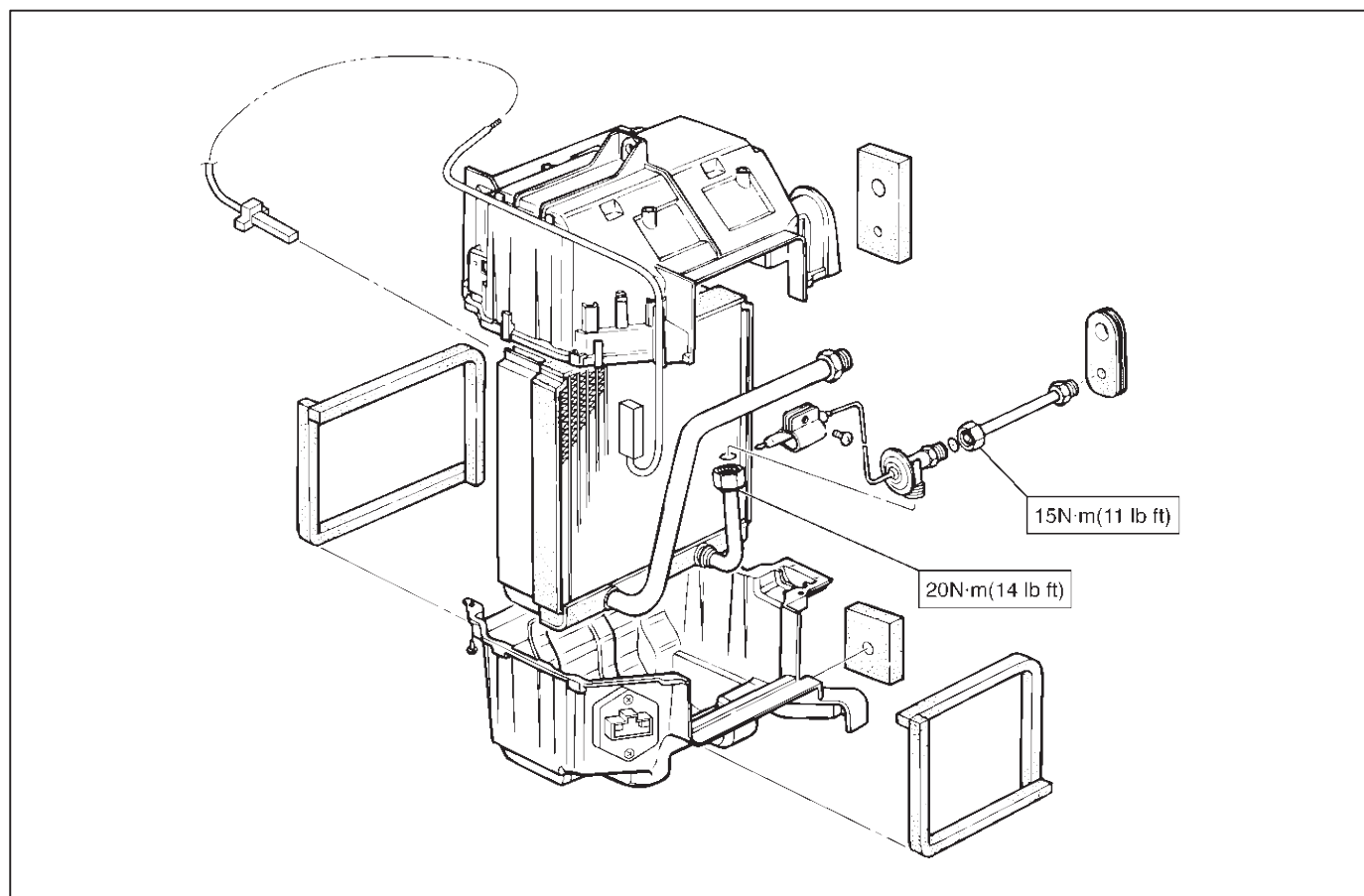
|                    |                                                                                                           |
|--------------------|-----------------------------------------------------------------------------------------------------------|
| Type               | Dual pressure switch                                                                                      |
|                    | Low pressure control<br>ON: 205.9±29.4 kPa (29.9±4.3 psi)<br>OFF: 176.5±24.5 kPa (25.6±3.6 psi)           |
|                    | High pressure control<br>ON: 2353.6±196.1 kPa (341.3±28.4 psi)<br>OFF: 2942.0±196.1 kPa (426.6±28.4 psi)  |
|                    | Triple pressure switch (V6, A/T)                                                                          |
|                    | Low pressure control<br>ON: 196.3±29.4 kPa (27.0±4.3 psi)<br>OFF: 176.5±19.6 kPa (25.6±2.8 psi)           |
|                    | Medium pressure control<br>ON: 1471.0±98.1 kPa (213.3±14.2 psi)<br>OFF: 1078.7±117.7 kPa (156.4±17.7 psi) |
|                    | High pressure control<br>ON: 2353.6±196.1 kPa (341.3±28.4 psi)<br>OFF: 2942.0±196.1 kPa (426.6±28.4 psi)  |
| <b>REFRIGERANT</b> |                                                                                                           |
| Type               | HFC-134a                                                                                                  |
| Specified amount   | 700 g (1.54 lbs.)                                                                                         |

## 1A-74 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

### Torque Specifications



852R100005



874RX006

## Compressor

### Service Precaution

**WARNING: THIS VEHICLE HAS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS). REFER TO THE SRS COMPONENT LOCATION VIEW IN ORDER TO DETERMINE WHETHER YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING. WHEN YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING, REFER TO THE SRS ON-VEHICLE SERVICE INFORMATION. FAILURE TO FOLLOW CAUTIONS COULD RESULT IN POSSIBLE AIR BAG DEPLOYMENT, PERSONAL INJURY, OR OTHERWISE UNNEEDED SRS SYSTEM REPAIRS.**

**CAUTION:** Always use the correct fastener in the proper location. When you replace a fastener, use **ONLY** the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. **UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.**

### General Description

When servicing the compressor, keep dirt or foreign material from getting on or into the compressor parts and system. Clean tools and a clean work area are important for proper service. The compressor connections and the outside of the compressor should be cleaned before any "On-Vehicle" repair, or before removal of the compressor. The parts must be kept clean at all times and any parts to be reassembled should be cleaned with Trichloroethane, naphtha, kerosene, or equivalent solvent, and dried with dry air. Use only lint free cloths to wipe parts.

The operations described below are based on bench overhaul with compressor removed from the vehicle, except as noted. They have been prepared in order of accessibility of the components. When the compressor is removed from the vehicle for servicing, the oil remaining in the compressor should be discarded and new compressor oil added to the compressor.

Compressor malfunction will appear in one of four ways: noise, seizure, leakage or low discharge pressure. Resonant compressor noises are not cause for alarm; however, irregular noise or rattles may indicate broken parts or excessive clearances due to wear. To check seizure, de-energize the magnetic clutch and check to

see if the drive plate can be rotated. If rotation is impossible, the compressor is seized. Low discharge pressure may be due to a faulty internal seal of the compressor, or a restriction in the compressor. Low discharge pressure may also be due to an insufficient refrigerant charge or a restriction elsewhere in the system. These possibilities should be checked prior to servicing the compressor. If the compressor is inoperative, but is not seized, check to see if current is being supplied to the magnetic clutch coil terminals.

The compressor oil used in the HFC-134a system compressor differs from that used in R-12 systems.

Also, compressor oil to be used varies according to the compressor model. Be sure to avoid mixing two or more different types of oil.

If the wrong oil is used, lubrication will be poor and the compressor will seize or malfunction.

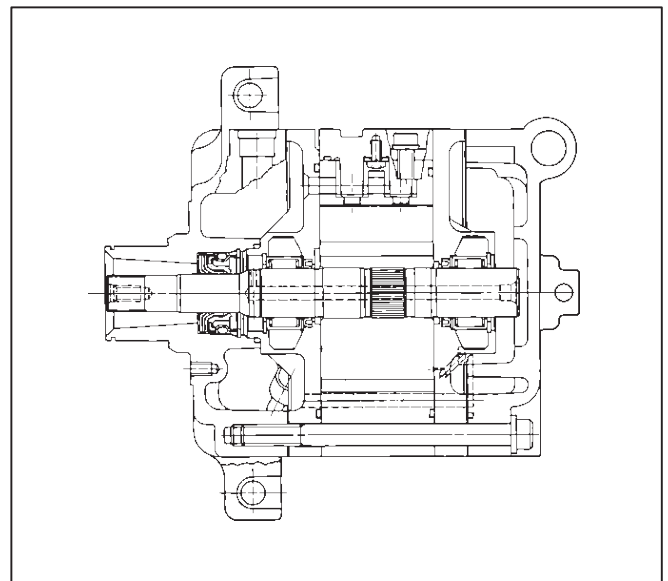
### DKV-14G Type Compressor

DKV-14G is equipped with five-vane rotary compressor. These vanes are built into a rotor which is mounted on a shaft.

When the shaft rotates, the vanes built into the cylinder block assembly are operated by centrifugal force.

This changes the volume of the space formed by the rotor and cylinder, resulting in the intake and compression of the refrigerant gas. The discharge valve and the valve stopper, which protects the discharge valve, are built into the cylinder block assembly. There is no suction valve but a shaft seal is installed between the shaft and head; a trigger valve, which applies back pressure to the vanes, is installed in the cylinder block and a refrigerant gas temperature sensor is installed in the front head.

The specified quantity of compressor oil is contained in the compressor to lubricate the various parts using the refrigerant gas discharge pressure.



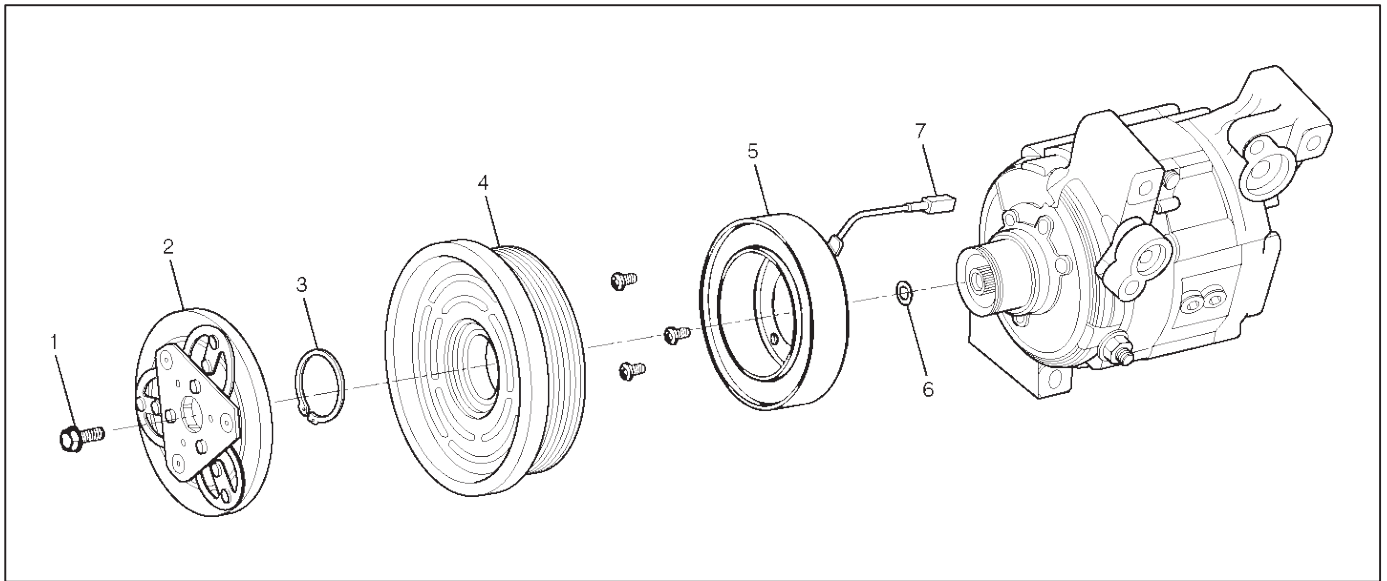
871RX002

## Diagnosis

| Condition                  | Possible cause                                        | Correction                                      |
|----------------------------|-------------------------------------------------------|-------------------------------------------------|
| Noise from compression     | Defective rotor/piston                                | Replace compressor/cylinder and shaft assembly  |
|                            | Defective shaft                                       | Replace compressor/cylinder and shaft assembly  |
| Noise from magnetic clutch | Defective bearing                                     | Replace magnetic clutch                         |
|                            | Defective clutch                                      | Replace magnetic clutch                         |
|                            | Clearance between drive plate and pulley not standard | Adjust the clearance or replace magnetic clutch |
| Insufficient cooling       | Defective gasket                                      | Replace compressor/gasket                       |
|                            | Defective rotor/reed valve                            | Replace compressor/valve plate                  |
|                            | Defective trigger valve/suction valve                 | Replace compressor/suction valve                |
| Not rotating               | Defective rotor/piston                                | Replace compressor/cylinder and shaft assembly  |
|                            | Defective shaft                                       | Replace compressor/cylinder and shaft assembly  |
|                            | Rotating parts seized due to insufficient oil         | Replace compressor                              |
| Oil and/or gas leakage     | Defective seal                                        | Replace compressor/shaft seal                   |
|                            | Defective O-ring                                      | Replace                                         |

## Magnetic Clutch Assembly (DKV-14G Type)

### Parts Location View



871RX025

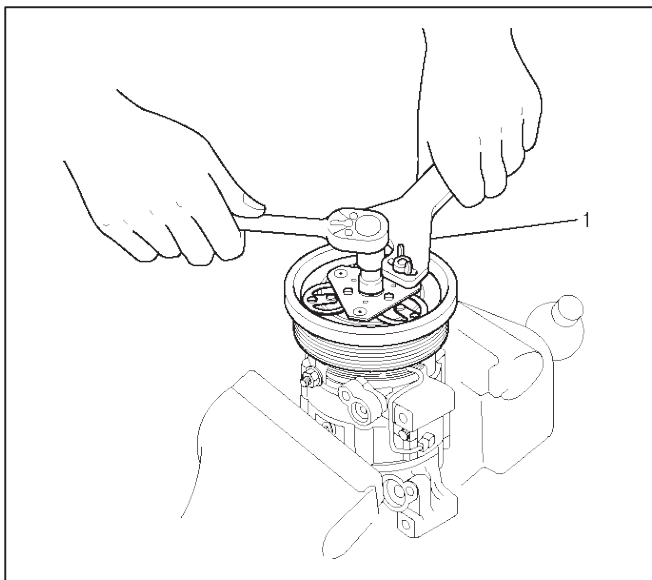
#### Legend

- (1) Drive Plate bolt
- (2) Drive Plate
- (3) Snap Ring

- (4) Pulley Assembly
- (5) Field Coil
- (6) Shim (s)
- (7) Lead Wire

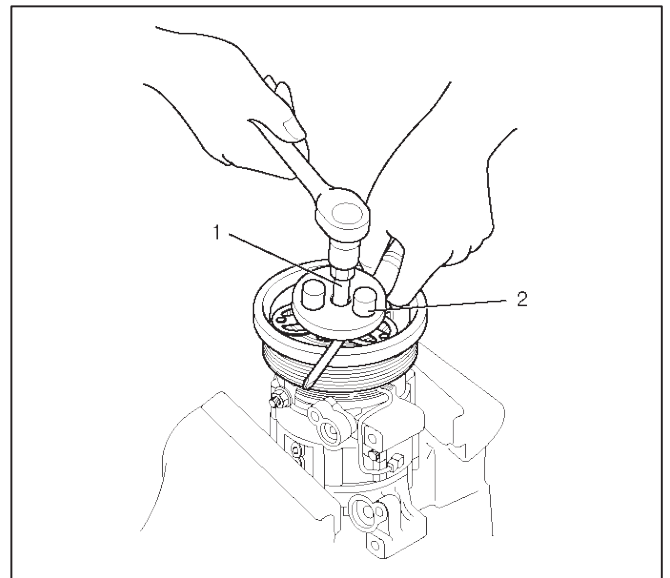
### Removal

1. Using drive plate holder J-33939 (1) to prevent the drive plate from rotating, then remove the drive plate bolt.



871RX029

2. Remove drive plate by using drive plate puller J-33944-A (2) and forcing screw J-33944-4 (1).

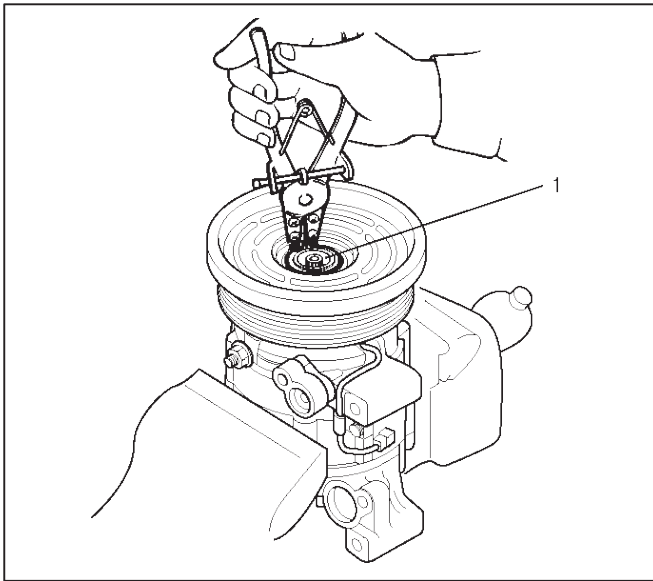


871RX023

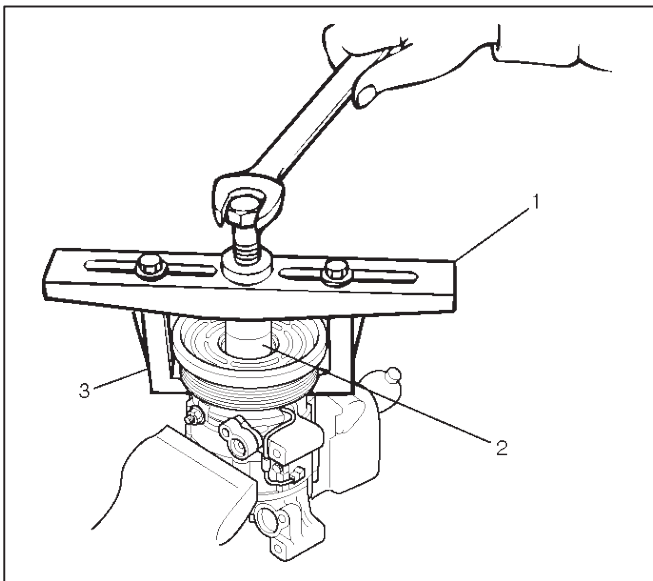
3. Remove shim (s).

## 1A-78 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

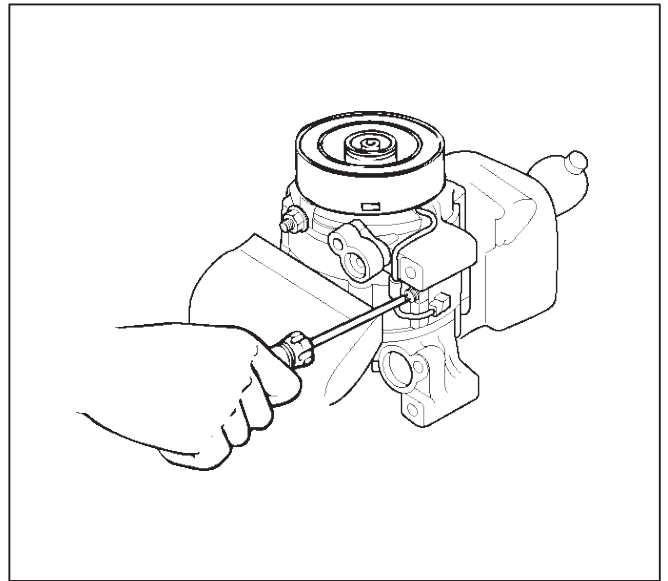
4. Remove snap ring (1) by using snap ring pliers.



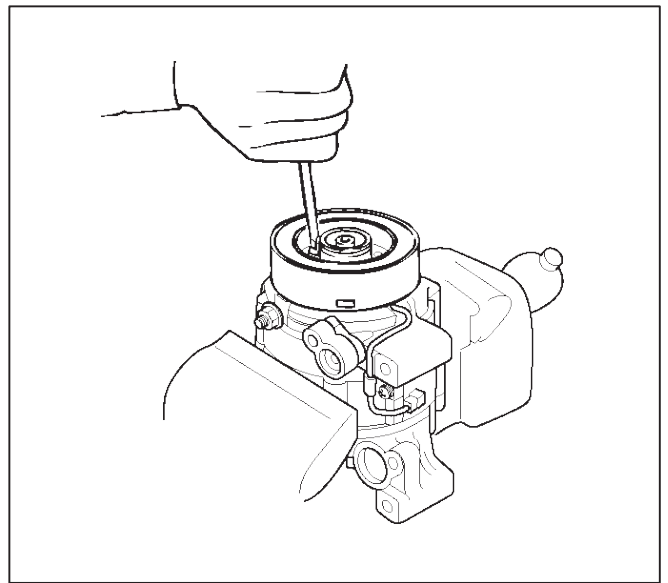
5. Remove pulley assembly by using pulley puller pilot J-38424 (2), pulley puller J-8433 (1) and pulley puller leg J-24092-2 (3).



6. Loosen screw and disconnect the field coil wire connector.



7. Loosen three screws and remove the field coil.



## Inspection and Repair

### Drive Plate

If the frictional surface shows signs of damage due to excessive heat, the drive plate and pulley should be replaced.

### Pulley Assembly

Check the appearance of the pulley assembly. If the frictional surface of the pulley shows signs of excessive grooving due to slippage, both the pulley and drive plate should be replaced. The frictional surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

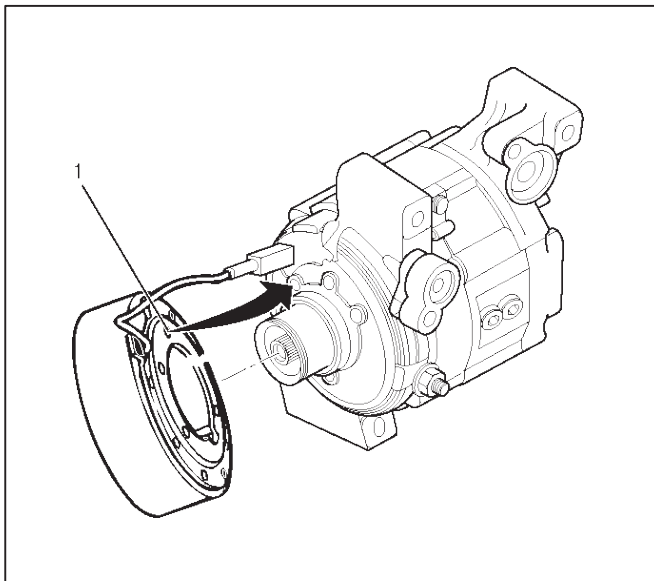
### Coil

Check coil for loose connector or cracked insulation.

## Installation

### 1. Install field coil.

- Align the located portion (1) of the field coil and compressor.



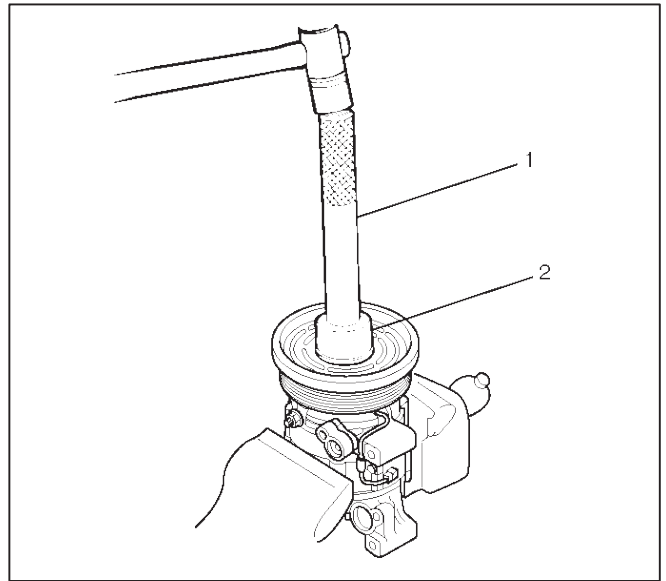
871RY00035

- Tighten the mounting screw to the specified torque.

**Torque: 5N·m (44 lb in)**

### 2. Connect the lead wire connector with the rubber hold and tighten the screw.

### 3. Install pulley assembly by using pulley installer J-33940-A (2) and drive handle J-8092 (1).

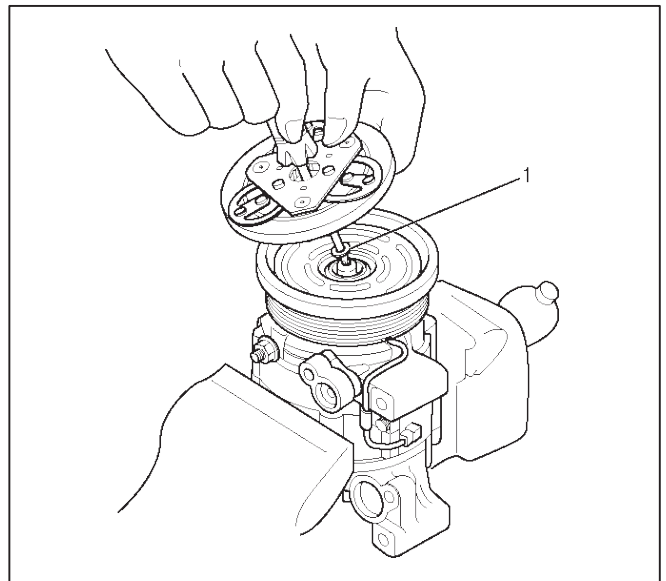


871RY00032

### 4. Install snap ring.

### 5. Install shim (s).

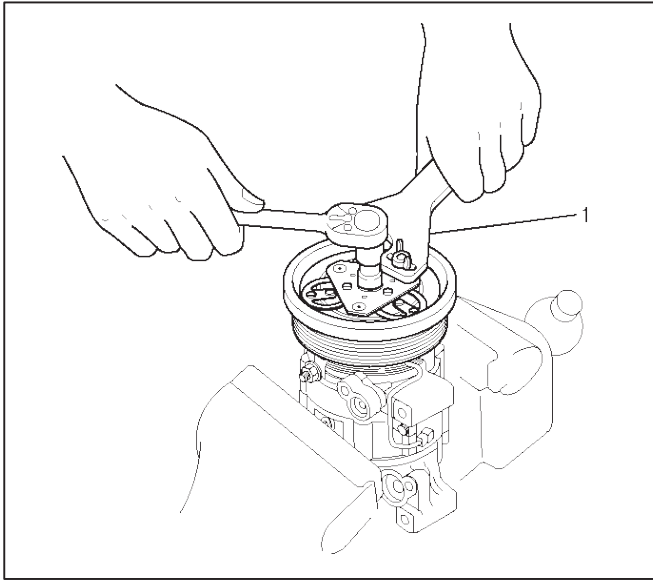
### 6. Install the drive plate to the compressor drive shaft together with the original shim(s)(1). Press the drive plate by hand.



871RY00031

## 1A-80 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

- 7. Install drive plate bolt by using drive plate holder J-33939 (1) to prevent the drive plate from rotating.



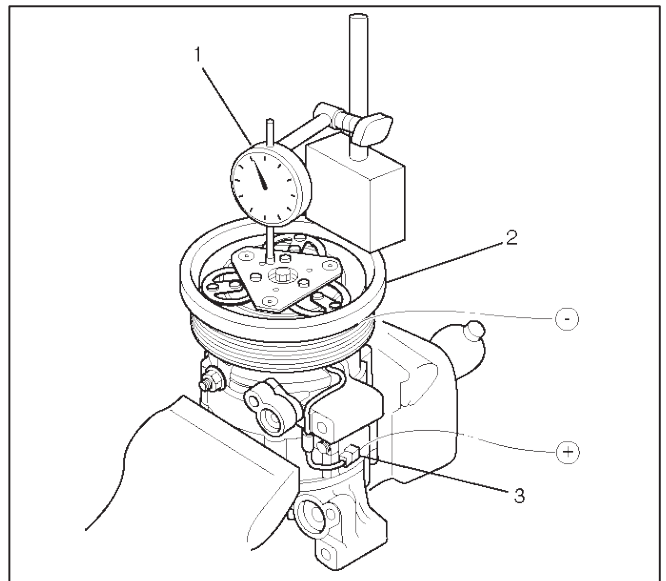
871RX029

- Tighten the drive plate bolt to the specified torque.

**Torque: 13 N·m (113 lb in)**

- After tightening the drive plate bolt, check to be sure the pulley rotates smoothly.

- Check to be sure that the clutch clearance is between 0.3-0.6 mm (0.01-0.02 in.)



871RY0028

### Legend

- (1) Dial Gauge
- (2) Pulley Assembly
- (3) Field Coil Wire Connector

- If necessary, install adjusting shim(s).
- Adjusting shims are available in the following thickness.

### Thickness

- 0.1 mm (0.0039 in.)
- 0.3 mm (0.0118 in.)
- 0.5 mm (0.0197 in.)

## Compressor Oil

### Oil Specification

- The HFC-134a system requires a synthetic (PAG) compressor oil whereas the R-12 system requires a mineral compressor oil. The two oils must never be mixed.
- Compressor (PAG) oil varies according to compressor model. Be sure to use oil specified for the model of compressor.
- **Always use HFC-134a Vane Rotary Type Compressor Oil (AIPDN Part No.2-90188-301-0)**

### Handling of Oil

- The oil should be free from moisture, dust, metal powder, etc.
- Do not mix with other oil.
- The water content in the oil increases when exposed to the air. After use, seal oil from air immediately. (HFC-134a Vane Rotary Compressor Oil absorbs moisture very easily.)
- The compressor oil must be stored in steel containers, not in plastic containers.

### Compressor Oil Check

The oil used to lubricate the compressor is circulating with the refrigerant.

Whenever replacing any component of the system or a large amount of gas leakage occurs, add oil to maintain the original amount of oil.

#### Oil Capacity

**Capacity total in system: 150cc (5.0 fl.oz)**

**Compressor (Service parts) charging amount:  
150 cc (5.0 fl.oz)**

### Checking and Adjusting Oil Quantity for Used Compressor

1. Perform oil return operation. Refer to Oil Return Operation in this section.
2. Discharge and recover refrigerant and remove the compressor.
3. Drain the compressor oil and measure the extracted oil with a measuring cylinder.
4. If the amount of oil drained is much less than 90 cc (3.0 fl. oz.), some refrigerant may have leaked out. Conduct a leak tests on the connections of each system, and if necessary, repair or replace faulty parts.
5. Check the compressor oil contamination. (Refer to Contamination of Compressor Oil in this section.)
6. Adjust the oil level following the next procedure below.

| (Charging Amount)           | (Collected Amount)       |
|-----------------------------|--------------------------|
| more than 90cc (3.0 fl.oz)  | same as collected amount |
| less than 90 cc (3.0 fl.oz) | 90cc (3.0 fl.oz)         |

7. Install the compressor, then evacuate, charge and perform the oil return operation.

8. Check system operation.

**When it is impossible to preform oil return operation, the compressor oil should be checked in the following order:**

1. Discharge and recover refrigerant and remove the compressor.
2. Drain the compressor oil and measure the extracted oil with a measuring cylinder.
3. Check the oil for contamination.
4. If more than 90 cc (3.0 fl. oz.) of oil is extracted from the compressor, supply the same amount of oil to the compressor to be installed.
5. If the amount of oil extracted is less than 90 cc (3.0 fl. oz.), recheck the compressor oil in the following order.
6. Supply 90 cc (3.0 fl. oz.) of oil to the compressor and install it onto the vehicle.
7. Evacuate and recharge with the proper amount of refrigerant.
8. Perform the oil return operation.
9. Remove the compressor and recheck the amount of oil.
10. Adjust the compressor oil, if necessary.

| (Collected Amount)          | (Charging Amount)        |
|-----------------------------|--------------------------|
| more than 90 cc (3.0 fl.oz) | same as collected amount |
| less than 90 cc (3.0 fl.oz) | 90 cc (3.0 fl.oz)        |

## Checking and Adjusting for Compressor Replacement

150 cc (5.0 fl.oz.) of oil is charged in compressor (service parts). So it is necessary to drain the proper amount of oil from the new compressor.

1. Perform oil return operation.
2. Discharge and recover the refrigerant and remove the compressor.
3. Drain the compressor oil and measure the extracted oil.
4. Check the compressor oil for contamination.
5. Adjust the oil level as required.

| (Amount of oil drained from used compressor) | (Draining amount of oil from new compressor) |
|----------------------------------------------|----------------------------------------------|
| less than 90 cc (3.0 fl.oz)                  | Same as drained amount                       |
| more than 90 cc (3.0 fl.oz)                  | 90 cc (3.0 fl.oz)                            |

6. Evacuate, charge and perform the oil return operation.
7. Check the system operation.

## Contamination of Compressor Oil

Unlike engine oil, no cleaning agent is added to the compressor oil. Even if the compressor runs for a long period of time (approximately one season), the oil never becomes contaminated as long as there is nothing wrong with the compressor or its method of use.

**Inspect the extracted oil for any of the following conditions:**

- The capacity of the oil has increased.
- The oil has changed to red.
- Foreign substances, metal powder, etc., are present in the oil.

**If any of these conditions exists, the compressor oil is contaminated. Whenever contaminated compressor oil is discovered, the receiver/drier must be replaced.**

## Oil Return Operation

There is close affinity between the oil and the refrigerant. During normal operation, part of the oil recirculates with the refrigerant in the system. When checking the amount of oil in the system, or replacing any component of the system, the compressor must be run in advance for oil return operation. The procedure is as follows:

1. Open all the doors and the engine hood.
2. Start the engine and air conditioning switch to "ON" and set the fan control knob at its highest position.
3. Run the compressor for more than 20 minutes between 800 and 1,000 rpm in order to operate the system.
4. Stop the engine.

## Replacement of Component Parts

When replacing the system component parts, supply the following amount of oil to the component parts to be installed.

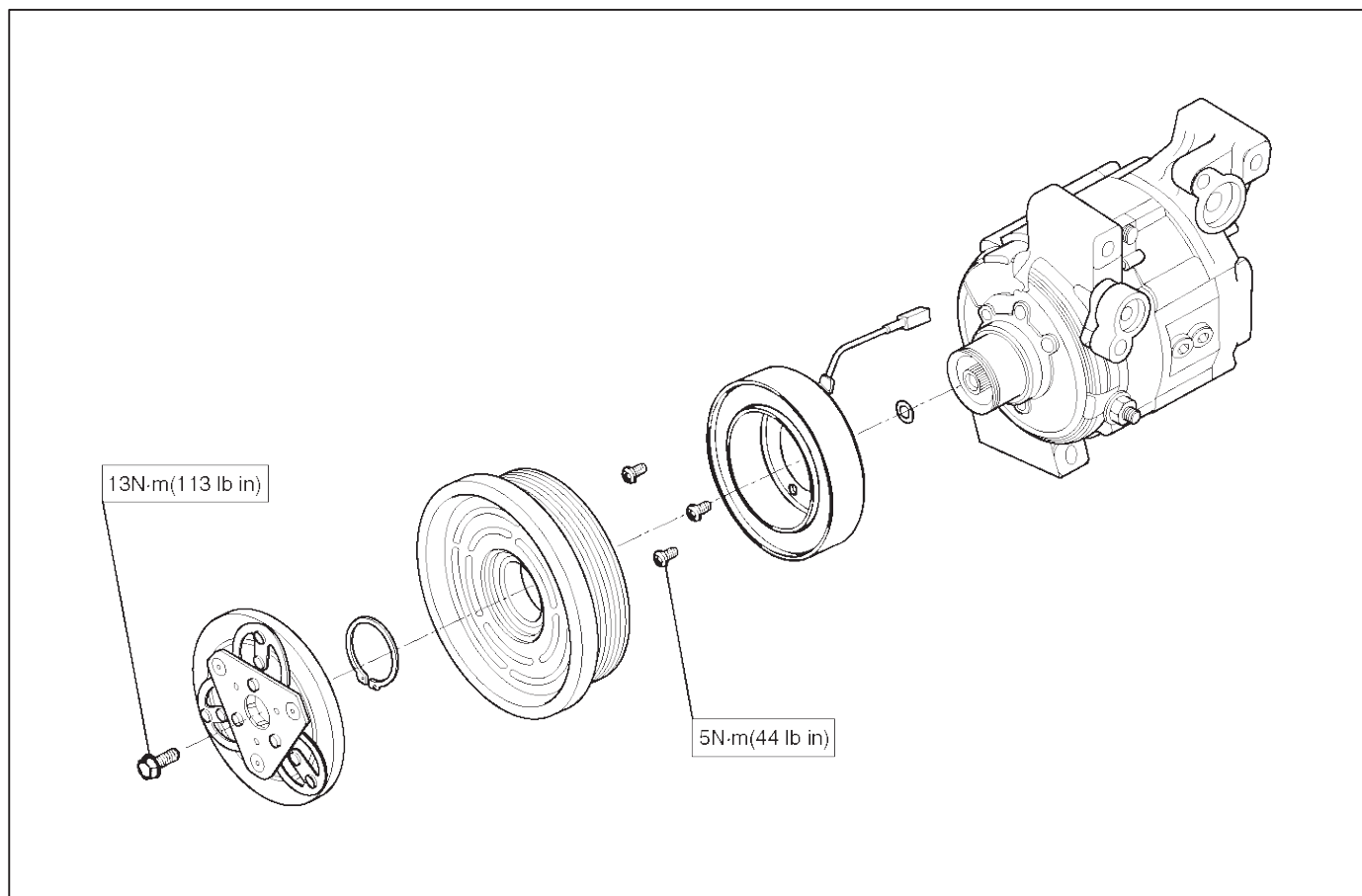
| (Component parts to be installed) | (Amount of Oil)     |
|-----------------------------------|---------------------|
| Evaporator                        | 50 cc (1.7 fl. oz.) |
| Condenser                         | 30 cc (1.0 fl. oz.) |
| Receiver/dryer                    | 30 cc (1.0 fl. oz.) |
| Refrigerant line (one piece)      | 10 cc (0.3 fl. oz.) |

## Main Data and Specifications

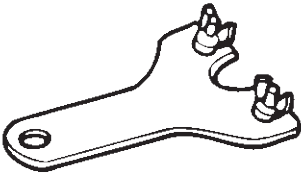
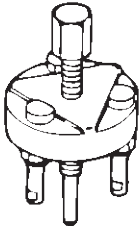
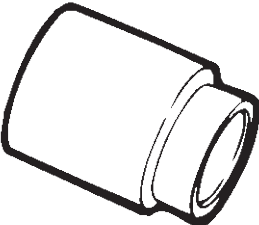
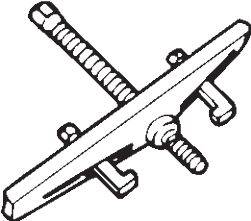
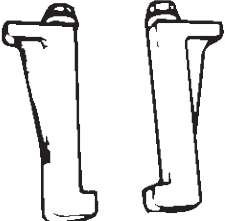
### General Specifications

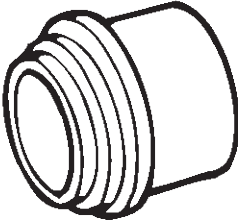
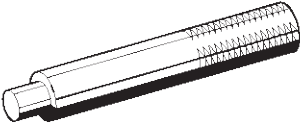
| <b>COMPRESSOR</b>      |                                                                                                |
|------------------------|------------------------------------------------------------------------------------------------|
| Model                  | DKV-14G                                                                                        |
| Type                   | Vane rotary type                                                                               |
| Number of vanes        | 5                                                                                              |
| Rotor diameter         | 64 mm (2.52 in.)                                                                               |
| Stroke                 | 8.75 mm (0.34 in.)                                                                             |
| Displacement           | 140 cc (47.3 fl.oz.)                                                                           |
| Maximum speed          | 7,000 rpm (up to 8,400 rpm)                                                                    |
| Direction of rotation  | Clockwise (Front-side view)                                                                    |
| Lubrication system     | Pressure differential type                                                                     |
| Lubricant              | R-134a Vane Rotary Type Compressor Oil<br>(AIPDN Part No.2-90188-301-0)<br>150 cc (5.0 fl.oz.) |
| Refrigerant            | Refrigerant-134a (R-134a), 700 g (1.54 lbs.)                                                   |
| Shaft seal             | Lip type                                                                                       |
| Weight                 | 3.5 kg                                                                                         |
| <b>MAGNETIC CLUTCH</b> |                                                                                                |
| Type                   | Electromagnetic single-plate dry clutch                                                        |
| Rated voltage          | 12 Volts D.C.                                                                                  |
| Current consumption    | 3.7 A                                                                                          |
| Starting torque        | 49 N·m (36 lb·ft)                                                                              |
| Direction of rotation  | Clockwise (Front-side view)                                                                    |
| Weight                 | 3.0 kg (6.6 lbs.)                                                                              |

## Torque Specifications



Special Tools

| ILLUSTRATION                                                                                                   | TOOL NO.<br>TOOL NAME                  |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <br><small>901RS191</small>   | <b>J-33939</b><br>Drive plate holder   |
| <br><small>901RS192</small>   | <b>J-33944-A</b><br>Drive plate puller |
| <br><small>901RS193</small> | <b>J-33944-4</b><br>Forcing screw      |
| <br><small>901RS194</small> | <b>J-38424</b><br>Pulley puller pilot  |
| <br><small>901RS195</small> | <b>J-8433</b><br>Pulley puller         |
| <br><small>901RS196</small> | <b>J-24092-2</b><br>Pulley puller leg  |

| ILLUSTRATION                                                                                                  | TOOL NO.<br>TOOL NAME                |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <br><small>901RS197</small> | <b>J-33940-A</b><br>Pulley installer |
| <br><small>901RS218</small> | <b>J-8092</b><br>Drive handle        |