

AXIOM

HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

HVAC SYSTEMS

CONTENTS

Service Precaution	1A-3	Individual Inspection	1A-31
Heating and Ventilation System	1A-3	General Repair Procedure	1A-31
General Description	1A-3	Leak Check	1A-33
Heater Unit	1A-6	Compressor Assembly	1A-38
Heater Unit and Associated Parts	1A-6	Compressor Assembly and Associated Parts (6VE1)	1A-38
Removal	1A-6	Removal	1A-38
Installation	1A-6	Installation	1A-39
Heater Core and / or Mode Door	1A-7	New Compressor Installation	1A-39
Disassembled View	1A-7	Condenser Assembly	1A-40
Removal	1A-8	Condenser Assembly and Associated Parts	1A-40
Inspection	1A-8	Removal	1A-40
Installation	1A-8	Installation	1A-41
Heater Mode Control Link Unit	1A-9	Condenser Fan Motor	1A-42
Disassembled View	1A-9	Condenser Fan Motor and Associated Parts	1A-42
Removal	1A-9	Removal	1A-42
Installation	1A-10	Installation	1A-42
Heater Temperature Control Link Unit	1A-11	Receiver / Drier	1A-43
Disassembled View	1A-11	Receiver / Drier and Associated Parts	1A-43
Removal	1A-11	Removal	1A-43
Installation	1A-11	Installation	1A-43
Blower Assembly	1A-12	Pressure Switch	1A-44
Blower Assembly and Associated Parts	1A-12	Pressure Switch and Associated Parts	1A-44
Removal	1A-12	Removal	1A-44
Installation	1A-12	Installation	1A-44
Blower Link Unit and / or Mode door	1A-13	Evaporator Assembly	1A-45
Disassembled View	1A-13	Evaporator Assembly and Associated Parts	1A-45
Removal	1A-13	Removal	1A-45
Installation	1A-14	Installation	1A-46
Blower Motor	1A-15	Duct Sensor, Evaporator Core and/or Expansion Valve	1A-47
Blower Motor and Associated Parts	1A-15	Disassembled View	1A-47
Removal	1A-15	Removal	1A-47
Installation	1A-15	Installation	1A-48
Rear Heater Duct, Defroster Nozzle and Ventilation Duct	1A-16	Refrigerant Line	1A-49
Rear Heater Duct, Defroster Nozzle, Ventilation Duct and Associated Parts	1A-16	Refrigerant Line and Associated Parts	1A-49
Removal	1A-16	Removal	1A-49
Installation	1A-17	Installation	1A-50
Air Conditioning System	1A-18	Main Data And Specifications	1A-51
General Description	1A-18		
Diagnosis	1A-24		
Air Conditioning System	1A-31		

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

Compressor	1A-53	Performance and Movement checklist for Automatic Air Conditioner Related Parts ..	1A-89
Service Precaution	1A-53	Troubleshooting With Self-Diagnosis Function	1A-91
General Description	1A-53	Inspection By Failed Location	1A-97
Diagnosis	1A-54	Inspection of the Sensors	1A-97
Magnetic Clutch Assembly (DKV-14G Type)	1A-55	Inspection of the Intake Actuator System ..	1A-101
Parts Location View	1A-55	Inspection of the Mix Actuator System	1A-104
Removal	1A-55	Inspection of the Mode Actuator System ..	1A-107
Inspection and Repair	1A-57	Inspection of the Fan Motor System	1A-110
Installation	1A-57	Inspection of the Magnetic Clutch System ..	1A-115
Compressor Oil	1A-59	Individual Inspection	1A-118
Oil Specification	1A-59	On-Vehicle Service	1A-121
Handling of Oil	1A-59	Power Transistor	1A-121
Compressor Oil Check	1A-59	Removal	1A-121
Checking and Adjusting Oil Quantity for Used Compressor	1A-59	Installation	1A-121
Checking and Adjusting for Compressor Replacement	1A-60	Automatic Heater/Air Conditioner Control Unit	1A-121
Contamination of Compressor Oil	1A-60	Removal	1A-121
Oil Return Operation	1A-60	Installation	1A-121
Replacement of Component Parts	1A-60	In Car Sensor	1A-122
Main Data and Specifications	1A-61	Removal	1A-122
Special Tools	1A-63	Installation	1A-122
Automatic Air Conditioning System	1A-64	Ambient Sensor	1A-122
General Description	1A-64	Removal	1A-122
Automatic Air Conditioner Parts Configuration	1A-64	Installation	1A-122
Circuit Diagram	1A-65	Sun Sensor	1A-123
Functions and Features	1A-70	Removal	1A-123
Automatic Air Conditioner Block Diagram ..	1A-71	Installation	1A-123
Control Panel Layout	1A-72	Duct Sensor	1A-123
Air Control Functions	1A-73	Removal	1A-123
Control Panel Switch Operation	1A-74	Installation	1A-123
Overview of Construction, Movement and Control of Major Parts of Automatic Air Conditioner System	1A-77	Mode Actuator	1A-124
Overview of Automatic Control of Automatic Air Conditioner	1A-81	Removal	1A-124
Automatic Air Conditioning System	1A-82	Installation	1A-124
Troubleshooting	1A-86	Mix Actuator	1A-124
Troubleshooting, Its Overview and Procedures	1A-86	Removal	1A-124
Auto Air Conditioner Control Unit Power Supply Diagnosis	1A-87	Installation	1A-125
		Intake Actuator	1A-125
		Removal	1A-125
		Installation	1A-125

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.

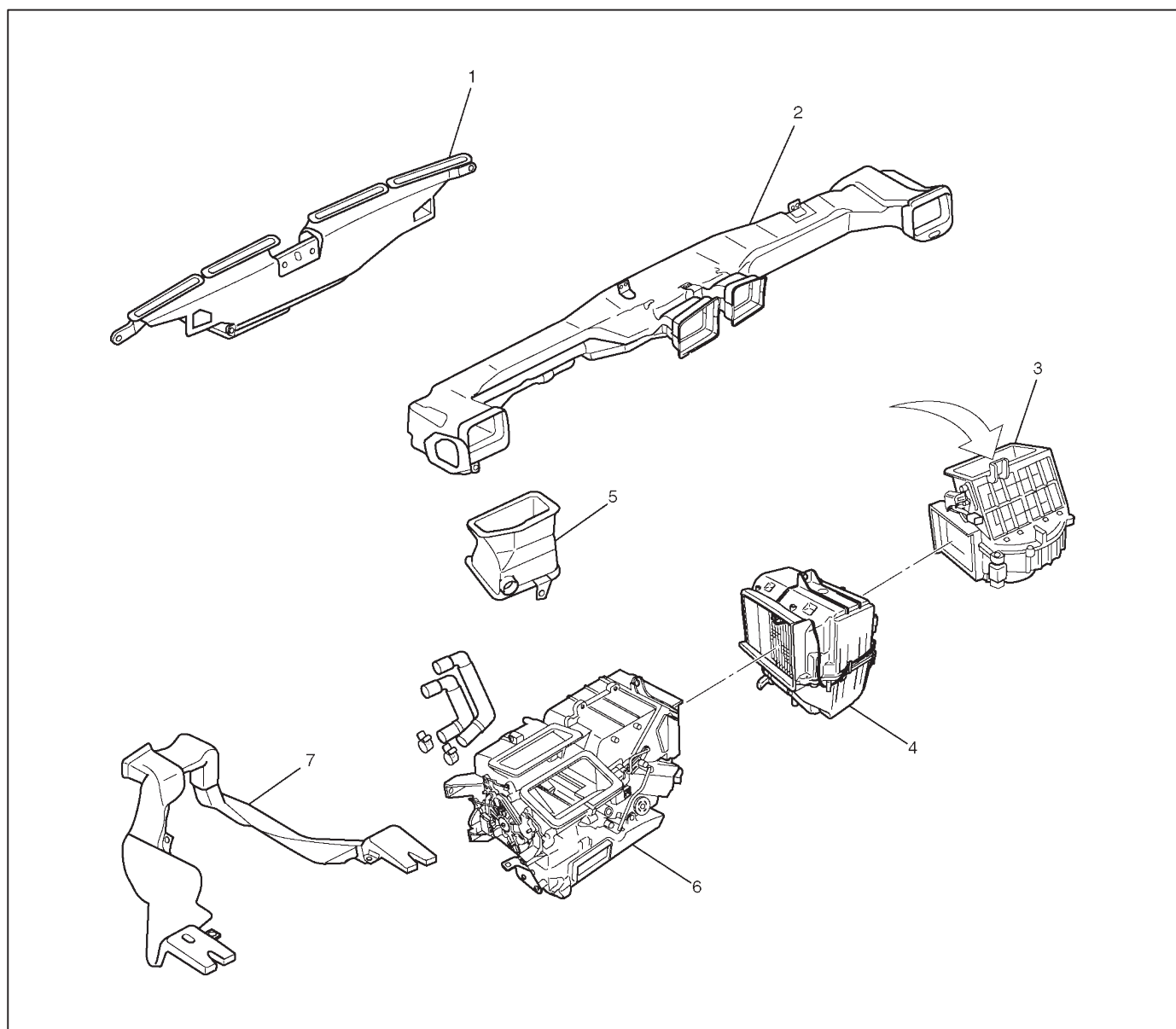
Outside air is circulated through the heater core of the heater unit and then into the passenger compartment. By controlling the mixture of outside air and heater core air, the most comfortable passenger compartment temperature can be selected and maintained.

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 switch (Mode SW), with its different modes, also allows you to select and maintain the most comfortable passenger compartment temperature.

The air source select switch is used to select either "FRESH" for the introduction of the outside air, or "CIRC" for the circulation of the inside air. When the switch is set to "FRESH", the outside air is always taken into the passenger compartment. When setting the switch 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 switch is normally set to "FRESH" to prevent the windshield from clouding.

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

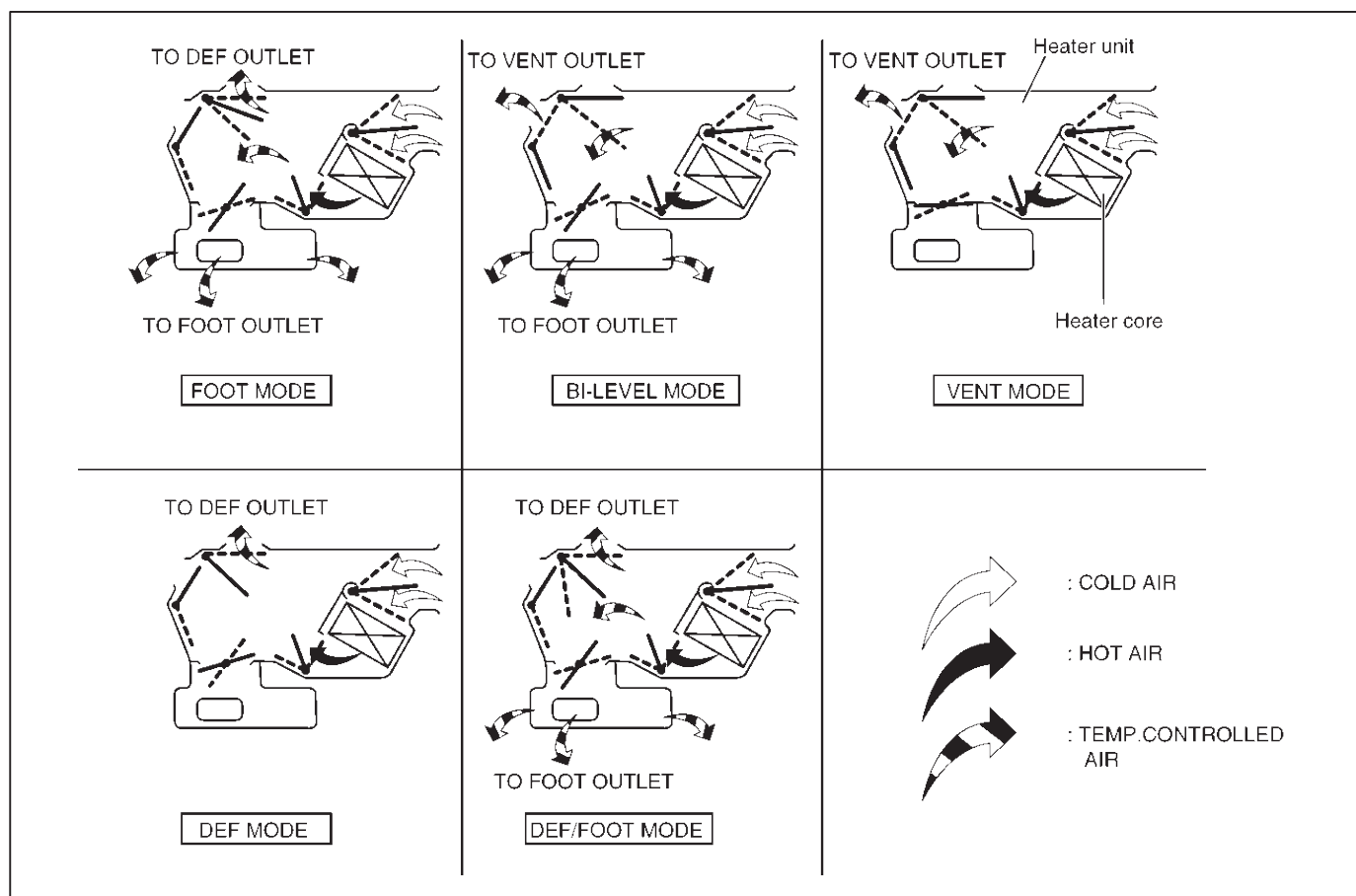


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Legend

- (1) Defroster Nozzle
- (2) Ventilation Duct
- (3) Blower Assembly

- (4) Evaporator Assembly
- (5) Ventilation Lower Duct
- (6) Heater Unit
- (7) Rear Heater Duct



C01RW001

Air Source Select Switch

Press this button to select either Fresh Air Intake or CIRC (inside air circulation). There is an indicator light inside the button. This light indicates that the CIRC mode is "ON". Fresh Air Intake is the default setting for both DEFROST and FOOT/DEFROST.

Fan Control Switch

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

1. L0
2. M1
3. M2
4. M3
5. HI

Temperature Control Switch

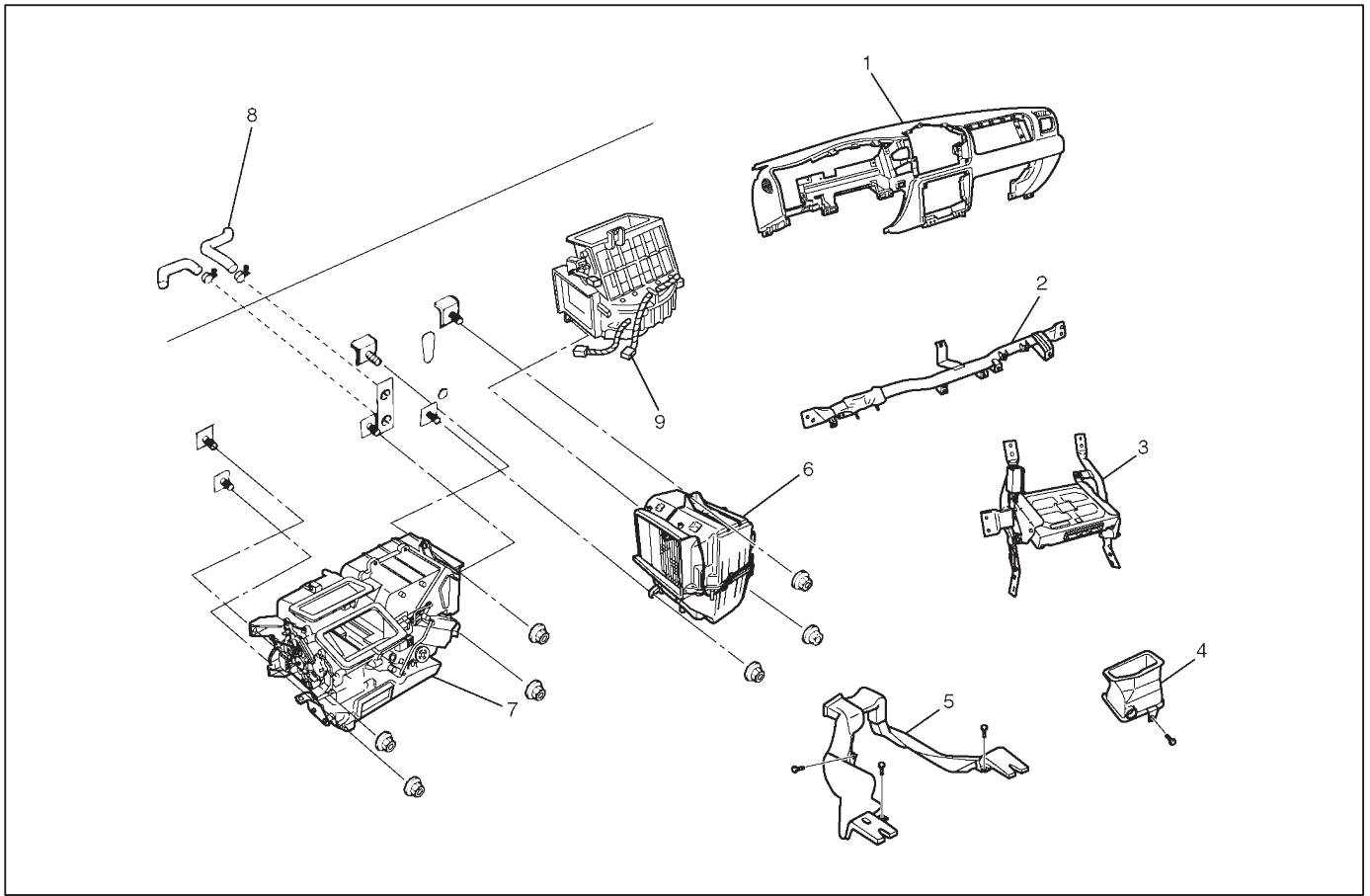
When the temperature control switch is in the "18°C (65°F)" position, the air mix door closes to block the air flow to the heater core.

When the temperature control switch is in the "32°C (90°F)" position, the air mix door opens to allow air to pass through the heater core and heat the passenger compartment.

Selecting the desired temperature will control the air flow through the heater core, allowing control of the cabin temperature.

Heater Unit

Heater Unit and Associated Parts



840R200008

Legend

- | | |
|--|--------------------------------|
| (1) Instrument Panel Assembly | (5) Rear Heater Duct |
| (2) Cross Beam Assembly | (6) Evaporator Assembly |
| (3) Instrument Panel Bracket W/Suspension Control Unit | (7) Heater Unit Assembly |
| (4) Ventilation Lower Duct | (8) Heater Hose |
| | (9) Power Transistor 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 w/suspension control unit.
 - 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 power transistor connector.
8. Remove evaporator assembly.
 - Refer to *Evaporator Assembly in this section*.
9. Remove ventilation lower duct.
10. Remove rear heater duct.
 - Remove foot rest, carpet and 3 clips.
11. Disconnect mode/mix actuator connector.
12. Remove heater unit assembly.
 - Disconnect heater hoses at heater unit.

Installation

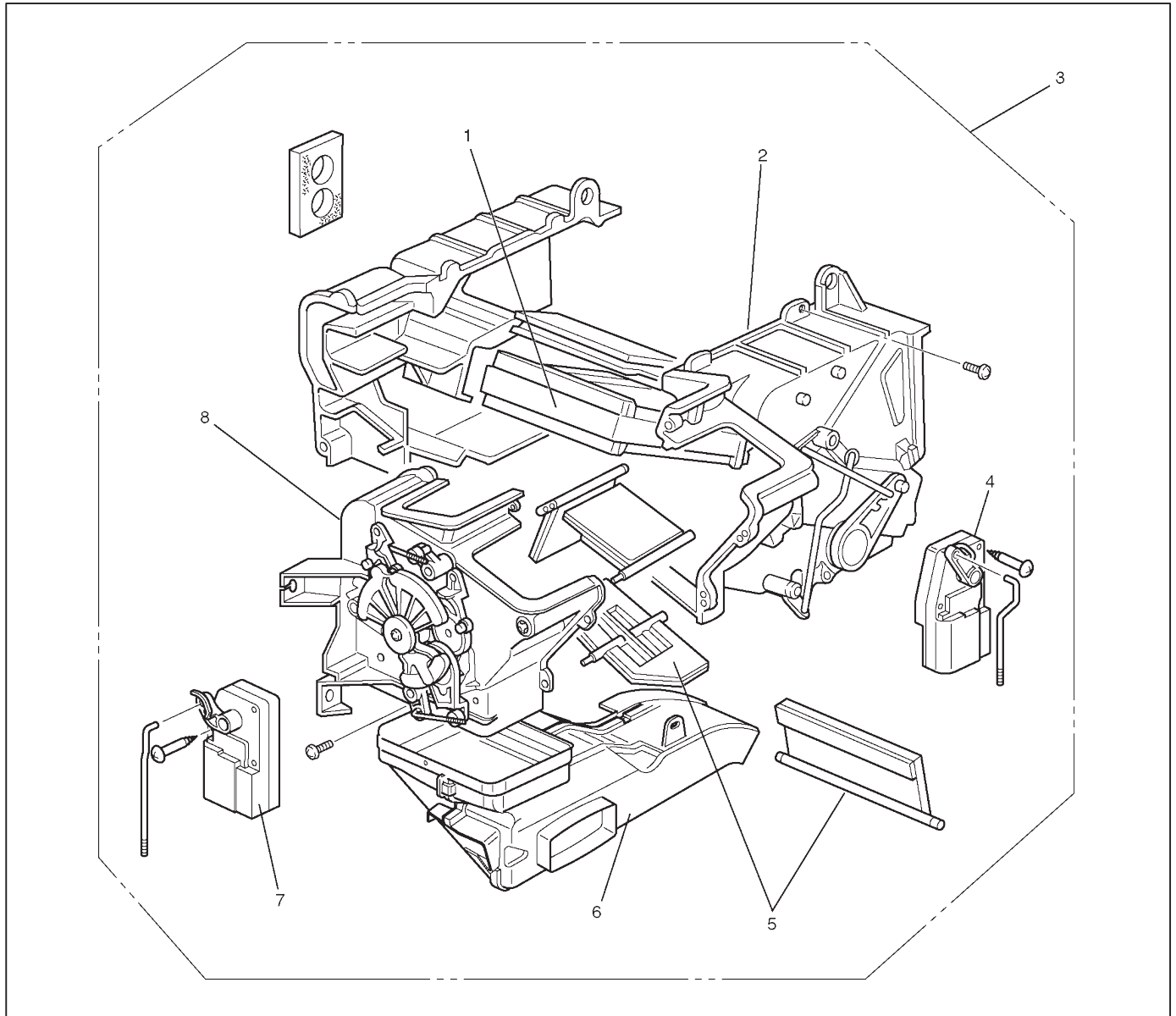
To install, follow the removal steps in the reverse order, noting the following points:

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

2. 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



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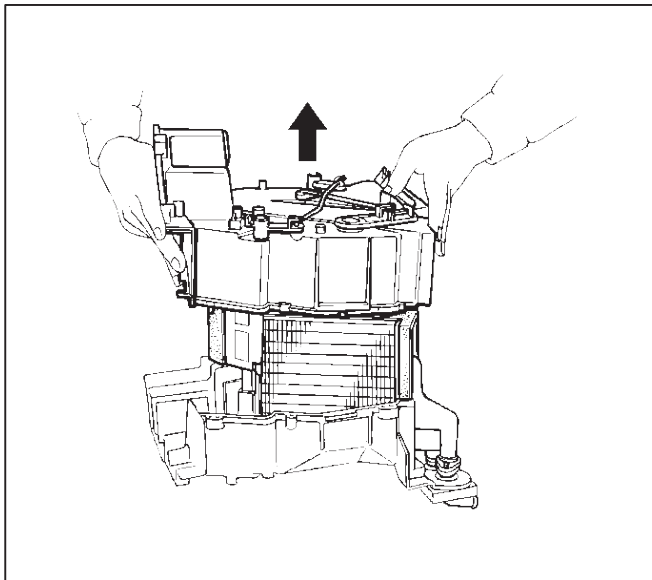
Legend

- | | |
|--------------------------------|-------------------------|
| (1) Heater Core | (5) Mode Door |
| (2) Case (Temperature Control) | (6) Duct |
| (3) Heater Unit | (7) Mode Actuator |
| (4) Mix Actuator | (8) Case (Mode Control) |

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

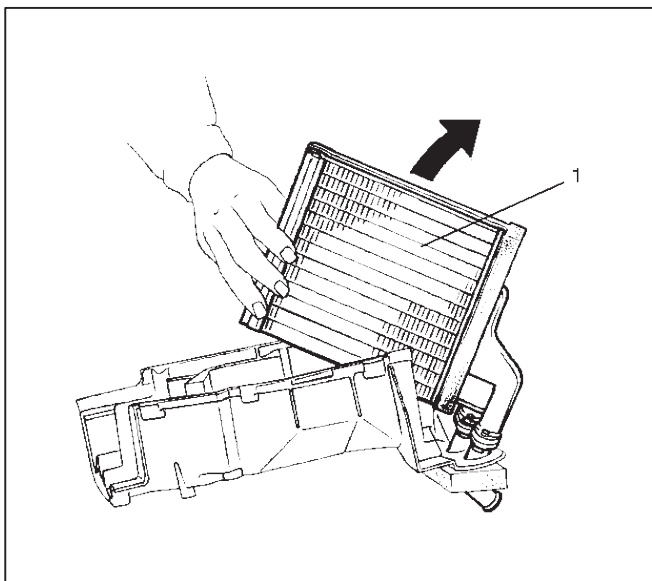
Removal

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 mix actuator.
7. Remove mode actuator.
8. Remove case (Mode control) and do not remove link unit at this step.
9. Remove case (Temperature control) separate two halves of core case.



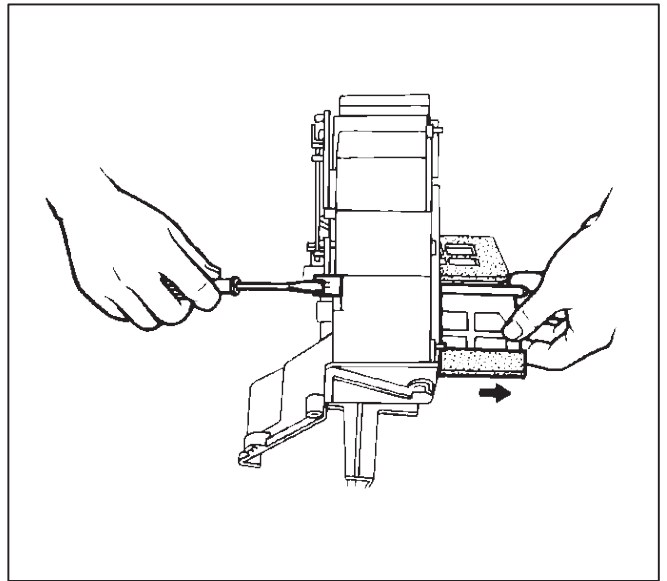
860RS002

10. Remove heater core (1).



860RS003

11. 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.

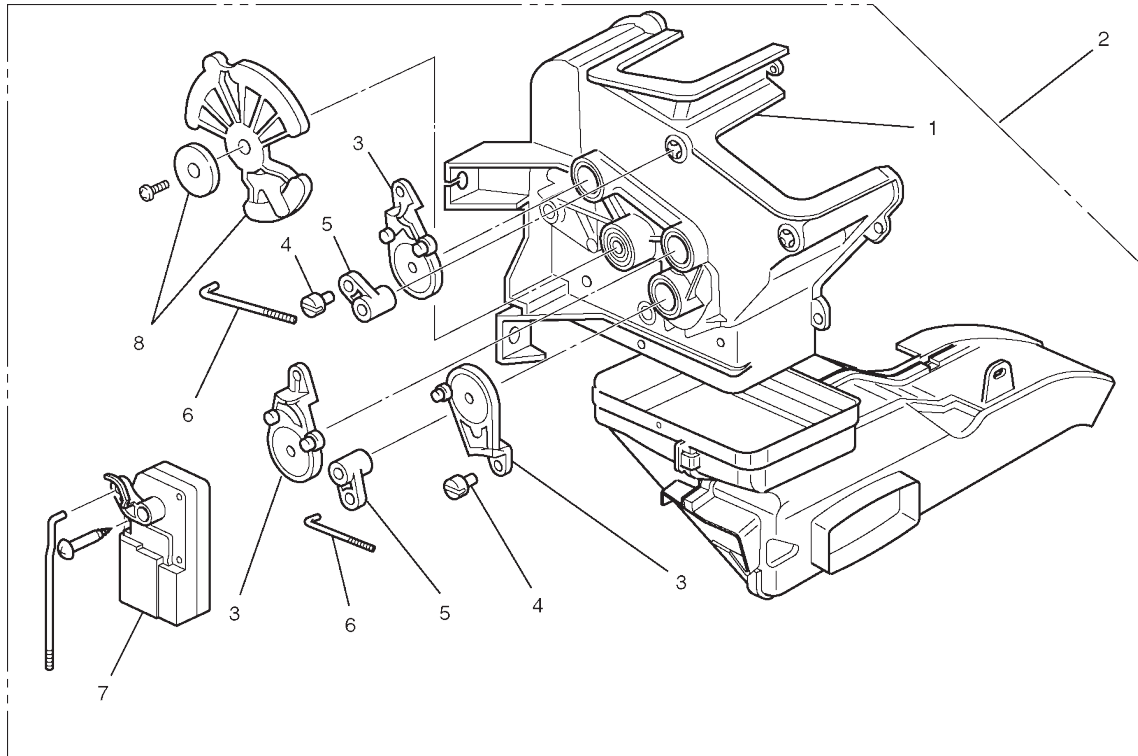
Installation

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



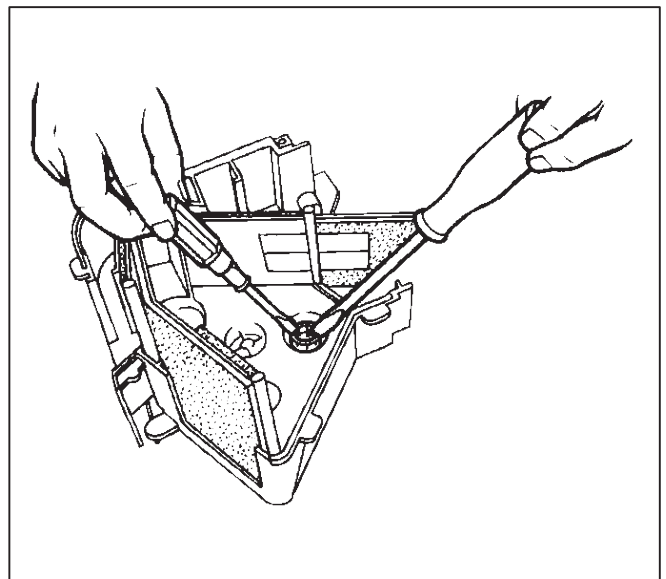
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Legend

- | | |
|-------------------------|--------------------------------|
| (1) Case (Mode Control) | (5) Door Lever |
| (2) Heater Unit | (6) Rod |
| (3) Mode Sub-lever | (7) Mode Actuator |
| (4) Clip | (8) 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 mode actuator.
6. Remove the case (Mode control) from heater unit.
7. Remove washer and the mode main lever.
8. Remove rod.
9. Press the tab of the sub-lever inward, and take out the sub-lever.



860RS006

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

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

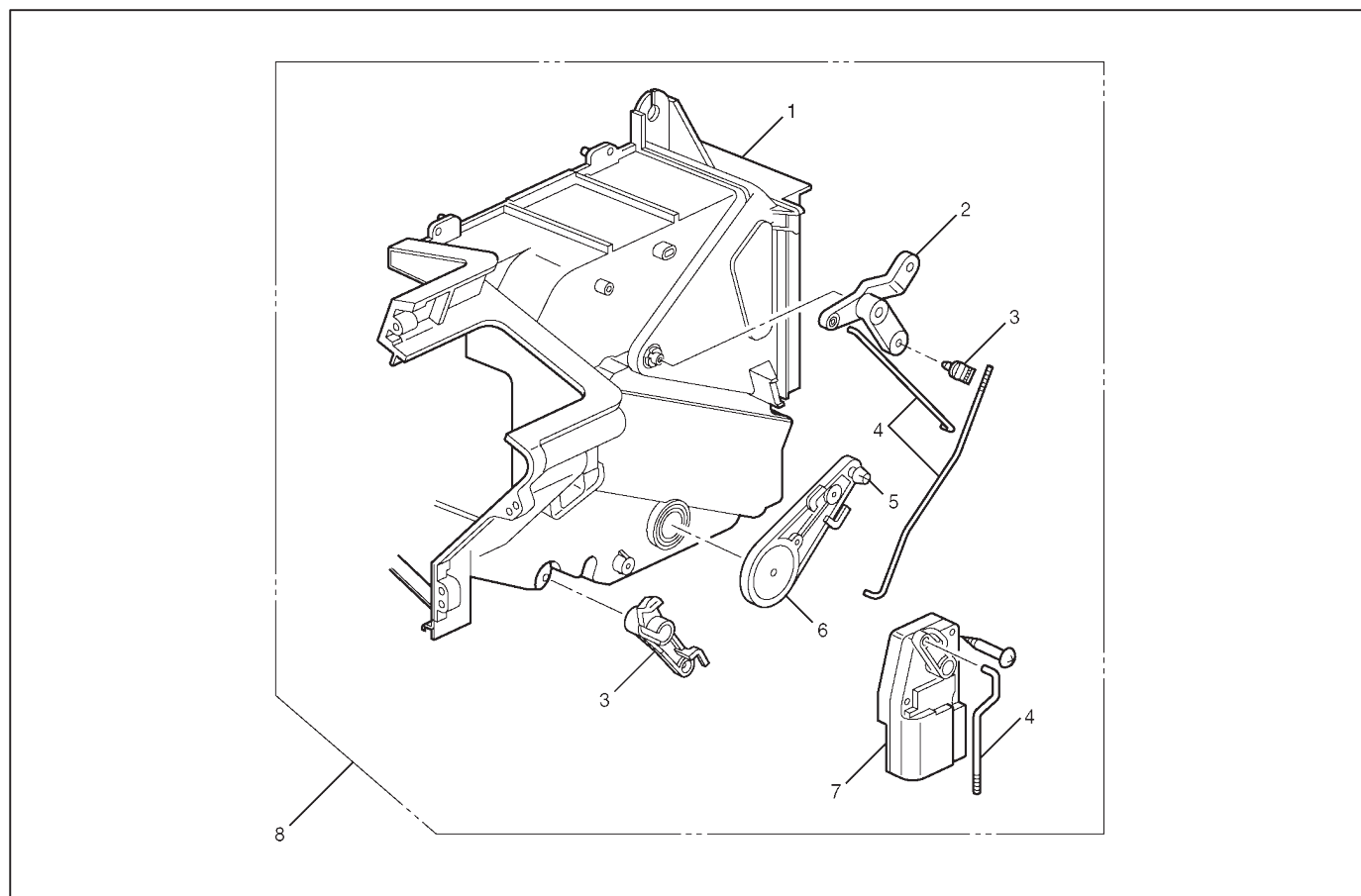
Installation

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

Heater Temperature Control Link Unit

Disassembled View



860R200003

Legend

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

- (5) Clip
- (6) Sub-lever
- (7) Mix Actuator
- (8) Heater Unit

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

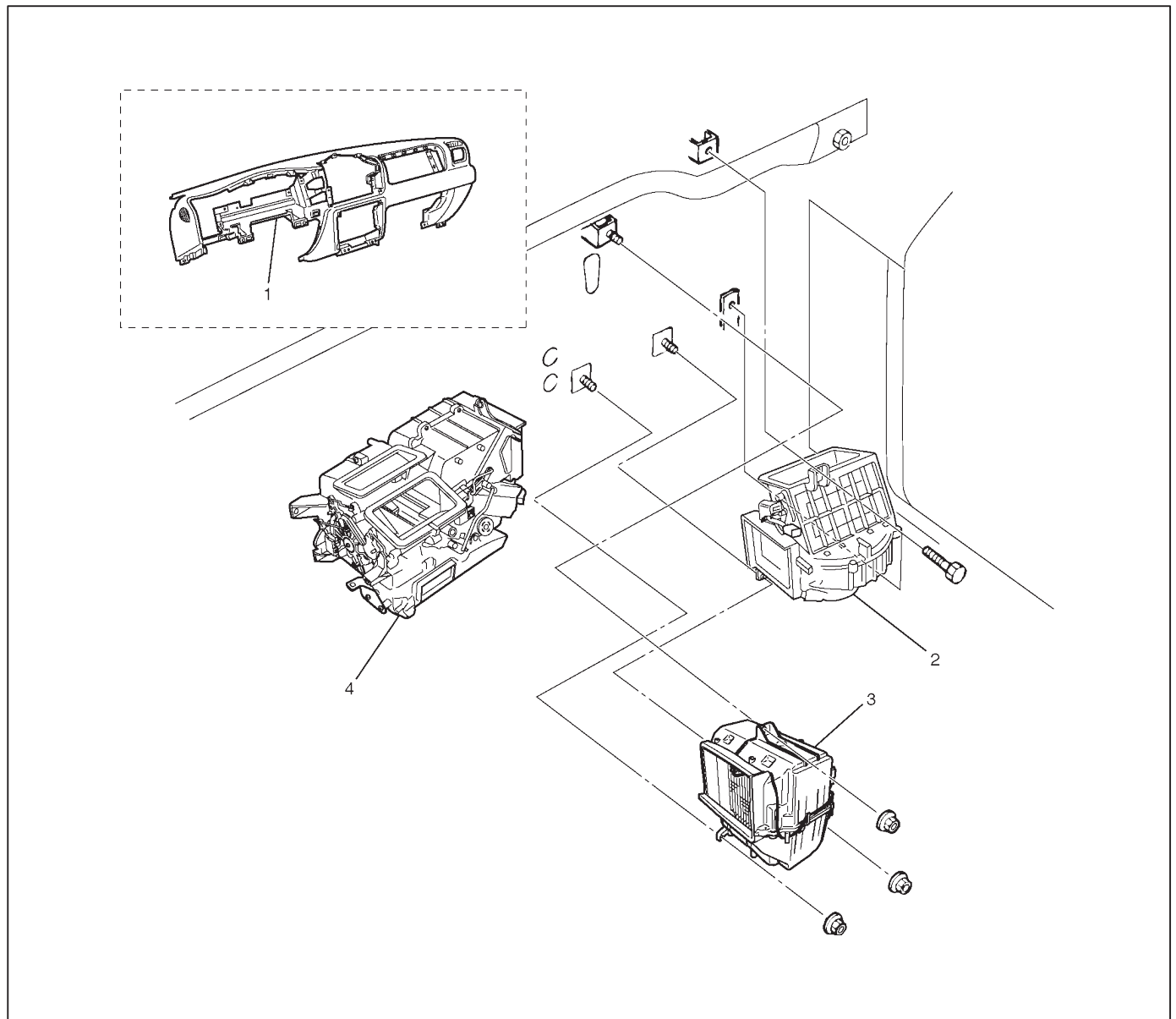
Installation

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



873R200004

Legend

- (1) Instrument Panel Assembly
- (2) Blower Assembly

- (3) Evaporator Assembly
- (4) 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 power transistor connector.
5. Remove evaporator assembly.
 - Refer to *Evaporator Assembly* in this section.

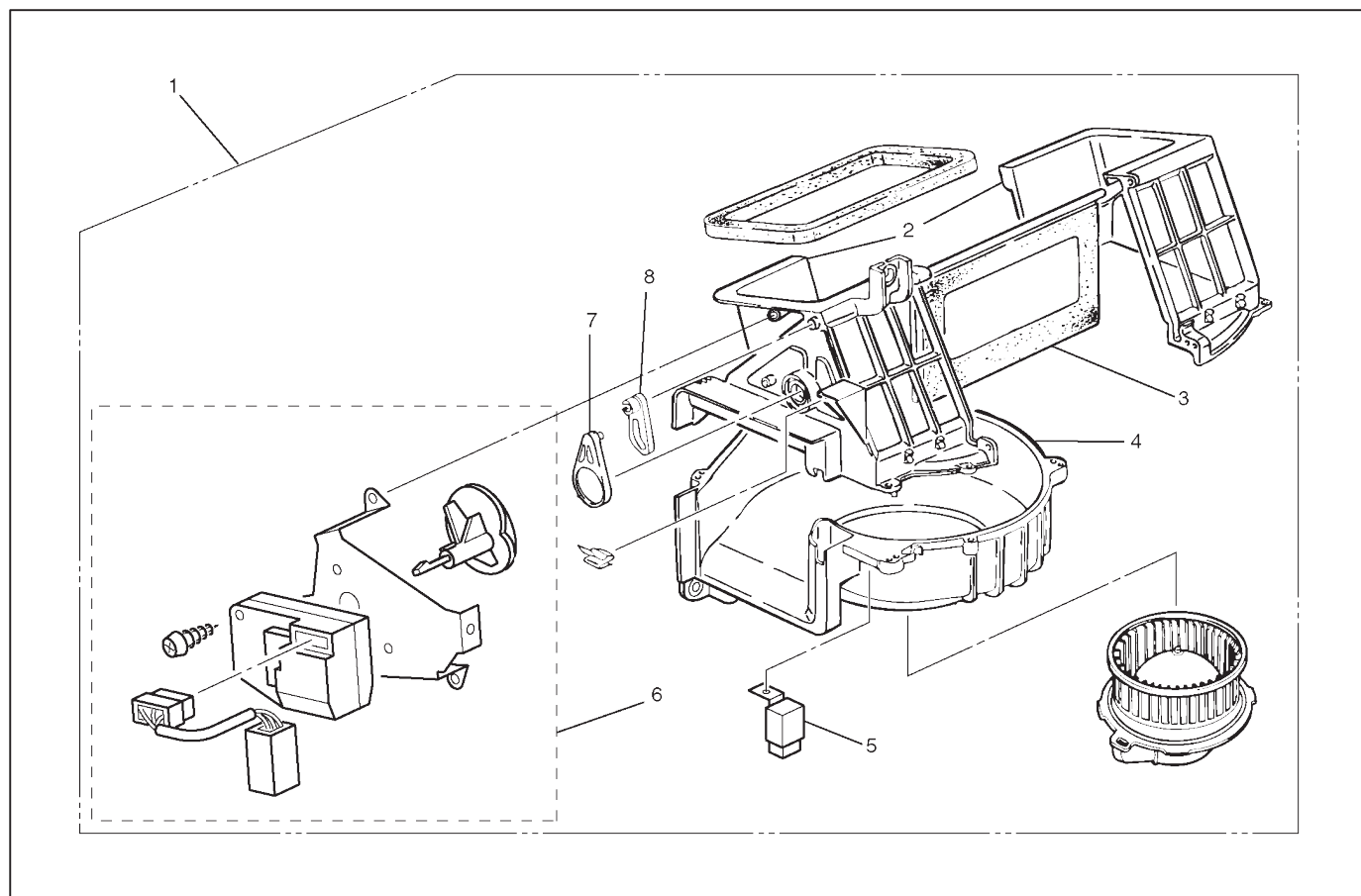
6. Disconnect blower motor/intake actuator connector.
7. Remove blower assembly.

Installation

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

Blower Link Unit and / or Mode door

Disassembled View



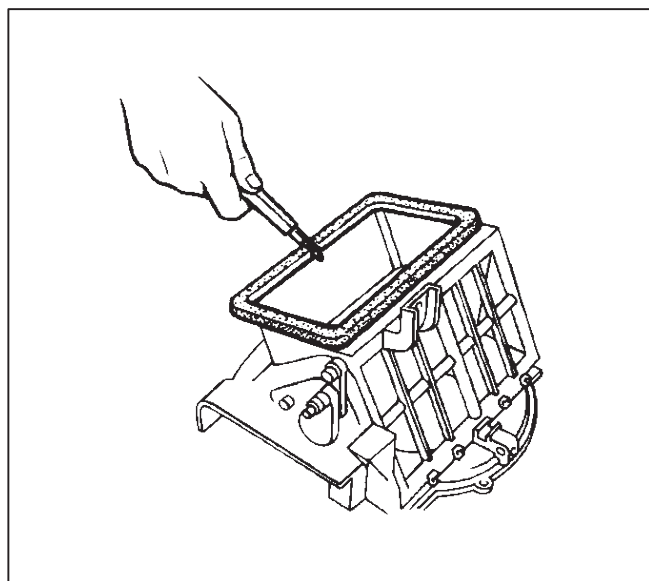
873R200001

Legend

- | | |
|---------------------|---------------------|
| (1) Blower Assembly | (5) Max High Relay |
| (2) Upper Case | (6) Intake Actuator |
| (3) Mode Door | (7) Sub Lever |
| (4) Lower Case | (8) 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 max high relay.
6. Remove lower case.
7. Separate the upper case and slit the lining parting face with a knife.



873R5002

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

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

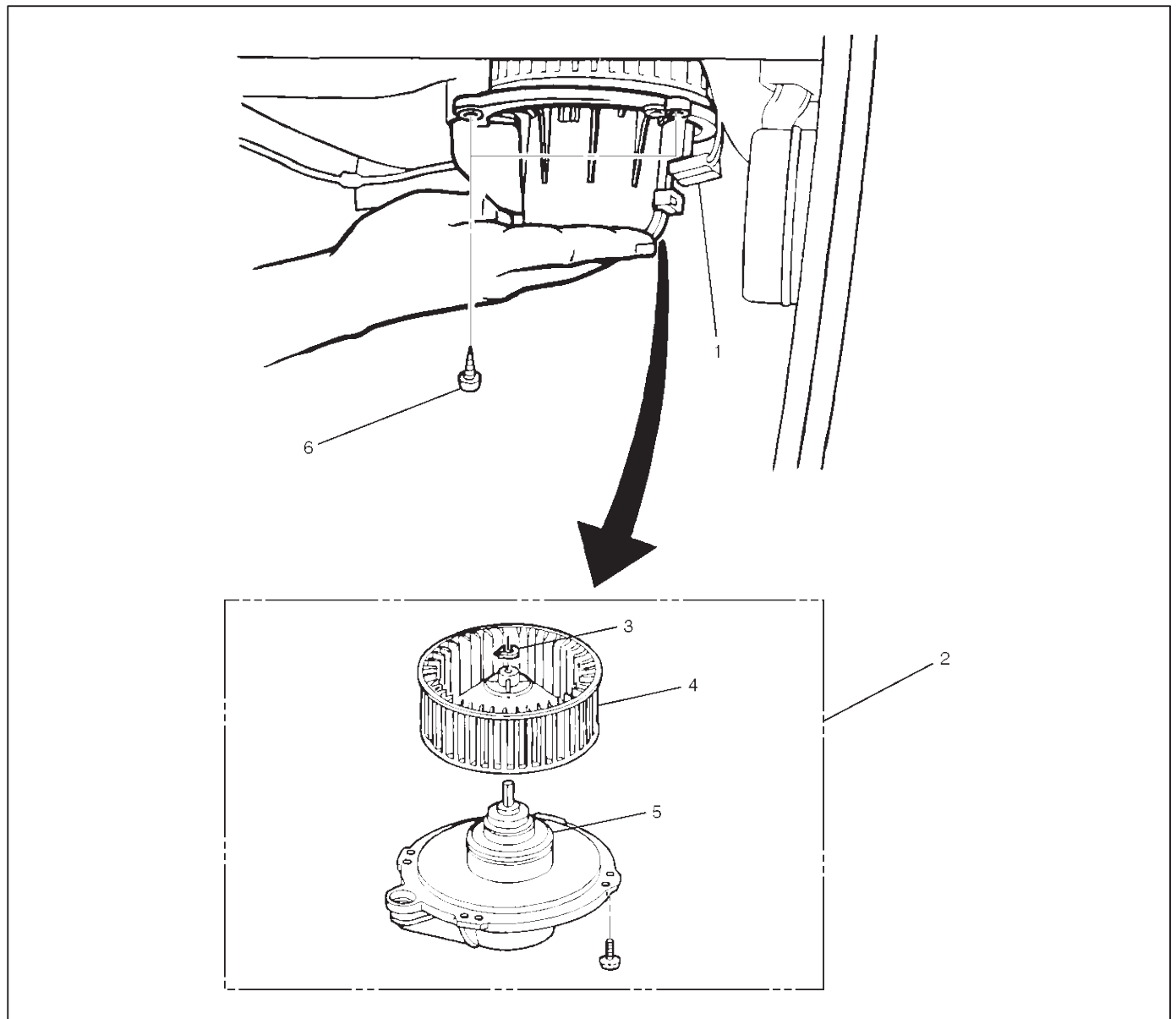
Installation

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

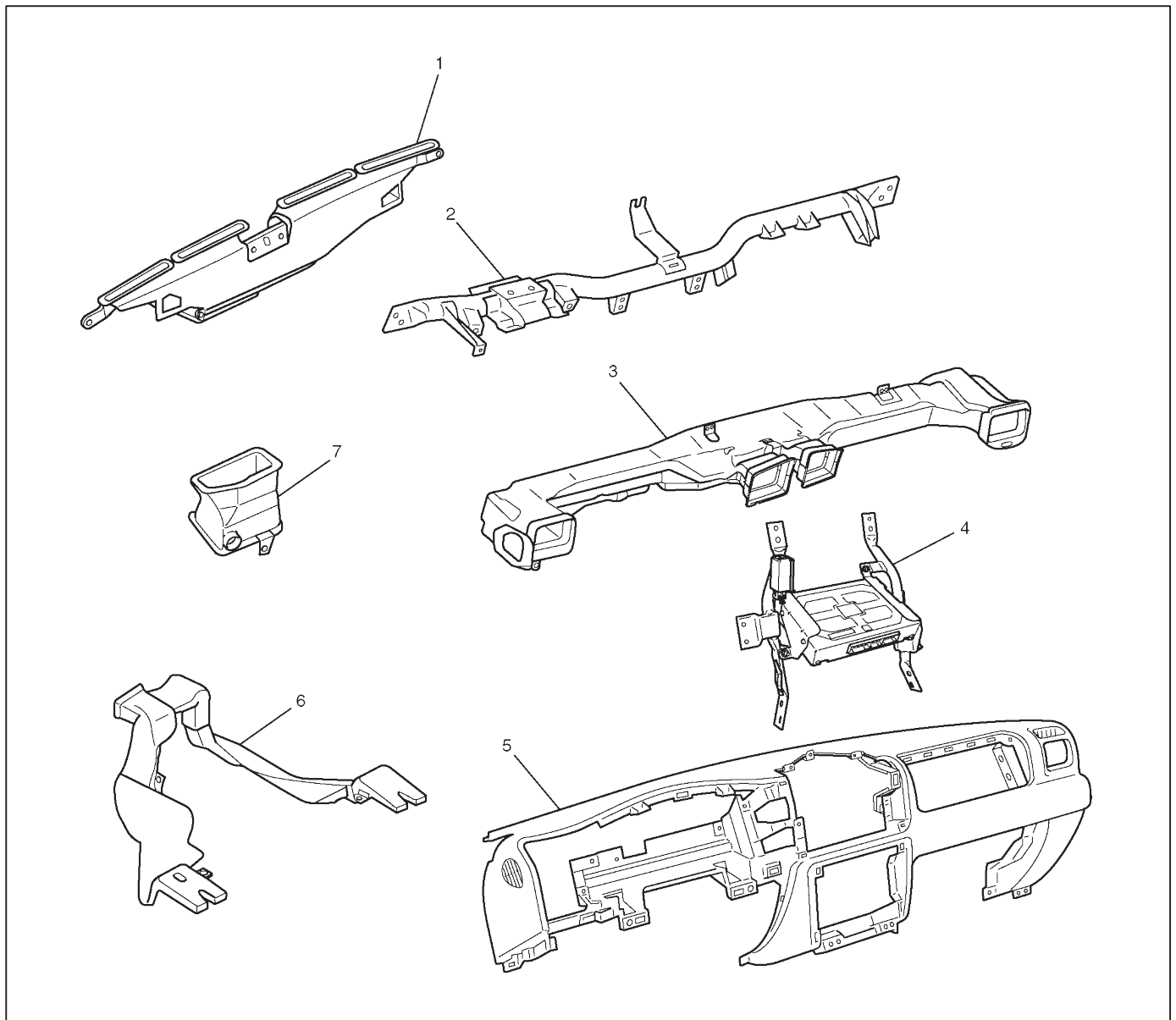
1. Disconnect the battery ground cable.
2. Remove blower motor connector.
3. Remove attaching screw.
4. Remove blower motor assembly.
5. Remove clip.
6. Remove fan.
7. Remove blower motor.

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



840R200009

Legend

- | | |
|---|--|
| (1) Defroster Nozzle | (4) Instrument Panel Bracket W/Suspension Control Unit |
| (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 w/suspension control unit.
 - 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

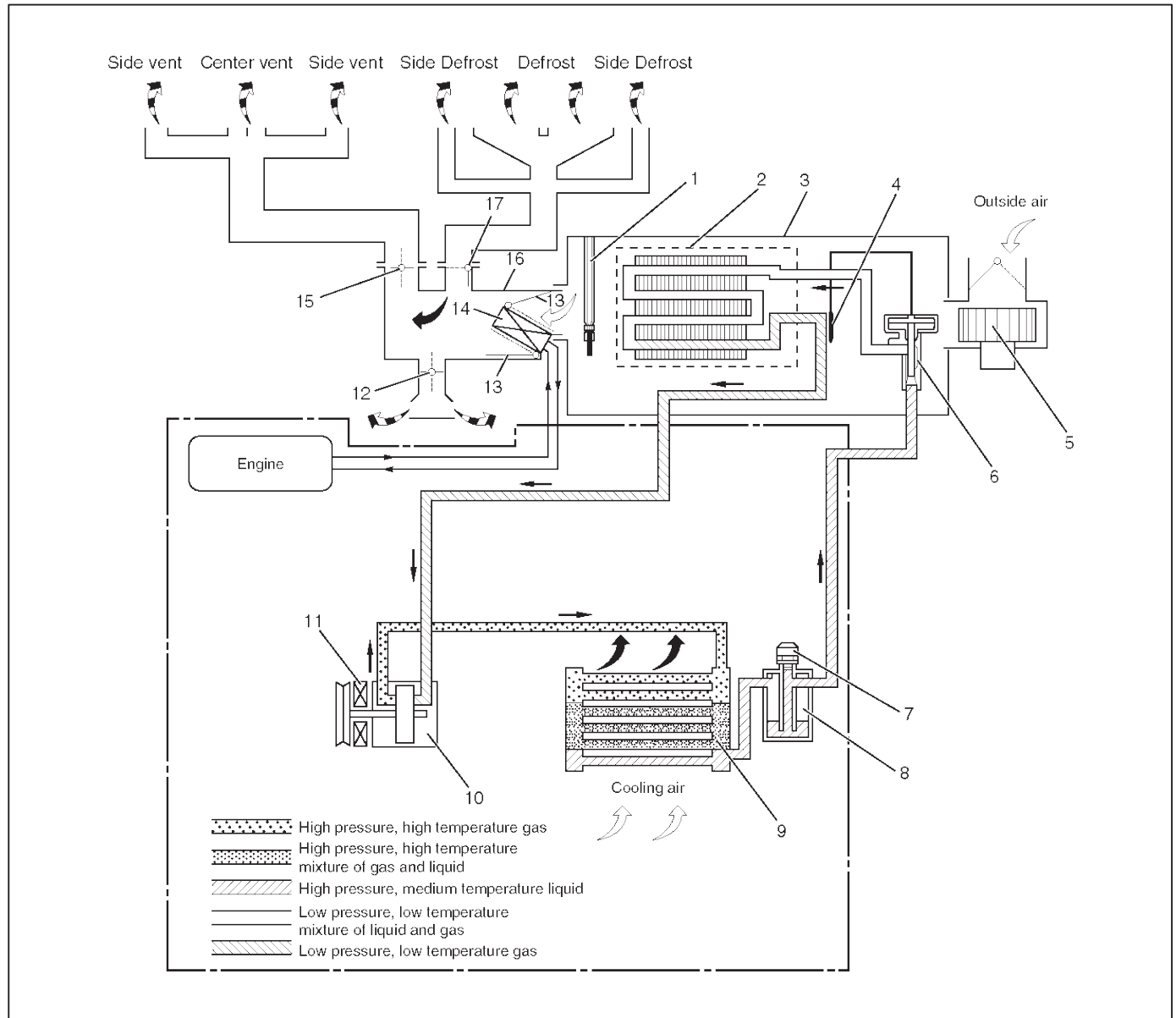
To install, follow the removal steps in the reverse order, noting the following point:

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

Air Conditioning System

General Description

Air Conditioning Refrigerant Cycle Construction



C01RY00013

Legend

- | | |
|-------------------------|--|
| (1) Duct Sensor | (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 | (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.

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.

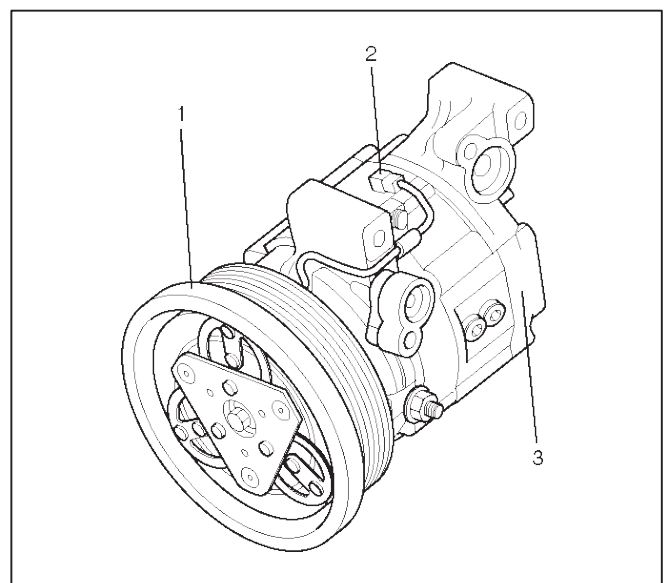
Also, compressor oil to be used varies according to the compressor model. Be sure to avoid mixing two or more different types of oil.

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.

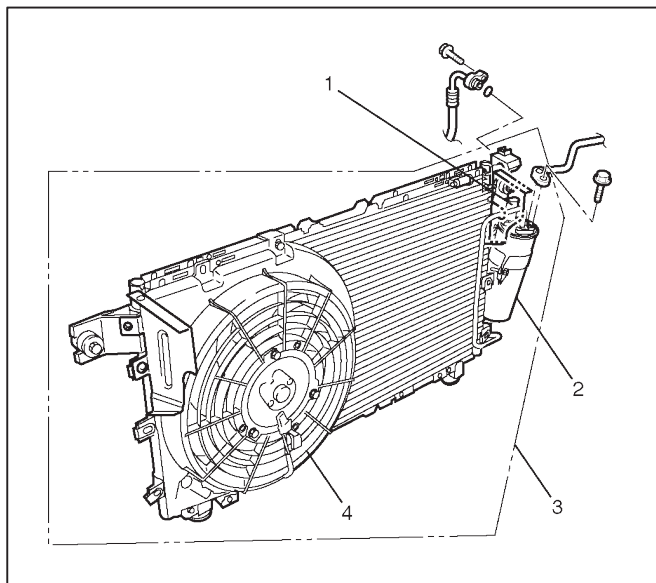
1A-20 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

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.



875R200015

Legend

- (1) Pressure Switch
- (2) Receiver Drier
- (3) Condenser & Receiver Tank Assembly
- (4) Condenser Fan

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.

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 (kPa/psi)	OFF (kPa/psi)
Low-pressure control	206.0±30.0 (29.8±4.3)	176.5±24.5 (25.6±3.6)
High-pressure control	2353.6±196.1 (341.3±28.4)	2942.0±196.1 (426.6±28.4)

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

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.

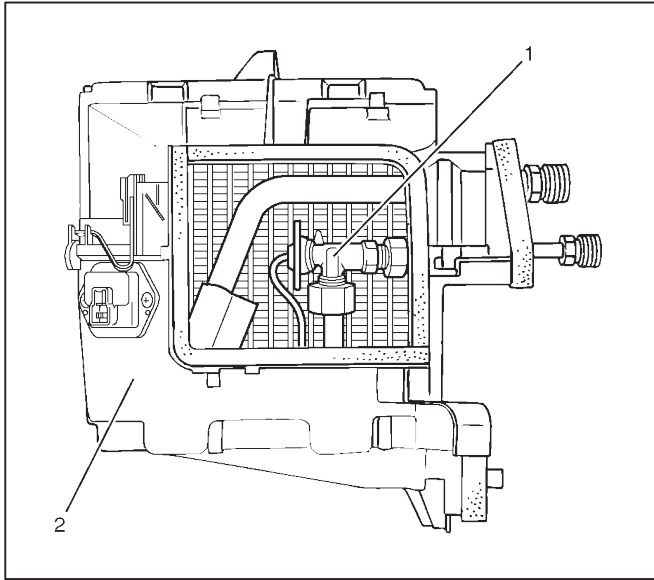
The temperature sensor contacts the evaporator outlet pipe, and converts changes in temperature to pressure. It then transmits these to the top chamber of the diaphragm.

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.



Legend

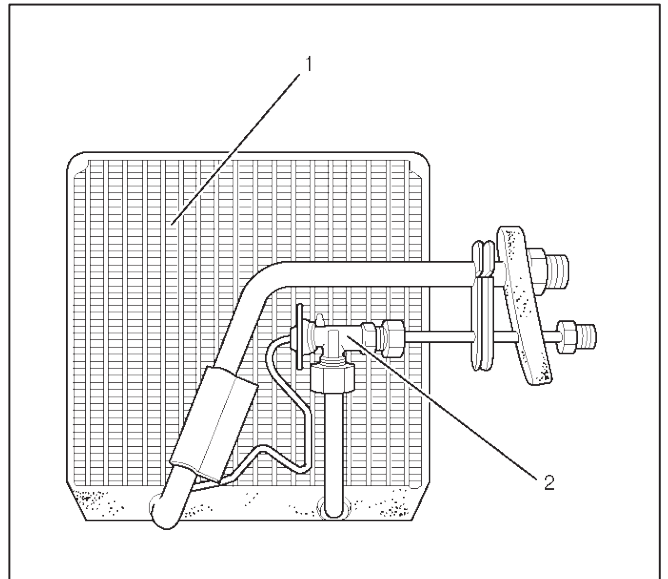
- (1) Expansion Valve
- (2) Evaporator Assembly

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.



Legend

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

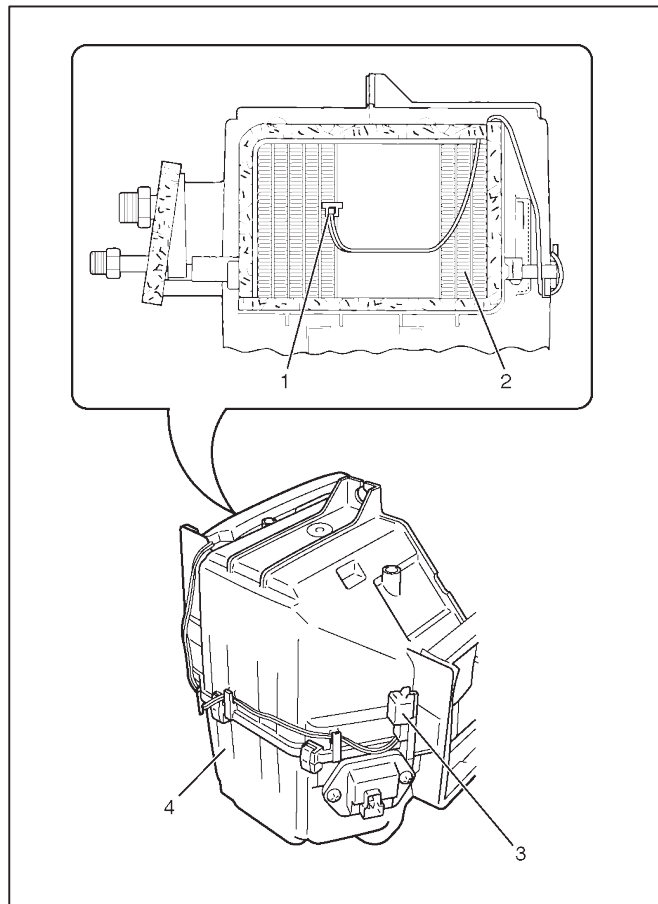
Duct Sensor

The duct sensor is the sensor to detect temperature change of the side of evaporator blower coming by fresh recirculation of intake door or "on" "off" of compressor.

The temperature is converted to resistant rate.

And it works as thermostat to control to prevent freezing of evaporator.

This sensor is installed in the upper case of evaporator.



Legend

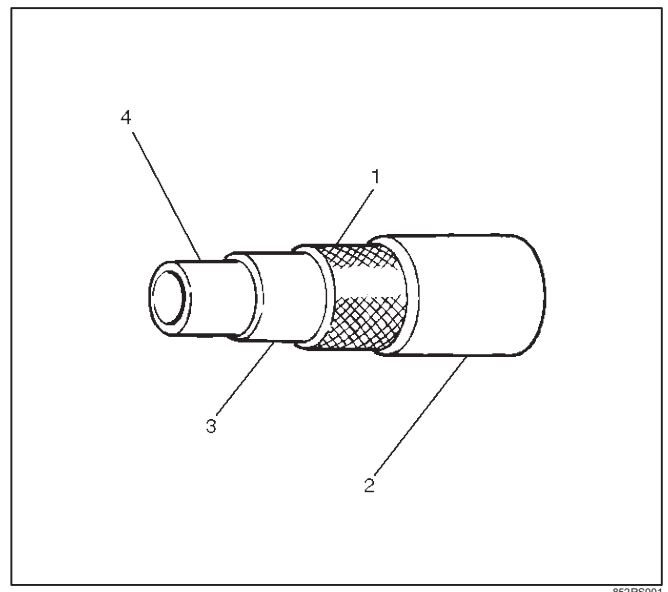
- (1) Sensor Part
- (2) Evaporator Core
- (3) Duct Sensor Assembly
- (4) Evaporator Assembly

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.

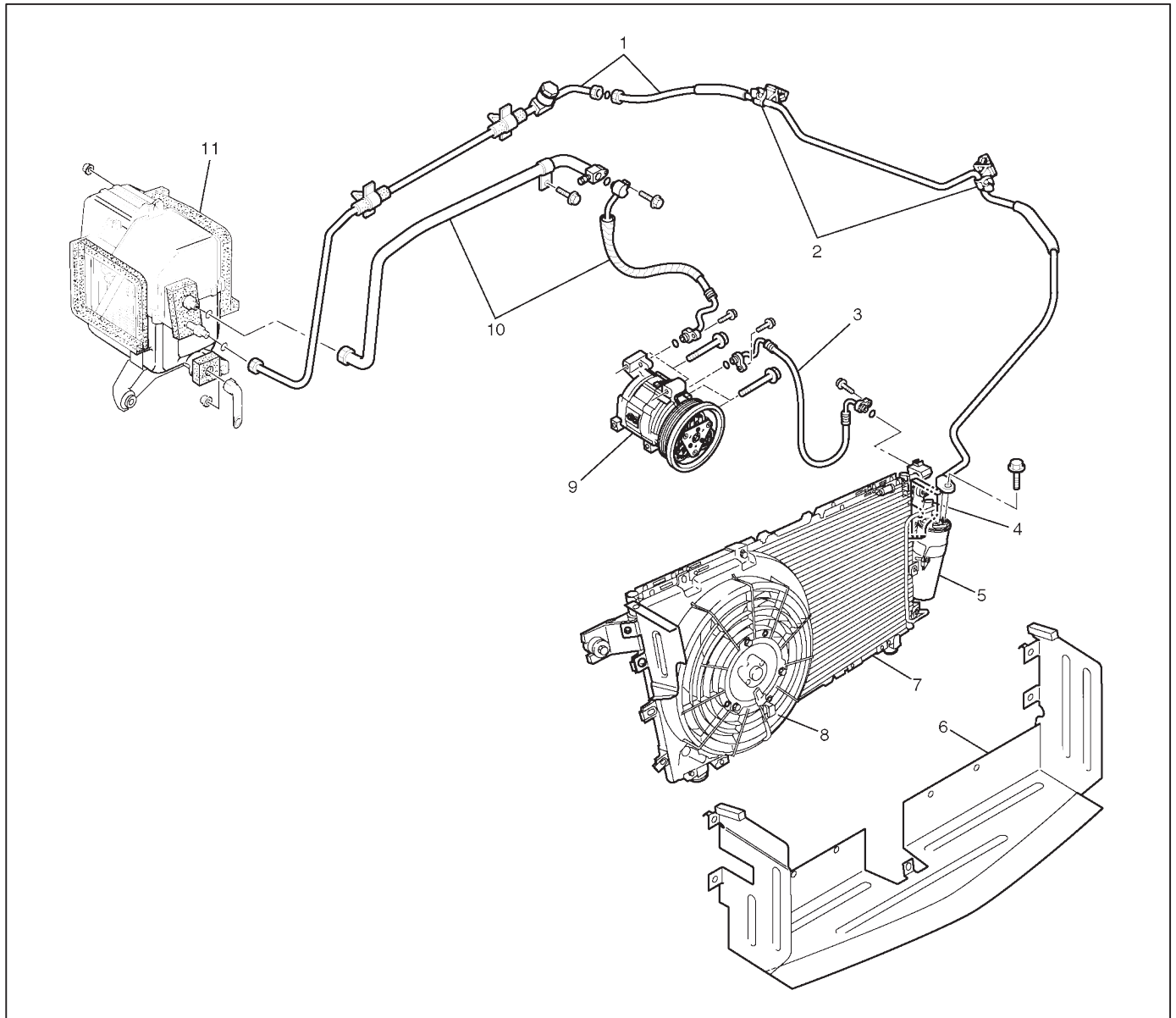
Refrigerant flexible hoses that have a low permeability to refrigerant and moisture are used. These low permeability hoses have a special nylon layer on the inside.



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) | (6) Condenser Air Guide |
| (2) Clip | (7) Condenser & Receiver Tank Assembly |
| (3) Discharge Line (High-Pressure Hose) | (8) Condenser Fan |
| (4) Pressure Switch | (9) Compressor |
| (5) Receiver/Drier | (10) Suction Line (Low-Pressure Hose) |
| | (11) Evaporator Assembly |

Diagnosis

Air Conditioning Cycle Diagnosis

Condition	Possible cause	Correction
No cooling or insufficient cooling.	Magnetic clutch does not run.	Refer to <i>"Magnetic Clutch Diagnosis"</i> 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 <i>Compressor</i> 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 <i>Fan Control Lever (Fan Switch) Diagnosis</i> 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 (5 positions)
- Temperature control set to "MAX COLD" (65°F)
- Air source selector 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.

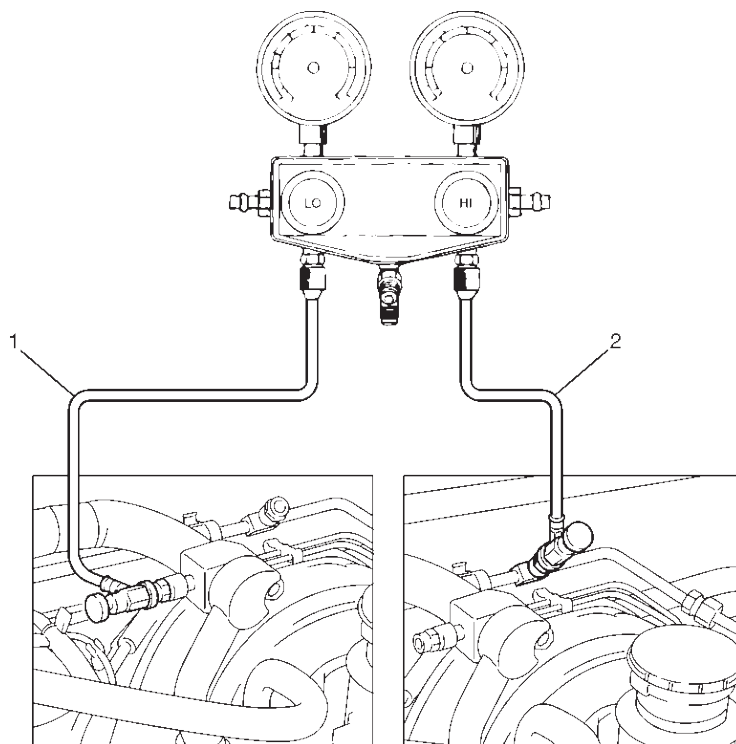
HFC-134a Pressure-Temperature Relationship			
Pressure		Temperature	
(kPa)	(psi)	(°C)	(°F)
36	5.3	–20	–4.4
67	9.7	–15	5
104	15	–10	14
147	21	–5	23
196	28	0	32
255	37	5	41
314	45	10	50
392	57	15	59
471	68	20	68
569	82	25	77
677	98	30	86
785	114	35	95
912	132	40	104
1059	154	45	113
1216	176	50	122

1A-26 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Connect The Manifold Gauge

Low-pressure hose (LOW) — Suction side

High pressure hose (HI) — Discharge side



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Legend

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

HEATING, VENTILATION AND AIR CONDITIONING (HVAC) 1A-27

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. Insufficient cooling.	Excessive refrigerant in system.	Discharge and recover refrigerant. Recharge to specified amount.
Discharge (High Gauge) Pressure Abnormally High. 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. 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. Low pressure gauge indicates vacuum.	Clogged or defective expansion valve.	Replace the expansion valve.
Discharge (High Gauge) Pressure Abnormally Low. 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. 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. 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. 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. 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. Insufficient cooling.	Insufficient refrigerant in system.	Check for leaks. Discharge and recover the refrigerant. Recharge to specified amount.
Suction (Low Gauge) Pressure Abnormally Low. Frost on the expansion valve inlet line	Expansion valve clogged.	Replace the expansion valve.

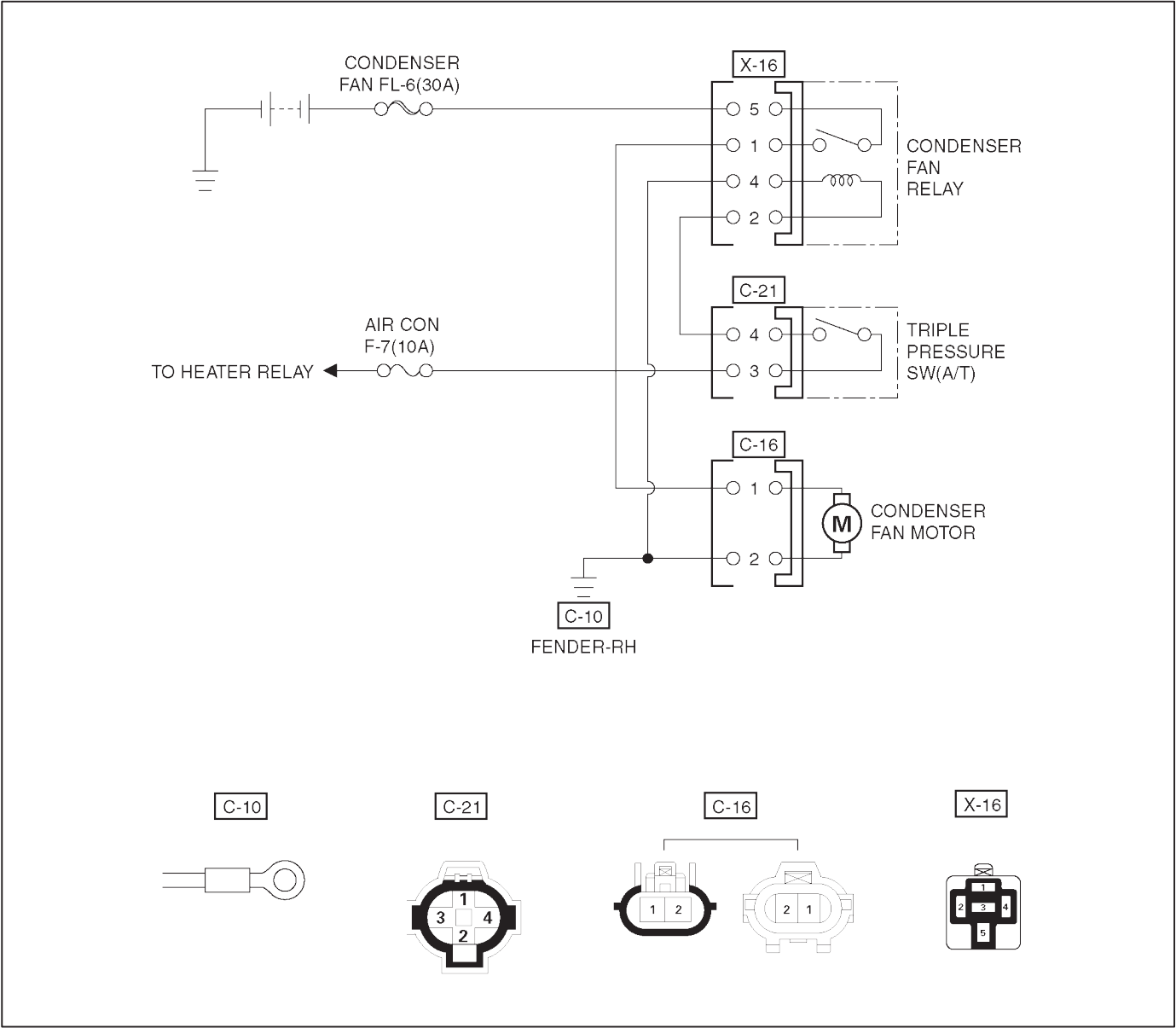
1A-28 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Condition	Possible cause	Correction
Suction (Low Gauge) Pressure Abnormally Low 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. 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. 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. Evaporator core is frozen.	Thermo switch defective.	Replace thermo switch.
Suction (Low Gauge) and Discharge (High Gauge) Pressure Abnormally High. 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. Suction (Low) pressure hose (Not cold).	Air in system.	Evacuate and charge refrigerant.
Suction (Low Gauge) and Discharge (High Gauge) Pressure Abnormally Low. Insufficient cooling	Insufficient refrigerant in system.	Check for leaks. Discharge and recover refrigerant. Recharge to specified amount.

A/C — Air Conditioning

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.



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

1A-30 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)**Chart “A” Condenser Fan Does Not Run**

Step	Action	Yes	No
1	Are 30A fuse normal?	Go to <i>Step 2</i>	Replace
2	Is relay (X-16) normal?	Go to <i>Step 3</i>	Replace
3	Is pressure switch normal?	Go to <i>Step 4</i>	Switch defective or insufficient refrigerant.
4	Is fan motor normal?	Go to <i>Step 5</i>	Replace
5	1. Disconnect condenser fan relay (X-16). 2. Check to see if battery voltage is present at the chassis side relay terminal NO. X16-5. Is there a battery voltage?	Go to <i>Step 6</i>	Repair open circuit between Condenser Fan fuse (30A) and No.X16-5.
6	1. Reconnect condenser fan relay (X-16). 2. Check to see if battery voltage is present at chassis side connector terminal No.C21-3. Is there a battery voltage?	Go to <i>Step 7</i>	Repair open circuit between fuse (10A) and C21-3.
7	Check to see if continuity between chassis side relay terminal No.X16-2 and the chassis side connector terminal No.C21-4. Is there a continuity?	Go to <i>Step 8</i>	Repair open circuit.
8	Check to see if continuity between chassis side connector terminal No. C16-1 and chassis side relay terminal No.X16-1. Is there a continuity?	Poor ground or open circuit between chassis side connector terminal No.X16-4 (or No.C16-2) and body ground (No.C10).	Repair open circuit.

Chart “B” Condenser Fan Does Not Stop

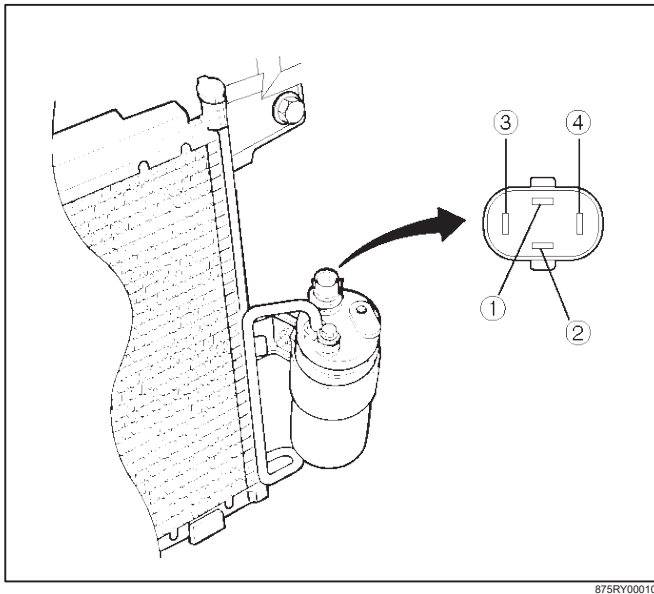
Step	Action	Yes	No
1	1. Disconnect the triple pressure connector. Does condenser fan stop?	Replace the triple pressure switch.	Replace the condenser fan relay.

Air Conditioning System

Individual Inspection

Triple Pressure Switch (V6, A/T)

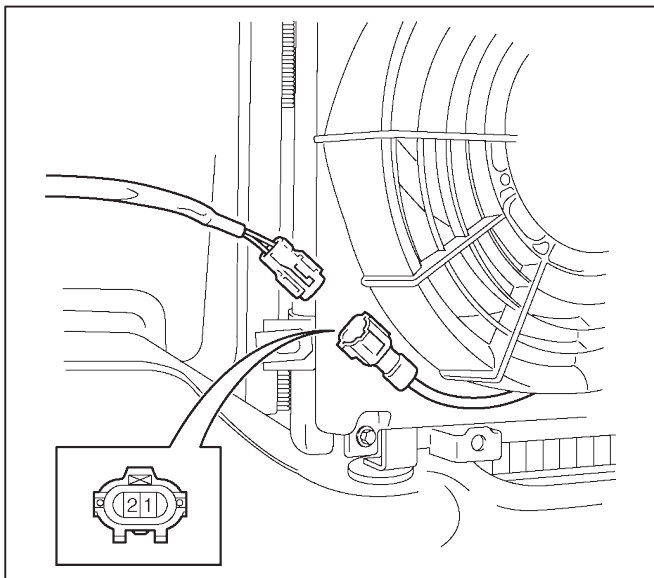
1. Disconnect the connector and check for continuity between pressure switch side connector terminals (1) and (2).
2. Reconnect the connector to activate the A/C switch, and check to see if there is continuity between the chassis side connector terminals (3) and (4) and the fan operates.



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Condenser Fan

1. Disconnect the condenser fan connector.
2. Connect the battery positive terminal to the condenser fan side connector terminal No.C-16-1 and negative to the No.C-16-2.
3. Check that condenser fan is rotating correctly.



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General Repair Procedure

Precautions For Replacement or Repair of Air Conditioning Parts

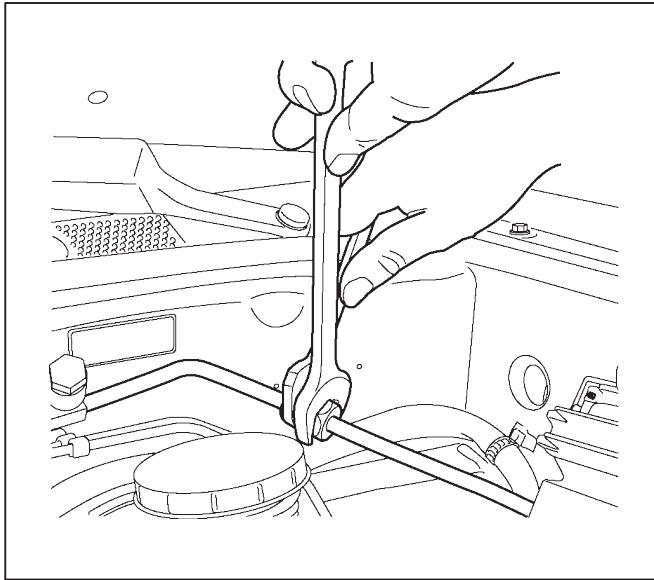
There are certain procedures, practices and precautions that should be followed when servicing air conditioning systems:

- 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 (ACR⁴: 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

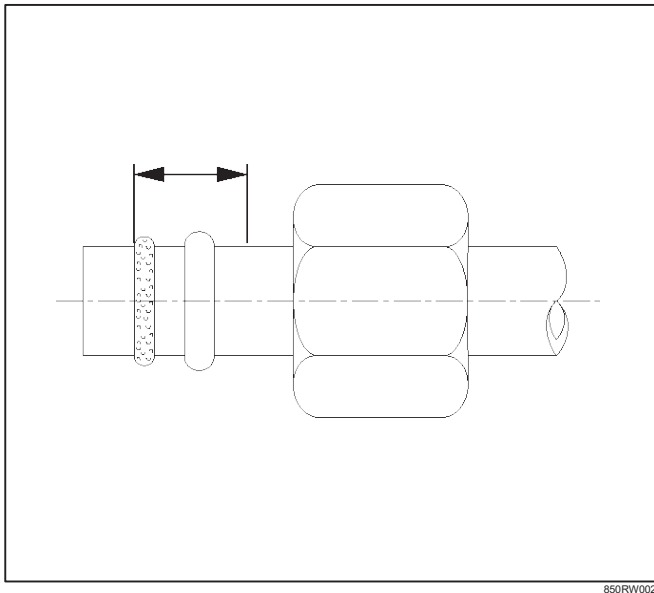
Refrigerant Line Connections

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

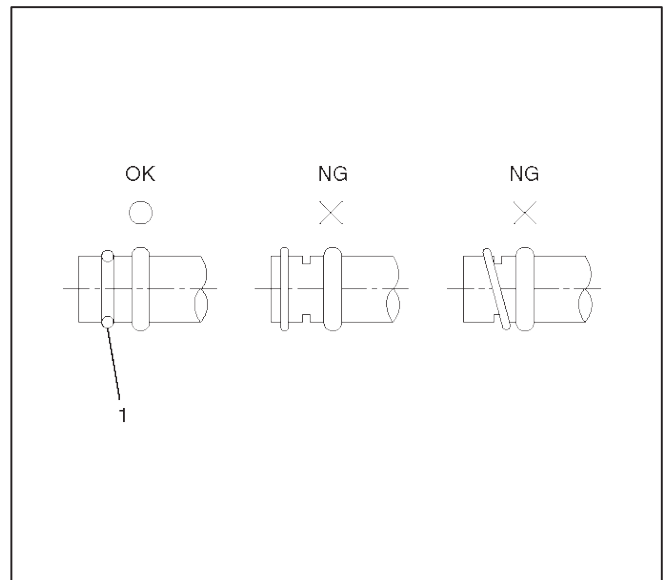


When connecting the refrigerant line at a block joint, securely insert the projecting portion of the joint portion into the connecting hole on the unit side and secure with a bolt. Apply the specified compressor oil to the O-rings prior to connecting.

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

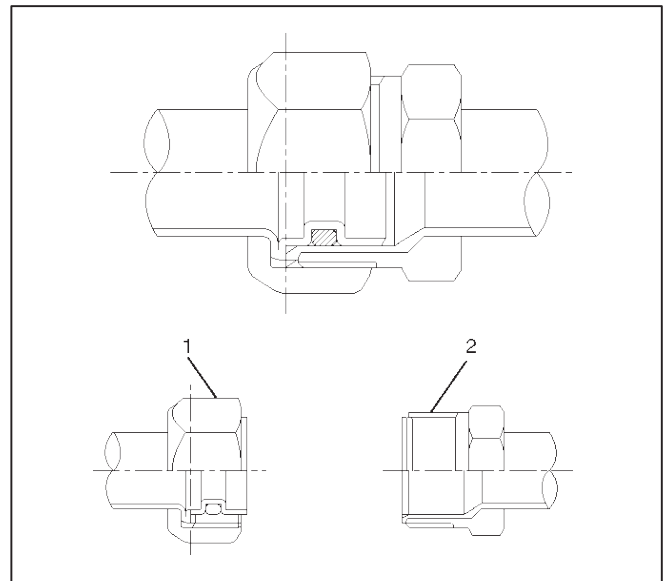


O-rings (2) must be fitted in the groove (1) of refrigerant line.



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. 2. Charge the refrigerant. 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. 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.

1A-34 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

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).

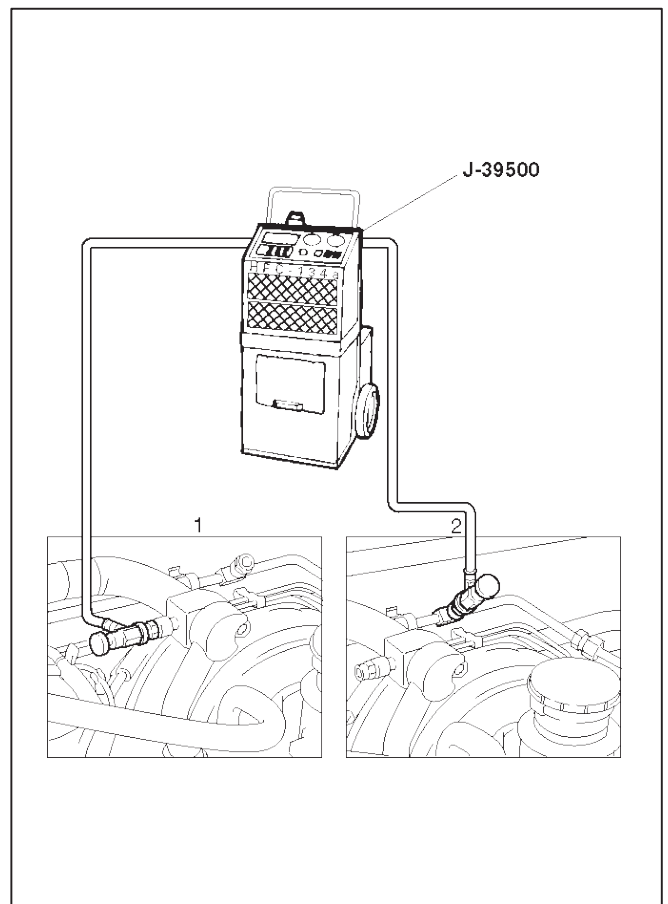
WARNING:

- **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 (ACR⁴: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 ACR⁴(or equivalent) as shown below.



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Legend

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

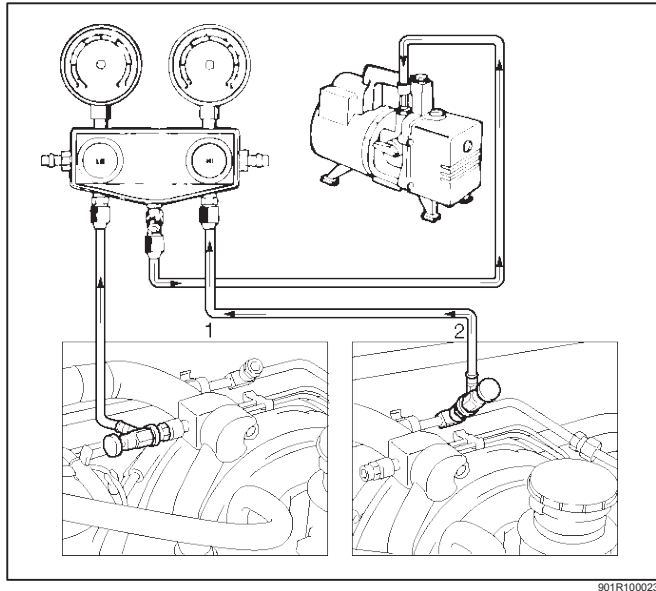
2. Recover the refrigerant by following the Manufacturer's Instructions.
3. When a part is removed, put a cap or a plug on the connecting portion so that dust, dirt or moisture cannot get into it.

Refrigerant Recycling

Recycle the refrigerant recovered by J-39500 (ACR⁴:HFC-134a Refrigerant Recovery / Recycling / Recharging / System) or equivalent.

For the details of the actual operation, follow the steps in the ACR⁴(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 ACR⁴(or equivalent) manufacturer's instructions when evacuating the system with a ACR⁴(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

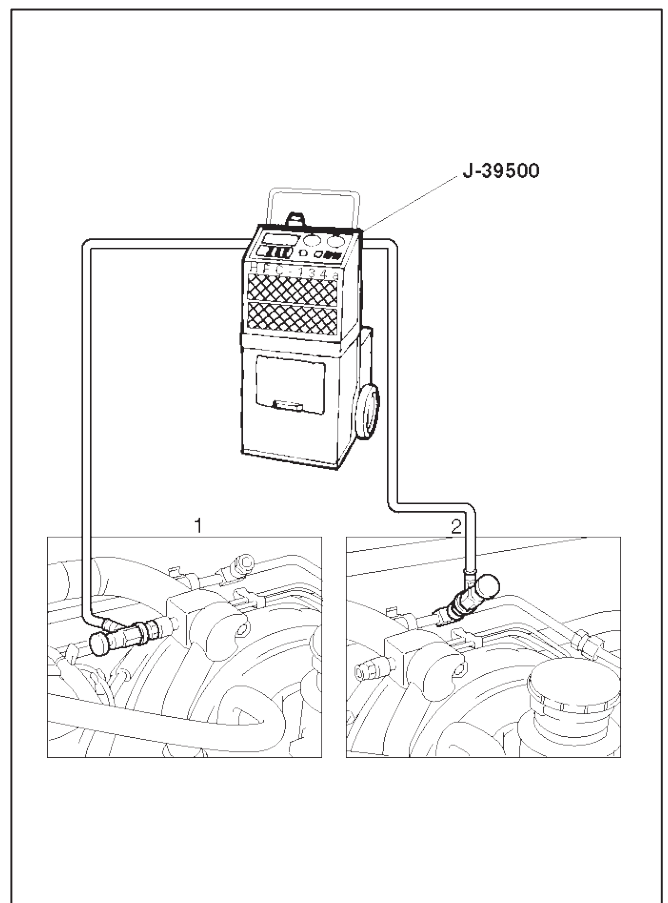
There are various methods of charging refrigerant into the air conditioning system.

These include using J-39500 (ACR⁴:HFC-134a Refrigerant Recovery/Recycling/Recharging/System) or equivalent and direct charging with a weight scale charging station.

Charging Procedure

• ACR⁴(or equivalent) Method

For the charging of refrigerant recovered by ACR⁴(or equivalent), follow the manufacturer's instruction.



901R100022

Legend

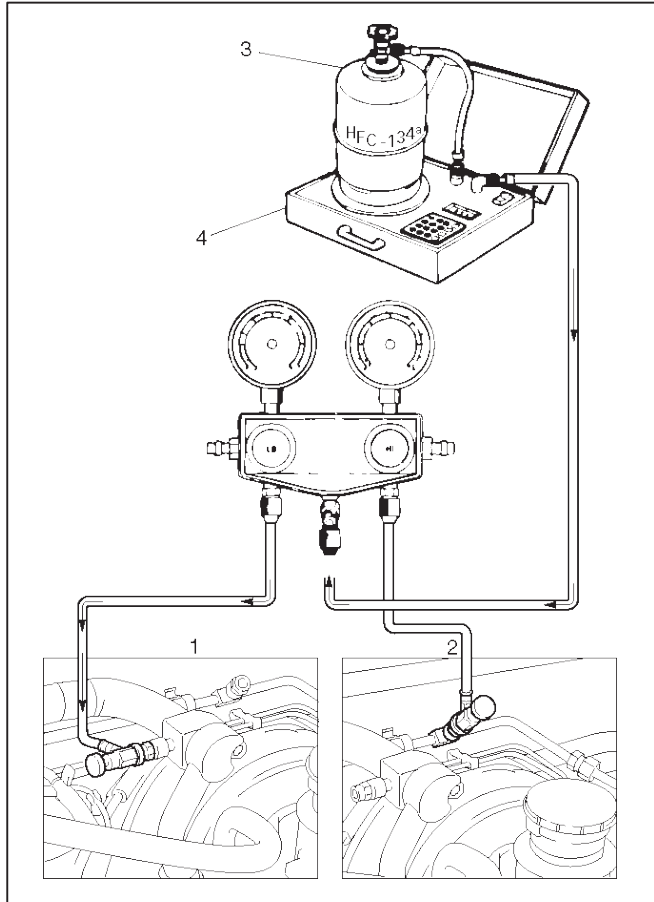
- (1) Low Side
- (2) High Side

• 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.

1A-36 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

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.

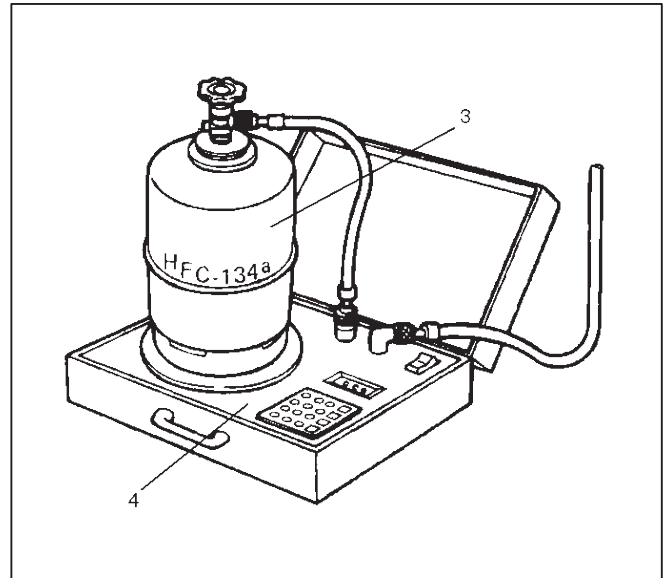


901R100021

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.



901RS144

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: 700 g (1.54 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.

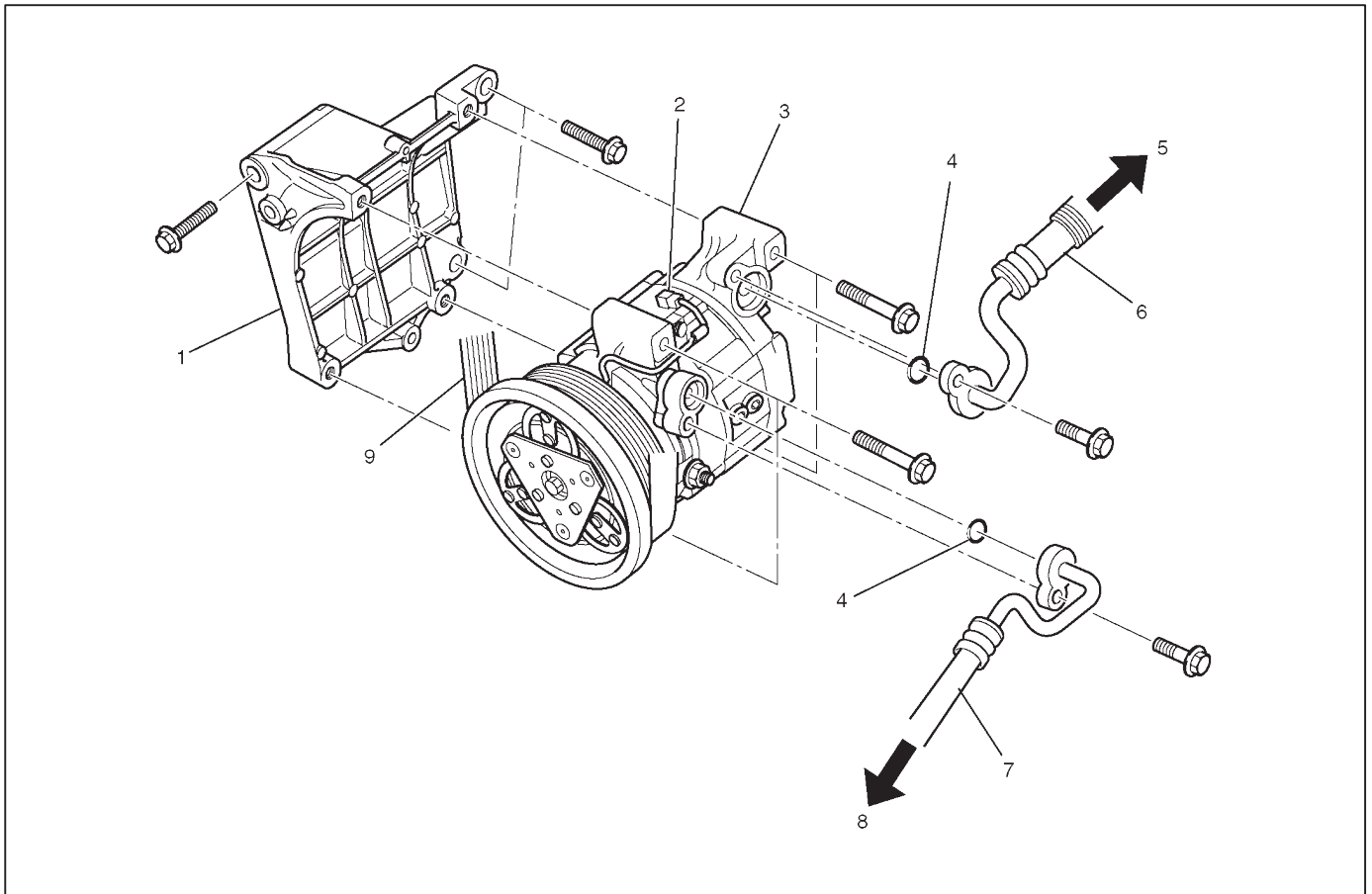
8. When finished with the refrigerant charging, close the low pressure valve of the manifold gauge and container valve.
9. Check for refrigerant leaks.

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 switch to "CIRC", set the temperature switch 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 switch of the control panel to different positions. Check if the outlet temperature changes as selected by the control switch.

Compressor Assembly

Compressor Assembly and Associated Parts (6VE1)



852R100002

Legend

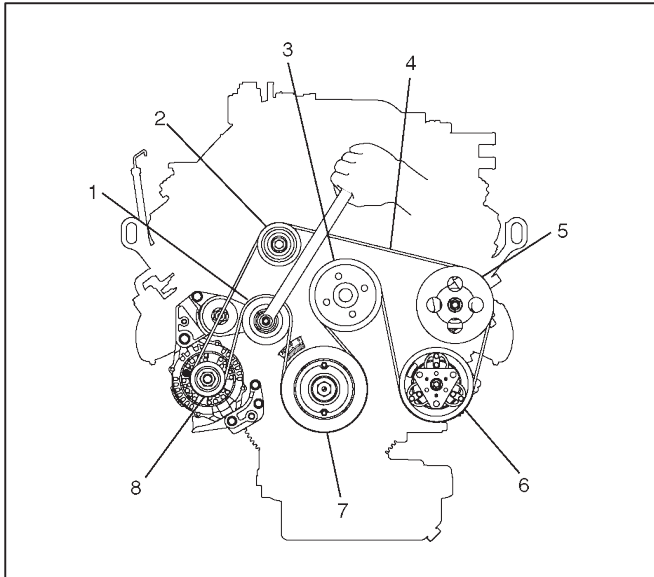
- | | |
|---------------------------------------|---|
| (1) Compressor Bracket | (5) To Evaporator |
| (2) Magnetic Clutch Harness Connector | (6) Suction Line (Low-Pressure Hose) |
| (3) Compressor | (7) Discharge Line (High-Pressure Hose) |
| (4) O-ring | (8) To Condenser |
| | (9) Serpentine Belt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

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.

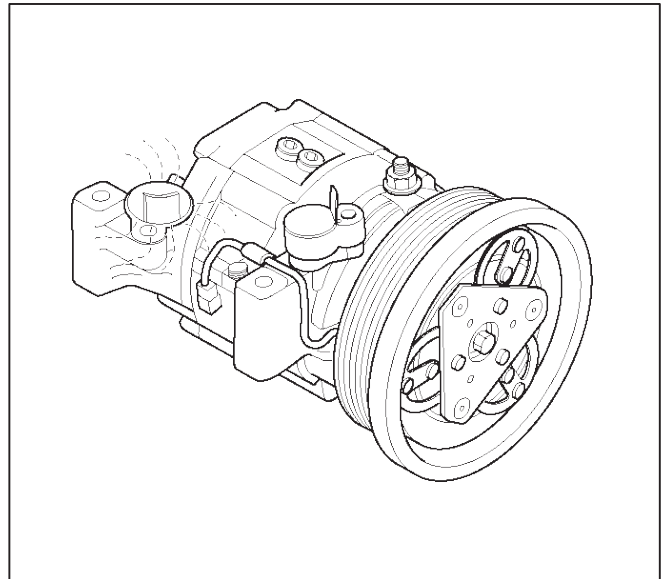
- Move serpentine belt tensioner to loose side using wrench, then install serpentine belt to normal position.

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;

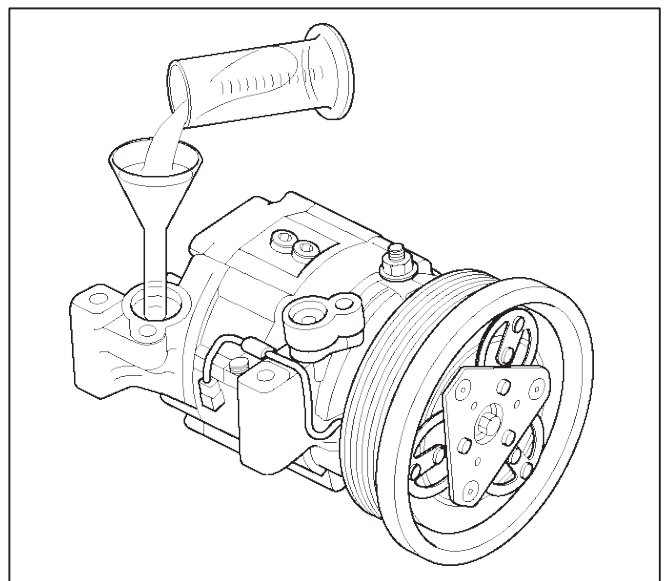
1. Gently release nitrogen gas from the new compressor.
 - Take care not to let the compressor oil flow out.
 - Inspect O-rings and replace if necessary.



871RX033

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

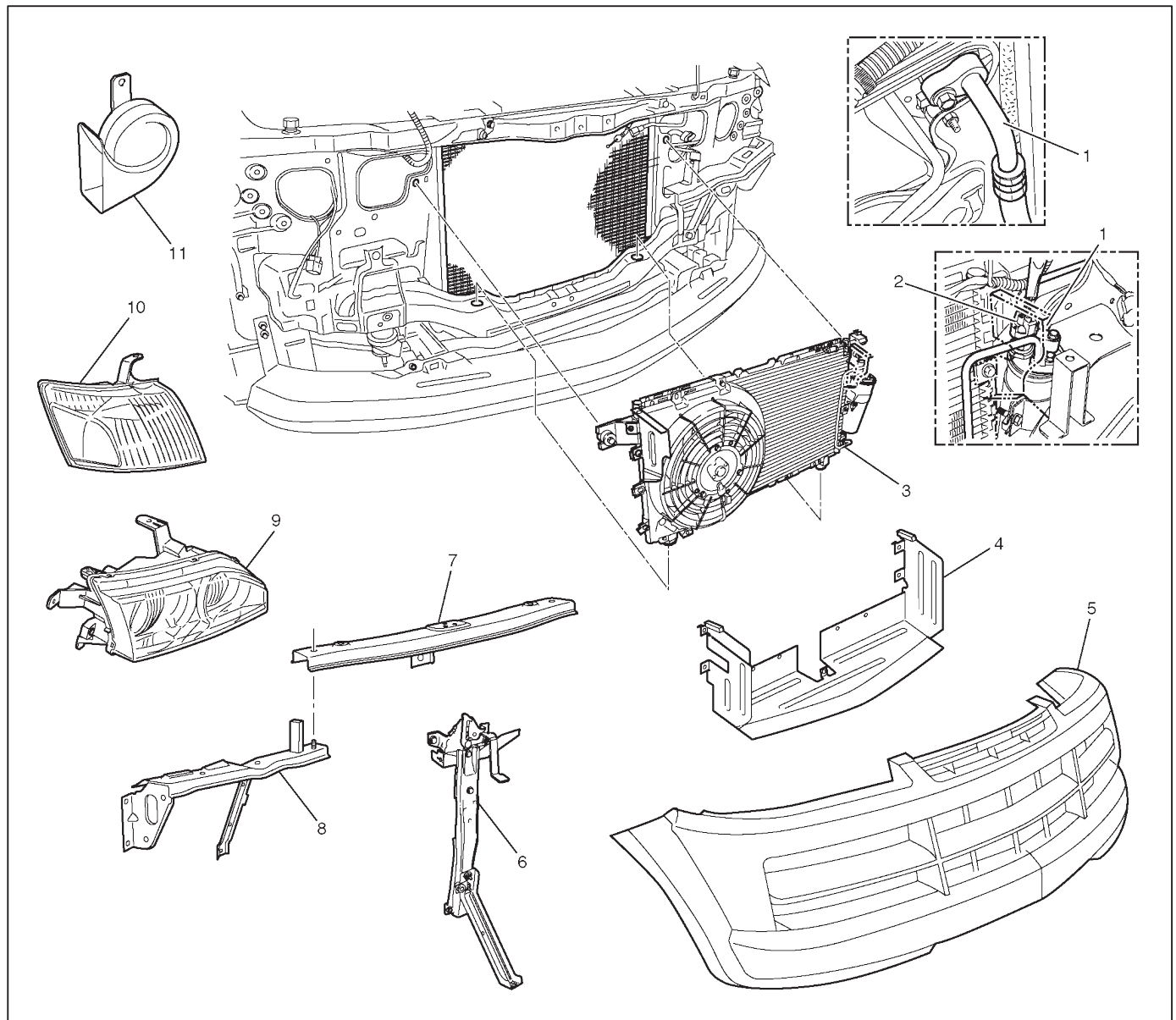
3. When installing on a new system, the compressor should be installed as it is. When installing on a used system, the compressor should be installed after adjusting the amount of compressor oil. (Refer to *Compressor in this section*)



871RX035

Condenser Assembly

Condenser Assembly and Associated Parts



875R200022

Legend

- | | |
|--|--|
| (1) Refrigerant Line | (6) Engine Hood Front End W/Engine Hood Lock & Bumper Stay |
| (2) Pressure Switch Connector | (7) Front Center Bumper Retainer |
| (3) Condenser & Receiver Tank Assembly | (8) Front Side Bumper Retainer (RH) |
| (4) Condenser Air Guide | (9) Head Light (R/LH) |
| (5) Front Bumper Assembly | (10) Front Side Turn Signal Light (R/LH) |
| | (11) Horn (R/LH) |

Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
 - Refer to *Refrigerant Recovery* in this section.
3. Remove front bumper assembly.
 - Refer to the *Front Bumper in Body Structure* section.
4. Remove front center bumper retainer.
5. Remove front side bumper retainer (RH).
6. Remove condenser air guide.
7. Remove engine hood front end with engine hood lock & bumper stay.
 - Apply setting mark to the engine hood lock fixing position before removing it.

8. Remove horn (R/LH).
9. Remove front side turn signal light (R/LH).
10. Remove head light (R/LH).
11. Disconnect pressure switch, ambient sensor and condenser fan connector.
12. 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.
13. Remove condenser & receiver tank assembly.
 - Handle with care to prevent damaging the condenser or radiator fin.

Installation

1. Install condenser & receiver tank 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)

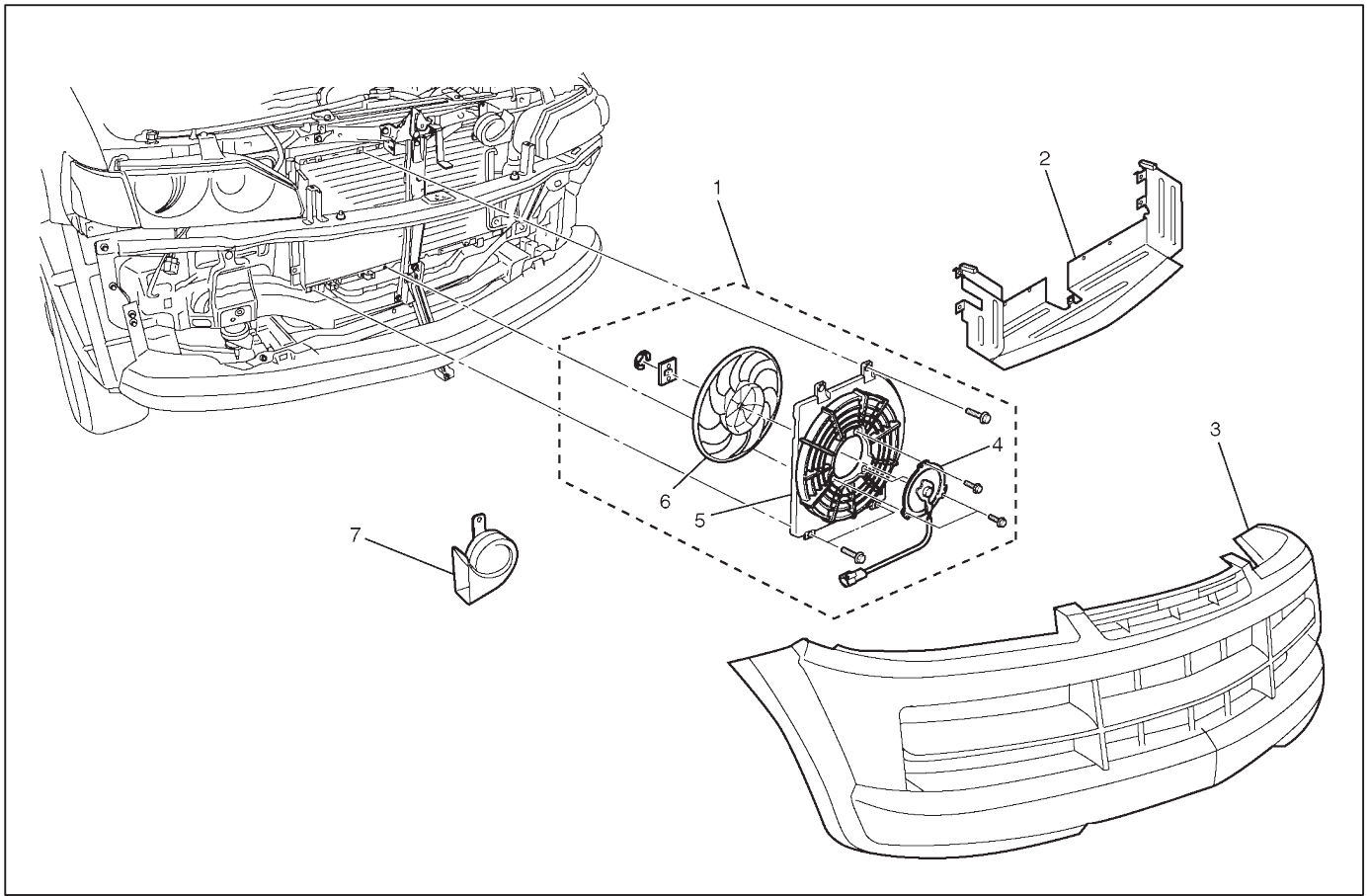
 - Tighten the outlet line connector fixing bolt to the specified torque.

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, ambient sensor and condenser fan connector.
4. Install head light (R/LH).
5. Install front side turn signal light (R/LH).
6. Install horn (R/LH).
7. Install engine hood front end with engine hood lock & bumper stay.
 - Align the setting mark when installing.
8. Install condenser air guide.
9. Install front side bumper retainer (RH).
10. Install front center bumper retainer.
11. Install front bumper assembly.

Condenser Fan Motor

Condenser Fan Motor and Associated Parts



875R200016

Legend

- | | |
|----------------------------|-------------------------|
| (1) Condenser Fan Assembly | (4) Condenser Fan Motor |
| (2) Condenser Air Guide | (5) Shroud |
| (3) Front Bumper Assembly | (6) Fan |
| | (7) Horn (RH) |

Removal

1. Disconnect the battery ground cable.
2. Remove the front bumper assembly.
 - Refer to the *Front Bumper in Body Structure section*.
3. Remove the condenser air guide.
4. Remove the horn (RH).
5. Remove the condenser fan assembly.
 - Disconnect the fan motor connector and remove the 3 fixing bolts.
6. Remove the shroud.
 - Remove the 3 fixing nuts.
 - Loosen the condenser fixing nut and disconnect the fan motor connector from bracket.
7. Remove the fan.
 - Remove the fan fixing C-ring and plate.
8. Remove the condenser fan motor.

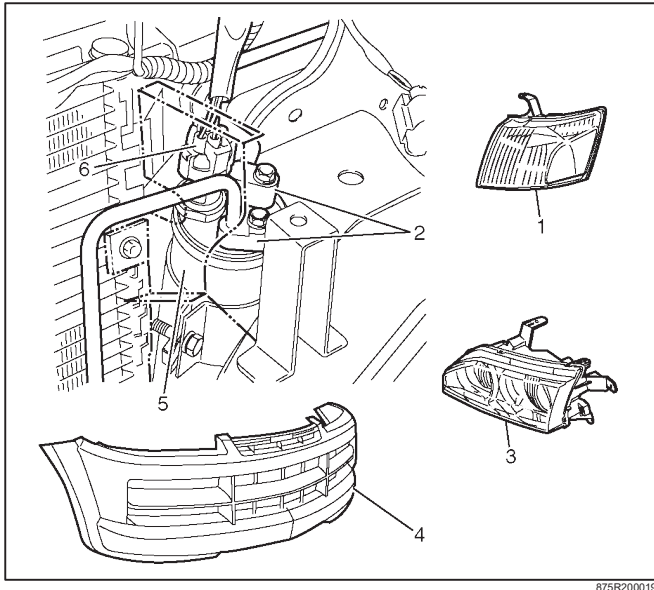
Installation

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



875R200019

Legend

- (1) Front Side Turn Signal Light (LH)
- (2) Refrigerant Line
- (3) Head Light (LH)
- (4) Front Bumper Assembly
- (5) Receiver / Drier
- (6) Pressure Switch Connector

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)

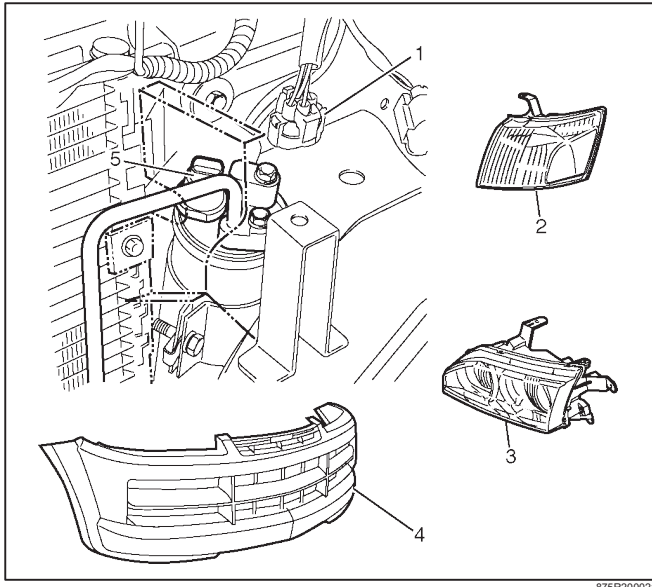
4. O-rings cannot be reused. Always replace with new ones.
5. Be sure to apply new compressor oil to the O-rings when connecting the refrigerant line.

Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
 - Refer to *Refrigerant Recovery in this section*.
3. Remove front bumper assembly.
 - Refer to the *Front Bumper in Body Structure section*.
4. Remove front side turn signal light (LH).
5. Remove head light (LH).
6. Disconnect pressure switch connector.
7. 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.
8. 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



875R200021

Legend

- (1) Pressure Switch Connector
- (2) Front Side Turn Signal Light (LH)
- (3) Head Light (LH)
- (4) Front Bumper Assembly
- (5) Pressure Switch

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.

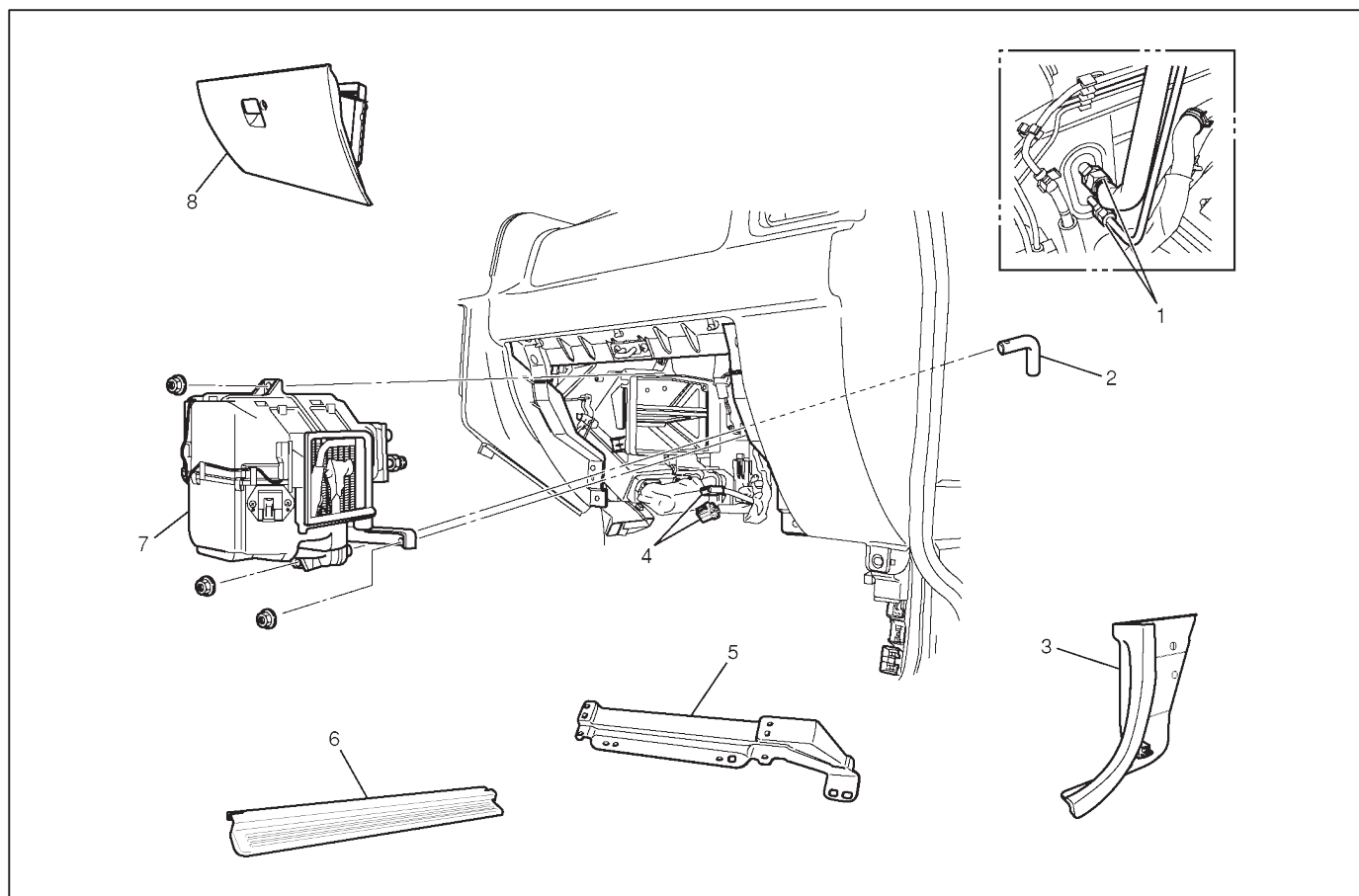
Torque: 13 N•m (113 lb in)

Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
 - Refer to *"Refrigerant Recovery in this section."*
3. Remove the front bumper assembly.
 - Refer to the *Front Bumper in Body Structure section.*
4. Remove the front side turn signal light (LH).
5. Remove the head light (LH).
6. Disconnect pressure switch connector.
7. 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



874R200015

Legend

- (1) Refrigerant Line
- (2) Drain Hose
- (3) Dash Side Trim Panel
- (4) Power Transistor and Duct Sensor Connector

- (5) Passenger Lower Bracket
- (6) Sill Plate
- (7) Evaporator Assembly
- (8) Glove Box

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 power transistor (2) and duct sensor connector (1).
5. Remove sill plate.
6. Remove dash side trim panel.
7. Remove passenger lower bracket.
8. Disconnect drain hose.



874R200005

1A-46 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

9. Disconnect drain hose.
10. 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.
11. 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)

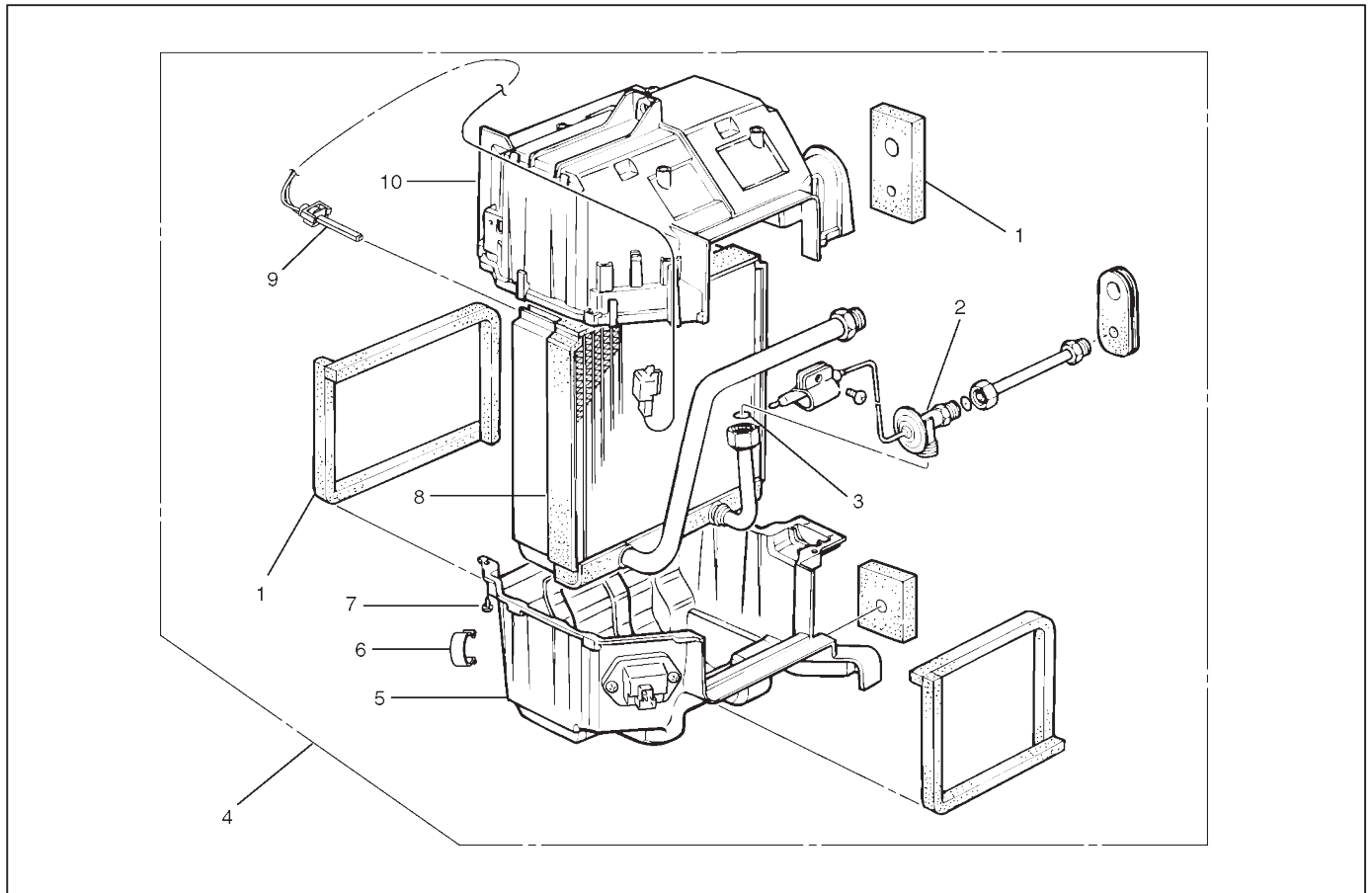
3. Tighten the refrigerant inlet line to the specified torque.

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.

Duct Sensor, Evaporator Core and/or Expansion Valve

Disassembled View



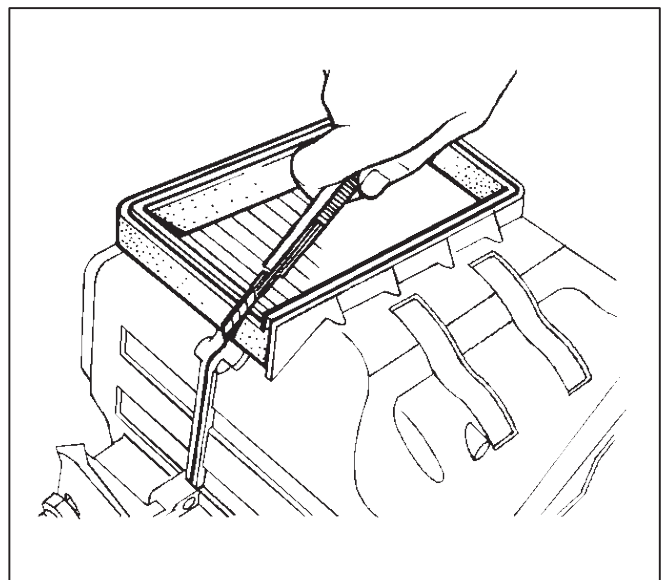
874R200012

Legend

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

Removal

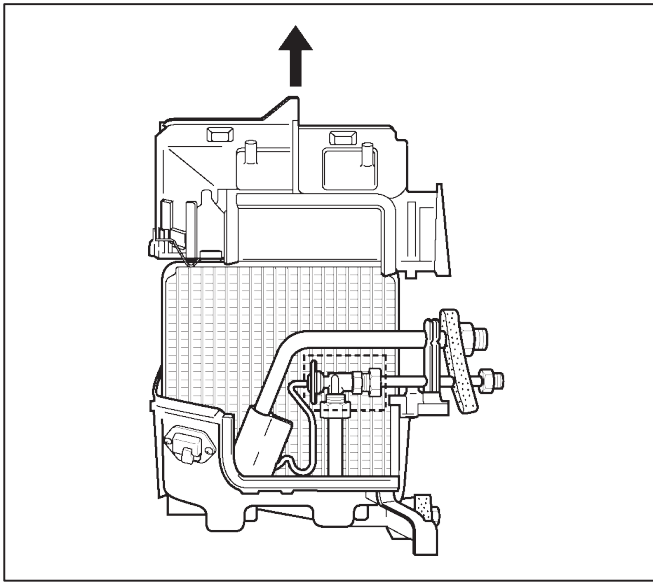
1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
 - Refer to *Refrigerant Recovery* in this section.
3. Remove evaporator assembly.
 - Refer to *Evaporator Assembly* in this section.
4. Remove the duct sensor fixing clip.
 - Pull the sensor from the evaporator assembly.
5. 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.



874RS006

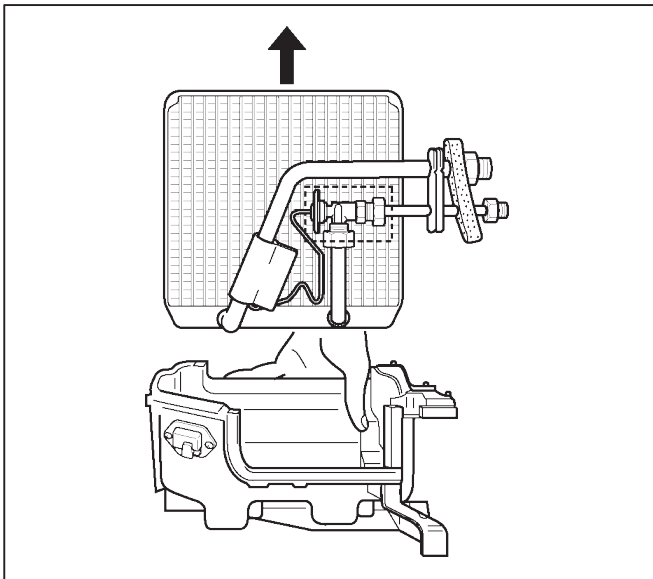
1A-48 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

- Lift to remove the upper case.



874R200007

9. Remove evaporator core.



874R200008

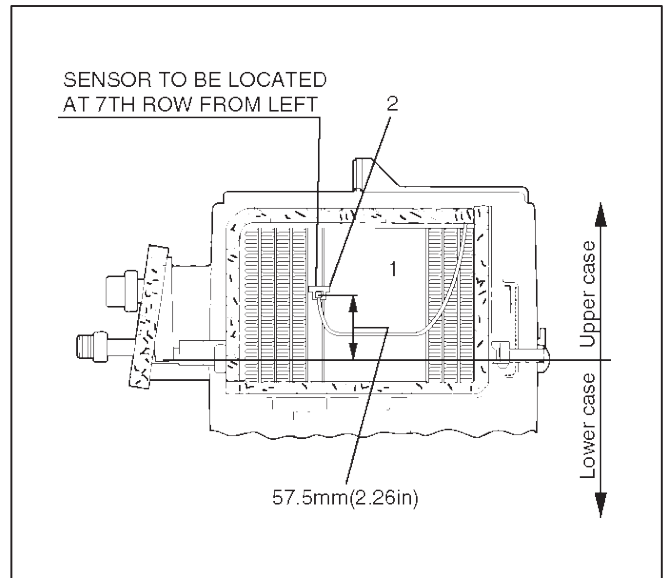
10. Remove expansion valve.

- 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.

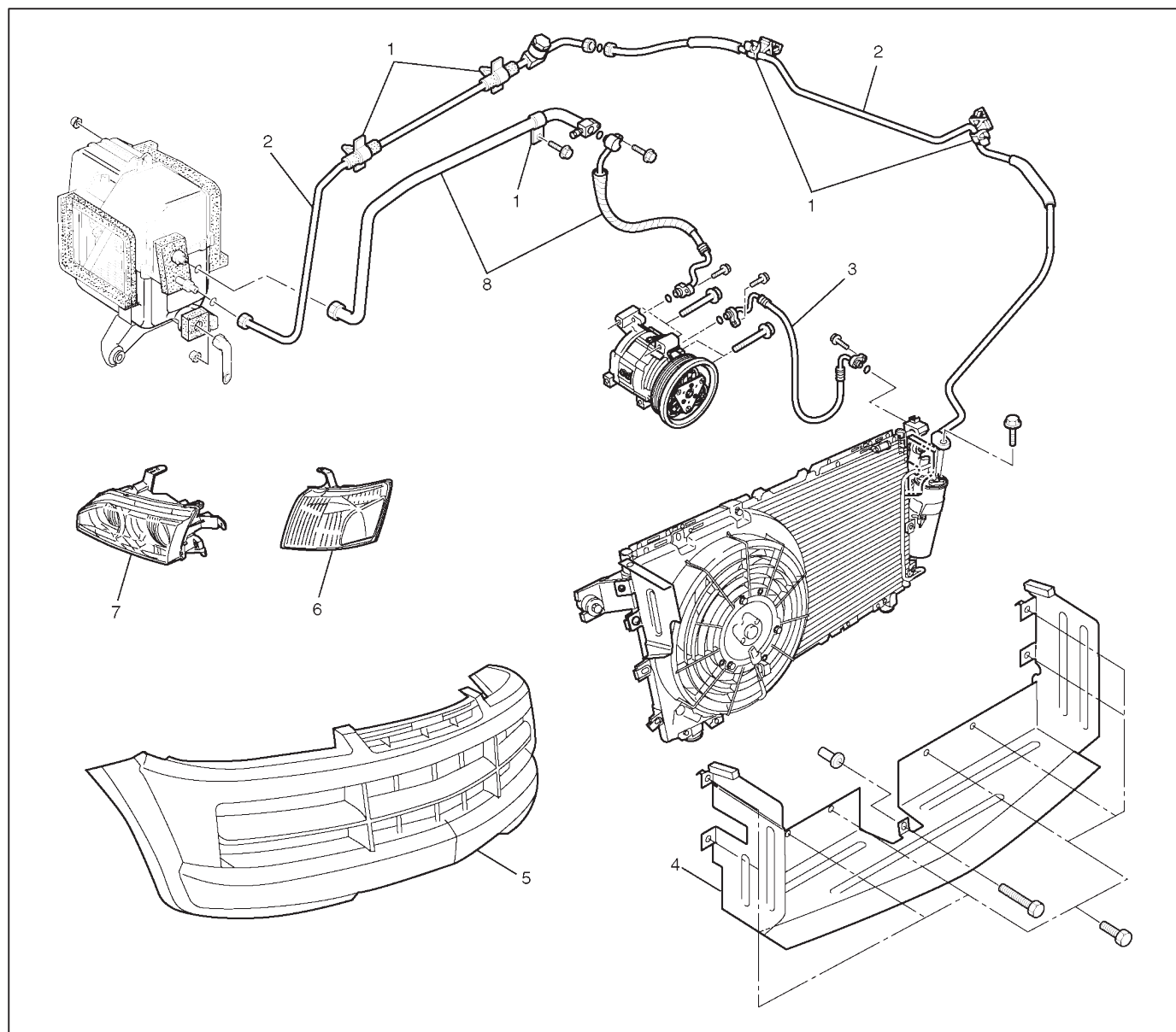


874RY00016

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



852R200007

Legend

- | | |
|---|---------------------------------------|
| (1) Clip and Clamp | (5) Front Bumper Assembly |
| (2) Liquid Line (High-Pressure Pipe) | (6) Front Side Turn Signal Light (LH) |
| (3) Discharge Line (High-Pressure Hose) | (7) Head Light (LH) |
| (4) Condenser Air Guide | (8) 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 the front bumper assembly.
 - Refer to the *Front Bumper* in *Body Structure* section.
4. Remove the condenser air guide.
5. Remove the front side turn signal light (LH).
6. Remove the head light (LH).
7. Remove clip and clamp.
8. Disconnect liquid line (High-pressure pipe).
9. Disconnect suction line (Low-pressure pipe) using a back-up wrench.
10. Disconnect suction line (Low-pressure hose) using a back-up wrench.

11. 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:

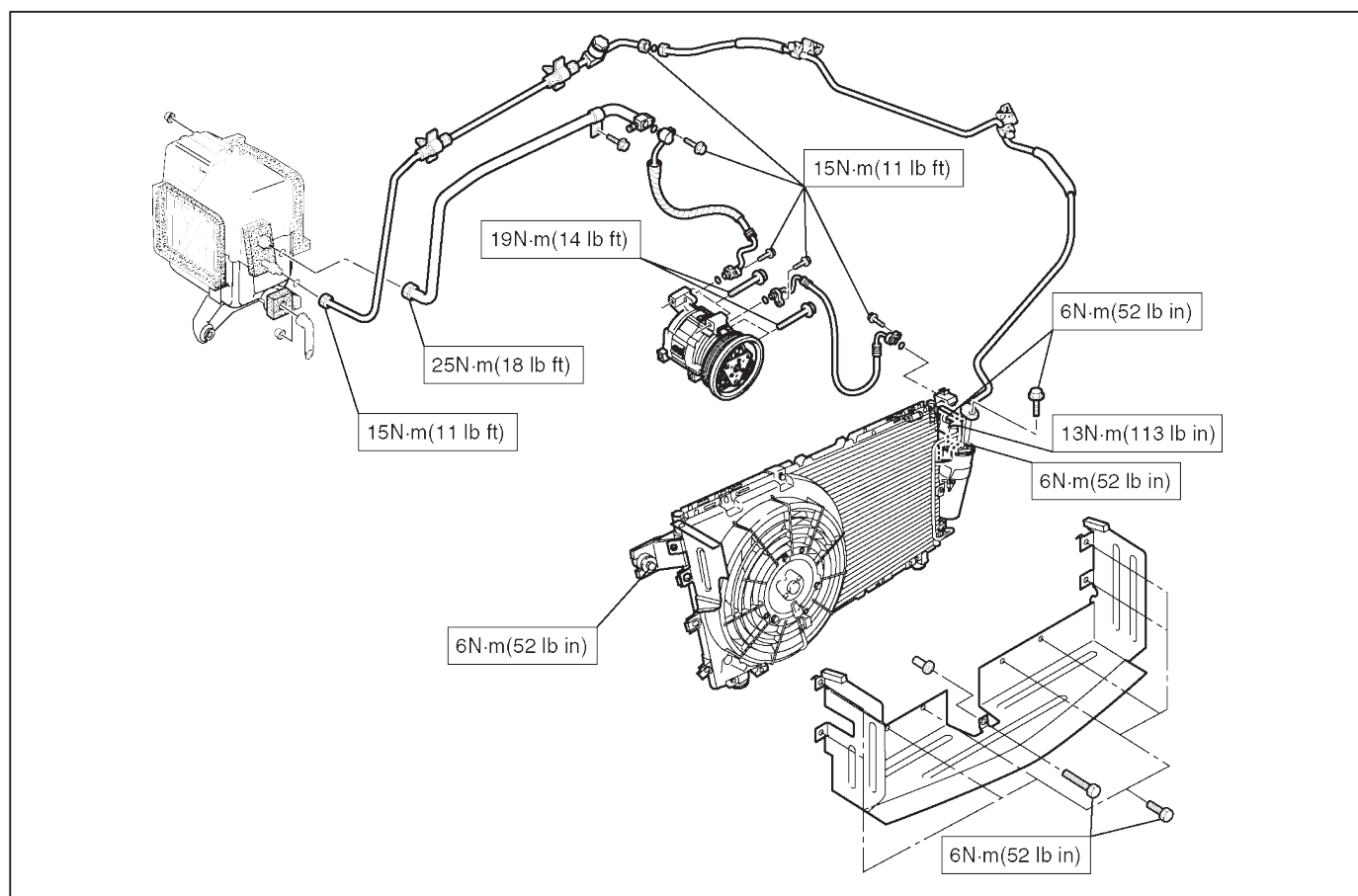
1. O-rings cannot be reused. Always replace with new ones.
2. Be sure to apply new compressor oil to the O-rings when connecting lines.
3. Tighten the refrigerant line to the specified torque.
Refer to *Main Data and Specifications for Torque Specifications* in this section.

Main Data And Specifications

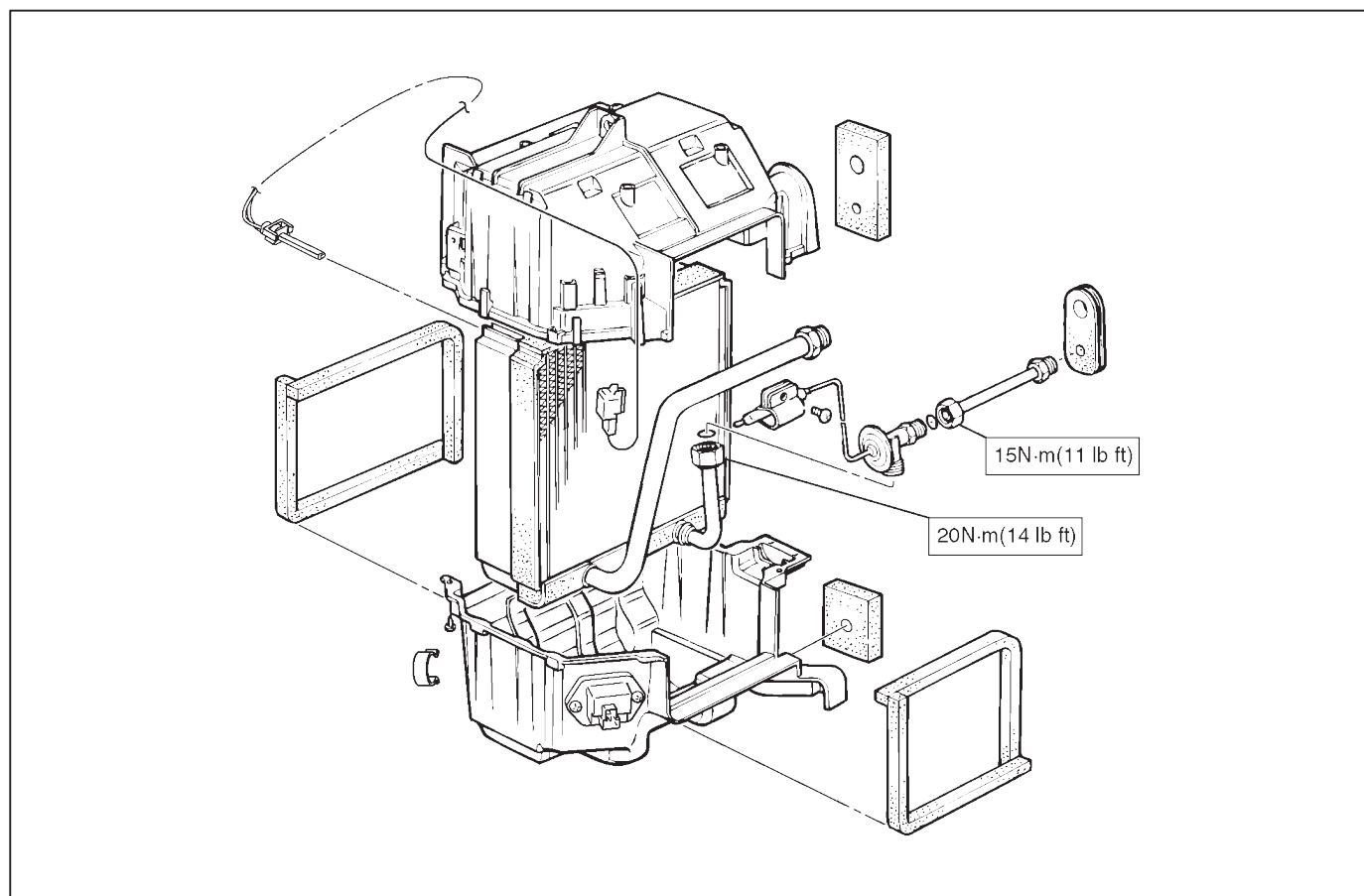
General Specifications

Heater Unit	
Temperature control	Reheat air mix system
Capacity	4.3 kw (3700 Kcal./hr.)
Air flow	280 m ³ /h
HEATER CORE	
Type	Plate and corrugate fin
Element dimension	167 mm (6.6 in.) × 151 mm (5.9 in.) × 35 mm (1.4 in.)
Radiating area	Approx. 2.4 m ²
EVAPORATOR ASSEMBLY	
Capacity	4.8 kw (4100 Kcal./hr.)
Air flow	430 m ³ /hr
EVAPORATOR CORE	
Type	Al-laminate louver fin type
Element dimension	235 mm (9.3 in.) × 224 mm (8.8 in.) × 60 mm (2.4 in.)
EXPANSION VALVE	
Type	Internal pressure equalizer type
CONDENSER	
Type	Parallel flow type
Radiation performance	14.8 kw (12,700 Kcal./hr.)
CONDENSER FAN	
Air flow	850 m ³ /h
Fan size	φ261
RECEIVER/DRIER	
Type	Assembly includes triple pressure switch
Internal volume	300 cc (10 fl.oz.)
PRESSURE SWITCH	
Type	Triple pressure switch
	Low pressure control ON: 206.0±30.0 kPa (29.8±4.3 psi) OFF: 176.5±19.6 kPa (25.6±2.8 psi)
	Medium pressure control ON: 1471.0±98.1 kPa (213.3±14.2 psi) OFF: 1078.7±117.7 kPa (156.4±17.7 psi)
	High pressure control ON: 2353.6±196.1 kPa (341.3±28.4 psi) OFF: 2942.0±196.1 kPa (426.6±28.4 psi)
REFRIGERANT	
Type	HFC-134a
Specified amount	700 g (1.54 lbs.)

Torque Specifications



852R200009



874R200013

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.

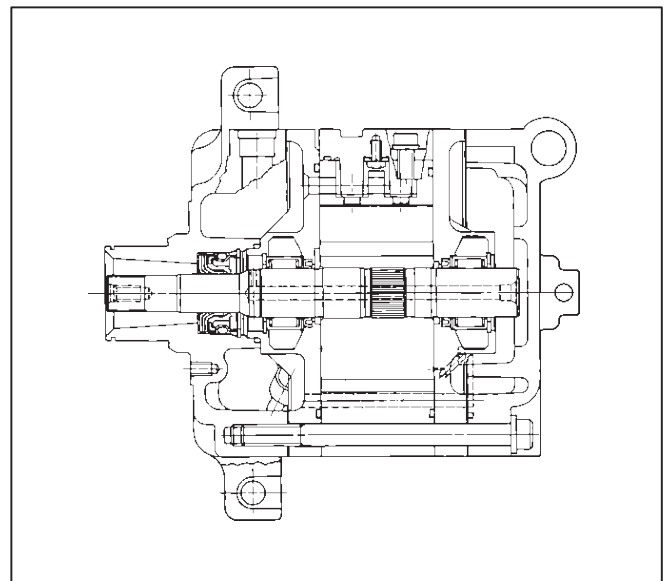
DKV-14G Type Compressor

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.



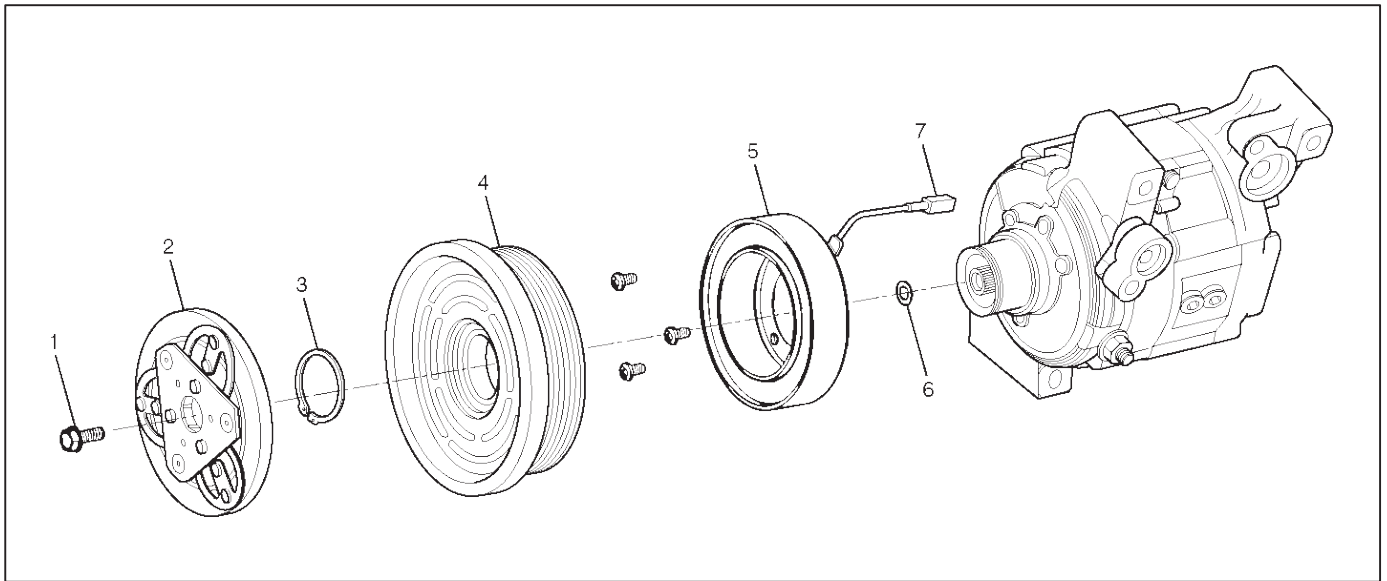
871RX002

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

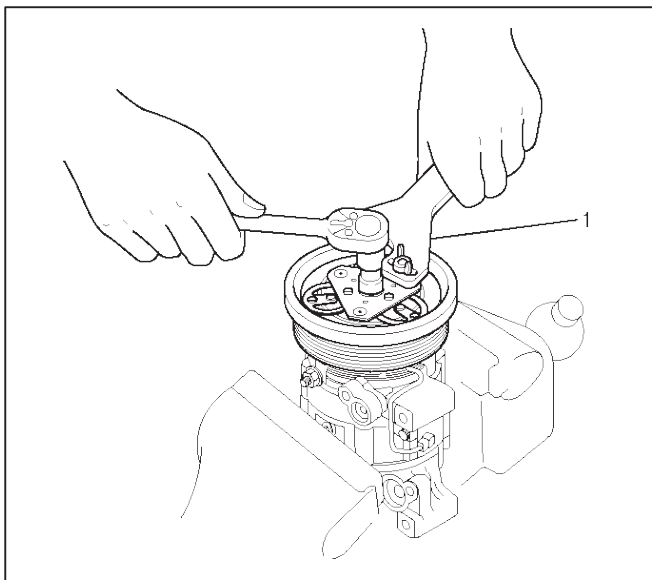
Legend

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

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

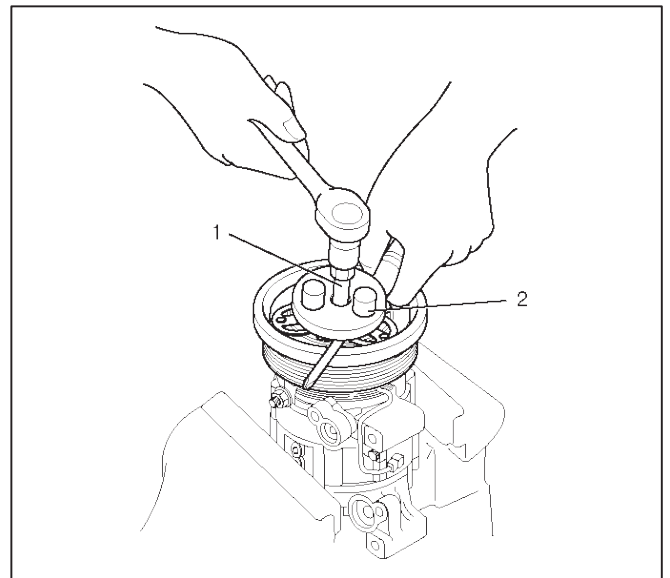
Removal

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).

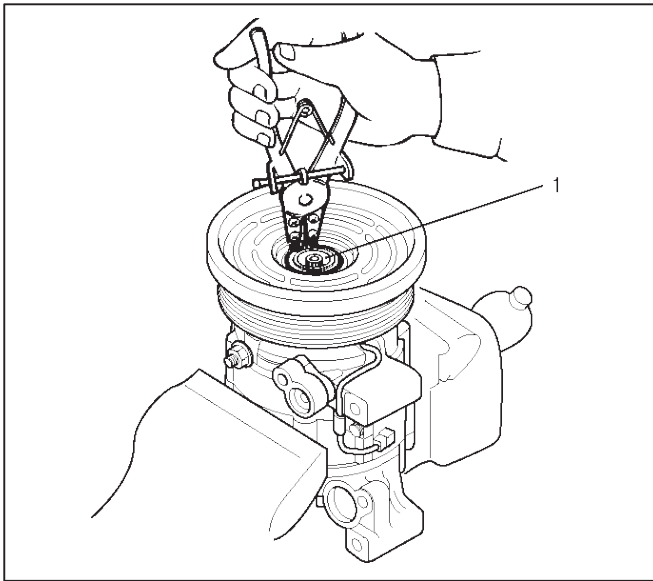


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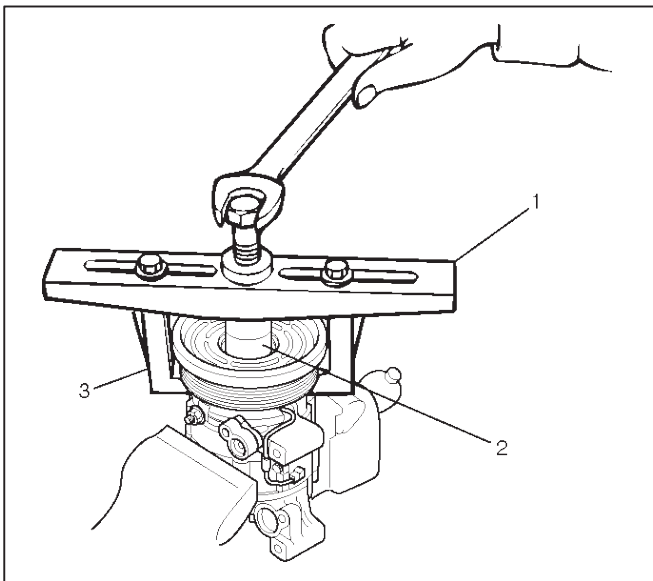
3. Remove shim (s).

1A-56 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

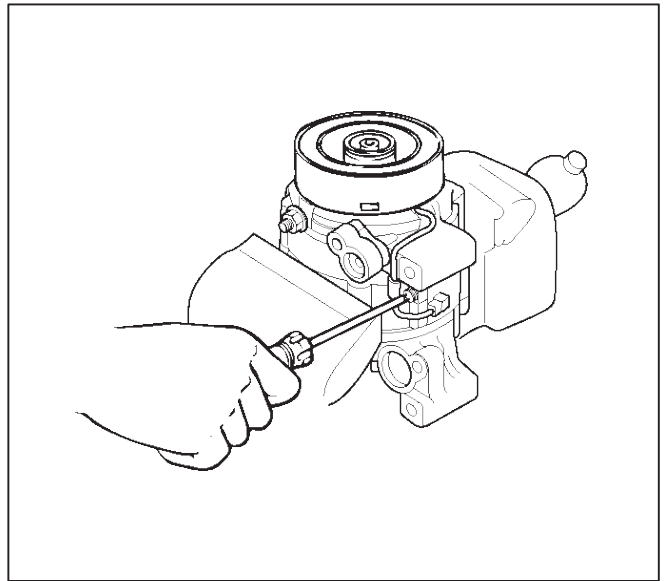
4. Remove snap ring (1) by using snap ring pliers.



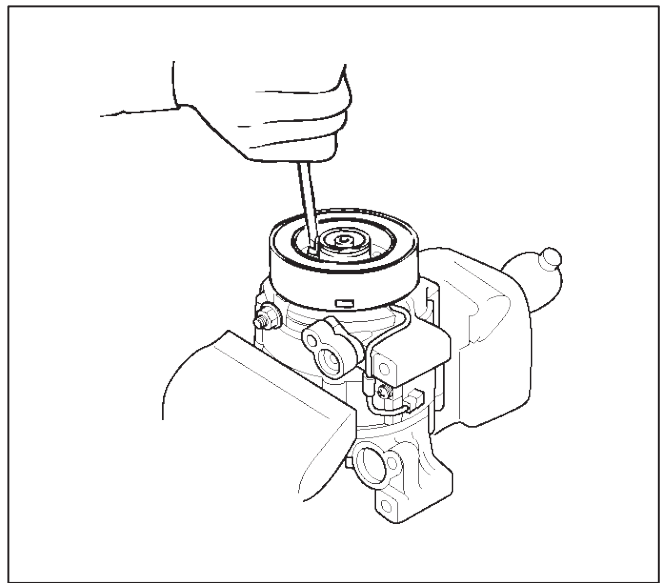
5. Remove pulley assembly by using pulley puller pilot J-38424 (2), pulley puller J-8433 (1) and pulley puller leg J-24092-2 (3).



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.

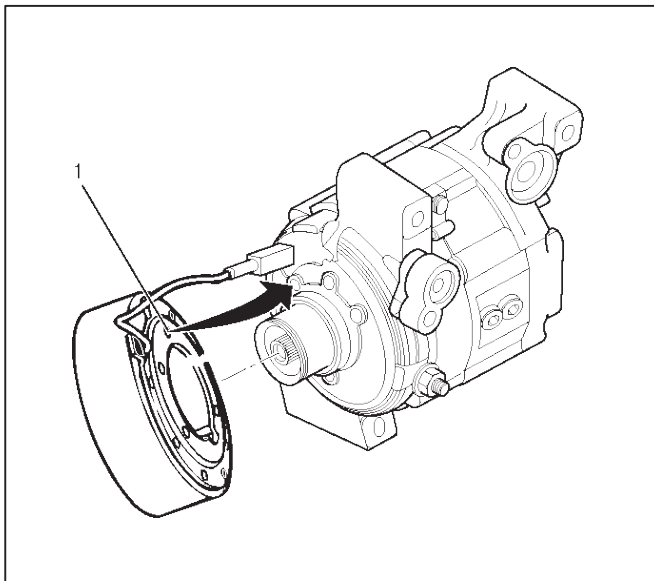
Coil

Check coil for loose connector or cracked insulation.

Installation

1. Install field coil.

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



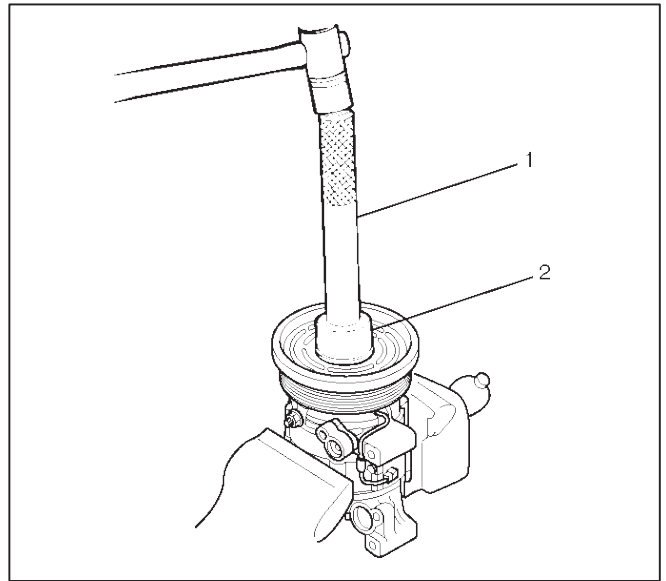
871RY00035

- 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).

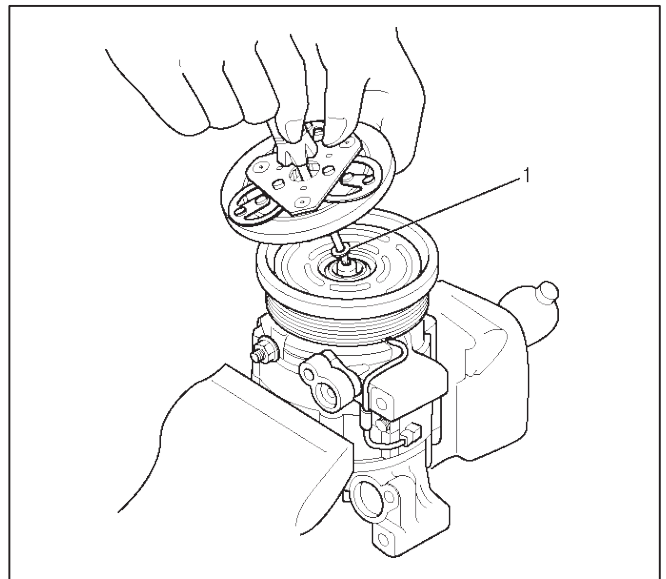


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4. Install snap ring.

5. Install shim (s).

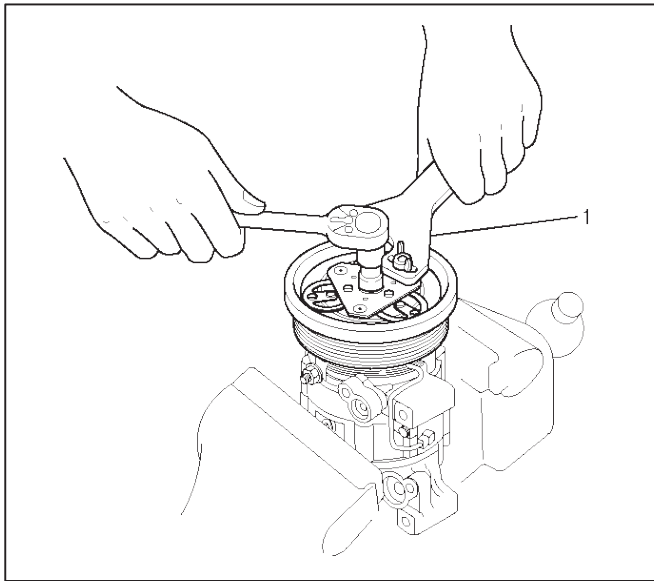
6. Install the drive plate to the compressor drive shaft together with the original shim(s)(1). Press the drive plate by hand.



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1A-58 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.



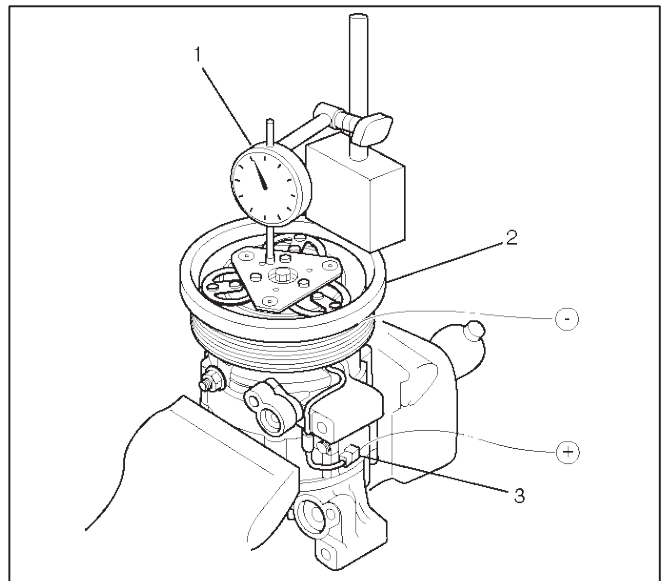
871RX029

- 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.

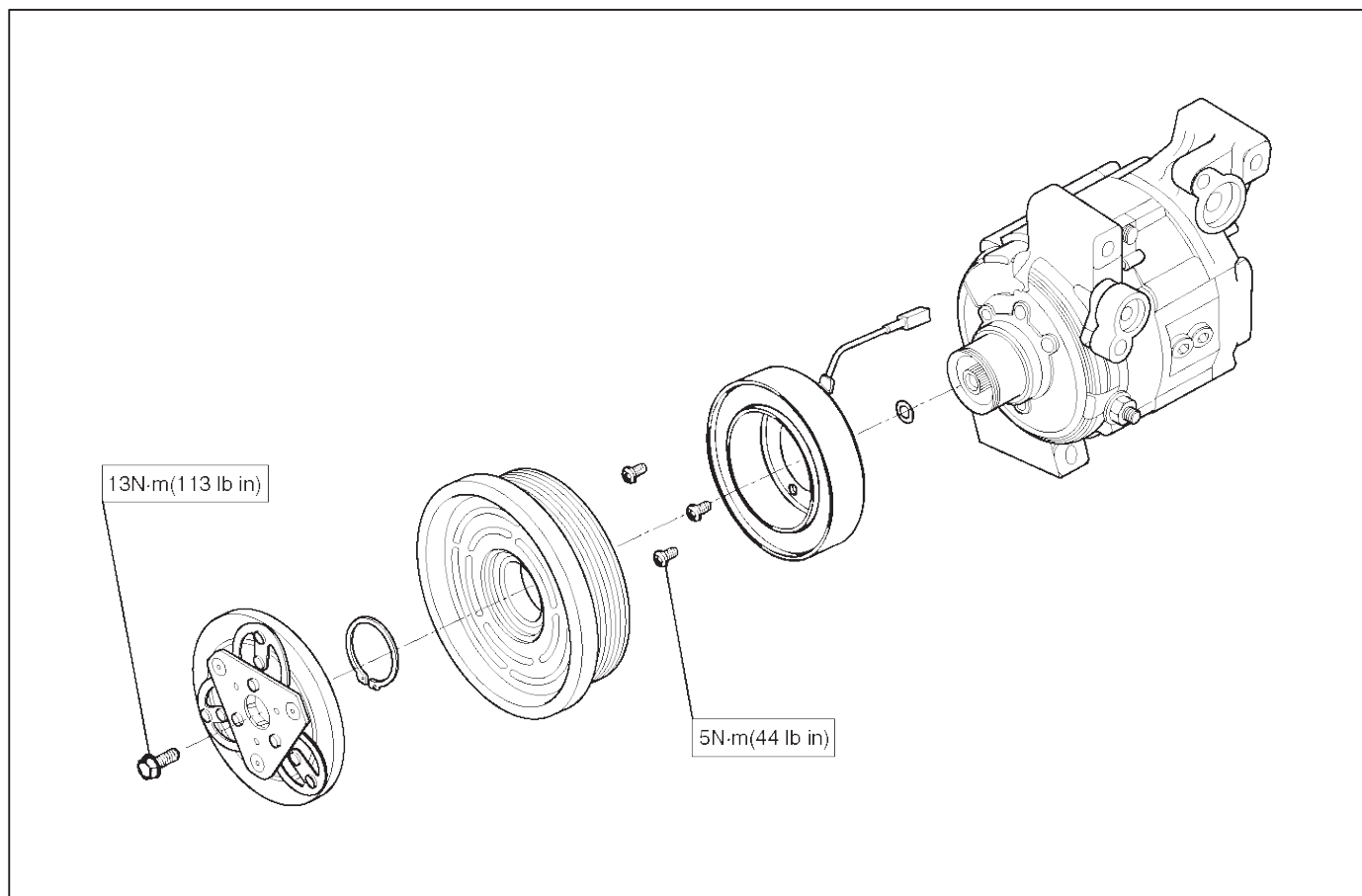
(Component parts to be installed)	(Amount of Oil)
Evaporator	50 cc (1.7 fl. oz.)
Condenser	30 cc (1.0 fl. oz.)
Receiver/dryer	30 cc (1.0 fl. oz.)
Refrigerant line (one piece)	10 cc (0.3 fl. oz.)

Main Data and Specifications

General Specifications

COMPRESSOR	
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 (AIPDN Part No.2-90188-301-0) 150 cc (5.0 fl.oz.)
Refrigerant	Refrigerant-134a (R-134a), 700 g (1.54 lbs.)
Shaft seal	Lip type
Weight	3.5 kg
MAGNETIC CLUTCH	
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

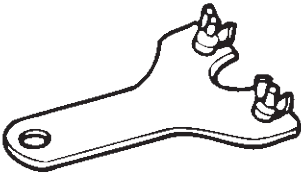
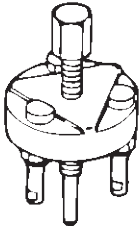
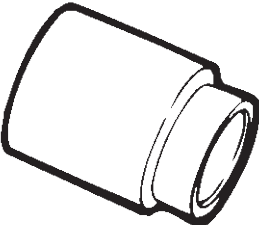
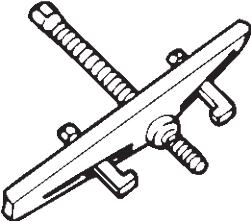
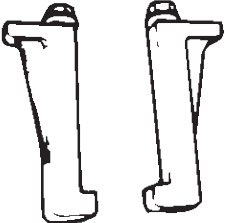
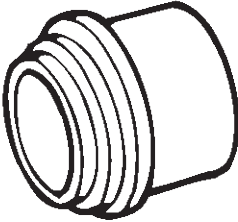
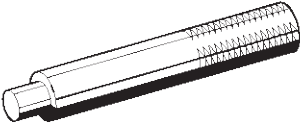
ILLUSTRATION	TOOL NO. TOOL NAME
 901RS191	J-33939 Drive plate holder
 901RS192	J-33944-A Drive plate puller
 901RS193	J-33944-4 Forcing screw
 901RS194	J-38424 Pulley puller pilot
 901RS195	J-8433 Pulley puller
 901RS196	J-24092-2 Pulley puller leg

ILLUSTRATION	TOOL NO. TOOL NAME
 901RS197	J-33940-A Pulley installer
 901RS218	J-8092 Drive handle

Automatic Air Conditioning System

General Description

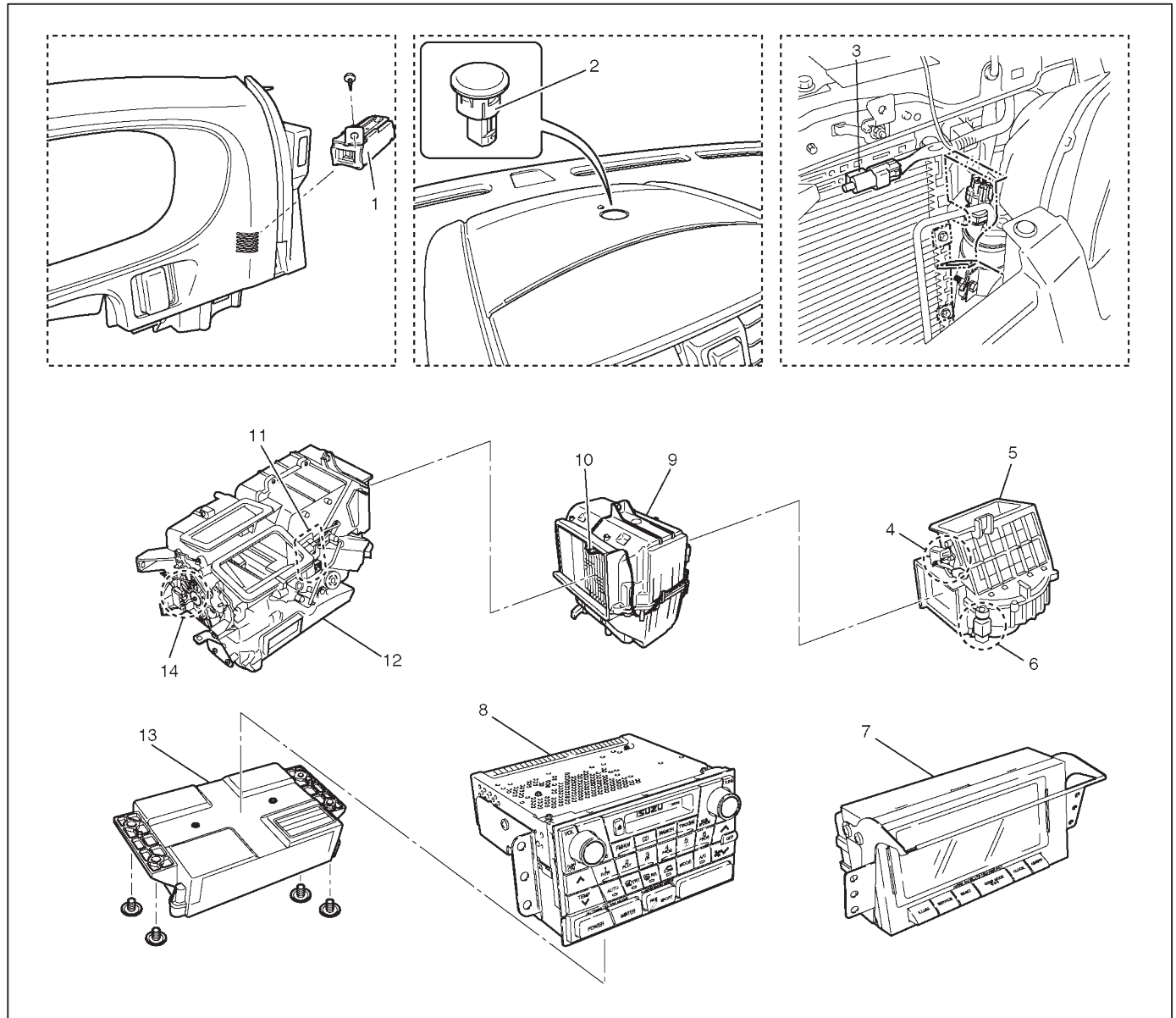
Using a variety of sensors, this automatic air conditioner accurately senses outside air temperature, solar radiation quantity, evaporator's blowing temperature, and interior temperature, then enters these data to the automatic air conditioner control unit (equipped with the built-in micro-computer). The data provided to the control unit enables to automatically control blow temperature

and blow air quantity, turn on or off the compressor and switch the blow port as well as switching between the fresh air intake and interior air circulation.

Resetting the automatic function allows you to switch to the manual control mode.

The self-diagnosis function of the automatic air conditioner control unit (with the built-in micro-computer) allows the unit to access and diagnose a failed part easier and quicker.

Automatic Air Conditioner Parts Configuration

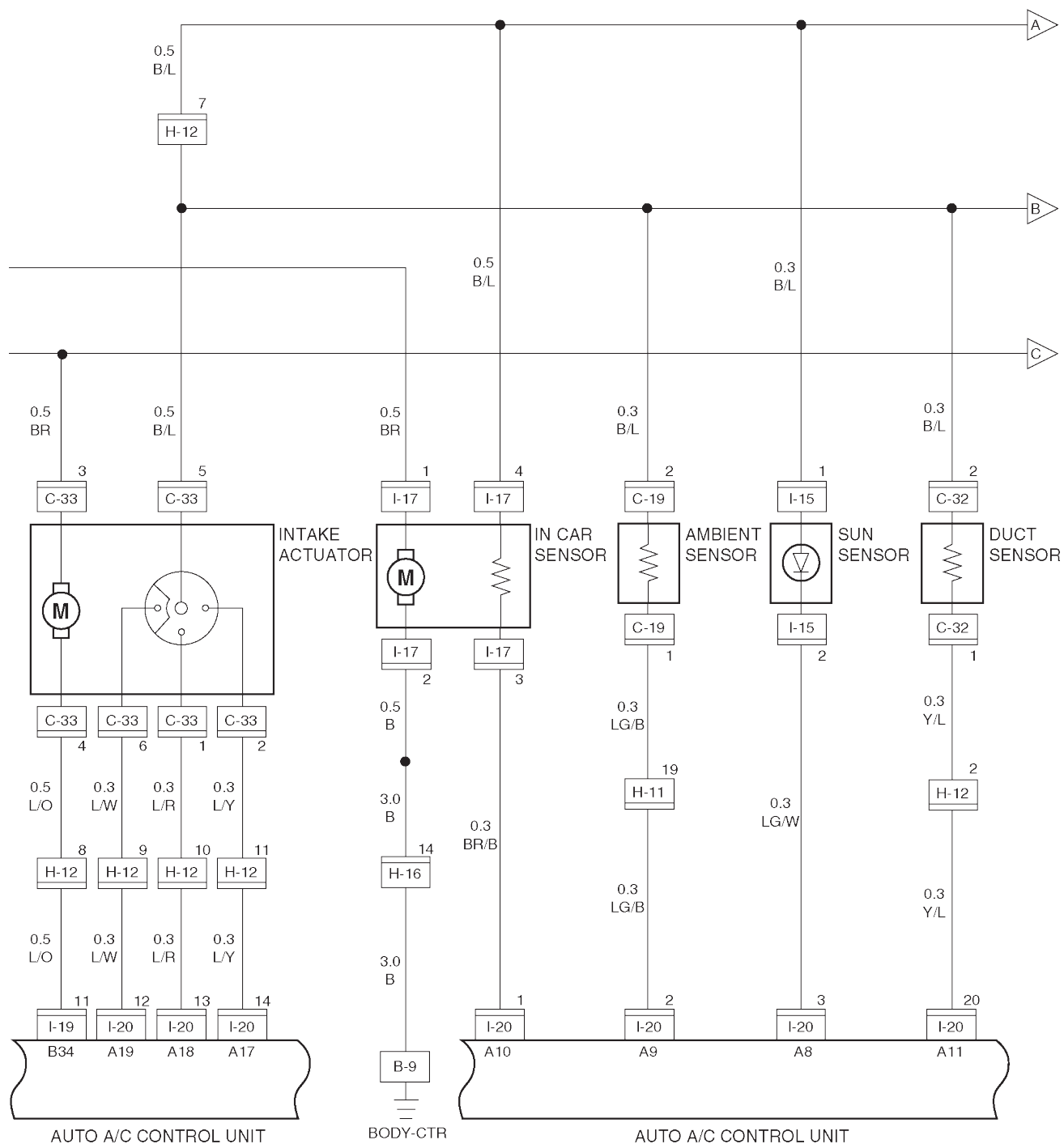


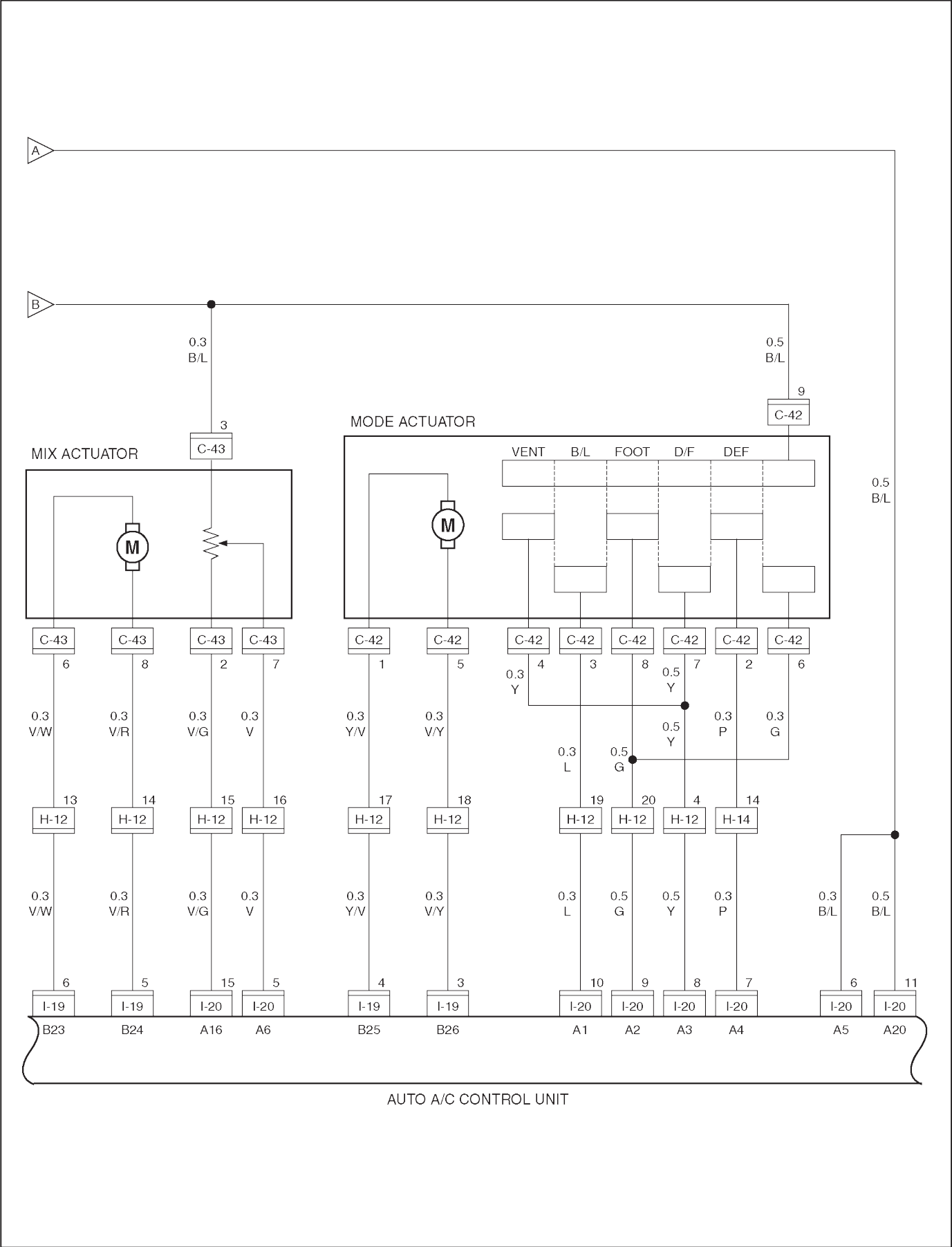
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Legend

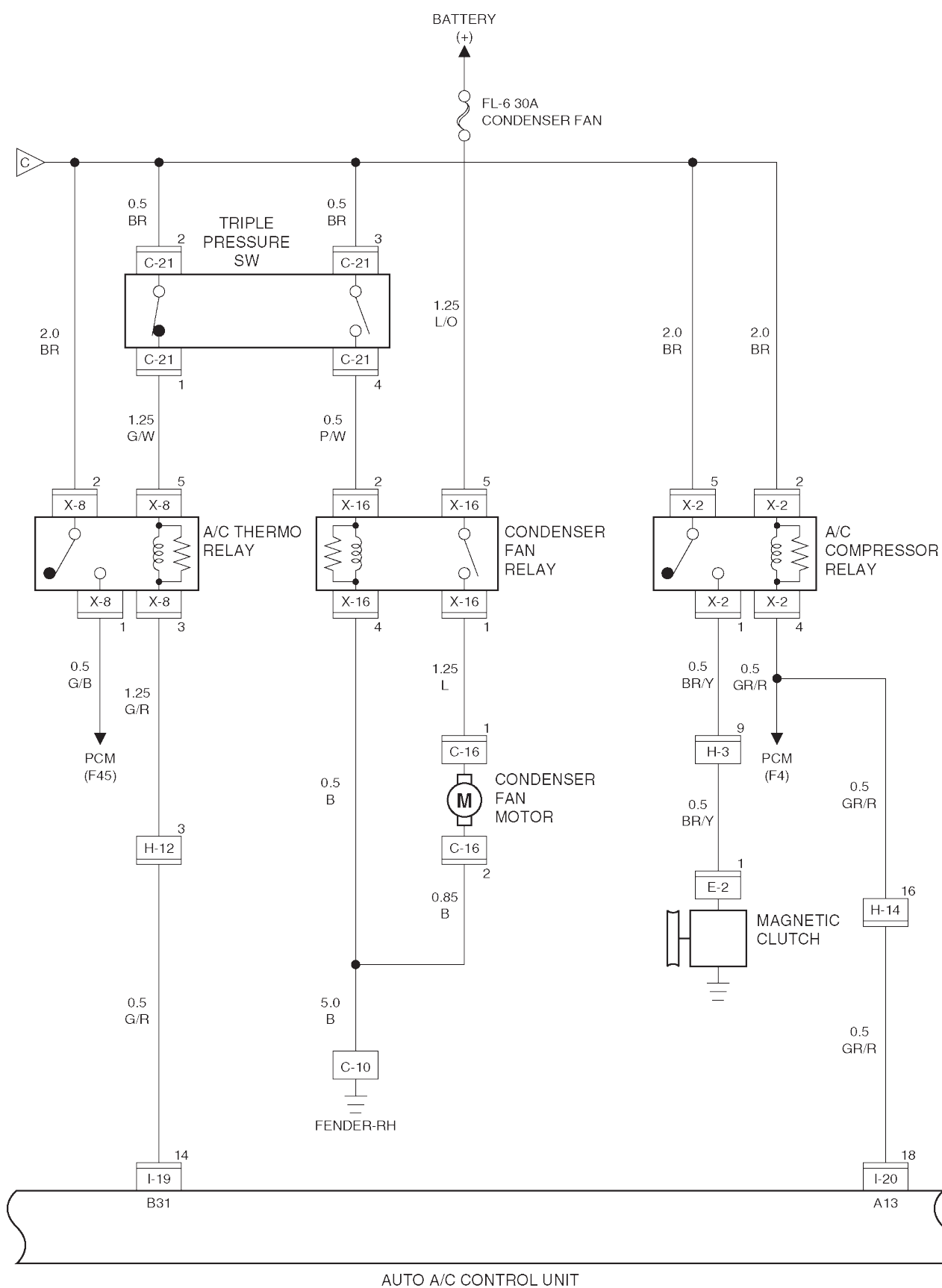
- | | |
|----------------------|---|
| (1) In Car Sensor | (8) Audio & Switch Assembly |
| (2) Sun Sensor | (9) Evaporator Assembly |
| (3) Ambient Sensor | (10) Duct Sensor |
| (4) Intake Actuator | (11) Mix Actuator |
| (5) Blower Unit | (12) Heater Unit |
| (6) Max - High Relay | (13) Automatic Air Conditioner Control Unit |
| (7) Display | (14) Mode Actuator |

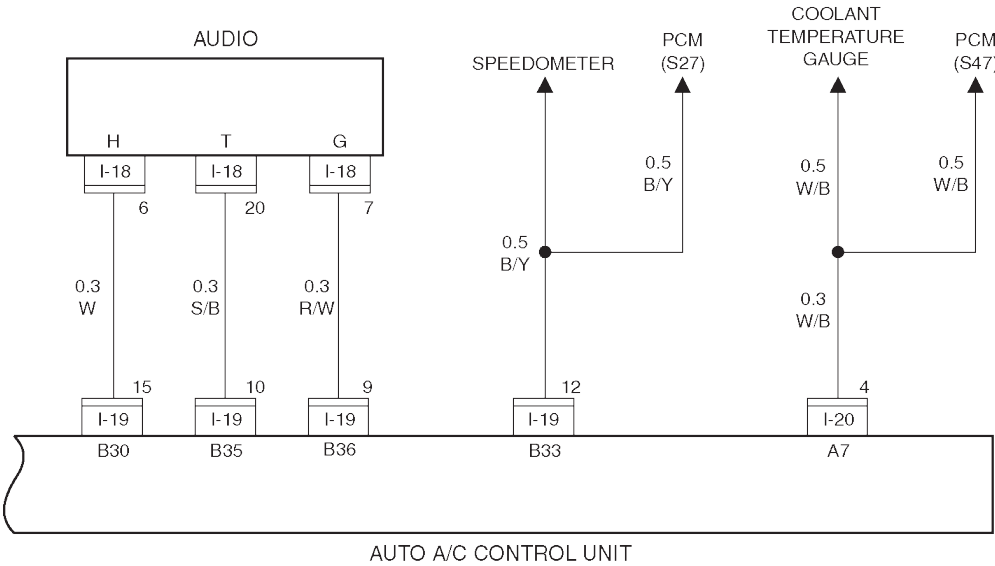






1A-68 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)





Functions and Features

Automatic air conditioning control unit

The control unit features a prominent control and display panel that clearly shows air conditioner operational settings (delivered air volume, air outlet location, inside/outside air circulation, and set temperature). Desired temperature can be set in -17°C (1°F) increments. The current setting appears on the digital display.

Automatic temperature control

Vehicle interior temperature is maintained at the set level. It is unaffected by changes in vehicle speed, outside air temperature, and number of passengers.

Maximum cooling and heating

Moving the switch to the 18°C (65°F) position provides maximum cooling. Moving the switch to the 32°C (90°F) position provides maximum heating.

Automatic air flow control

Air flow is automatically and precisely regulated in response to set temperature change and/or changes in heater unit mixing door aperture.

Automatic air outlet selection

Appropriate air outlets (VENT, BE-LEVEL, FOOT, or DEF) are selected in response to changes in outlet temperatures. The mode switch permits manual selection of the desired air outlet.

Air source (Fresh air intake from outside the vehicle or recirculation of the air inside the vehicle) selection

Automatic switching between outside air (FRESH), recirculated inside air (RECIRC), or a combination of the two (MIX) occurs in response to changes in outlet temperatures. The intake switch permits manual selection of the air source (FRESH or RECIRC). Mixing of the two sources is not possible during manual operation. When the defrost mode switch (DEF) is pressed, the system automatically switches to outside air intake.

Cooler start-up control

When the vehicle is parked in a hot area for an extended period of time, the evaporator becomes hot. When the cooler is turned on, hot air is blown into the vehicle until the evaporator cools down. The cooler start-up control prevents blower operation until the evaporator is able to provide cool air.

Heater start-up control

When the vehicle is parked in a cold area for an extended period of time, the heater core becomes cold. When the heater is turned on, cold air is blown into the vehicle until the heater core heats up. The heater start-up control prevents blower operation to the air outlets until the heater core is able to provide warm air. Air is delivered through the defrost outlets.

Solar radiation offset

The sun sensor uses a photodiode to precisely determine the amount of solar radiation affecting the vehicle. The cooler operates in response to this radiation to quickly correct the vehicle interior temperature.

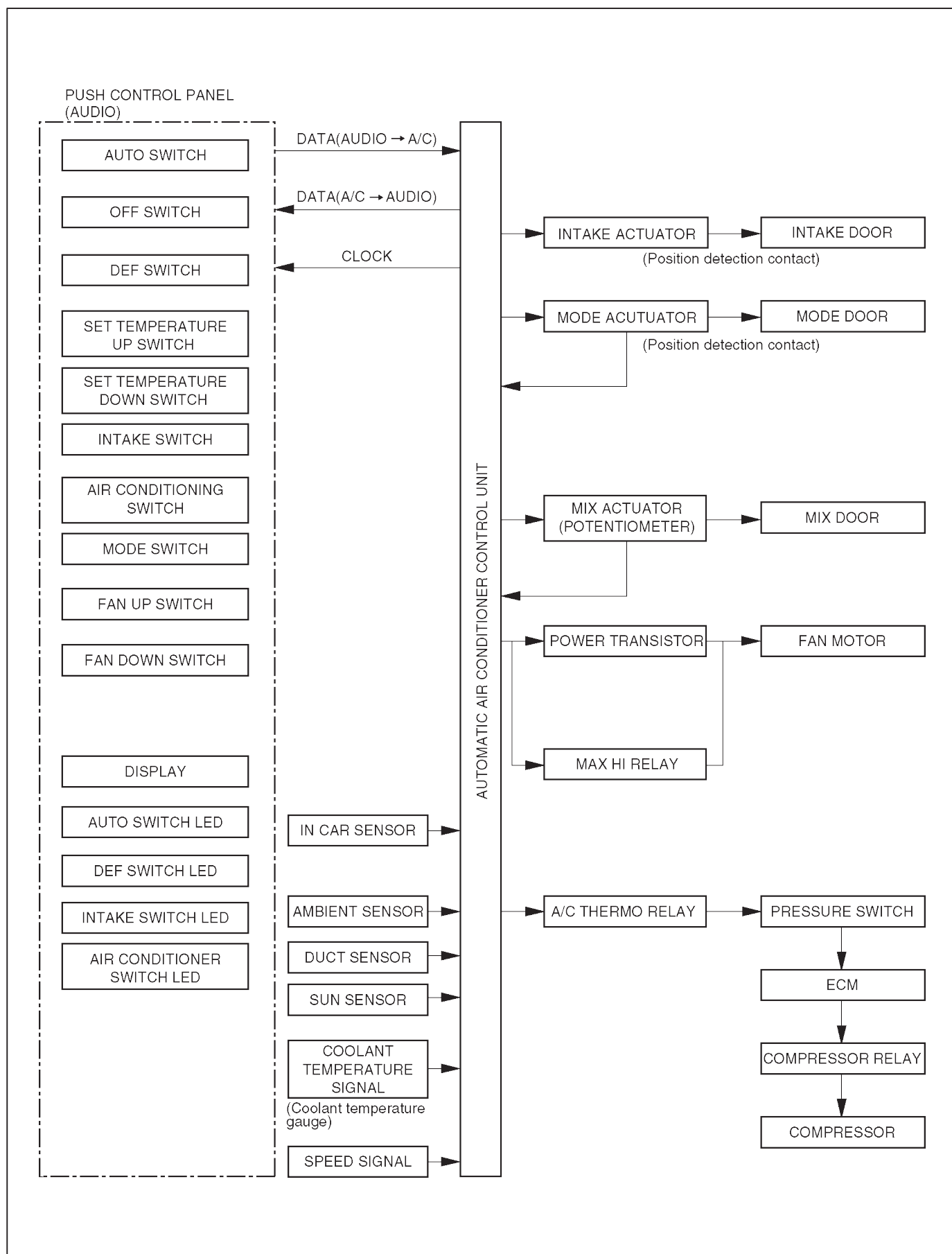
Switch position memory

Current switch positions are stored in memory when the ignition switch is turned off. When the ignition switch is turned on again, the switches automatically return to the position they were in when the ignition switch was turned off. This simplifies the restarting procedure.

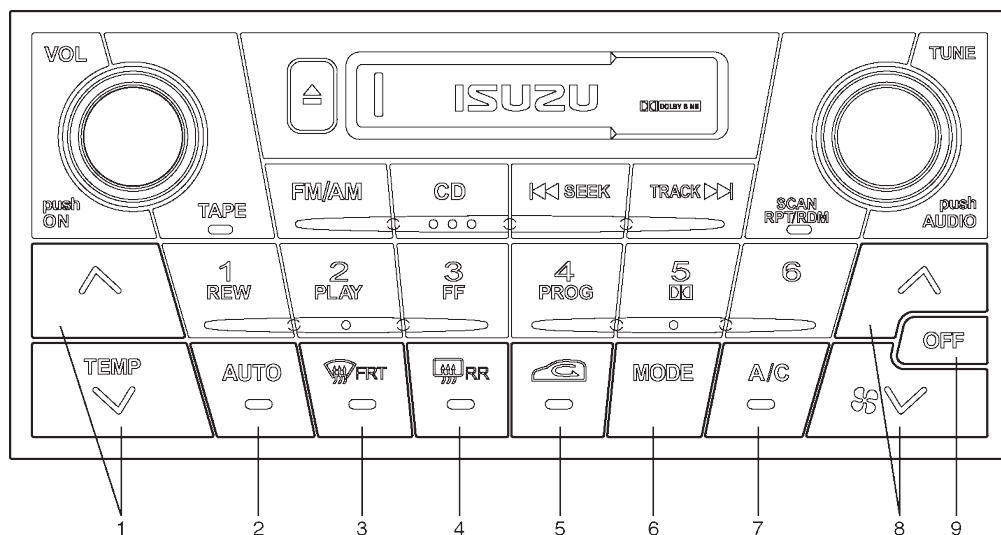
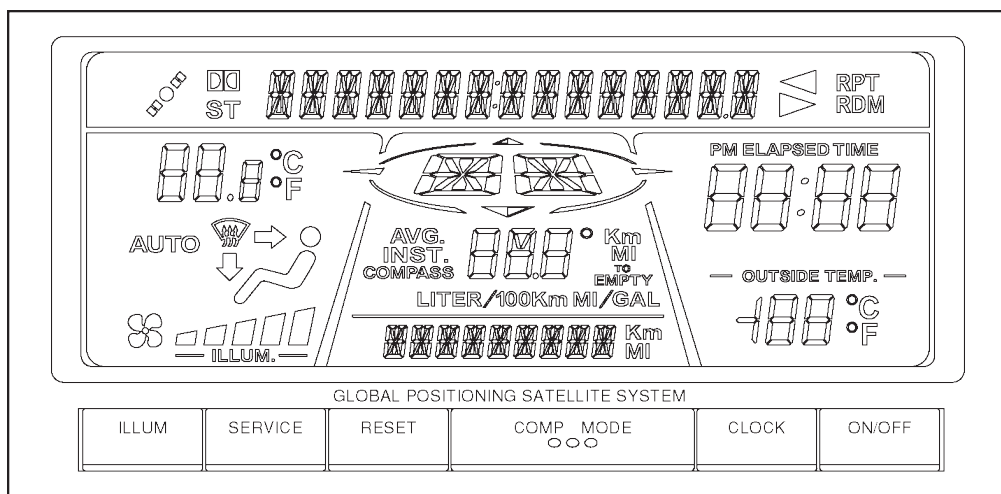
Self-diagnosis function

The self-diagnosis switches on the control panel permit easy system troubleshooting. Refer to "Self-Diagnosis" later in this Section.

Automatic Air Conditioner Block Diagram



Control Panel Layout

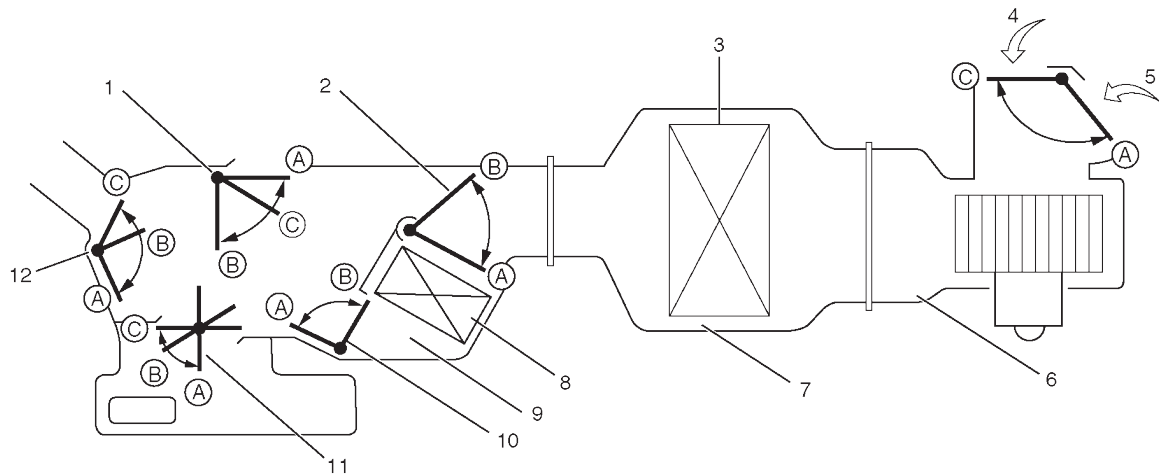


Legend

- (1) Temperature Control Switch
- (2) Auto Switch
- (3) DEF Mode Switch
- (4) Rr DEF Mode Switch

- (5) Intake Switch
- (6) Mode Switch
- (7) Air Conditioning Switch
- (8) Fan Switch
- (9) Off Switch

Air Control Functions



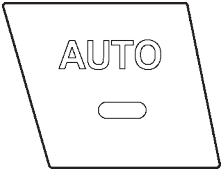
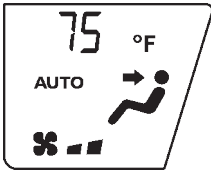
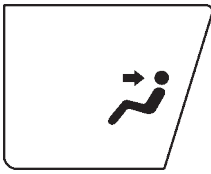
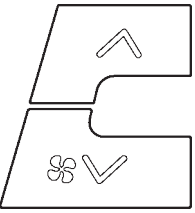
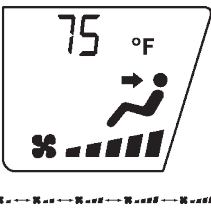
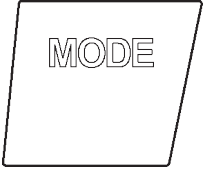
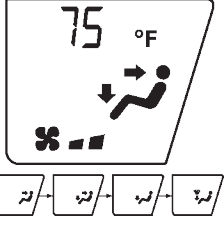
	Indication of Mode					Indication of Intake Switch LED		Set Temperature		
	VENT	BI-LEVEL	FOOT	DEF/FOOT	DEF	FRE	REC	FULL COOL 18.0°C (65°F)	18.5~31.5 (66~89)	FULL HEAT 32.0°C (90°F)
						OFF	ON			
Vent Door	(A)	(B)	(C)	(C)	(C)	—	—	—	—	—
Foot Door	(C)	(B)	(A)	(B)	(C)	—	—	—	—	—
DEF Door	(A)	(A)	(A)	(C)	(B)	—	—	—	—	—
Intake Door	—	—	—	—	—	(A)	(C)	—	—	—
Air Mix Door	—	—	—	—	—	—	—	(A)	(A ~ B)	(B)
Sub Air Mix Door	—	—	—	—	—	—	—	(B)	(B ~ A)	(A)

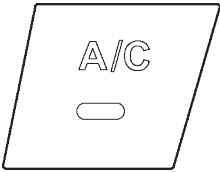
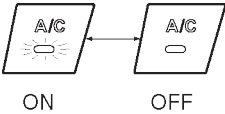
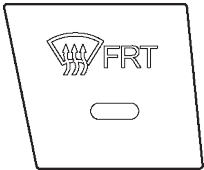
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Legend

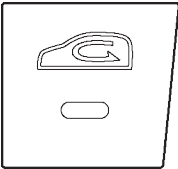
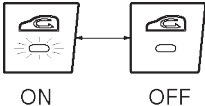
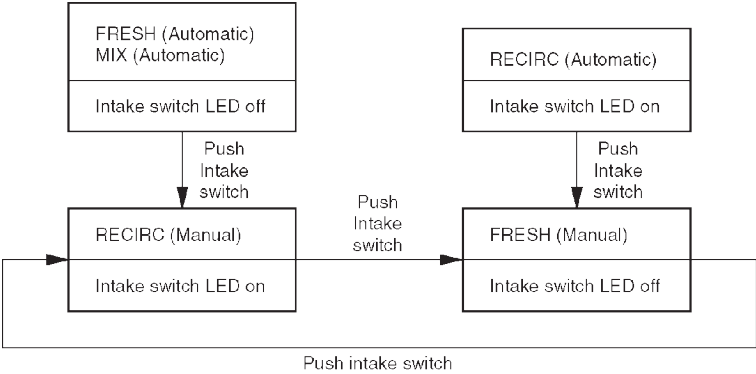
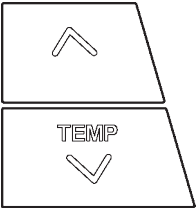
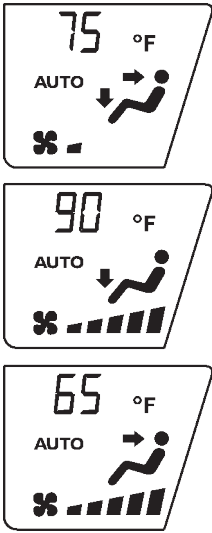
- (1) DEF Door
 (2) Air Mix Door
 (3) Evaporator Core
 (4) Fresh Air Intake
 (5) Interior Air Intake
 (6) Blower Unit
- (7) Evaporator Unit
 (8) Heater Core
 (9) Heater Unit
 (10) Sub Air Mix Door
 (11) FOOT Door
 (12) VENT Door

Control Panel Switch Operation

Switch Name	Panel Display	Switch Operation
A u t o S w i t c h	 	During manual outside air intake (FRESH), pressing the AUTO switch cancels manual outside air intake. The display panel shows the current set temperature, the current air outlet(s), and the blower speed. The intake switch LED shows the current air source. The A/C switch LED is on. Air volume, air outlet operation, and air source are controlled automatically. The compressor is on. During manual inside air recirculation (REC), pressing the AUTO switch does not cancel inside air recirculation. The intake switch LED is on.
O f f S w i t c h	 	When the OFF switch is pressed, the display panel clears except for the air outlet indication. Blower and compressor operation stop. The air source switches from automatic to outside air. During manual inside air recirculation (REC), pressing the OFF switch does not cancel inside air recirculation. The intake switch LED is on.
F a n ▲ ▼ S w i t c h	 	When the fan switch is pressed, air outlet volume (fan speed) can be manually controlled. Other control switches are unaffected. The display panel clears AUTO indication. 1. FAN switch is pressed during automatic fan control (AUTO) Fan control (AUTO)→Press ▲ fan switch→Fan speed increases from automatic set speed to HI Fan control (AUTO)→Press ▼ fan switch→Fan speed decreases from automatic set speed to LO 2. Fan switch is pressed when the fan is off. Fan (OFF)→Press ▲ fan switch→The fan operates at LO speed Fan (OFF)→Press ▼ fan switch→The fan operates at LO speed 3. Fan switch is pressed when the fan is in manual operation. Manual (LO)→Press ▲ fan switch→Manual operation (LO)→(M1)→(M2)→(M3)→(HI) Manual (HI)→Press ▼ fan switch→Manual operation (HI)→(M3)→(M2)→(M1)→(LO)
M o d e S w i t c h	 	Press the mode switch to manually select the air outlet(s). Each time the switch is pressed, the air outlets change in the progression shown below. Mode switch (Automatic control of air outlets)→VENT→BI-LEVEL→FOOT→DEF/FOOT

A / C S w i t c h			When the A/C switch is pressed, the LED light goes out and the compressor turns off. If the switch is pressed again, the LED light turns on and the compressor begins to operate. The air conditioner will not operate if the fan switch is off. During manual DEF or D/F operation, the A/C LED will turn on or off in response to switch operation. However, the compressor remains on regardless of switch position.
D E F M o d e S w i t c h			When the defrost switch (DEF) is pressed, air flows from the defroster outlets. The compressor is on and blower speed is automatically controlled. Air intake is from outside the vehicle (FRESH). The defroster symbol appears on the display. When the defrost switch (DEF) is pressed again, the unit returns to the settings in use before the defroster was turned on.

1A-76 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

I n t a k e S w i t c h			Pressing the intake switch permits manual control of air intake and/or recirculation. <pre>graph TD A["FRESH (Automatic) MIX (Automatic) Intake switch LED off"] -- "Push Intake switch" --> B["RECIRC (Manual) Intake switch LED on"] B -- "Push Intake switch" --> C["FRESH (Manual) Intake switch LED off"] C -- "Push Intake switch" --> B</pre> If the intake switch is pressed during manual DEF or D/F, the intake switch LED briefly turns on. However, outside air intake (FRESH) continues.
T e m p e r a t u r e C o n t r o l S w i t c h			The display panel temperature setting can be set from 18°C (65°F) to 32°C (90°F). Pressing and immediately releasing the ▲ switch increases the temperature setting in -17°C (1°F) increments. If the switch is pressed and held, the temperature setting increases rapidly. Pressing and immediately releasing the ▼ switch decreases the temperature setting in -17°C (1°F) decrements. If the switch is pressed and held, the temperature setting decreases rapidly. When the temperature setting is at 32°C (90°F), the unit is set to maximum heat mode. When the temperature setting is at 18°C (65°F), the unit is set to maximum cooling mode.

Overview of Construction, Movement and Control of Major Parts of Automatic Air Conditioner System

Automatic Air Conditioner Control Unit

Equipped with the built-in micro-computer, this control unit operates on signals from sensors and input signals from switches to offer total control of the blower fan, and actuators used for the mode door, intake door and air mix door.

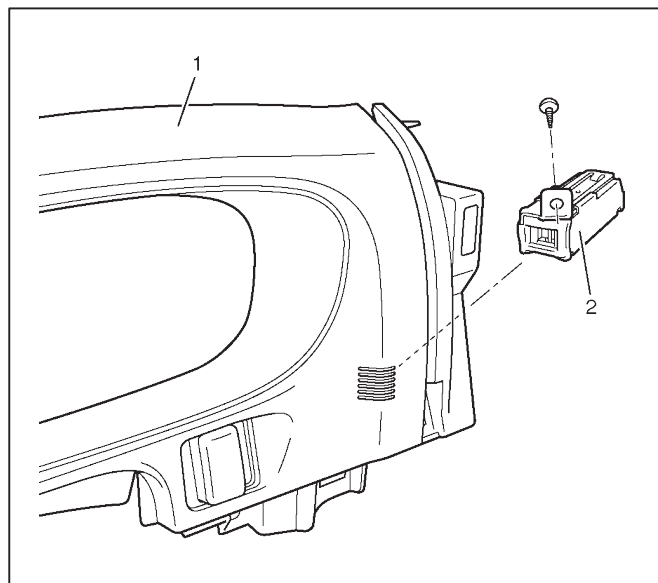
Its self-diagnosis function enables quicker access to a failed part and its more accurate troubleshooting.

In Car Sensor

It is a sensor used for detecting room temperature of a vehicle. This sensor converts a given room temperature into a resistance value before entering the data to the automatic air conditioner control unit.

This in car sensor unites the power driven aspirator and the motor fan so that a small amount of room air may be constantly fed to the sensor.

This sensor is provided on the right side of meter cluster.



865R200001

Legend

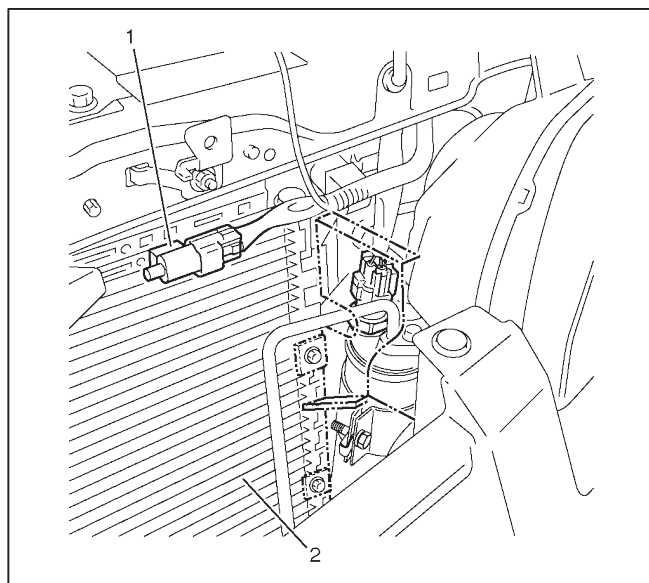
- (1) Meter Cluster
- (2) In Car Sensor

Ambient Sensor

This sensor is used for detecting temperature outside the vehicle. It converts a given outside air temperature into a resistance value before entering the data to the automatic air conditioner control unit.

Thermal effects from the condenser and radiator during idling after a run can be measured and offset the automatic amplifier.

This sensor is provided on the side plate situated at upper right side of the condenser.



875R200017

Legend

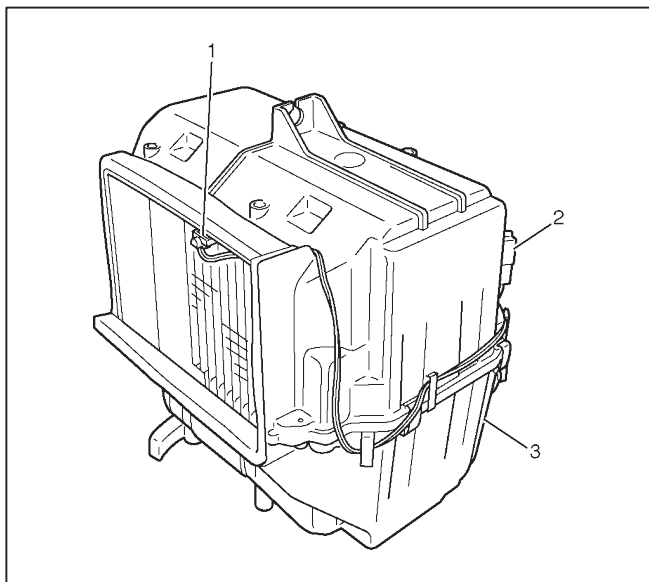
- (1) Ambient Sensor
- (2) Condenser Assembly

Duct Sensor

The duct sensor is the sensor to detect temperature change of the side of evaporator blower coming by fresh recirculation of intake door or "on" "off" of compressor. The temperature is converted to resistant rate.

And it works as thermostat to control to prevent freezing of evaporator.

This sensor is installed in the upper case of evaporator.



874R200001

Legend

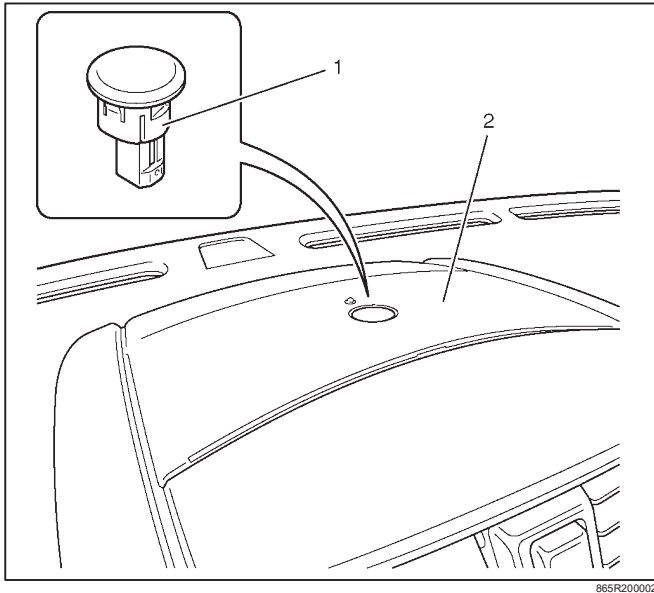
- (1) Sensor Part
- (2) Duct Sensor Assembly
- (3) Evaporator Assembly

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

Sun Sensor

It is a photodiode used for detecting quantity of solar radiation. This sensor converts the offset signal generated by changes in the interior temperature (which results from fluctuations in solar radiation) into photoelectric current to enter into the automatic air conditioner control unit.

This sensor is provided at top of the center cluster upper.

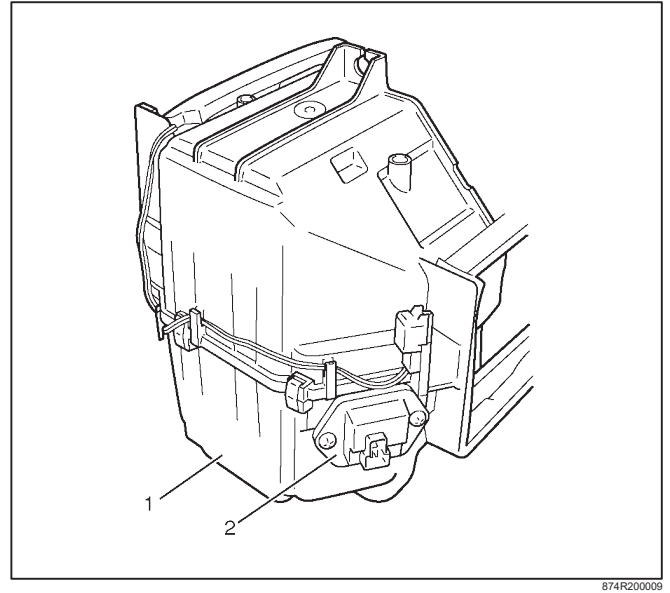


Legend

- (1) Sun Sensor
- (2) Center Cluster Upper

Power Transistor

Receiving base current from the automatic air conditioner control unit, the power transistor implements stage-less speed change of the blower fan motor. This transistor is provided on the evaporator.

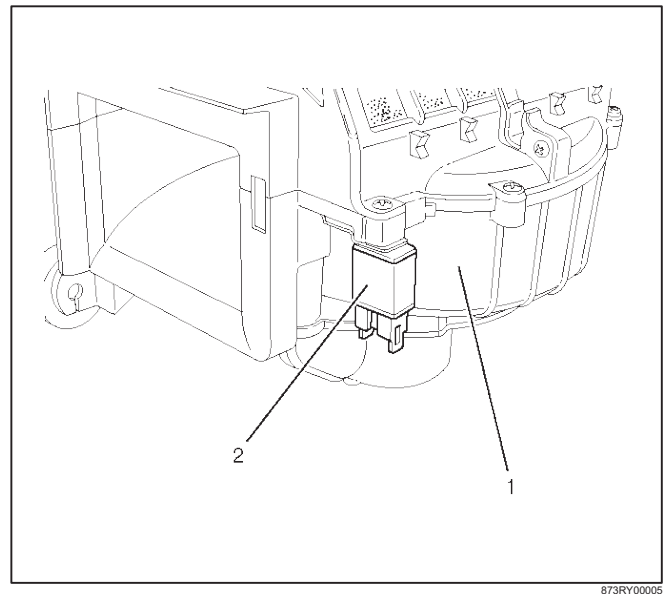


Legend

- (1) Evaporator Assembly
- (2) Power Transistor

Max Hi Relay

This relay turned on or off by the signal from the automatic air conditioner control unit. As the Max Hi relay is turned on, supply voltage is directly fed to the blower fan motor to select the Max Hi mode.



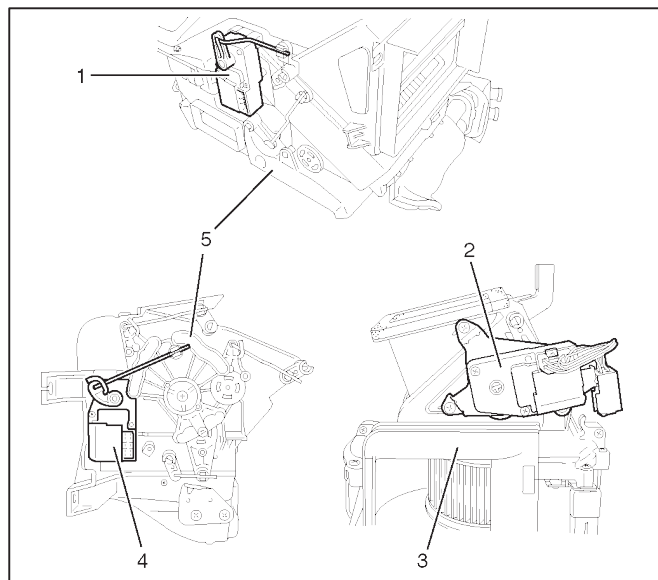
Legend

- (1) Blower Unit
- (2) Max High Relay

Actuator

The actuators are power driven type containing a small motor. Receiving output current from the automatic air conditioner control unit, actuators drive the heater and blower unit mode doors.

Actuators consist of the mode actuator used for switching the mode (blow port selection), the mix actuator used for changing aperture of the air mix door, the intake actuator used for switching the intake mode(fresh air/interior air) actuator.

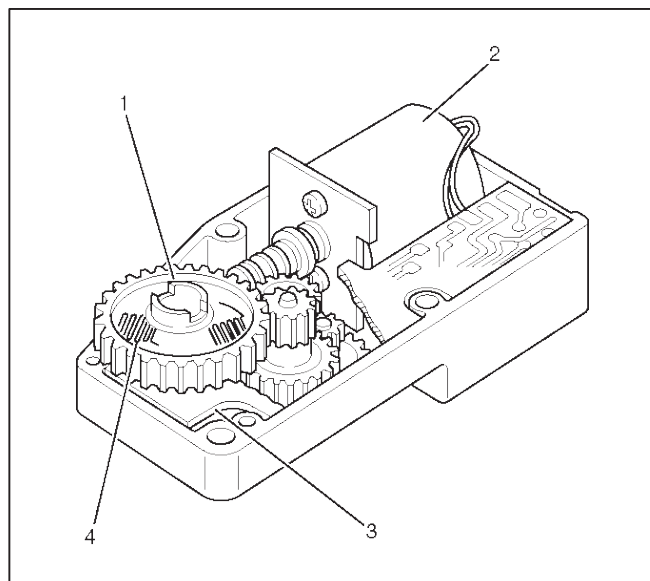


860R200004

Legend

- (1) Mix Actuator
- (2) Intake Actuator
- (3) Blower Unit
- (4) Mode Actuator
- (5) Heater Unit

The actuator changes the motor speed using the gear and drives each door rotating the output axis united with the sliding contact.



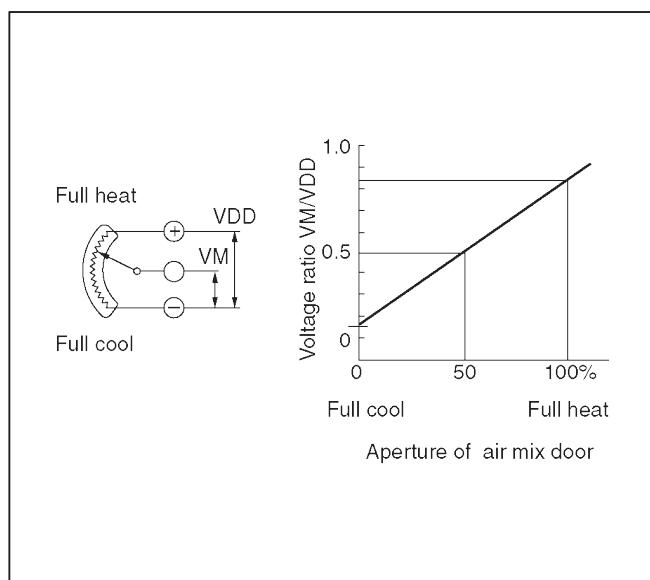
860RW026

Legend

- (1) Output Axis
- (2) Motor
- (3) Printed Circuit Board
- (4) Sliding Contact

The mode and mix actuators are common actuators with the built-in potentiometer. For the intake actuator, the contact switch type is selected.

The potentiometer is a register assembled to the printed circuit board of the mix and mode actuators. It detects the air mix door position specified by rotation of the output axis as a ratio of the variable terminal (VM) voltage against the reference voltage (VDD: 5V), then signals the value to the automatic air conditioner control unit.



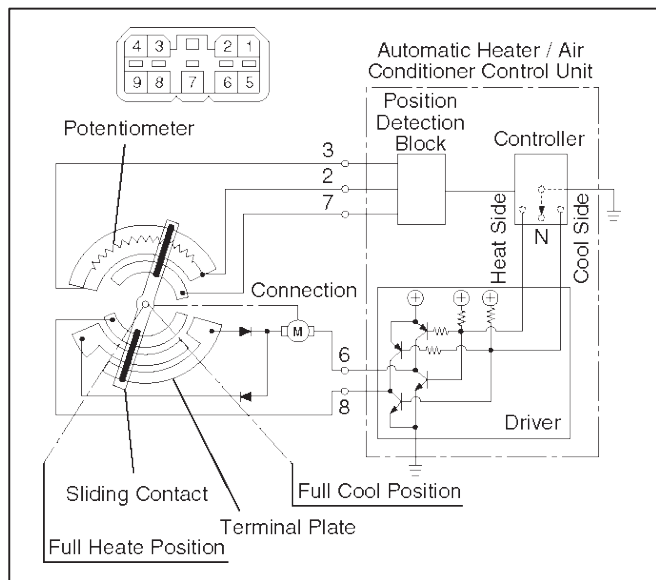
C01RX016

Movement of Mix Actuator

Position of the air mix door is determined by the controller on the automatic air conditioner control unit.

As the heat or cool side of the controller is grounded, the transistor on the driver is activated and, thus, the motor rotation is turned on. The sliding contact connected to the motor sends the position detection signal from the potentiometer to the automatic air conditioner control unit. As the set temperature and interior temperature are balanced, the controller returns to the neutral and the motor rotation is stopped.

C-43		Rotation direction	Remarks
(+) side	(-) side		
8	6	Clockwise	Full heat side
6	8	Counter clockwise	Full cool side

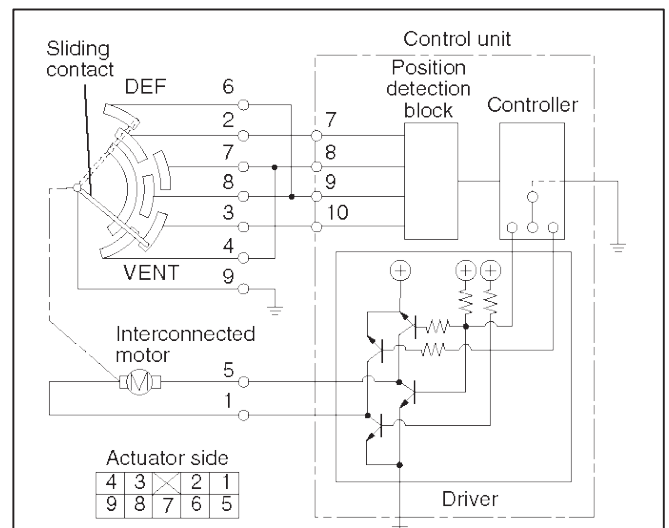


C01RX005

Movement of Mode Actuator

As target position of the mode door is decided on the controller of the control unit, the control unit reads the position detection signal from the actuator to select the clockwise or counter clockwise motor rotation direction. Grounding the controller VENT or DEF side after the direction selection activates the transistor on the driver, thus turning on the motor rotation. Accompanying the motor rotation, the sliding contact rotates, too. When the target position is reached, the controller on the control unit returns to the neutral and the motor stops.

Conduction pin		Rotation direction	Remarks
(+) side	(-) side		
5	1	Clockwise	VENT to DEF direction
1	5	Counter clockwise	DEF to VENT direction



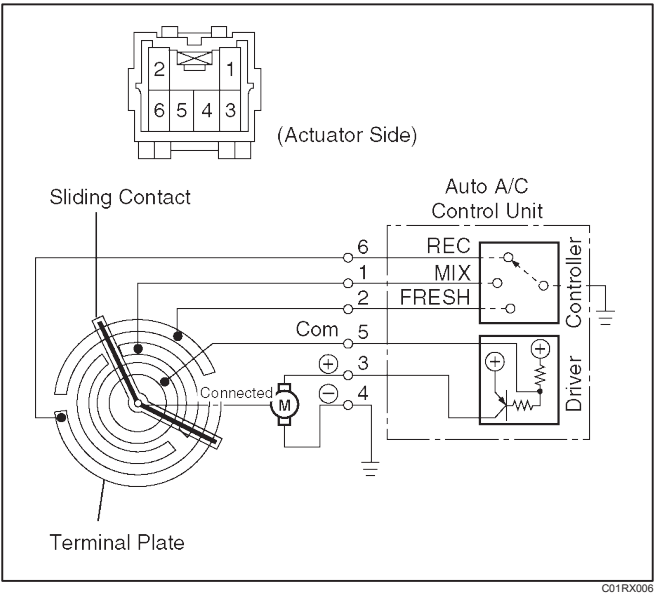
	7	8	9	10
VENT	H	L	H	L
Mid point between VENT - B/L	H	H	H	L
B/L	H	H	L	L
Mid point between B/L - FOOT	H	H	L	H
FOOT	H	L	L	H
Mid point between FOOT - D/F	H	L	H	H
D/F	L	L	H	H
Mid point between D/F - DEF	L	H	H	H
DEF	L	H	L	H

C01RX017

Movement of Intake Actuator

The controller on the automatic heater/air conditioner control unit selects an intake mode to be used. As the Terminal No.5 C-33 is grounded via the sliding contact on the terminal plate, the transistor on the driver is activated, thus turning on the motor rotation. Then, accompanying move of the motor, the sliding contact rotates until grounding of the Terminal No.5 C-33 is removed, thus stopping the motor.

Grounding terminal	Rotation direction	Remarks
No.5 C-33	Clockwise	RE-CIRCULATION→MIX→FRESH



Overview of Automatic Control of Automatic Air Conditioner

The automatic air conditioner on this vehicle has the following features:

- Interior temperature control.
- Air flow control.
- Mode (blow port) control.
- Intake (switching between fresh air and interior air) control.
- Heater start timing control.
- Cooler start timing control.
- Evaporator anti-freeze control.

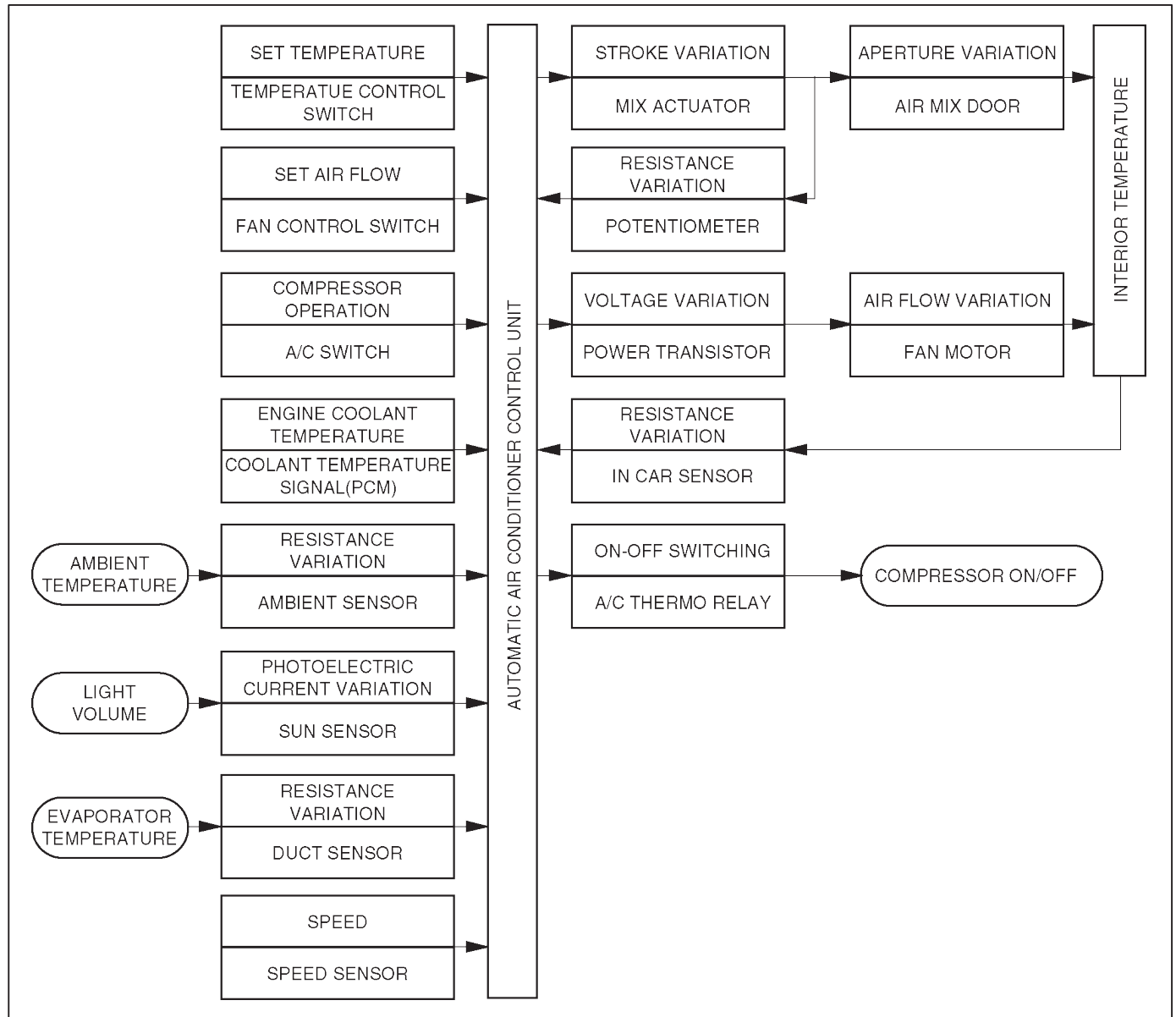
Automatic Air Conditioning System

System Overview (Chart)

Conditions both inside and outside the vehicle are detected by sensors (in-car temperature sensor, ambient temperature sensor, duct sensor, sun sensor, speed sensor, and water temperature sensor). These sensors send signals to the control unit.

Potentiometer position sensors send data to the control unit. Signals related to control panel settings are also sent to the control unit.

In response to the signals received, the control unit automatically adjusts air-mix door aperture (outlet air temperature), fan speed (forced air volume), and air intake (outside air, recirculated inside air, or a mixture of the two).



Interior Temperature Control

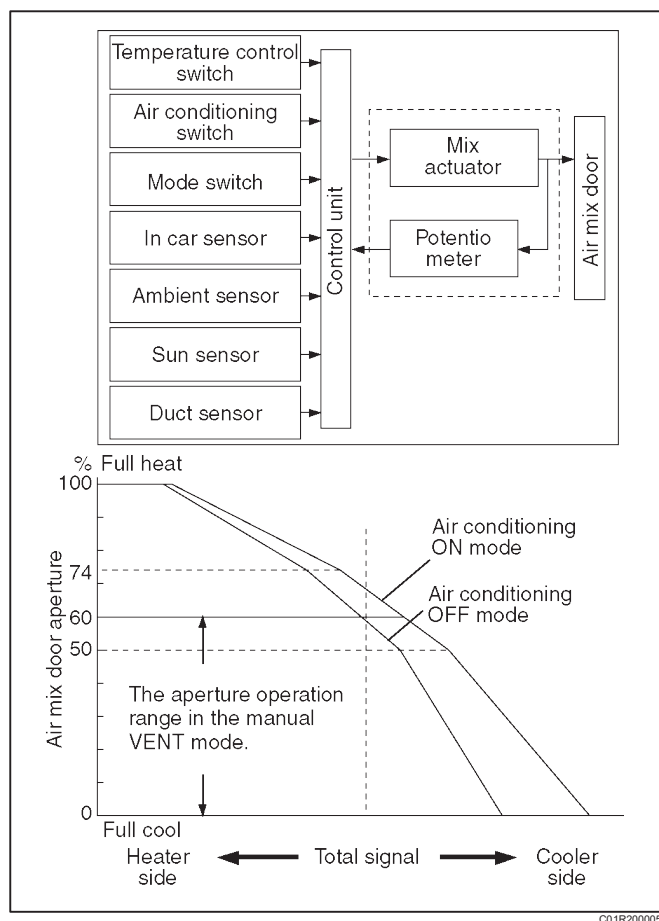
When the temperature control switch is set to a specific temperature, a signal is sent to the A/C control unit. Other signals are sent to the control unit from the various sensors. This data is analyzed by the control unit which creates a composite data signal that is compared with the signal received from the potentiometer. The result determines the direction of mix actuator rotation.

The mix actuator reacts to the composite air mix door opening angle signal. Opening angle is increased or decreased to maintain the temperature at the selected level.

When the compressor is off, the air mix door moves toward the COOL side. When the compressor turns on, the temperature of the air being discharged from the outlet vents is regulated.

When the temperature control is set to 18°C (65°F), the air mix door moves to the FULL COOL position. When the control is set to 32°C (90°F), the door moves to the FULL HOT position.

In the VENT position, the air mix door moves from FULL COOL to a 60% aperture. This prevents hot air from being discharged into the vehicle.



C01R200005

Air Flow Control

In the Auto Mode

• Automatic operation

When the AUTO switch or the DEF switch is pressed, a signal indicating the forced air volume is sent to the A/C auto-control unit. Other signals are sent to the control unit from the various sensors. This data is analyzed by the control unit which creates a composite data signal. Based on this signal, the base voltage of the power transistor is varied to change the blower voltage. This results in a non-stepped change in blower motor speed.

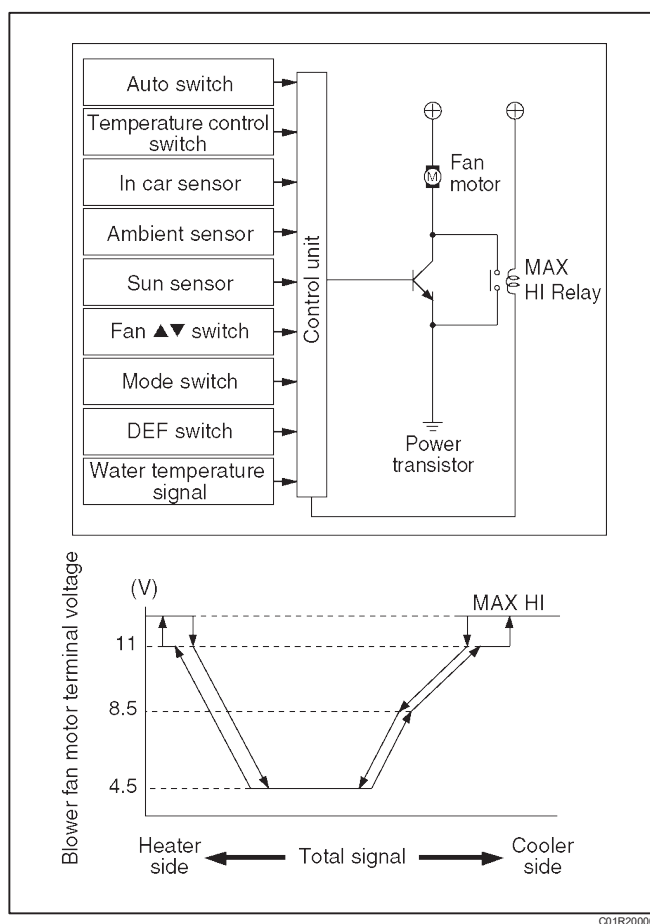
When the temperature control switch is set to either 18°C (65°F) or 32°C (90°F), blower motor speed is in the MAX-HI mode.

In the Manual Mode

• Manual operation

When the fan switch is manually set to a specified air volume, a signal is sent to the A/C auto-control-unit. In response to this signal, the auto-control unit controls the blower voltage.

When the fan switch is set to HI, the max-hi relay operates to increase blower motor speed to the MAX-HI mode.



C01R200001

Mode (Blow Port) Control

The A/C control unit receives temperature setting data as well as temperature and solar radiation level data from the various sensors. Based on this data, the control unit compiles a composite TMO signal. The TMO signal allows the outlet positions to be changed in a set pattern (VENT→BI-LEVEL→FOOT→DEFROST/FOOT).

The mode actuator acts in response to mode position. It compares data signals received from the target mode, the door position, and mode door position to determine the direction of rotation.

If the temperature is set to 18°C (65°F), cool air is discharged from the head outlets. If the temperature is set to 32°C (90°F), warm air is discharged from the foot outlets.

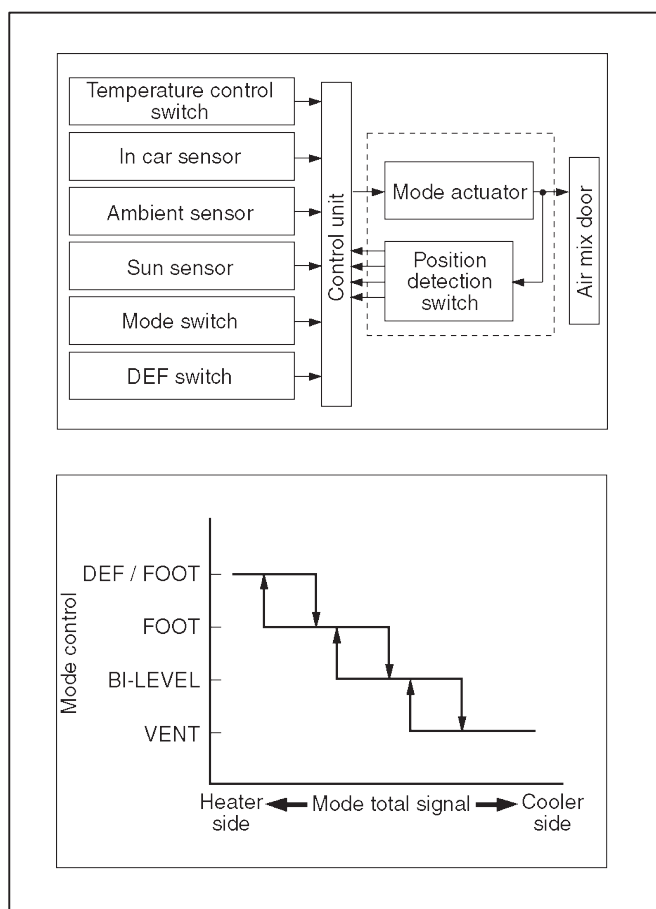
In manual mode, existing air outlet settings remain unchanged when the temperature is set to 18°C (65°F) or 32°C (90°F).

<Mode switch operation>

Press the mode switch to change to the outlet mode. Blower operation (outlet mode position) can now be switched between the VENT, BI-LEVEL, FOOT, and DEF positions.

<Defroster switch operation>

The DEF position can be selected from the outlet mode.



Intake (Fresh air/interior air switching) Control

During automatic operation, the A/C control unit responds to the temperature setting signal together with signals from the various sensors to generate a general signal that controls operation in a prescribed pattern.

If either or both the fan and the cooler are off, air intake is from outside the vehicle.

If the temperature control switch is set to either 18°C (65°F) or 32°C (90°F), the air inside the vehicle is recirculated.

1. Manual switch operation

Press the intake switch to change between outside air intake and recirculated inside air.

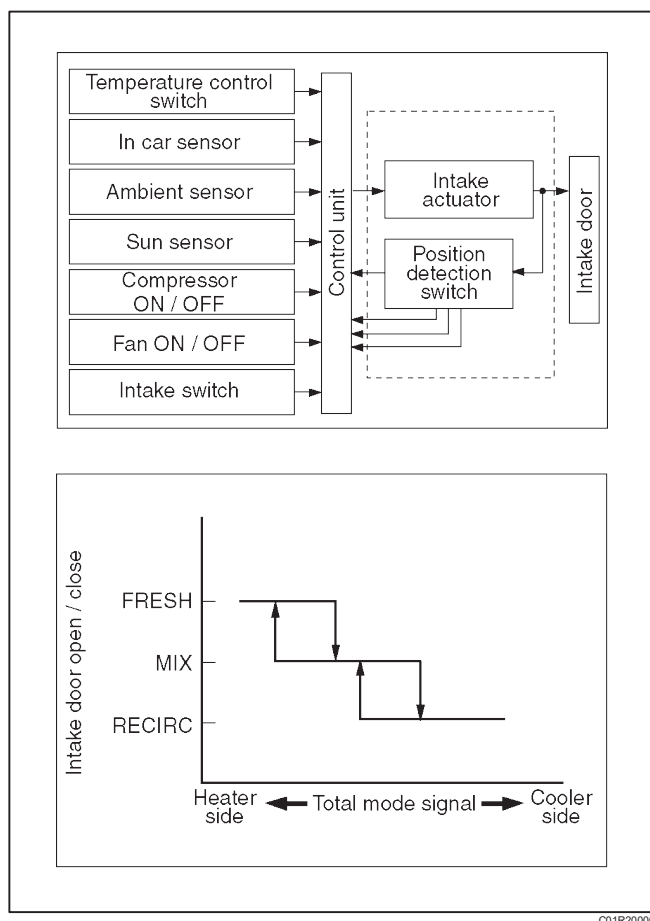
2. Defrost switch operation

Air intake is from outside the vehicle.

3. Mode switch operation

During automatic operation, outside air intake or recirculated inside air is selected as appropriate.

During manual operation or when the DEF mode is selected, air intake is from outside the vehicle.

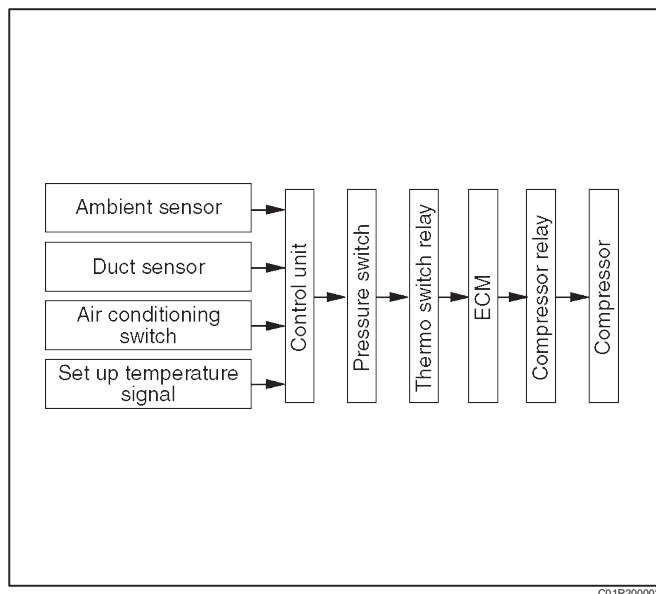


Compressor Control

In the automatic control mode, the automatic air conditioner control unit turns on or off the compressor with the evaporator anti-freeze mechanism using the evaporation sensor. And, when outside air is detected to be low through the outside air temperature sensor signal, the control unit turns off the compressor using the compressor control function.

Manual Control

- In the automatic control mode, pressing the A/C (air conditioning) switch turns off the compressor.
- Pressing the DEF mode switch automatically turns on the compressor.

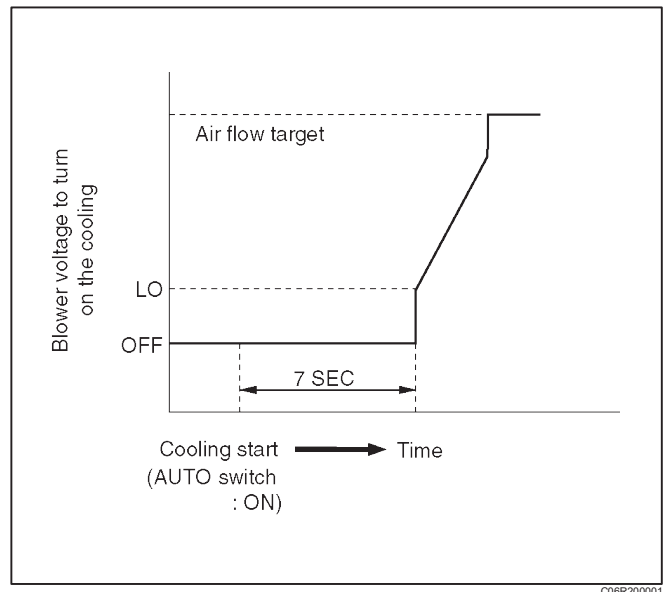


Cooler Start-up Control

When cooler operation is started with the air discharge mode is in the VENT or B/L position and the in-car temperature higher than 26°C (78°F) (detected by the in-car sensor), cooler start-up control occurs.

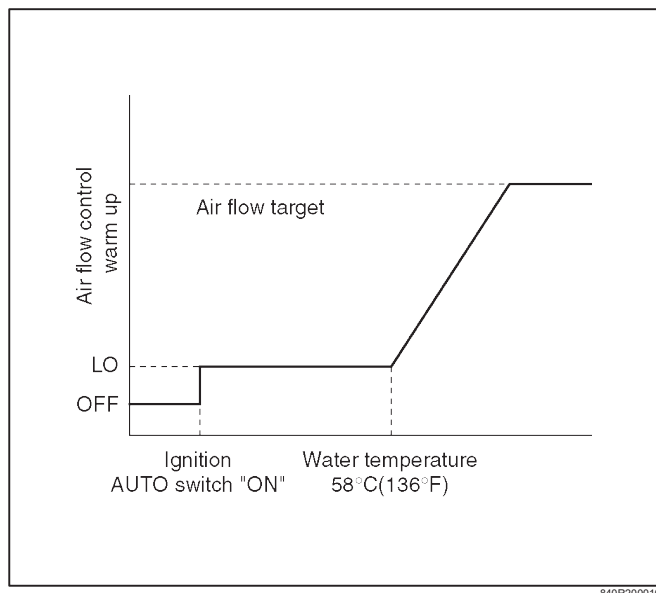
For the first 7 seconds of cooler operation, the fan remains OFF. It then switches to AUTO LO. Air discharge volume then increases in linear increments to the pre-set level.

Cooler start-up control occurs the first time the engine is started or the cooler switch is moved from OFF to AUTO. It will not occur during subsequent switch movements.



Heater Start-up Control

Heater start-up control occurs when the air discharge mode is in the BI=LEVEL, FOOT, or DEF/FOOT position and the heater core temperature is less than 14°C (58°F). Air discharge volume remains in the AUTO LO mode until the engine coolant temperature rises above 14°C (58°F). The volume then increases in linear increments to the pre-set level.



Troubleshooting

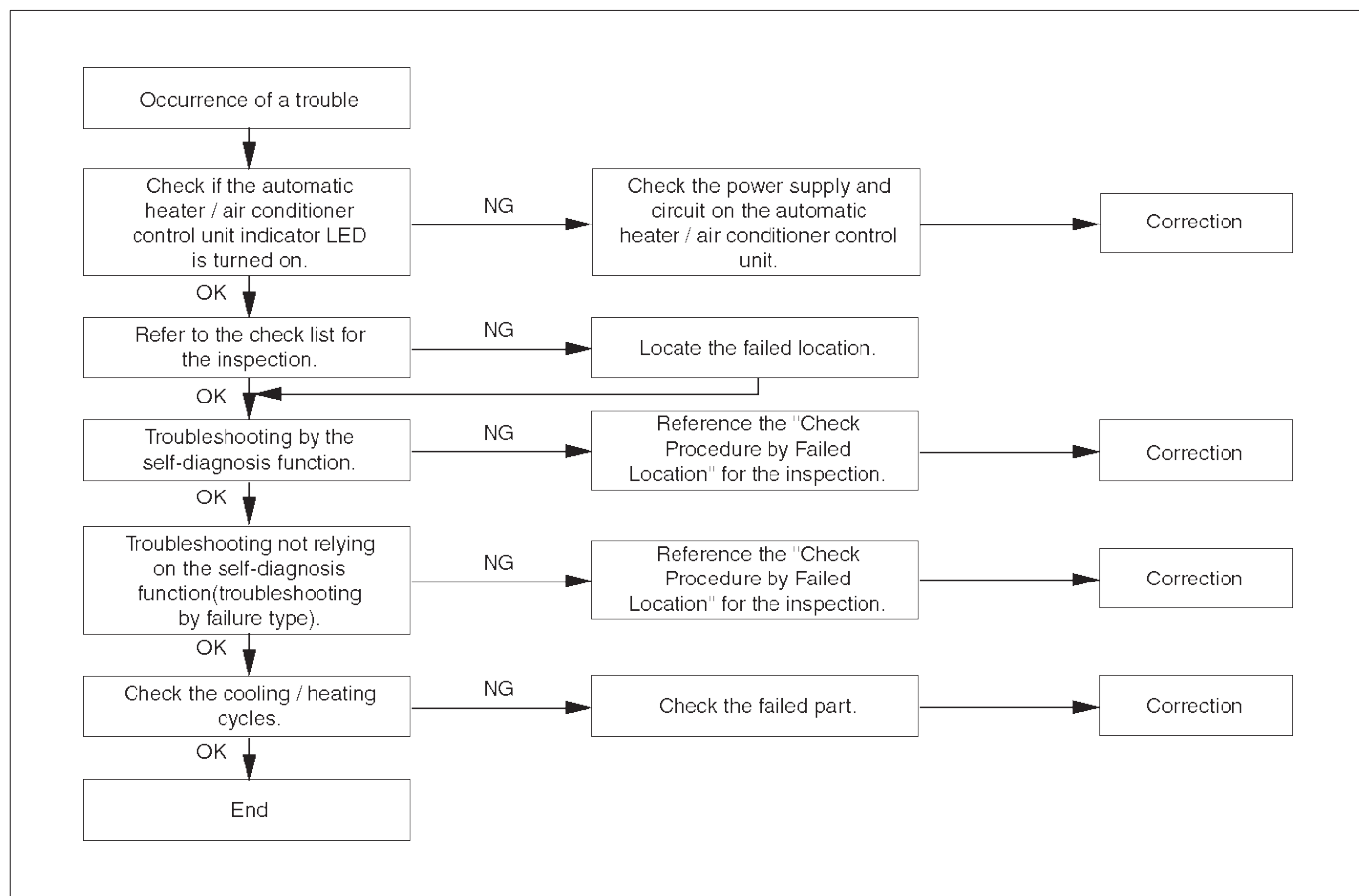
Troubleshooting, Its Overview and Procedures

The automatic air conditioner equips with the "Self-Diagnosis Function" to check its major components. This function makes access to the sensors, actuators and blower fan motor system easier when checking them up and, when a failed part is located, this function restores its original performance.

When implementing the troubleshooting, this self-diagnosis function narrows the range to be searched at the first step, then check relevant parts one by one according to the "Checking Procedures by Failed Location". As for a location this function is unappreciable, the system accurately determines characteristics of a given trouble and checks relevant parts according to the "Checking Procedures by Failed Location".

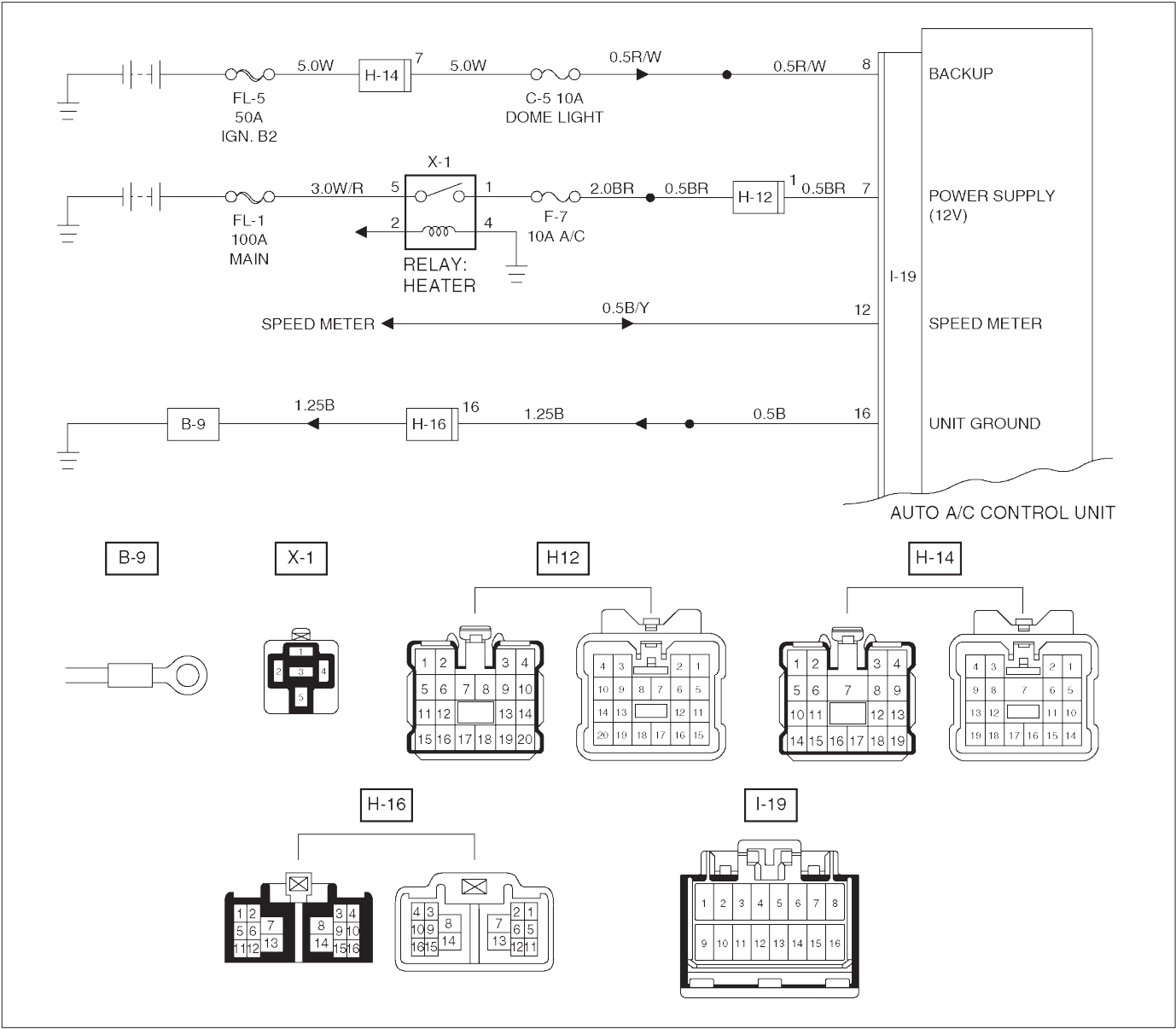
The following illustrates basic troubleshooting flow.

Basic Troubleshooting Flow



Auto Air Conditioner Control Unit Power Supply Diagnosis

This check is required because a trouble on the auto amplifier (control unit) power supply circuit or grounding circuit prevents accurate troubleshooting.



D08R200034

Condition	Possible cause	Correction
Power source does not supply to auto air conditioner control unit.	—	Refer to <i>Chart A</i>

Chart “A”: Check of Auto Amplifier Power Supply System

Step	Action	Value(s)	Yes	No
1	Is the fuse C-5 normal?	—	Go to <i>Step 2</i>	Replace the fuse
2	Is the fuse F-7 normal?	—	Go to <i>Step 3</i>	Replace the fuse
3	Disconnect the auto A/C control unit connector I-19. Is the battery voltage applied between the harness side connector terminal No.I32-8 and the ground?	Approx. 12V	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Repair an open circuit between the fuse C-5 and terminal No.I19-8. Is the action complete?	—	Go to <i>Step 4</i>	—
5	Is there continuity between the harness side connector terminal No.I19-16 and the ground?	—	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair an open circuit between terminal No.I19-16 and the ground No.B-9. Is the action complete?	—	Go to <i>Step 5</i>	—
7	Turn the lighting switch on. Is the battery voltage applied between the harness side connector terminal No.I19-12 and the ground?	Approx. 12V	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Repair an open circuit between the lighting switch and terminal No.I19-12. Is the action complete?	—	Go to <i>Step 7</i>	—
9	Turn the starter switch on. Is the battery voltage applied between the harness side connector terminal No.I19-7 and the ground?	Approx. 12V	—	Go to <i>Step 10</i>
10	Repair an open circuit between the fuse F-7 and terminal No.I19-7. Is the action complete?	—	Verify repair	—

Performance and Movement checklist for Automatic Air Conditioner Related Parts

Start the engine, and when the engine coolant reached 50°C (122°F) check performance and movement of the related parts according the following checklist.

Performance Check Using the Manual Switch

No.	Item	Procedure		Criteria
		Condition	Operation	
1	Air discharge temperature (Air-mix door operation)	Auto-switch ON	Set temperature to 18°C (65°F).	Cold air discharge.
			Set temperature to 32°C (90°F).	Hot air discharge.
2	Air discharge volume (Fan operation)	Fan switch ON	1. Set temperature to 25°C (77°F). 2. Press the OFF switch.	Fan does not operate. There is no air discharge.
			1. Set temperature to 25°C (77°F). 2. Press the fan switch.	Fan operates. Fan speed increases each time the switch is pressed (LO to HI in 5 increments).
3	Air discharge temperature (Mode door operation)	Fan in manual 5-speed operation	1. Set temperature to 25°C (77°F). 2. Press the mode switch. 3. Move through the 5 modes (VENT→BI-LEVEL→FOOT→DEF/FOOT→DEF).	● Panel display lights for each mode. ● Air discharge outlet position changes for each mode.
4	Inside/outside air mode (Intake door operation)	Auto-switch ON	1. Set temperature to 25°C (77°F). 2. Press the intake switch. 3. Press the fan switch. 4. Set the fan to the highest speed. 5. Press the intake switch.	● Intake switch LED turns from on to off. ● Air discharge sound changes.
5	Compressor	Outside air temperature above 0°C (32°F) and vehicle interior at normal temperature	1. Set temperature to 25°C (77°F). 2. Press the OFF switch. 3. Press the auto-switch. 4. Press the air conditioner switch.	● When the auto-switch is pressed, the LED in the air conditioner switch turns on and the compressor begins operation. ● When the air conditioner switch is pressed, the LED in the air conditioner switch turns off and the compressor stops operation.

1A-90 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Check of Auto Function

No.	Item	Procedure		Criteria
		Condition	Operation	
1	Automatic operation	Auto-switch ON	Set temperature to 18°C (65°F).	- AUTO display highlighted on display panel. - Cold air discharge. - VENT mode.  - Intake switch LED on. - Fan speed bar graph display at MAX6dash;HI - A/C switch LED on.
			Gradually increase the temperature setting from 18°C (65°F) to 31.5°C (89°F).	- Temperature of air discharge increases with increase in setting temperature. - Air discharge volume changes. - Panel display shows VENT, BI-LEVEL, FOOT, or DEF/FOOT. 
			Set temperature to 32°C (90°F).	- Hot air discharge. - A/C bar graph display disappears. - Foot mode.  - Intake LED switch off. - Fan speed bar graph display at MAX-HI - A/C switch LED on.

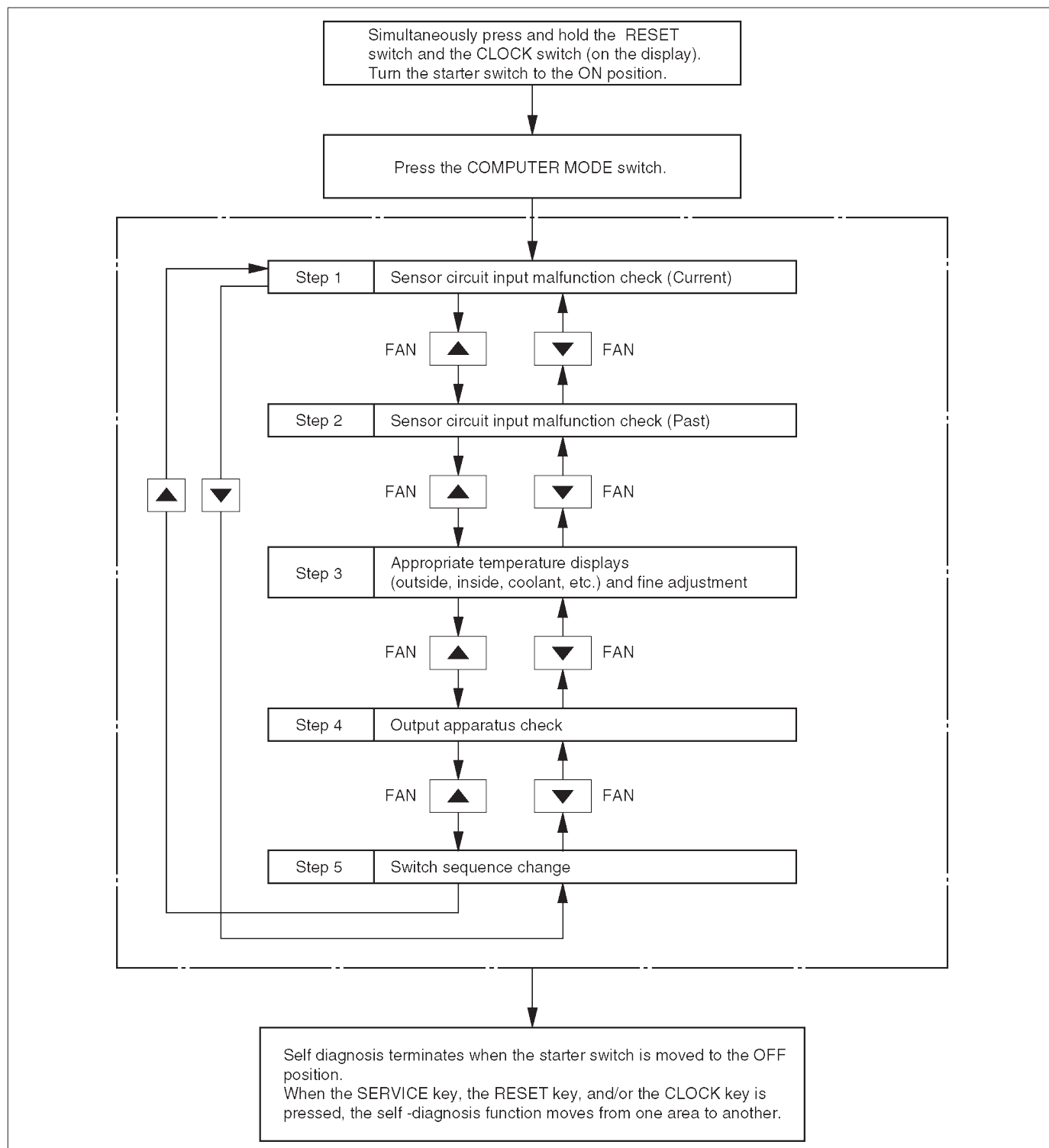
Troubleshooting With Self-Diagnosis Function

Overview of Self-Diagnosis Function

Sensors (input) and actuators (output) are used to check circuit function and provide essential data on these circuits. For more detailed information, refer to the [Inspection and Repair] Sections for the applicable system or component.

The Table below shows how to turn the self-diagnosis function on and off.

Self-Diagnosis Operation Procedure



1A-92 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Step	Action	Value(s)	Yes	No
1	1. Allow the engine to idle until it completely warms up. 2. Turn the starter switch to the OFF position. 3. Place a 60-watt lamp approximately 15 cm from the sun sensor. NOTE: This procedure is best performed at night or in a dark, unlit area. Is the action complete?	—	Go to <i>Step 2</i>	—
2	Simultaneously press and hold the RESET key and the CLOCK key (display unit). Move the starter switch to start the engine. Does DIAG appear on the display?	—	Go to <i>Step 3</i>	Replace display unit
3	Press the COMPUTER MODE key. Does DIAG AIRCON appear on the display?	—	Go to <i>Step 4</i>	Replace audio unit
4	NOTE: A '1' should appear in the set temperature segment of the display. Does '0' appear in the outside air segment of the display?	—	Go to <i>Step 6</i>	Go to <i>Step 5</i>
5	Repair or replace damaged parts. NOTE: Refer to <i>Step 1 Trouble Code Table</i> . Is the action complete?	—	Go to <i>Step 1</i>	—
6	Press and release the fan switch (one time only). NOTE: A '2' should appear in the set temperature segment of the display. Does '0' appear in the outside air segment of the display?	—	Go to <i>Step 8</i>	Go to <i>Step 7</i>
7	Repair or replace damaged parts. NOTE: Refer to <i>Step 2 Trouble Code Table</i> . Is the action complete?	—	Go to <i>Step 1</i>	—
8	Press and release the fan switch (one time only). NOTE: • Refer to <i>Step 3 Sensor Output Check for a sample output value</i> . • A '3' should appear in the set temperature segment of the display. Does the correct sensor output value appear in the outside air segment of the display?	—	Go to <i>Step 10</i>	Go to <i>Step 9</i>
9	Repair or replace damaged parts. NOTE: Refer to <i>Trouble Spot Inspection</i> . Is the action complete?	—	Go to <i>Step 1</i>	—
10	Press and release the fan switch one time only. NOTE: Refer to <i>Step 4 (Operation Check)</i> for display readings and inspection steps. Are all parts operating normally?	—	Go to <i>Step 12</i>	Go to <i>Step 11</i>

HEATING, VENTILATION AND AIR CONDITIONING (HVAC) 1A-93

Step	Action	Value(s)	Yes	No
11	Repair or replace damaged parts. NOTE: Refer to <i>Trouble Spot Inspection</i> . Is the action complete?	—	Go to <i>Step 1</i>	—
12	1. Press and release the fan switch (one time only). 2. Press the DEF switch several times. NOTE: A '3' should appear in the set temperature segment of the display. Does the correct sequence pattern (1, 2, 1, 2) appear in the outside air segment of the display?	—	Go to <i>Step 15</i>	Go to <i>Step 13</i>
13	Perform diagnosis for DEF switch, intake actuator, and AUTO A/C control unit. Have the diagnosis procedures been completed.	—	Go to <i>Step 14</i>	—
14	1. Press and release the fan switch (one time only). 2. Press the DEF switch several times. Are all parts operating normally?	—	Go to <i>Step 15</i>	Replace display unit
15	Turn the starter switch OFF. Is the action complete?	—	—	—

1A-94 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

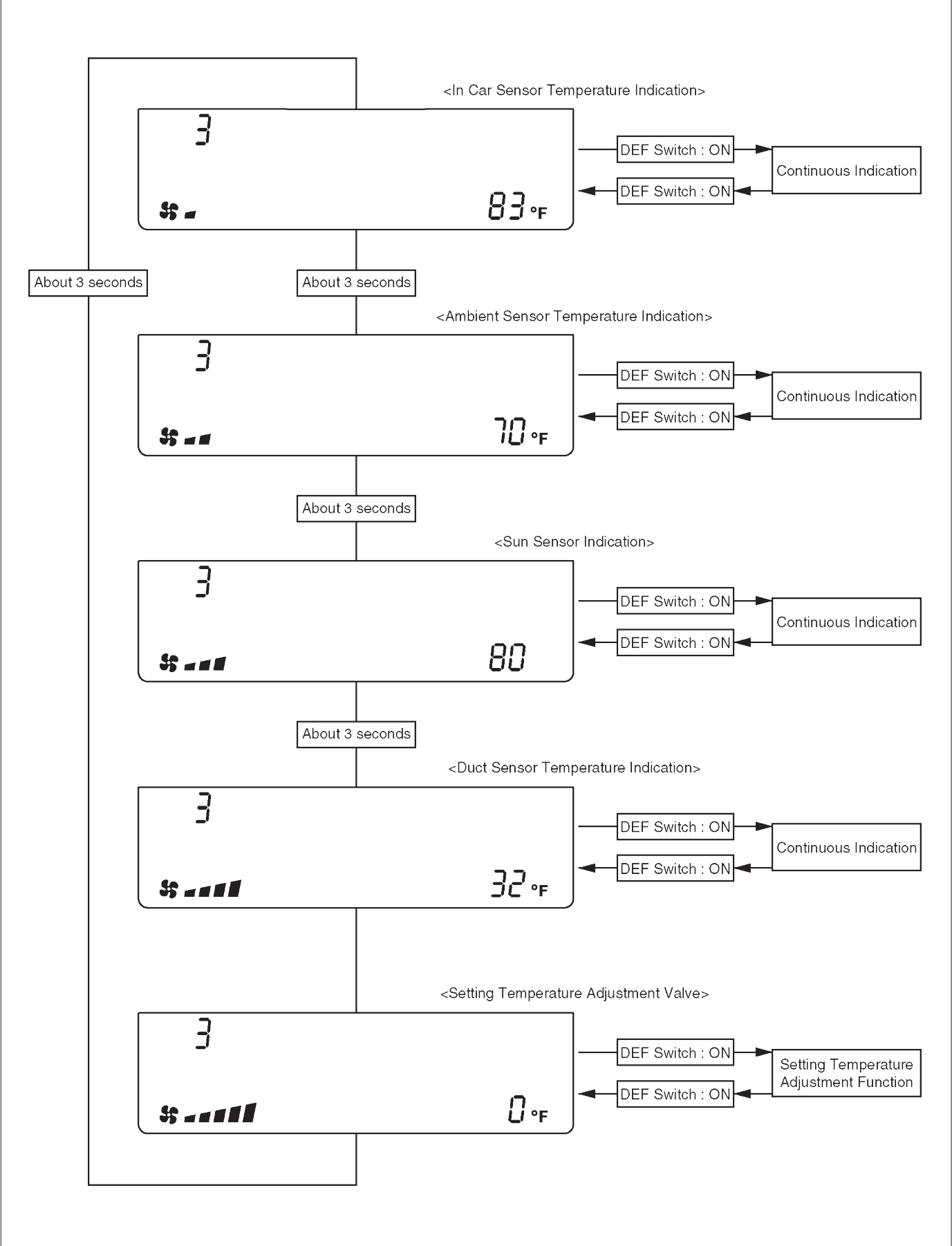
STEP 1: Trouble Code Table

Trouble Code	Defective Part	Trouble Code	Defective Part
1	In Car Sensor Open Circuit	– 1	In Car Sensor Short Circuit
2	Ambient Sensor Open Circuit	– 2	Ambient Sensor Short Circuit
3	Sun Sensor Open Circuit	– 3	Sun Sensor Short Circuit
4	Duct Sensor Open Circuit	– 4	Duct Sensor Short Circuit
5	Mix Potentiometer Open Circuit	– 5	Mix Potentiometer Short Circuit
6	Mode Encoder Open Circuit		
7	Intake Encoder Open Circuit		
0	No Defective Part		

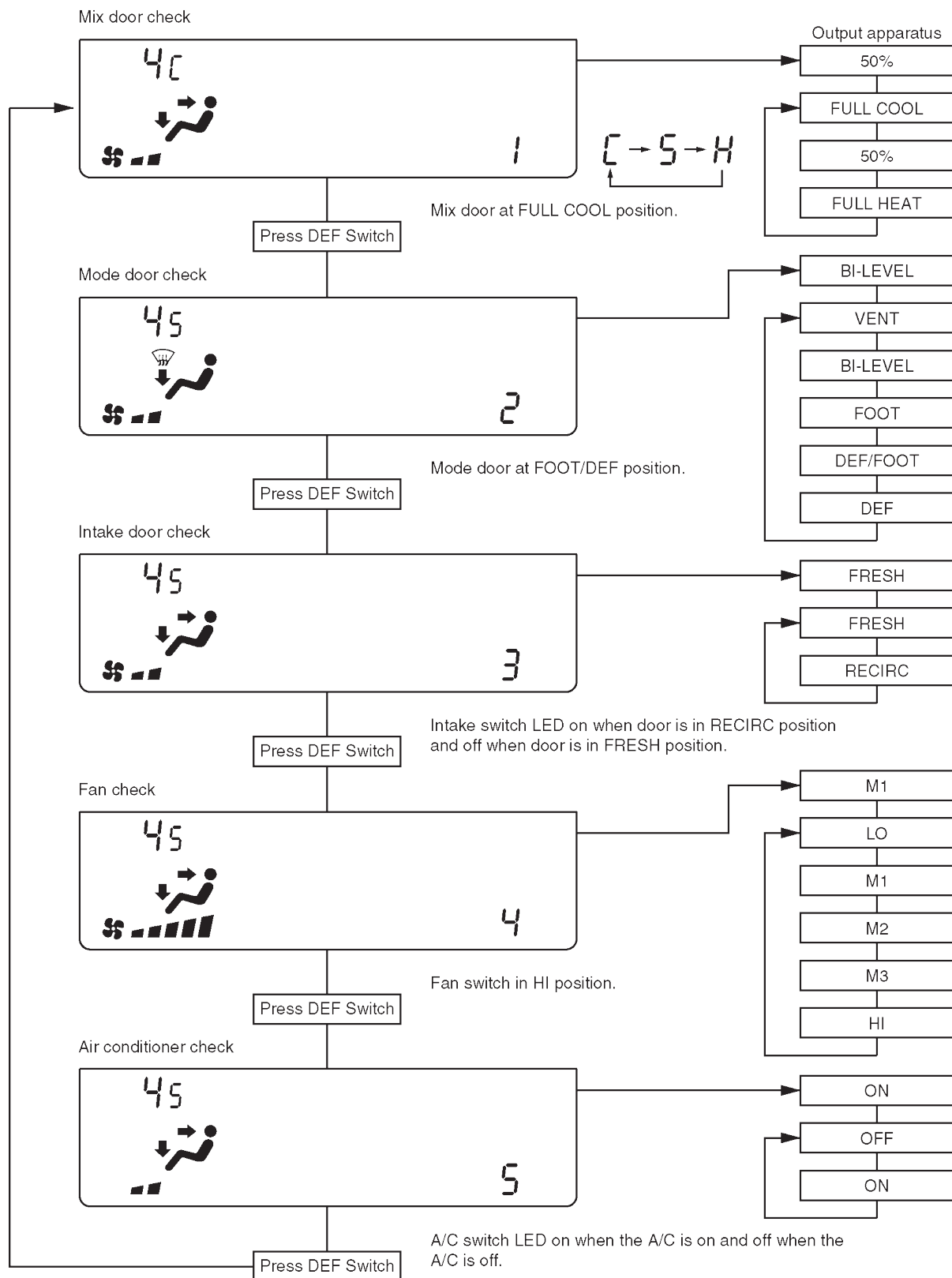
STEP 2: Trouble Code Table

Trouble Code	Defective Part	Trouble Code	Defective Part
1	In Car Sensor Open Circuit	– 1	In Car Sensor Short Circuit
2	Ambient Sensor Open Circuit	– 2	Ambient Sensor Short Circuit
3	Not Used	– 3	Sun Sensor Short Circuit
4	Duct Sensor Open Circuit	– 4	Duct Sensor Short Circuit
5	Mix Potentiometer Open Circuit	– 5	Mix Potentiometer Short Circuit
6	Mode Encoder Open Circuit		
7	Intake Encoder Open Circuit		
0	No Defective Part		

STEP 3: Sensor Output Check



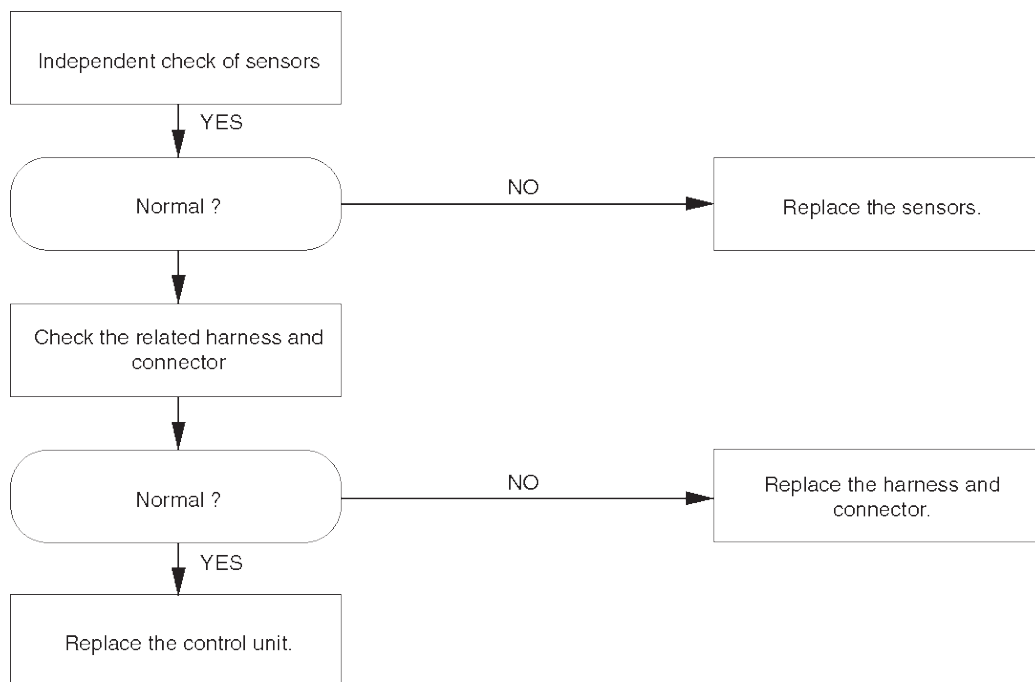
STEP 4: Operation Check



Inspection By Failed Location

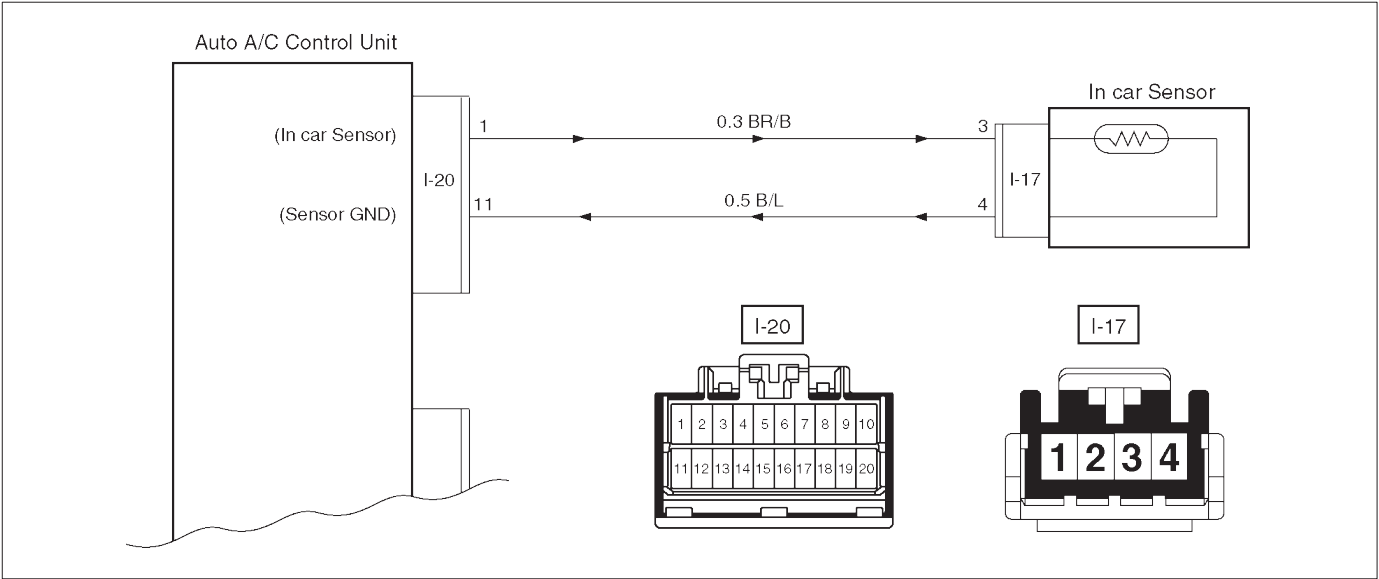
Inspection of the Sensors

When the self-diagnosis function has determined that trouble is present on the sensors, check them according to the following flow chart.



Sensors	Allowable range	Check method
In car sensor	Refer to the sensor resistance curve.	Chart 1
Ambient sensor	Refer to the sensor resistance curve.	Chart 2
Sun sensor	100 ohms maximum in forward and 0.02 mA minimum when exposed to 60W incandescent lamp.	Chart 3

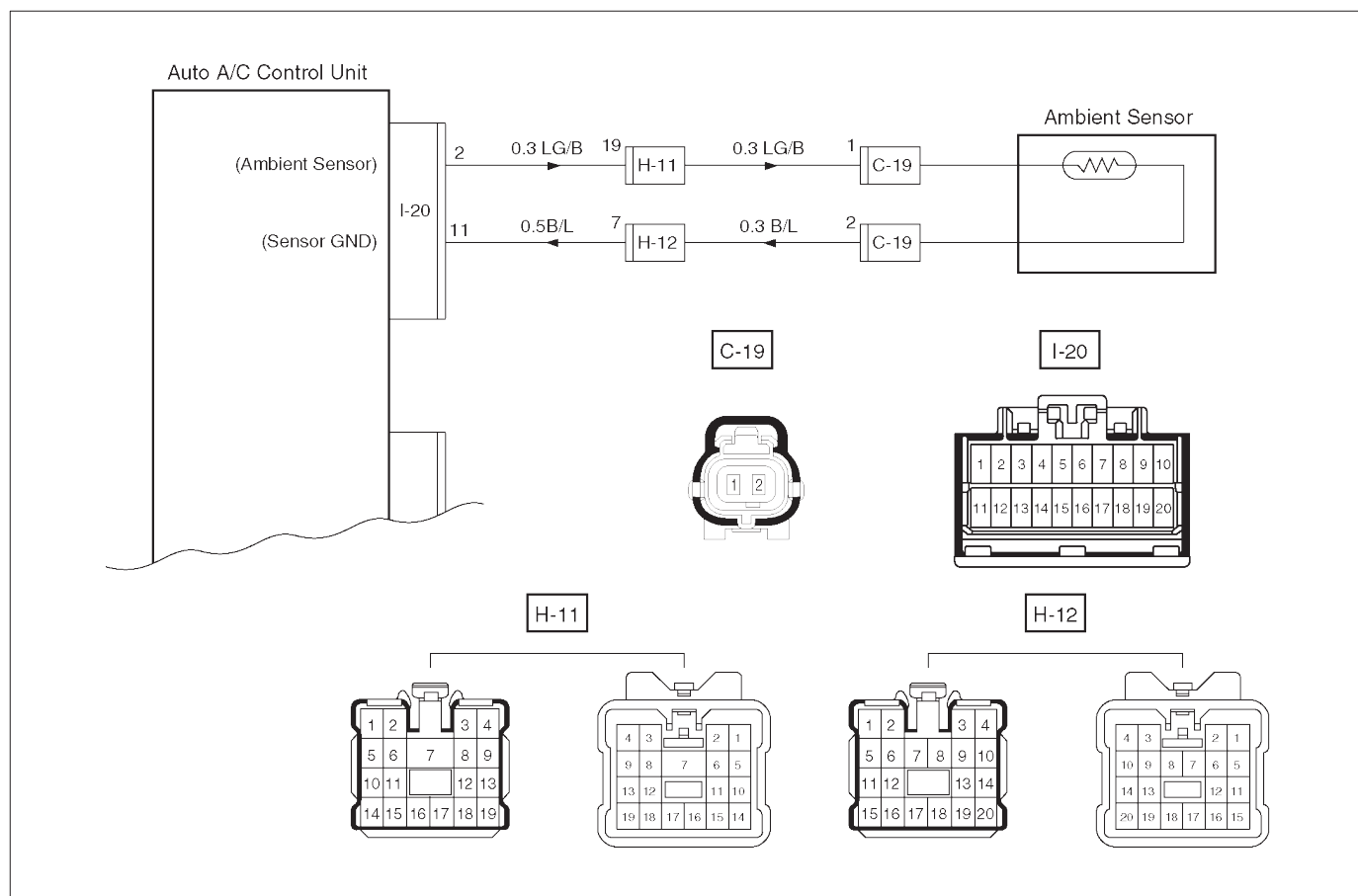
Chart 1: In Car Sensor



D08R200029

Step	Action	Value(s)	Yes	No
1	Disconnect the in car sensor connector. (No.I-17) Is performance of the sensor normal? (Refer to the later section on "Individual Inspection")	—	Go to Step 2	Replace the in car sensor
2	Is there continuity between the harness side connector No.I20-1 and No.I17-3?	—	Go to Step 4	Go to Step 3
3	Repair an open circuit between terminal No.I20-1 and No.I17-3. Is the action complete?	—	Go to Step 2	—
4	Is there continuity between the harness side connector No.I20-11 and No.I17-4?	—	Go to Step 6	Go to Step 5
5	Repair an open circuit between terminal No.I20-11 and No.I17-4. Is the action complete?	—	Go to Step 4	—
6	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—

Chart 2: Ambient Sensor

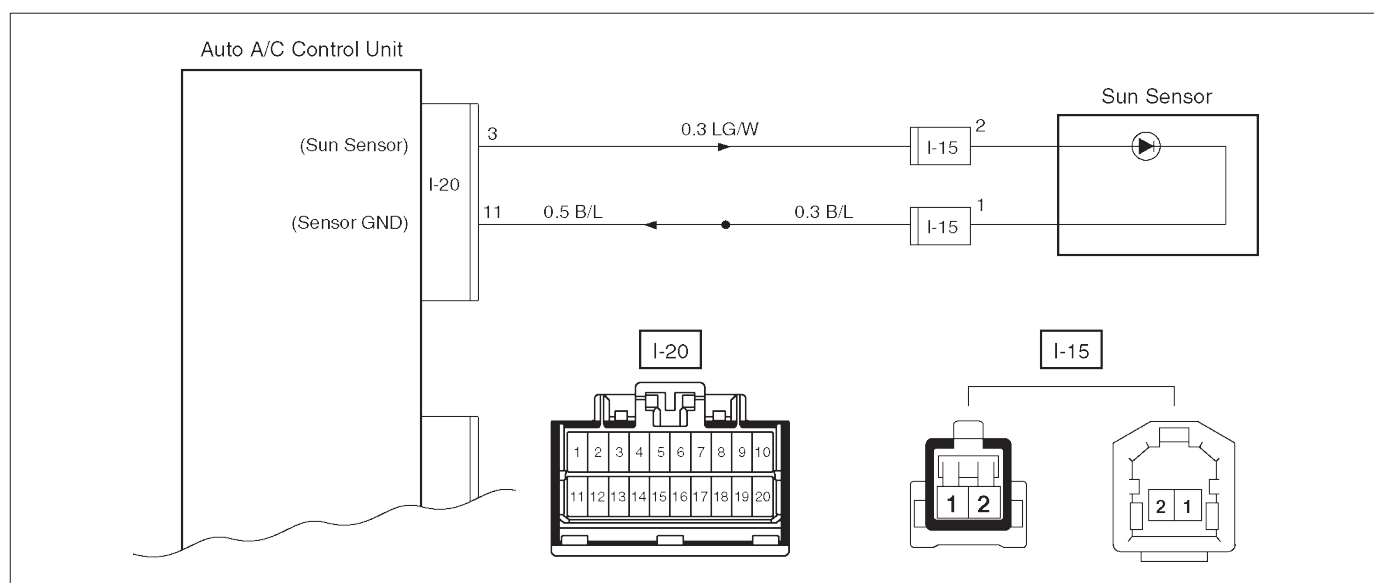


D08R200030

Step	Action	Value(s)	Yes	No
1	Disconnect ambient sensor connector. (No.C-19) Is performance of the ambient sensor normal? (Refer to the <i>later section</i> on "Individual inspection")	—	Go to Step 2	Replace the ambient sensor
2	Connect the ambient sensor connector. Is resistance between the harness side connector No.I20-2 and No.I20-11 normal?	Refer to the <i>later section</i> on "Individual inspection"	Go to Step 4	Go to Step 3
3	Repair an open circuit between terminal No.I20-2 and No.C19-1 or No.I20-11 and No.C19-2. Is the action complete?	—	Verify repair	—
4	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—

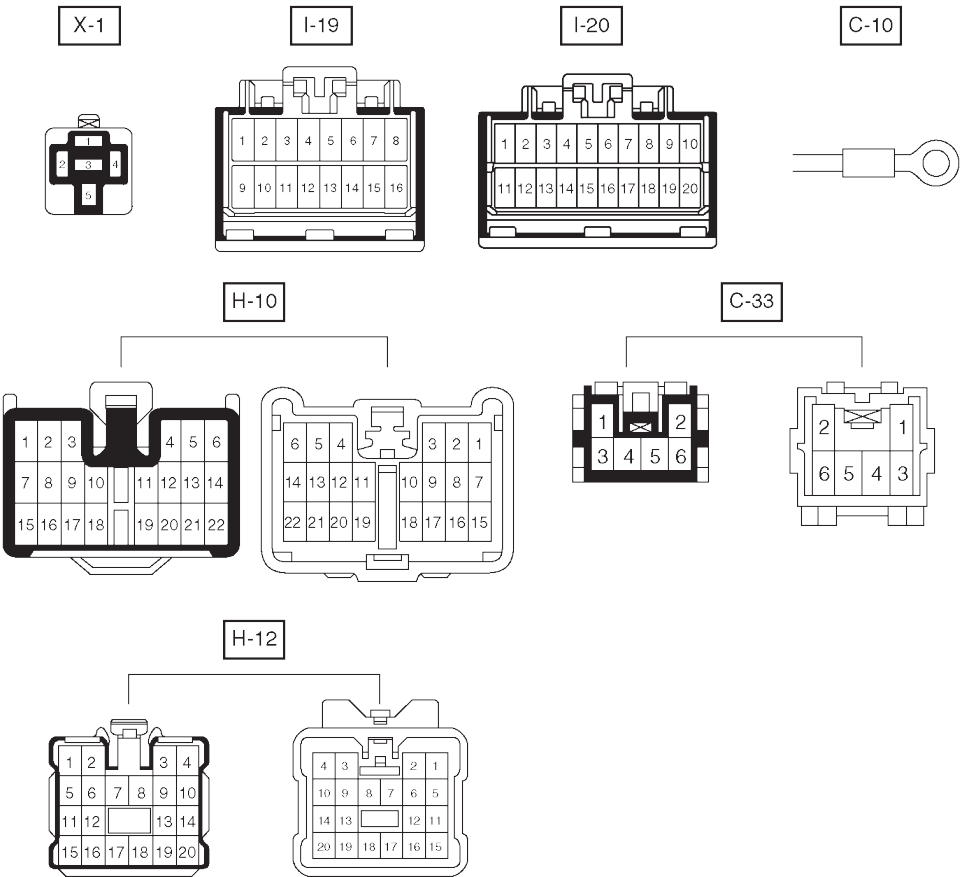
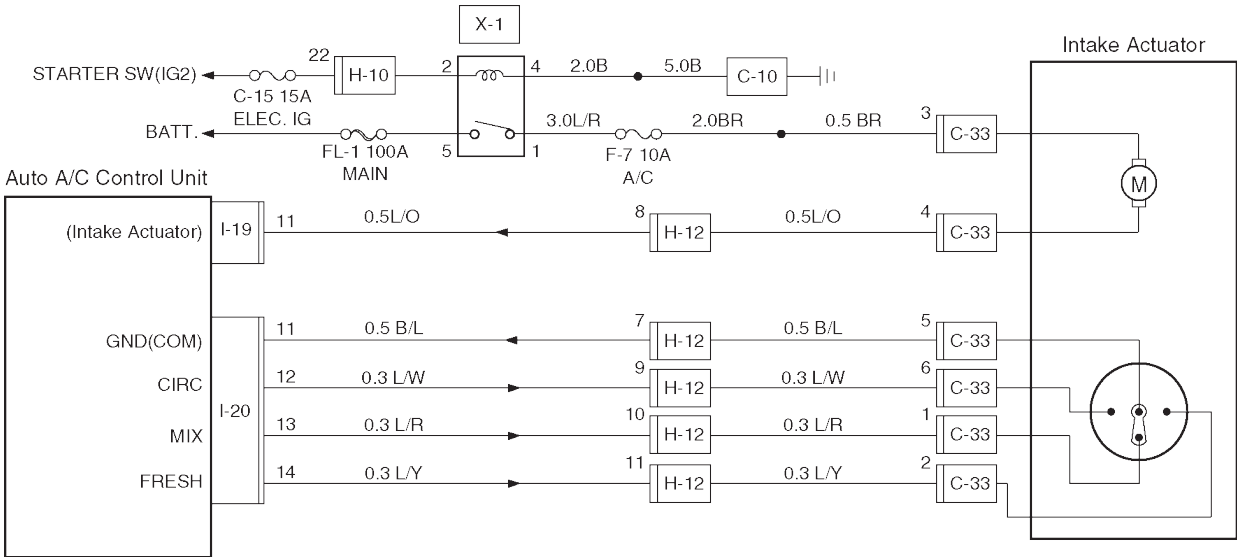
1A-100 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Chart 3: Sun Sensor



Step	Action	Value(s)	Yes	No
1	Disconnect the sun sensor connector. (No.I-15) Is performance of the sun sensor normal? (Refer to the <i>later section on individual inspection</i>)	—	Go to Step 2	Replace the sun sensor.
2	Is there continuity between the harness side connector terminal No.I20-3 and No.I15-2?	—	Go to Step 4	Go to Step 4
3	Repair an open circuit between terminal No.I20-3 and No.I15-2. Is the action complete?	—	Go to Step 2	—
4	Is there continuity between the harness side connector terminal No.I20-11 and No.I15-1?	—	Go to Step 6	Go to Step 5
5	Repair an open circuit between terminal No.I20-11 and I15-1. Is the action complete?	—	Go to Step 4	—
6	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—

Inspection of the Intake Actuator System



1A-102 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Condition	Possible cause	Correction
Does not work at all	—	Refer to <i>Chart A</i>
Control failure	—	Refer to <i>Chart B</i>

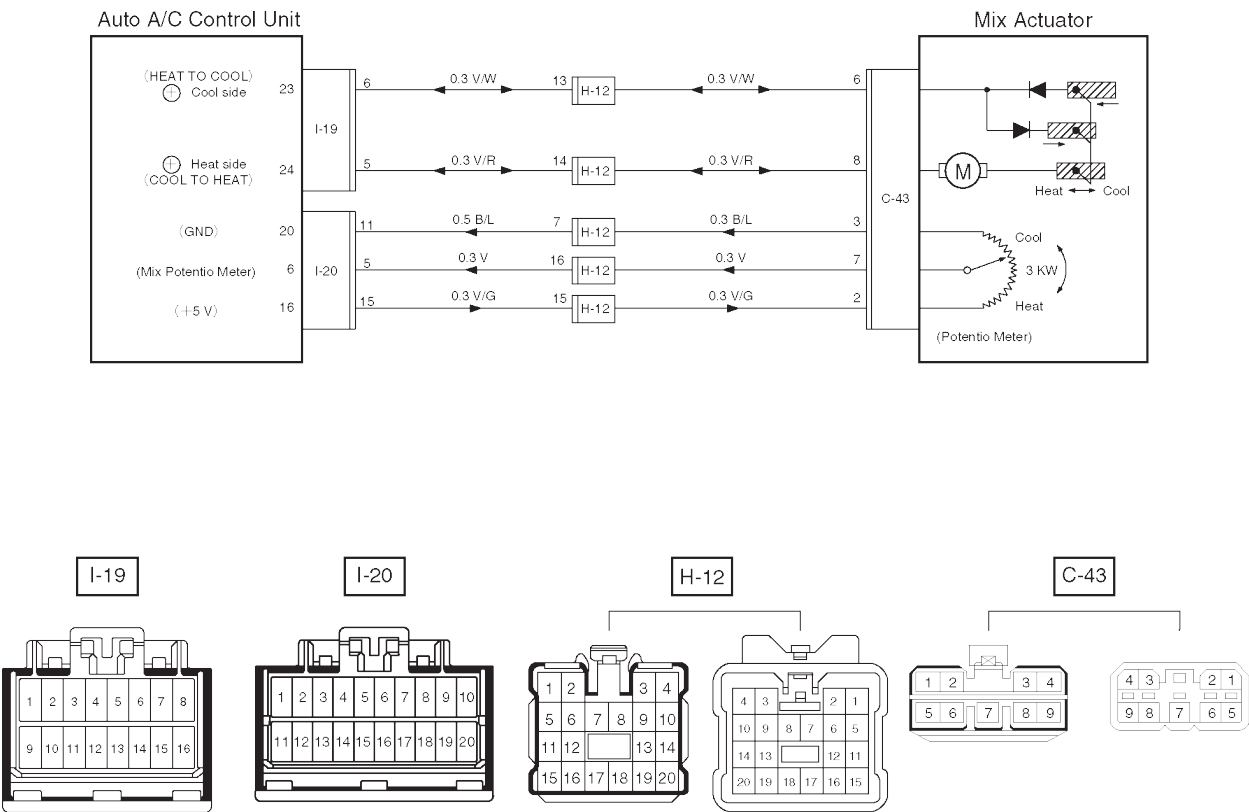
Chart A: Does Not Work At All

Step	Action	Value(s)	Yes	No
1	Is the fuse FL-1 normal?	—	Go to <i>Step 2</i>	Replace the fuse
2	Is the fuse F-7 normal?	—	Go to <i>Step 3</i>	Replace the fuse
3	Is the relay X-1 normal?	—	Go to <i>Step 4</i>	Replace the relay
4	Turn on the ignition switch. (the engine is run.) Is the battery voltage applied between the harness side connector terminal No.C33-3 and ground?	Approx 12V	Go to <i>Step 6</i>	Go to <i>Step 5</i>
5	Repair an open circuit between terminal No.C33-3 and No.X1-1. Is the action complete?	—	Go to <i>Step 4</i>	—
6	Is the battery voltage applied between the harness side connector terminal No.C33-4 and ground?	Approx 12V	Go to <i>Step 8</i>	Go to <i>Step 7</i>
7	Replace the intake actuator motor. Is the action complete?	—	Go to <i>Step 6</i>	—
8	Is there continuity between the harness side connector terminal No.I19-11 and No.C33-4?	—	Go to <i>Step 10</i>	Go to <i>Step 9</i>
9	Repair an open circuit between No.I19-11 and C33-4. Is the action complete?	—	Verify repair	—
10	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—

Chart B: Failure on the Intake Control

Step	Action	Value(s)	Yes	No
1	Is the fuse No.F-7 normal?	—	Go to <i>Step 2</i>	Replace the fuse
2	Is the relay No.X-1 normal?	—	Go to <i>Step 3</i>	Replace the relay
3	Turn on the ignition switch. (the engine is run.) Is the intake actuator stopped?	—	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Replace or repair the auto air conditioner control unit. Is the action complete?	—	Verify repair	—
5	Is there continuity between the harness side connector terminal No.C33-5 and No.I20-11?	—	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair an open circuit between terminal No.C33-5 and No.I20-11. Is the action complete?	—	Go to <i>Step 5</i>	—
7	Is there continuity between the harness side connector terminal No.C33-6 and No.I20-12?	—	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Repair an open circuit between terminal No.C33-6 and No.I20-12. Is the action complete?	—	Go to <i>Step 7</i>	—
9	Is there continuity between the harness side connector terminal No.C33-1 and No.I20-13?	—	Go to <i>Step 11</i>	Go to <i>Step 10</i>
10	Repair an open circuit between terminal No.C33-1 and I20-13. Is the action complete?	—	Go to <i>Step 9</i>	—
11	Is there continuity between the harness side connector terminal No.C33-2 and No.I20-14?	—	Go to <i>Step 13</i>	Go to <i>Step 12</i>
12	Repair an open circuit between harness No.C33-2 and No.I20-14. Is the action complete?	—	Go to <i>Step 11</i>	—
13	1. Disconnect the intake actuator connector No.C33. 2. Is the battery voltage applied between harness side connector terminal No.C33-6 and ground? No.C33-2 and ground? No.C33-1 and ground?	—	Go to <i>Step 14</i>	Go to <i>Step 15</i>
14	Replace or repair the intake actuator. Is the action complete?	—	Verify repair	—
15	Replace or repair the air conditioner control unit. Is the action complete?	—	Verify repair	—

Inspection of the Mix Actuator System



D08R200032

Condition	Possible cause	Correction
Does not work at all	—	Refer to <i>Chart A</i>
Control failure	—	Refer to <i>Chart B</i>

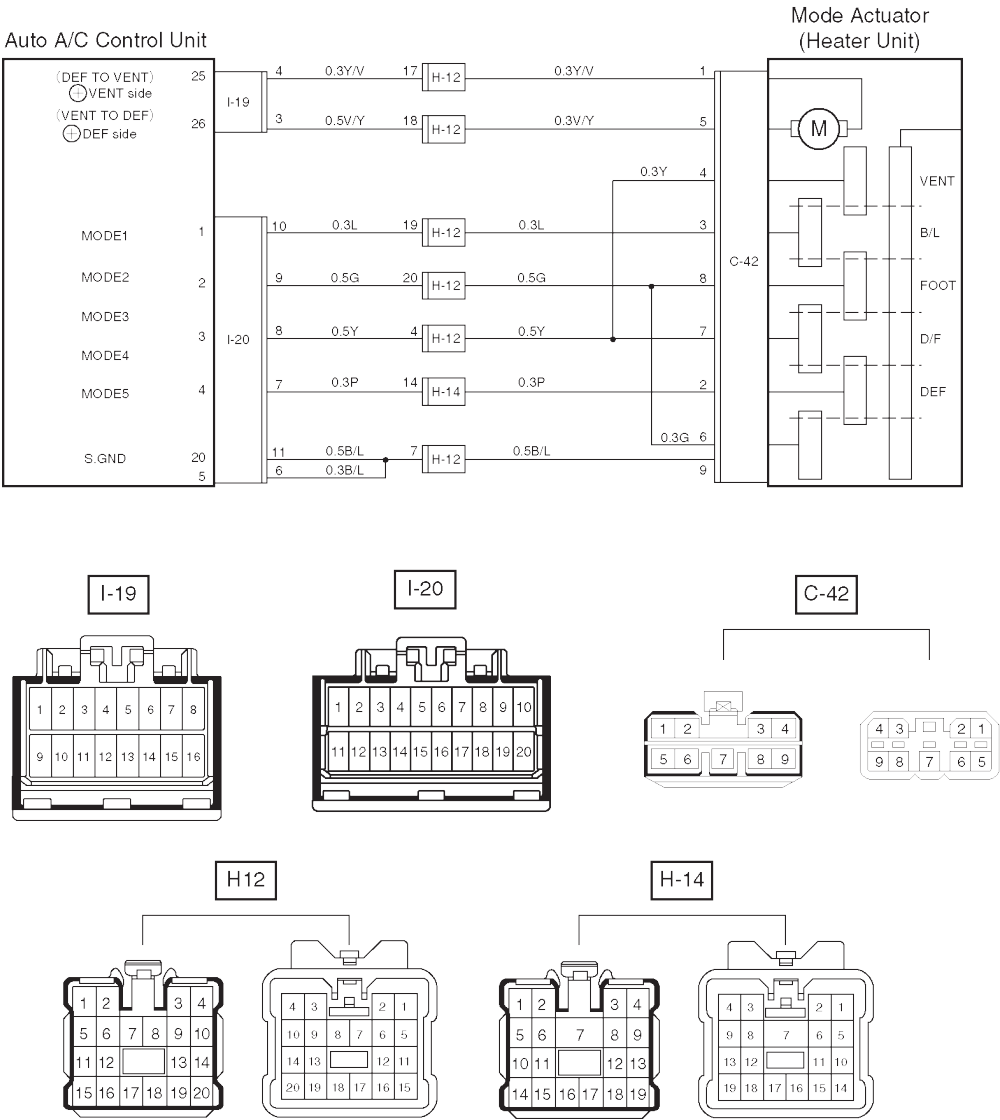
Chart A: Does Not work At All

Step	Action	Value(s)	Yes	No
1	1. Turn on the ignition switch (the engine is run). 2. Disconnect the mix actuator connector (C-43). 3. Short-circuit the chassis harness side connector terminal No.C43-3 and No.C43-7. 4. Using the temperature control switch, select 18°C (65°F) for the temperature. Is the battery voltage applied on a regular interval basis between the harness side connector terminal No.C43-6 (-) and No.C43-8 (+)?	—	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	Replace the auto air conditioner control unit.	—	Verify repair	—
3	Using the temperature control switch, select 32°C (90°F) for the temperature. Is the battery voltage applied on a regular interval basis between the harness side connector terminal No.C43-6 (+) and No.C43-8 (-)?	—	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Replace the auto air conditioner control unit.	—	Verify repair	—
5	Is there continuity between the harness side connector terminal No.I19-6 and No.C43-6?	—	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair an open circuit between terminal No.I19-6 and No.C43-6. Is the action complete?	—	Go to <i>Step 5</i>	—
7	Is there continuity between the harness side connector terminal No.I19-5 and No.C43-8?	—	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Repair an open circuit between terminal No.I19-5 and No.C43-8. Is the action complete?	—	Verify repair	—
9	Replace the mix actuator. Is the action complete?	—	Verify repair	—

Chart B: Mix Actuator Control Failure

Step	Action	Value(s)	Yes	No
1	Turn the ignition switch (the engine is run). Dose the mix actuator fully stroke when 32 °C (90 °F) and 18 °C (65 °F) of the temperature control switch?	—	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	Repair or replace the air mix door or the link unit. Is the action complete?	—	Verify repair	—
3	Is there continuity between the harness side connector terminal No.C43–3 and No.I20–11?	—	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Repair an open circuit between terminal No.C43–3 and No.I20–11. Is the action complete?	—	Go to <i>Step 3</i>	—
5	Is there continuity between harness side connector terminal No.C43–7 and No.I20–5?	—	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair an open circuit between terminal No.C43–7 and No.I20–5. Is the action complete?	—	Go to <i>Step 5</i>	—
7	Is there continuity between the harness side connector terminal No.C43–2 and No.I20–15?	—	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Repair an open circuit between terminal No.C43–2 and No.I20–15. Is the action complete?	—	Go to <i>Step 7</i>	—
9	Is sum of the voltage between the following chassis harness side connector terminals approximately 5V? No.I20–15 and No.I20–5, No.I20–5 and No.I20–11	—	Go to <i>Step 11</i>	Go to <i>Step 10</i>
10	Replace the actuator. Is the action complete?	—	Verify repair	—
11	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—

Inspection of the Mode Actuator System



D08R200035

Condition	Possible cause	Correction
Does not work at all	—	Refer to <i>Chart A</i>
Control failure	—	Refer to <i>Chart B</i>

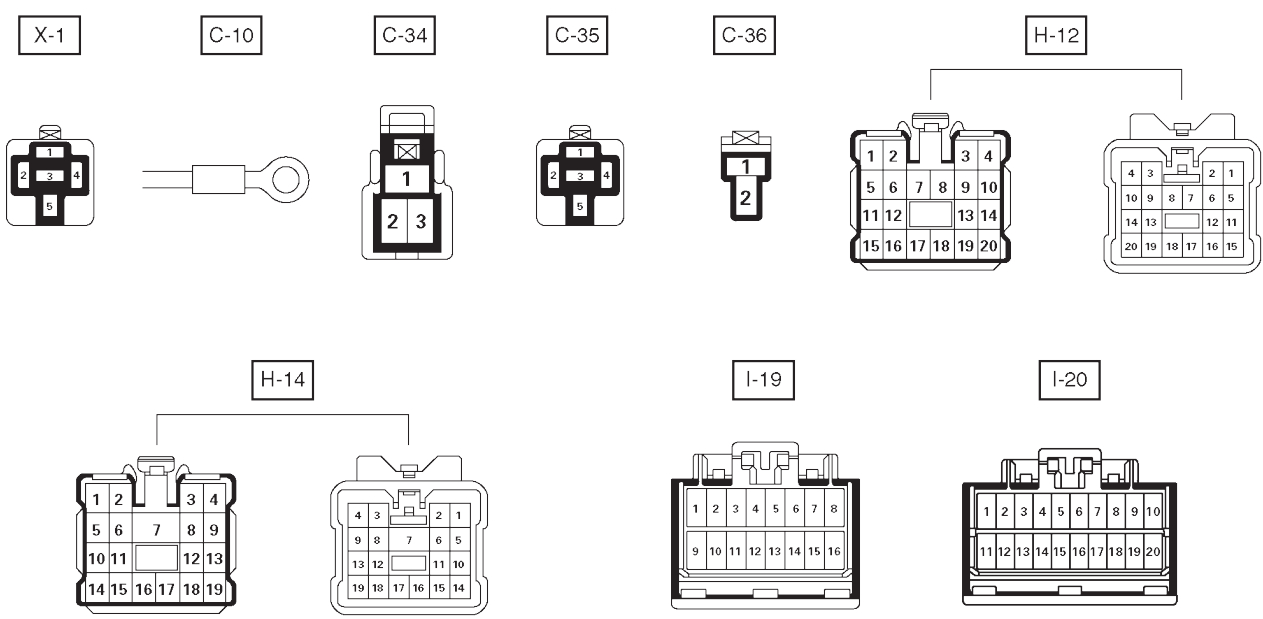
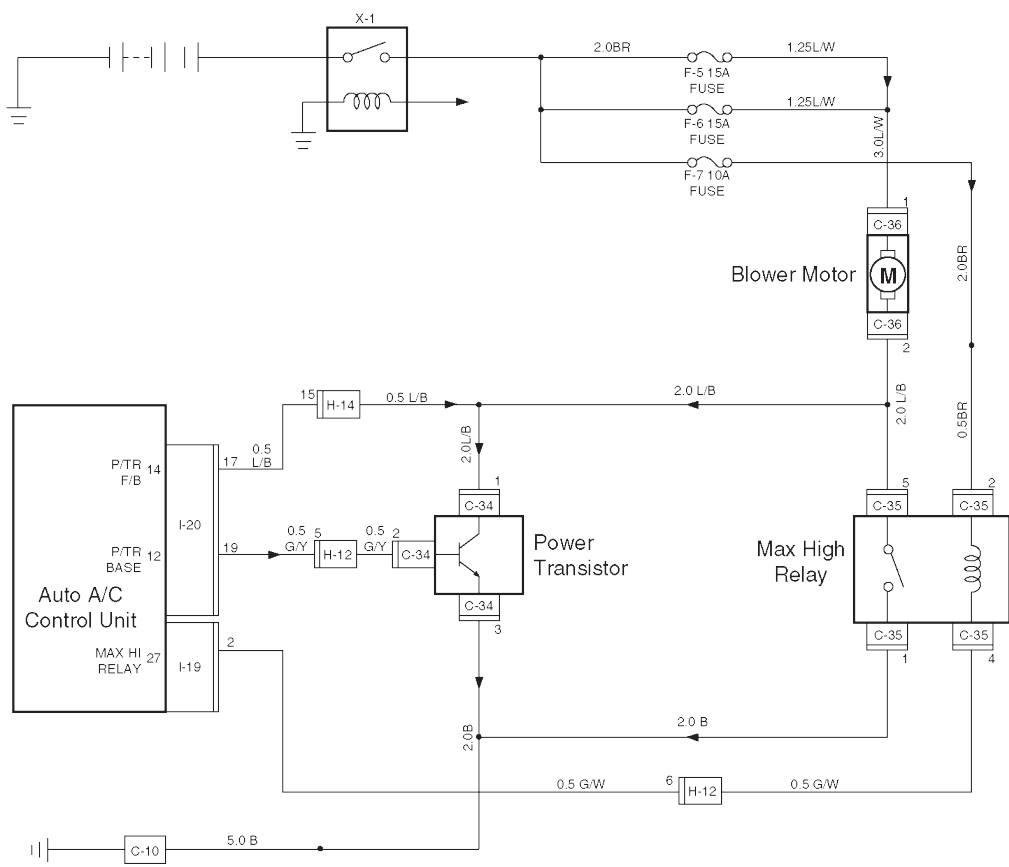
1A-108 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)**Chart A: Does Not Work At All**

Step	Action	Value(s)	Yes	No
1	1. Turn on the ignition switch (the engine is run). 2. Disconnect the mode actuator connector (C-42) 3. Select VENT pressing the mode actuator. Is the battery voltage provided on a regular interval between the harness side connector terminal No.C42-1 (+) and No.C42-5 (-)?	—	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—
3	Turn on the DEF mode switch. Is the battery voltage provided on a regular interval between the chassis side connector terminal No.C42-5 (+) and No.C42-1 (-)?	—	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Replace the auto air conditioner control unit.	—	Verify repair	—
5	Is there continuity between the harness side connector terminal No.C42-1 and No.I19-4?	—	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair an open circuit between terminal No.C42-1 and No.I19-4. Is the action complete?	—	Go to <i>Step 5</i>	—
7	Is there continuity between the harness side connector terminal No.C42-5 and No.I19-3?	—	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Repair an open circuit between terminal No.C42-5 and No.I19-3. Is the action complete?	—	Verify repair	—
9	Replace the mode actuator.	—	Verify repair	—

Chart B: Mode Actuator Control Failure

Step	Action	Value(s)	Yes	No
1	Turn on the ignition switch (the engine is run). Dose the mode actuator fully stroke when the defrost mode and the vent mode are selected?	—	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	Repair or replace the mode door or the link unit. Is the action complete?	—	Go to <i>Step 1</i>	—
3	Is there continuity between the harness side connector terminal No.C42-9 and No.I20-11?	—	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Repair an open circuit between terminal No.C42-9 and No.I20-11. Is the action complete?	—	Go to <i>Step 3</i>	—
5	Is there continuity between the harness side connector terminal No.C42-3 and No.I20-10?	—	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair an open circuit between terminal No.C42-3 and No.I20-10. Is the action complete?	—	Go to <i>Step 5</i>	—
7	Is there continuity between harness side connector terminal No.C42-4 and No.I20-8?	—	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Repair an open circuit between terminal No.C42-4 and No.I20-8. Is the action complete?	—	Go to <i>Step 7</i>	—
9	Is sum of the voltage between the following harness side connector terminal approximately 5V? Voltage between No.I20-8 and No.I20-10 plus voltage between No.I20-8 and No.I20-11	5V	Go to <i>Step 11</i>	Go to <i>Step 10</i>
10	Replace the actuator. Is the action complete?	—	Verify repair	—
11	Dose the mode actuator work normally through manual operation?	—	Go to <i>Step 13</i>	Go to <i>Step 12</i>
12	Replace the sensor. Is the action complete?	—	Verify repair	—
13	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—

Inspection of the Fan Motor System



Condition	Possible cause	Correction
The fan dose not rotate at all	—	Refer to <i>Chart A</i>
The fan dose not rotate in the MAX-HI mode	—	Refer to <i>Chart B</i>
The fan dose not rotate in any mode other than MAX-HI	—	Refer to <i>Chart C</i>
The fan dose not stop	—	Refer to <i>Chart D</i>

Chart A: Fan Does Not Rotate At All

Step	Action	Value(s)	Yes	No
1	Are the fuse No.F-5, F-6 and No.F-7 normal?	—	Go to <i>Step 2</i>	Replace the fuse
2	Are the relay No.X-1 and No.C-35 normal?	—	Go to <i>Step 3</i>	Replace the relay
3	Turn on the ignition switch (the engine is run). Is the battery voltage applied between the harness side connector terminal No.C36-1 and ground?	—	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Repair an open circuit between terminal No.C36-1 and No.F-5 and F-6 fuse. Is the action complete?	—	Go to <i>Step 3</i>	—
5	Is there continuity between the harness side connector terminal No.C36-2 and ground (No.C-10)?	—	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Repair an open circuit between terminal No.C36-2 and ground. Is the action complete?	—	—	—
7	Is the battery voltage applied between the harness side connector terminal No.C36-2 and No.C36-1?	—	Go to <i>Step 8</i>	Go to <i>Step 9</i>
8	Replace the blower motor. Is the action complete?	—	Verify repair	—
9	Refer to <i>chart B and C</i> . Is the action complete?	—	Verify repair	—

1A-112 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)**Chart B: Fan Does Not Rotate in MAX HI Mode**

Step	Action	Value(s)	Yes	No
1	Is the MAX-HI relay (C-35) normal?	—	Go to <i>Step 2</i>	Replace the relay
2	1. Turn on the ignition switch (the engine is run). 2. Set the fan switch to the MAX-HI. Is there continuity between the harness side connector terminal No.C36-2 and No.C35-5?	—	Go to <i>Step 4</i>	Go to <i>Step 3</i>
3	Repair an open circuit between terminal No.C36-2 and No.C35-5. Is the action complete?	—	Go to <i>Step 3</i>	—
4	Is there continuity between the harness side connector terminal No.C35-1 and ground (No.C-10)?	—	Go to <i>Step 6</i>	Go to <i>Step 5</i>
5	Repair an open circuit between terminal No.C35-1 and ground (No.C-10). Is the action complete?	—	Go to <i>Step 4</i>	—
6	Is the battery voltage applied between the harness side connector terminal No.C35-2 and ground?	—	Go to <i>Step 8</i>	Go to <i>Step 7</i>
7	Repair an open circuit between terminal No.C35-2 and No.F-7 fuse. Is the action complete?	—	Go to <i>Step 6</i>	—
8	Is the battery voltage applied between the harness side connector terminal No.I19-2 and ground?	—	Go to <i>Step 10</i>	Go to <i>Step 9</i>
9	Repair an open circuit between terminal No.C35-4 and No.I19-2. Is the action complete?	—	Verify repair	—
10	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—

Chart C: Fan Does Not Rotate In Any Mode Other Than MAX HI

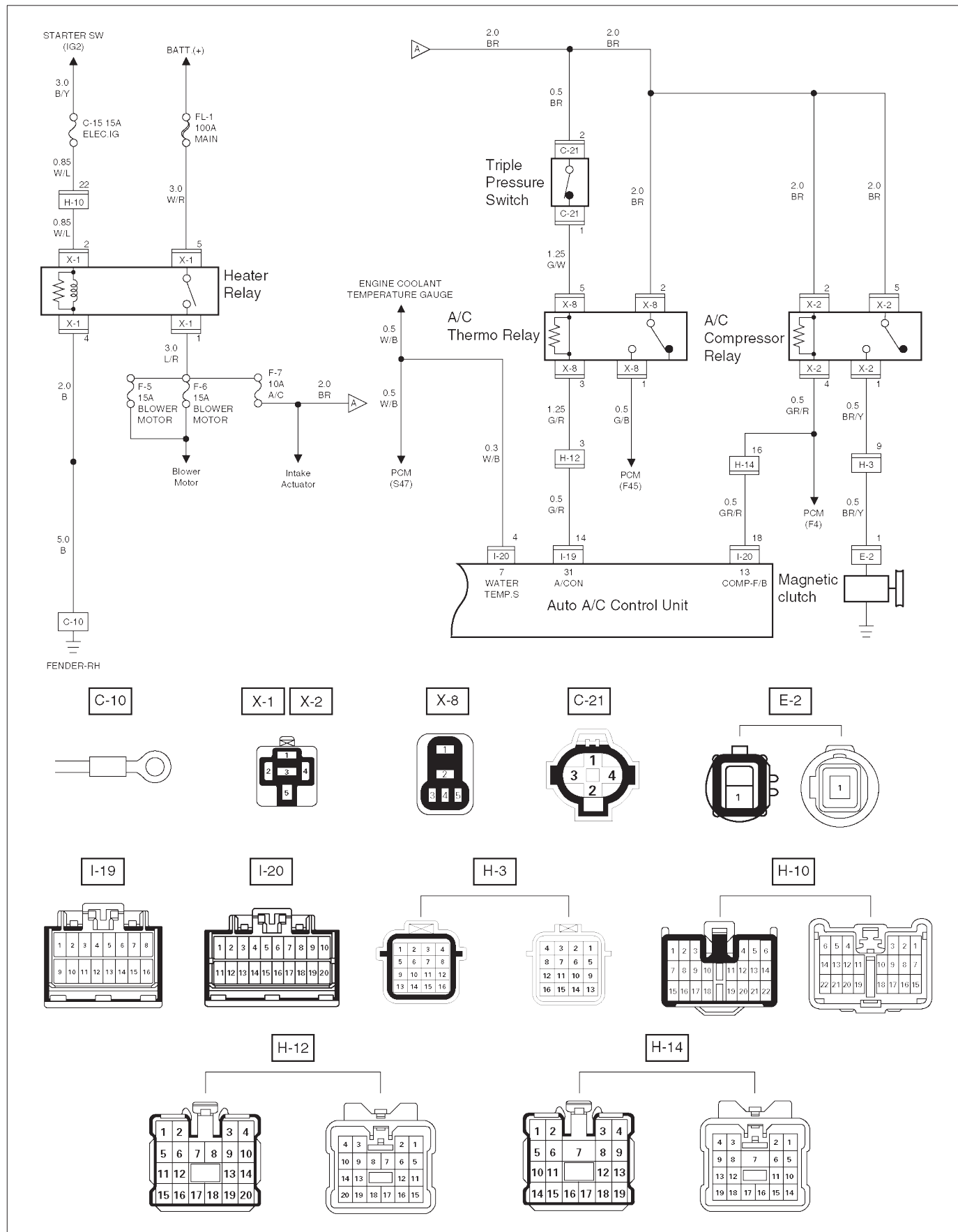
Step	Action	Value(s)	Yes	No
1	Is the power transistor performance normal? (Refer to the <i>later section on "individual inspection"</i>)	—	Go to <i>Step 2</i>	Replace the power transistor
2	Is there continuity between the harness side connector terminal No.C36-2 and No.C34-1, No.C36-2 and No.I20-17?	—	Go to <i>Step 4</i>	Go to <i>Step 3</i>
3	Repair an open circuit between terminal. No.C36-2 and C34-1 No.C36-2 and I20-17	—	Go to <i>Step 2</i>	—
4	Is there continuity between the harness side connector terminal No.C34-3 and ground (No.C-10)?	—	Go to <i>Step 6</i>	Go to <i>Step 5</i>
5	Repair an open circuit between terminal No.C34-3 and ground. Is the action complete?	—	Go to <i>Step 4</i>	—
6	Is there continuity between the harness side connector terminal No.C34-2 and No.I20-19?	—	Go to <i>Step 8</i>	Go to <i>Step 7</i>
7	Repair an open circuit between terminal No.C34-2 and No.I20-19. Is the action complete?	—	Go to <i>Step 6</i>	—
8	Replace the auto air conditioner control unit. Is the action complete?	—	Verify repair	—

1A-114 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)**Chart D: Fan Does Not Stop**

Step	Action	Value(s)	Yes	No
1	1. Disconnect the max high relay, the power transistor connector C-34 and the auto A/C control unit connector I-20. 2. Turn on the ignition switch. Does the blower motor stop?	—	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	Repair a short circuit between connector No.C36-2 and No.C35-5, No.C36-2 and No.C34-1, or No.C36-2 and I20-17. Is the action complete?	—	Verify repair	—
3	Is the max high relay normal? (Refer to the <i>later section on "individual inspection".</i>)	—	Go to <i>Step 4</i>	Replace the relay
4	Reinstall the max high relay. Does the blower motor start operating?	—	Go to <i>Step 6</i>	Go to <i>Step 5</i>
5	Repair a short circuit between connector No.C35-4 and No.I19-2. Is the action complete?	—	Go to <i>Step 4</i>	—
6	Is the power transistor normal? (Refer to the <i>later section on "individual inspection".</i>)	—	Go to <i>Step 7</i>	Replace the power transistor
7	Reinstall the power transistor. Does the blower motor start operating?	—	Replace the auto A/C control unit	—

Inspection of the Magnetic Clutch System

6VE1 Engine



1A–116 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Condition	Possible cause	Correction
Magnetic clutch does not work	—	Refer to <i>Chart A</i>

Chart A: Magnetic Clutch Does Not work

Step	Action	Value(s)	Yes	No
1	Is the fuse No.F–7 normal?	—	Go to <i>Step 2</i>	Replace the fuse
2	Is the relay No.X–2 (compressor relay) No.X–8 (A/C thermo relay) and No.X–1 (heater relay) normal?	—	Go to <i>Step 3</i>	Replace the relay
3	Is there continuity between the pressure switch side connector terminal No.C21–1 and No.C21–2?	—	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Pressure switch defective or refrigerant pressure improper. Pressure switch replaced or refrigerant pressure adjusted?	—	Go to <i>Step 3</i>	—
5	1. Turn the ignition switch on. (the engine is run.) 2. Turn the air conditioner switch on. Is the battery voltage applied between the harness side connector terminal No.E2–1 and the ground?	—	Go to <i>Step 7</i>	Go to <i>Step 6</i>
6	Magnetic clutch defective or earth defective. Magnetic clutch replaced or earth replaced?	—	Go to <i>Step 5</i>	—
7	Is there continuity between the harness side connector terminal No.X2–1 and No.E2–1?	—	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Repair an open circuit between terminal No.X2–1 and No.E2–1. Is the action complete?	—	Go to <i>Step 7</i>	—
9	Is the battery voltage applied between the harness side connector terminal No.X2–5 and ground, No.X2–2 and ground?	—	Go to <i>Step 11</i>	Go to <i>Step 10</i>
10	Repair an open circuit between terminal No.X2–5 and fuse No.F–7, No.X2–2 and fuse No.F–7. Is the action complete?	—	Go to <i>Step 9</i>	—
11	Is the battery voltage applied between the harness side connector terminal No.I20–18 and ground?	—	Go to <i>Step 13</i>	Go to <i>Step 12</i>
12	Repair an open circuit between terminal No.I20–18 and No.X2–4. Is the action complete?	—	Go to <i>Step 11</i>	—
13	Is the battery voltage applied between the harness side connector terminal No.C21–2 and ground?	—	Go to <i>Step 15</i>	Go to <i>Step 14</i>
14	Repair an open circuit between terminal No.C21–2 and fuse No.F–7. Is the action complete?	—	Go to <i>Step 13</i>	—
15	Is the battery voltage applied between the harness side connector terminal No.X8–5 and ground, No.X8–2 and ground?	—	Go to <i>Step 17</i>	Go to <i>Step 16</i>
16	Repair an open circuit between terminal No.X8–5 and No.C21–1, No.X8–2 and fuse No.F–7. Is the action complete?	—	Go to <i>Step 15</i>	—

Chart A: Magnetic Clutch Does Not work (Cont'd)

Step	Action	Value(s)	Yes	No
17	Is the battery voltage applied between the harness side connector terminal No.I19-14 and ground?	—	Go to <i>Step 19</i>	Go to <i>Step 18</i>
18	Repair an open circuit between terminal No.X8-3 and I19-14. Is the action complete?	—	Go to <i>Step 17</i>	—
19	Is there continuity between the harness side connector terminal No.X8-1 and PCM (F45)?	—	Go to <i>Step 21</i>	Go to <i>Step 20</i>
20	Repair an open circuit between terminal No.X8-1 and PCM (F45). Is the action complete?	—	Go to <i>Step 19</i>	—
21	Is there continuity between the harness side connector terminal No.X2-4 and PCM (F4)?	—	Go to <i>Step 23</i>	Go to <i>Step 22</i>
22	Repair on open circuit between terminal No.X2-4 and PCM (F4). Is the action complete?	—	Go to <i>Step 21</i>	—
23	Is there continuity between the harness side connector terminal No.I20-4 and ground?	—	Go to <i>Step 25</i>	Go to <i>Step 24</i>
24	Repair an open circuit between terminal No.I20-4 and PCM (S47). Is the action complete?	—	Go to <i>Step 23</i>	—
25	1. Connect the connector of PCM. 2. Connect the connector terminal No.I19-14 which is on the harness side on the auto air conditioner control unit. Magnetic clutch works?	—	Replace the auto air conditioner control unit	Replace the PCM

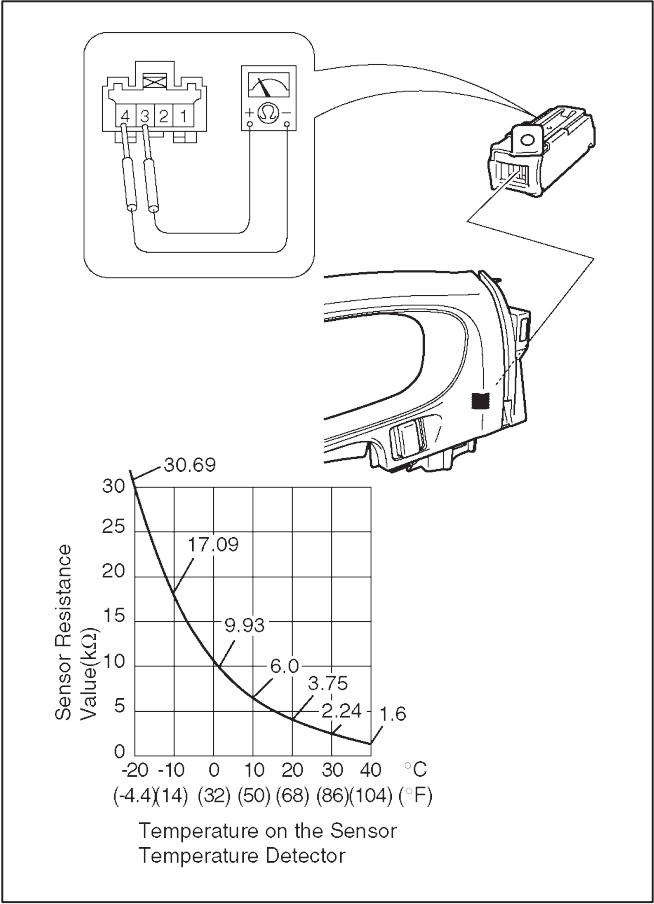
CAUTION: There are conditions which air conditioner system dose not operate except trouble as follows.

1. The throttle is griater than 90%.
2. The ignition voltage is below 10.5 volts.
3. The engine speed greater than 4500 RPM for 5 seconds or 5400 RPM.
4. The engine coolant temperature (ECT) is greater than 125°C (257°F).
5. The intake air temperature (IAT) is less than 5°C (41°F).
6. The power steering pressure switch signals a high pressure condition.

Individual Inspection

In Car Sensor

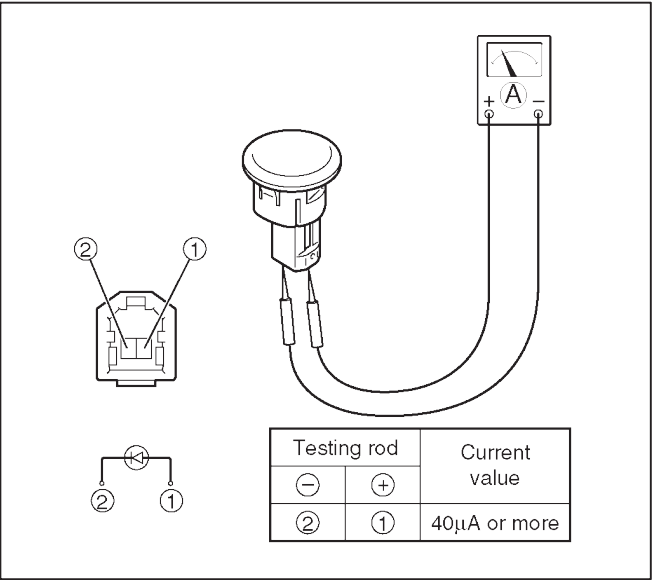
- 1. Disconnect the in car sensor connector (I-17).
- 2. Measure resistance between the in car sensor side terminal No.I17-3 and No.I17-4.



C01R200015

Sun Sensor

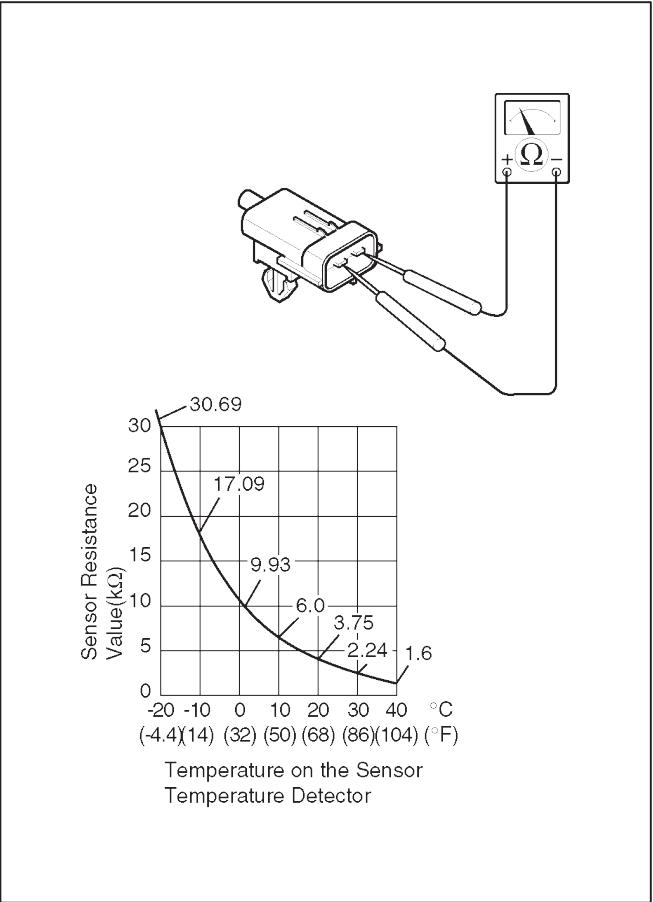
- 1. Disconnect the sun sensor connector (I-15).
- 2. Measure the current value on the sun sensor when placed it approximately 15 cm away from 60W incandescent lamp.



D06R200001

Ambient Sensor

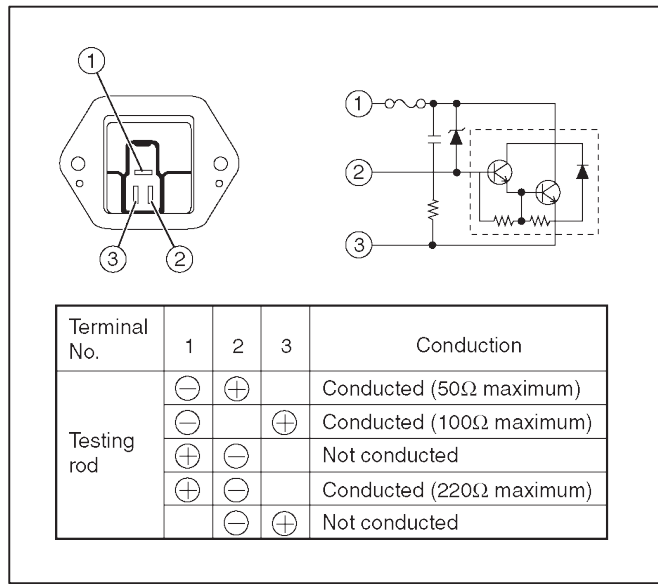
- 1. Disconnect the connector (C-19) on the ambient sensor.
- 2. Measure resistance between the ambient sensor side terminals.



C01R200014

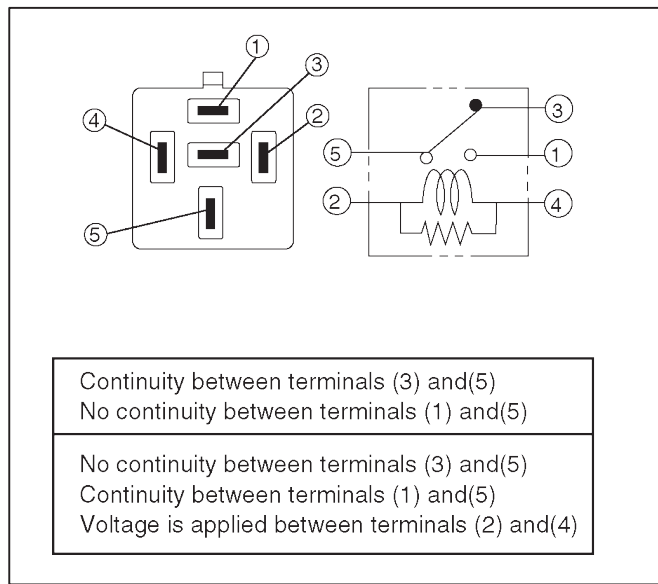
Power Transistor

1. Remove the power transistor connector (C-34) from the evaporator assembly.
2. Check the conduction between the power transistor side terminals.



MAX HI Relay

1. Remove the MAX – HI relay connector (C-35) from the blower assembly.
2. Check the conduction between the MAX – HI relay side terminals.

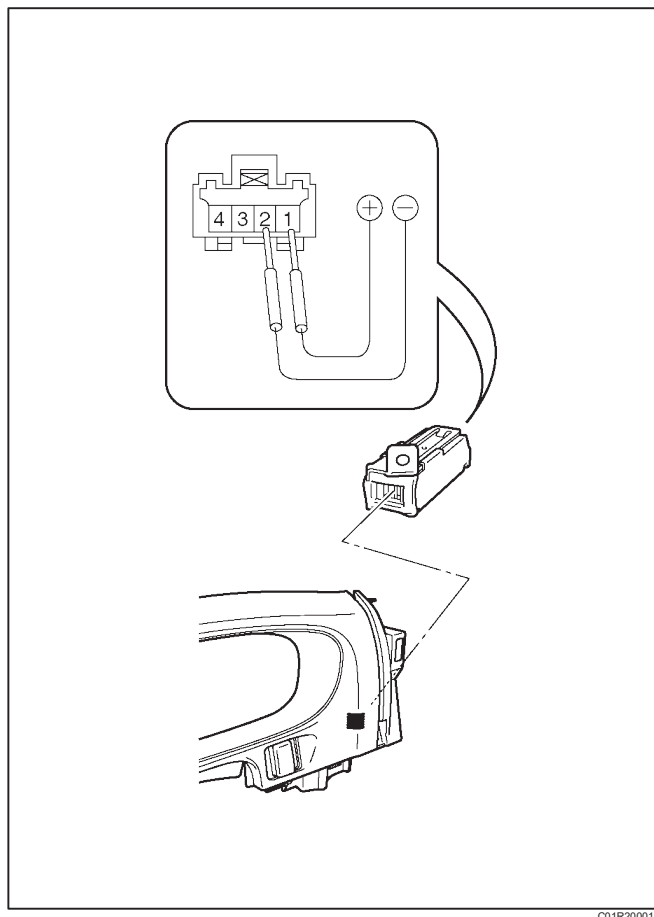


In Car Sensor

1. Turn on the ignition switch (the engine is started). Start the air conditioner in “Auto”.
2. Make sure that the in car sensor suctions cigarette smokes and such.

In Car Sensor

1. Dismount the in car sensor from the automatic heater/air conditioner control unit. Connect (+) end and (–) end of the battery to the aspirator motor side terminals No.117–1 and No.117–2, respectively, then check if the motor runs normally.



Heater (X-1) 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.*

The diagram shows a relay with five terminals labeled 1 through 5. Terminals 1, 2, and 3 are on the top, 4 and 5 are on the bottom. A schematic to the right shows a coil connected between terminals 1 and 2, and a switch controlled by the coil with terminals 3, 4, and 5.

Continuity between terminals (3) and(5)
No continuity between terminals (1) and(5)

No continuity between terminals (3) and(5)
Continuity between terminals (1) and(5)
Voltage is applied between terminals (2) and(4)

C01R200011

Thermostat (X-8) 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.*

The diagram shows a relay with five terminals labeled 1 through 5. Terminals 1 and 2 are on the top, 3, 4, and 5 are on the bottom. A schematic to the right shows a coil connected between terminals 1 and 2, and a switch controlled by the coil with terminals 3, 4, and 5.

Continuity between terminals (2) and(4)
No continuity between terminals (1) and(2)

No continuity between terminals (2) and(4)
Continuity between terminals (1) and(2)
Voltage is applied between terminals (3) and(5)

C01R200012

Triple Pressure Switch

- 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 terminal (3) and (4) and the fan operates.

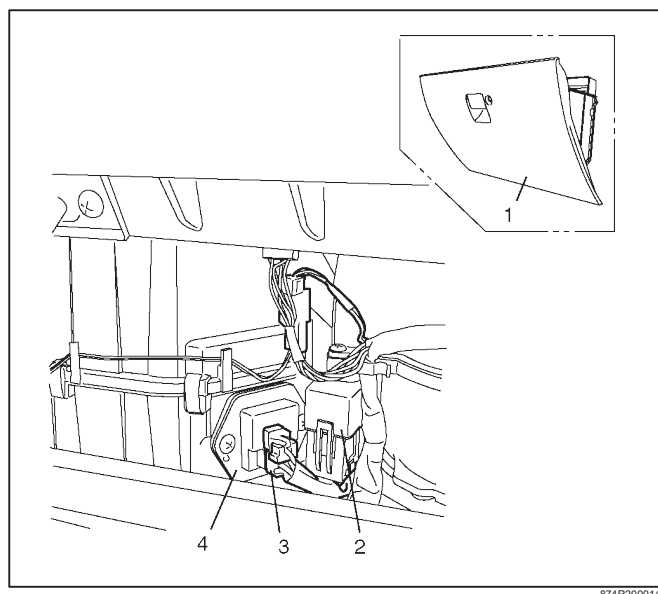
The diagram shows a pressure switch with four terminals labeled 1, 2, 3, and 4. A schematic to the right shows a coil connected between terminals 1 and 2, and a switch controlled by the coil with terminals 3 and 4.

Terminal	Conducted
1-2	ON OFF kpa (psi)
3-4	ON OFF kpa (psi)

875R200020

On-Vehicle Service

Power Transistor



Legend

- (1) Glove Box
- (2) MAX HI Relay
- (3) Power Transistor Connector
- (4) Power Transistor

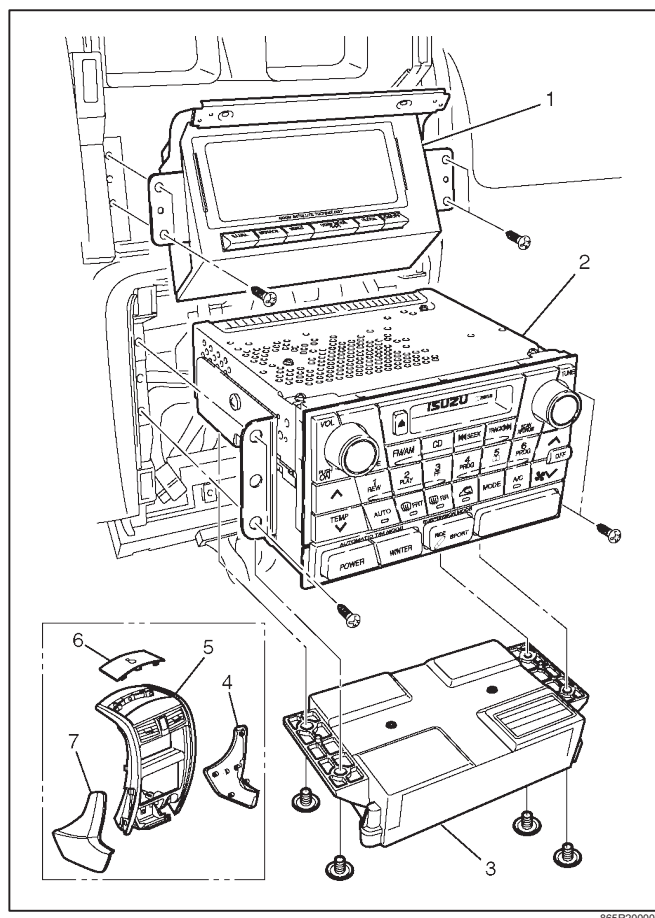
Removal

1. Remove the glove box.
2. Remove the MAX-HI relay.
3. Disconnect the power transistor connector.
4. Remove the power transistor.

Installation

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

Automatic Heater/Air Conditioner Control Unit



Legend

- (1) Display
- (2) Audio & Switch Assembly
- (3) Automatic Air Conditioner Control Unit
- (4) Knee Pad (RH)
- (5) Center Cluster
- (6) Center Cluster Upper
- (7) Knee Pad (LH)

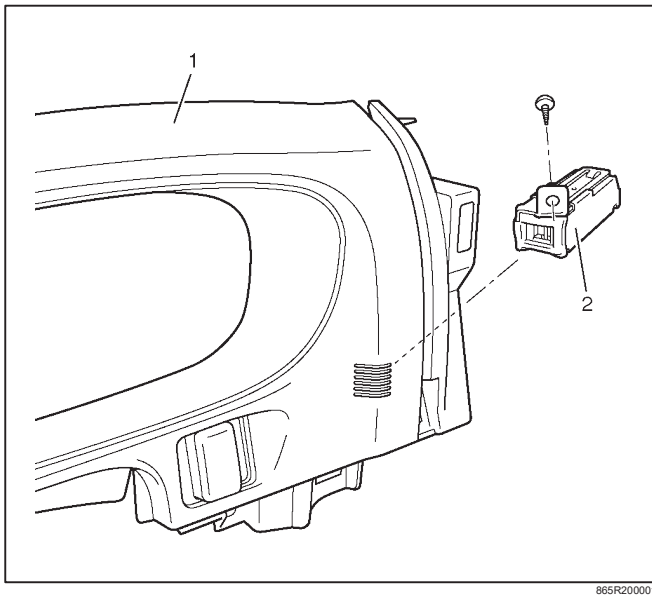
Removal

1. Disconnect the battery ground cable.
2. Remove the knee pad (R/LH).
3. Remove the center cluster upper.
4. Remove the center cluster.
 - Refer to *Instrument Panel Assembly in Body Structure* section.
5. Disconnect the six connectors.
6. Remove the automatic air conditioner control unit.

Installation

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

In Car Sensor



Legend

- (1) Meter Cluster
- (2) In Car Sensor

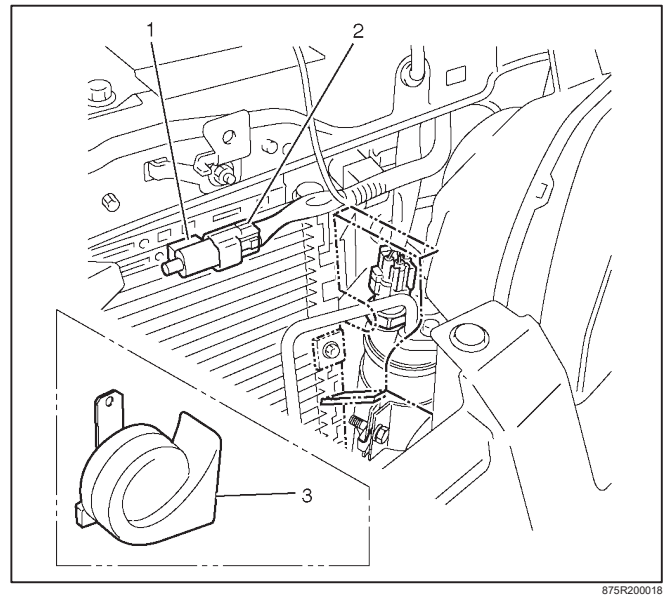
Removal

1. Disconnect the battery ground cable.
2. Remove the meter cluster.
 - Refer to *Instrument Panel Assembly in Body Structure* section.
3. Remove the in car sensor.

Installation

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

Ambient Sensor



Legend

- (1) Ambient Sensor
- (2) Ambient Sensor Connector
- (3) Horn (LH)

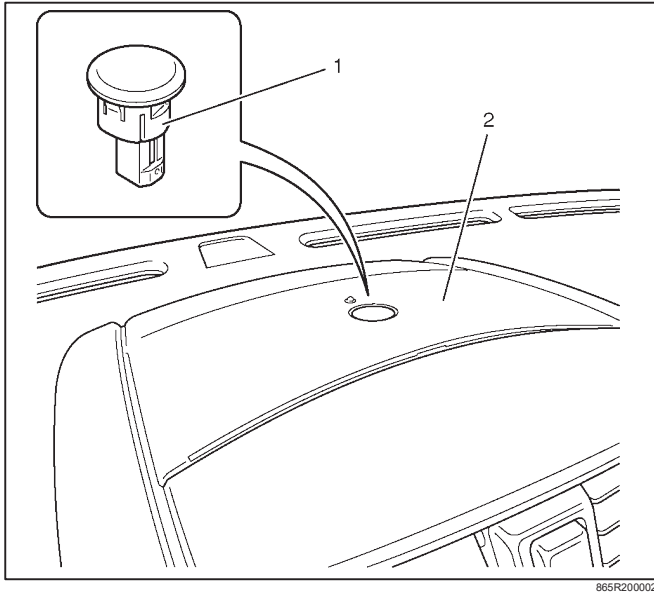
Removal

1. Disconnect the battery ground cable.
2. Remove the horn (LH).
3. Disconnect the ambient sensor connector.
4. Remove the ambient sensor.

Installation

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

Sun Sensor



865R200002

Legend

- (1) Sun Sensor
- (2) Center Cluster Upper

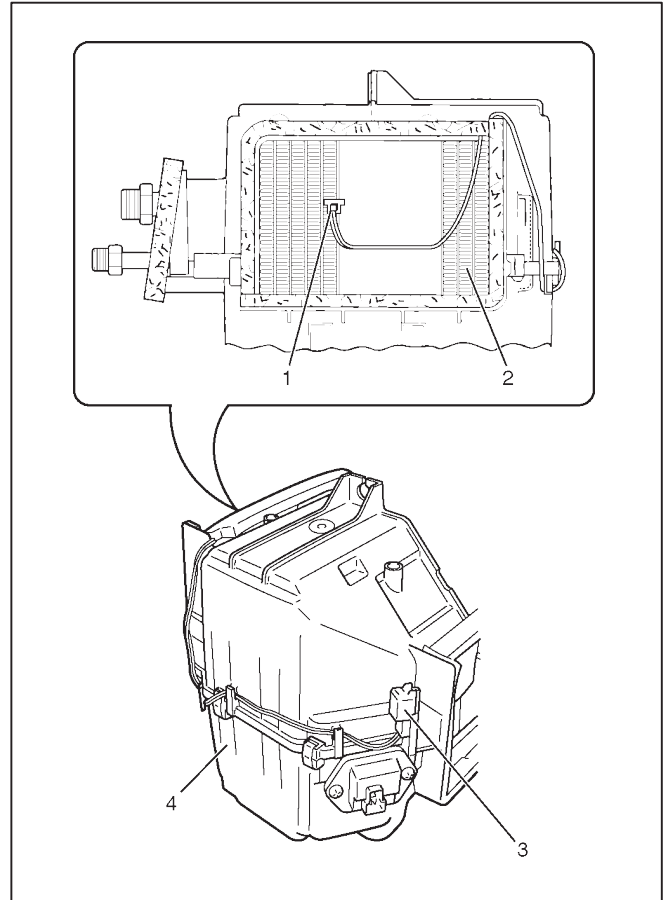
Removal

1. Disconnect the battery ground cable.
2. Remove the center cluster upper.
3. Disconnect the sun sensor connector.
4. Remove the sun sensor.

Installation

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

Duct Sensor



874R200010

Legend

- (1) Sensor Part
- (2) Evaporator Core
- (3) Duct Sensor Assembly
- (4) Evaporator Assembly

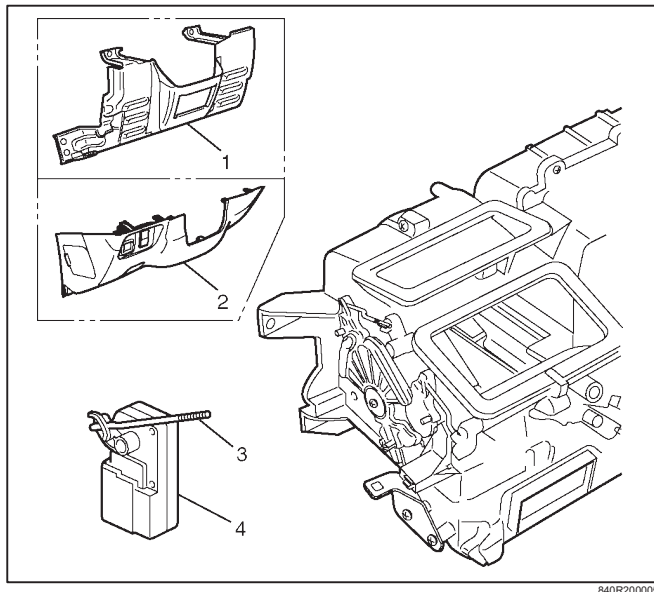
Removal

1. Disconnect the battery ground cable.
2. Remove the evaporator assembly.
 - Refer to *evaporator assembly* in this section.
3. Remove the duct sensor assembly.

Installation

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

Mode Actuator



Legend

- (1) Driver Knee Bolster Assembly
- (2) Instrument Panel Driver Lower Cover Assembly
- (3) Actuator Rod
- (4) Mode Actuator

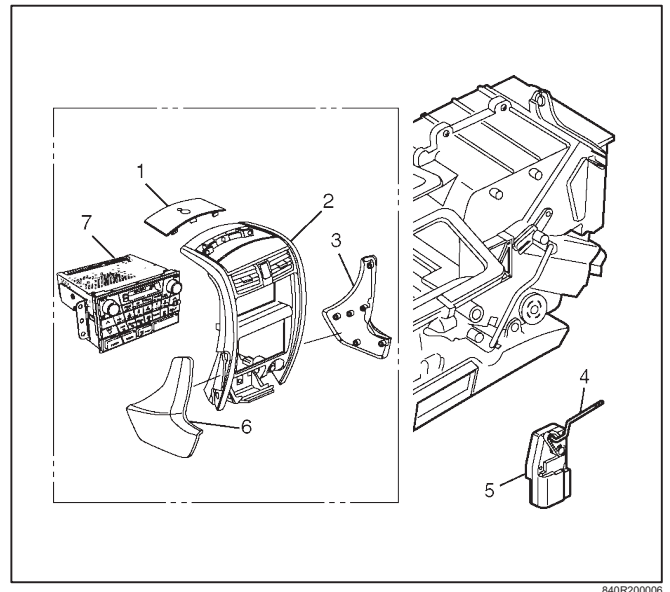
Removal

1. Disconnect the battery ground cable.
2. Remove the instrument panel driver lower cover assembly.
3. Remove the driver knee bolster assembly.
 - Refer to the *Instrument Panel Assembly in Body Structure* section.
4. Remove the actuator rod.
5. Remove the mode actuator.

Installation

To install, follow the remove step in the reverse order.

Mix Actuator



Legend

- (1) Center Cluster Upper
- (2) Center Cluster
- (3) Knee Pad (RH)
- (4) Actuator Rod
- (5) Mix Actuator
- (6) Knee Pad (LH)
- (7) Audio & Switch Assembly

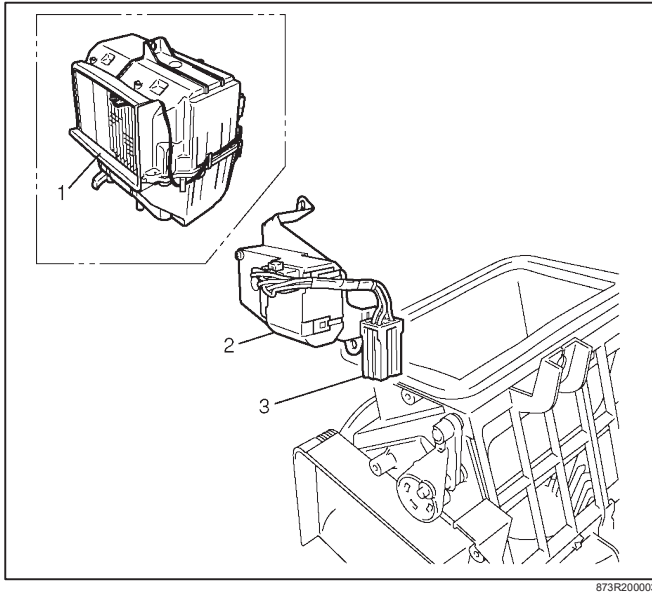
Removal

1. Disconnect the battery ground cable.
2. Remove the knee pad (R/RH).
3. Remove the center cluster upper.
4. Remove the center cluster.
 - Refer to the *Instrument Panel Assembly in Body Structure* section.
5. Disconnect the six connectors.
6. Remove the Audio & Switch Assembly.
7. Remove the actuator rod.
8. Remove the mix actuator.

Installation

To install, follow the remove step in the reverse order.

Intake Actuator



Legend

- (1) Evaporator Assembly
- (2) Intake Actuator
- (3) Intake Actuator Connector

Removal

1. Disconnect the battery ground cable.
2. Discharge and recover refrigerant.
 - Refer to *Refrigerant Recovery in this section*.
3. Remove the evaporator assembly.
 - Refer to *Evaporator Assembly section*.
4. Disconnect the intake actuator connector.
5. Remove the intake actuator.

Installation

To install, follow the remove step in the reverse order.