HEATER & AIR CONDITIONER

SECTION HA

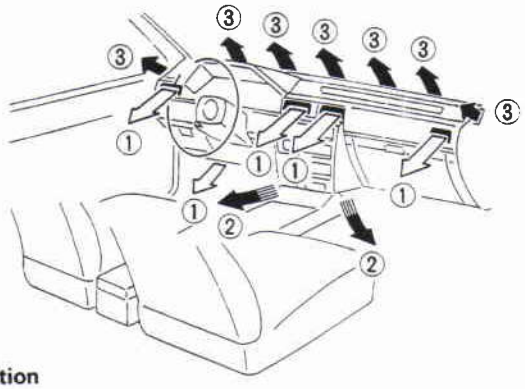
CONTENTS

When you read wiring diagrams:

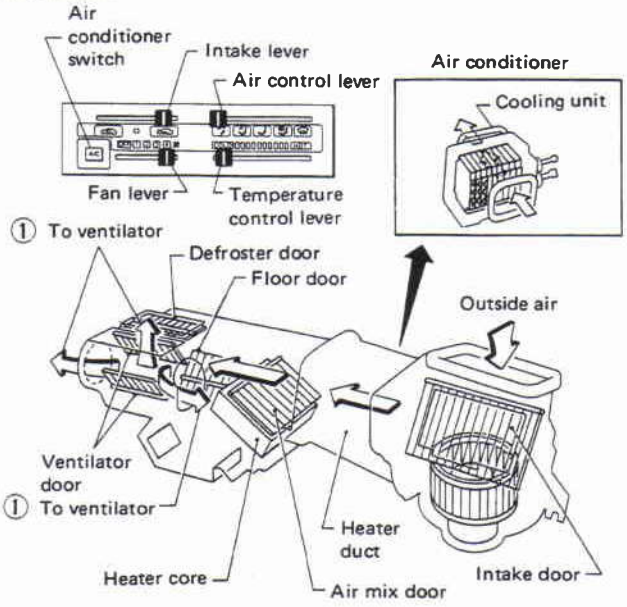
- **Read GI section, "HOW TO READ WIRING DIAGRAMS".**
- **See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.**

Air Flow

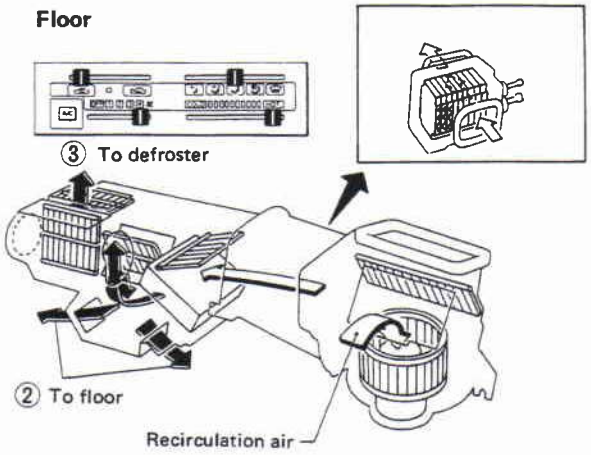
FOR L.H. DRIVE MODEL



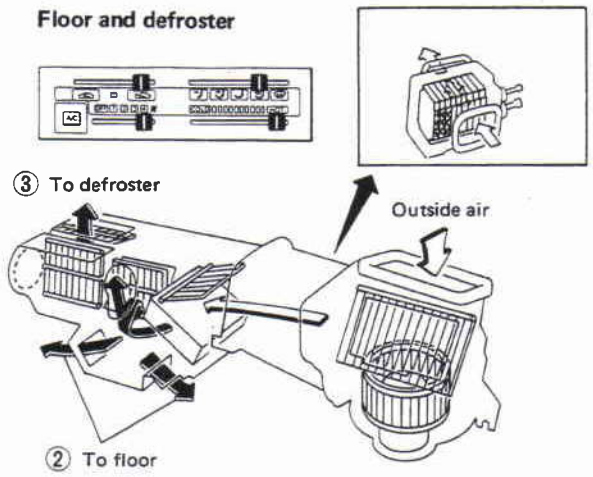
Ventilation



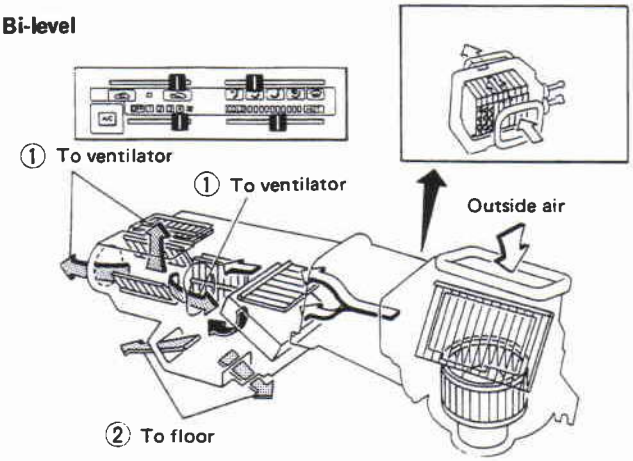
Floor



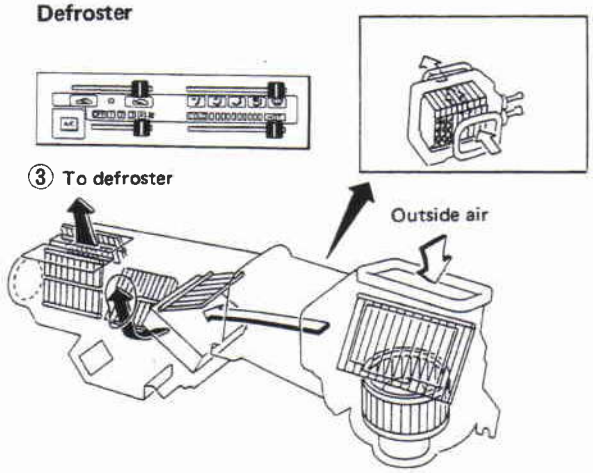
Floor and defroster



Bi-level



Defroster



: Air passed through heater core

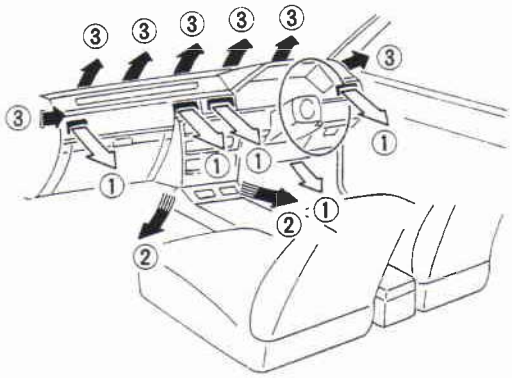
: Mixed air (+)

: Air not passed through heater core

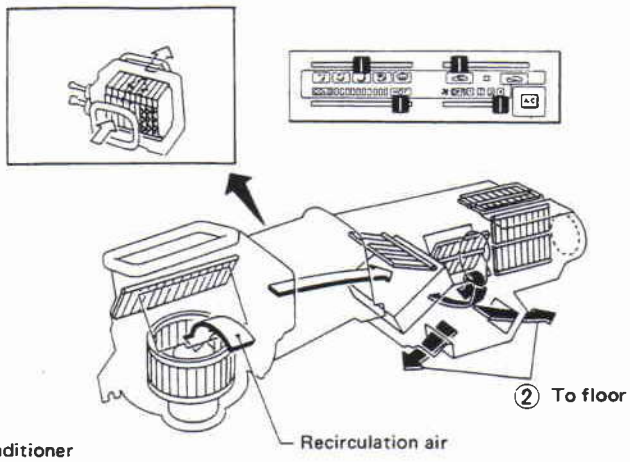
RHA052A

Air Flow (Cont'd)

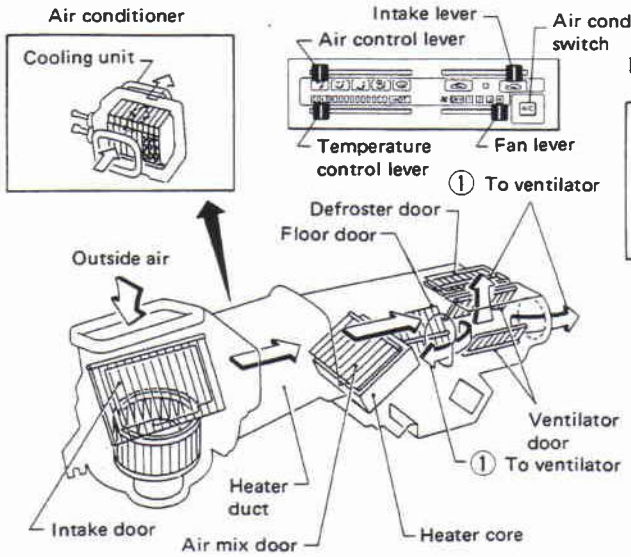
FOR R.H. DRIVE MODEL



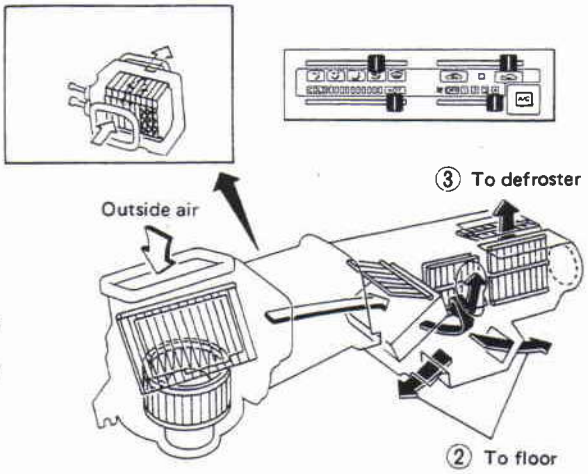
Floor



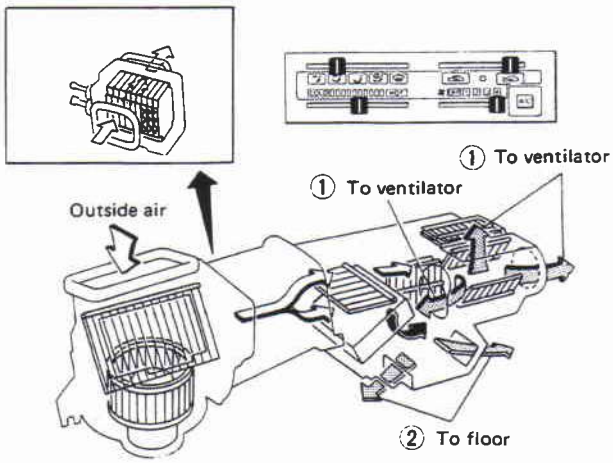
Ventilation



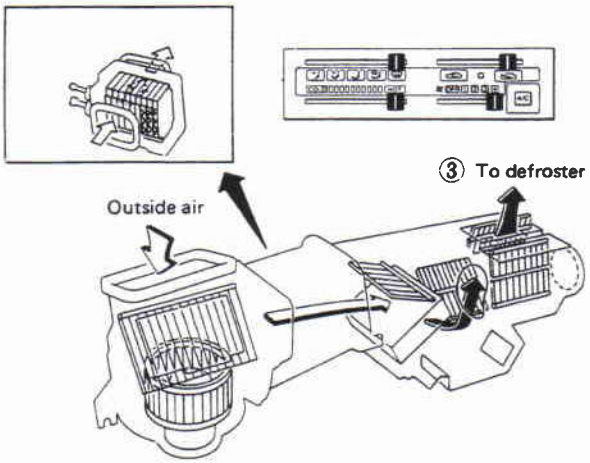
Floor and defroster



Bi-level



Defroster



: Air passed through heater core

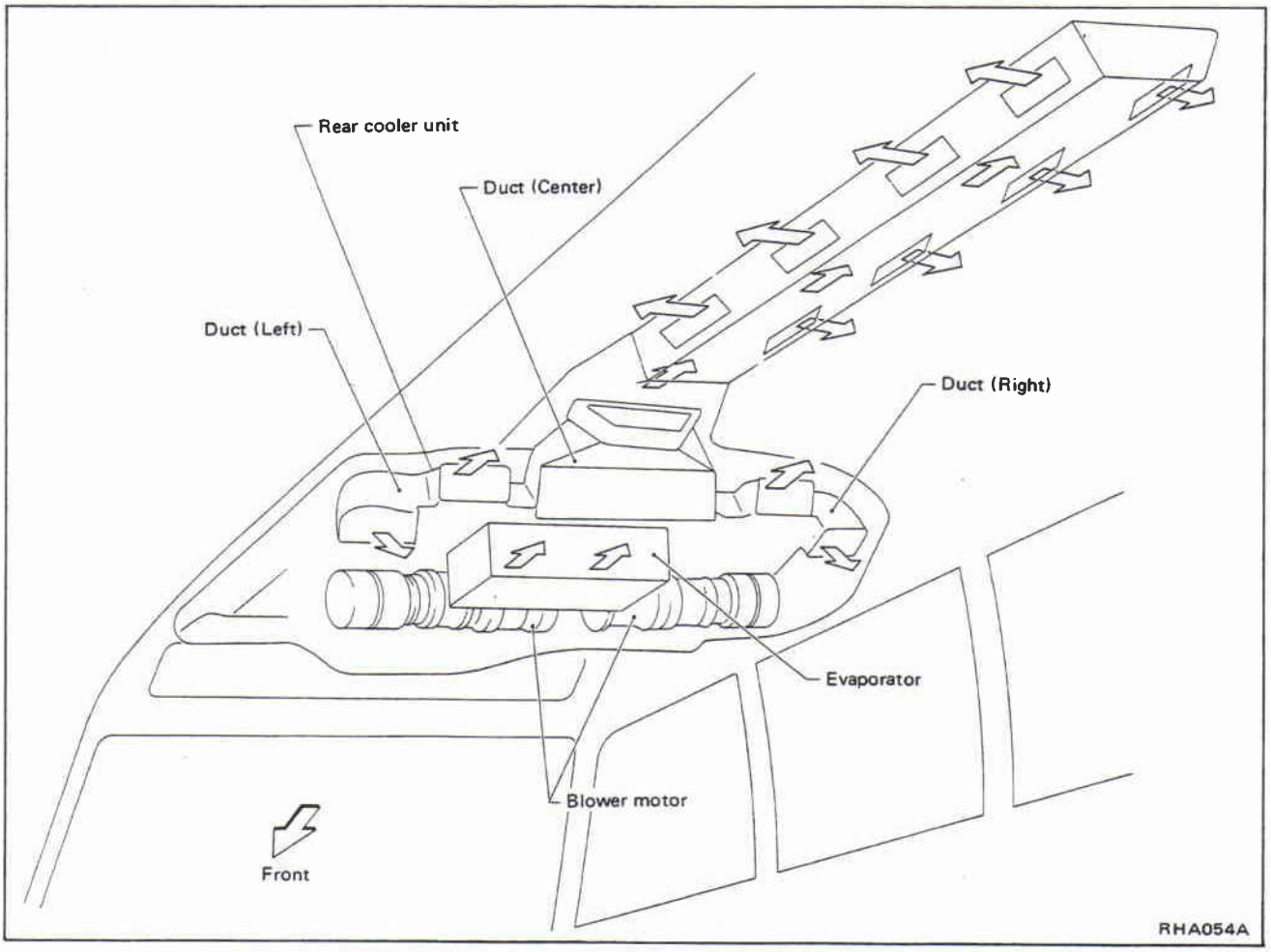
: Mixed air (+)

: Air not passed through heater core

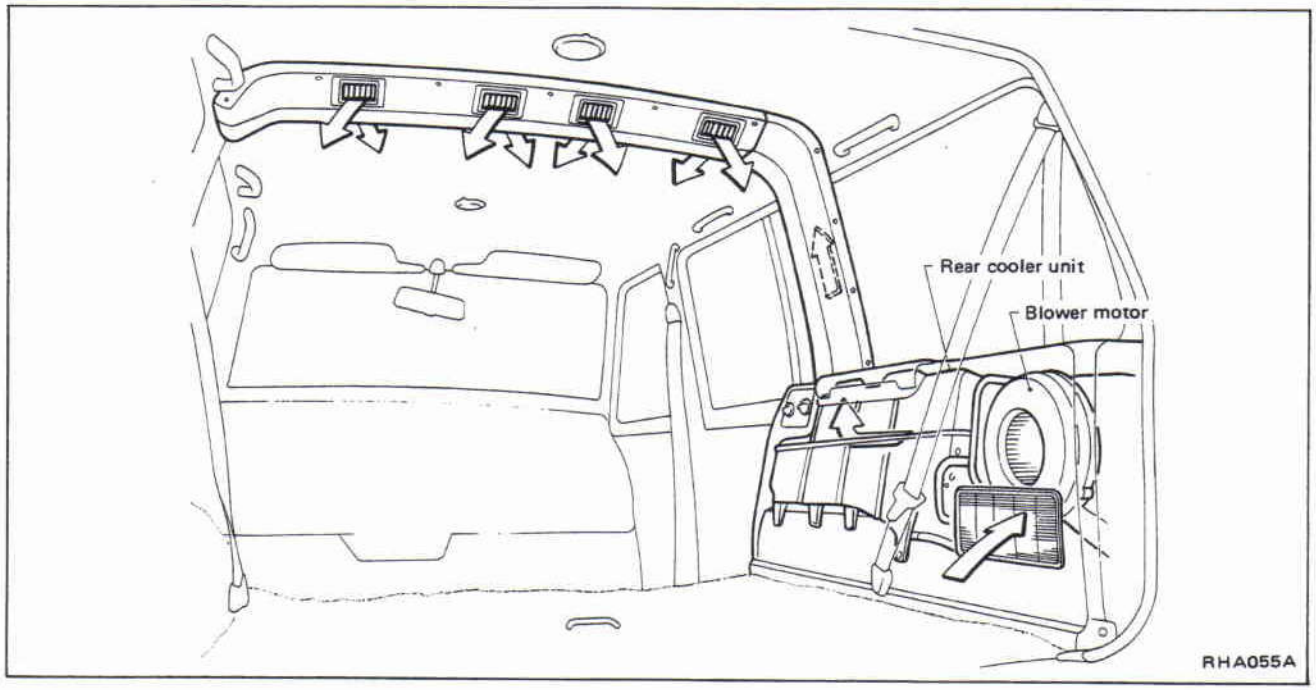
RHA053A

Air Flow (Cont'd)

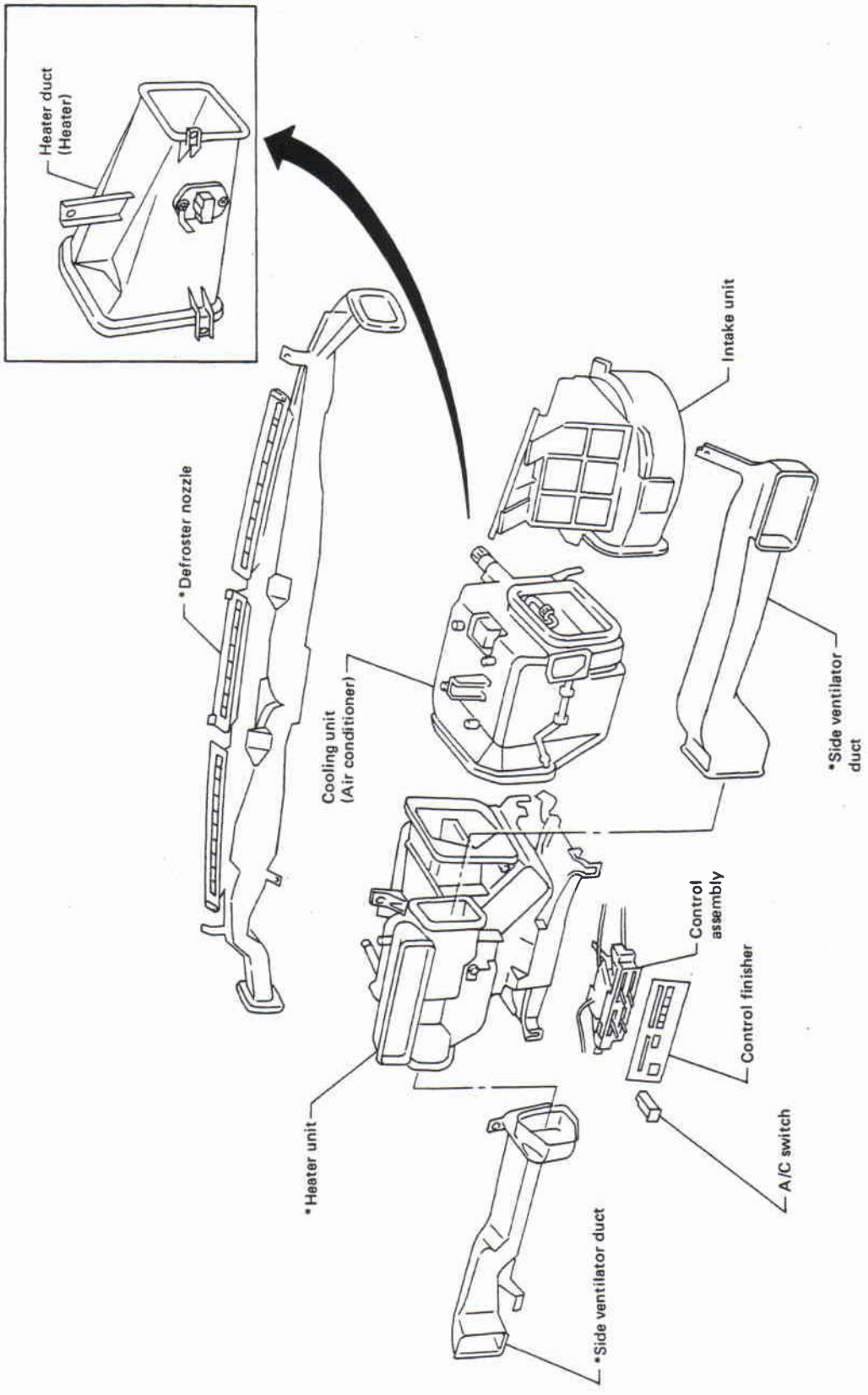
OVERHEAD TYPE REAR COOLING UNIT (Type 1)



REAR COOLING UNIT (Type 2)

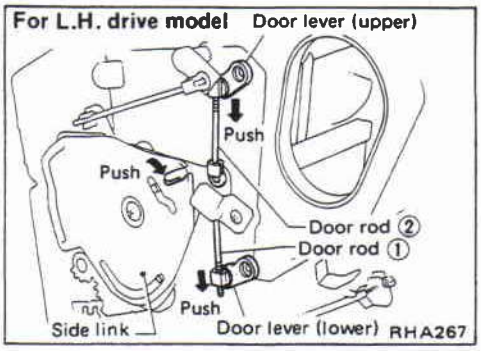


Component Layout



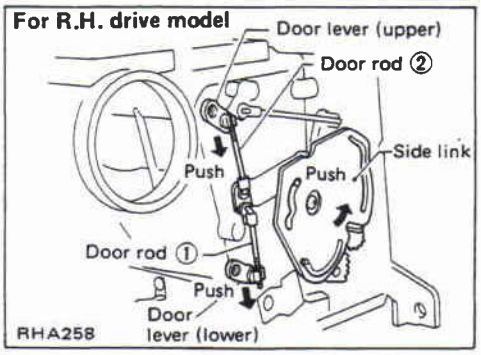
Control Cable and Rod Adjustment

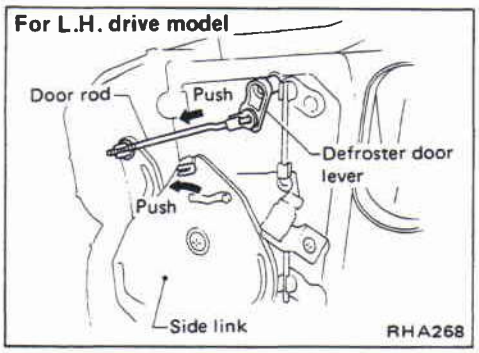
- **When adjusting ventilator door rod and defroster door rod, first disconnect air control cable from side link. Reconnect and readjust air control cable.**



VENTILATOR DOOR CONTROL ROD

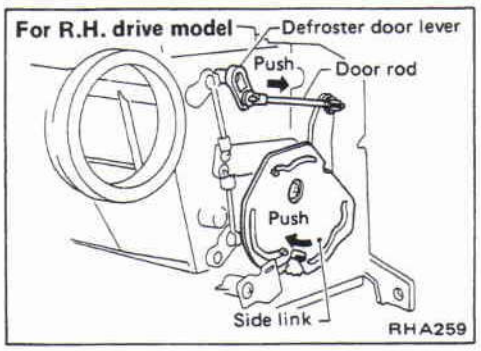
1. Move side link in direction of arrow.
2. With upper and lower ventilator door levers held in the direction of the arrow as shown in the figure at left, connect rods ① and ② to their corresponding ventilator door levers, in that order.



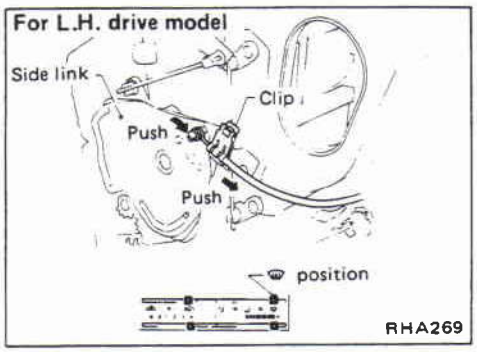


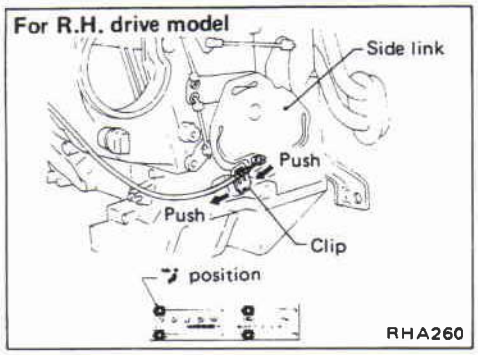
DEFROSTER DOOR CONTROL ROD

1. Move side link in direction of arrow.
2. Connect rod to side link while pushing defroster door lever in direction of arrow.



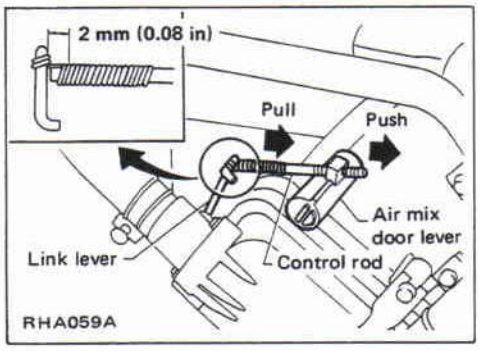
Control Cable and Rod Adjustment (Cont'd)





AIR CONTROL CABLE

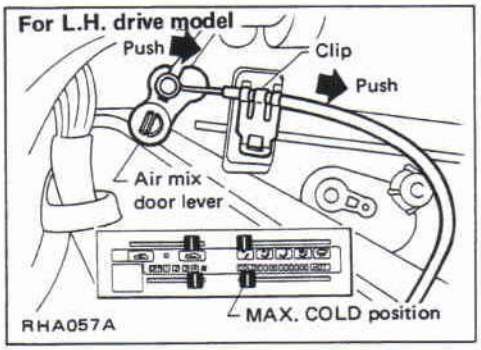
- Clamp the cable while pushing cable outer and side link in direction of arrow.



WATER COCK CONTROL ROD

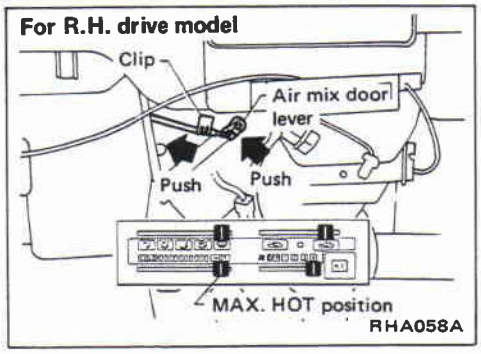
- **When adjusting water cock control rod, first disconnect temperature control cable from air mix door lever. Reconnect and readjust temperature control cable.**

1. Push air mix door lever in direction of arrow.
2. Pull control rod of water cock in direction of arrow so as to make clearance of about 2 mm (0.08 in) between ends of rod and link lever and connect the rod to door lever.



TEMPERATURE CONTROL CABLE

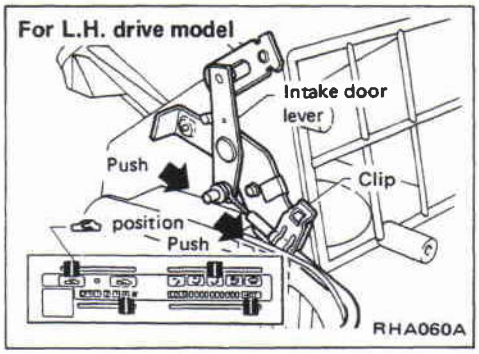
- Clamp the cable while pushing cable outer and air mix door lever in direction of arrow.

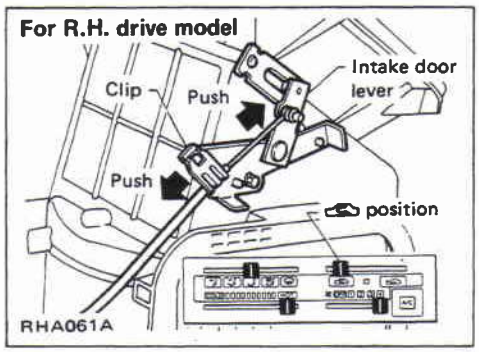


Control Cable and Rod Adjustment (Cont'd)

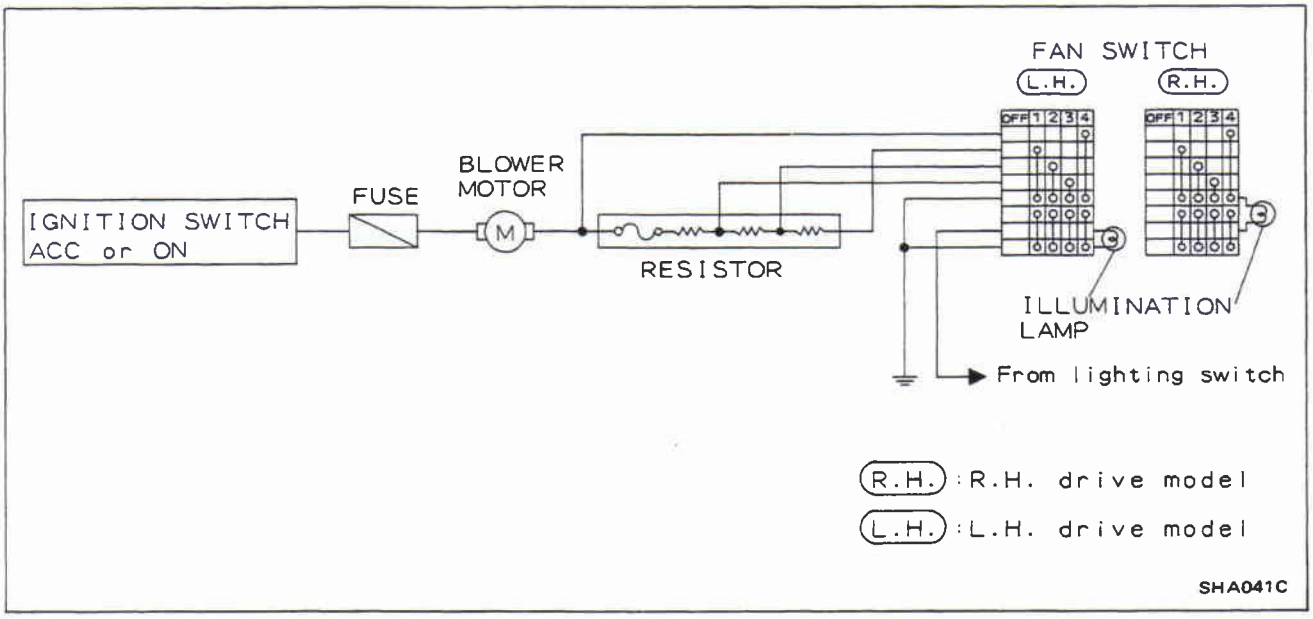
INTAKE DOOR CONTROL CABLE

- Clamp the cable while pushing cable outer and intake door lever in direction of arrow.

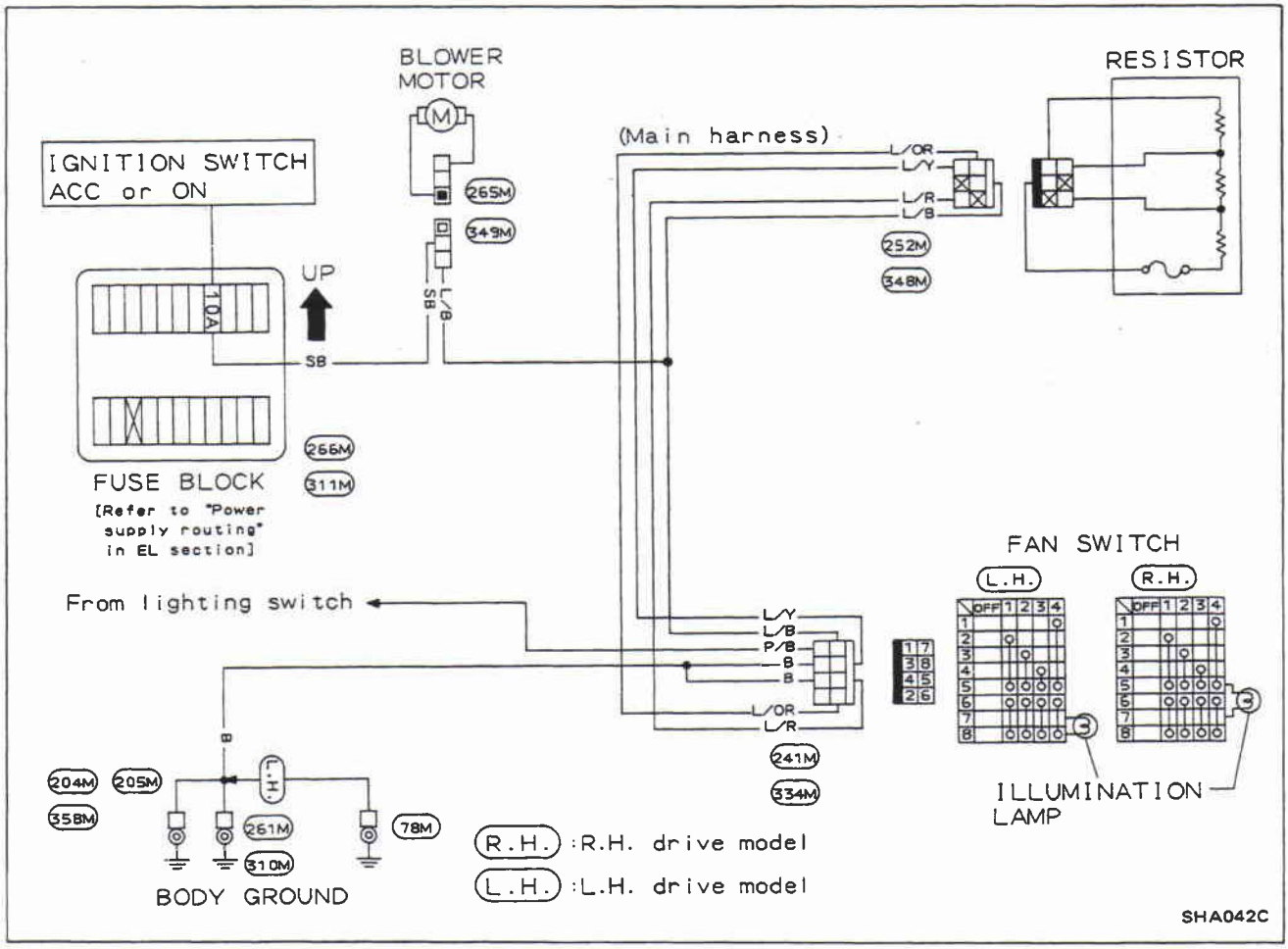


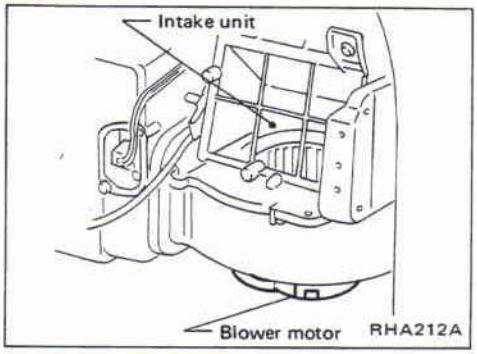


Schematic



Wiring Diagram



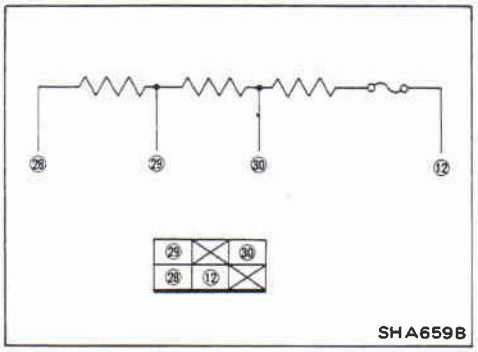


Inspection

FRONT BLOWER MOTOR

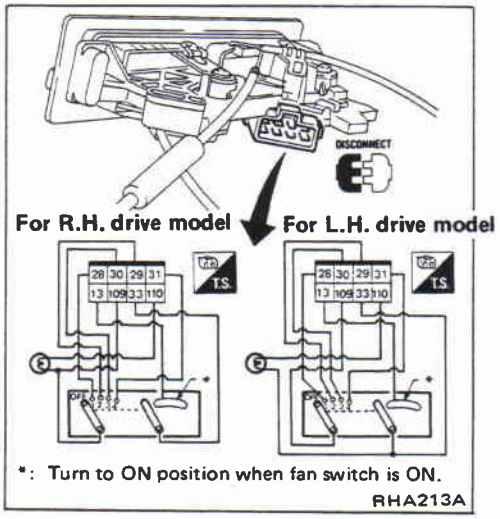
Confirm smooth rotation of the blower motor.

- Ensure that there are no foreign particles inside the intake unit.
- If the blower does not rotate, refer to TROUBLE-SHOOTING PROCEDURE 2.



FRONT BLOWER RESISTOR

Check continuity between terminals.



FRONT FAN SWITCH

Check continuity between terminals at each lever position shown in the table.

L.H. drive model

Lever position / Terminal	OFF	1	2	3	4
31					○
28		○			○
29			○		○
30				○	○
109		○	○	○	○
13		○	○	○	○
110					
33		○	○	○	○

Illumination lamp

R.H. drive model

Lever position / Terminal	OFF	1	2	3	4
31					○
28		○			○
29			○		○
30				○	○
109		○	○	○	○
13		○	○	○	○
110					
33		○	○	○	○

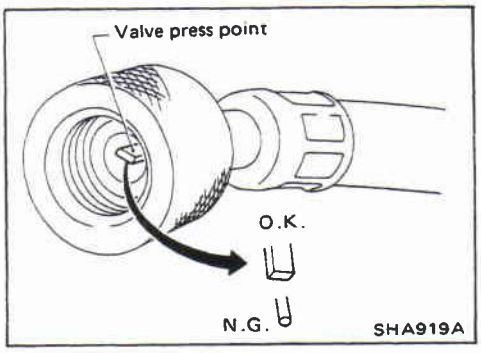
Illumination lamp

WARNING:

- **Always wear eye protection when working around the system.**
- **Always be careful that refrigerant does not come in contact with your skin.**
- **Keep refrigerant containers stored below 40°C (104°F) and never drop from high places.**
- **Work in well-ventilated area because refrigerant gas evaporates quickly and breathing may become difficult due to the lack of oxygen.**
- **Keep refrigerant away from open flames because poisonous gas will be produced if it burns.**
- **Do not increase can temperature beyond 40°C (104°F) in charging.**
- **Do not heat refrigerant can with an open flame. There is danger that can will explode.**

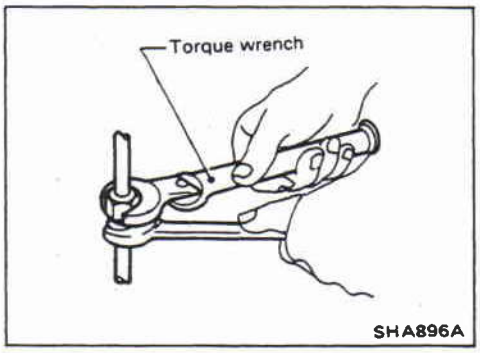
CAUTION

- **Do not use steam to clean surface of condenser or evaporator. Be sure to use cold water or compressed air.**
- **Compressed air must never be used to clean a dirty line. Clean with refrigerant gas.**



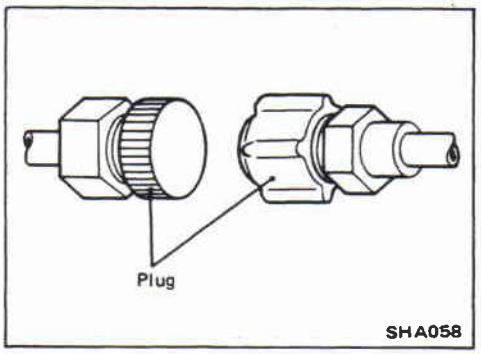
- **Do not use manifold gauge whose press point shape is different from that shown. Otherwise, insufficient evacuating may occur.**

- **Do not over-tighten service valve cap.**
- **Do not allow refrigerant to rush out. Otherwise, compressor oil will be discharged along with refrigerant.**

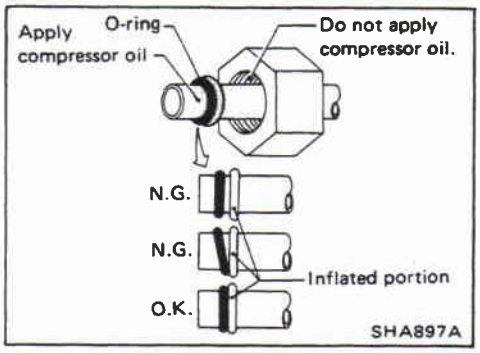


WARNING:
Gradually loosen discharge side hose fitting, and remove it after remaining pressure has been released.
CAUTION:
When replacing or cleaning refrigerant cycle components, observe the following.

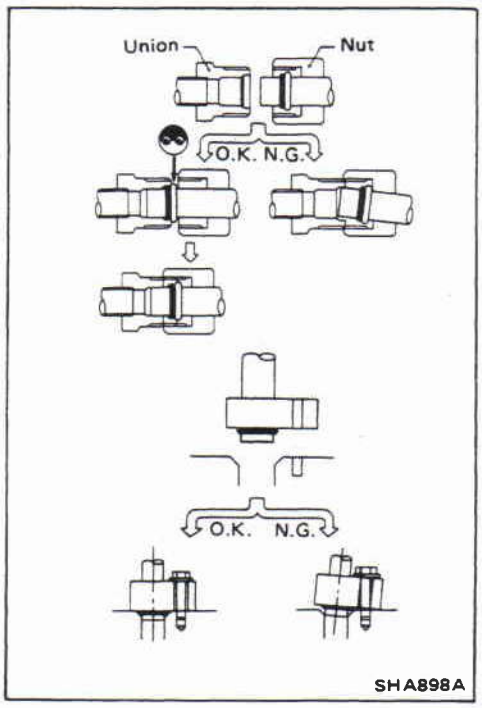
- **Do not leave compressor on its side or upside down for more than 10 minutes, as compressor oil will enter low pressure chamber.**
- **When connecting tubes, always use a torque wrench.**



- **After disconnecting tubes, plug all openings immediately to prevent entrance of dirt and moisture.**



- **Always replace used O-rings.**
- **When connecting tube, apply compressor oil to portions shown in illustration. Be careful not to apply oil to threaded portion.**
- **O-ring must be closely attached to inflated portion of tube.**

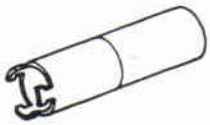
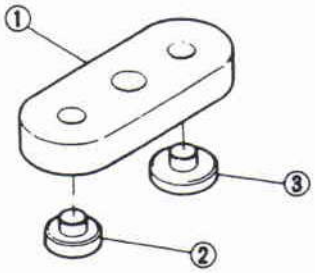
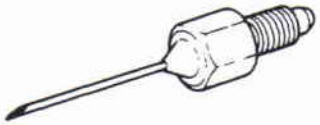
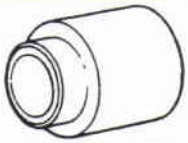
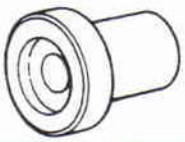


- **After inserting tube into union until O-ring is no longer visible, tighten nut to specified torque.**
- **After connecting line, conduct leak test and make sure that there is no leakage from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**

SPECIAL SERVICE TOOLS

DKS-16H model

*: Special tool or commercial equivalent

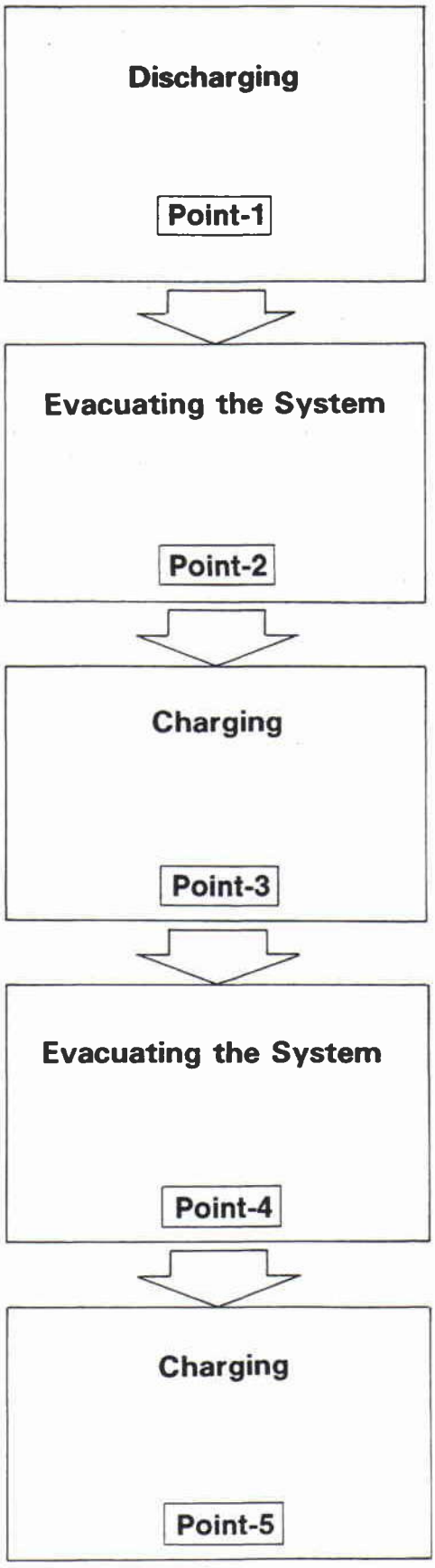
Tool number Tool name	Description	
KV99232022 Clutch disc puller		Removing clutch disc
KV99235140 Shaft seal remover and installer		Removing and installing shaft seal.
KV99241420 Blind cover set ① KV99241400 ② KV99211100 ③ KV99211300		Blind cover
KV994C1552 Charge nozzle		Using charge refrigerant
KV99231010* Clutch disc wrench		Removing shaft nut and clutch disc
KV99233040* Puller pilot		Removing pulley
KV99234160* Pulley installer		Installing pulley

*: Special tool or commercial equivalent

Tool number Tool name	Description	
KV99267420* Shaft seal guide		Installing shaft seal
KV99235160* Nut wrench		Removing lock nut

SERVICE TOOLS

Tool name	Description	
Manifold gauge		Using discharge and charge refrigerant into system
Charging hose		Using discharge and evacuate, charge refrigerant into system
Charge valve		Using discharge and charge refrigerant into system
Thermometer		Using check temperature
Vacuum pump		Using evacuate refrigerant system
Electric leak-detector	**Nominal sensitivity:** **15 - 25 g (0.53 - 0.88 oz)/year** 	Using check refrigerant leaks



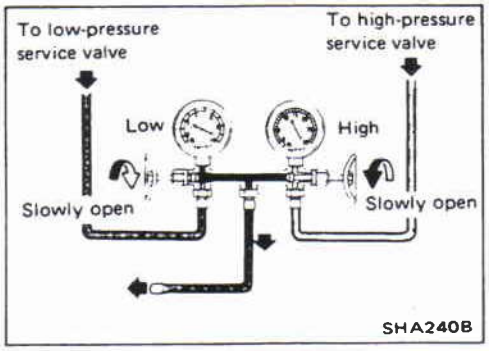
Discharge refrigerant system.

Run pump for 5 minutes.

Charge refrigerant into system.
When low-pressure gauge reading is 98 kPa (0.98 bar, 1.0 kg/cm^2, 14 psi), completely close high-pressure valve of manifold gauge and stop charging.

Run pump for 20 minutes.

Charge the specified amount of refrigerant into system.



Discharging—Point-1

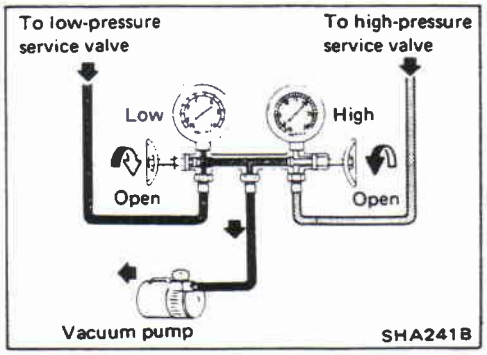
Slowly open the valves to discharge only refrigerant. If they are opened quickly, compressor oil will also be discharged.

CAUTION:

Rear cooler equipped model

On rear cooler equipped model, do the following procedures.

- **Ignition switch "ON"**
- **Front fan switch "ON"**
- **Front A/C and rear cooler switches "ON"**
- **Rear cooler temp. switch "Max. COLD"**



Evacuating the System—Point-2

Refer to "CAUTION: Rear cooler equipped model".

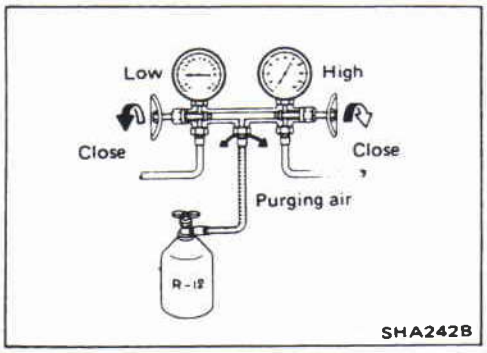
1. Start pump, then open both valves and run pump for about 5 minutes.
2. When low gauge has reached approx. 101.3 kPa (1,013 mbar, 760 mmHg, 29.92 inHg), completely close both valves of gauge and stop vacuum pump. Let it stand for 5 to 10 minutes in this state and confirm that the reading does not rise.

a. The low-pressure gauge reads lower by 3.3 kPa (33 mbar, 25 mmHg, 0.98 inHg) per 300 m (1,000 ft) elevation. Perform evacuation according to the following table.

b. The rate ascension of the low-pressure gauge should be less than 3.3 kPa (33 mbar, 25 mmHg, 0.98 inHg) in 5 minutes.

Elevation m (ft)	Vacuum of system* kPa (mbar, mmHg, inHg)
0 (0)	101.3 (1,013, 760, 29.92)
300 (1,000)	98.0 (980, 735, 28.94)
600 (2,000)	94.6 (946, 710, 27.95)
900 (3,000)	91.3 (913, 685, 26.97)

*: Values show reading of the low-pressure gauge.



Charging—Point-3

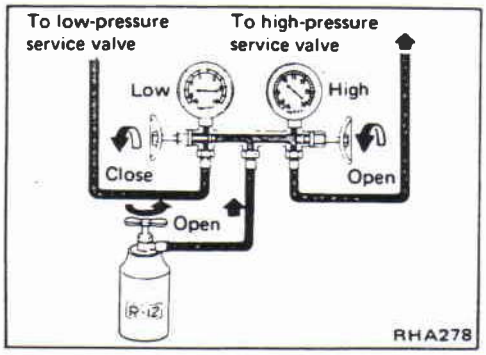
1. Evacuate refrigerant system.

Refer to "Point-2"

2. Close manifold gauge valves securely and disconnect charging hose from vacuum pump.
3. Purge air from center charging hose.

1) Connect center charging hose to refrigerant can through charge valve.
2) Break seal of refrigerant can and purge air.

Charging—Point-3 (Cont'd)

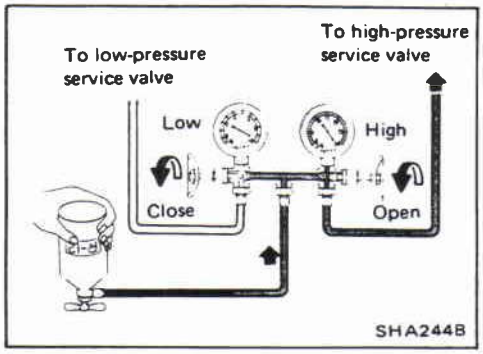


4. Charge refrigerant into system.

WARNING:

Ensure that engine is off.

1) Open high-pressure valve of manifold gauge and charge refrigerant into system.

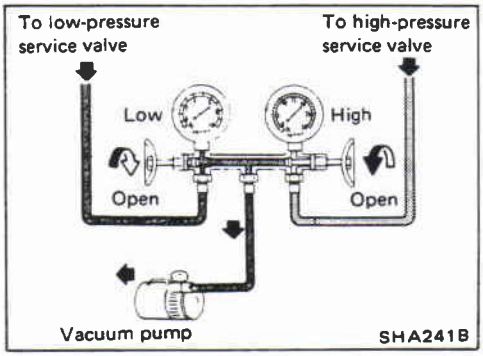


CAUTION:

If charging liquefied refrigerant into the system with the can turned upside down to reduce charging time, charge it only through high-pressure (discharge) service valve. After charging, the compressor should always be turned several times manually.

2) When low-pressure gauge reading is 98 kPa (0.98 bar, 1.0 kg/cm^2, 14 psi), completely close high-pressure valve of manifold gauge and stop charging.

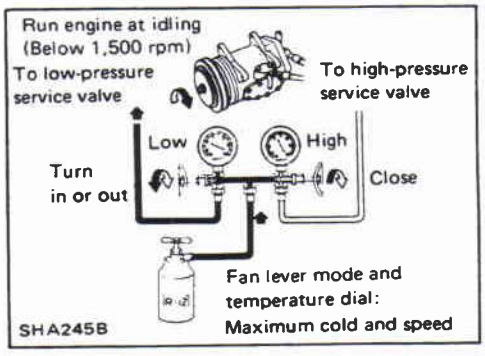
Evacuating the System—Point-4



Refer to "CAUTION: Rear cooler equipped model".

1. Close manifold gauge valve securely and disconnect charging hose from refrigerant can.
2. Connect center charging hose to vacuum pump.
3. Start pump, then open both valves and run pump for about 20 minutes.

Charging—Point-5



Perform 'Point-3 (No. 2—)".

Refer to "CAUTION: Rear cooler equipped model".

1. Charge refrigerant into system.

WARNING:

Ensure that engine is off.

1) Open low-pressure valve of manifold gauge and charge refrigerant into system.
2. When refrigerant charging speed slows down, close high-pressure valve of manifold gauge and open low-pressure valve of manifold gauge and charge it while running the compressor for ease of charging.
3. Start engine — Air conditioning system ON, maximum temperature set, maximum blower speed. Open low-pressure valve on gauge set, with can in upright position, and monitor sight glass. Charge is complete when sight glass is clear.

Cycling clutch systems will produce bubbles in sight glass when clutch engages. Therefore, allow 5 seconds after clutch engages to determine if bubbles continue, and, if so, add refrigerant to clear sight glass.

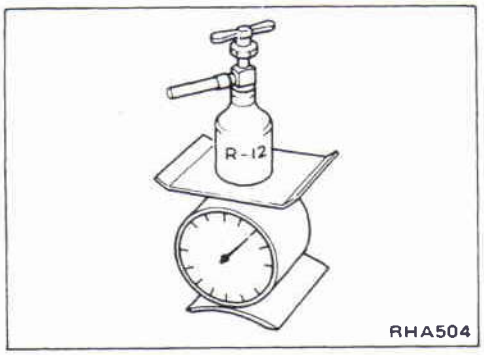
Charging—Point-5 (Cont'd)

WARNING:

Never charge refrigerant through high-pressure side (discharge side) of system since this will force refrigerant back into refrigerant can and can may explode.

4. Charge refrigerant while controlling low-pressure gauge reading at 275 kPa (2.75 bar, 2.8 kg/cm^2, 40 psi) or less by turning in or out low-pressure valve of manifold gauge.

- **Be sure to purge air from charging hose when replacing can with a new one.**



5. Charge the specified amount of refrigerant into system by weighing charged refrigerant with scale. Overcharging will cause discharge pressure to rise.

Refrigerant amount:
Front A/C
0.9 - 1.1 kg (2.0 - 2.4 lb)
Front A/C & overhead type rear cooler (Type 1)
1.3 - 1.5 kg (2.9 - 3.3 lb)
Front A/C & rear cooler (Type 2)
1.1 - 1.3 kg (2.4 - 2.9 lb)

The state of the bubbles in sight glass should only be used for checking whether the amount of charged refrigerant is small or not. The amount of charged refrigerant can be correctly judged by means of discharge pressure.

6. After charging, be sure to install valve cap on service valve.
7. Confirm that there are no leaks in system by checking with a leak detector.

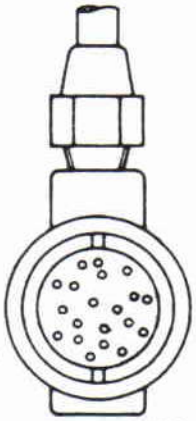
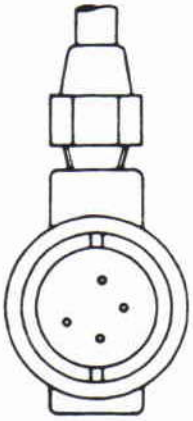
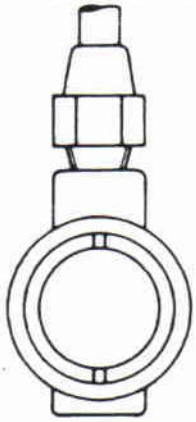
- When refrigerant charging is performed with a charging cylinder, charging station, or automatic charging equipment, engine off, charge only through high side, after specified refrigerant amount has entered the system, close high-pressure valve on gauge set. Start engine return to idle speed, operate A/C at maximum temperature setting, high blower. Observe sight glass to confirm complete charge.

Overcharging will result in increased high pressures, and reduced performance.

Checking Refrigerant Level

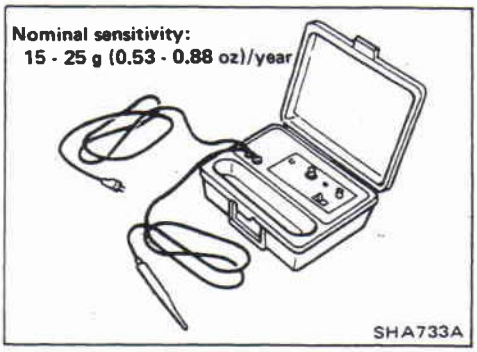
CONDITION

- Door window: Open
- A/C switch: ON
- Rear cooler switch (Rear cooler equipped model): ON
- TEMP. lever position: Max. COLD
- Rear cooler temp. switch (Rear cooler equipped model): Max. COLD
- FAN lever position: 4
- Rear cooler fan switch (Rear cooler equipped model): HI
- Check sight glass after a lapse of about five minutes.

Amount of refrigerant / Check item	Almost no refrigerant	Insufficient	Suitable	Too much refrigerant
Temperature of high-pressure and low-pressure lines.	Almost no difference between high-pressure and low-pressure side temperature.	High-pressure side is warm and low-pressure side is fairly cold.	High-pressure side is hot and low-pressure side is cold.	High-pressure side is abnormally hot.
State in sight glass.	Bubbles flow continuously. Bubbles will disappear and something like mist will flow when refrigerant is nearly gone.  AC256	The bubbles are seen at intervals of 1 - 2 seconds.  AC257	Almost transparent. Bubbles may appear when engine speed is raised and lowered. No clear difference exists between these two conditions.  AC258	No bubbles can be seen.
Pressure of system.	High-pressure side is abnormally low.	Both pressures on high and low-pressure sides are slightly low.	Both pressures on high and low-pressure sides are normal.	Both pressures on high and low-pressure sides are abnormally high.
Repair.	Stop compressor immediately and conduct an overall check.	Check for gas leakage, repair as required, replenish and charge system.		Discharge refrigerant from service valve of low pressure side.

a. The bubbles seen through the sight glass are influenced by the ambient temperature. Since the bubbles are hard to show up in comparatively low temperatures below 20°C (68°F), it is possible that a slightly larger amount of refrigerant would be filled, if supplied according to the sight glass. Recheck the amount when it exceeds 20°C (68°F). In higher temperature the bubbles are easy to show up.

b. When the screen in the receiver drier is clogged, the bubbles will appear even if the amount or refrigerant is normal. In this case, the outlet side pipe of the receiver drier becomes considerably cold.

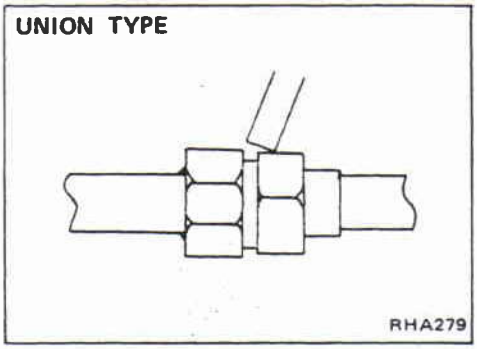


Checking Refrigerant Leaks

ELECTRIC LEAK DETECTOR

The leak detector is a delicate device that detects small amounts of halogen.

To use the device properly, read the manufacturer's manuals. Also perform the specified maintenance and inspections.



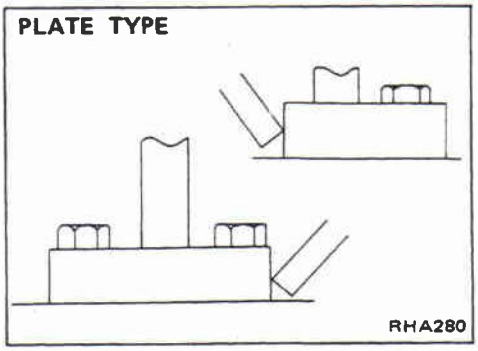
GENERAL PRECAUTIONS FOR HANDLING LEAK DETECTOR

Place the probe on connection fitting and wait for 5 seconds or more.

To check cooling unit, wait for 10 seconds or more.

WARNING:

Keep the probe as still as possible for one more minute.



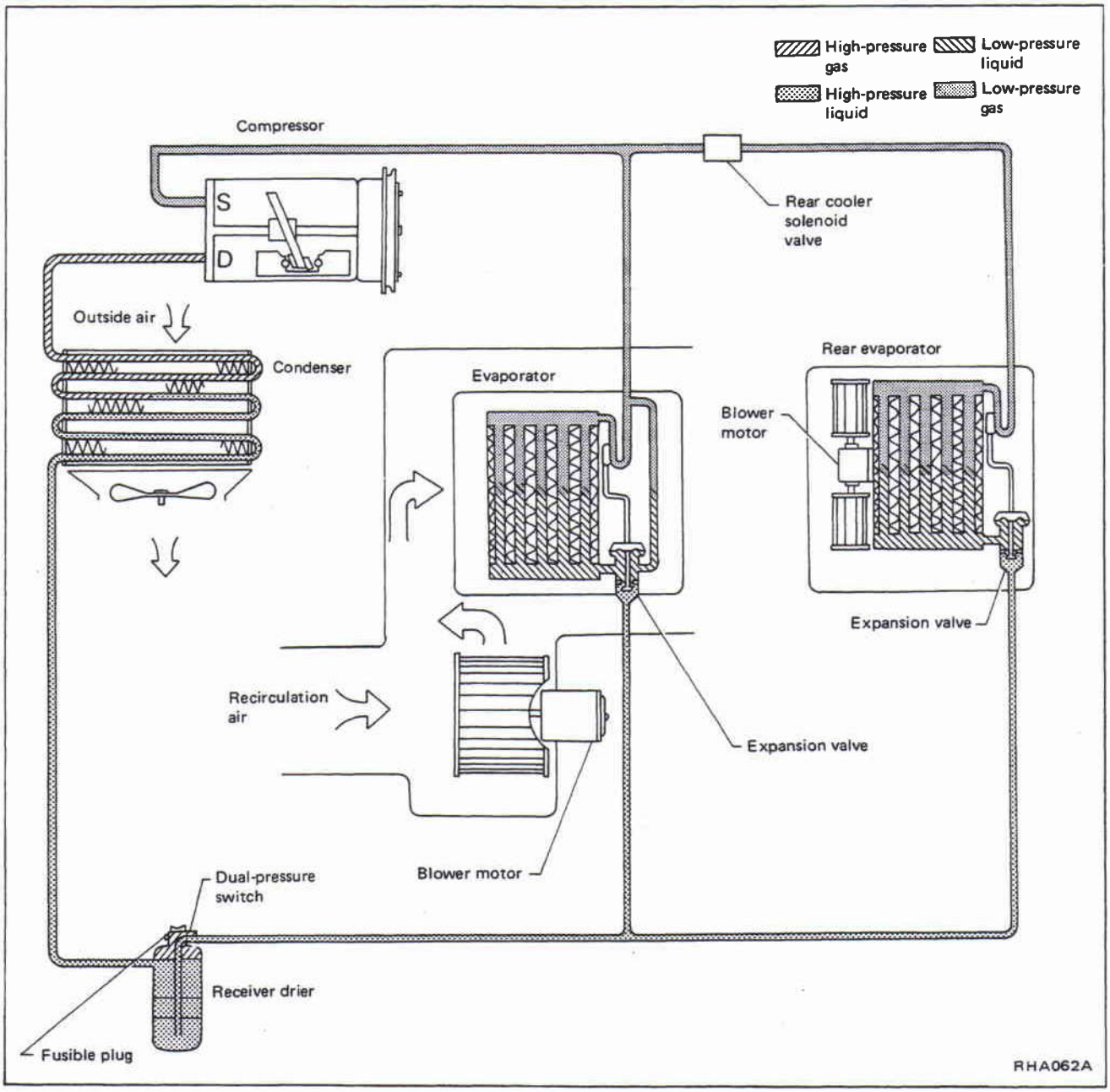
- **When testing single-bolt flange, place the probe on the opposite side of the fitting.**

MEASUREMENT STANDARD

If any leak is noted with a detector having a nominal sensitivity of 15 to 25 g (0.53 to 0.88 oz)/year, that leak must be repaired.

- The nominal sensitivity of the detector is determined under the assumption that all the leaking gas is collected by the detector. Accordingly, the quantity of gas actually leaking can amount to five to ten times the indicated value. Generally speaking, leakage of 150 to 200 g (5.29 to 7.05 oz) of refrigerant can cause insufficient cooling.
- Oil deposited during assembling must be wiped off before inspection. Refrigerant easily dissolves in oil, and the presence of oil can cause an error in measurement.
  This precaution is important when checking a used car for refrigerant leakage.
- If oil is noted at or around connections, it indicates that refrigerant is leaking.

Refrigeration Cycle



REFRIGERANT FLOW

This system has two evaporators; a front evaporator and a rear evaporator. The system design is such that there are the following possibilities for the refrigerant flow path:

Flow path #1 — through the front evaporator only
Flow path #2 — through the front and rear evaporators

Refrigeration Cycle (Cont'd)

Flow path #1 —The front A/C switch is on, the rear cooler switch is off. The rear cooler solenoid valve is closed.
Flow path #2 —The rear cooler switch is on, the front A/C switch is on. The rear cooler solenoid valve is open.

FREEZE PROTECTION — Compressor control

The compressor cycles on and off to maintain the front and rear evaporator temperature within a specified range.
The front A/C thermo control amp. controls the compressor clutch (A/C relay) and the rear cooler solenoid valve (rear cooler relay), and the rear cooler thermo control amp. controls the rear cooler solenoid valve (rear cooler relay) according to the following operating conditions:

Front A/C and rear cooler thermo control amp. function

Operating condition	Function
Front A/C: on Rear cooler: off	The front thermo control amp. disengages the compressor clutch when the front evaporator gets too cold.
Front A/C: on Rear cooler: on	The rear cooler thermo control amp. closes the rear cooler solenoid valve when the rear evaporator gets too cold. The front A/C thermo control amp. disengages the compressor clutch and closes the rear cooler solenoid valve when the front evaporator gets too cold.

The rear evaporator thermo control setting is controlled by the temperature control knob located on the rear cooler control panel, and the front evaporator thermo control setting is pre-set and non-adjustable.

REFRIGERANT SYSTEM PROTECTION

Dual-pressure switch

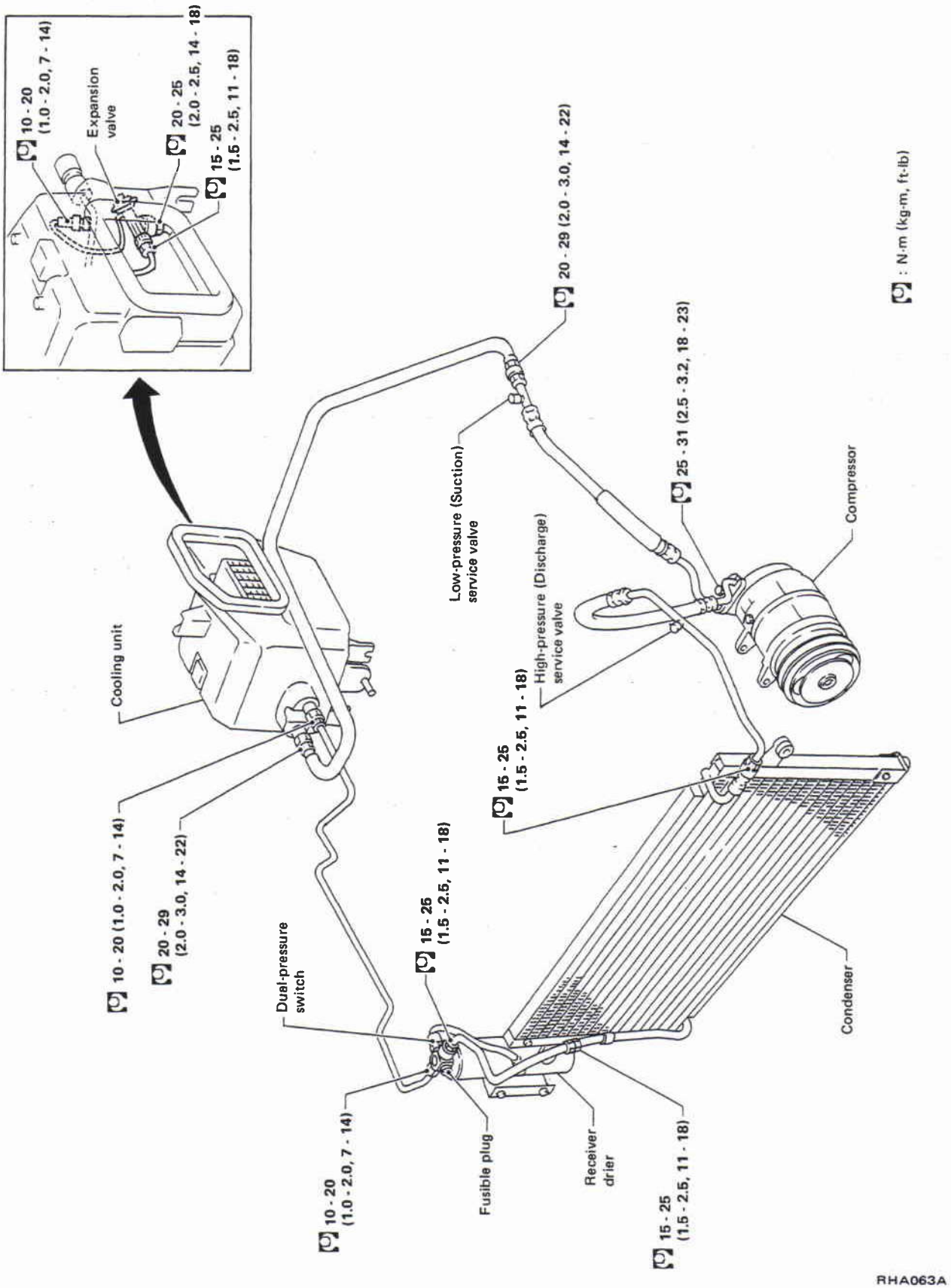
The refrigerant system is protected against excessively high or low pressures by the dual-pressure switch, located on the receiver drier. If the system pressure rises above, or falls below the specifications, the dual-pressure switch opens to interrupt the compressor operation.

Fusible plug

Open at temperature above 105°C (221°F), thereby discharging refrigerant to the atmosphere. If this plug is melted and opened, check the refrigerant line and replace receiver drier.

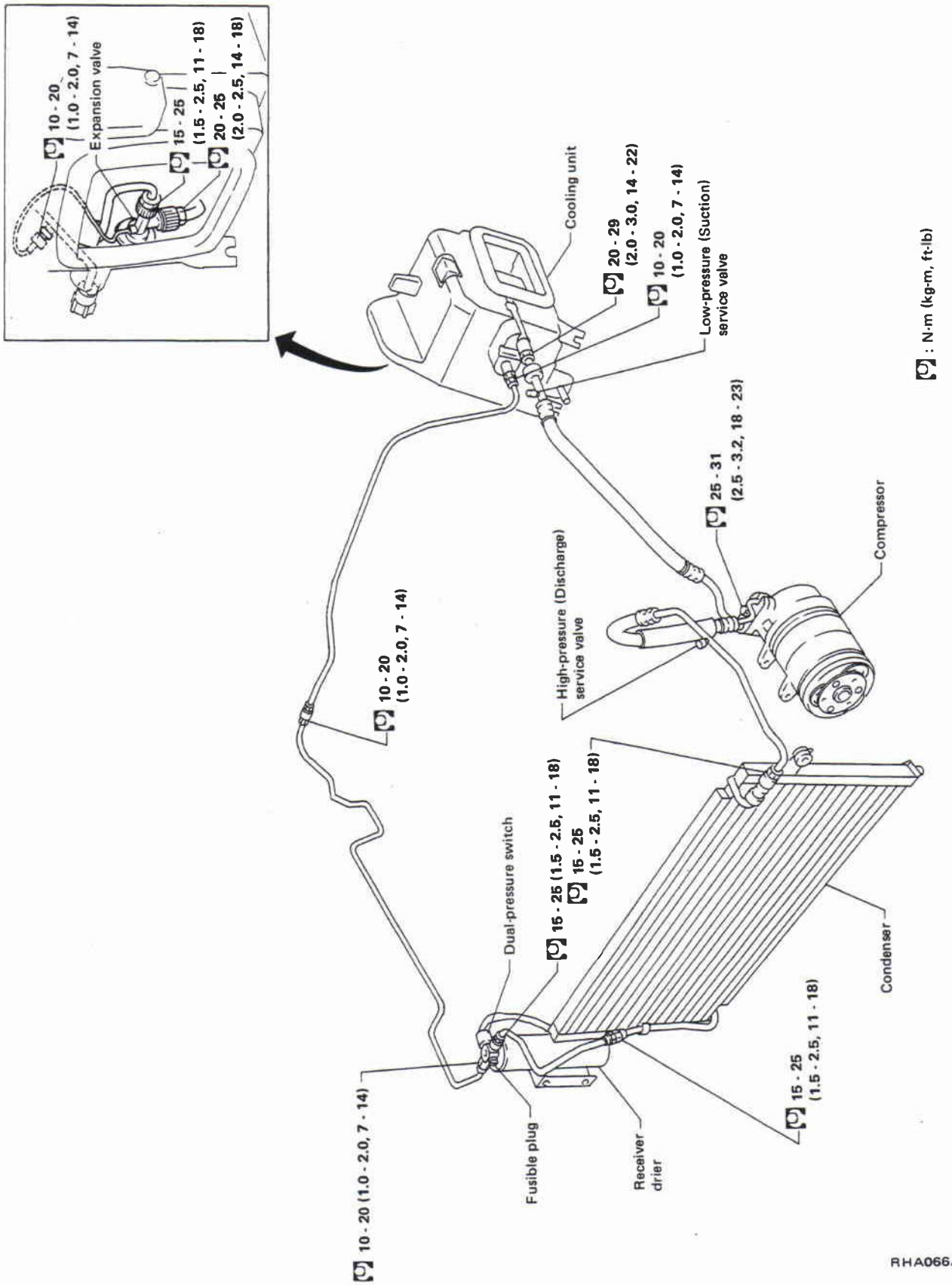
Refrigeration Cycle (Cont'd)

FRONT A/C L.H. DRIVE MODEL



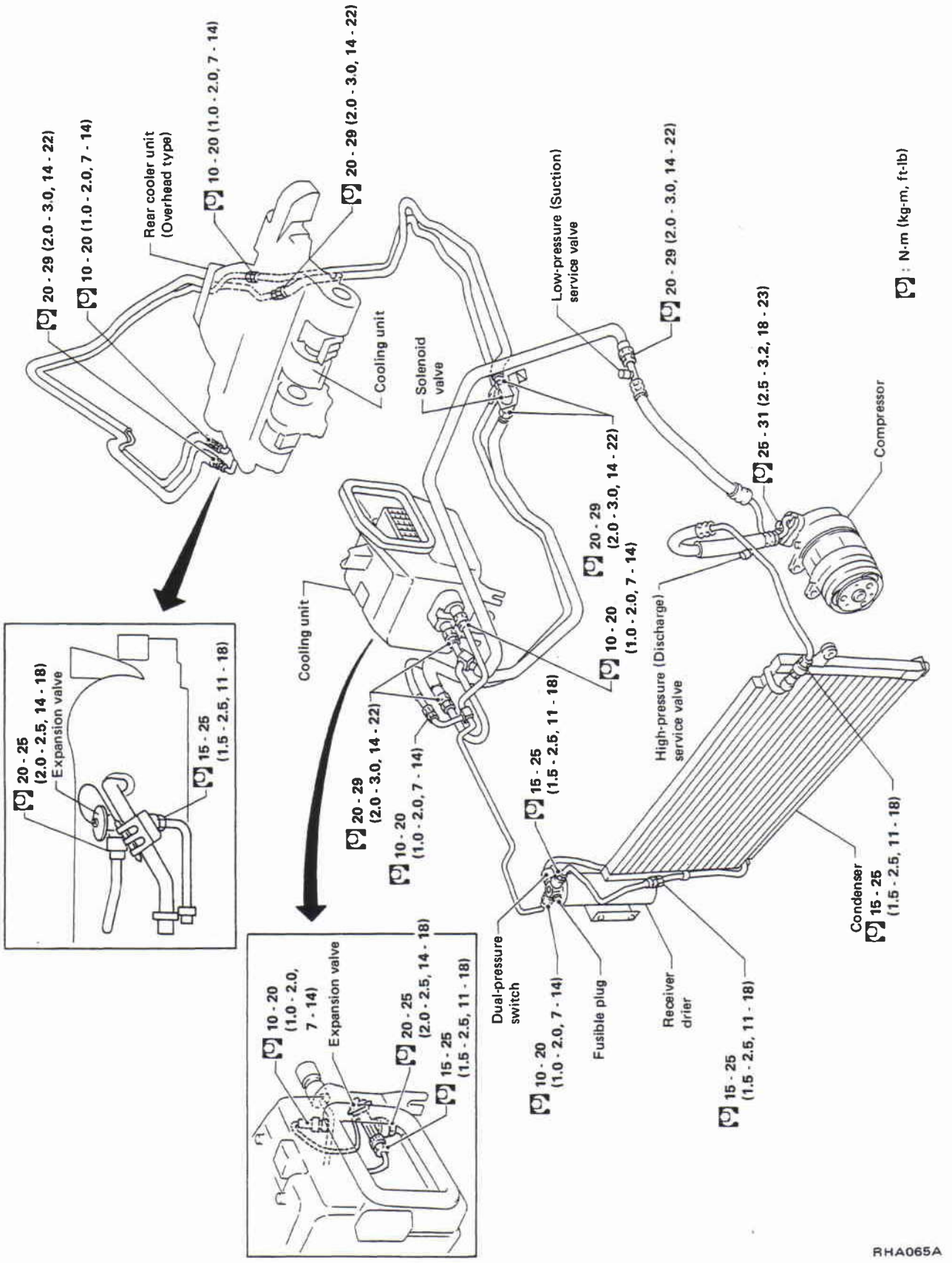
Refrigeration Cycle (Cont'd)

FRONT A/C R.H. DRIVE MODEL



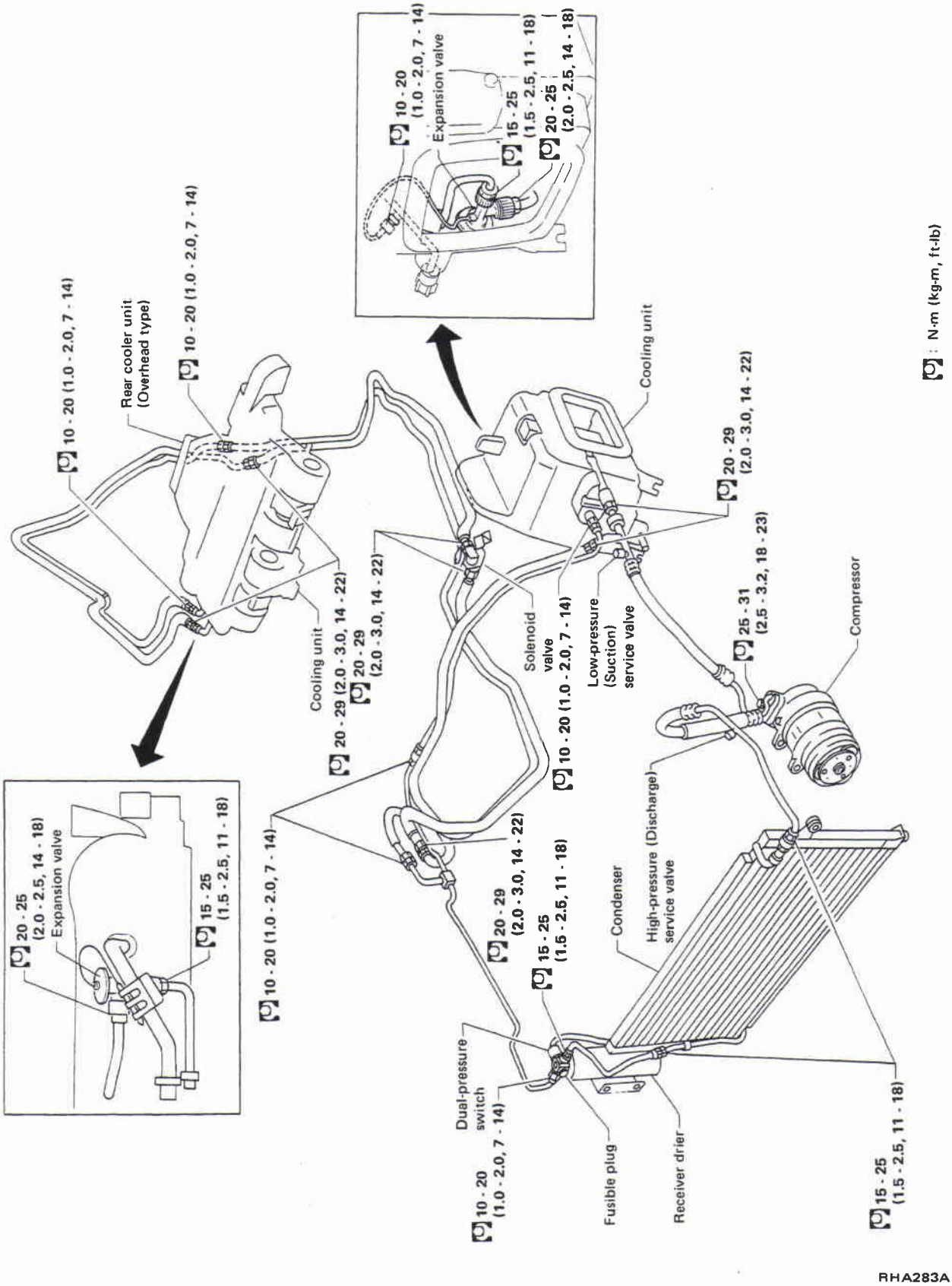
Refrigeration Cycle (Cont'd)

FRONT A/C & OVERHEAD TYPE REAR COOLER (Type 1) L.H. DRIVE MODEL



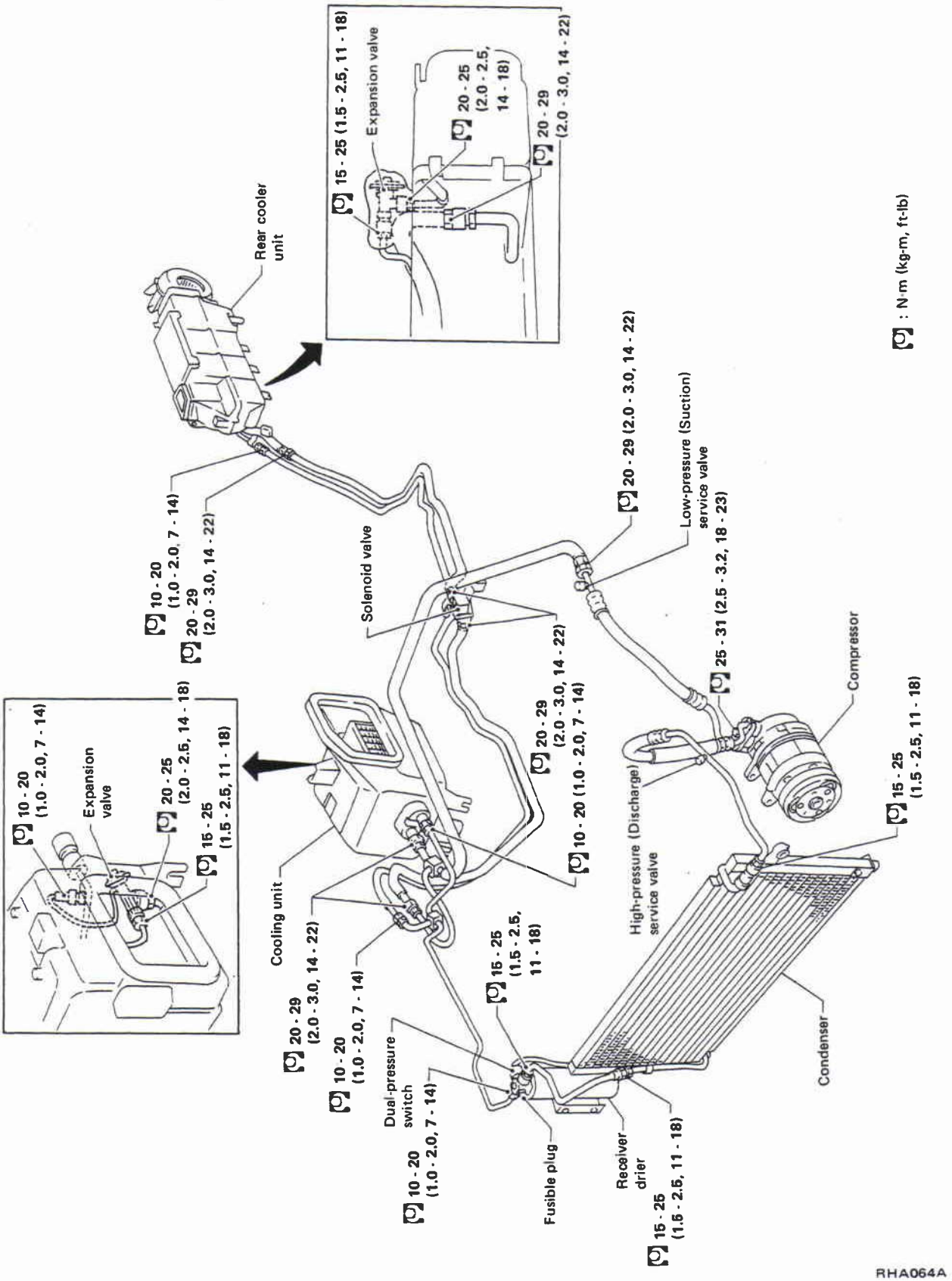
Refrigeration Cycle (Cont'd)

FRONT A/C & OVERHEAD TYPE REAR COOLER (Type 1) R.H. DRIVE MODEL



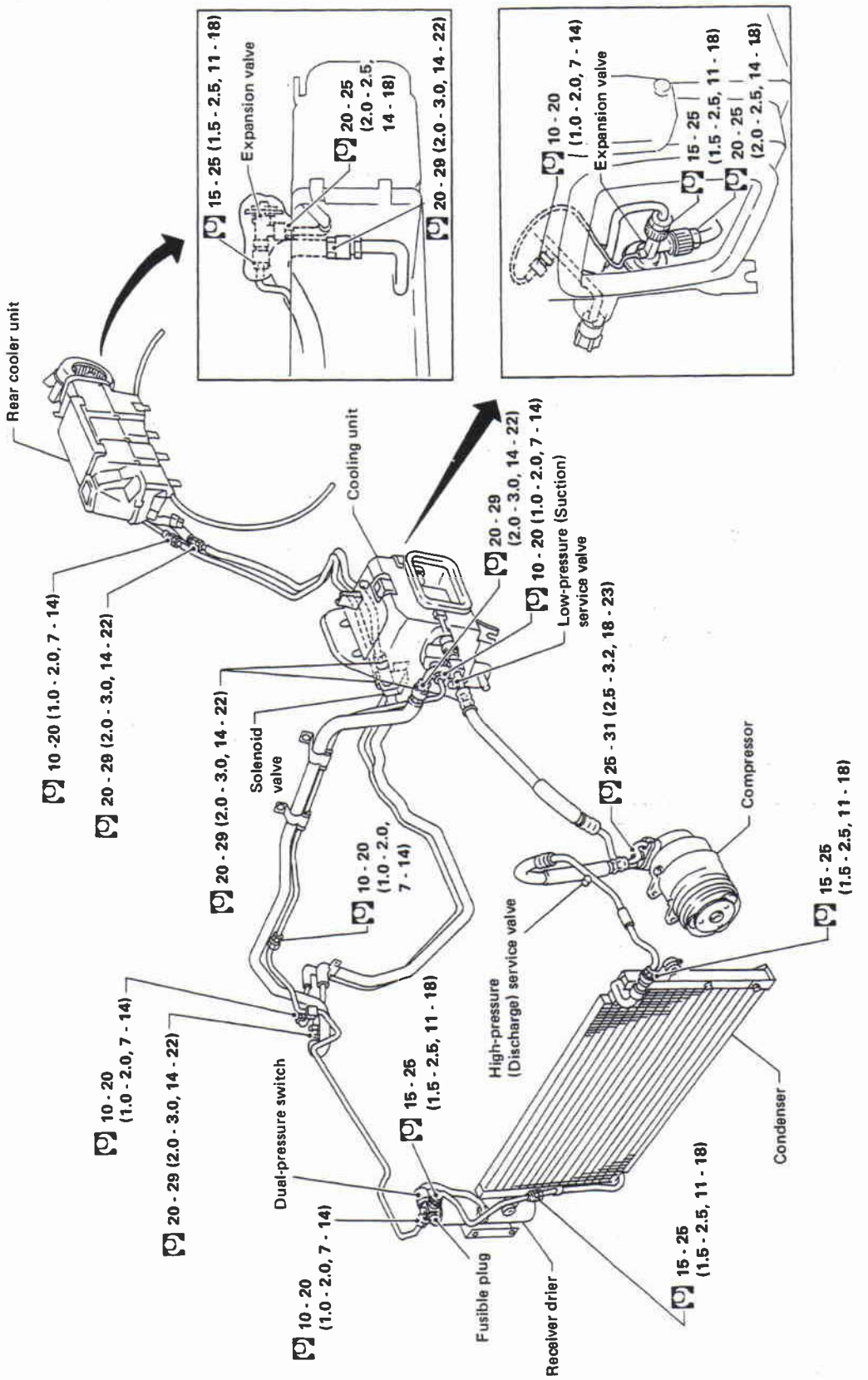
Refrigeration Cycle (Cont'd)

FRONT A/C & REAR COOLER (Type 2) L.H. DRIVE MODEL



Refrigeration Cycle (Cont'd)

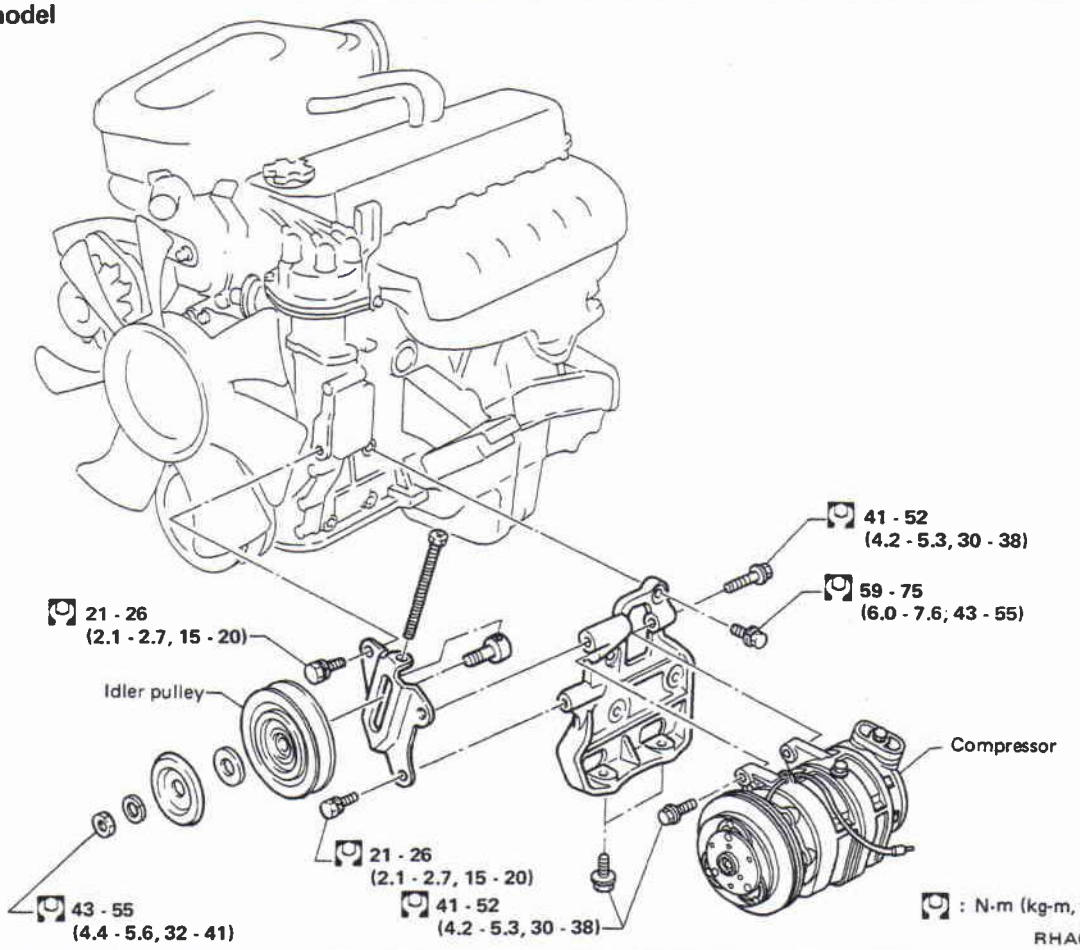
FRONT A/C & REAR COOLER (Type 2) R.H. DRIVE MODEL



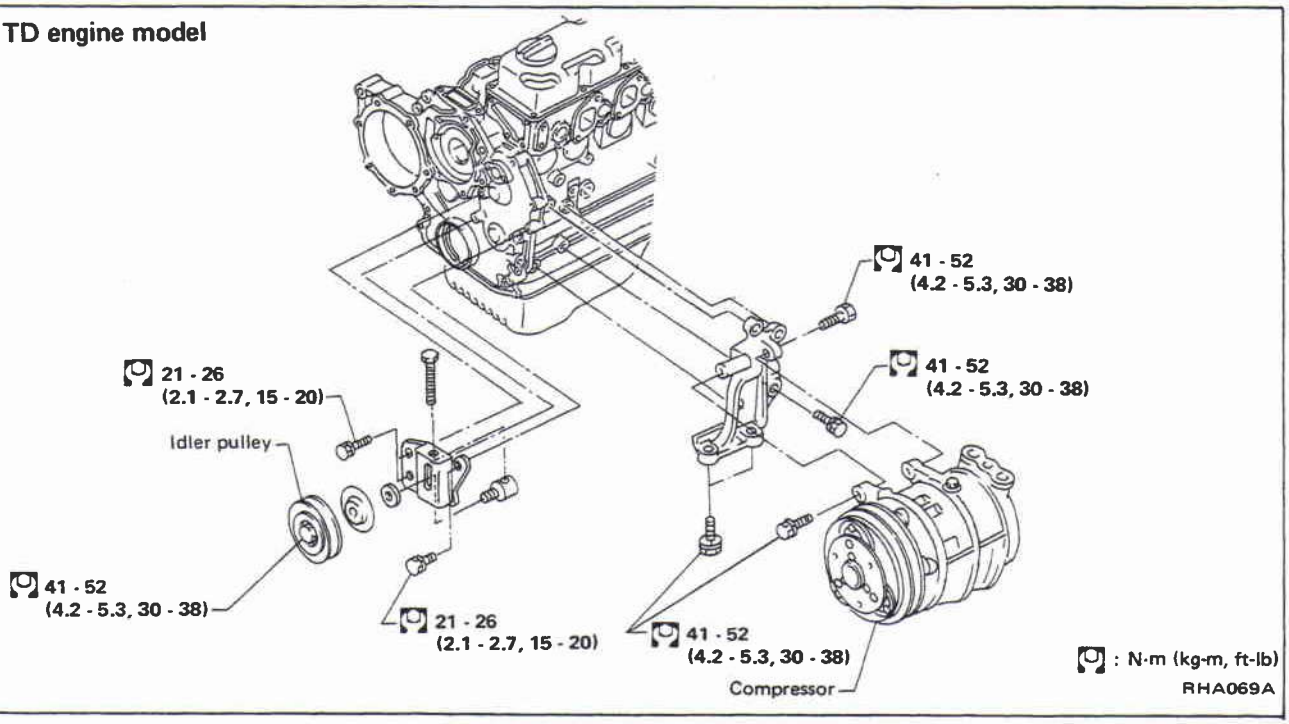
RHA067A

Compressor Mounting

TB engine model



TD engine model

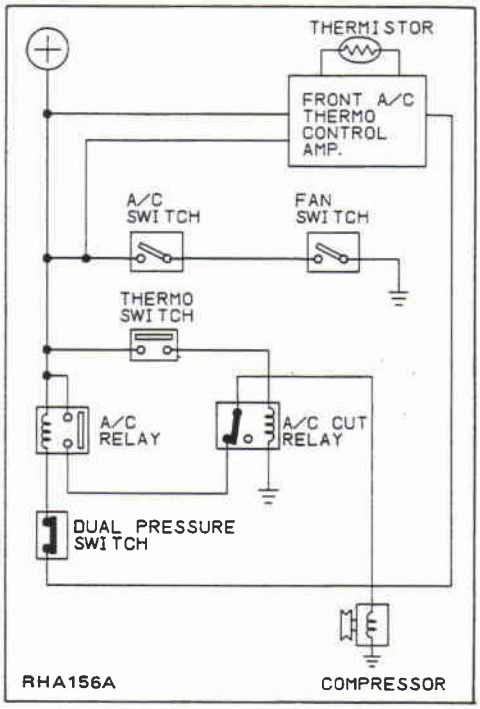


Belt Tension

- Refer to MA section.

Fast Idle Control Device (F.I.C.D.)

- For TB engine model, refer to EF & EC section.
- For TD engine model, refer to MA section.



A/C Cut System

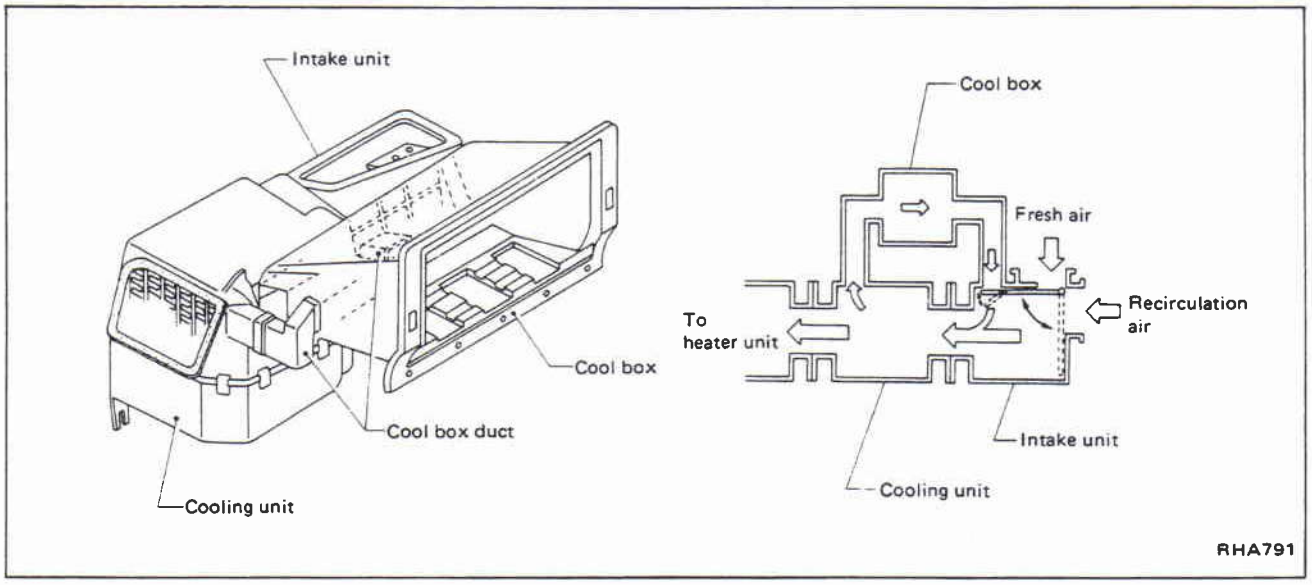
For Australia A/T models, Gulf standard (Middle East) models, Hardtop and Wagon models with TD engine except for Australia

This system is used to monitor the temperature of coolant for engine. When the engine is heavily overloaded, the compressor is turned off to reduce the overloading by the function of the thermo switch located at radiator.

The thermo switch turns ON when the temperature of coolant for engine increases approx. 107°C (225°F), then A/C cut relay stays in open position to cut power source for compressor.

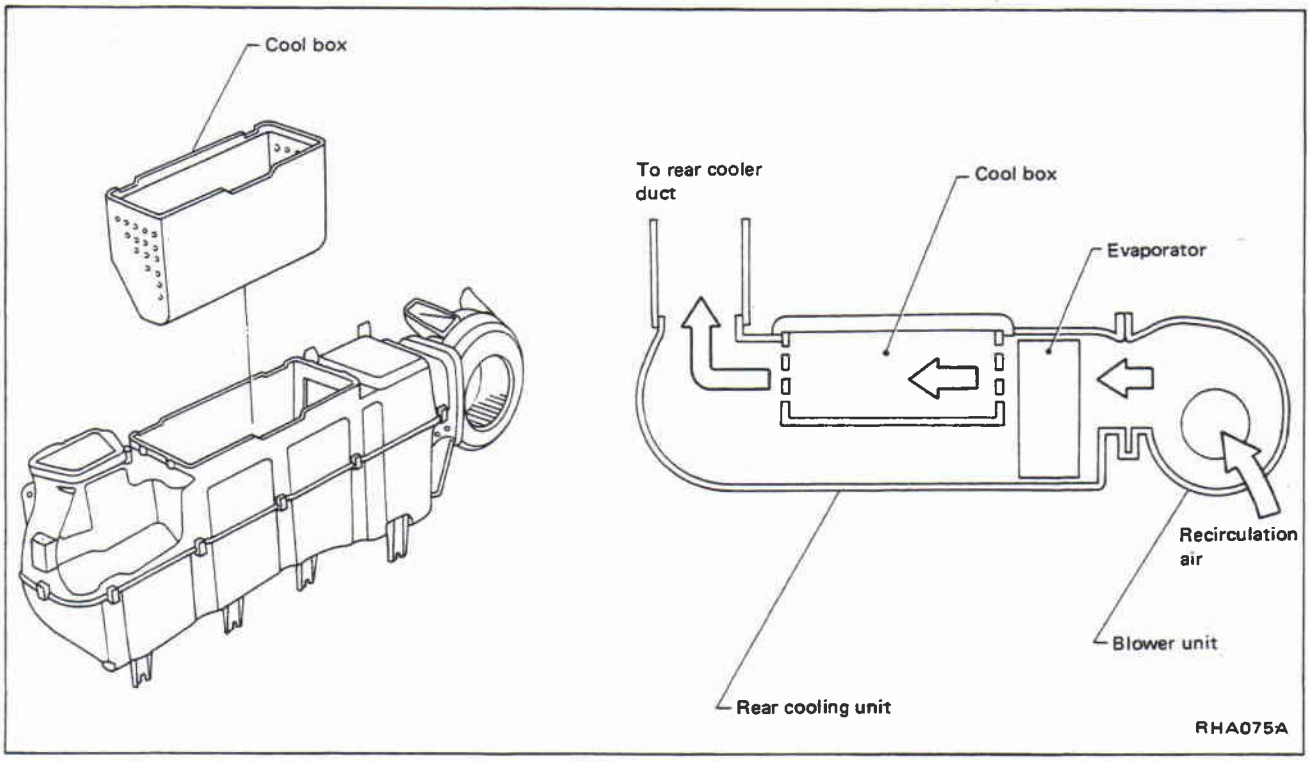
Cool Box System — Front

- This system uses cool air from the cooling unit to make it possible to refrigerate.



Cool Box System — Rear

- This system uses cool air from the cooling unit to make it possible to refrigerate.



Performance Chart

TEST CONDITION

Testing must be performed as follows:

Vehicle location: Indoors or in the shade (in a well ventilated place)
Doors: Closed
Door window: Open
Hood: Open
TEMP. lever position: Max. COLD.
Rear cooler temp. switch*: Max. COLD
Air control lever position: (Ventilation)
INTAKE lever position: (Recirculation)
FAN lever and switch* position: Max. position
Engine speed: 1,500 rpm
Time required before starting testing after air conditioner starts operating: More than 10 minutes
Rear cooler: ON*
*: For rear cooler equipped model only

TEST READING

Single A/C equipped model

Recirculating-to-discharge air temperature table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	25 (77)	6.0 - 8.5 (43 - 47)
	30 (86)	11.0 - 14.0 (52 - 57)
	35 (95)	15.5 - 18.5 (60 - 65)
	40 (104)	20.5 - 23.5 (69 - 74)
60 - 70	25 (77)	8.5 - 11.0 (47 - 52)
	30 (86)	14.0 - 17.0 (57 - 63)
	35 (95)	18.5 - 22.0 (65 - 72)
	40 (104)	23.5 - 28.0 (74 - 82)

Ambient air temperature-to-compressor pressure table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	25 (77)	981 - 1,226 (9.81 - 12.26, 10.0 - 12.5, 142 - 178)	118 - 196 (1.18 - 1.96, 1.2 - 2.0, 17 - 28)
	30 (86)	1,177 - 1,373 (11.77 - 13.73, 12.0 - 14.0, 171 - 199)	137 - 206 (1.37 - 2.06, 1.4 - 2.1, 20 - 30)
	35 (95)	1,324 - 1,569 (13.24 - 15.69, 13.5 - 16.0, 192 - 228)	157 - 235 (1.57 - 2.35, 1.6 - 2.4, 23 - 34)
	40 (104)	1,520 - 1,765 (15.20 - 17.65, 15.5 - 18.0, 220 - 256)	196 - 275 (1.96 - 2.75, 2.0 - 2.8, 28 - 40)

Performance Chart (Cont'd)

Overhead type rear cooler (Type 1) equipped model

Recirculating-to-discharge air temperature table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	25 (77)	9.0 - 11.5 (48 - 53)
	30 (86)	13.5 - 16.0 (56 - 61)
	35 (95)	18.0 - 20.0 (64 - 68)
	40 (104)	22.0 - 24.5 (72 - 76)
60 - 70	25 (77)	11.5 - 13.5 (53 - 56)
	30 (88)	16.0 - 18.0 (61 - 64)
	35 (95)	20.0 - 22.5 (68 - 73)
	40 (104)	24.5 - 27.0 (76 - 81)

Ambient air temperature-to-compressor pressure table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	25 (77)	1,373 - 1,520 (13.73 - 15.20, 14.0 -15.5, 199 - 220)	167 - 226 (1.67 - 2.26, 1.7 - 2.3, 24 - 33)
	30 (86)	1,569 - 1,716 (15.69 - 17.16, 16.0 - 17.5, 228 - 249)	216 - 265 (2.16 - 2.65, 2.2 - 2.7, 31 - 38)
	35 (95)	1,814 - 1,961 (18.14 - 19.61, 18.5 - 20.0, 263 - 284)	245 - 314 (2.45 - 3.14, 2.5 - 3.2, 36 - 46)
	40 (104)	2,059 - 2,354 (20.59 - 23.54, 21.0 - 24.0, 299 - 341)	294 - 373 (2.94 - 3.73, 3.0 - 3.8, 43 - 54)

Performance Chart (Cont'd)

Rear cooler (Type 2) equipped model

Recirculating-to-discharge air temperature table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	25 (77)	7.0 - 9.0 (45 - 48)
	30 (86)	11.5 - 14.0 (53 - 57)
	35 (95)	16.0 - 18.5 (61 - 65)
	40 (104)	20.5 - 23.0 (69 - 73)
60 - 70	25 (77)	9.0 - 12.0 (48 - 54)
	30 (86)	14.0 - 16.5 (57 - 62)
	35 (95)	18.5 - 21.0 (65 - 70)
	40 (104)	23.0 - 25.5 (73 - 78)

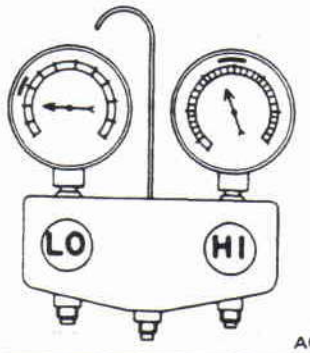
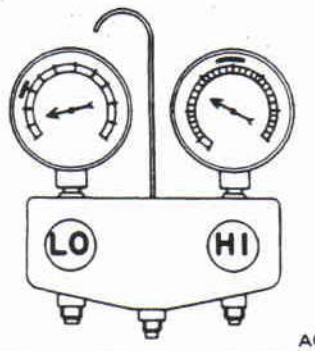
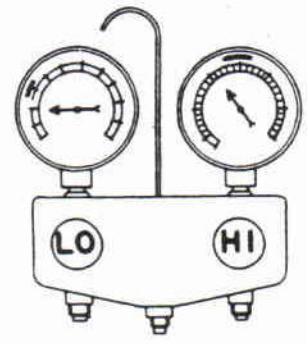
Ambient air temperature-to-compressor pressure table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	25 (77)	1,177 - 1,324 (11.77 - 13.24, 12.0 - 13.5, 171 - 192)	167 - 226 (1.67 - 2.26, 1.7 - 2.3, 24 - 33)
	30 (86)	1,422 - 1,569 (14.22 - 15.69, 14.5 - 16.0, 206 - 228)	216 - 275 (2.16 - 2.75, 2.2 - 2.8, 31 - 40)
	35 (95)	1,618 - 1,765 (16.18 - 17.65, 16.5 - 18.0, 235 - 256)	255 - 314 (2.55 - 3.14, 2.6 - 3.2, 37 - 46)
	40 (104)	1,863 - 2,059 (18.63 - 20.59, 19.0 - 21.0, 270 - 299)	304 - 363 (3.04 - 3.63, 3.1 - 3.7, 44 - 53)

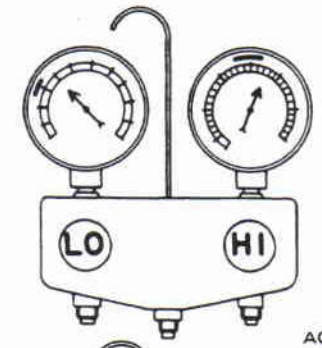
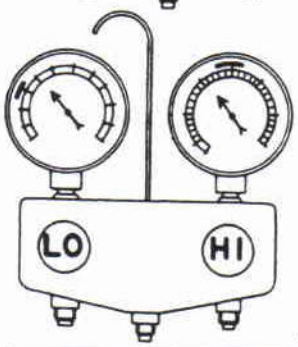
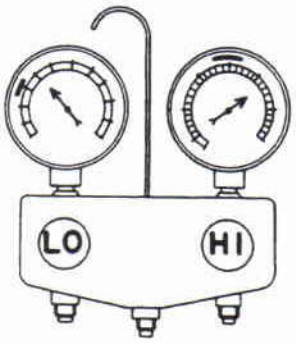
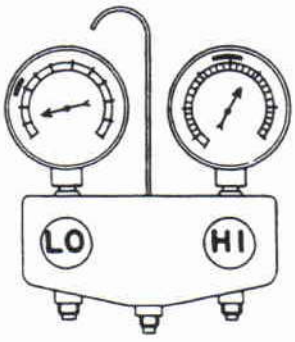
Performance Test Diagnoses

Characteristics revealed by the manifold gauge readings for the air conditioning system are shown in the following.
For how to do the performance test, refer to the item "Performance Chart".

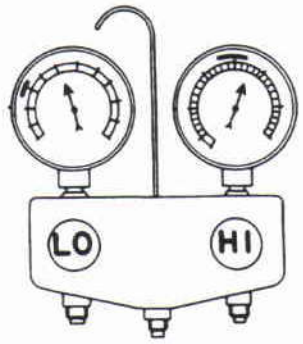
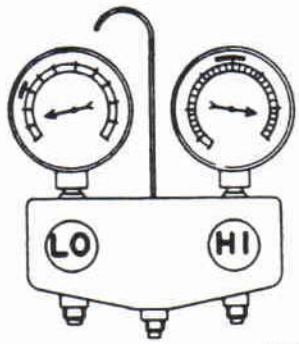
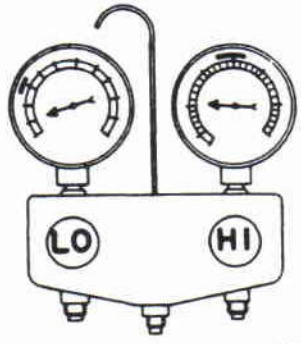
In the following table, the portion smeared with ink on each gauge scale indicates the range showing that the air conditioning system is in good order. This range is described in Performance Chart.

Condition		Probable cause	Corrective action
INSUFFICIENT REFRIGERANT CHARGE			
 AC352A	Insufficient cooling. Bubbles appear in sight glass.	Refrigerant is low, or leaking slightly.	1. Leak test. 2. Repair leak. 3. Charge system. **Evacuate, as necessary, and recharge system.**
ALMOST NO REFRIGERANT			
 AC353A	No cooling action. A lot of bubbles or something like mist appears in sight glass.	Serious refrigerant leak.	**Stop compressor immediately.** 1. Leak test. 2. Discharge system. 3. Repair leak(s). 4. Replace receiver drier if necessary. 5. Check oil level. 6. Evacuate and recharge system.
FAULTY EXPANSION VALVE			
 AC354A	Slight cooling. Sweat or frosting on expansion valve inlet.	Expansion valve restricts refrigerant flow. • Expansion valve is clogged. • Expansion valve is inoperative. Valve stuck closed. Thermal bulb has lost charge.	If valve inlet reveals sweat or frost: 1. Discharge system. 2. Remove valve and clean it. Replace it if necessary. 3. Evacuate system. 4. Charge system. If valve does not operate: 1. Discharge system. 2. Replace valve. 3. Evacuate and charge system.

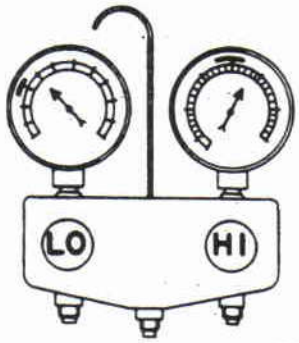
Performance Test Diagnoses (Cont'd)

Condition		Probable cause	Corrective action
 AC355A	Insufficient cooling. Sweat on suction line.	Expansion valve allows too much refrigerant through evaporator.	Check valve for operation. If suction side does not show a pressure decrease, replace valve.
 AC356A	No cooling. Sweat or frosting on suction line.	Faulty expansion valve.	1. Discharge system. 2. Replace valve. 3. Evacuate and replace system.
AIR IN SYSTEM			
 AC359A	Insufficient cooling. Sight glass shows occasional bubbles.	Air mixed with refrigerant in system.	1. Discharge system. 2. Replace receiver drier. 3. Evacuate and charge system.
MOISTURE IN SYSTEM			
 AC360A	After short operation, suction side may show vacuum pressure reading. During this condition, discharge air will be warm. As a warning of this, reading vibrates around 39 kPa (0.39 bar, 0.4 kg/cm^2, 6 psi).	Drier is saturated with moisture. Moisture has frozen in expansion valve. Refrigerant flow is restricted.	1. Discharge system. 2. Replace receiver drier (twice if necessary). 3. Evacuate system completely. (Repeat 30-minutes evacuating three times.) 4. Recharge system.

Performance Test Diagnoses (Cont'd)

Condition		Probable cause	Corrective action
FAULTY CONDENSER  AC361A	No cooling action: engine may overheat. Bubbles appear in sight glass of drier. Suction line is very hot.	Usually a malfunctioning condenser.	• Check fan belt and fluid coupling • Check condenser for dirt accumulation. • Check engine cooling system for overheating. • Check for refrigerant overcharging. **If pressure remains high in spite of all above actions taken, remove and inspect the condenser for possible oil clogging.**
HIGH PRESSURE LINE BLOCKED  AC362A	Insufficient cooling. Frosted high pressure liquid line.	Drier clogged, or restriction in high pressure line.	1. Discharge system. 2. Remove receiver drier or strainer and replace it. 3. Evacuate and charge system.
FAULTY COMPRESSOR  AC363A	Insufficient cooling.	Internal problem in compressor, or damaged gasket and valve.	1. Discharge system. 2. Remove and check compressor. 3. Repair or replace compressor. 4. Check oil level. 5. Replace receiver drier. 6. Evacuate and charge system.

Performance Test Diagnoses (Cont'd)

Condition		Probable cause	Corrective action
TOO MUCH OIL IN SYSTEM (Excessive)  AC364A	Insufficient cooling.	Too much oil circulates with refrigerant, causing the cooling capacity of the system to be reduced.	Refer to COMPRESSOR OIL for correcting oil level.

Checking and Adjusting

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

Unit: mℓ (Imp fl oz)

Applied model	Without rear cooler model	With rear cooler model
Capacity Total in system	200 (7.0)	250 (8.8)
Amount of oil which can be drained	110 (3.9)*	
Compressor (Service parts) charging amount	200 (7.0)	

*: All oil cannot be drained from system.

OIL RETURN OPERATION

Before checking and adjusting oil level, operate compressor at engine idling speed, with controls set for maximum cooling and high blower speed, for 20 to 30 minutes in order to return oil to compressor.

CHECKING AND ADJUSTING FOR USED COMPRESSOR

1. After oil return operation, stop the engine and discharge refrigerant and then remove compressor from the vehicle.
2. Remove oil drain plug, drain compressor oil from compressor oil sump and measure the amount.

Oil is sometimes hard to extract when compressor is cooled. Remove oil while compressor is warm [maintained to 40 to 50°C (104 to 122°F)].

3. If the amount is less than 110 mℓ (3.9 Imp fl oz), some refrigerant may have leaked out. Conduct leak tests on connections of each system, and if necessary, repair or replace faulty parts.
4. Check the purity of the oil and then adjust oil level following the procedure below.
   (a) When oil is clean;

Unit: mℓ (Imp fl oz)

Amount of oil drained	Adjusting procedure
Above 110 (3.9)*	Oil level is right. Pour in same amount of oil as was drained out.
Below 110 (3.9)	Oil level may be low. Pour in 110 mℓ (3.9 Imp fl oz) of oil.

*: If amount of oil drained is much greater than under normal circumstances, flush air conditioner system with refrigerant. Then pour in 200 mℓ (7.0 Imp fl oz) of oil into air conditioner system.

   (b) When oil contains chips or foreign material; After air conditioner system has been flushed with refrigerant, replace receiver drier. Then pour in 200 mℓ (7.0 Imp fl oz) of oil into air conditioner system.

CHECKING AND ADJUSTING FOR COMPRESSOR REPLACEMENT

200 mℓ (7.0 Imp fl oz) of oil is charged in compressor (service parts). So it is necessary to drain the proper amount of oil from new compressor. Follow the procedure below.

1. After oil return operation, drain compressor oil from used compressor and measure the amount.
   (It is the same procedure as CHECKING AND ADJUSTING FOR USED COMPRESSOR.)

Checking and Adjusting (Cont'd)

2. Check the purity of the oil and then adjust oil level following the procedure below.
   (a) Oil is clean;

Unit: mℓ (Imp fl oz)

Amount of oil drained from used compressor	Draining amount of oil from new compressor
Above 110 (3.9)*	200 (7.0) – [Amount of oil drained + 25 (0.9)]
Below 110 (3.9)	110 (3.9)

*: If amount of oil drained is much greater than under normal circumstances, flush air conditioner system with refrigerant. Then install new compressor [200 mℓ (7.0 Imp fl oz) of oil is changed compressor service parts.]

Example:

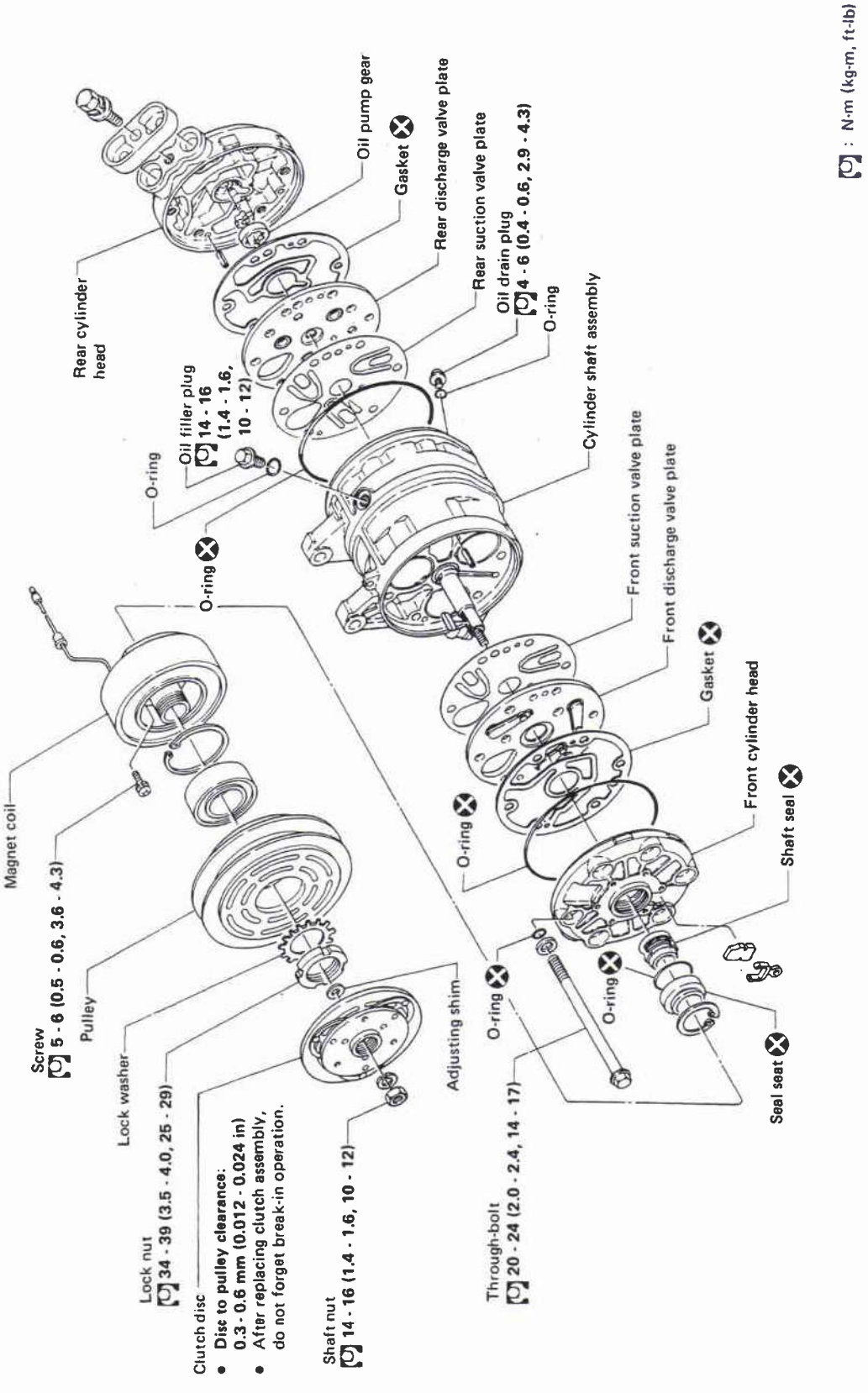
Unit: mℓ (Imp fl oz)

Amount of oil drained from used compressor	Draining amount of oil from new compressor
135 (4.8)	90 (3.2)
95 (3.3)	110 (3.9)

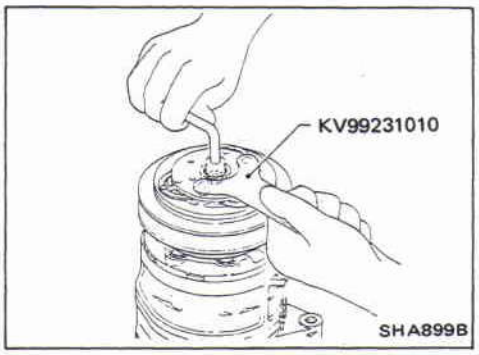
   (b) When oil contains chips or foreign material; After air conditioner system has been flushed with refrigerant, replace receiver drier. Then install new compressor. [200 mℓ (7.0 Imp fl oz) of oil is charged in compressor service parts.]

Precautions

- Plug all openings to prevent moisture and foreign matter from entering.
- Do not leave compressor on its side or upside down for more than 10 minutes.
- When replacing or repairing compressor, check compressor oil level in system.
- When replacing with a new compressor, drain specified oil from new compressor. Refer to COMPRESSOR OIL.
- Be sure there is no oil or dirt on frictional surface of clutch disc and pulley.
- When replacing compressor clutch, be careful not to scratch shaft or bend pulley.
- When replacing compressor clutch assembly, do not forget BREAK-IN OPERATION.
- When storing a compressor, be sure to fill it with refrigerant to prevent rust formation. Add refrigerant at the low-pressure side and purge air at the high-pressure side, while rotating shaft by hand.
- Replace shaft seal, seal seat, oil seal and O-ring as a set.
- When installing shaft seal, seal seat, oil seal, O-ring and gaskets, apply compressor oil sparingly to the contact surface. Do not reuse them.
- After replacement or repairs, conduct a Leak Test.


Rear cylinder head
Oil pump gear
Gasket
Rear discharge valve plate
Rear suction valve plate
Oil drain plug
4 - 6 (0.4 - 0.6, 2.9 - 4.3)
O-ring
Cylinder shaft assembly
Oil filler plug
14 - 16 (1.4 - 1.6, 10 - 12)
O-ring
O-ring
Front suction valve plate
Front discharge valve plate
Gasket
Front cylinder head
Shaft seal
Magnet coil
Screw
5 - 6 (0.5 - 0.6, 3.6 - 4.3)
Pulley
Lock washer
Lock nut
34 - 39 (3.5 - 4.0, 25 - 29)
Clutch disc
• Disc to pulley clearance: 0.3 - 0.6 mm (0.012 - 0.024 in)
• After replacing clutch assembly, do not forget break-in operation.
Shaft nut
14 - 16 (1.4 - 1.6, 10 - 12)
Adjusting shim
O-ring
Through-bolt
20 - 24 (2.0 - 2.4, 14 - 17)
O-ring
O-ring
Seal seat
: N·m (kg-m, ft-lb)

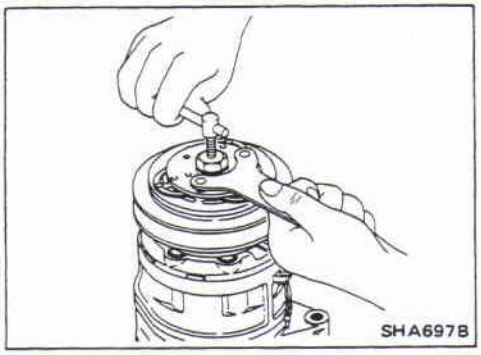
SHA9088



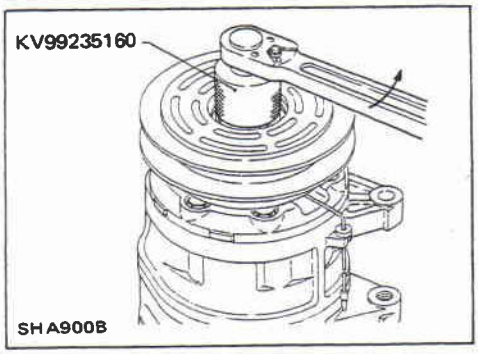
Compressor Clutch

REMOVAL

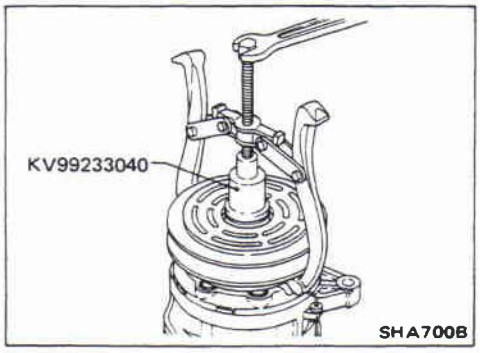
- When removing shaft nut, hold clutch disc with clutch disc wrench.



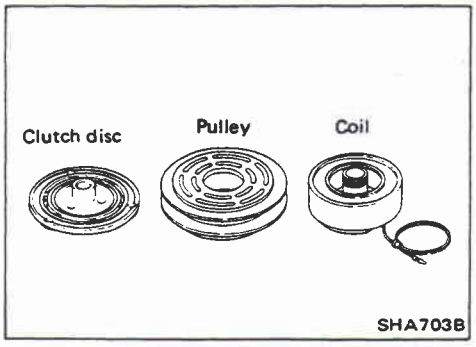
- Using clutch disc puller, clutch disc can be removed easily.



- Bend down pawl of lock washer.
- When removing pulley, remove lock nut with nut wrench.



- Remove the pulley by hand. If difficult, use puller pilot.



INSPECTION

Clutch disc

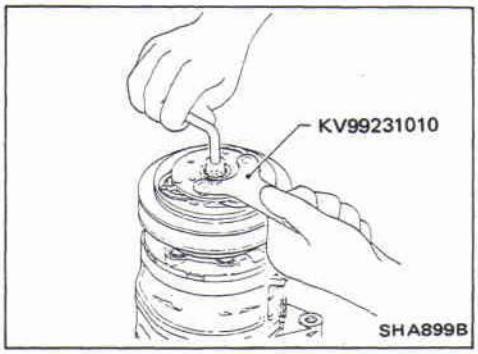
If the contact surface shows signs of damage due to excessive heat, the drive plate and pulley should be replaced.

Pulley

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

Coil

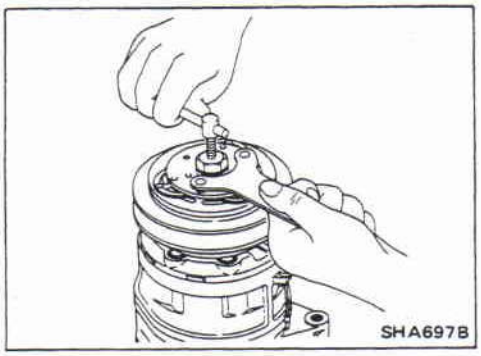
Check coil for loose connection or cracked insulation.



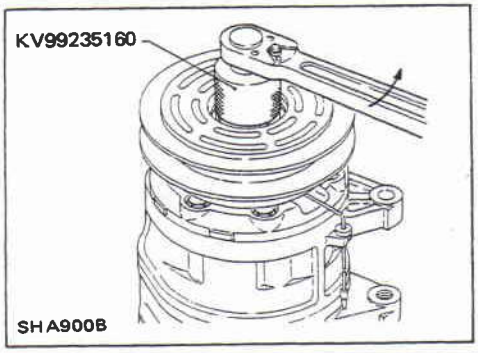
Compressor Clutch

REMOVAL

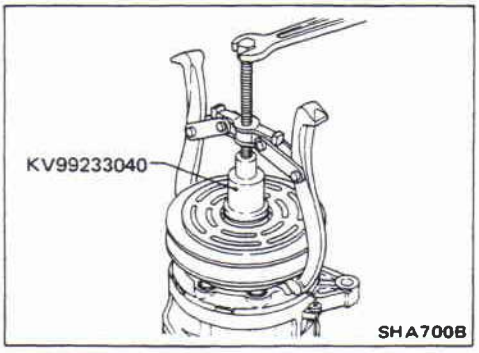
- When removing shaft nut, hold clutch disc with clutch disc wrench.



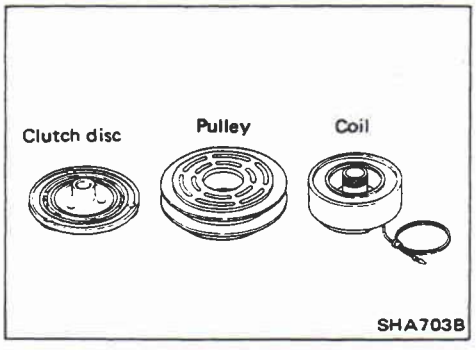
- Using clutch disc puller, clutch disc can be removed easily.



- Bend down pawl of lock washer.
- When removing pulley, remove lock nut with nut wrench.



- Remove the pulley by hand. If difficult, use puller pilot.



INSPECTION

Clutch disc

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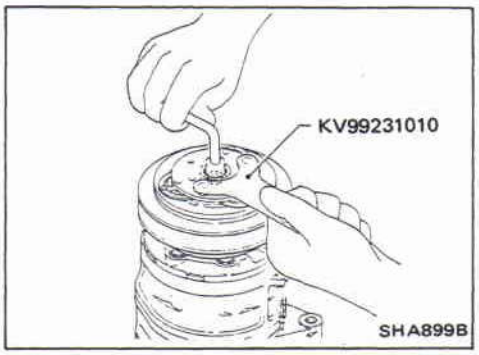
Pulley

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

Coil

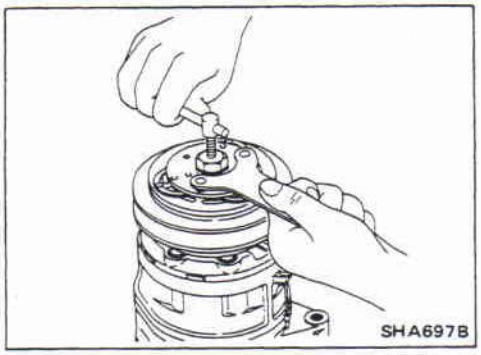
Check coil for loose connection or cracked insulation.



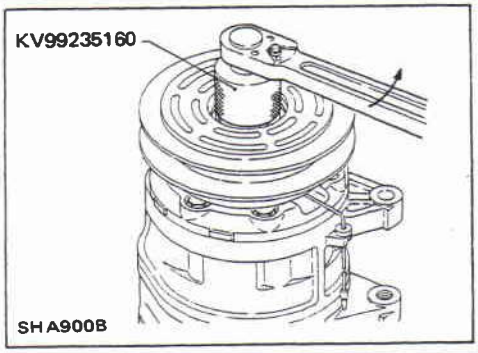
Compressor Clutch

REMOVAL

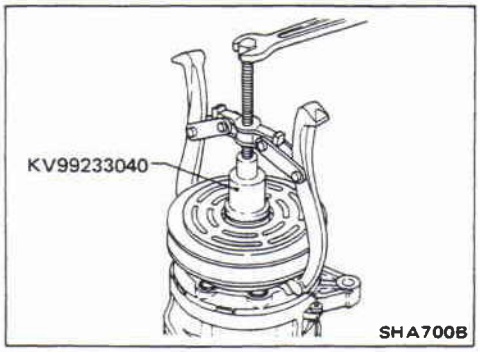
- When removing shaft nut, hold clutch disc with clutch disc wrench.



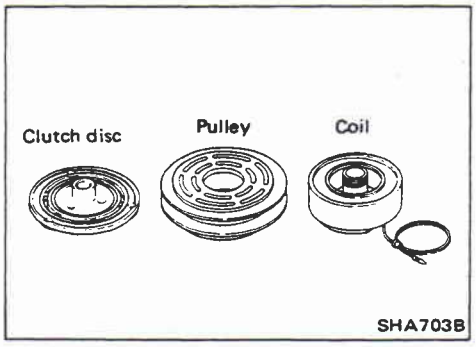
- Using clutch disc puller, clutch disc can be removed easily.



- Bend down pawl of lock washer.
- When removing pulley, remove lock nut with nut wrench.



- Remove the pulley by hand. If difficult, use puller pilot.



INSPECTION

Clutch disc

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

Pulley

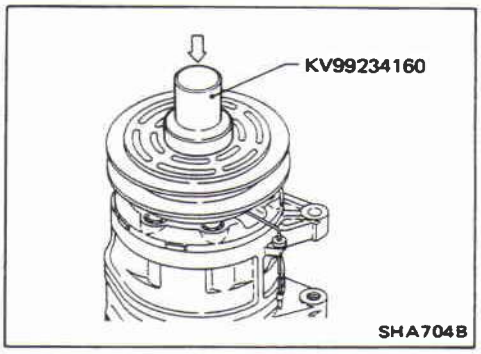
Check the appearance of the pulley assembly. If the contact surface of the pulley shows signs of excessive grooving due to slippage, both the pulley and drive plate should be replaced. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

Coil

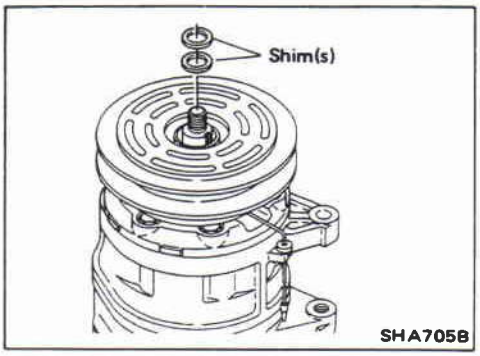
Check coil for loose connection or cracked insulation.

Compressor Clutch (Cont'd)

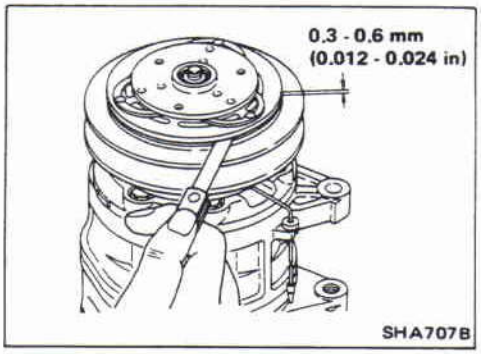
INSTALLATION



- Install the key in the keyway on the compressor drive shaft.
- Install the coil to compressor (lead wire up) and tighten the mounting screws.
- Install the lead wire with its holder into the hold.



- Install lock washer and nut with nut wrench.
- Bend one pawl of the lock washer up against the nut to prevent the nut from loosening.

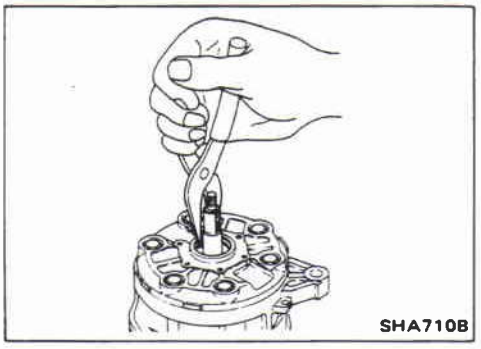


- Check to ensure that the clutch clearance is between 0.3 to 0.6 mm (0.012 to 0.024 in). Adjust the clearance using shim(s) as necessary.

BREAK-IN OPERATION

When replacing compressor clutch assembly, do not forget break-in operation, accomplished by engaging and disengaging the clutch about thirty times.

Break-in operation raises the level of transmitted torque.



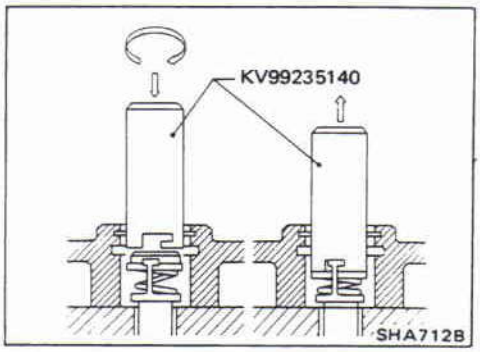
Shaft Seal Assembly

The shaft seal assembly is a precision-part, with it's critical parts finished to extremely close tolerances and, as such, must be handled with great care. Its slip face demands particularly careful handling.

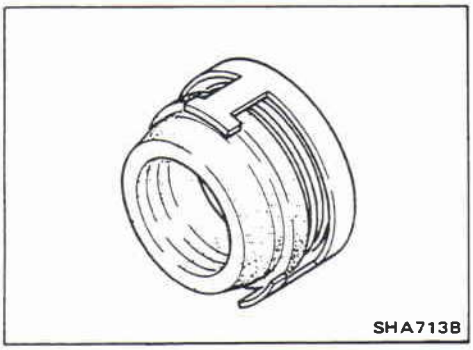
REMOVAL

- Remove the magnetic clutch assembly, as outlined in **"Compressor Clutch-REMOVAL".**
- Using Internal Snap Ring Pliers, remove the seal seat/compressor snap ring.
- Remove and discard seal seat.
- Using a suitable piece of wire, remove the O-ring from the inside groove of the shaft seal housing. Discard the O-ring.

Shaft Seal Assembly (Cont'd)

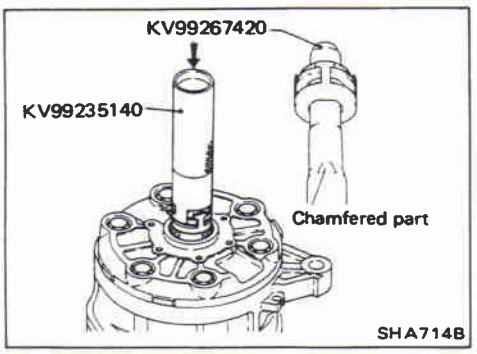


- Remove the shaft seal as follows. Turning clockwise, engage the remover hook with the shaft seal hook, and slowly draw out the seal. Discard the shaft seal.
- Check the shaft and inside of the compressor neck for dirt of foreign material and ensure these areas are perfectly clean before installing new shaft seal.



INSPECTION

- Shaft seal assembly should not be reused. Always use a new shaft seal kit on reassembling the compressor. Be extremely careful to ensure that the face of the shaft of the shaft seal to be installed is not scratched or damaged in anyway. Make sure the seal seat and shaft seal are free of lint and dirt that could damage the shaft seal surface.

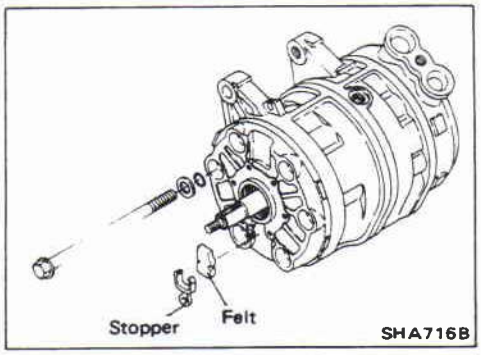


INSTALLATION

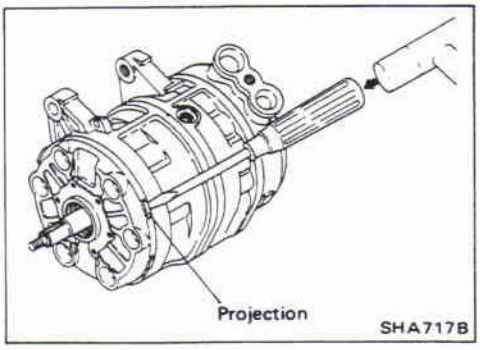
Clean the sealed section of the compressor. Apply clean compressor oil to the new shaft seal and the drive shaft. If the slip faces are dirty, clean them with thinners and after drying the cleaned faces, apply clean compressor oil.
Fit the new O-ring with clean compressor oil to the groove inside the compressor neck. Apply clean compressor oil to the seal seat.

Cylinder Heads (Front & Rear)

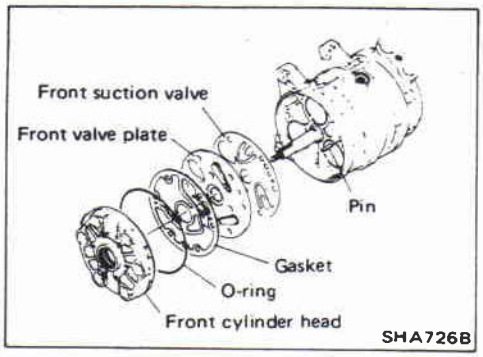
DISASSEMBLY



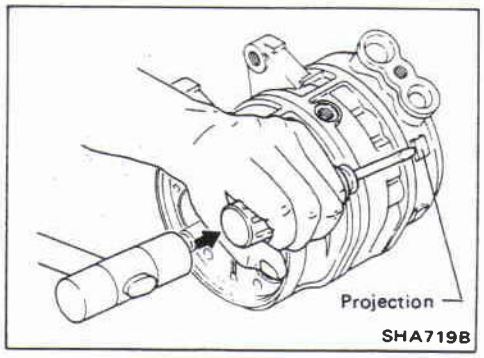
- Remove the compressor clutch assembly, as outlined in **"Compressor Clutch-REMOVAL".**
- Remove the oil filler plug and drain plug, and then draw out the oil.
- Remove the shaft seal assembly, as outlined in **"Shaft Seal Assembly-REMOVAL".**
- Remove the felt, stopper and six through-bolts securing the head, using a wrench.
- Alternately tap four projections on the circumference of the front head with a screwdriver and a plastic mallet, and remove the front cylinder head.



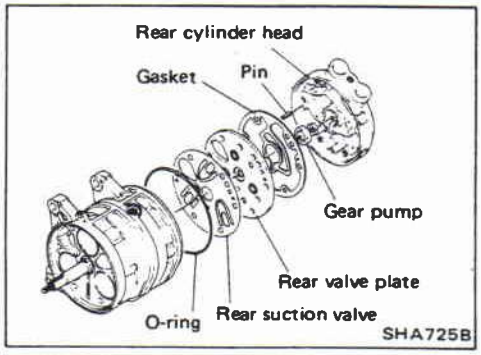
Cylinder Heads (Front & Rear)(Cont'd)



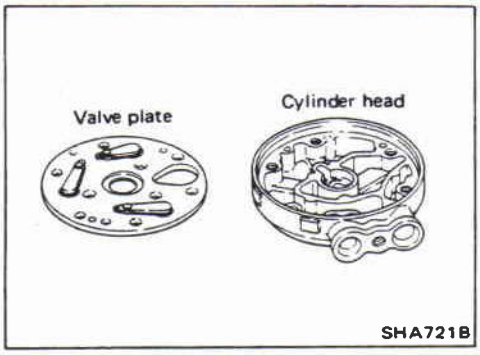
- Remove and discard the O-ring from the front cylinder head.
- Remove all gasket material from the front cylinder head and front valve plate.



- Alternately tap four projections on the circumference of the rear head with a screwdriver and a plastic mallet, and remove the rear cylinder head.



- Remove the gear pump from the rear cylinder head or drive shaft end.
  Remove all gasket material from the rear cylinder head and rear valve plate.
  Remove and discard the O-ring from the rear side of the cylinder shaft assembly.

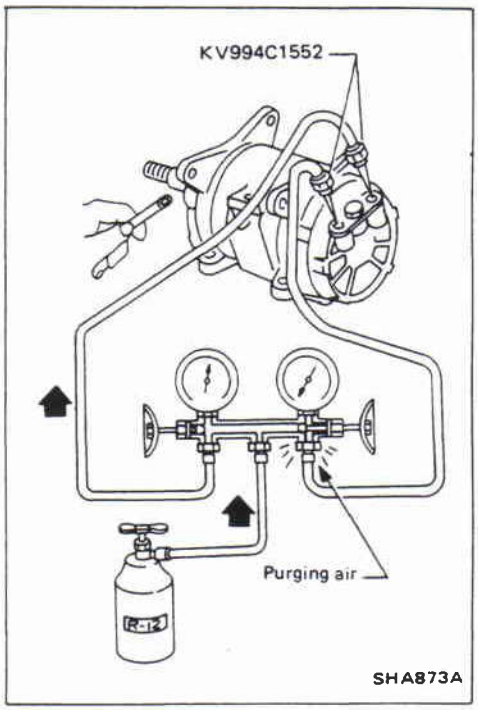


INSPECTION

Check the front and rear valve plates for scratched, bent or otherwise damaged parts. Inspect both cylinder heads and both valve plate assemblies for nicks or burrs on the sealingsurfaces. Clean, or replace if badly damaged. Make sure that all passages in the valve plate are unobstructed. If either the cylinder head or valve plate is cracked, it must be replaced.

INSTALLATION

- Installation is the reverse of removal.
- Tighten bolts or plugs to specified torques.

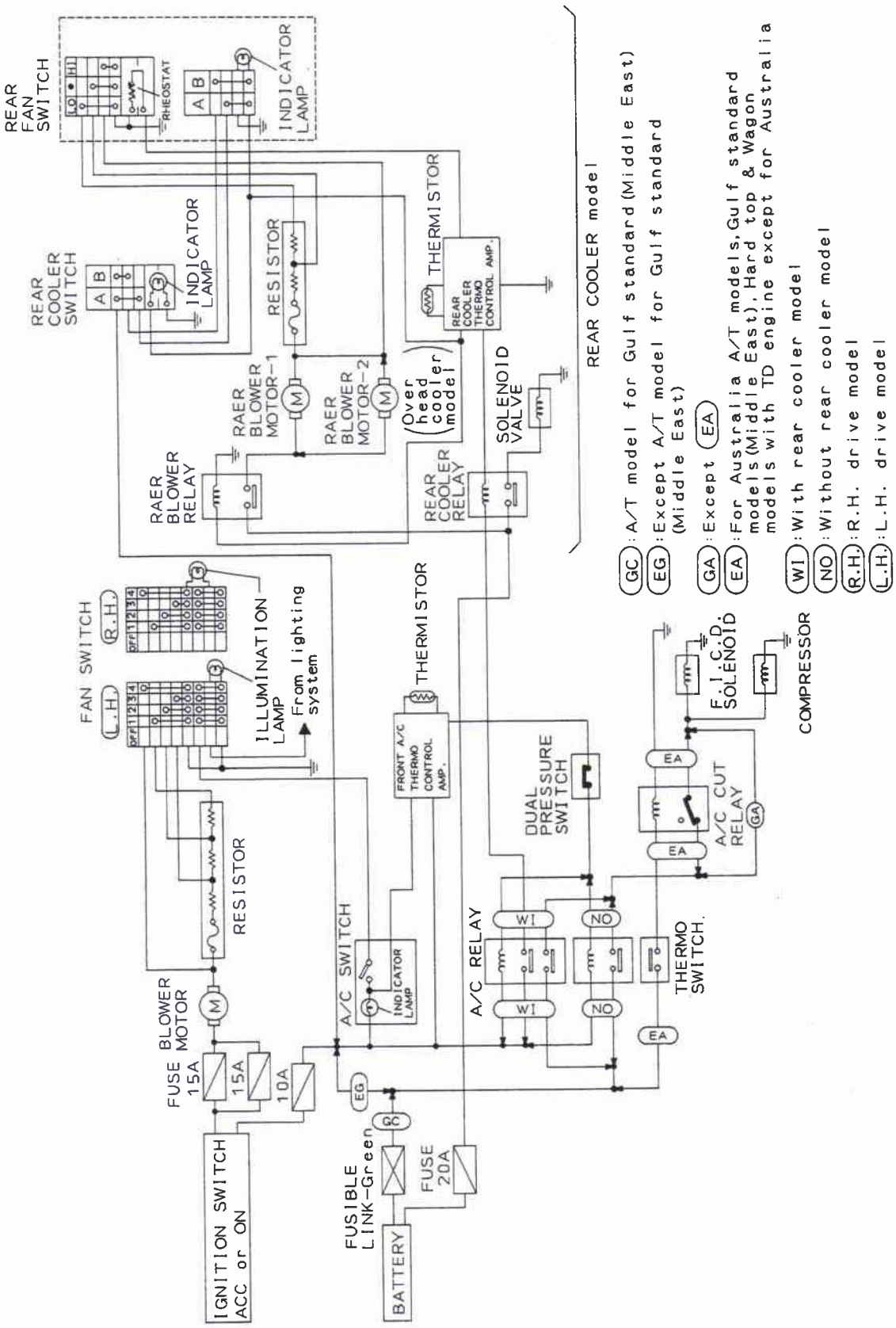


Leak Test

- Charge refrigerant from suction side and evacuate air from discharge side. Then conduct leak test.

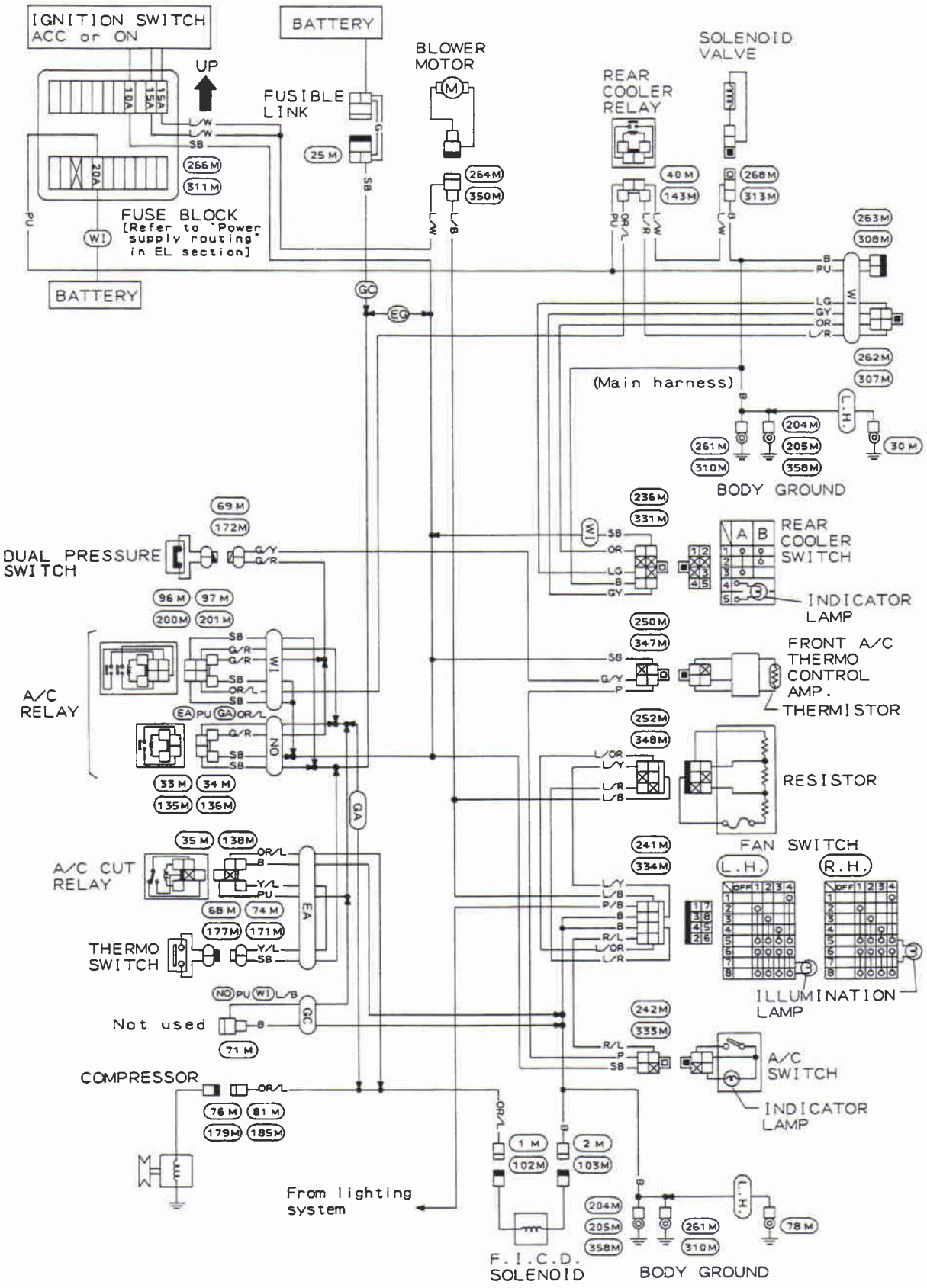
Note:

Schematic

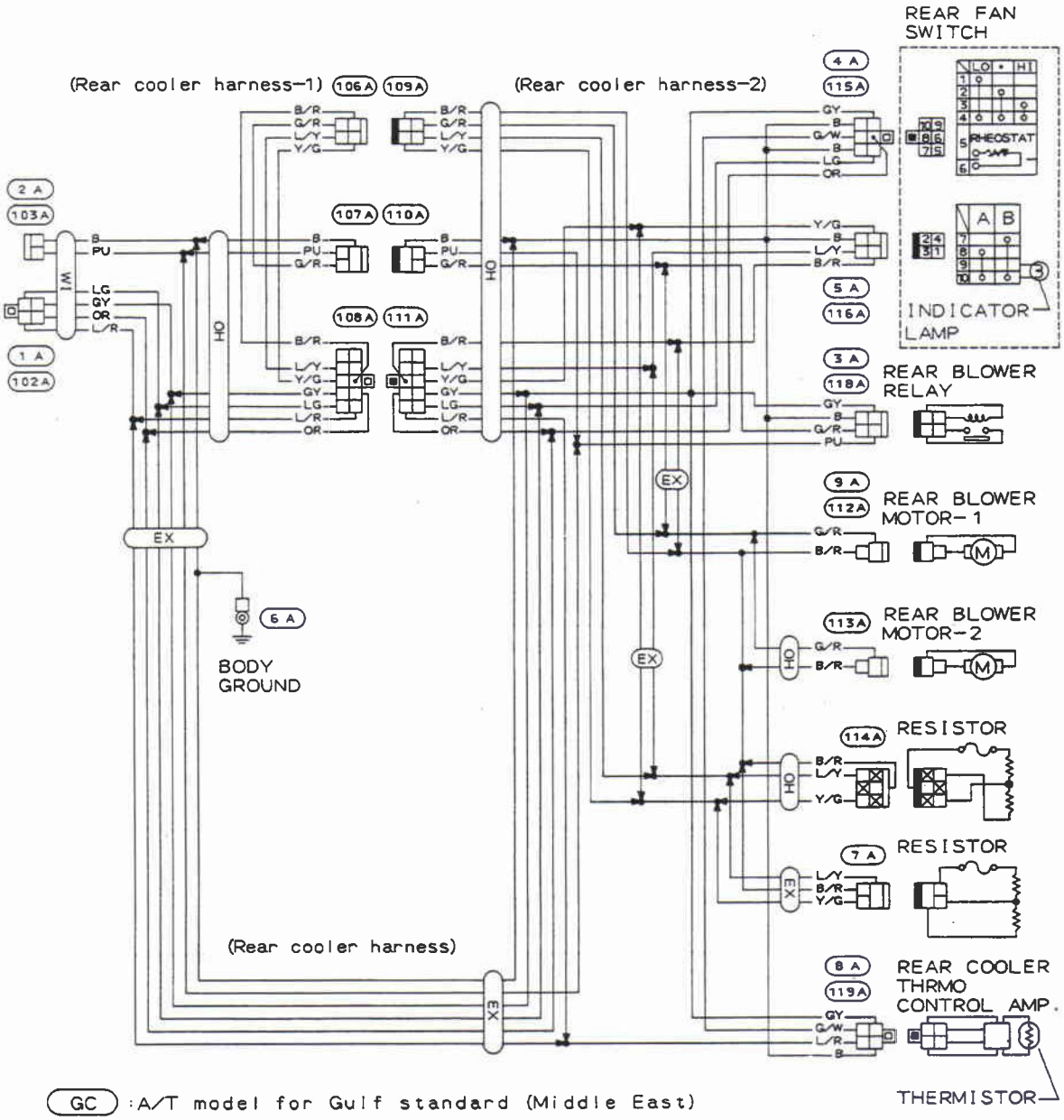


SHA044C

Wiring Diagram



Wiring Diagram (Cont'd)



GC :A/T model for Gulf standard (Middle East)

EG :Except A/T model for Gulf standard (Middle East)

GA :Except EA

EA :For Australia A/T models, Gulf standard models (Middle East), Hard top & Wagon models with TD engine except for Australia

WI :With rear cooler model

NO :Without rear cooler model

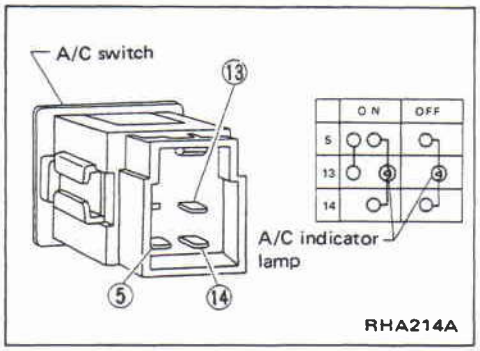
OH :Over head cooler model (Type 1)

EX :Except Over head cooler model (Type 2)

R.H. :R.H. drive model

L.H. :L.H. drive model

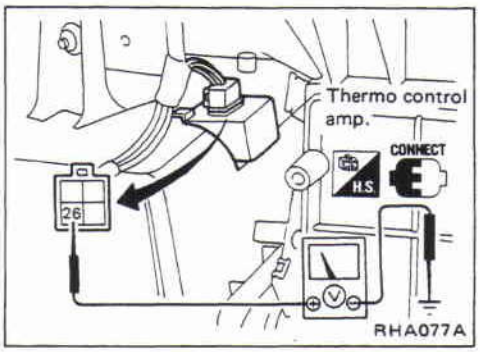
SHA043C



Inspection

FRONT A/C SWITCH

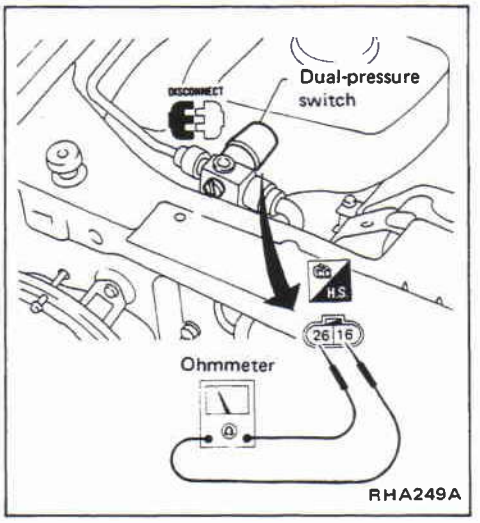
Check continuity between terminals at each switch position shown in the table.



FRONT A/C THERMO CONTROL AMP.

1. Run engine, and operate front A/C system.
2. Connect the voltmeter from harness side.
3. Check front A/C thermo control amp. operation shown in the table.

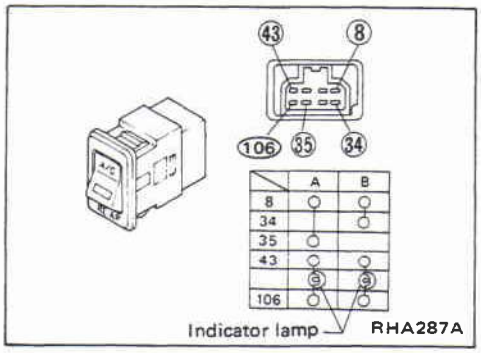
Evaporator outlet air temperature °C (°F)	Thermo amp. operation	Tester
Decreasing to 0.1 - 0.9 (32 - 34)	Turn OFF	Approx. 12V
Increasing to 2.5 - 3.5 (37 - 38)	Turn ON	Approx. 0V



DUAL-PRESSURE SWITCH

Check continuity between terminals after disconnecting dual-pressure switch connector.

High-pressure side line pressure kPa (bar, kg/cm^2, psi)	Operation	Continuity
• Decreasing to 177 - 216 (1.77 - 2.16, 1.8 - 2.2, 26 - 31) • Increasing to 2,452 - 2,844 (24.5 - 28.4, 25 - 29, 356 - 412)	Turn OFF	Not exist
• Increasing to 177 - 235 (1.77 - 2.35, 1.8 - 2.4, 26 - 34) • Decreasing to 1,863 - 2,256 (18.6 - 22.6, 19 - 23, 270 - 327)	Turn ON	Exists



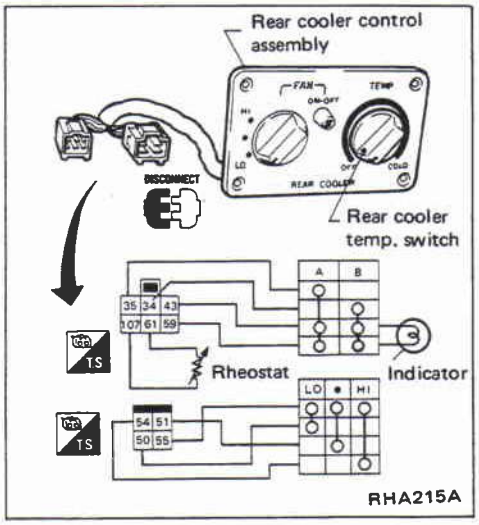
REAR COOLER SWITCH

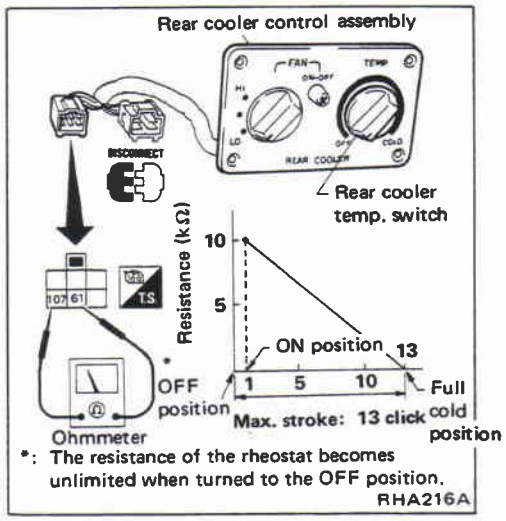
Check continuity between terminals at each switch position shown in the table.

Inspection (Cont'd)

REAR COOLER CONTROL ASSEMBLY

1. Check continuity between terminals at each switch position shown in the table.

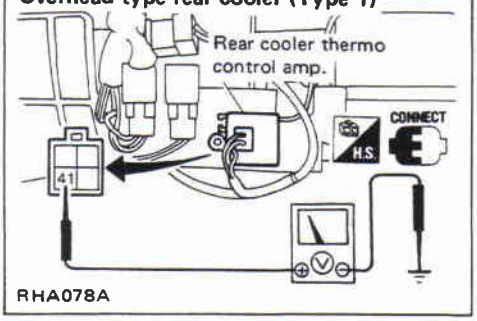




2. Check rheostat.
- Confirm smooth rotation of the rear cooler temperature control knob.
- Using an ohmmeter, check the rheostat values.

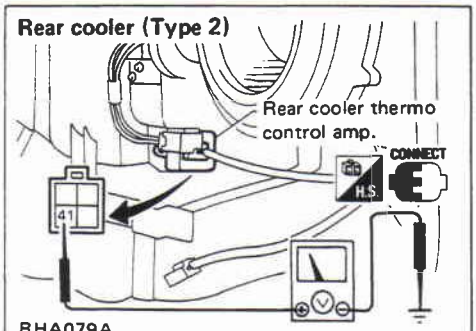
Terminal \ Rear cooler temp. switch	OFF	ON	ON: MAX. COLD
⑥① - ⑩⑦	Continuity: Not exist	Approx. 10 kΩ ↔ Approx. 0Ω	

Overhead type rear cooler (Type 1)

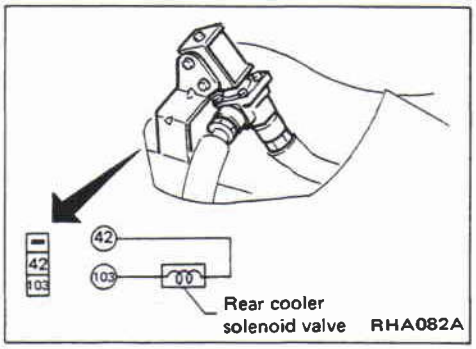


RHA078A

Rear cooler (Type 2)

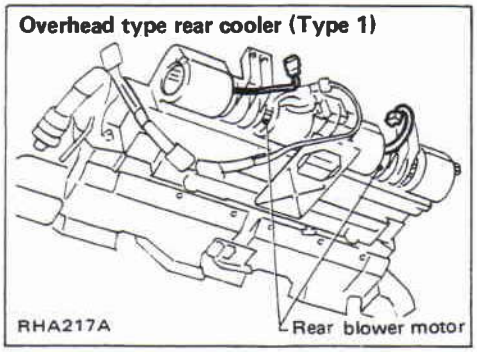


RHA079A



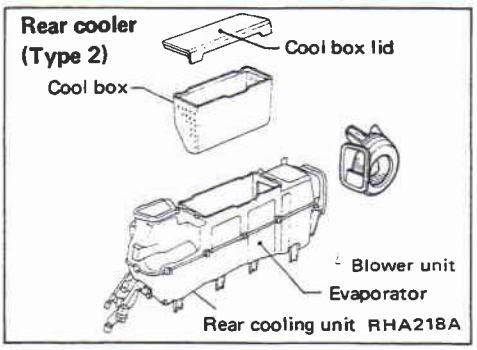
RHA082A

Overhead type rear cooler (Type 1)



RHA217A

Rear cooler (Type 2)



RHA218A

Inspection (Cont'd)

REAR COOLER THERMO CONTROL AMP.

1. Start engine, and operate front A/C and rear cooler system.
2. Connect voltmeter from harness side.
3. Check rear cooler thermo control amp. operation shown in the table.

Rear temp. control position	Evaporator outlet air temperature °C (°F)	Operation	Voltage
MAX. COLD	Decreasing to −1.5 to 0.5 (29 - 33)	Turn OFF	Approx. 12V
	Increasing to 2.5 - 4.5 (37 - 40)	Turn ON	Approx. 0V
MAX. HOT	Decreasing to 13.5 - 15.5 (56 - 60)	Turn OFF	Approx. 12V
	Increasing to 6.5 - 20.5 (44 - 69)	Turn ON	Approx. 0V

REAR COOLER SOLENOID VALVE

Check continuity between terminals.

REAR BLOWER MOTOR

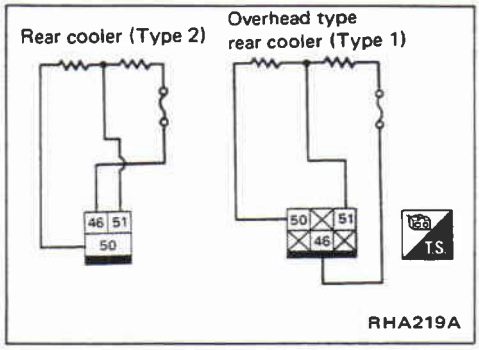
Confirm smooth rotation of the blower motor.

- Ensure that there are no foreign particles inside the blower unit.
- If the blower does not rotate, refer to TROUBLE-SHOOTING PROCEDURE 3.

Inspection (Cont'd)

REAR BLOWER RESISTOR

Check continuity between terminals.

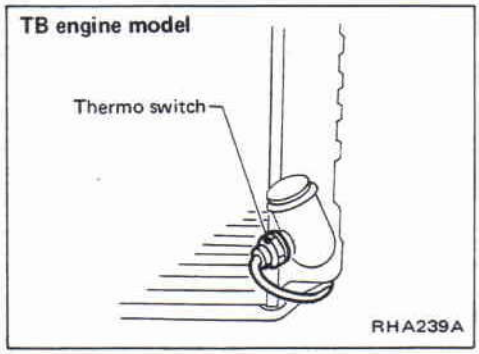


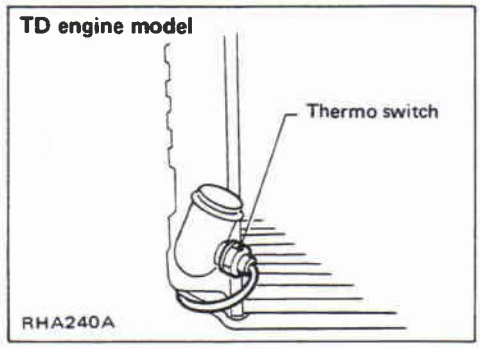
THERMO SWITCH

For Australia A/T models, Gulf standard (Middle East) models, Hardtop and Wagon models with TD engine except for Australia

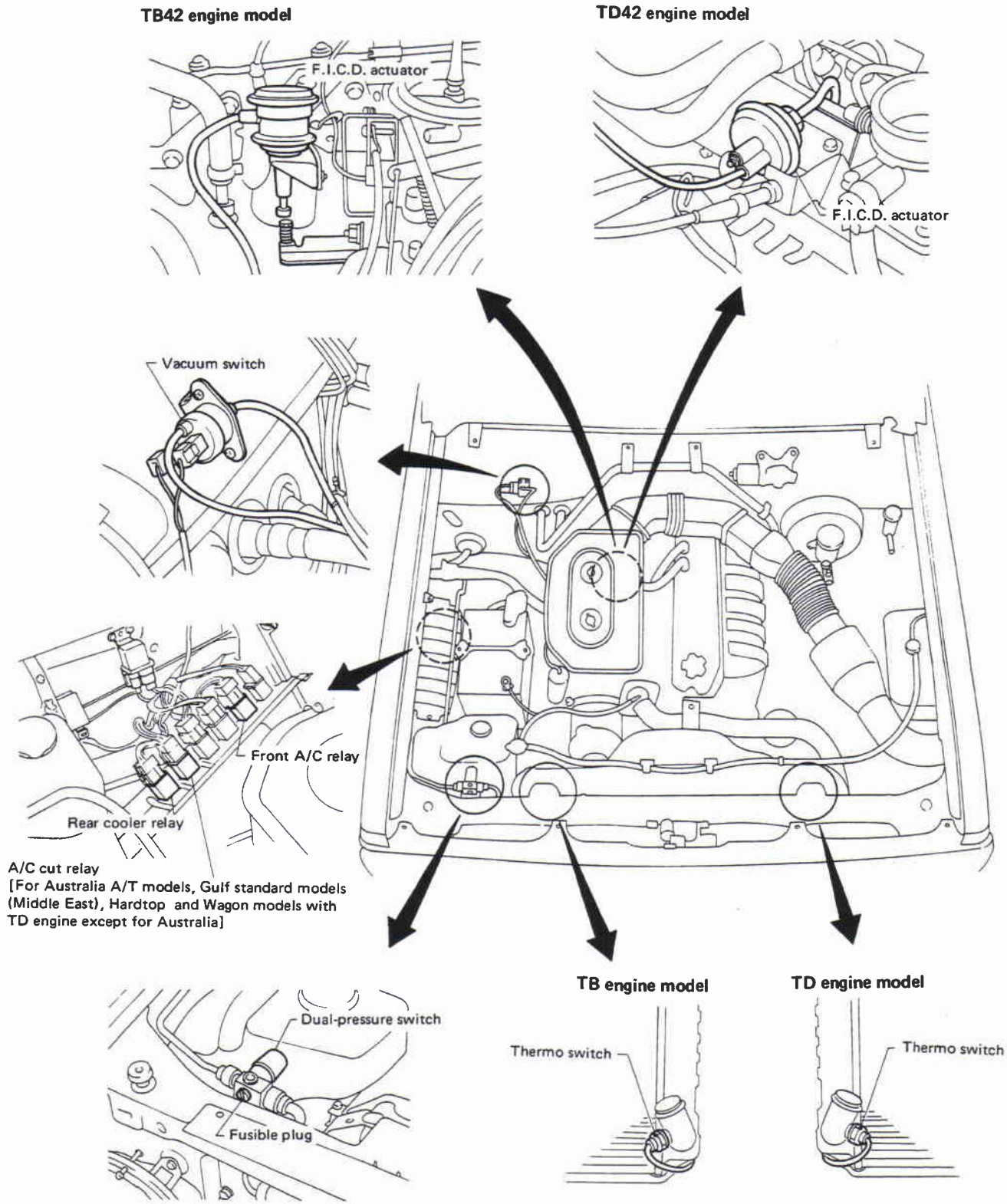
Engine coolant temperature °C (°F)	Operation
Increasing to 107 (225)	ON
Decreasing to 103 (217)	OFF

Refer to LC section.



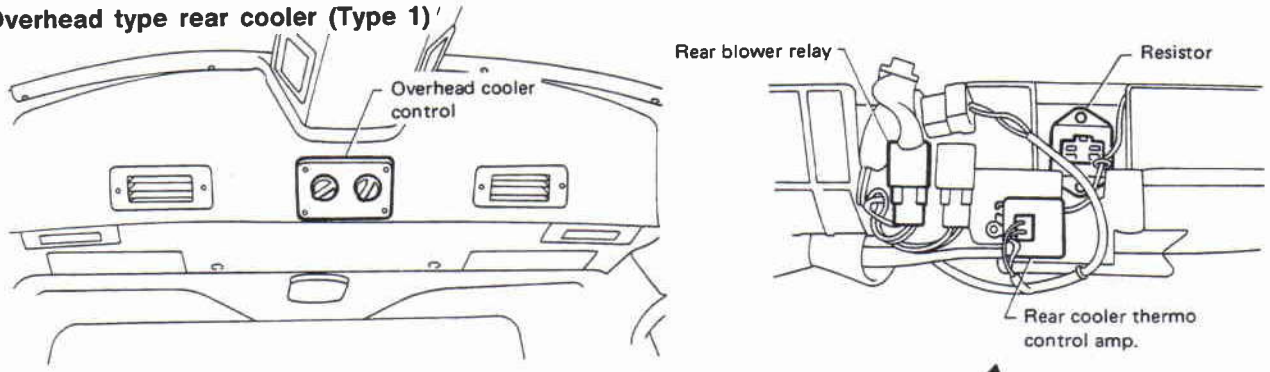


ENGINE COMPARTMENT

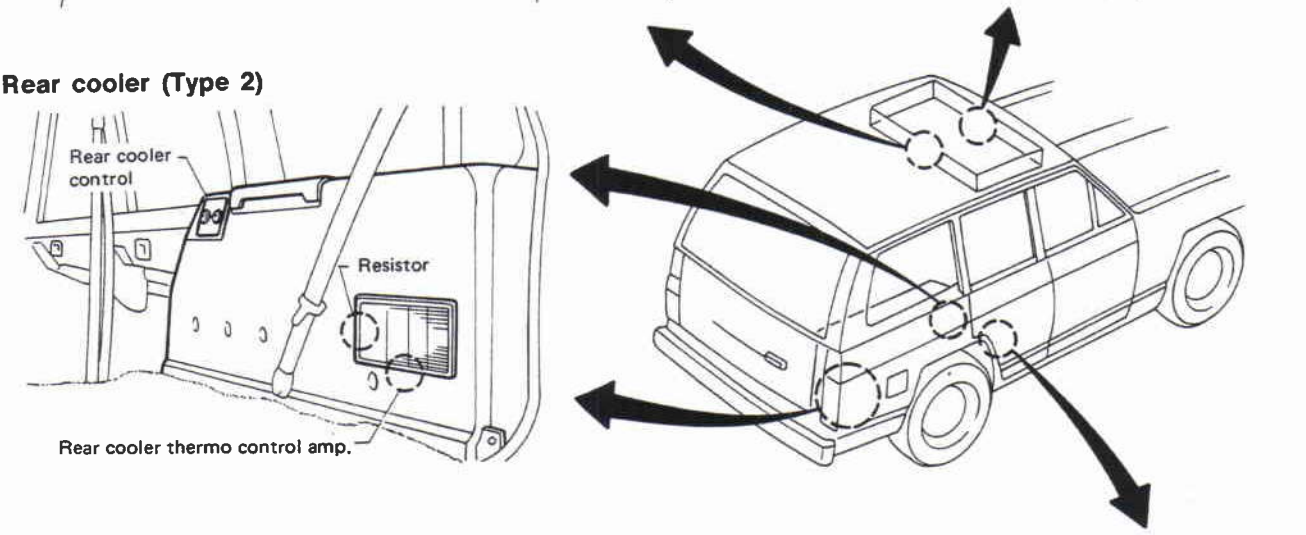


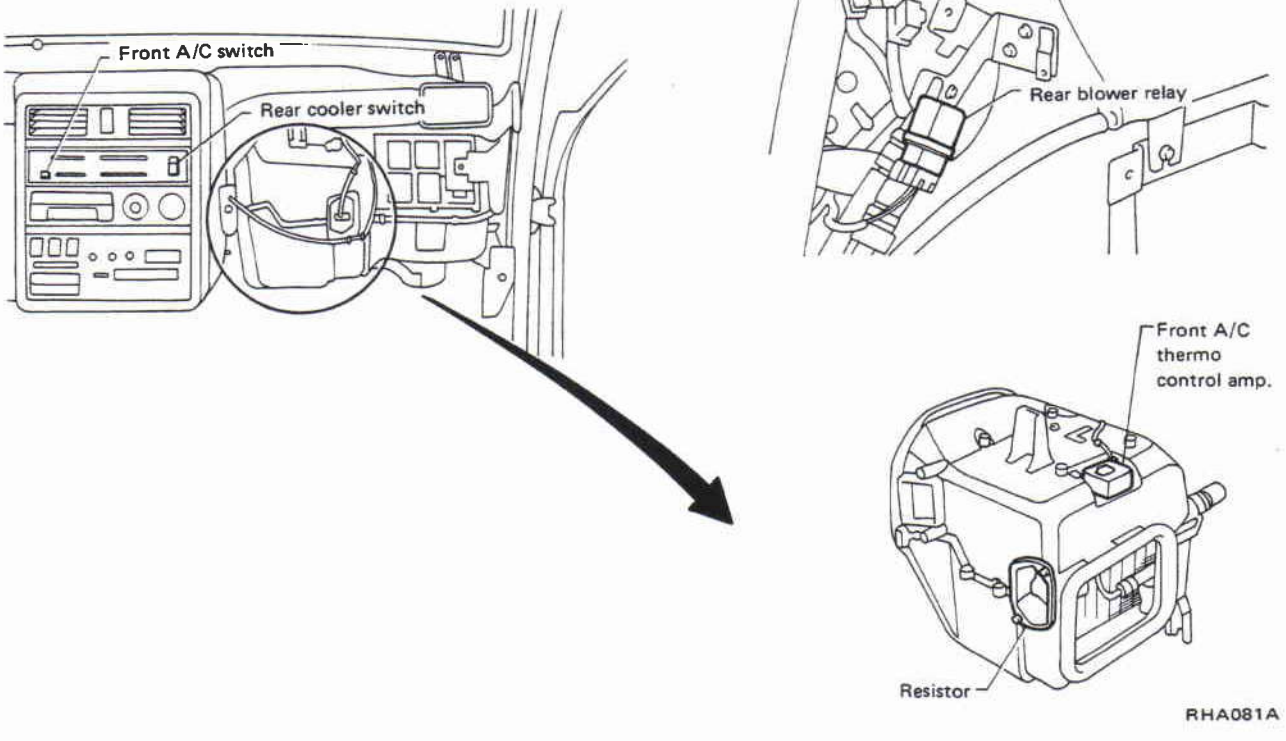
PASSENGER COMPARTMENT

Overhead type rear cooler (Type 1)



Rear cooler (Type 2)





Trouble-shooting

INSPECTION TABLE

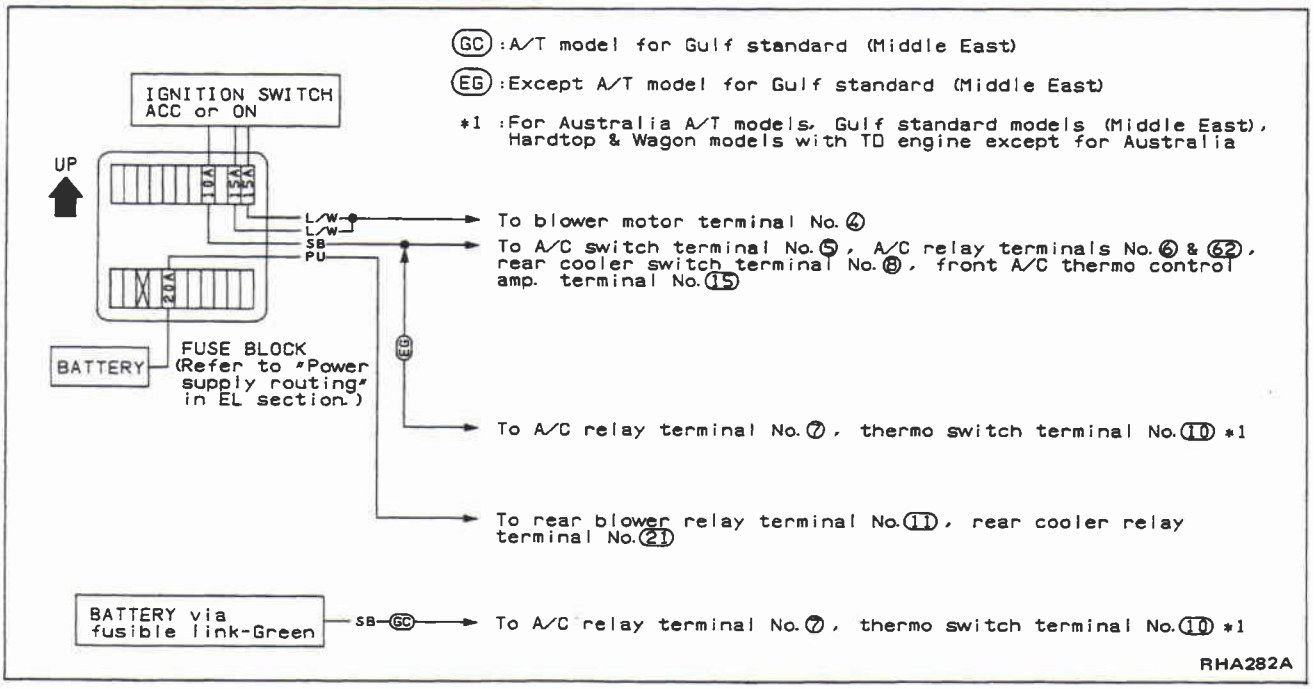
No.	INCIDENT	"HOW TO REPAIR"	INSPECTION PORTION																							
			10A Fuse *1	15A Fuses*1	20A Fuse*1	Fusible link (Green)*1	Front blower motor	Rear blower motor(s)	Front resistor	Rear resistor	Front A/C switch	Front fan switch	Rear cooler switch	Rear cooler control: Fan switch	Rear cooler control: Temp. switch	A/C relay	A/C cut relay*2	Rear cooler relay	Rear blower relay	Front A/C thermo control amp.	Rear cooler thermo control amp.	Dual-pressure switch	Thermo switch*2	Compressor (Magnet clutch)	Solenoid valve	Harness
1	Magnet clutch does not operate.	Go to TROUBLE-SHOOTING PROCEDURE 1.	○			○					○	○				○	○			○		○	○	○		○
2	Front blower motor does not rotate.	Go to TROUBLE-SHOOTING PROCEDURE 2.		○			○		○			○														○
3	Rear blower motor(s) does not rotate.	Go to TROUBLE-SHOOTING PROCEDURE 3.	○		○			○		○			○	○					○							○
4	Rear cooler solenoid valve does not operate.	Go to TROUBLE-SHOOTING PROCEDURE 4.	○		○						○	○			○	○		○		○	○	○			○	○

This table indicates the inspection portion for each type of incident.
*1: For location, refer to PRELIMINARY CHECK.
*2: For Australia A/T models, Gulf standard models (Middle East), Hardtop and Wagon models with TD engine except for Australia

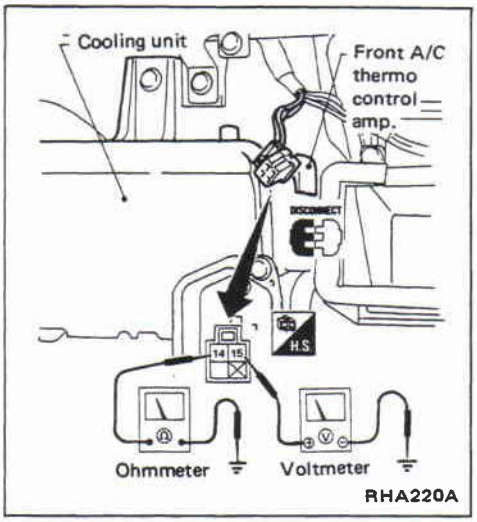
PRELIMINARY CHECK

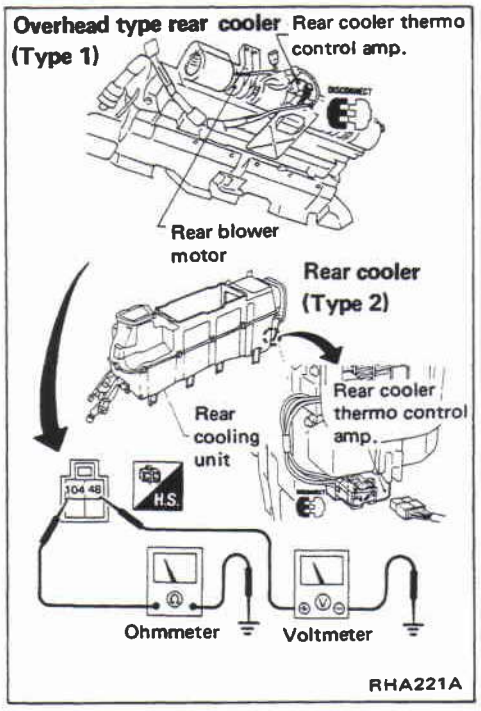
Compressor belt tension check
Check compressor belt deflection.
Adjust belt deflection if it exceeds the limit.
Refer to "Checking Drive Belts" in MA section.

Power supply circuit check for air conditioning system
Check power supply circuit for air conditioning system.
Refer to "Power Supply Routing" in EL section and A/C ELECTRICAL CIRCUIT.



Trouble-shooting (Cont'd)





Front A/C thermo control amp. check

Check power supply and body ground circuit for front A/C thermo control amp. with ignition switch ON.

1. Disconnect front A/C thermo control amp. connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal No. ⑮ and body ground.

Voltmeter terminal		Voltage
⊕	⊖	
⑮	Body ground	Approx. 12V

4. Switch to ignition switch OFF, A/C switch ON and front fan switch ON.
5. Connect ohmmeter from harness side.
6. Check continuity between terminal No. ⑭ and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
⑭	Body ground	Yes

Rear cooler thermo control amp. check

Check power supply and body ground circuit for rear cooler thermo control amp. with ignition switch ON, front A/C ON and rear cooler ON.

1. Disconnect rear cooler thermo control amp. connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal No. ㊽ and body ground.

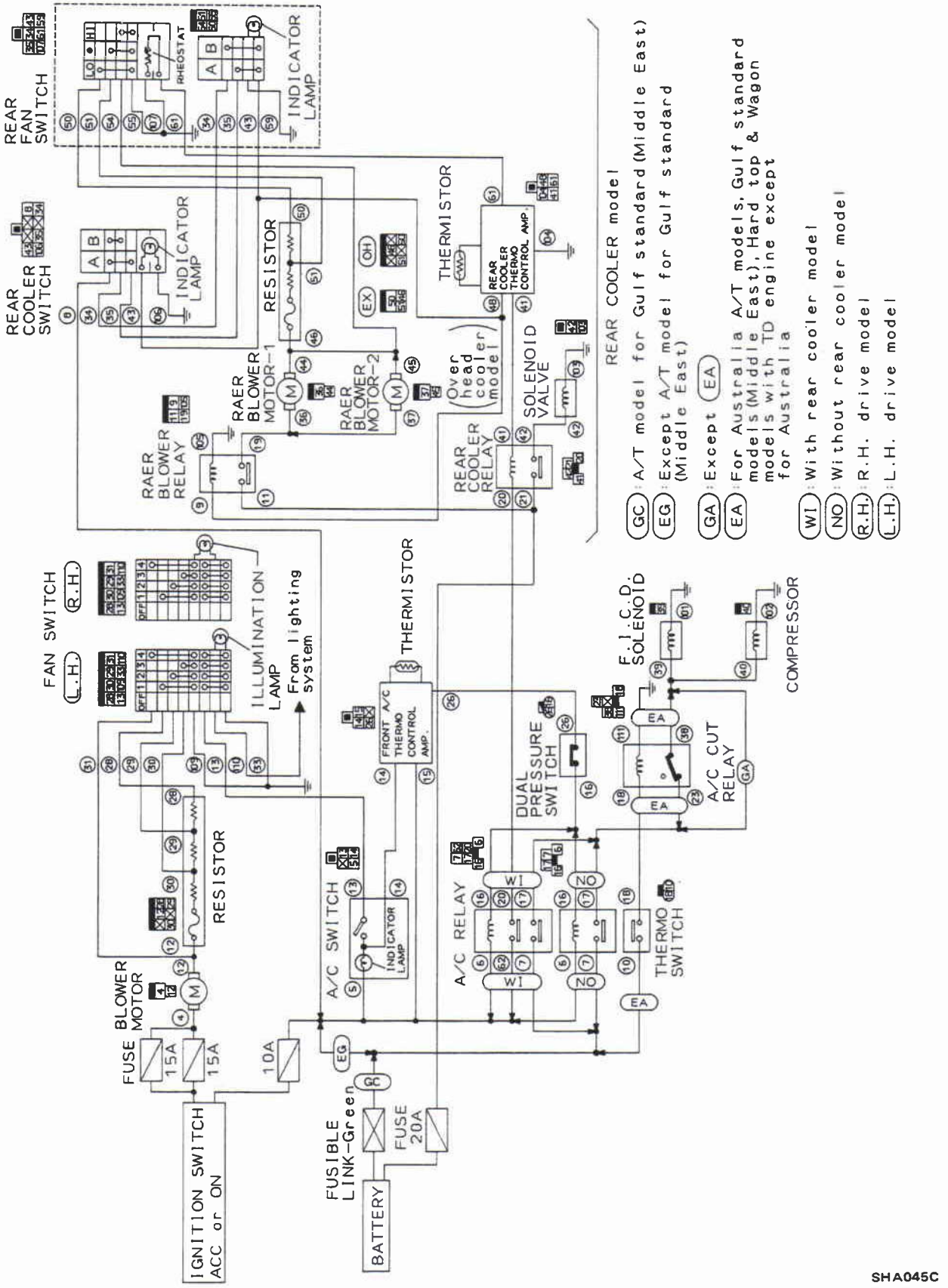
Voltmeter terminal		Voltage
⊕	⊖	
㊽	Body ground	Approx. 12V

4. Switch to ignition switch OFF.
5. Connect ohmmeter from harness side.
6. Check continuity between terminal No. (104) and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
(104)	Body ground	Yes

Trouble-shooting (Cont'd)

CIRCUIT FOR TROUBLE DIAGNOSES



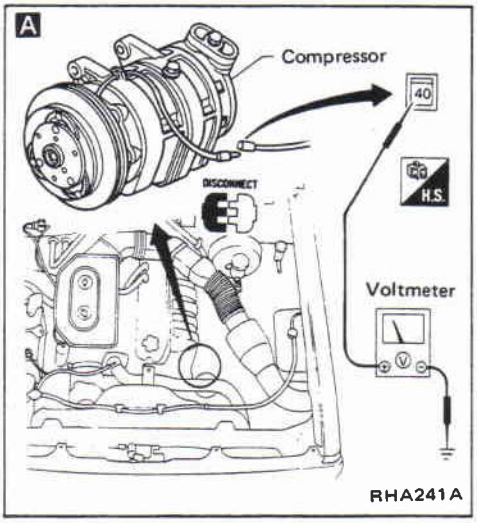
SHA045C

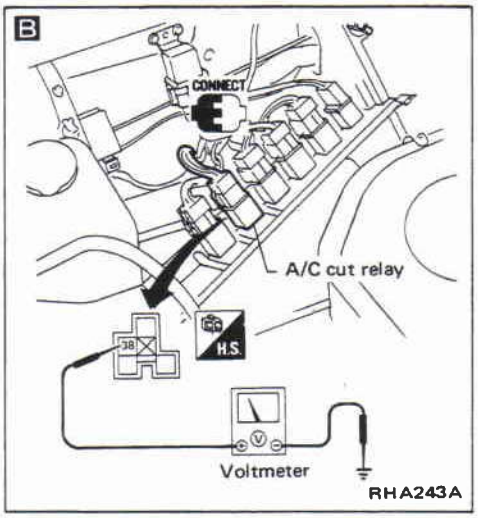
Trouble-shooting (Cont'd)

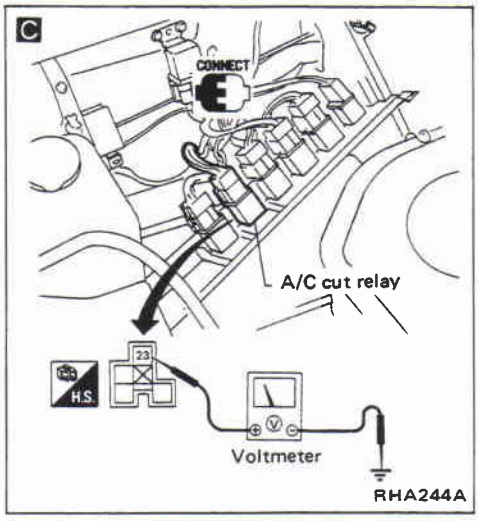
TROUBLE-SHOOTING PROCEDURE 1

INCIDENT: Magnet clutch does not operate.

- **Perform preliminary check before referring to the following flowchart.**







A

Check power supply for compressor with ignition switch ON, A/C switch ON and fan switch ON.

N.G. → Check the system according to each below-listed flowchart.

Model	Flow-chart
With A/C cut system*1	1
Without A/C cut system*2	2

Disconnect compressor terminal.
Do approx. 12 volts exist between compressor harness terminal No. (40) and body ground?

O.K. ↓

Check magnet clutch coil.

1 → 2 → (A)

Make the engine coolant go down sufficiently.

B

Check A/C cut relay operation with ignition switch ON, A/C switch ON and fan switch ON.

N.G. → C

Do approx. 12 volts exist between A/C cut relay harness terminal No. (38) and body ground?

O.K. ↓ Note

Disconnect A/C cut relay.
Check circuit continuity between A/C cut relay harness terminal No. (38) and compressor harness terminal No. (40) with ignition switch OFF.

C

Check power supply for switch side circuit of A/C cut relay with ignition switch ON, A/C switch ON and fan switch ON.

Disconnect A/C cut relay.
Do approx. 12 volts exist between A/C out relay harness terminal No. (23) and body ground?

O.K. → (B)
N.G. → (A)

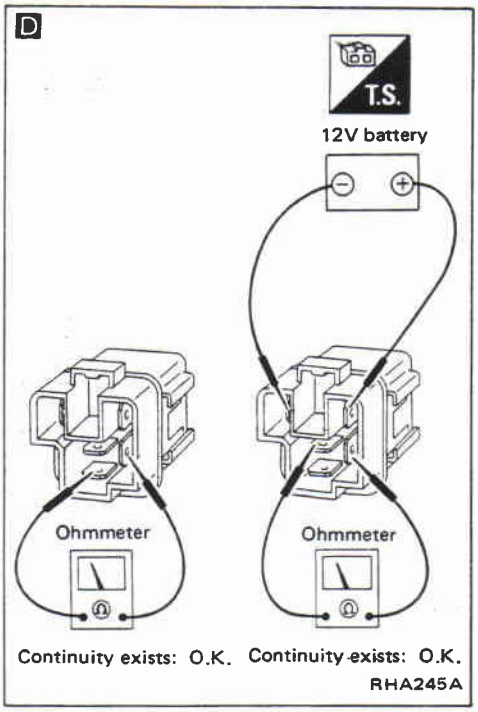
Note:

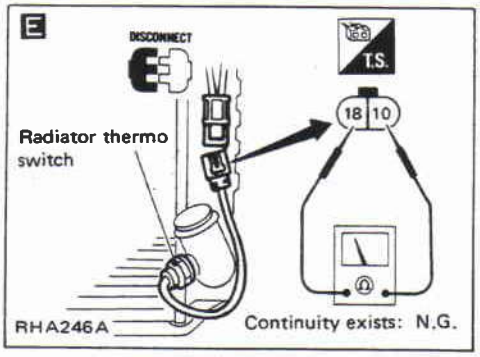
If the result is N.G. after checking circuit continuity, repair harness or connector.

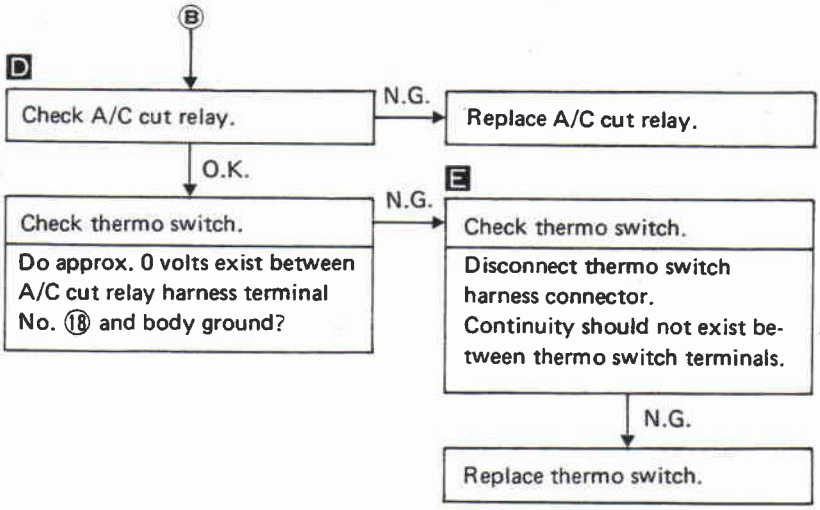
*1: For Australia A/T models, Gulf standard models (Middle East), Hardtop and Wagon models with TD engine except for Australia

*2: Except for *1

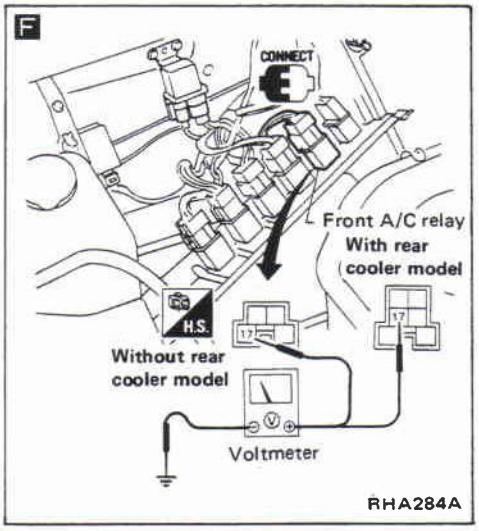
Trouble-shooting (Cont'd)

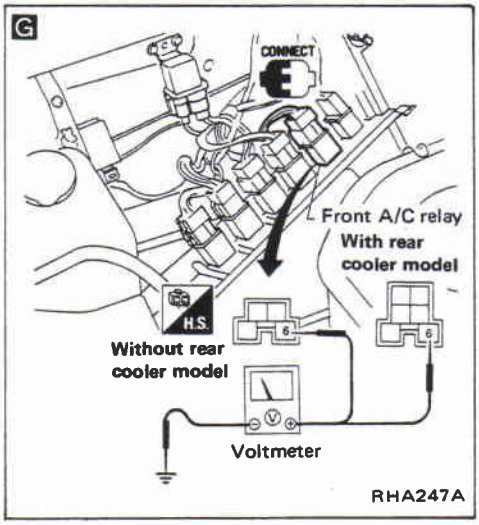


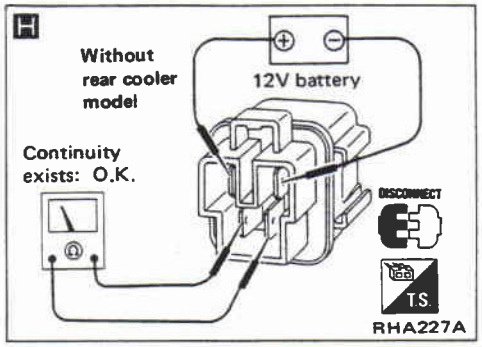


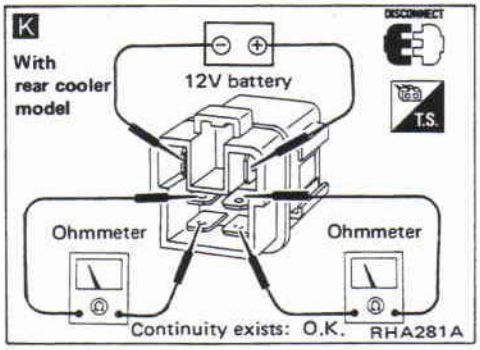


Trouble-shooting (Cont'd)









Ⓐ

F

Check A/C relay operation with ignition switch ON, A/C switch ON, and fan switch ON.

Do approx. 12 volts exist between A/C relay harness terminal No. ⑰ and body ground?

N.G. → **G**

Check power supply for A/C relay with ignition switch ON.

Disconnect A/C relay.

Do approx. 12 volts exist between A/C relay harness terminal No. ⑥ and body ground?

O.K. ↓ / N.G. → Check power supply and 10A fuse at fuse block. Refer to Preliminary Check.

O.K. ↓

Note

Check circuit continuity according to each below-listed incident with ignition switch OFF.

With A/C cut system*1
Disconnect A/C relay.
Check circuit continuity between A/C relay harness terminal No. ⑰ and A/C cut relay harness terminal No. ㉓.

Without A/C cut system*2
Disconnect A/C relay.
Check circuit continuity between A/C relay harness terminal No. ⑰ and compressor harness terminal No. ㊵ .

H K

Check A/C relay.

O.K. ↓ / N.G. → Replace A/C relay.

Reconnect A/C relay.

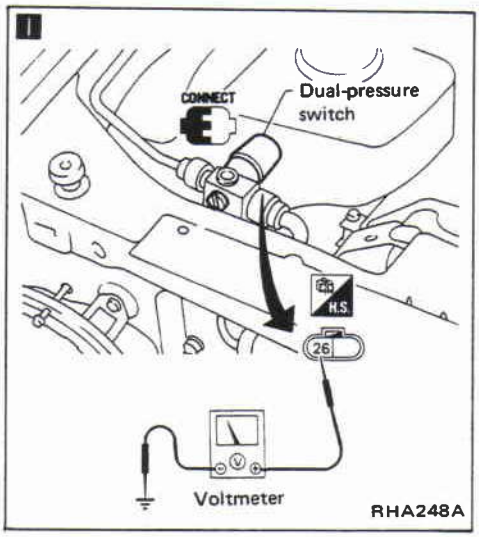
Ⓒ

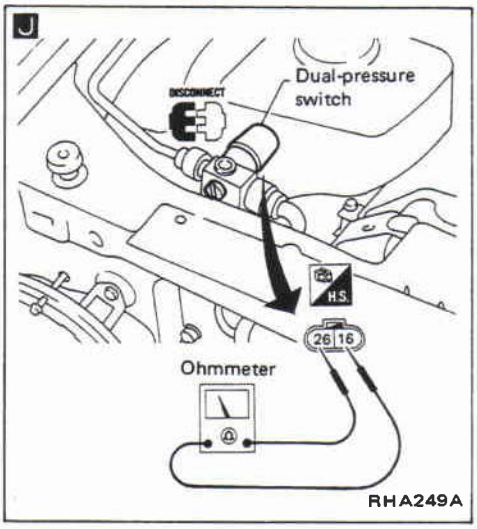
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

*1: For Australia A/T models, Gulf standard models (Middle East), Hardtop and Wagon models with TD engine except for Australia

*2: Except for *1

Trouble-shooting (Cont'd)





Ⓒ

I

Check coil side circuit of A/C relay with ignition switch ON and A/C switch OFF.

Do approx. 12 volts exist between dual-pressure switch harness terminal No. ㉖ and body ground?

N.G. → Note: Disconnect dual-pressure switch harness connector.

Check circuit continuity between A/C relay harness terminal No. ⑯ and dual-pressure switch harness terminal No. ⑯ with ignition switch OFF.

O.K. → **J** Check dual-pressure switch.

Does continuity exist between dual-pressure switch terminals?

N.G. → Check refrigerant.

Connect manifold gauge, then check system pressure. (Refer to A/C performance test.)

O.K. → Replace dual-pressure switch.

N.G. → Check refrigerant leaks.

O.K.

Check voltage for front A/C thermo control amp. with ignition switch ON and A/C switch OFF.

Do approx. 12 volts exist between front A/C thermo control amp. harness terminal No. ㉖ and body ground?

N.G. → Note: Check circuit continuity between front A/C thermo control amp. and dual-pressure switch with ignition switch OFF.

Disconnect front A/C thermo control amp. and dual-pressure switch harness connectors. Does continuity exist between front A/C thermo control amp. harness terminal No. ㉖ and dual-pressure switch harness terminal No. ㉖ .

O.K.

Check power supply for front A/C thermo control amp. with ignition switch ON.

Go to Preliminary Check.

O.K.

Check body ground circuit for front A/C thermo control amp.

Go to Preliminary Check.

N.G.

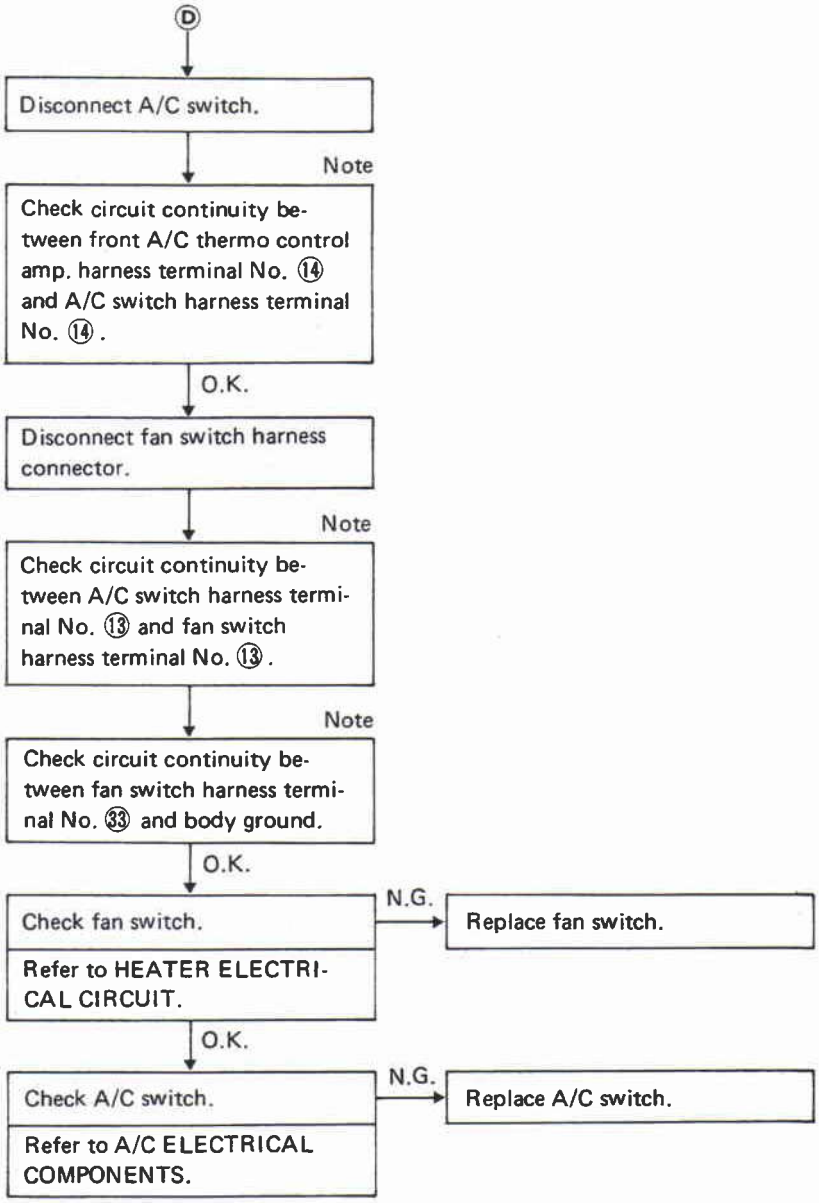
O.K.

Replace front A/C thermo control amp.

Ⓓ

Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)



Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)

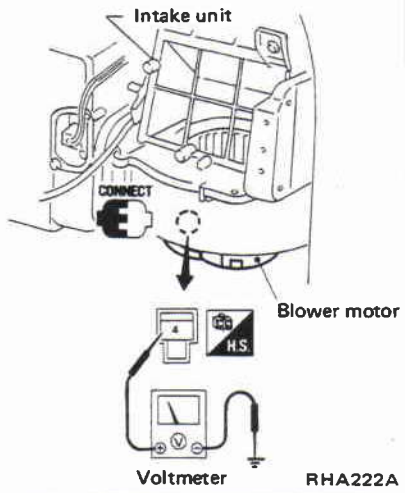
TROUBLE-SHOOTING PROCEDURE 2

INCIDENT: Front blower motor does not rotate.

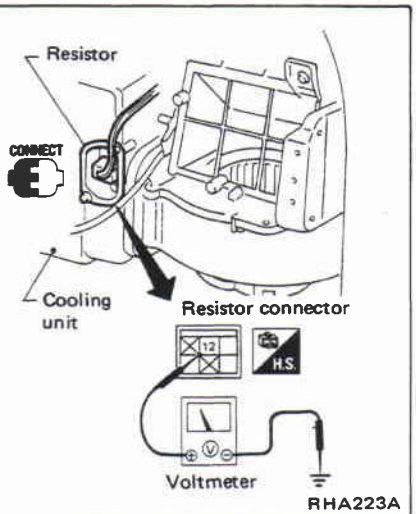
- **Perform preliminary check before referring to the following flowchart.**

	INCIDENT	Flowchart No.
1	Fan fails to rotate.	1
2	Fan does not rotate at 1-speed.	2
3	Fan does not rotate at 2-speed.	3
4	Fan does not rotate at 3-speed.	4
5	Fan does not rotate at 4-speed.	5

A



B



Check if blower motor rotates properly at each fan speed. Conduct checks as per flowchart at left.

→ 1 → A

A

Check power supply for blower motor with ignition switch ON and fan switch OFF.

Do approx. 12 volts exist between blower motor harness terminal No. ④ and body ground?

N.G. → Check 15A fuses at fuse block. (Refer to Preliminary Check.)

O.K.

Disconnect blower motor harness connector.

Check circuit continuity between blower motor harness terminal No. ⑫ and body ground with ignition switch OFF and fan switch ON.

N.G. → Reconnect blower motor harness connector.

O.K.

Replace blower motor.

B

B

Check blower motor circuit between blower motor and resistor with ignition switch ON and fan switch OFF.

Do approx. 12 volts exist between resistor harness terminal No. ⑫ and body ground?

N.G. → Check circuit continuity between blower motor harness terminal No. ⑫ and resistor harness terminal No. ⑫.

Note

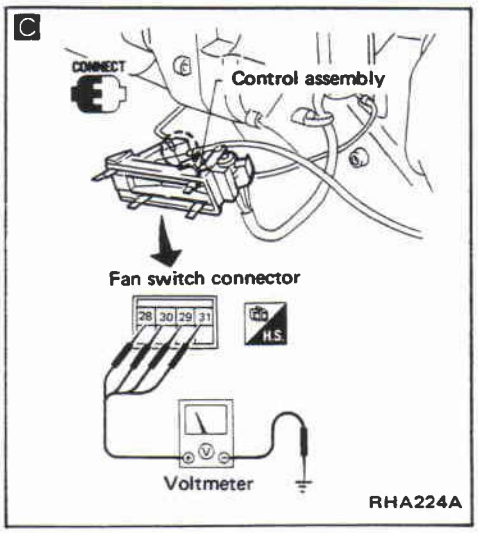
O.K.

→ Ⓐ

2 → Ⓑ
3 → Ⓒ
4 → Ⓓ
5 → Ⓔ

Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)



Ⓐ 1 — Check resistor after disconnecting it. (Refer to HEATER ELECTRICAL CIRCUIT.)

Ⓑ 2 Ⓒ 3 Ⓓ 4 Ⓔ 5 — Check resistor after disconnecting it. (Refer to HEATER ELECTRICAL CIRCUIT.)

Check resistor after disconnecting it. (Refer to HEATER ELECTRICAL CIRCUIT.)

- O.K. → Reconnect resistor harness connector.
- N.G. → Replace resistor.

Reconnect resistor harness connector.

1 2 3 4 5

C

Check fan switch circuit with ignition switch ON and fan switch OFF.

Do approx. 12 volts exist between each resistor harness terminals and body ground?

Flowchart No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
2	㉘	Body ground	Approx. 12V
3	㉙		
4	㉚		
5	㉛		

- 2 3 4 5 O.K. → Check fan switch. Refer to HEATER ELECTRICAL CIRCUIT.
- N.G. → Note: Check circuit continuity between fan switch and resistor.

Check fan switch. Refer to HEATER ELECTRICAL CIRCUIT.

- N.G. → Replace fan switch.
- O.K. → Note: Check circuit continuity between fan switch harness terminal No. ㉙ and body ground.

Check circuit continuity between fan switch harness terminal No. ㉙ and body ground.

→ Replace blower motor.

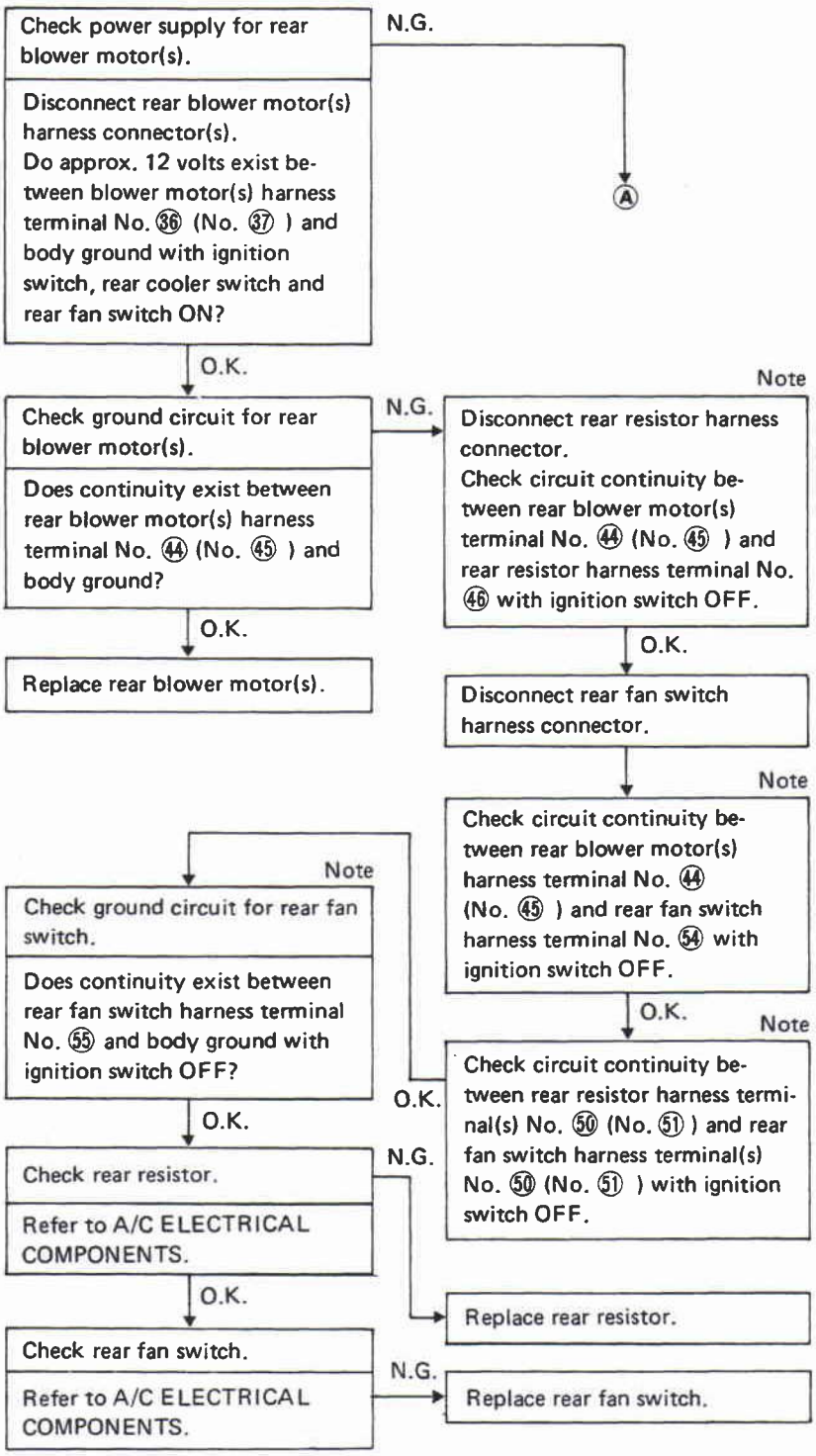
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)

TROUBLE-SHOOTING PROCEDURE 3

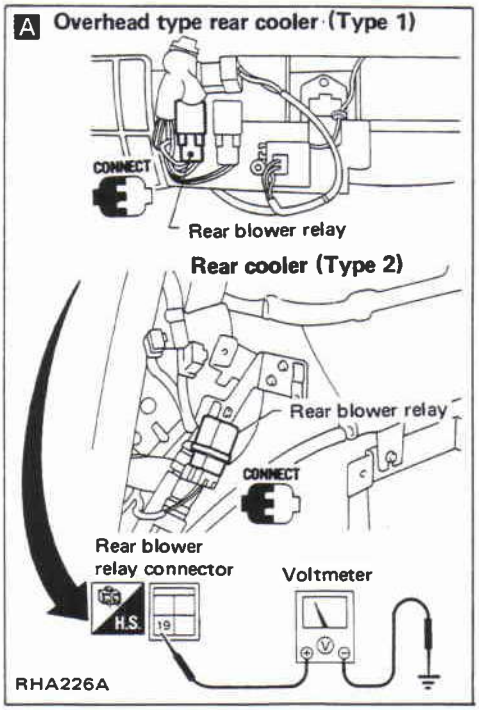
INCIDENT: Rear blower motor does not rotate.

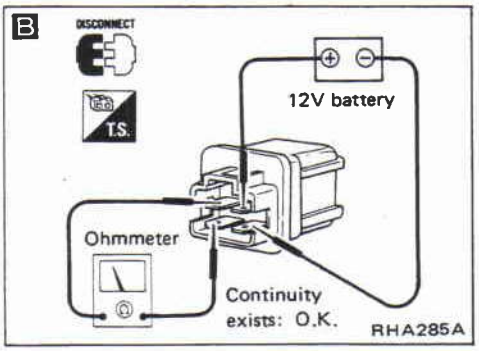
- **Perform preliminary check before referring to the following flowchart.**

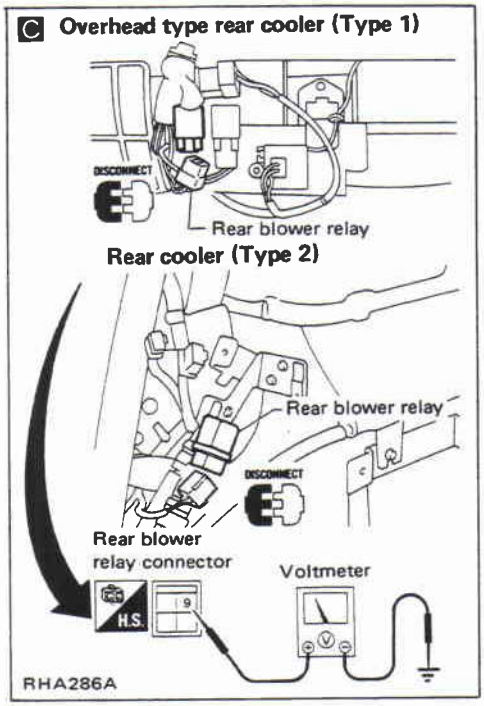


Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)







Ⓐ

A

Check rear blower relay operation with ignition switch and rear cooler switch ON.

Do approx. 12 volts exist between rear blower relay harness terminal No. ⑲ and body ground?

N.G. → Check power supply for rear blower relay.

Disconnect rear blower relay harness connector.
Do approx. 12 volts exist between rear blower relay harness terminal No. ⑪ and body ground?

O.K. → Note: Check circuit continuity between rear blower relay harness terminal No. ⑲ and rear blower motor(s) harness terminal(s) No. ㊱ (No. ㊲) with ignition switch OFF.

N.G. → Check power supply and 20A fuse at fuse block. (Refer to Preliminary Check.)

B

Check rear blower relay.

O.K. → **C**

N.G. → Replace rear blower relay.

C

Check power supply for rear blower relay with ignition switch and rear cooler switch ON.

Do approx. 12 volts exist between rear blower relay harness terminal No. ⑨ and body ground?

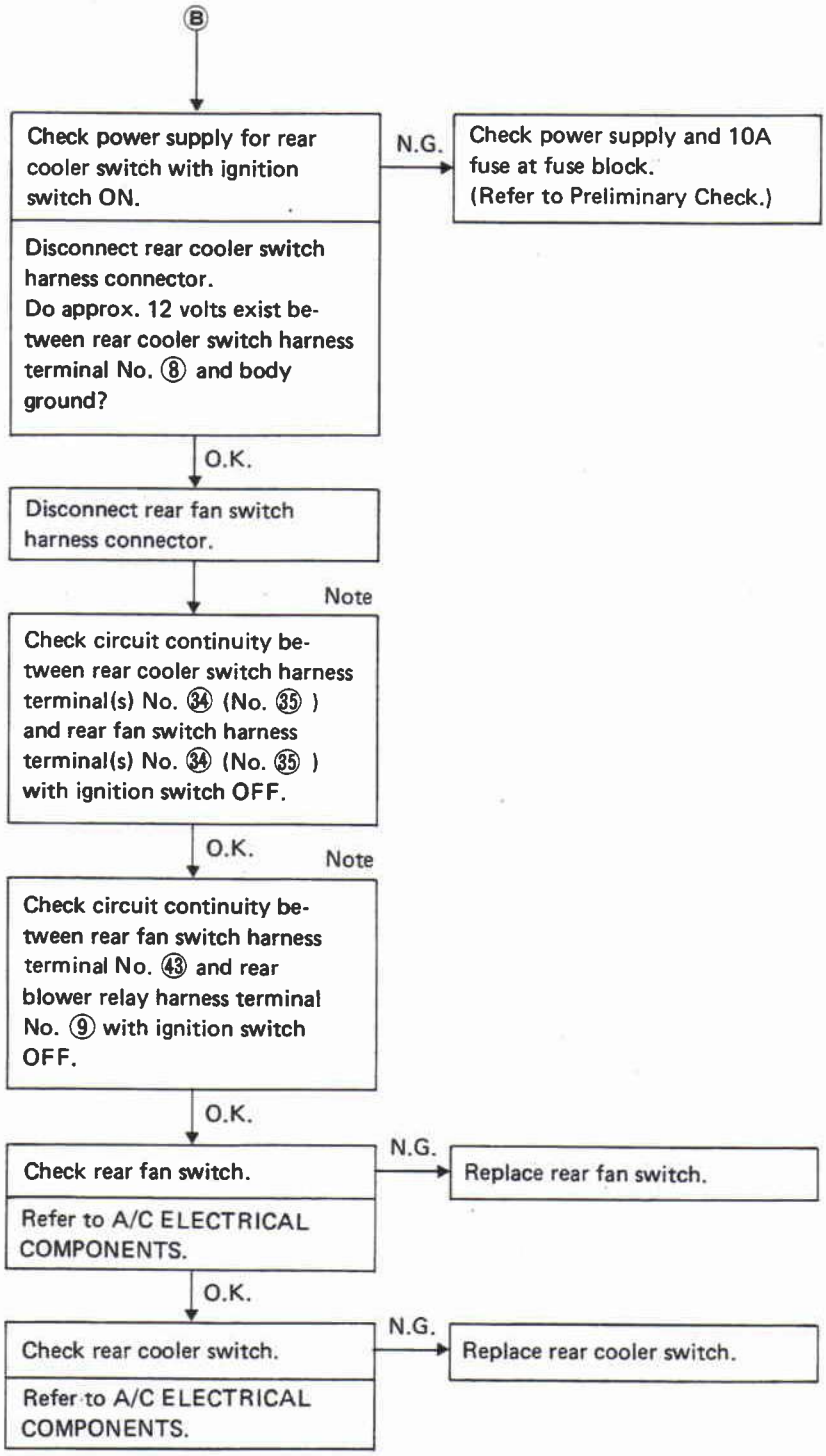
O.K. → Note: Check ground circuit for rear blower relay with ignition switch OFF.

Does continuity exist between rear blower relay harness terminal No. ㊿ and body ground?

N.G. → Ⓑ

Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)



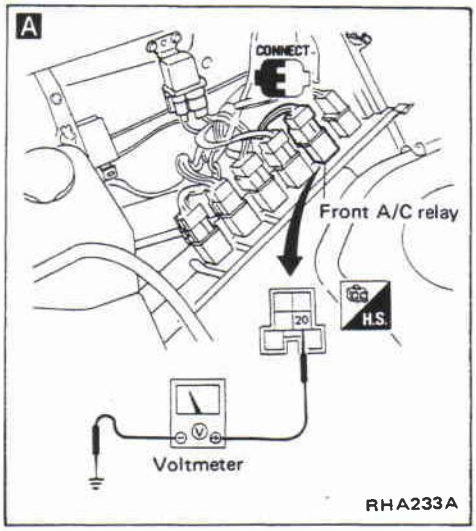
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)

TROUBLE-SHOOTING PROCEDURE 4

INCIDENT: Rear cooler solenoid valve does not operate.

- **Perform preliminary check before referring to the following flowchart.**



Check magnet clutch operation.
Does magnet clutch operate normally when front A/C switch, front fan switch, and ignition switch are ON?
N.G. → Go to TROUBLE-SHOOTING PROCEDURE 1.
O.K.

Check rear blower motor operation.
Does rear blower motor operate normally when rear fan switch and rear cooler switch are ON?
N.G. → Go to TROUBLE-SHOOTING PROCEDURE 3.
O.K.

Disconnect rear fan switch and rear cooler thermo control amp. harness connectors.

Note

Check circuit continuity between rear fan switch harness terminal No. (43) and rear cooler thermo control amp. harness terminal No. (48) with ignition switch OFF.

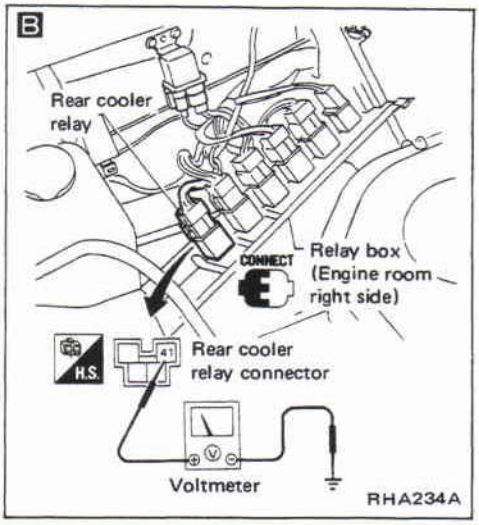
O.K.

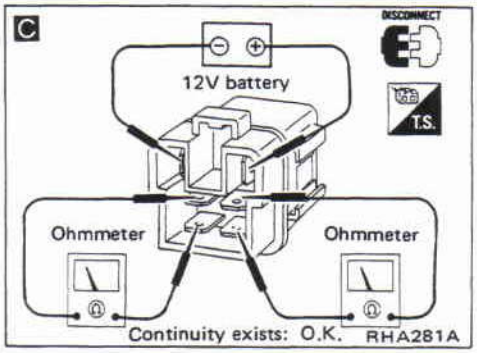
A

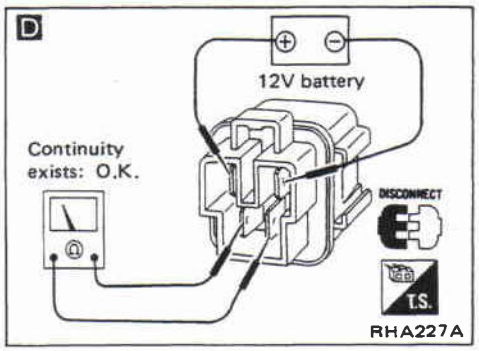
Check A/C relay operation with ignition switch, A/C switch are ON, and rear cooler switch OFF.
Do approx. 12 volts exist between A/C relay harness terminal No. (20) and body ground.
N.G. → Check power supply for A/C relay with ignition switch ON, A/C switch OFF.
Do approx. 12 volts exist between A/C relay harness terminal No. (62) and body ground.
O.K. → (A)
N.G. → Check power supply and 10A fuse at fuse block. (Refer to Preliminary Check.)
O.K. → (B)

Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)







Ⓐ

Reconnect rear fan switch and rear cooler thermo control amp. harness connectors.

B

Check coil side circuit for rear cooler relay with ignition switch, A/C switch are ON, and rear cooler switch OFF.

Do approx. 12 volts exist between rear cooler relay harness terminal No. ㊶ and body ground?

N.G. →

Disconnect A/C relay and rear cooler relay harness connectors.

Note

Check circuit continuity between A/C relay harness terminal No. ⑳ and rear cooler relay harness terminal No. ⑳ with ignition switch OFF.

O.K.

D

Check rear cooler relay.

N.G.

Replace rear cooler relay.

O.K. ↓

Ⓒ

Ⓑ

C

Check A/C relay.

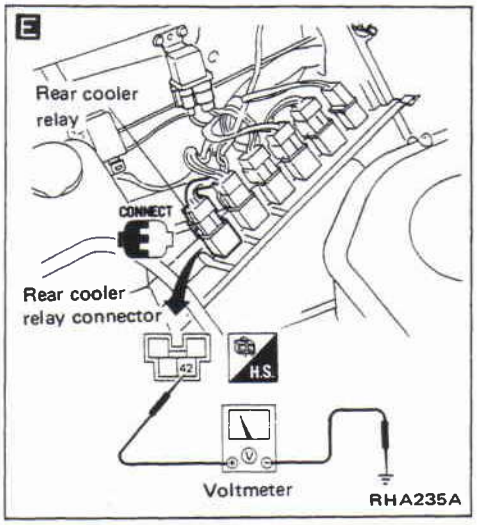
N.G.

Replace A/C relay.

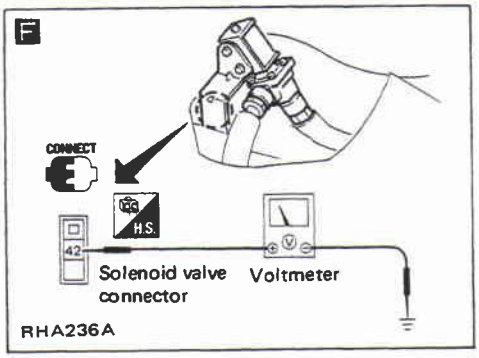
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)

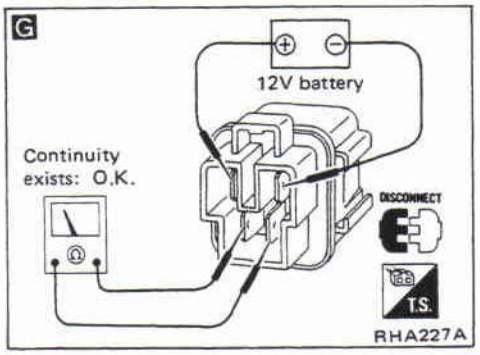
E



F



G



Ⓒ

E

Check power supply for rear cooler relay with ignition switch, A/C switch, and rear cooler switch are ON.

Do approx. 12 volts exist between rear cooler relay harness terminal No. ㊷ and body ground?

N.G. → **G**

Check rear cooler relay after disconnecting it.

O.K. → Check power supply for rear cooler relay.

N.G. → Replace rear cooler relay.

Check power supply for rear cooler relay.

Do approx. 12 volts exist between rear cooler relay harness terminal No. ㉑ and body ground?

O.K. → Ⓓ

N.G. → Check power supply and 20A fuse at fuse block. (Refer to Preliminary Check.)

O.K. ↓

F

Check power supply for rear cooler solenoid valve with ignition switch, A/C switch, and rear cooler switch are ON.

Do approx. 12 volts exist between rear cooler solenoid valve harness terminal No. ㊷ and body ground?

N.G. → Disconnect rear cooler relay and rear cooler solenoid valve harness connectors.

Note: Check circuit continuity between rear cooler relay harness terminal No. ㊷ and rear cooler solenoid valve harness terminal No. ㊷ with ignition switch OFF.

O.K. ↓

Note: Check ground circuit for rear cooler solenoid valve.

Disconnect rear cooler solenoid valve harness connector. Does continuity exist between rear cooler solenoid valve harness terminal No. (103) and body ground with ignition switch OFF?

O.K. ↓

Check rear cooler solenoid valve.

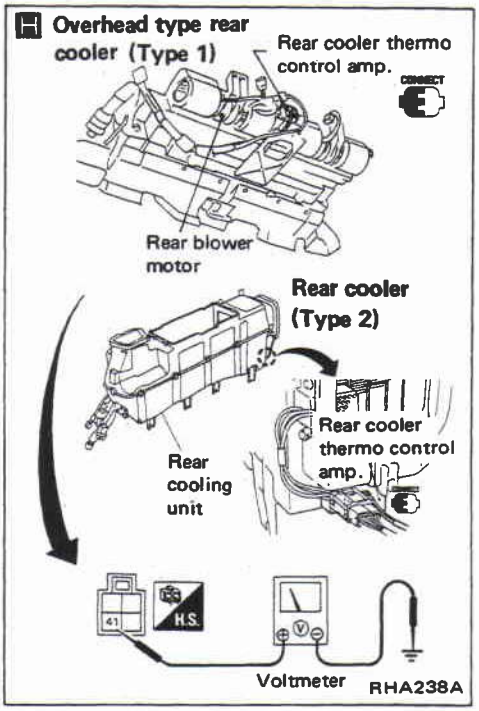
Refer to A/C ELECTRICAL COMPONENTS.

N.G. → Replace rear cooler solenoid valve.

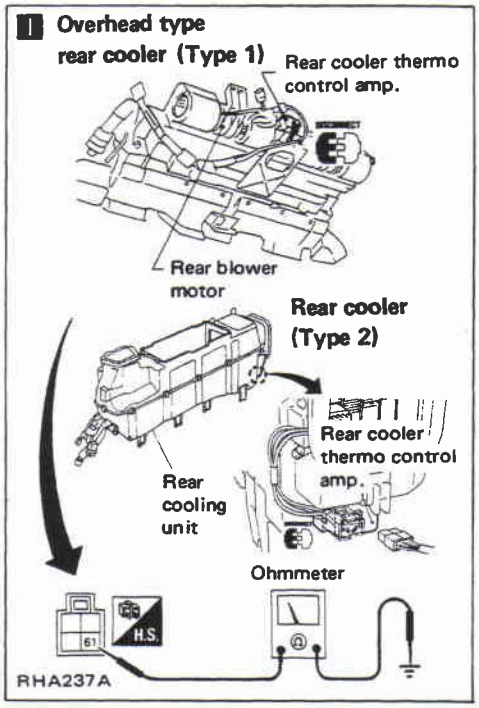
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Trouble-shooting (Cont'd)

H Overhead type rear cooler (Type 1)



I Overhead type rear cooler (Type 1)



Ⓓ

H

Check power supply for rear cooler thermo control amp. with ignition switch, A/C switch are ON, and rear cooler switch OFF.

Reconnect rear cooler relay harness connector.
Do approx. 12 volts exist between rear cooler thermo control amp. harness terminal No. ㊶ and body ground?

N.G. → Disconnect rear cooler relay and rear cooler thermo control amp. harness connectors.

Note: Check circuit continuity between rear cooler thermo control amp. harness terminal No. ㊶ and rear cooler relay harness terminal No. ㊶ with ignition switch OFF.

O.K. ↓

I

Check rheostat operation.

Disconnect rear cooler thermo control amp. harness connector. Does continuity exist between rear cooler thermo control amp. harness terminal No. ㊶ and body ground with rear cooler temp. switch ON. (Max. cold position.)

N.G. → Check rheostat.

Refer to A/C ELECTRICAL COMPONENTS.

O.K. → Note: Check ground circuit for rheostat.

Disconnect rear fan switch harness connector.
Does continuity exist between rear fan switch harness terminal No. (107) and body ground.

O.K. → Note: Check circuit continuity between rear cooler thermo control amp. harness terminal No. ㊶ and rear fan switch harness terminal No. ㊶ with ignition switch OFF.

N.G. → Replace rear cooler control assembly.

O.K. ↓

Check rear cooler thermo control amp. operation.

Refer to A/C ELECTRICAL COMPONENTS.

N.G. → Replace rear cooler thermo control amp.

Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

General Specifications

COMPRESSOR

Model	DIESEL-KIKI make DKS-16H
Type	Swash plate
Displacement cm^3 (cu in)/Rev.	167 (10.19)
Cylinder bore x stroke mm (in)	37.0 x 25.8 (1.457 x 1.016)
Direction of rotation	Clockwise (Viewed from drive end)
Drive belt	A type

LUBRICATION OIL

Model	Without rear cooler model	With rear cooler model
	DIESEL-KIKI make DKS-16H	
Type	SUNISO 5GS	
Capacity mℓ (Imp fl oz) Total in system	200 (7.0)	250 (8.8)
Remaining oil in system after oil return operation and draining it	Approx. 90 (3.2)	Approx. 140 (4.9)
Compressor (Service parts) charging amount	200 (7.0)	

REFRIGERANT

Type	R-12
Capacity kg (lb) Front A/C	0.9 - 1.1 (2.0 - 2.4)
Front A/C & overhead type rear cooler (Type 1)	1.3 - 1.5 (2.9 - 3.3)
Front A/C & rear cooler (Type 2)	1.1 - 1.3 (2.4 - 2.9)

Inspection and Adjustment

ENGINE IDLING SPEED

- For TB engine model, refer to EF & EC section.
- For TD engine model, refer to MA section.

BELT TENSION

- Refer to MA section

COMPRESSOR

Model	DKS-16H
Clutch hub to pulley clearance mm (in)	0.3 - 0.6 (0.012 - 0.024)