

# HEATER & AIR CONDITIONER

## SECTION **HA**

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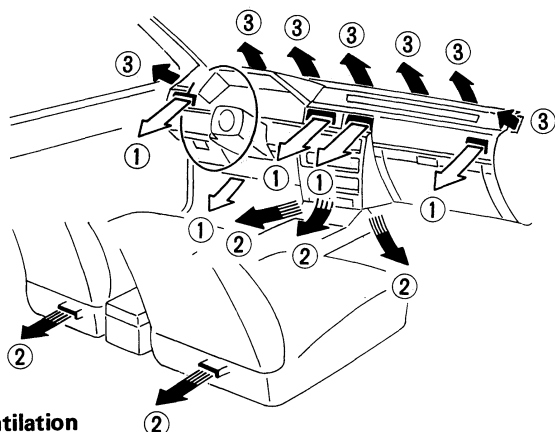
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When you read wiring diagrams:

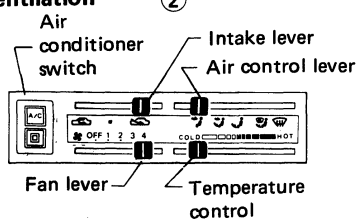
- Read GI section, "HOW TO READ WIRING DIAGRAMS".
- See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.

# AIR FLOW AND COMPONENT LAYOUT

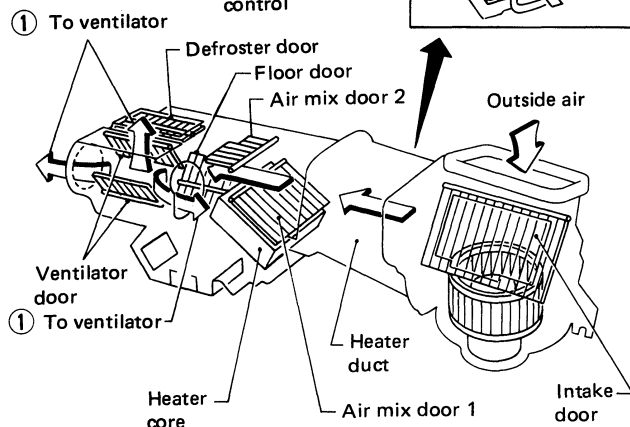
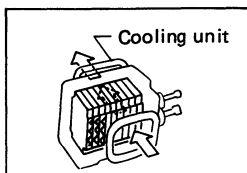
## Air Flow



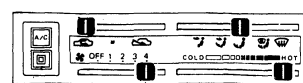
### Ventilation



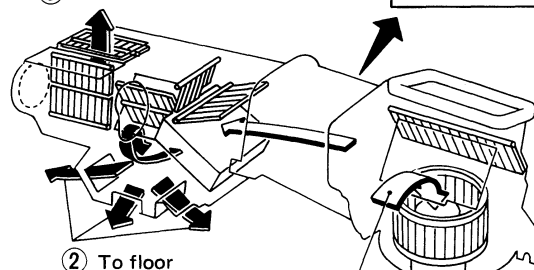
### Air conditioner



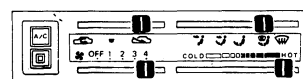
### Floor



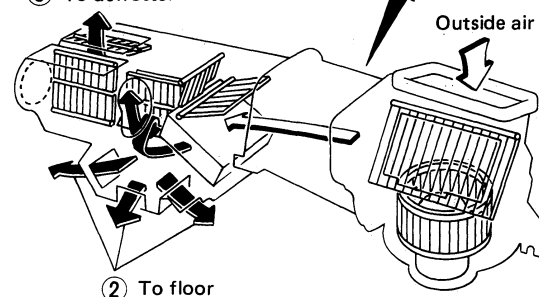
### To defroster



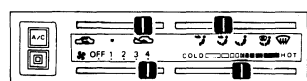
### Floor and defroster



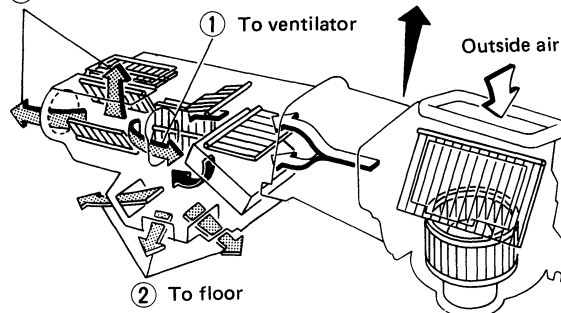
### To defroster



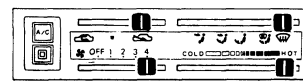
### Bi-level



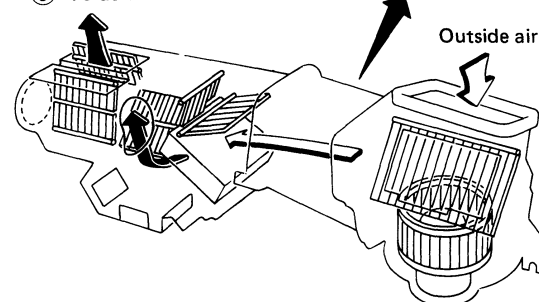
### To ventilator



### Defroster



### To defroster



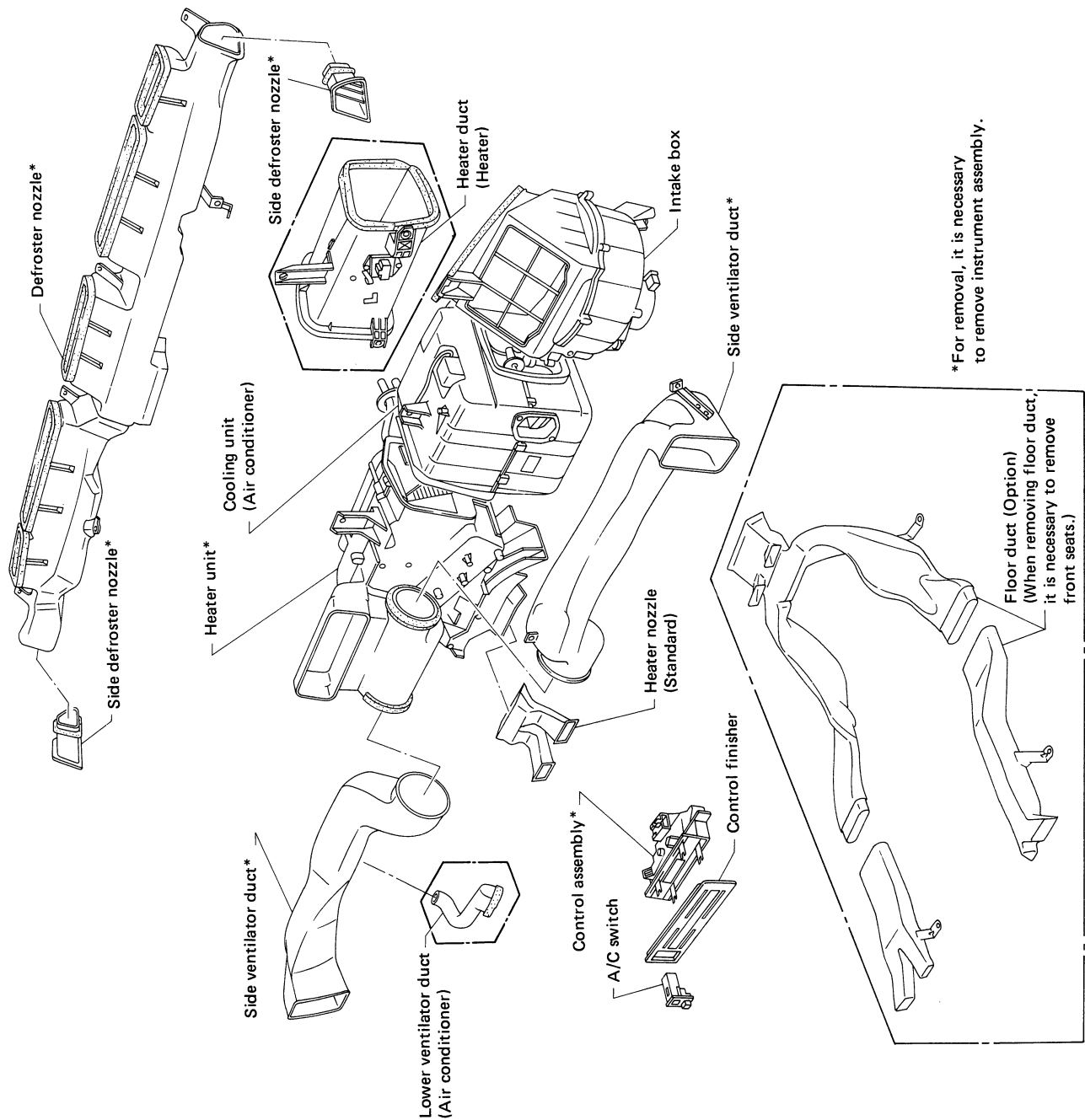
← : Air passed through heater core

← : Air not passed through heater core

← : Mixed air ( ← + ← )

SHA955B

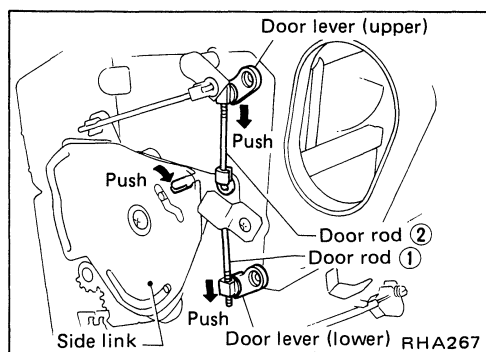
## Component Layout



**\*For removal, it is necessary to remove instrument assembly.**

**Floor duct (Option)**  
(When removing floor duct,  
it is necessary to remove  
front seats.)

## DOOR CONTROL

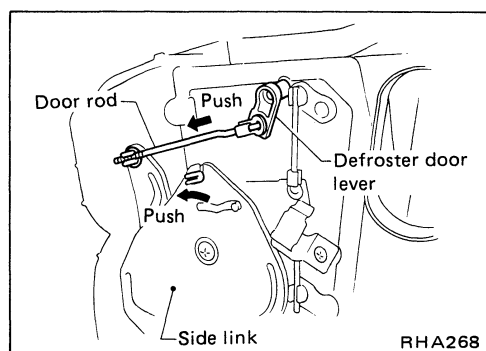


### Control Cable and Rod Adjustment

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

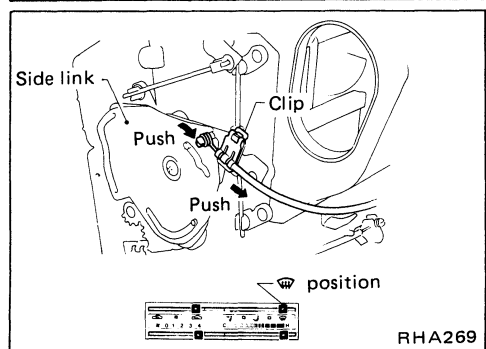
#### VENTILATOR DOOR CONTROL ROD

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



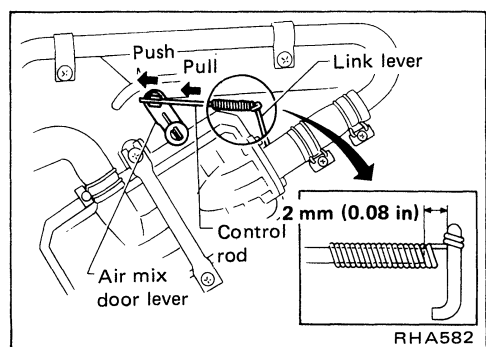
#### DEFROSTER DOOR CONTROL ROD

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



#### AIR CONTROL CABLE

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



#### WATER COCK CONTROL ROD

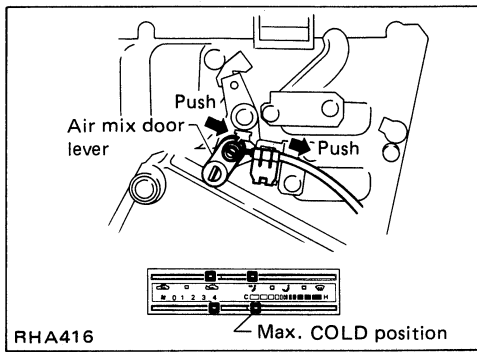
- When adjusting water cock control rod, first disconnect temperature control cable from air mix door lever and then adjust control rod. Reconnect temperature control cable and readjust it. (Refer to next item.)
1. Push air mix door lever in direction of arrow.
  2. Pull control rod of water cock in 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.

## DOOR CONTROL

### Control Cable and Rod Adjustment (Cont'd)

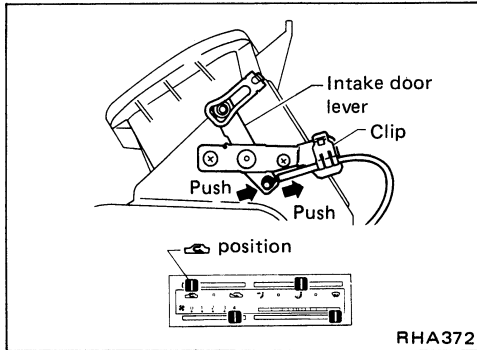
#### TEMPERATURE CONTROL CABLE

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



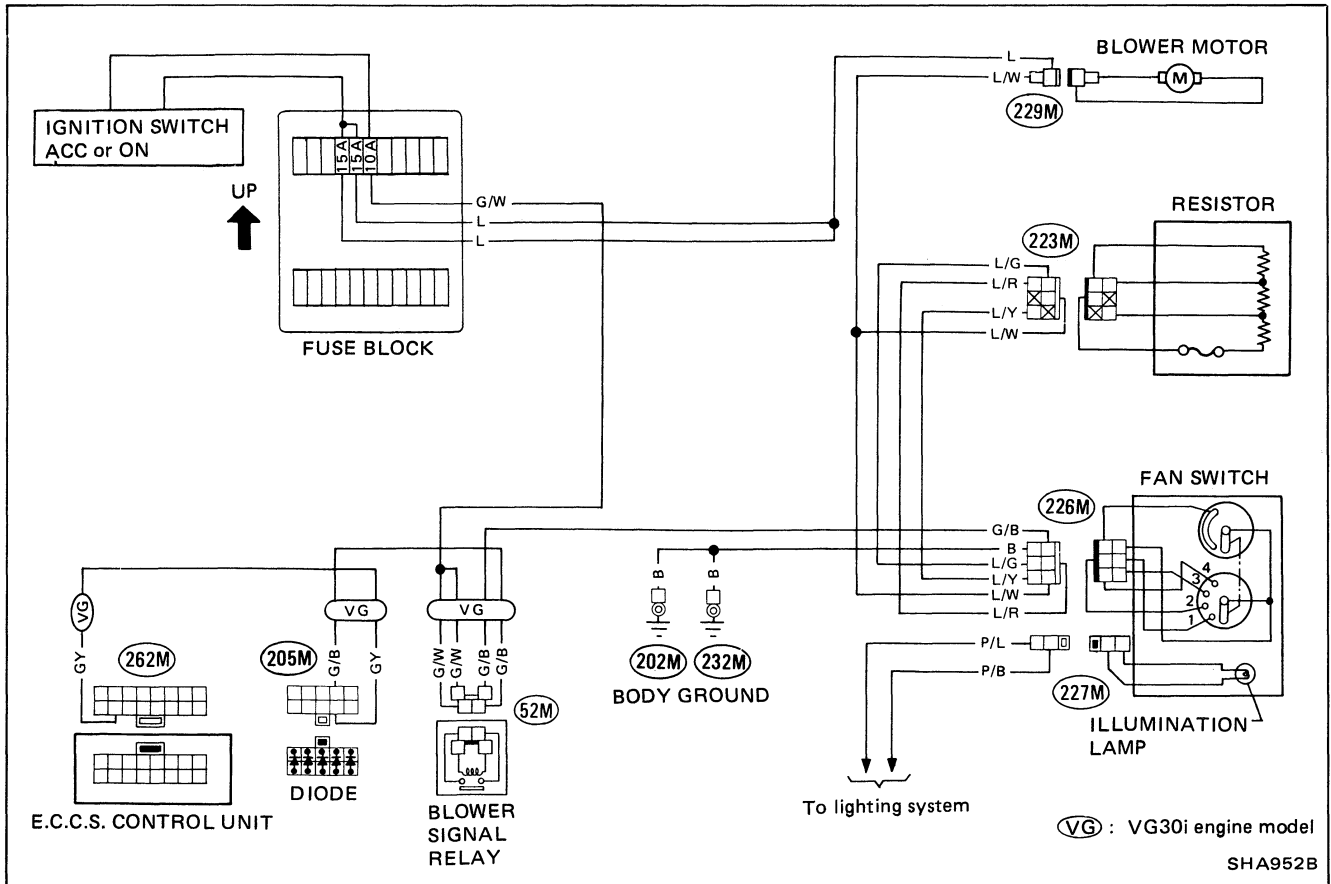
#### INTAKE DOOR CONTROL CABLE

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



# HEATER ELECTRICAL CIRCUIT

## Wiring Diagram

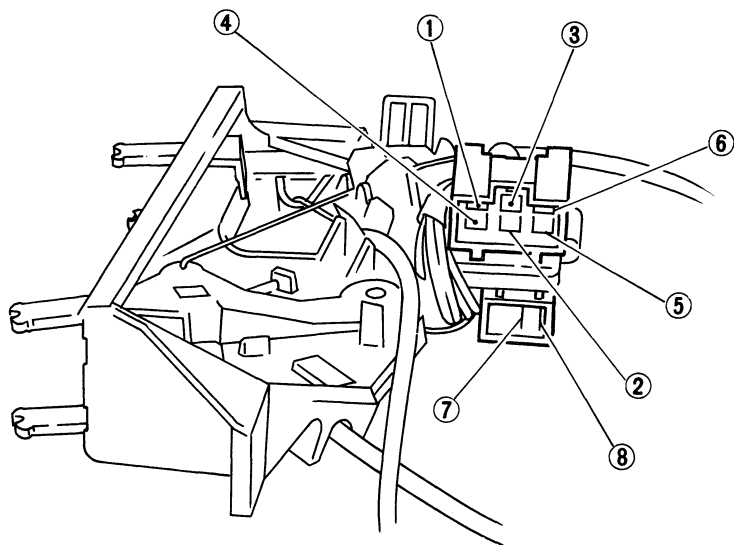


## Fan Switch Check

### Fan switch

LEVER POSITION	OFF	1	2	3	4
TERMINAL					
1					○
2		○			○
3			○		
4				○	
5		○	○	○	○
6		○	○	○	○
7		○			
8		○			

Illumination lamp



RHA374

## PRECAUTIONS

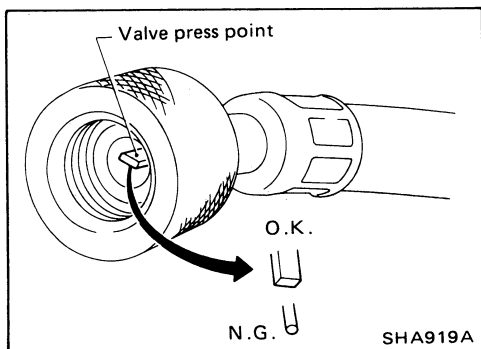
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### WARNING:

- 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.

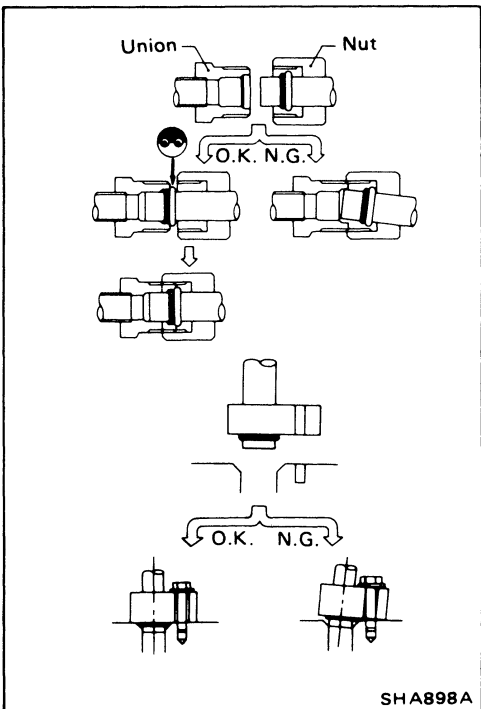
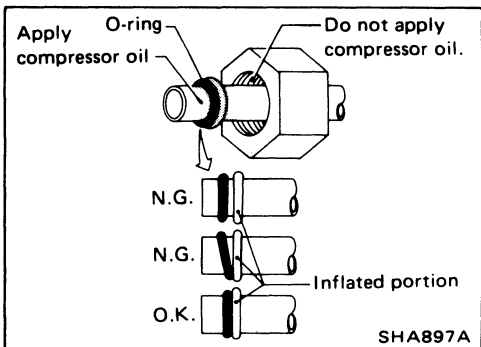
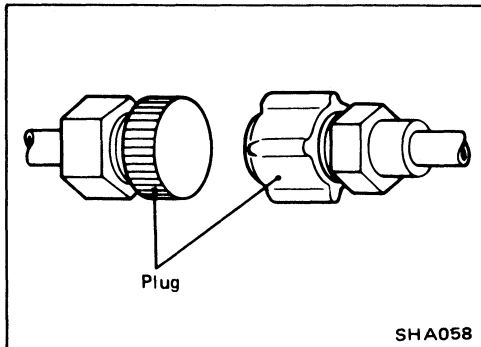
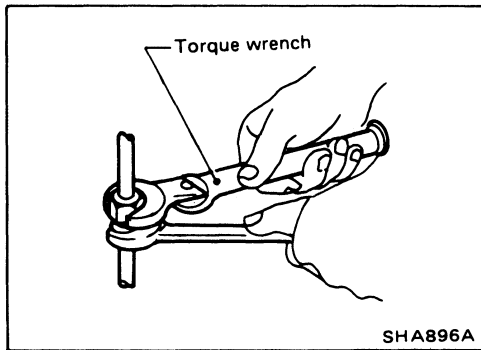
### CAUTION:

- 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.

## PRECAUTIONS FOR REFRIGERANT CONNECTION



### 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.

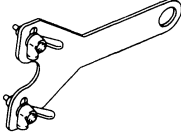
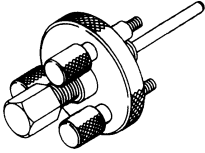
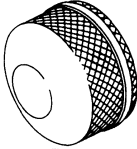
- Always replace used O-rings.
- When connecting tube, apply compressor oil to portions shown in illustration. Be careful not to apply oil to threaded portion.
- O-ring must be closely attached to inflated portion of tube.

- 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.




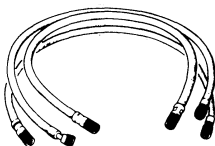
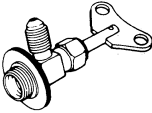
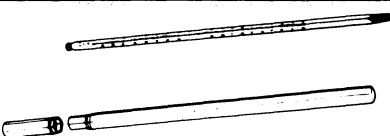
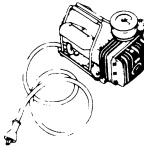

## PREPARATION

### SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.) Tool name	Description
KV99231162 (   -   ) Clutch disc wrench	 Removing shaft nut and clutch disc
KV99232340 (   -   ) Clutch disc puller	 Removing clutch disc
KV99234330 (   -   ) Pulley installer	 Installing pulley

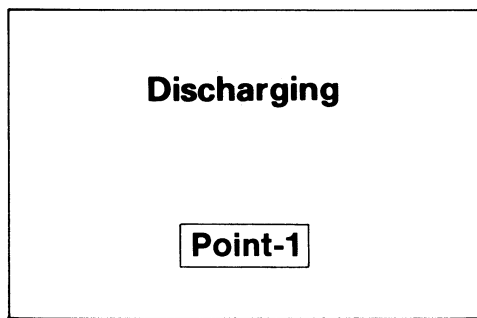
## PREPARATION

### SERVICE TOOLS

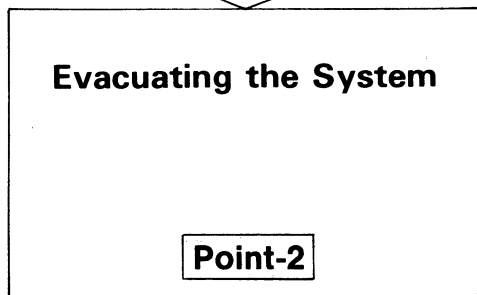
Tool name	Description	
Manifold gauge		Using discharge and charge refrigerant into system
Charging hose		Using discharge and evacuate, charge refrigerant into system
Charge valve		Using discharge and charge refrigerant into system
Thermometer		Using check temperature
Vacuum pump		Using evacuate refrigerant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

## DISCHARGING, EVACUATING, CHARGING AND CHECKING

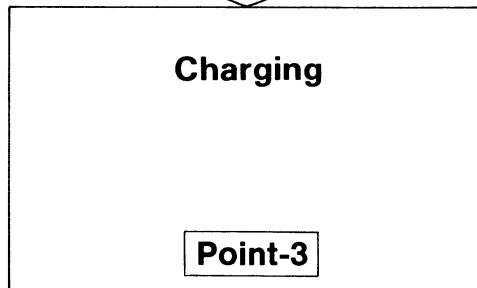
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Discharge refrigerant system.

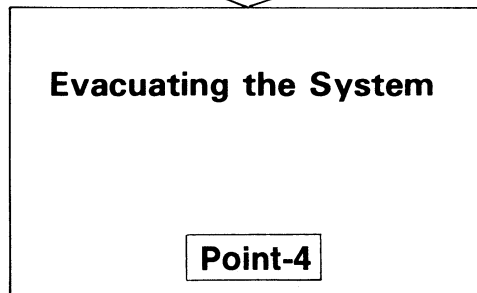


Run pump for 5 minutes.

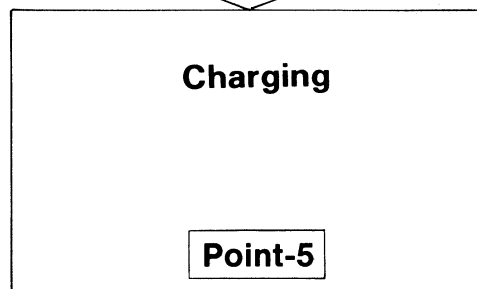


Charge refrigerant into system.

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

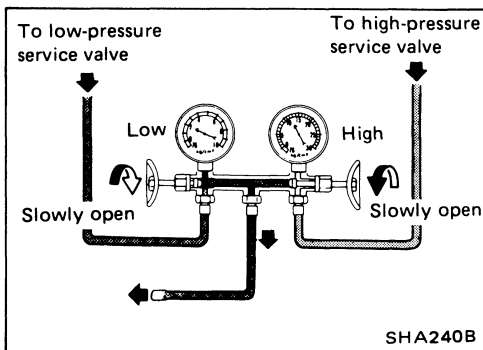


Run pump for 20 minutes.



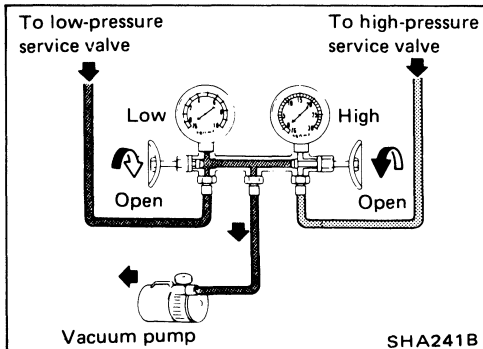
Charge the specified amount of refrigerant into system.

## DISCHARGING, EVACUATING, CHARGING AND CHECKING



### Discharging—Point-1

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

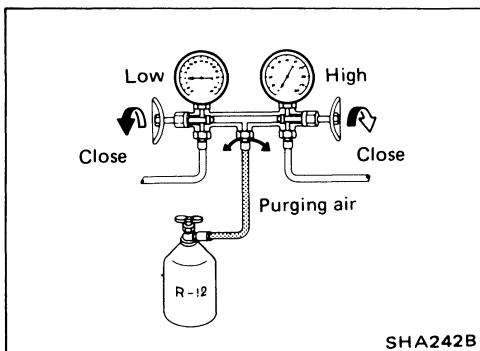


### Evacuating the System—Point-2

1. Start pump, then open both valves and run pump for about 5 minutes.
2. When low gauge has reached approx. 101.3 kPa (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 (25 mmHg, 0.98 inHg) per 300 m (1,000 ft) elevation. Perform evacuation according to the following table.
  - b. The rate of ascension of the low-pressure gauge should be less than 3.3 kPa (25 mmHg, 0.98 inHg) in 5 minutes.

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

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

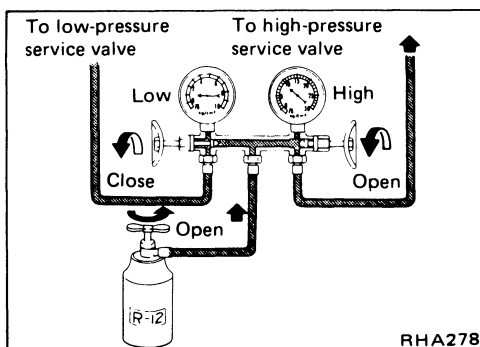


### Charging—Point-3

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.



4. Charge refrigerant into system.

**WARNING:**

**Ensure that engine is off.**

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

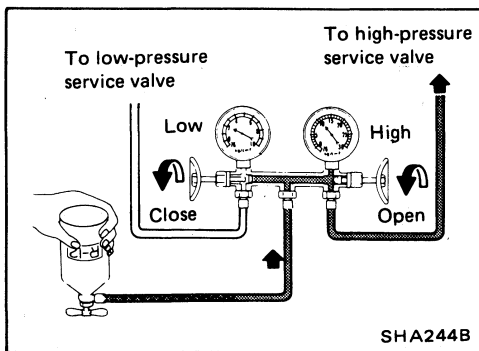
## DISCHARGING, EVACUATING, CHARGING AND CHECKING

### Charging—Point-3 (Cont'd)

#### CAUTION:

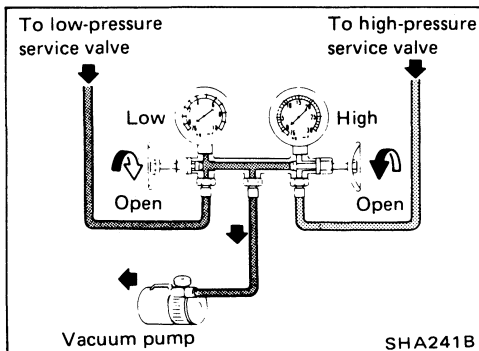
If charging liquefied refrigerant into system with the can turned upside down to reduce charging time, charge it only through high-pressure (discharge) service valve. After charging, the compressor should always be turned several times manually.

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



### Evacuating the System—Point-4

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

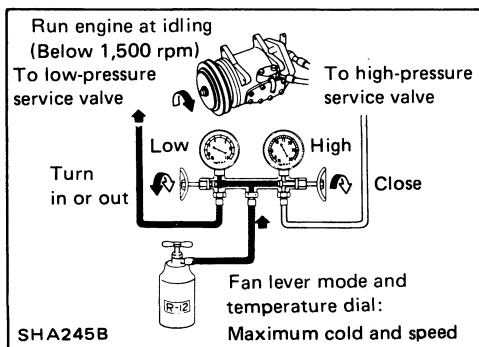
1. Charge refrigerant into system.

Refer to "Point-3".

#### 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 refrigerant 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.



## DISCHARGING, EVACUATING, CHARGING AND CHECKING

### Charging—Point-5 (Cont'd)

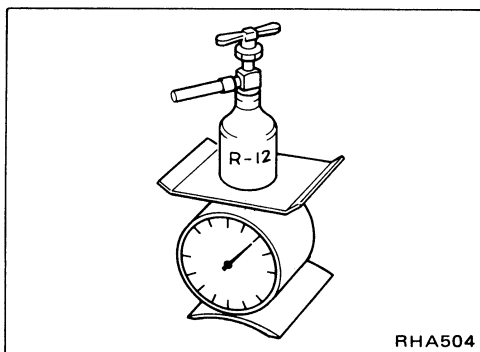
Cycling clutch systems will produce bubbles in sight glass when clutch engages. Therefore, allow 5 seconds after clutch engages to determine if bubbles continue, and, if so, add refrigerant to clear sight glass.

#### 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 (2.8 kg/cm<sup>2</sup>, 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:

**0.8 - 0.9 kg (1.8 - 2.0 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.

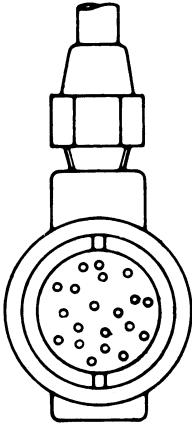
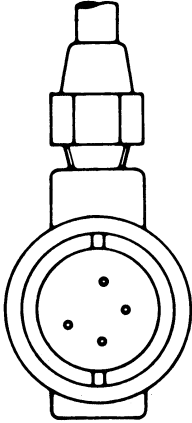
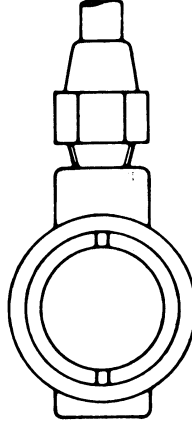
**Overcharging will result in increased high pressures, and reduced performance.**

# DISCHARGING, EVACUATING, CHARGING AND CHECKING

## Checking Refrigerant Level

### CONDITION

- Door window: Open
- A/C switch: ON
- TEMP. lever position: Max. COLD
- FAN lever position: 4
- Check sight glass after a lapse of about five minutes.

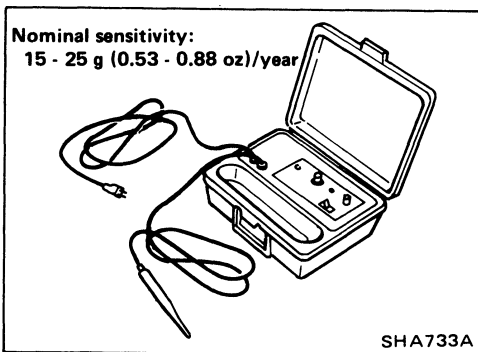
Amount of refrigerant	Almost no refrigerant	Insufficient	Suitable	Too much refrigerant
Check item				
Temperature of high-pressure and low-pressure lines.	Almost no difference between high-pressure and low-pressure side temperature.	High-pressure side is warm and low-pressure side is fairly cold.	High-pressure 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 of refrigerant is normal. In this case, the outlet side pipe of the receiver drier becomes considerably cold.

## DISCHARGING, EVACUATING, CHARGING AND CHECKING



### Checking Refrigerant Leaks

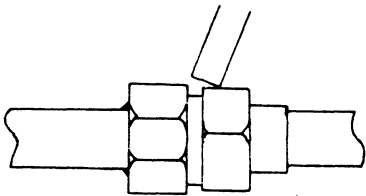
#### ELECTRIC LEAK DETECTOR

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.**

#### UNION TYPE



RHA279

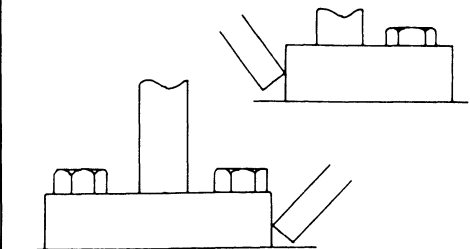
#### GENERAL PRECAUTIONS FOR HANDLING LEAK DETECTOR

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

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

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

#### PLATE TYPE



RHA280

**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

The refrigerant flows in the standard pattern, that is, through the compressor, the condenser, the receiver drier, through the evaporator, and back to the compressor.

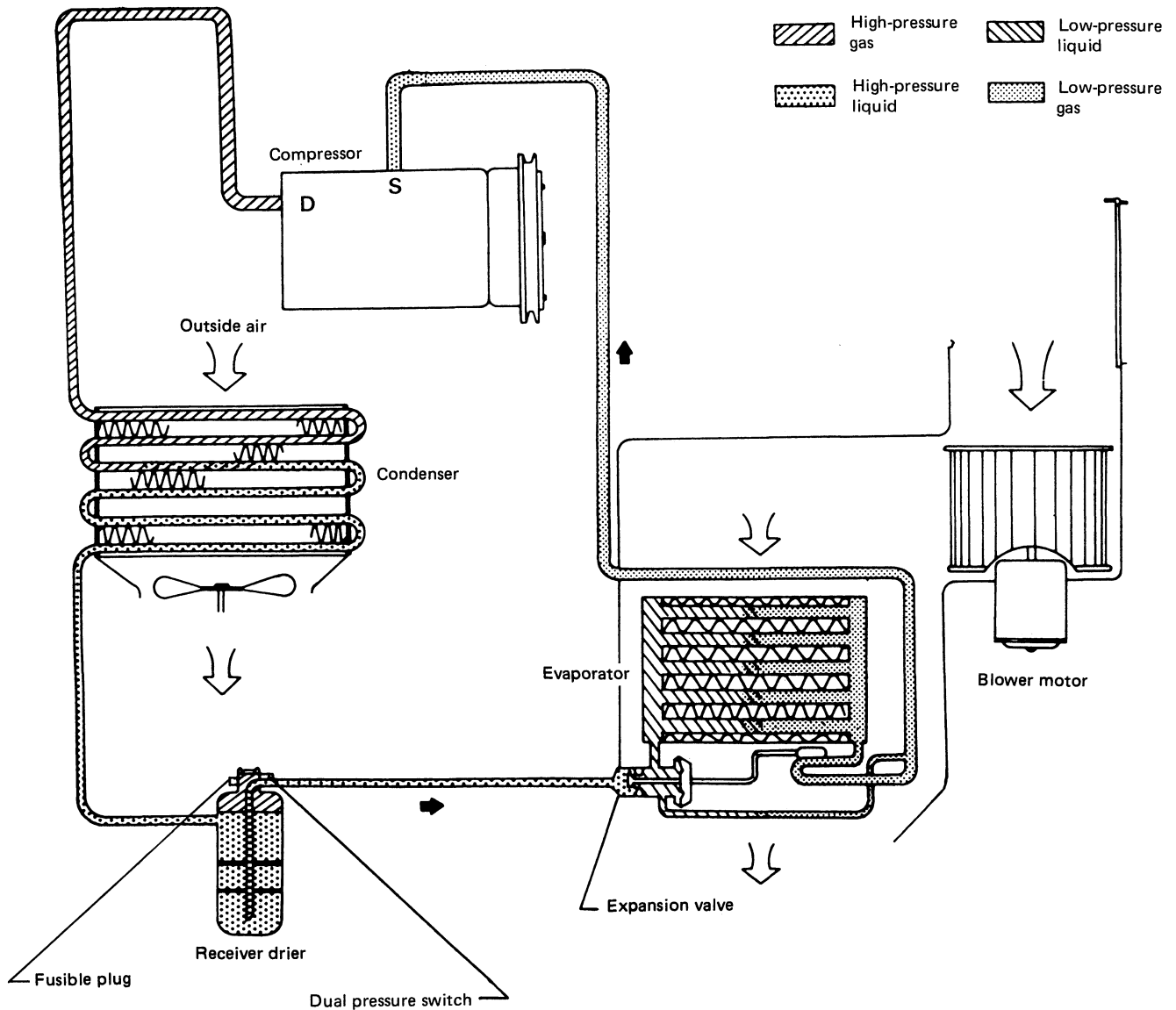
The refrigerant evaporation through the evaporator coil is controlled by an externally equalized expansion valve, located inside the evaporator case.

### FREEZE PROTECTION — Compressor control

The compressor cycles on and off to maintain the evaporator temperature within a specified range. When the evaporator coil temperature falls below a specified point, the thermo control amplifier interrupts the compressor operation. When the evaporator coil temperature rises above the specification, the thermo control amplifier allows compressor operation.

### REFRIGERANT SYSTEM PROTECTION

The refrigerant system is protected against excessively high pressure by a fusible plug located on the receiver drier, and protection against excessively high or low pressure (interruption of compressor operation) is provided by a dual pressure switch located on the receiver drier.

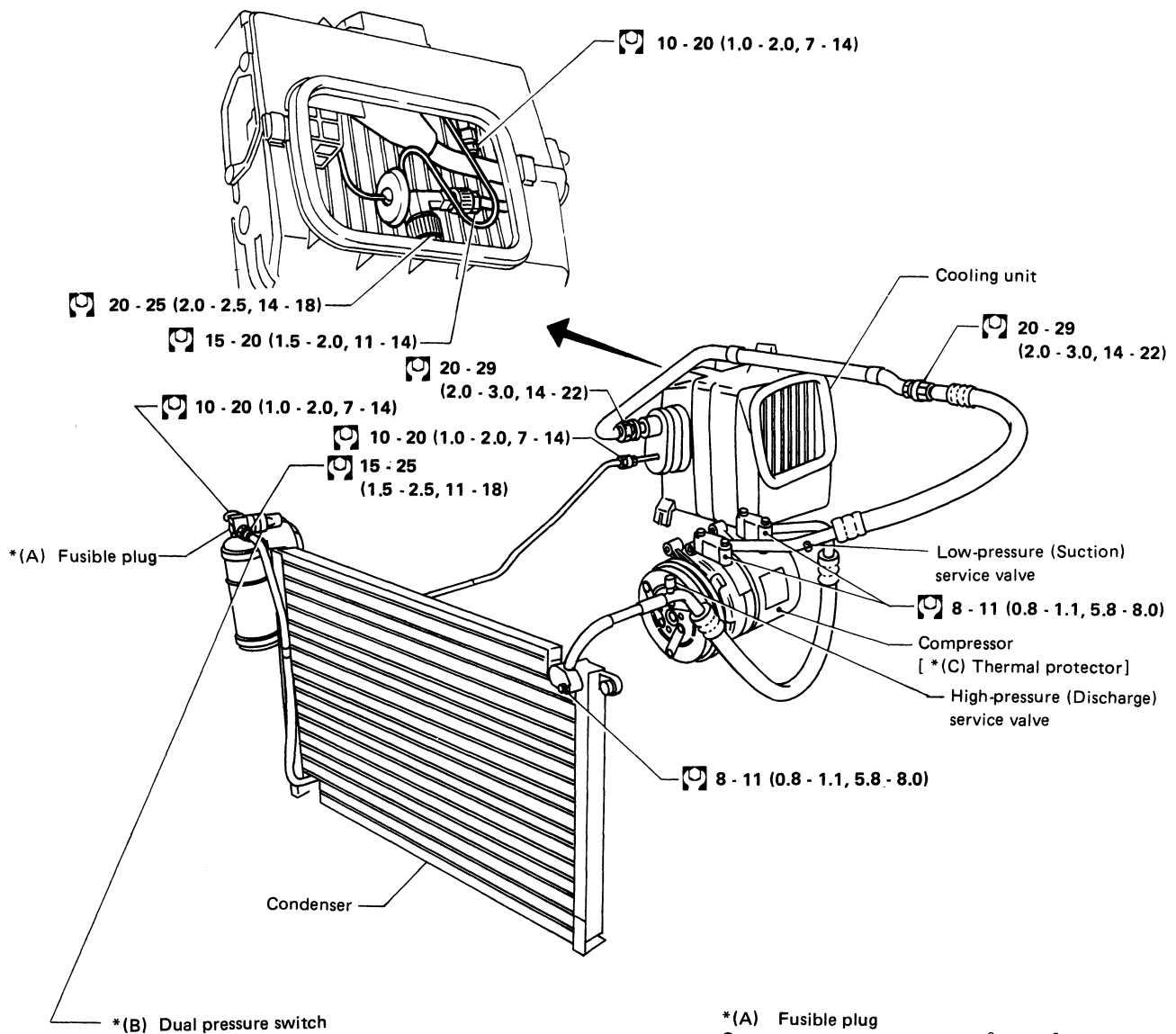


RHA321A

# PIPING, COMPRESSOR MOUNTING AND F.I.C.D.

## Refrigerant Lines

### VG ENGINE MODEL



: N-m (kg-m, ft-lb)

\* (C) Thermal protector

Temperature in compressor	°C (°F)	Operation
Increasing to approx.	145 - 155 (293 - 311)	Turns OFF
Decreasing to approx.	130 - 140 (266 - 284)	Turns ON

\* (A) Fusible plug  
Open at temperatures 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.

\* (B) Dual pressure switches

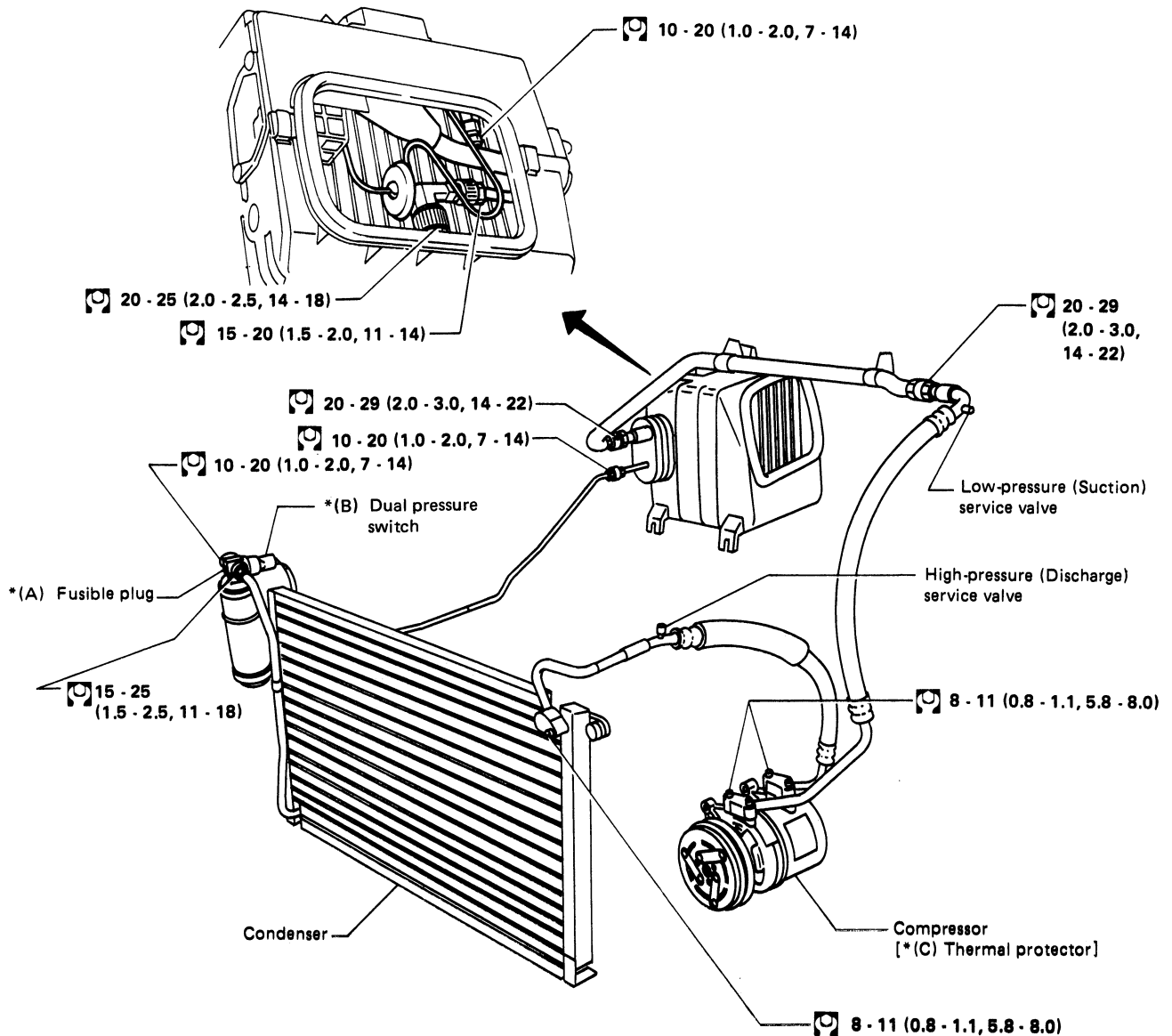
- Low-pressure side  
Turns OFF at pressures below 177 to 216 kPa (1.8 to 2.2 kg/cm<sup>2</sup>, 26 to 31 psi), cutting compressor power supply, and turns ON at pressures above 177 to 235 kPa (1.8 to 2.4 kg/cm<sup>2</sup>, 26 to 34 psi).
- High-pressure side  
Turns OFF at pressures above 2,452 to 2,844 kPa (25 to 29 kg/cm<sup>2</sup>, 356 to 412 psi), cutting compressor power supply, and turns ON at pressures below 1,373 to 1,667 kPa (14 to 17 kg/cm<sup>2</sup>, 199 to 242 psi).

RHA375

# PIPING, COMPRESSOR MOUNTING AND F.I.C.D.

## Refrigerant Lines (Cont'd)

### Z ENGINE MODEL



: N·m (kg-m, ft-lb)

\*(A) Fusible plug  
Open at temperatures 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.

\*(B) Dual pressure switches

- Low-pressure side  
Turns OFF at pressures below 177 to 216 kPa (1.8 to 2.2 kg/cm<sup>2</sup>, 26 to 31 psi), cutting compressor power supply, and turns ON at pressures above 177 to 235 kPa (1.8 to 2.4 kg/cm<sup>2</sup>, 26 to 34 psi).
- High-pressure side  
Turns OFF at pressures above 2,452 to 2,844 kPa (25 to 29 kg/cm<sup>2</sup>, 356 to 412 psi), cutting compressor power supply, and turns ON at pressures below 1,373 to 1,667 kPa (14 to 17 kg/cm<sup>2</sup>, 199 to 242 psi).

\*(C) Thermal protector

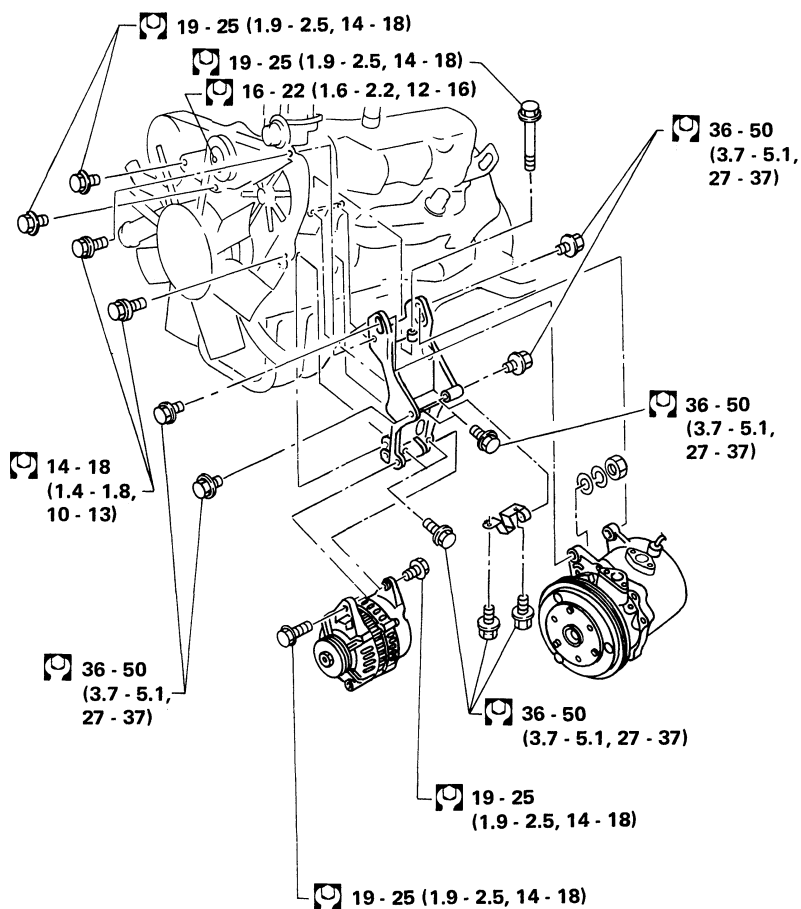
Temperature in compressor	°C (°F)	Operation
Increasing to approx.	145 - 155 (293 - 311)	Turns OFF
Decreasing to approx.	130 - 140 (266 - 284)	Turns ON


RHA376

# PIPING, COMPRESSOR MOUNTING AND F.I.C.D.

## Compressor Mounting

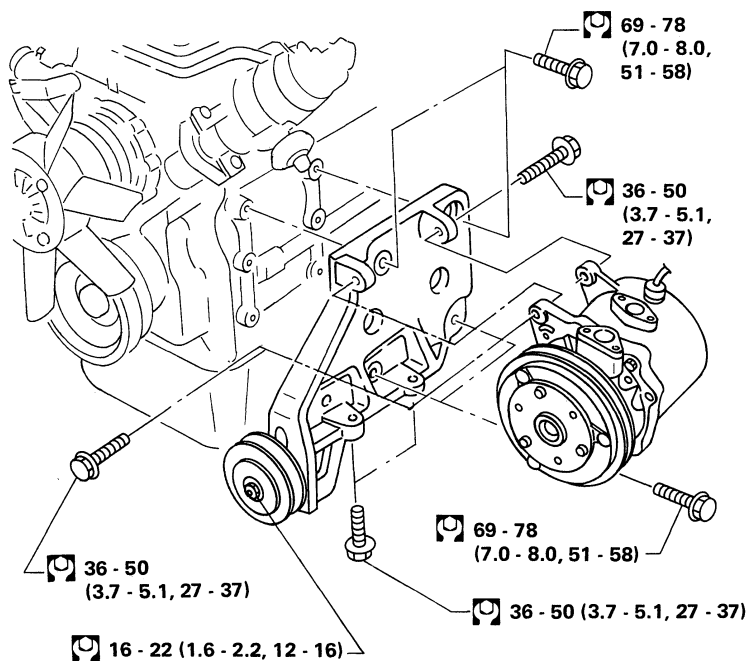
### VG engine model




 : N·m (kg·m, ft·lb)

RHA898

### Z engine model



 : N·m (kg·m, ft·lb)

RHA899

## PIPING, COMPRESSOR MOUNTING AND F.I.C.D.

### Idle Speed Adjusting

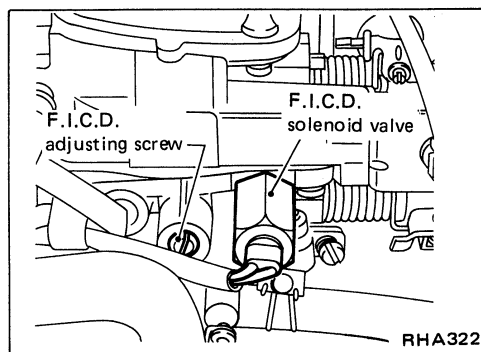
#### FAST IDLE CONTROL DEVICE (F.I.C.D.)

1. Warm up engine completely.
2. Make sure engine is at correct idling speed with air conditioner in OFF position.

Idling speed (Air conditioner: OFF):

Refer to S.D.S. (MA section).

3. Set engine speed with air conditioner in ON position (when F.I.C.D. is actuated) to following procedure.



#### Engine rpm

(Air conditioner: ON):

Unit: rpm



Transmission	Engine model	
	VG30i	Z24i
Manual	850 - 950	
Automatic (In "N" range)		

## A/C PERFORMANCE TEST

### 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
Air control lever position:	 (Ventilation)
INTAKE lever position:	 (Recirculation)
FAN lever position:	4
Engine speed:	1,500 rpm
Time required before starting testing after air conditioner starts operating:	More than 10 minutes

#### TEST READING

##### VG engine 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	20 (68)	5.4 - 7.0 (42 - 45)
	25 (77)	9.4 - 11.6 (49 - 53)
	30 (86)	13.6 - 16.4 (56 - 62)
	35 (95)	17.8 - 21.0 (64 - 70)
60 - 70	20 (68)	7.0 - 9.0 (45 - 48)
	25 (77)	11.6 - 14.2 (53 - 58)
	30 (86)	16.4 - 19.4 (62 - 67)
	35 (95)	21.0 - 24.6 (70 - 76)

##### Ambient air temperature-to-compressor pressure table

Ambient air		High-pressure (Discharge side) kPa (kg/cm <sup>2</sup> , psi)	Low-pressure (Suction side) kPa (kg/cm <sup>2</sup> , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	1,000 - 1,196 (10.2 - 12.2, 145 - 173)	88 - 137 (0.9 - 1.4, 13 - 20)
	25 (77)	1,216 - 1,451 (12.4 - 14.8, 176 - 210)	118 - 177 (1.2 - 1.8, 17 - 26)
	30 (86)	1,412 - 1,706 (14.4 - 17.4, 205 - 247)	157 - 216 (1.6 - 2.2, 23 - 31)
	35 (95)	1,618 - 1,961 (16.5 - 20.0, 235 - 284)	186 - 255 (1.9 - 2.6, 27 - 37)
	40 (104)	1,824 - 2,216 (18.6 - 22.6, 264 - 321)	226 - 294 (2.3 - 3.0, 33 - 43)

## A/C PERFORMANCE TEST

### Performance Chart (Cont'd)

#### Z engine 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	20 (68)	7.2 - 8.6 (45 - 47)
	25 (77)	11.0 - 12.8 (52 - 55)
	30 (86)	14.6 - 16.8 (58 - 62)
	35 (95)	18.4 - 21.0 (56 - 70)
60 - 70	20 (68)	8.6 - 10.4 (47 - 51)
	25 (77)	12.8 - 14.8 (55 - 59)
	30 (86)	16.8 - 19.2 (62 - 67)
	35 (95)	21.0 - 23.6 (70 - 74)

#### Ambient air temperature-to-compressor pressure table

Ambient air		High-pressure (Discharge side) kPa (kg/cm <sup>2</sup> , psi)	Low-pressure (Suction side) kPa (kg/cm <sup>2</sup> , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	941 - 1,157 (9.6 - 11.8, 137 - 168)	118 - 167 (1.2 - 1.7, 17 - 24)
	25 (77)	1,118 - 1,353 (11.4 - 13.8, 162 - 196)	137 - 196 (1.4 - 2.0, 20 - 28)
	30 (86)	1,295 - 1,569 (13.2 - 16.0, 188 - 228)	157 - 226 (1.6 - 2.3, 23 - 33)
	35 (95)	1,471 - 1,795 (15.0 - 18.3, 213 - 260)	186 - 255 (1.9 - 2.6, 27 - 37)
	40 (104)	1,628 - 2,001 (16.6 - 20.4, 236 - 290)	216 - 284 (2.2 - 2.9, 31 - 41)

## COMPRESSOR OIL — For DKV-14C (DIESEL-KIKI make)

### 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 (US fl oz, Imp fl oz)

Applied model	All models
Capacity	
Total in system	200 (6.8, 7.0)
Amount of oil which can be drained	70 - 120 (2.4 - 4.1, 2.5 - 4.2)*
Compressor (Service parts) charging amount	200 (6.8, 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. Drain compressor oil from compressor discharge port 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 70 ml (2.4 US fl oz, 2.5 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 (US fl oz, Imp fl oz)

Amount of oil drained	Adjusting procedure
Above 70 (2.4, 2.5)*	Oil level is right. Pour in same amount of oil as was drained out.
Below 70 (2.4, 2.5)	Oil level may be low. Pour in 70 ml (2.4 US fl oz, 2.5 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 (6.8 US fl oz, 7.0 Imp fl oz) of oil into air conditioner system.

- (b) When oil contains chips or other foreign material;

After air conditioner system has been flushed with refrigerant, replace receiver drier. Then pour in 200 ml (6.8 US fl oz, 7.0 Imp fl oz) of oil into air conditioner system.

#### CHECKING AND ADJUSTING FOR COMPRESSOR REPLACEMENT

200 ml (6.8 US fl oz, 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.)



## COMPRESSOR OIL — For DKV-14C (DIESEL-KIKI make)

### Checking and Adjusting (Cont'd)

2. Check the purity of the oil and then adjust oil level following the procedure below.

- (a) When oil is clean;

Unit: mL (US fl oz, Imp fl oz)

Amount of oil drained from used compressor	Draining amount of oil from new compressor
Above 70 (2.4, 2.5)*	200 (6.8, 7.0) — [Amount of oil drained + 20 (0.7, 0.7)]
Below 70 (2.4, 2.5)	110 (3.7, 3.9)

\*: If amount of oil drained is greater than under normal circumstances, flush air conditioner system with refrigerant. Then install new compressor [200 mL (6.9 US fl oz, 7.0 Imp fl oz) of oil is charged in compressor service parts.]

Example: Unit: mL (US fl oz, Imp fl oz)

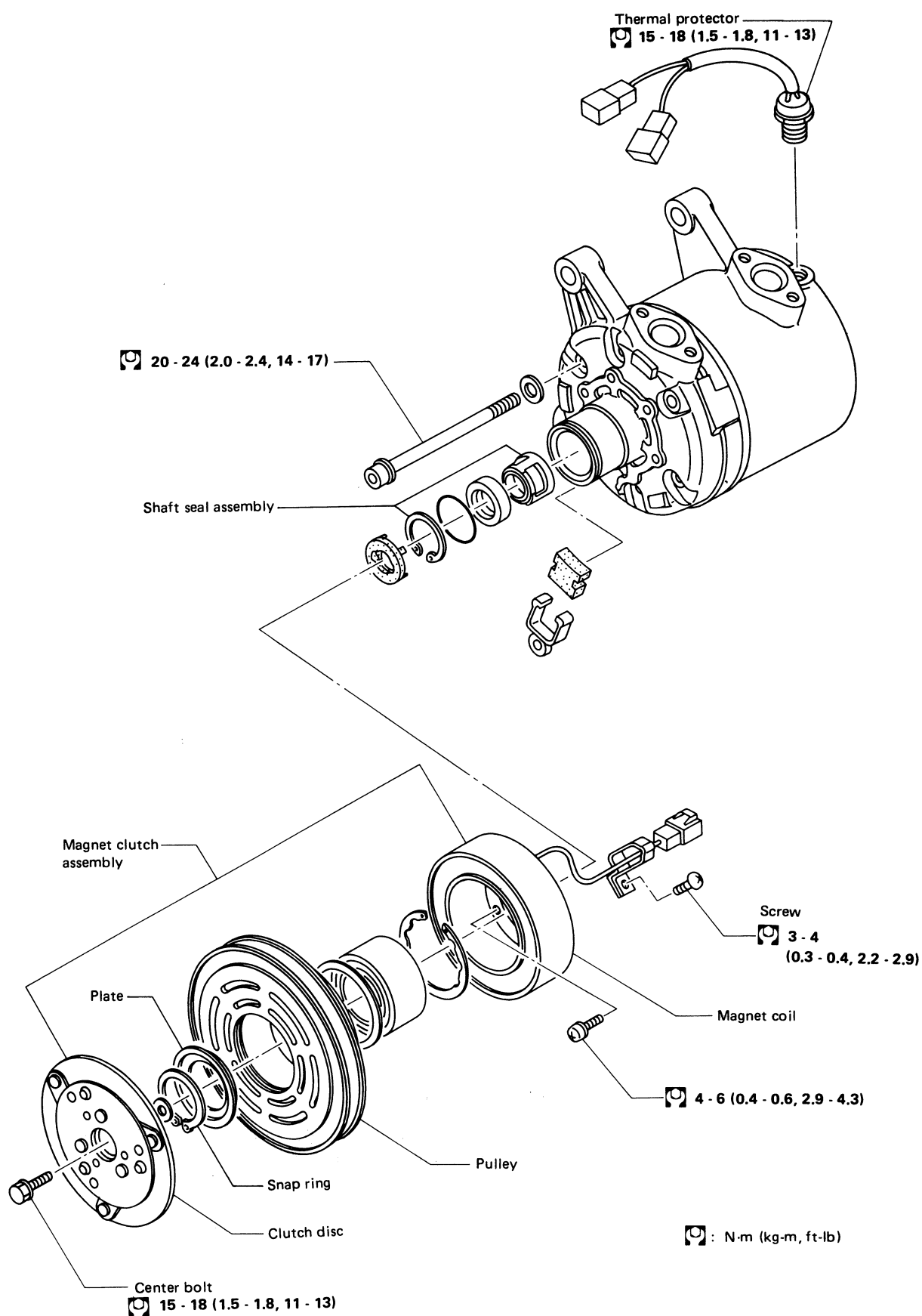
Amount of oil drained from used compressor	Draining amount of oil from new compressor
90 (3.0, 3.2)	90 (3.0, 3.2)
50 (1.7, 1.8)	110 (3.7, 3.9)

- (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 (6.8 US fl oz, 7.0 Imp fl oz) of oil is charged in compressor service parts.] .

### **Precautions**

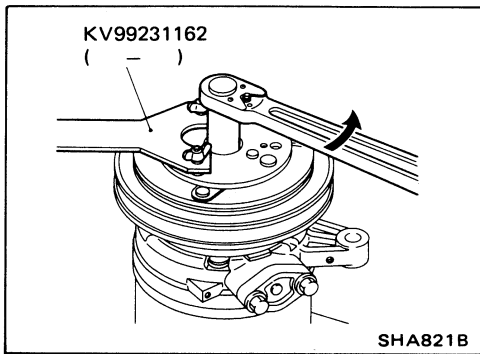
- Plug all openings to prevent moisture and foreign matter from entering.
- Do not leave compressor on its side or upside down for more than 10 minutes.
- When replacing or repairing compressor, check compressor oil level in system.
- When replacing with a new compressor, drain specified oil from new 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.

# COMPRESSOR — Model DKV-14C (DIESEL-KIKI make)



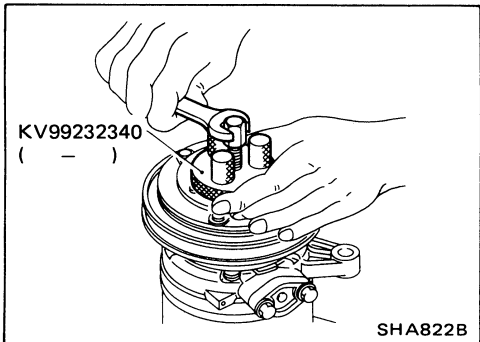
RHA402

## COMPRESSOR — Model DKV-14C (DIESEL-KIKI make)

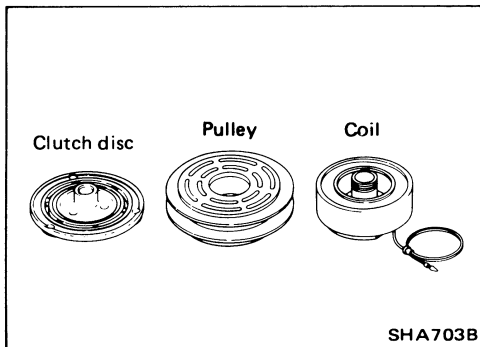


### Compressor Clutch REMOVAL

- When removing center bolt, hold clutch disc with clutch disc wrench.



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



### INSPECTION

#### Clutch disc

If the contact surface shows signs of damage due to excessive heat, the clutch disc 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 clutch disc should be replaced. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

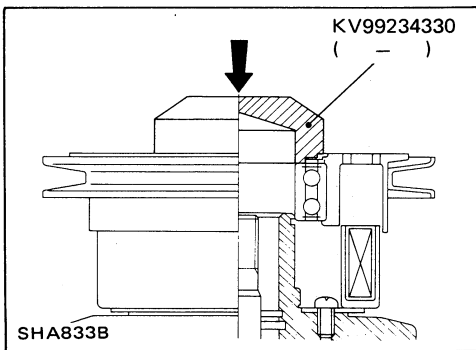
#### Coil

Check coil for loose connection or cracked insulation.

### INSTALLATION

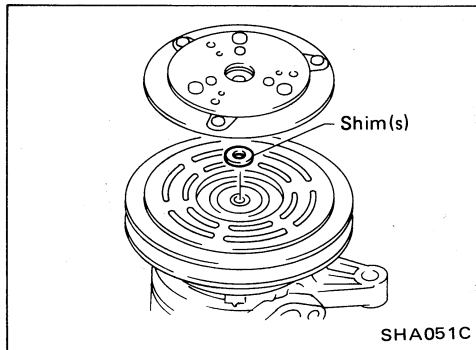
- Position coil assembly on compressor body. Be sure that the electrical terminals are reassembled in the original position. Install and tighten coil mounting screws evenly.

## COMPRESSOR — Model DKV-14C (DIESEL-KIKI make)



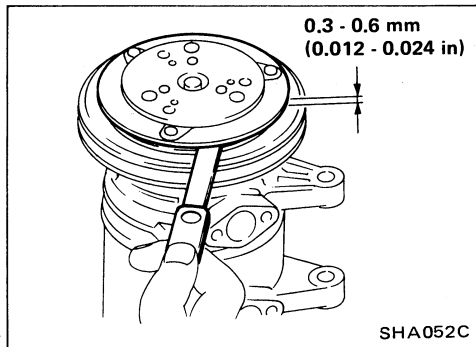
### Compressor Clutch (Cont'd)

- Press pulley assembly onto the neck of coil assembly using pulley installer.
- Wipe oil thoroughly off the clutch surface.



### ADJUSTMENT

- Select adjusting shim(s) which give(s) the correct clearance between pulley and clutch disc.
- Using a plastic mallet, tape clutch disc in place on drive shaft.
- Do not use excessive force with a plastic mallet or in a press, or internal damages may result.
- Place spring washer and center bolt onto drive shaft. Tighten center bolt to drive clutch wheel onto drive shaft.



- Check clearance around the entire periphery of clutch disc.

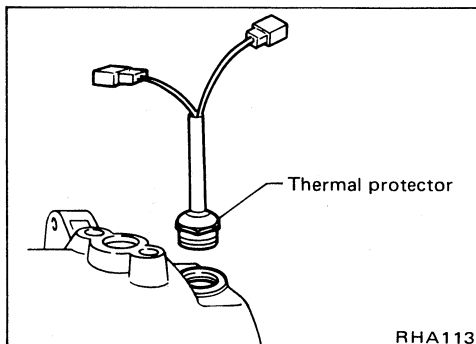
#### Disc-to-pulley clearance:

0.3 - 0.6 mm (0.012 - 0.024 in)

If the specified clearance is not obtained, replace adjusting spacer and readjust.

### BREAK-IN OPERATION

When replacing compressor clutch assembly, do not forget break-in operation, accomplished by engaging and disengaging the clutch some thirty times. Break-in operation raises the level of transmitted torque.

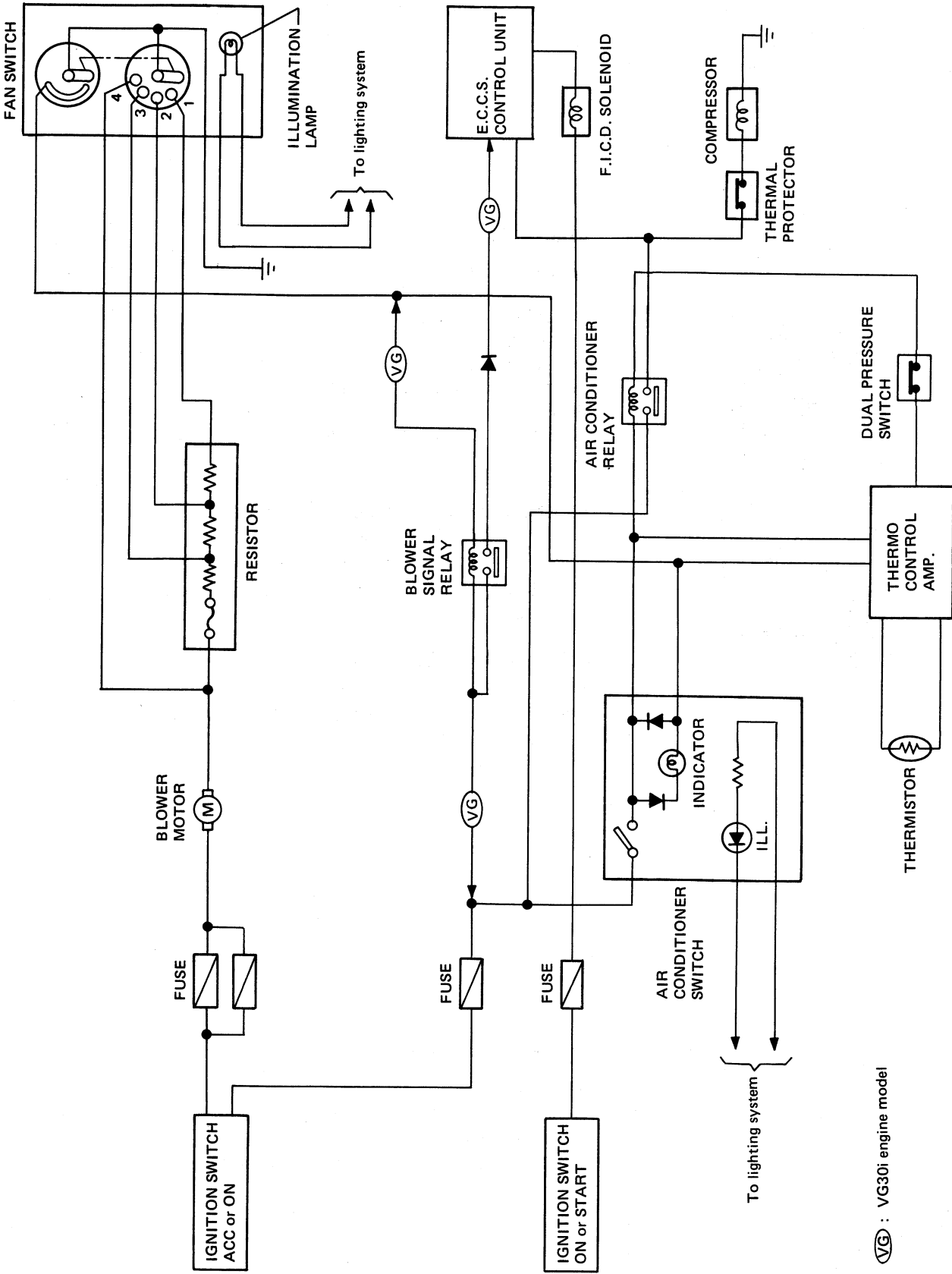


### Thermal Protector

#### INSPECTION

- When servicing, do not allow foreign matter to get into compressor.
- Check continuity between two terminals.

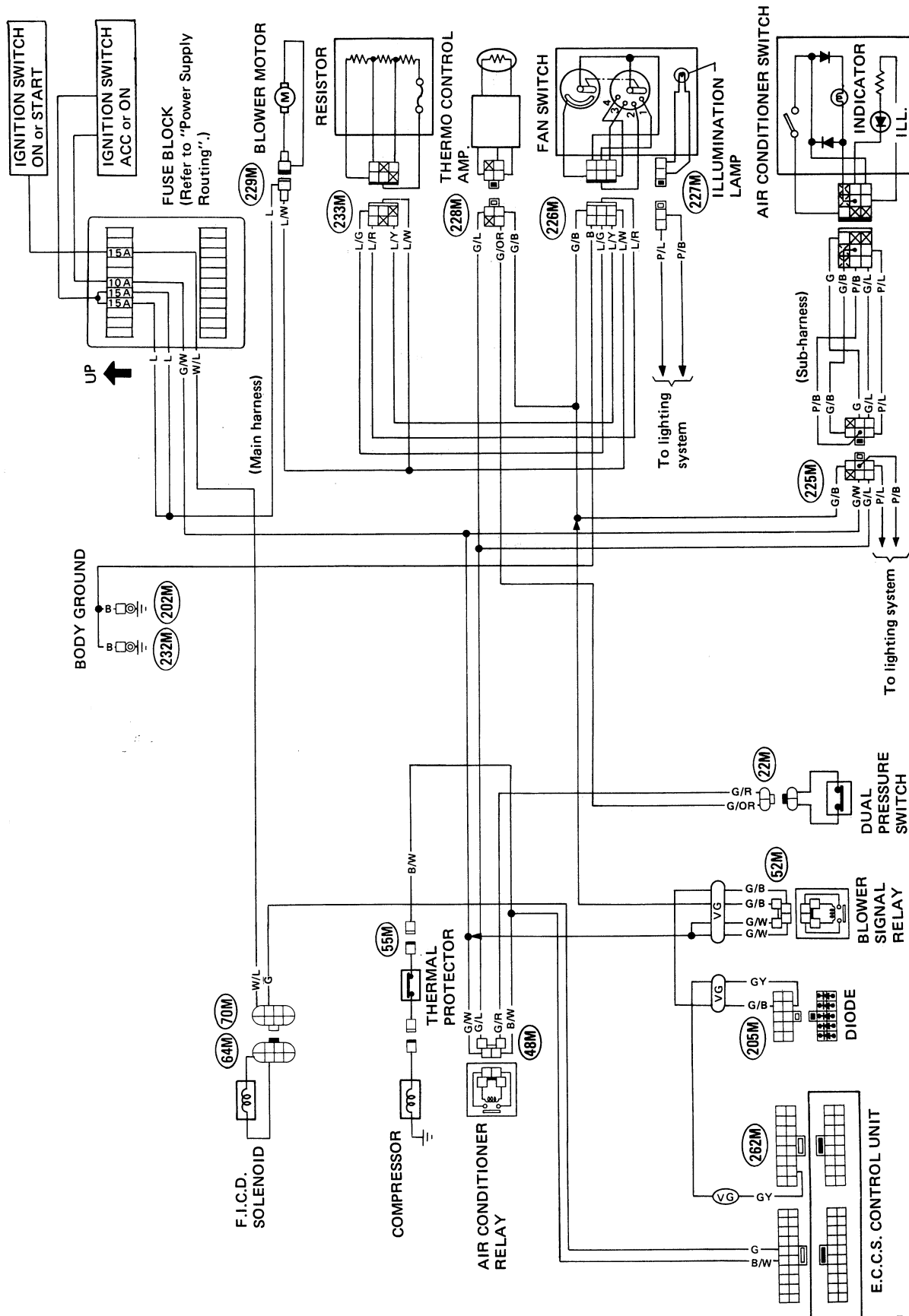
## Schematic



**VG** : VG30i engine model

RHA322A

## Wiring Diagram



**VG**: VG30i engine model

RHA323A

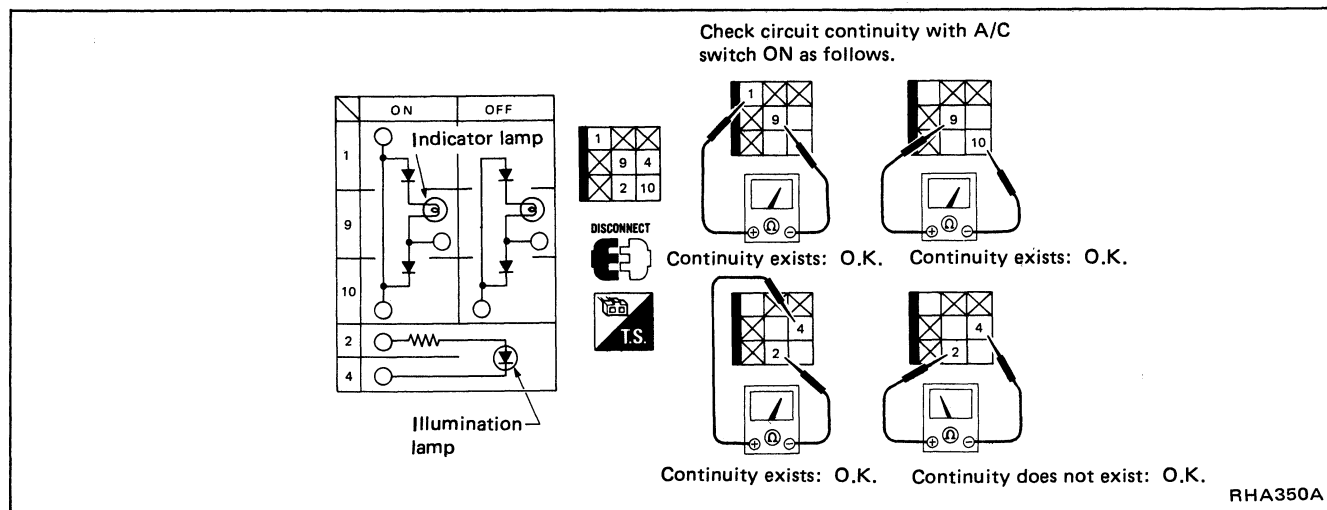
## A/C ELECTRICAL COMPONENTS

### Inspection

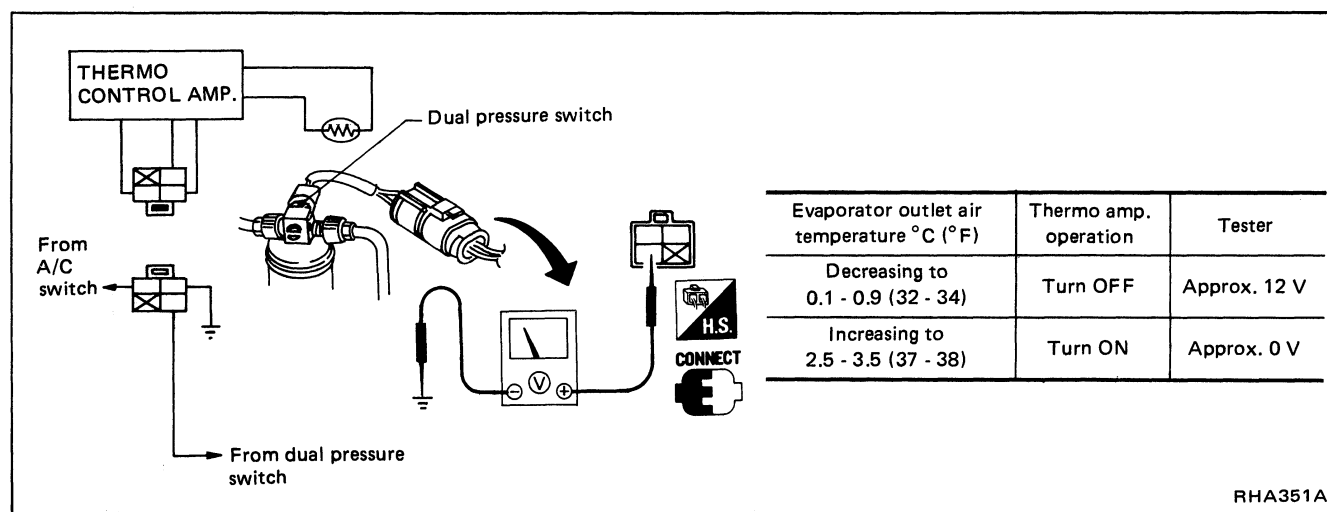
#### FAN SWITCH

Refer to page HA-6.

#### A/C SWITCH

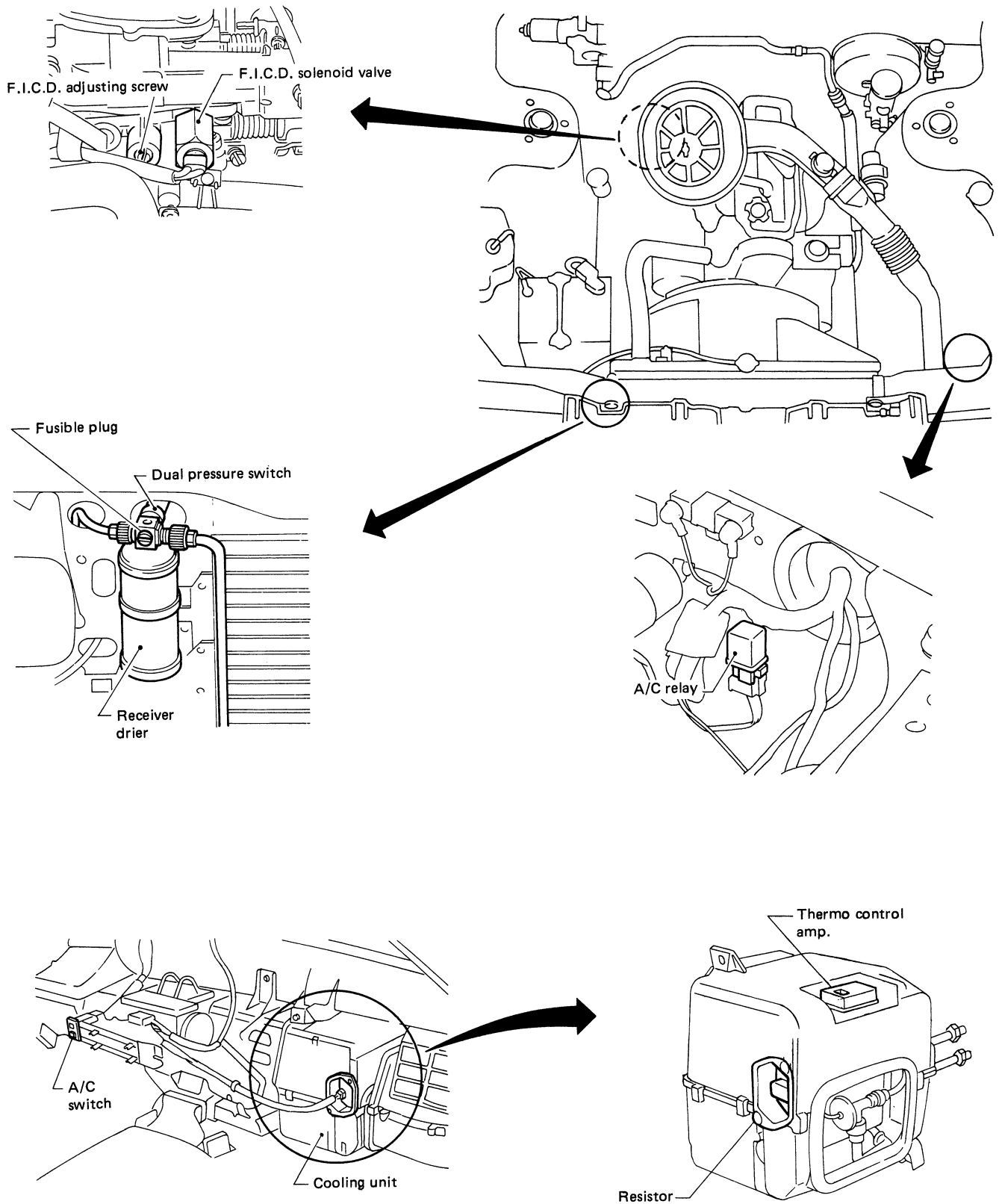


#### THERMO CONTROL AMP.





## A/C COMPONENT LAYOUT



RHA901

## SERVICE DATA AND SPECIFICATIONS (S.D.S.)

### General Specifications

#### COMPRESSOR

Model	DKV-14C
Type	Vane rotary
Displacement    cm <sup>3</sup> (cu in)/Rev	140 (8.54)
Direction of rotation	Clockwise (Viewed from drive end)
Drive belt	A type

#### LUBRICATION OIL

Model	DIESEL-KIKI make DKV-14C
Type	SUNISO 5GS
Capacity mℓ (US fl oz, Imp fl oz) Total in system	200 (6.8, 7.0)
Amount of oil which can be drained	70 - 120 (2.4 - 4.1, 2.5 - 4.2)
Compressor (Service parts) charging amount	200 (6.8, 7.0)

#### REFRIGERANT

Type	R-12
Capacity                      kg (lb)	0.8 - 0.9 (1.8 - 2.0)

### Inspection and Adjustment

#### ENGINE IDLING SPEED

When A/C is ON (F.I.C.D. is actuated)

Unit: rpm

Transmission	Engine model	
	VG30i	Z24i
Manual	850 - 950	
Automatic (In "N" range)		

#### COMPRESSOR

Model	DKV-14C
Clutch disc-to-pulley clearance mm (in)	0.3 - 0.6 (0.012 - 0.024)

#### BELT TENSION

Refer to Checking Drive Belts (MA section).

## SERVICE DATA AND SPECIFICATIONS (S.D.S.)

### Tightening Torque

#### COMPRESSOR INSTALLATION

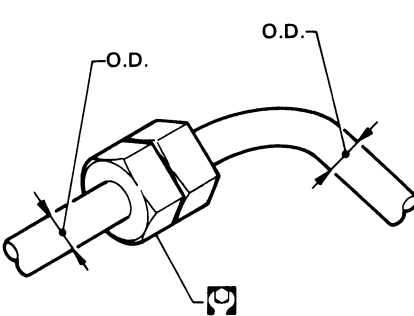
	VG engine model			Z engine model		
	N·m	kg·m	ft-lb	N·m	kg·m	ft-lb
Compressor bracket to cylinder block	36 - 50	3.7 - 5.1	27 - 37	69 - 78	7.0 - 8.0	51 - 58
Compressor to compressor bracket	36 - 50	3.7 - 5.1	27 - 37	36 - 50	3.7 - 5.1	27 - 37
Idler pulley bracket to compressor bracket	19 - 25	1.9 - 2.5	14 - 18	—	—	—

#### COMPRESSOR

Model	DKV-14C		
	N·m	kg·m	ft-lb
Center bolt	15 - 18	1.5 - 1.8	11 - 13
Thermal protector	15 - 18	1.5 - 1.8	11 - 13
Coil mounting screw	4 - 6	0.4 - 0.6	2.9 - 4.3

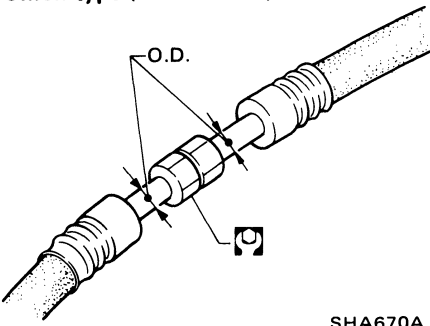
#### REFRIGERANT LINE

When connecting lines made of different material, basically use the lower tightening torque of the two.

Union type (pipe to pipe)	Pipe O.D. mm (in)	Material					
		Steel or copper			Aluminum		
		N·m	kg·m	ft-lb	N·m	kg·m	ft-lb
	6 (1/4)	10 - 20	1.0 - 2.0	7 - 14	—	—	—
	8 (5/16)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
	10 (3/8)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
	12 (1/2)	20 - 29	2.0 - 3.0	14 - 22	15 - 25	1.5 - 2.5	11 - 18
	16 (5/8)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22
	19 (3/4)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22

## SERVICE DATA AND SPECIFICATIONS (S.D.S.)

### Tightening Torque (Cont'd)

Union type (hose to hose)	Pipe O.D. mm (in)	Material					
		Steel or copper			Aluminum		
		N·m	kg·m	ft·lb	N·m	kg·m	ft·lb
	6 (1/4)	10 - 20	1.0 - 2.0	7 - 14	—	—	—
	8 (5/16)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
	10 (3/8)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
	12 (1/2)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22
	16 (5/8)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22

SHA670A

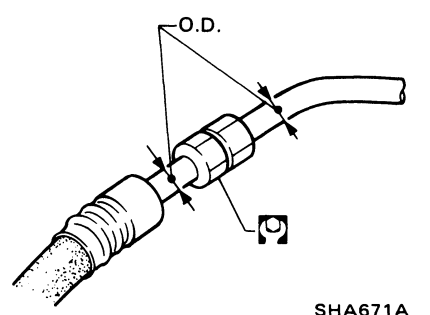
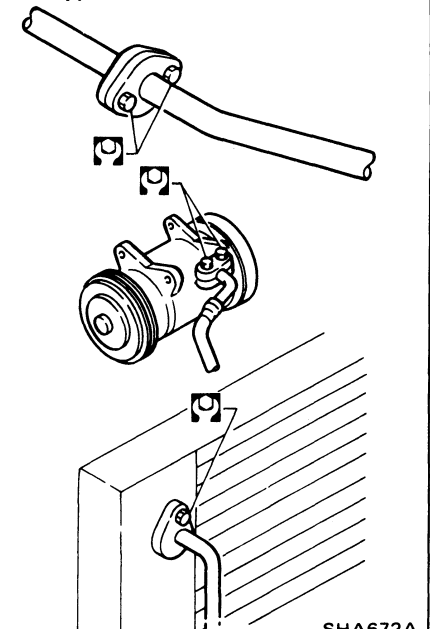
<b>Union type (hose to pipe)</b>  SHA671A	<ul style="list-style-type: none"> <li>Use tightening torque for flexible hose.</li> </ul>
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Plate type	Bolt type				Tightening torque		
	Grade	Nominal size	Bolt diameter mm	Pitch mm	N·m	kg·m	ft·lb
		M6	6.0	1.0	3 - 4	0.3 - 0.4	2.2 - 2.9
	4T	M8	8.0	1.25	8 - 11	0.8 - 1.1	5.8 - 8.0
		M10	10.0	1.5	16 - 22	1.6 - 2.2	12 - 16
		M6	6.0	1.0	6 - 7	0.6 - 0.7	4.3 - 5.1
	7T	M8	8.0	1.25	14 - 18	1.4 - 1.8	10 - 13
		M10	10.0	1.5	25 - 35	2.6 - 3.6	19 - 26

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