

HEATER & AIR CONDITIONER

SECTION **HA**

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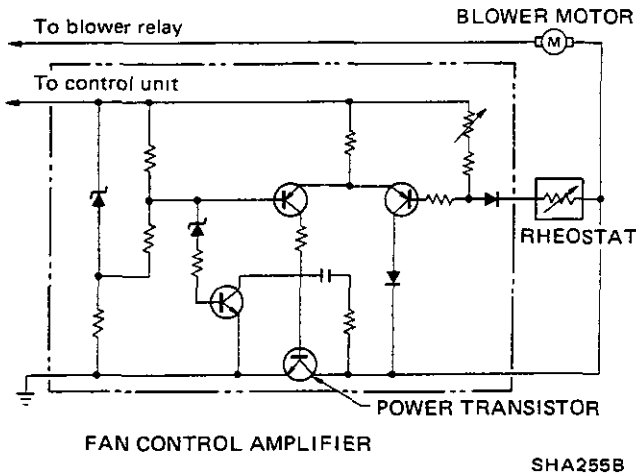
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GENERAL DESCRIPTION

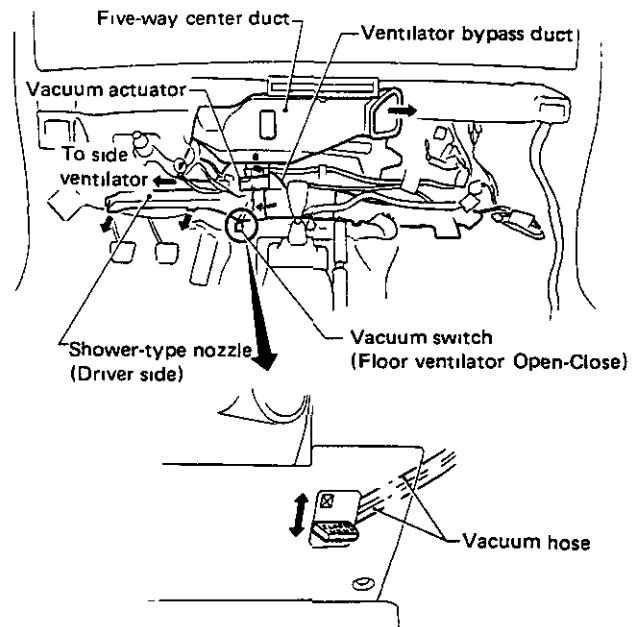
Continuously Variable Air Flow Control

The fan control amplifier, which utilizes transistor circuits, continuously controls the air flow blown out by the blower, allowing for selection of the desired air flowrate. The fan control amplifier is housed in the blower motor unit. The heat-radiating plate of the amplifier is placed in the stream of the air flow to effectively cool the transistors



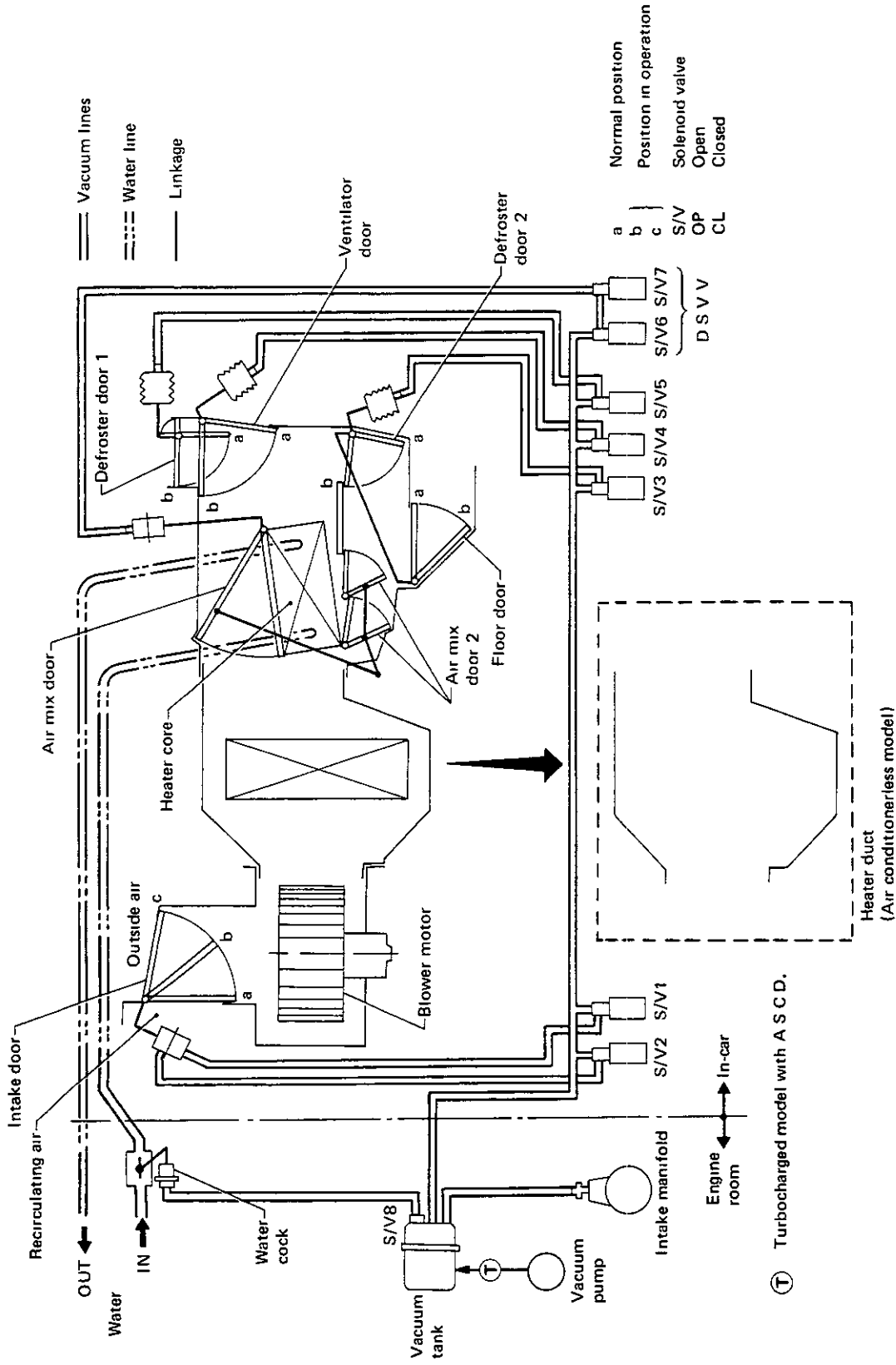
Device for Distributing Cool Air to the Feet during "FACE MODE"

A vacuum actuator is used in the cool-air distribution device to remove the hot air directed to the floor area and distribute the optimum air temperature to the driver's compartment. When the vacuum switch is turned "ON", part of the outside air (or part of the cool air on models equipped with air conditioning systems) taken in the vehicle is bypassed to the shower duct on the driver's side through the operation of the actuator



AIR FLOW AND COMPONENT LAYOUT

Air Flow



Ⓣ Turbocharged model with A S C D.

OUTLET CONTROL						
MODE	FACE	S/L	FOOT	DEMIST	DEF	
DEF DOOR 1	b	b	b	a	a	
VENT DOOR	b	b	a	a	a	
FLOOR DOOR	a	b	b	b	a	
DEF DOOR 2	a	b	b	b	a	
S/V3	CL	OP	OP	OP	CL	CL
S/V4	OP	OP	CL	CL	CL	CL
S/V5	OP	OP	OP	OP	CL	CL

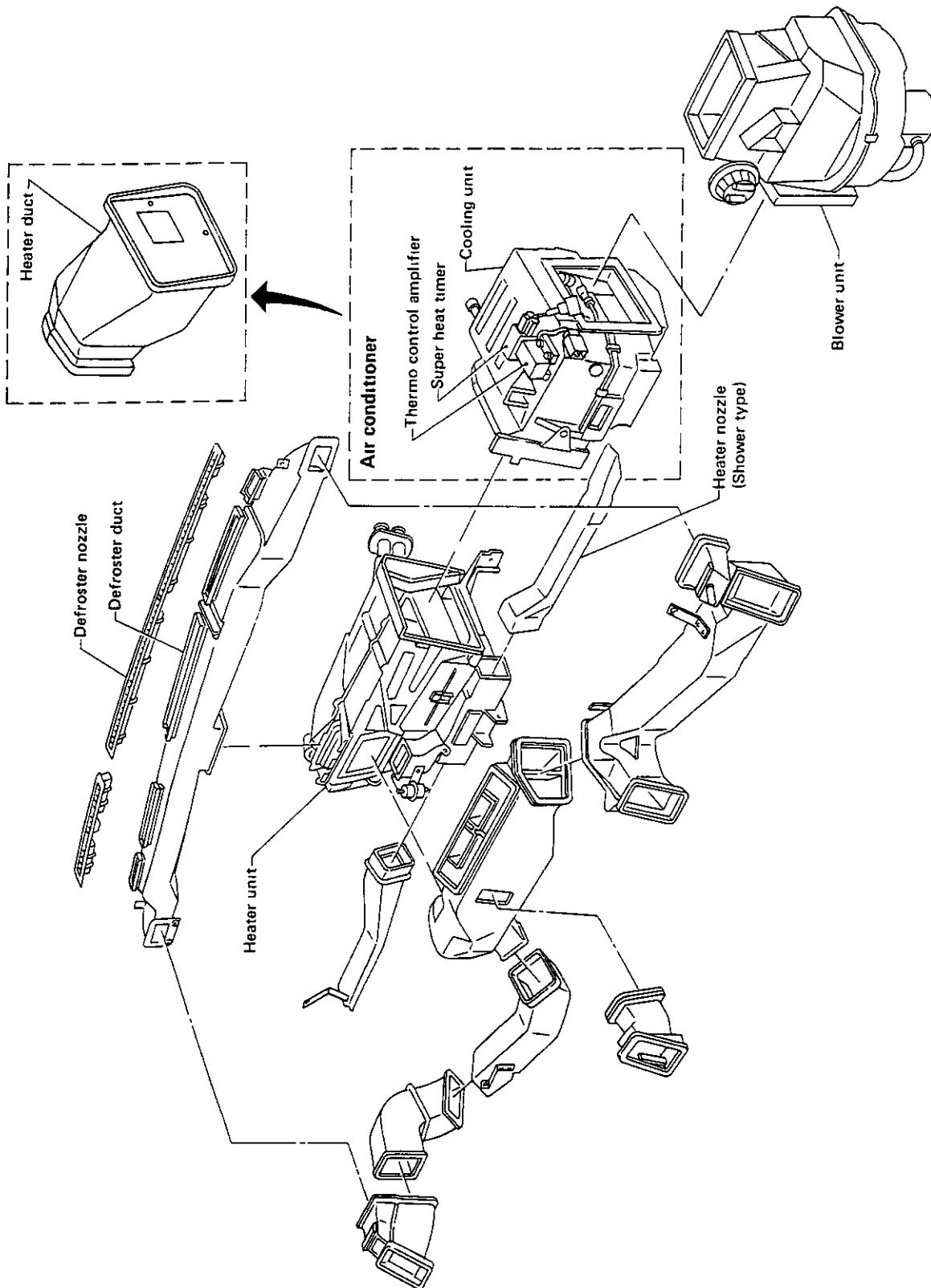
AIR MIX DOOR CONTROL					
Air mix door 1, 2	HOT side		HOLD		COLD side
	S/V6	S/V7	CL	OP	
OPERATION OF SOLENOID VALVE	OP	OP	CL	CL	OP

INTAKE CONTROL				
OPERATION OF SOLENOID VALVE	INTAKE DOOR		RECIRC OUTSIDE	
	S/V1	S/V2	c	b
OPERATION OF SOLENOID VALVE	OP	OP	OP	CL

WATER COCK CONTROL			
OPERATION OF SOLENOID VALVE	S/V8		OP
	CL	CL	
OPERATION OF SOLENOID VALVE	CL <td>CL <td>OP</td> </td>	CL <td>OP</td>	OP

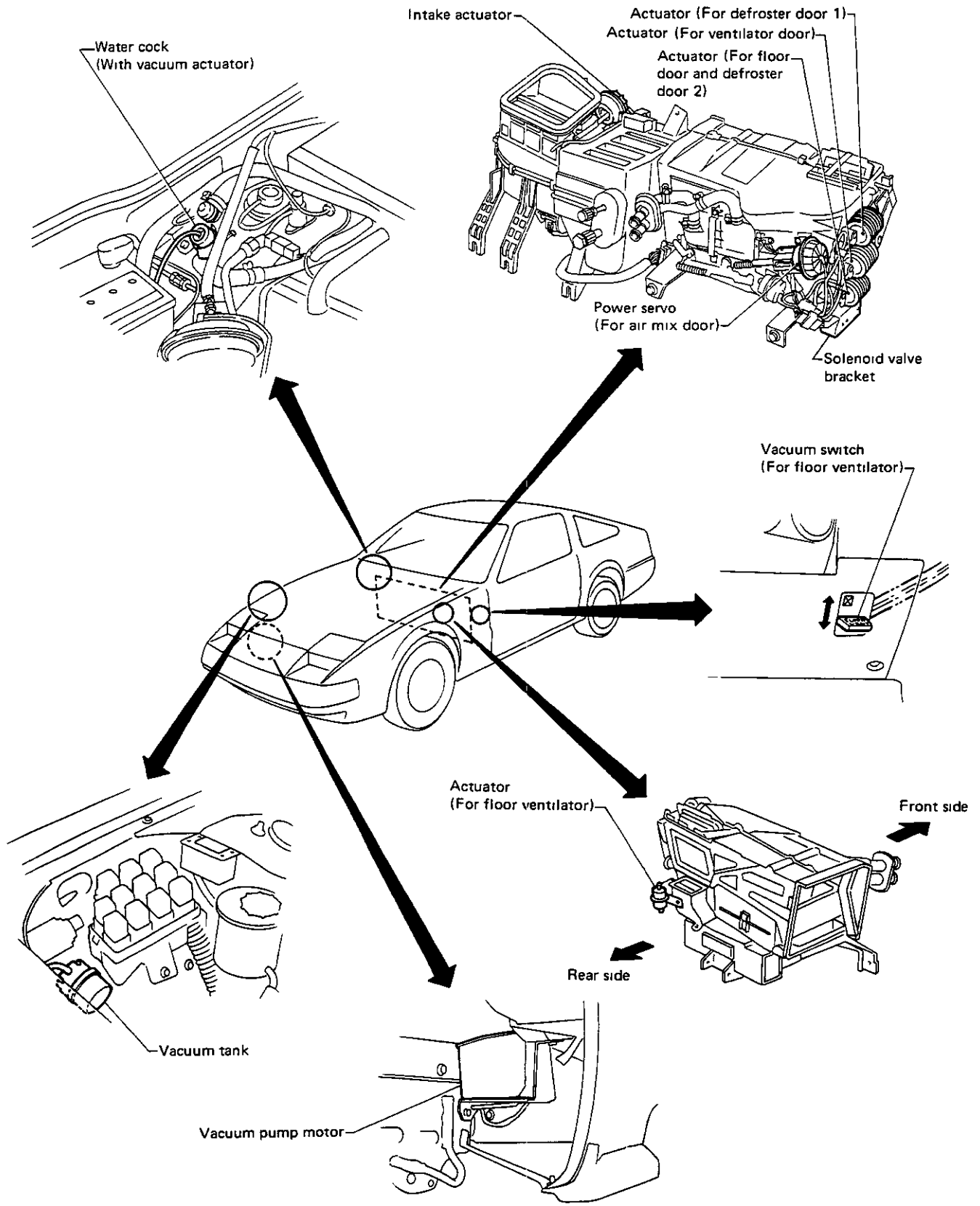
AIR FLOW AND COMPONENT LAYOUT

Component Layout



SHA232B

LOCATION OF VACUUM COMPONENTS



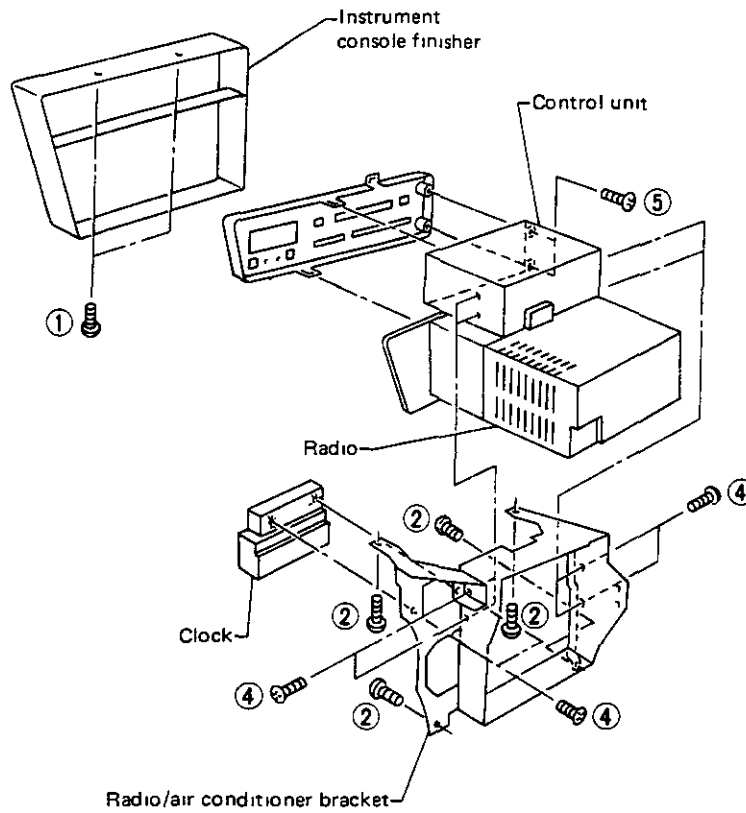
SHA233B

DOOR CONTROL

Heater and Air Conditioner Control Removal

PROCEDURES

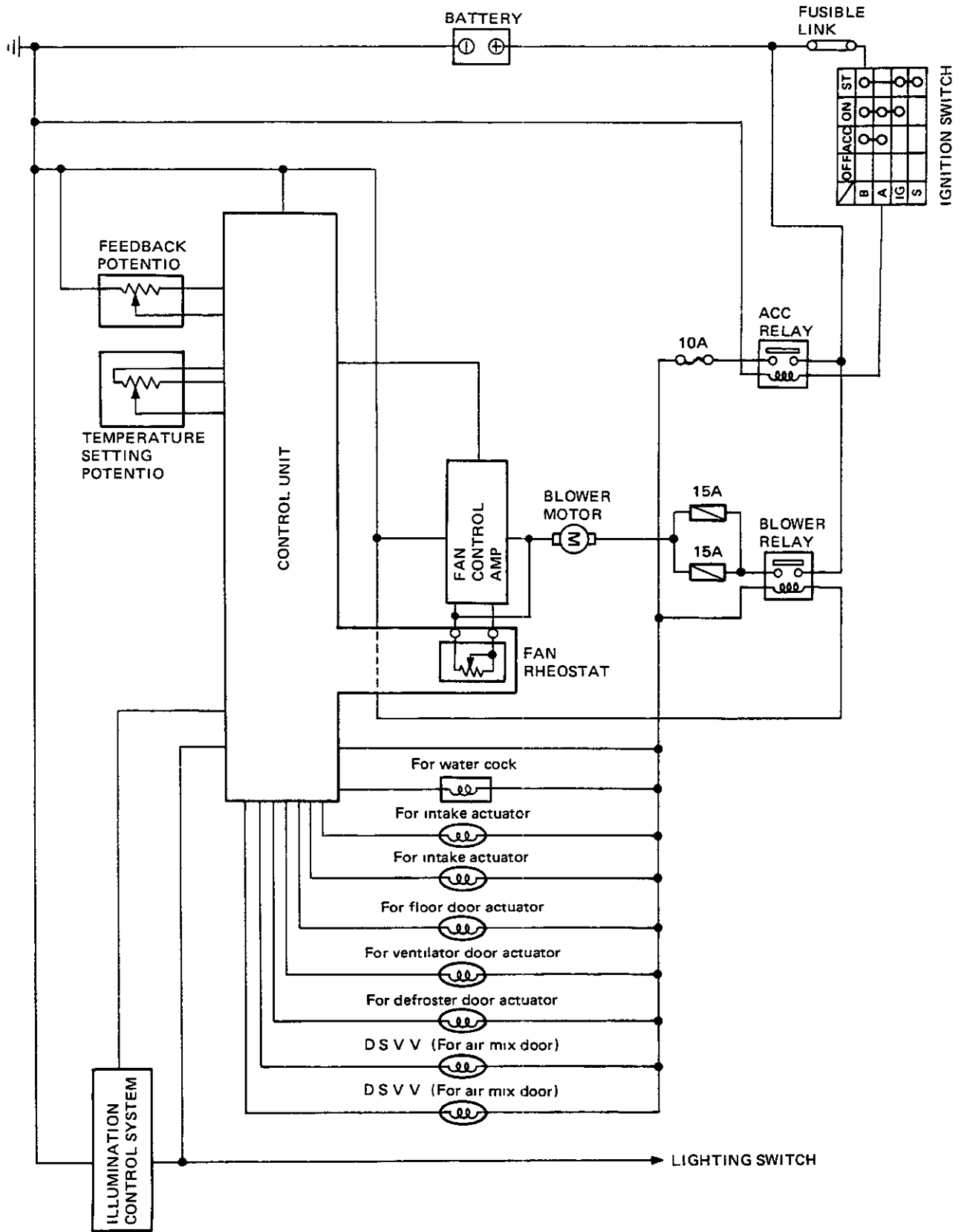
Remove each screw in the number order shown in the following illustration.



SHA234B

HEATER ELECTRICAL CIRCUIT

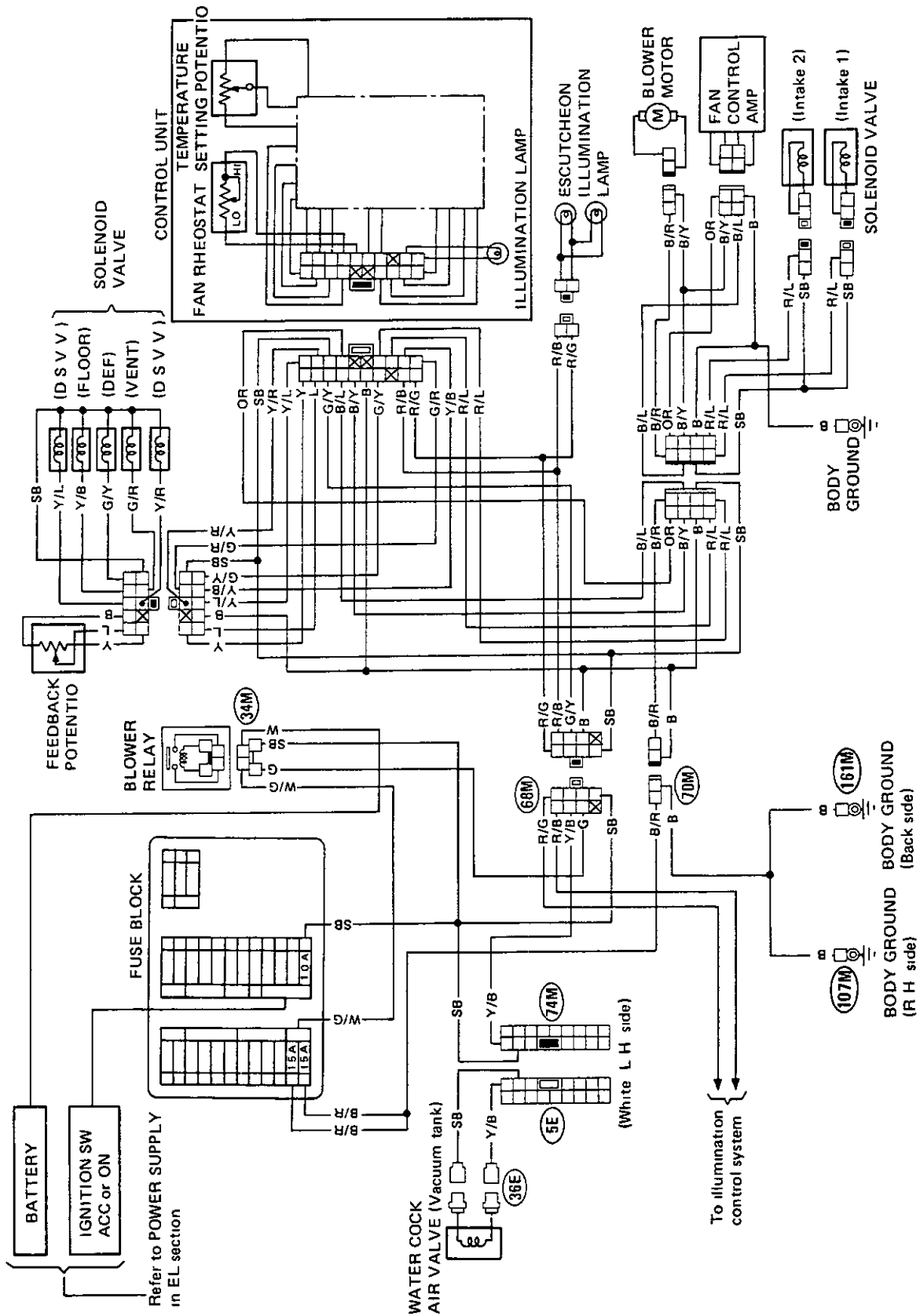
Schematic



SHA236B

HEATER ELECTRICAL CIRCUIT

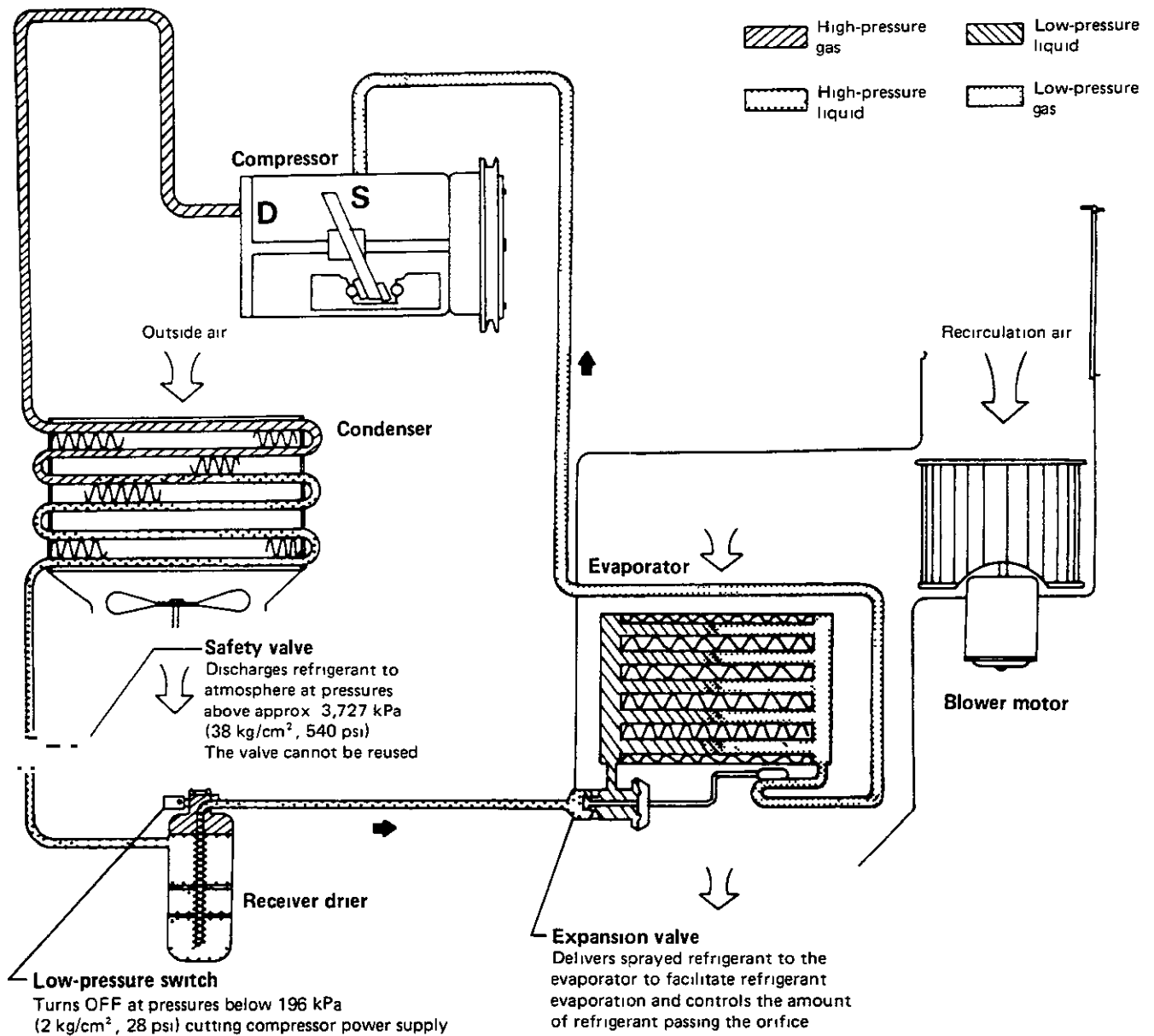
Wiring Diagram



SHA237B

DESCRIPTION—Air Conditioner (Manual)

Refrigeration Cycle

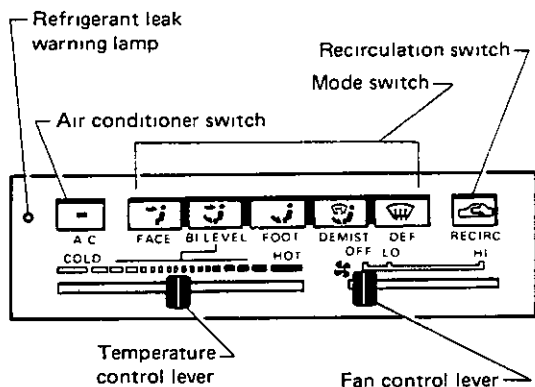


SHA238B

DESCRIPTION—Air Conditioner (Manual)

Refrigerant Leak Warning System

The refrigerant leak warning system, used in conjunction with the low-pressure switch, protects the cooler cycle from damage due to continued operation of the air conditioning system when there is a shortage of refrigerant. It also indicates when to replenish the refrigerant.



SHA227B

When the refrigerant in the cooler cycle is insufficient, it vaporizes quickly inside the evaporator. As a result, the "super heat" of the refrigerant at the outlet of the evaporator increases. If it exceeds the specified level [Approximately 45°C (81°F)], the super heat switch turns on, allowing the current to flow through the timer. If current continues to flow through the timer for the specified length of time, the timer activates to close the contacts which turn on the warning lamp.

Leak warning lamp check

Conduct a continuity test in the leak warning lamp circuit.

- 1) Turn ignition switch "ON" (with engine off) to make sure warning lamp illuminates.
- 2) Start engine. Warning lamp should go out if the amount of refrigerant is sufficient.

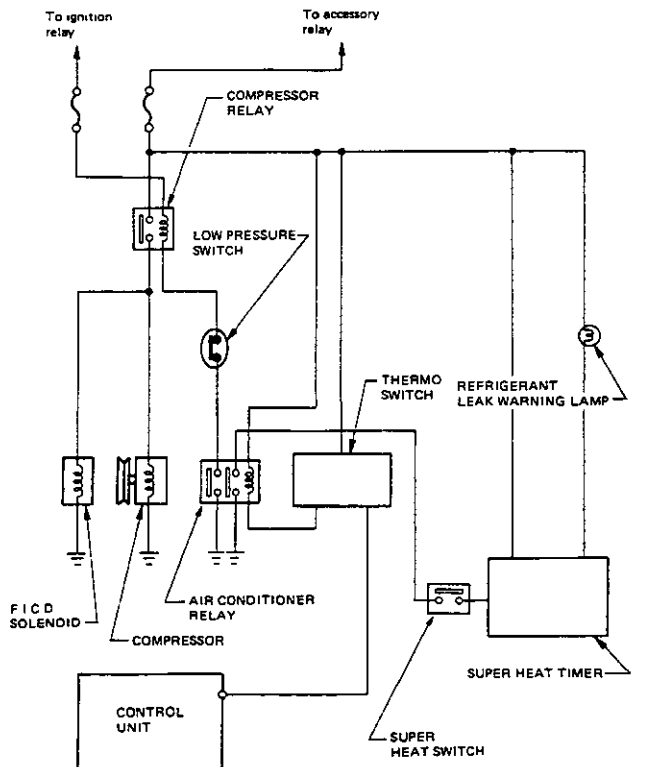
EXPLANATION OF SUPER HEAT

When a liquid under constant pressure inside a cylinder is heated, it apparently changes in three different states. The relationship between the temperature of the liquid (refrigerant) and its volume, which uses the pressure as a parameter, is shown in the graph below.

- 1) The temperature of the liquid rises along the saturated liquid line (a → b or a' → b')
- 2) When the temperature of the liquid reaches a certain level, evaporating bubbles quickly appear. This mixture of liquid and vapor continues to take place, during which the temperature remains constant until the last droplet of liquid vaporizes. Points c and c' where the entire liquid vaporizes, are located on the saturated vapor line (b → c or b' → c').
- 3) When the liquid is further heated, the temperature of the vapor rises again and its volume also increases. The volume will continue to increase as the temperature is increased.

We call this vapor "super heated vapor" (c → d or c' → d')

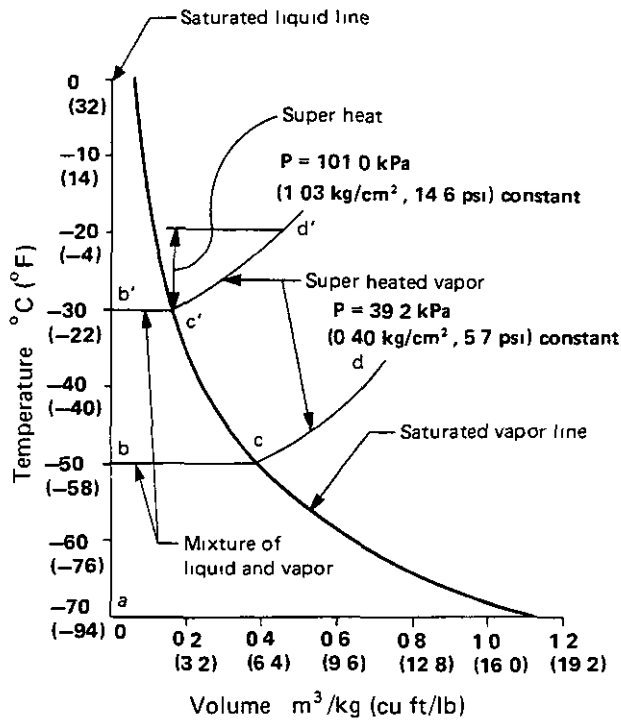
The line between points c and c' is called the "saturated vapor line."



SHA228B

DESCRIPTION—Air Conditioner (Manual)

Refrigerant Leak Warning System (Cont'd)



Relation between temperature and volume
(Refrigerant R-12)

SHA239B

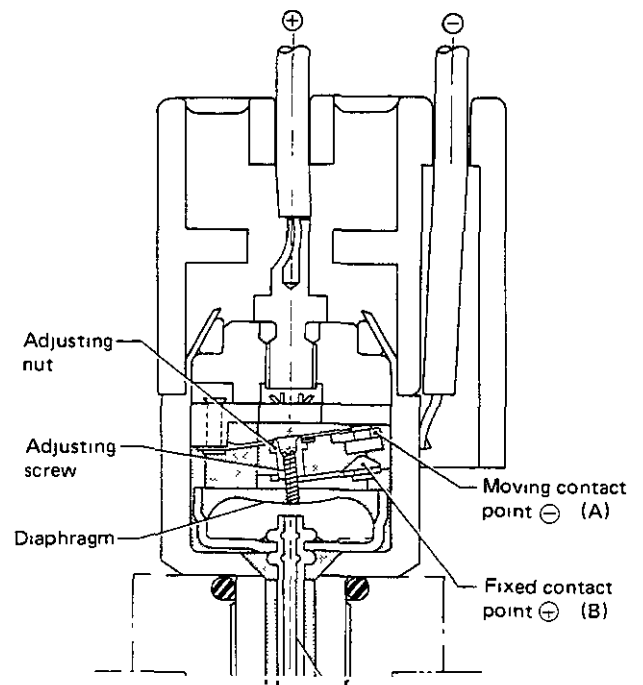
Definition

The super heat is the difference between the temperature of an optional super heated vapor point and the saturated temperature point (which is located on the saturated vapor line) under the same pressure as for the former point

SUPER HEAT SWITCH

The super heat switch, placed, in the refrigerant line at the outlet of the evaporator, consists of a diaphragm, temperature sensor, moving contact (A) and fixed contact (B). The diaphragm detects the refrigerant line pressure and the temperature sensor senses the refrigerant line temperature.

When the temperature in the refrigerant line increases, the gas charged inside the temperature sensor expands. This causes a force to move the diaphragm upward against the refrigerant line pressure. When the difference between the saturated temperature and the detected temperature in relation to the detected pressure reaches a specified condition, the adjusting screw is pushed up by the diaphragm. This then causes moving contact point (A) to move down so that the super heat switch turns "ON".



Temperature sensor
(R-12 within
capillary tube)

SHA229B

SUPER HEAT TIMER

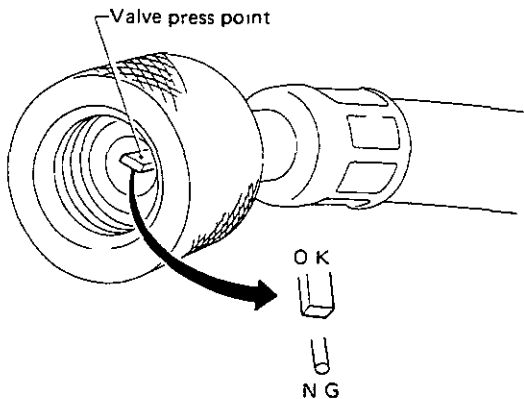
During rapid acceleration, the "super heat" increases momentarily and returns to its original level quickly even when the amount of the refrigerant is normal. Because of this, a timer, used in the warning system, detects an increase in "super heat" only when the amount of refrigerant is low, thereby preventing erroneous alarms.

DISCHARGING, EVACUATING, CHARGING AND CHECKING

Precautions

WARNING:

- Always be careful that refrigerant does not come in contact with your skin.
- Always wear eye protection when working around the system
- Keep refrigerant containers stored below 50° C (122° F) and never drop it from a high place
- 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 is burns.
- 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. Otherwise, insufficient evacuating may occur

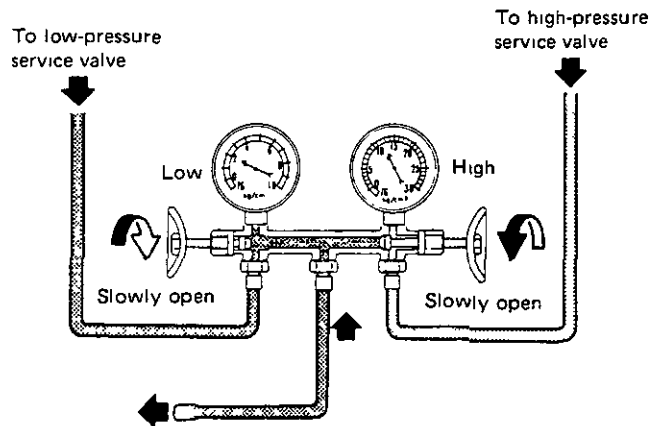


SHA919A

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

Discharging

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

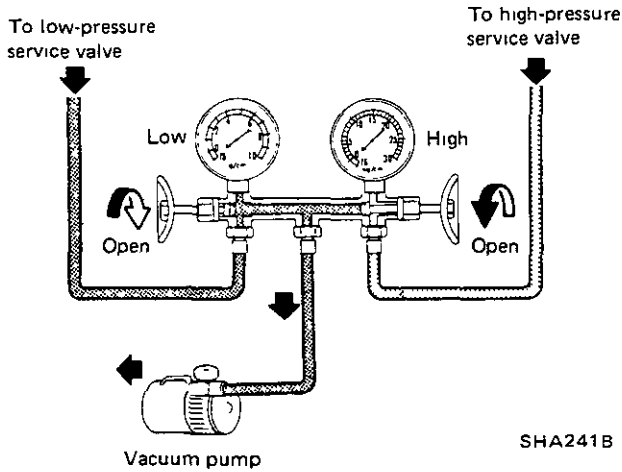


SHA240B

DISCHARGING, EVACUATING, CHARGING AND CHECKING

Evacuating The System

1. Start pump, then open both valves and run pump for about 20 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.

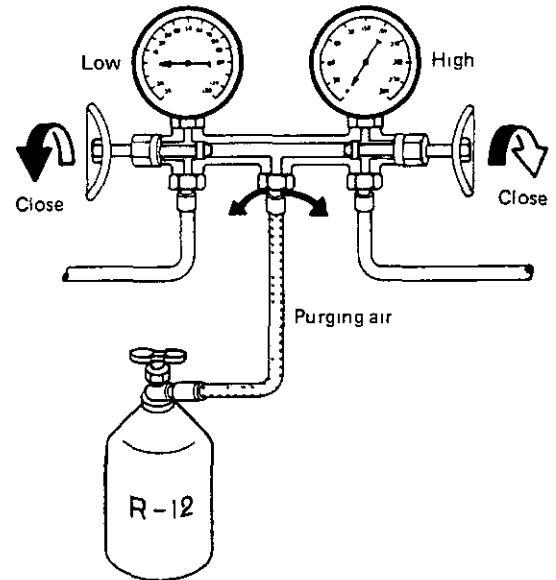
Elevation m (ft)	Vacuum of system* kPa (mmHg, inHg)
0 (0)	101.3 (760, 29.92)
300 (1,000)	98.0 (735, 28.94)
600 (2,000)	94.6 (710, 27.95)
900 (3,000)	91.3 (685, 26.97)

* Values show reading of the low-pressure gauge

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

Charging

1. Evacuate refrigerant system
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 can top
 - 2) Break seal of refrigerant can and purge air

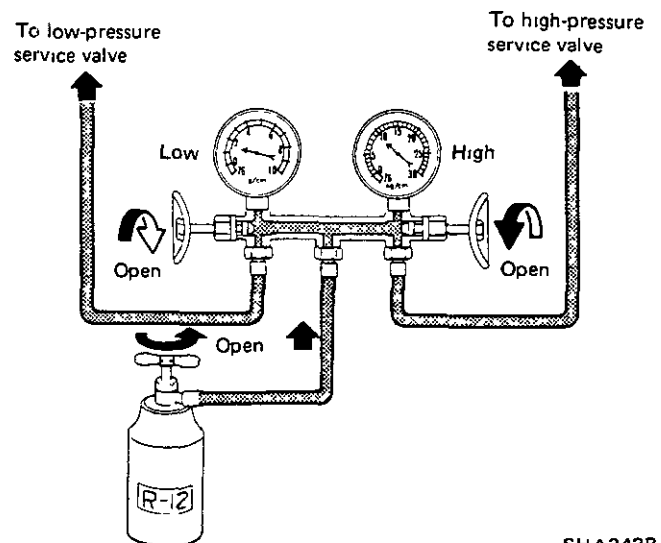


4. Charge refrigerant into system

WARNING:

Ensure that engine is off.

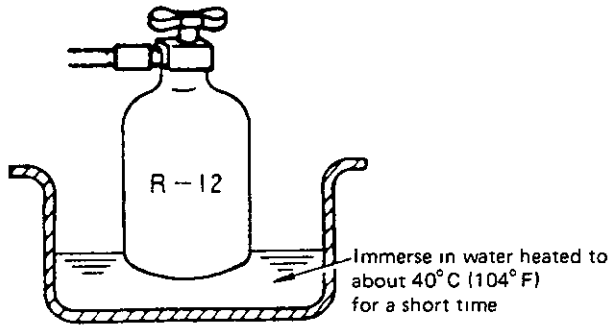
- 1) Open high- and low-pressure valves of manifold gauge and charge refrigerant into system



DISCHARGING, EVACUATING, CHARGING AND CHECKING

Charging (Cont'd)

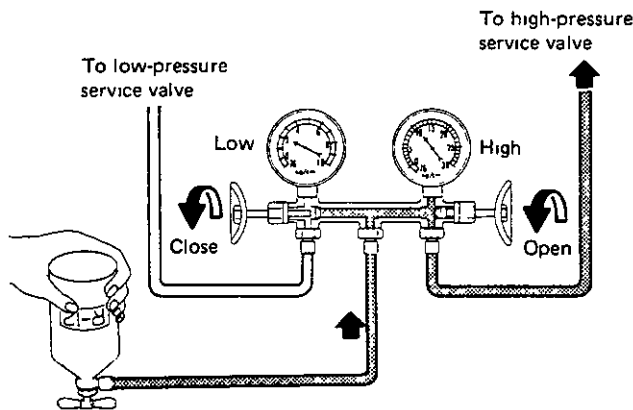
2) Quick charging



AC184A

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.

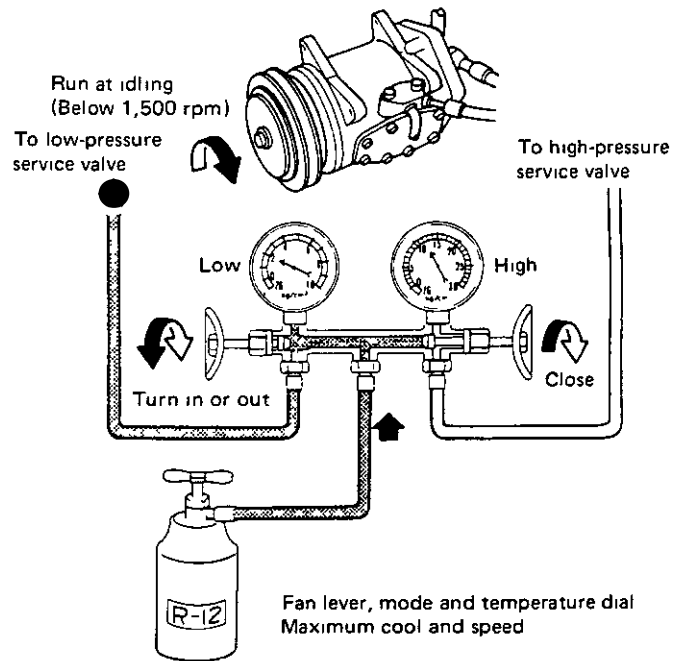


SHA244B

- When refrigerant charging speed slows down, charge it while running the compressor for ease of charging

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.



SHA245B

- Charge refrigerant while controlling low-pressure gauge reading at 275 kPa (2.8 kg/cm², 40 psi) or less by turning in or out low-pressure valve of manifold gauge.

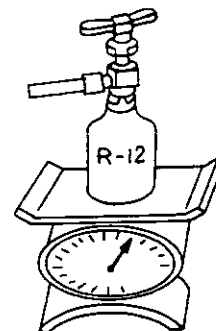
- Be sure to purge air from charging hose when replacing can with a new one.

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

Refrigerant amount:

MJS170

0.9 - 1.1 kg (2.0 - 2.4 lb)



SHA900A

DISCHARGING, EVACUATING, CHARGING AND CHECKING

Charging (Cont'd)

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.

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

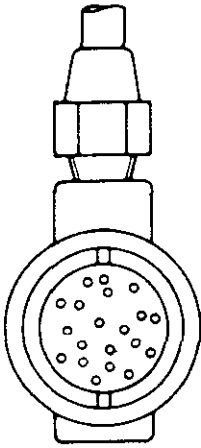
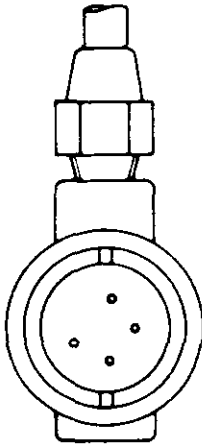
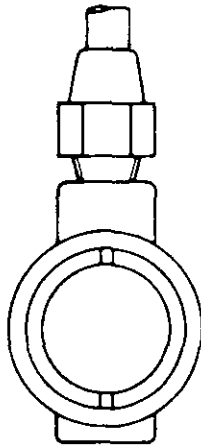
DISCHARGING, EVACUATING, CHARGING AND CHECKING

Checking Refrigerant Level

CONDITION

- Door window Open
- A/C switch ON

- TEMP lever position Max COLD
- FAN lever position Maximum speed
- 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	The bubbles are seen at intervals of 1 - 2 seconds	Almost transparent Bubbles may appear when engine speed is raised and lowered No clear difference exists between these two conditions	No bubbles can be seen
	 AC256	 AC257	 AC258	
Pressure of system	High pressure side is abnormally low	Both pressure 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. Be sure to 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

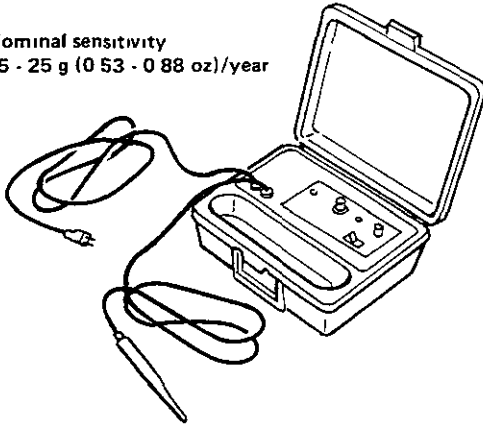
Checking Refrigerant Leaks

ELECTRIC LEAK-DETECTOR

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

In order to use the device properly, read the manuals put out by each maker and perform the specified maintenance and inspections

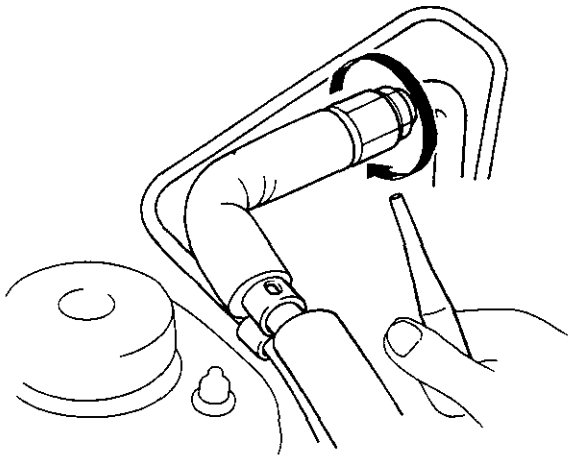
Nominal sensitivity
15 - 25 g (0.53 - 0.88 oz)/year



SHA733A

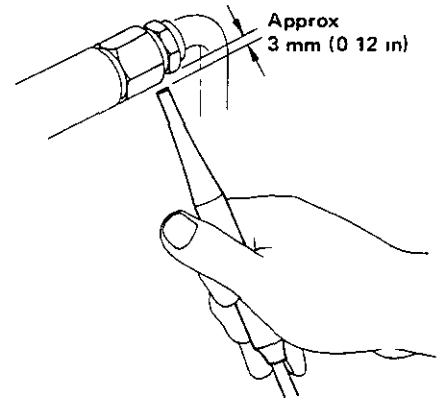
GENERAL PRECAUTIONS FOR HANDLING LEAK DETECTOR

- 1 Each fitting must be checked around its entire periphery



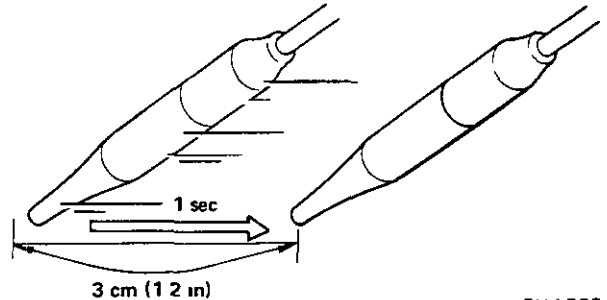
SHA734A

- 2 Move probe close to and 3 mm (0.12 in) away from the point to be checked



SHA735A

- 3 The moving speed of the probe must be maintained at less than 3 cm (1.2 in)/sec



SHA736A

MEASUREMENT STANDARD

If any reaction is noted using a detector having a nominal sensitivity of 15 to 25 g (0.53 to 0.88 oz)/year, that portion checked be found as leaking, and therefore must be repaired.

- Oil deposited during assembling must be wiped off before inspection
- If any trace of oil is noted at and around connection fittings, it is a sure indication that refrigerant is leaking
- When the gas leaking point is found, disconnect that line and replace the O-ring. Check seal seat for fit for further use and then tighten connections to the specified torque.
- Do not overtighten.

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
Mode switch position	(Face)
Recirculation switch position	RECIRC ON
FAN speed	MAX HI
Engine speed	1,500 rpm
Time required before starting testing after air conditioner starts operating	More than 10 minutes

TEST READING

Recirculating-to-discharge air temperature table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	At temperature °C (°F)	
50 - 60	20 (68)	4.5 - 5.0 (40 - 41)
	25 (77)	8.6 - 9.5 (47 - 49)
	30 (86)	12.7 - 14.1 (55 - 57)
	35 (95)	16.7 - 18.6 (62 - 65)
	40 (104)	20.8 - 23.1 (69 - 74)
60 - 70	20 (68)	5.0 - 5.5 (41 - 42)
	25 (77)	9.5 - 10.5 (49 - 51)
	30 (86)	14.1 - 15.5 (57 - 60)
	35 (95)	18.6 - 20.5 (65 - 69)
	40 (104)	23.1 - 25.4 (74 - 78)

A/C PERFORMANCE TEST

Performance Chart (Cont'd)

Ambient air temperature to compressor pressure table

Ambient air		High pressure (Discharge side) kPa (kg/cm ² , psi)	Low pressure (Suction side) kPa (kg/cm ² , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	853 - 1,049 (8.7 - 10.7, 124 - 152)	59 - 78 (0.6 - 0.8, 9 - 11)
	25 (77)	1,040 - 1,275 (10.6 - 13.0, 151 - 185)	88 - 108 (0.9 - 1.1, 13 - 16)
	30 (86)	1,216 - 1,491 (12.4 - 15.2, 176 - 216)	108 - 137 (1.1 - 1.4, 16 - 20)
	35 (95)	1,393 - 1,706 (14.2 - 17.4, 202 - 247)	137 - 167 (1.4 - 1.7, 20 - 24)
	40 (104)	1,579 - 1,932 (16.1 - 19.7, 229 - 280)	157 - 196 (1.6 - 2.0, 23 - 28)

- a. The pressure will change in the following manner with changes in conditions:
- When blower speed is low, discharge pressure will drop
 - When the relative humidity of intake air is low, discharge pressure will drop

- b. The temperature will change in the following manner with changes in conditions:
- When the ambient air temperature is low, the outlet air temperature will become low.

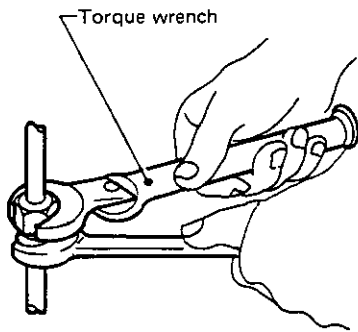
PRECAUTIONS FOR REFRIGERANT CONNECTION

WARNING.

Gradually loosen discharge side hose fitting, and remove it after remaining pressure has been released

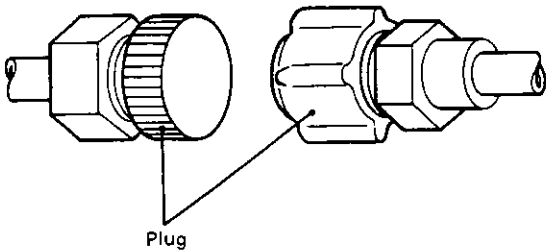
When replacing or cleaning refrigerant cycle components, observe the following

- 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, be sure to use a torque wrench



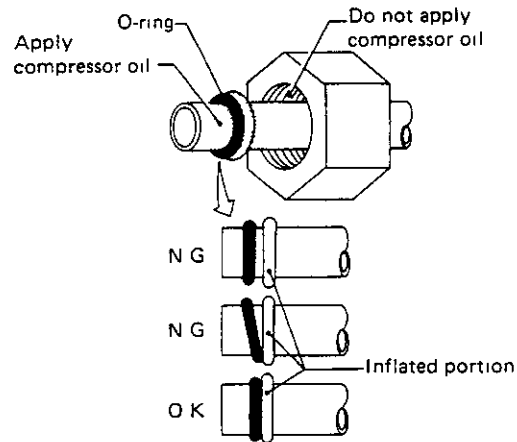
SHA896A

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



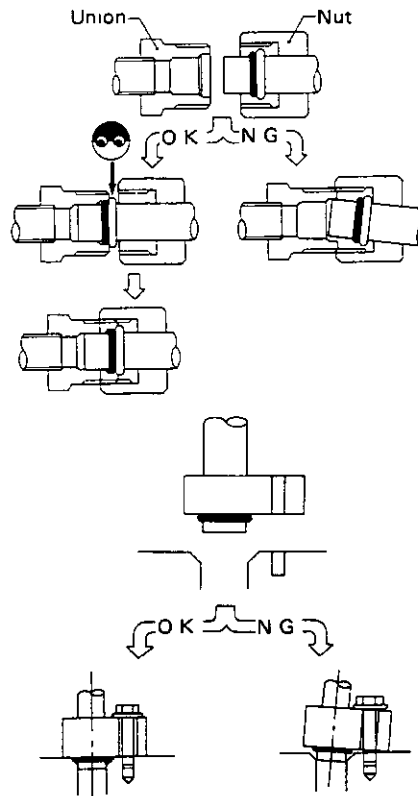
SHA058

- Do not reuse used O-ring
- 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



SHA897A

- After inserting tube into union until O-ring is no more visible, tighten nut to specified torque

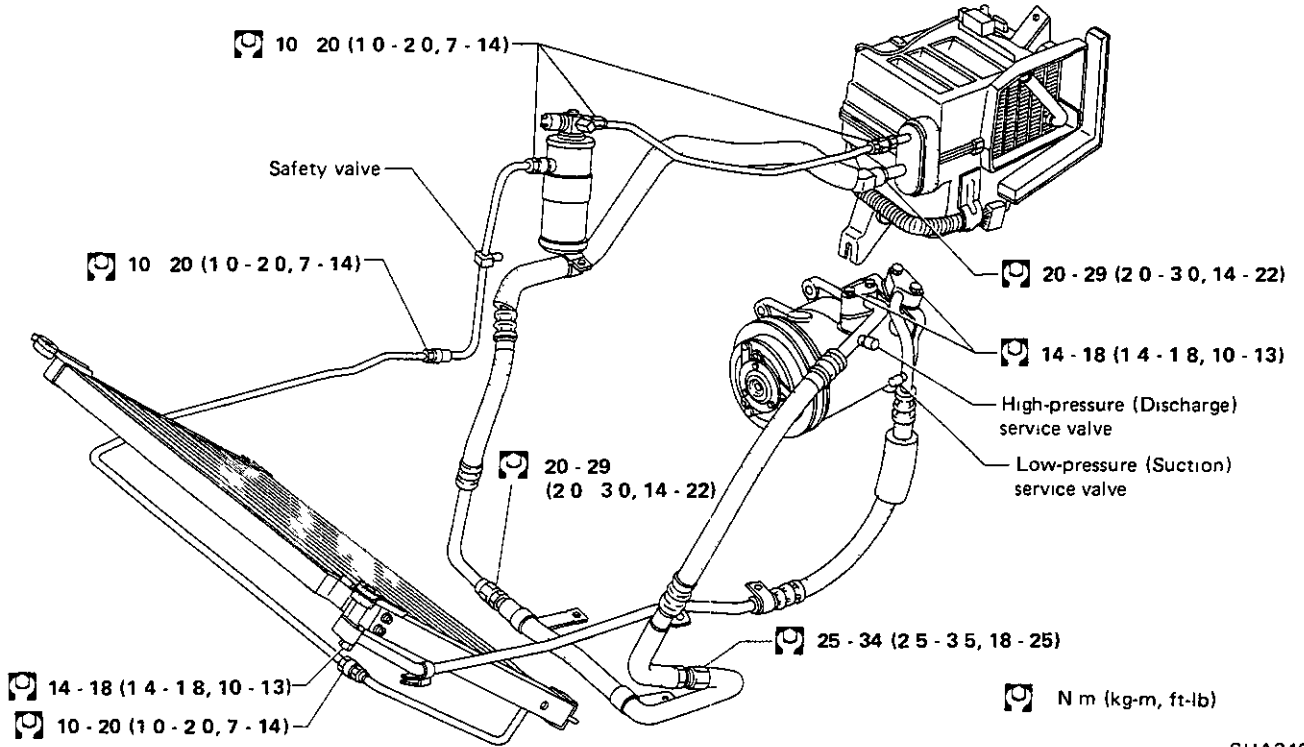


SHA898A

- After connecting line, conduct leak test and make sure that there is no leak from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Check fit for further use and then tighten connections to seal seat for the specified torque

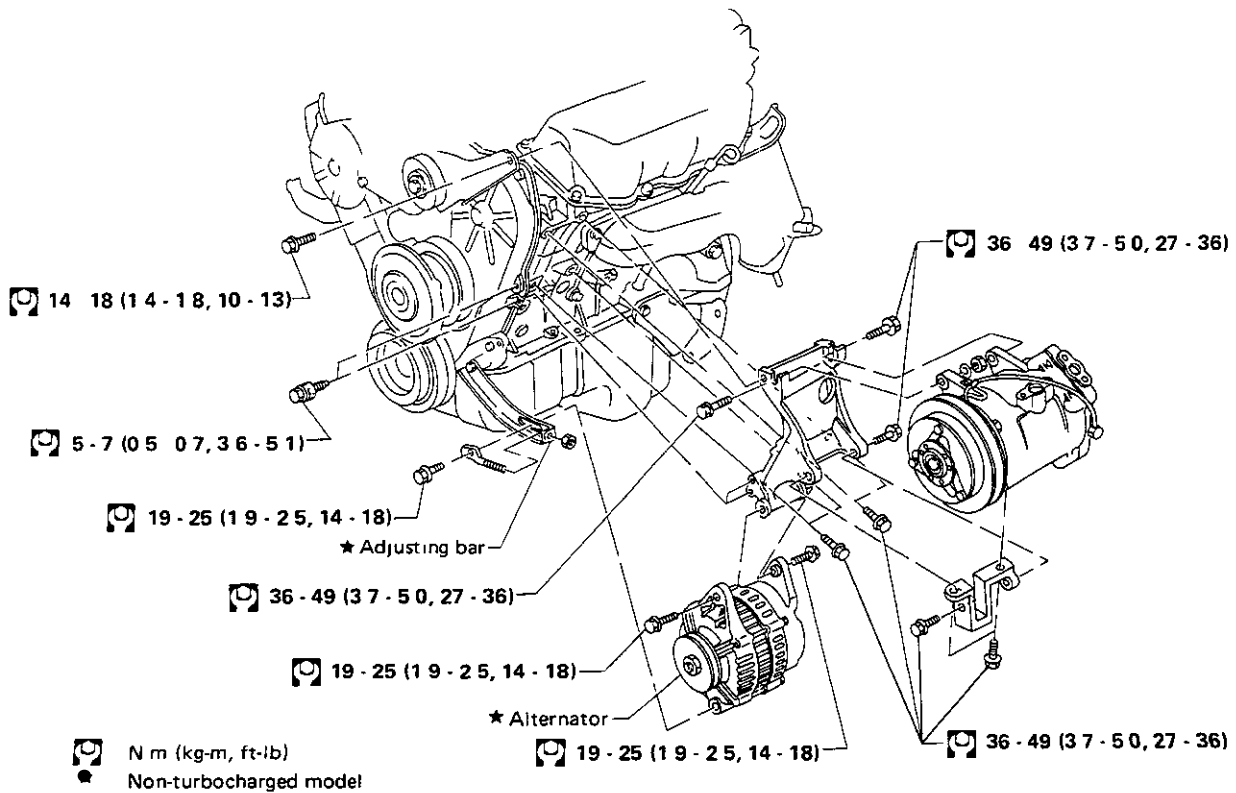
PIPING, COMPRESSOR MOUNTING AND F.I.C.D.

Refrigerant Lines



SHA246B

Compressor Mounting



SHA247B

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

Idle Speed Adjusting and Checking

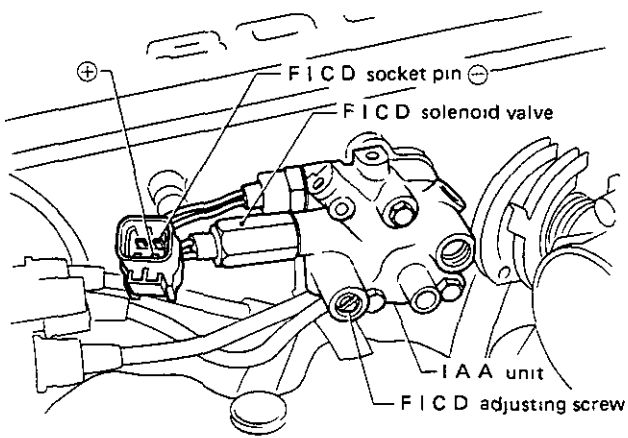
FAST IDLE CONTROL DEVICE (F.I.C.D.)

- 1 Run engine until it reaches operating temperature.
- 2 With air conditioning system OFF (when compressor is not operating), make sure that engine is at correct idle speed
- 3 With air conditioning system ON (Recirculation switch at "RECIRC" position, fan control lever at "HI" position), make sure that compressor and F I C D solenoid valve are functioning properly
- 4 For non-turbocharged model, set idle speed at the specified value
For turbocharged model, make sure that idle speed is at the specified value (Non-adjustable)

ENGINE IDLING SPEED

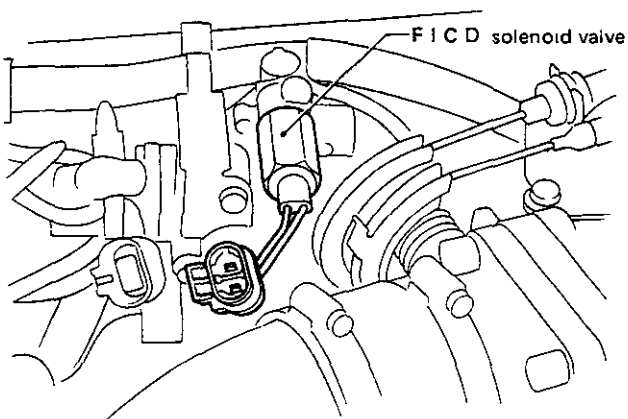
Transmission		Non-turbocharged model	Turbocharged model
When A/C is OFF			
M/T	rpm	650 - 750	650 - 750
A/T	rpm	650 - 750 at "D" range	600 - 700 at "D" range
When A/C is ON			
M/T	rpm	750 - 850	750 - 850
A/T	rpm	750 - 850 at "D" range	750 - 850 at "D" range

Non-turbocharged model



SHA223B

Turbocharged model



SHA248B

COMPRESSOR OIL—For MJS170

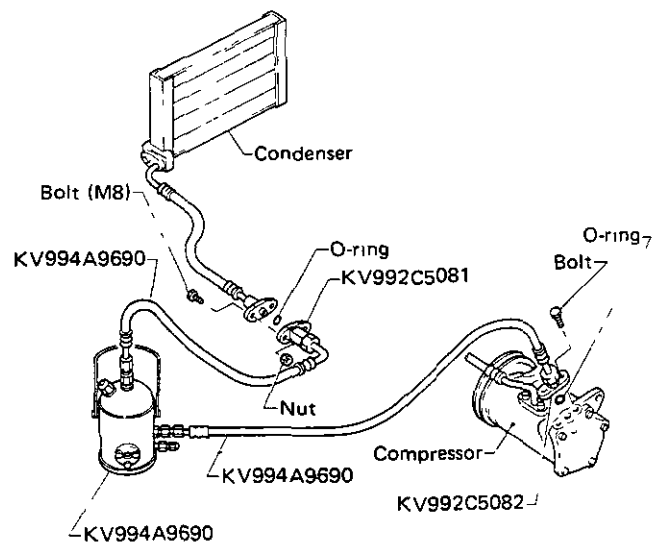
Checking and Adjusting

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

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

Total amount of oil in the system:

150 ml (5.1 US fl oz, 5.3 Imp fl oz)



SHA017A

- 1 Connect oil separator KV994A9690 between compressor discharge side and condenser
- 2 Evacuate and charge the system
- 3 Operate compressor at engine idling with air conditioner set for maximum cooling and high fan speed
- 4 Stop compressor operation after 10 minutes

Never allow engine speed to exceed idling speed

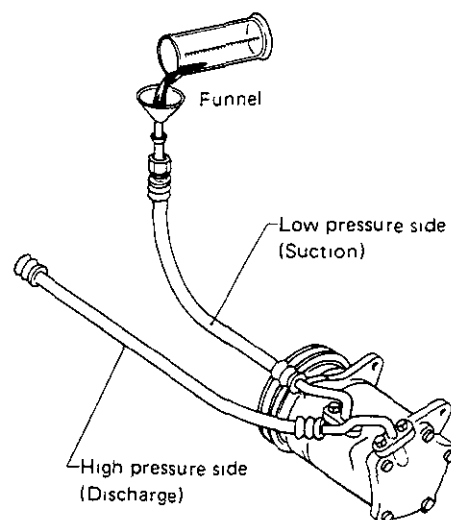
CAUTION

Do not continue compressor operation for more than 10 minutes

- 5 Disconnect oil separator and connect refrigerant line to original positions
- 6 Disconnect low flexible hose from compressor suction valve
- 7 Add new oil from compressor suction port

Amount of oil to be added:

120 ml (4.1 US fl oz, 4.2 Imp fl oz)



SHA702

- **Oil remains unremoved in the system about 30 ml (1.0 US fl oz, 1.1 Imp fl oz).**

- 8 After adding oil, rotate compressor clutch by hand 5 to 10 turns
- 9 Connect refrigerant line and evacuate and charge system
- 10 Conduct leak test and performance test
- 11 Gradually loosen drain cap of oil separator to release residual pressure. Remove cap and drain oil
- 12 To prevent formation of rust and intrusion of moisture or dust, perform the following before placing oil separator kit into storage:
 - 1) Cap each opening of flexible hose and double union securely
 - 2) Cap oil separator, evacuate it from service valve, and charge refrigerant

COMPRESSOR OIL—For MJS170

Checking and Adjusting (Cont'd)

IF OIL SEPARATOR IS NOT AVAILABLE

Add oil in accordance with the table below

Condition		Amount of oil to be added ml (US fl oz, Imp fl oz)
Replacement of compressor		1 Remove all oil from new and old compressors * 2 Charge new compressor with the same amount of oil as was in the old compressor
Replacement of evaporator		80 (2 7, 2 8)
Replacement of receiver dryer (liquid tank)		Oil need not be added
Replacement of condenser	There is no sign of oil leakage from condenser	Oil need not be added
	There are evidences of a large amount of oil leakage from condenser	60 (2 0, 2 1)
Replacement of flexible hose or pipe	There is no sign of oil leakage	Oil need not be added
	There are evidences of a large amount of oil leakage	70 (2 4, 2 5)
Gas leakage	There is no sign of oil leakage	Oil need not be added
	There are evidences of a large amount of oil leakage	70 (2 4, 2 5)

* Remove compressor oil as follows

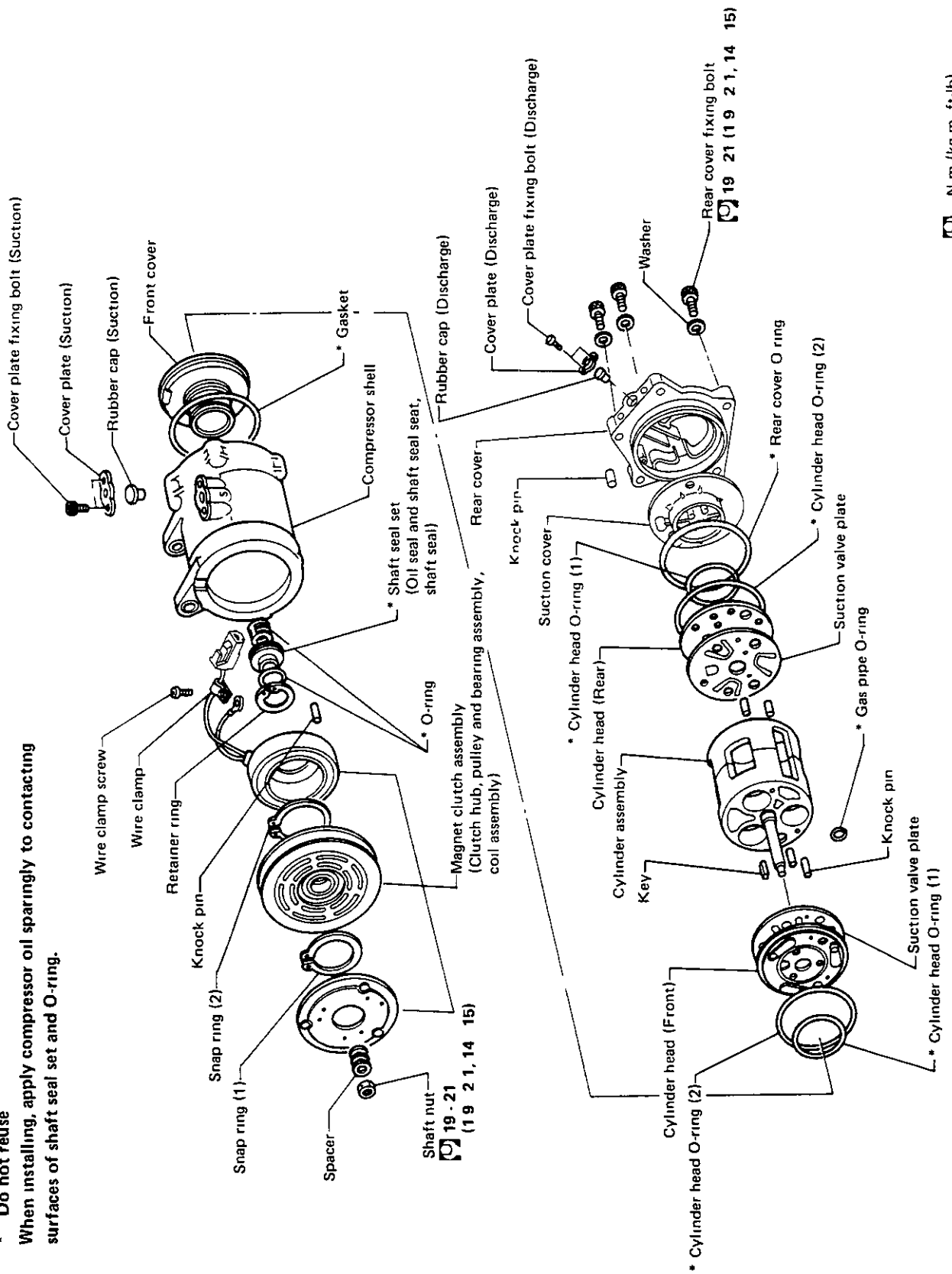
1. With the compressor upside down, completely drain the oil through the suction port (from the embossed letter "s" mark side)

2 When the oil stops flowing out, rotate the clutch hub two or three times to completely drain the oil

COMPRESSOR—Model MJS170

* Do not reuse

When installing, apply compressor oil sparingly to contacting surfaces of shaft seal set and O-ring.



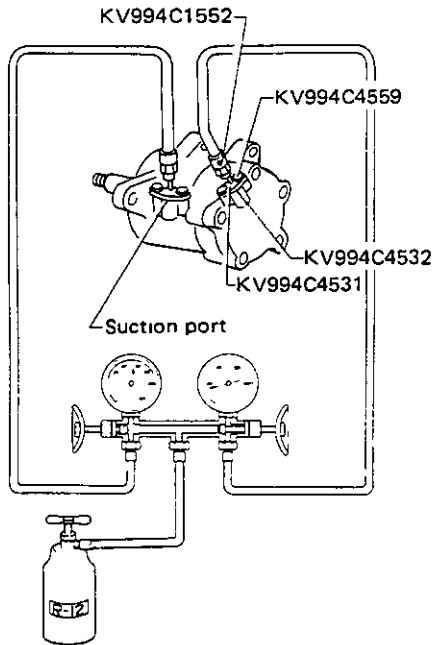
N m (kg m, ft-lb)

SHA906A

COMPRESSOR—Model MJS170

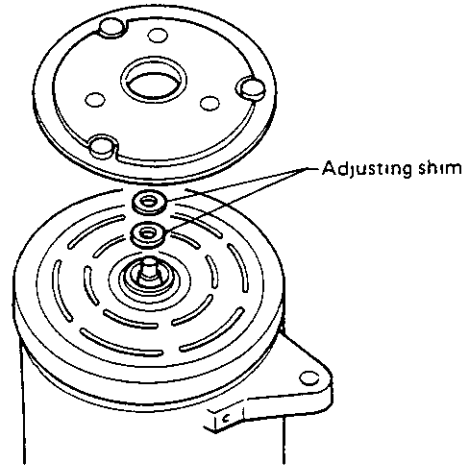
Leak Test

EVACUATE AND CONDUCT LEAK TEST



SHA907A

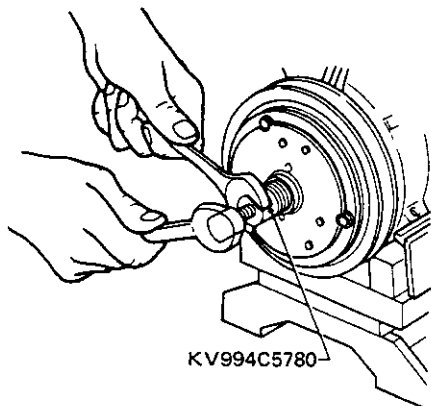
- When assembling clutch hub, adjust hub-to-pulley clearance with shims



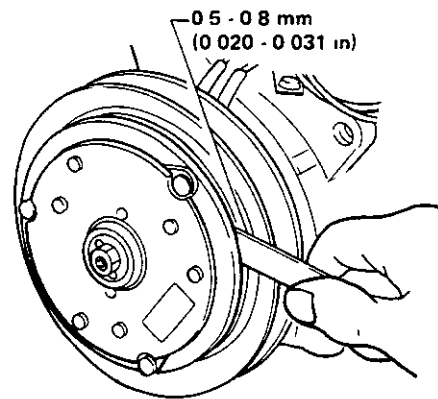
SHA272A

Clutch Replacement

- When removing shaft nut, hold clutch hub with Tool
- Tool No.: KV99412302 (J24878-1)
- Using Tool KV994C5780, clutch hub can be removed easily



SHA268A



SHA908A

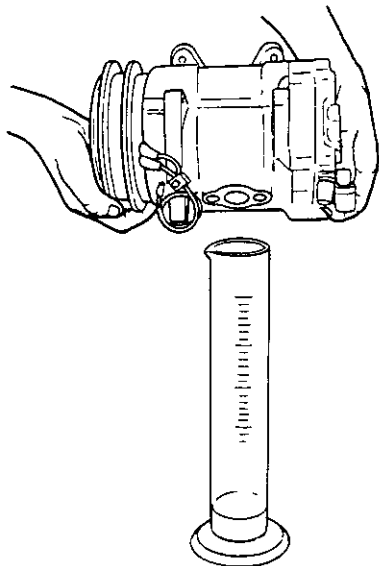
BREAK-IN OPERATION

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.

COMPRESSOR—Model MJS170

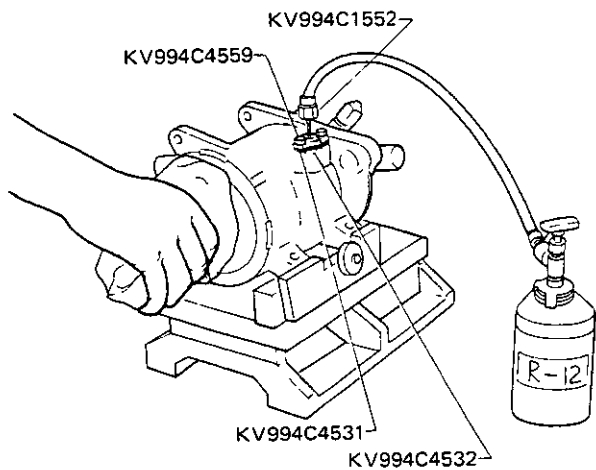
Shaft Seal Replacement

- Before disassembling, be sure to measure the amount of oil
After assembling, charge with the same amount of new oil



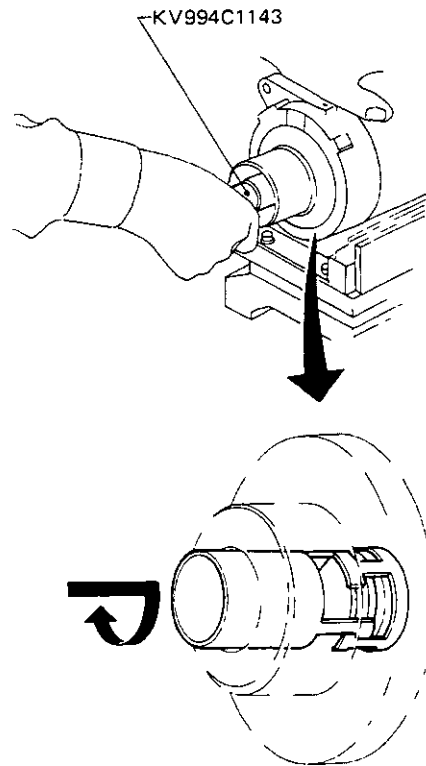
SHA033A

- When removing seal seat
Apply pressure with refrigerant



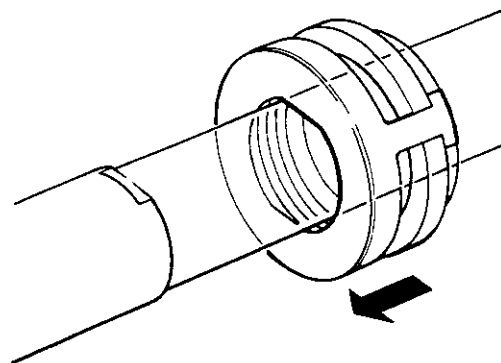
SHA274A

- With Tool KV994C1143, depress carbon seal and hook the case of shaft seal



SHA275A

- When installing shaft seal
 - 1) Cap Tool KV994C5784 to the top end of compressor shaft
 - 2) Using Tool KV994C1143, insert shaft seal with shaft seal case and shaft cutout aligned
Apply force to turn the seal somewhat to the left and right. Insure that shaft seal seats properly in the shaft cutout

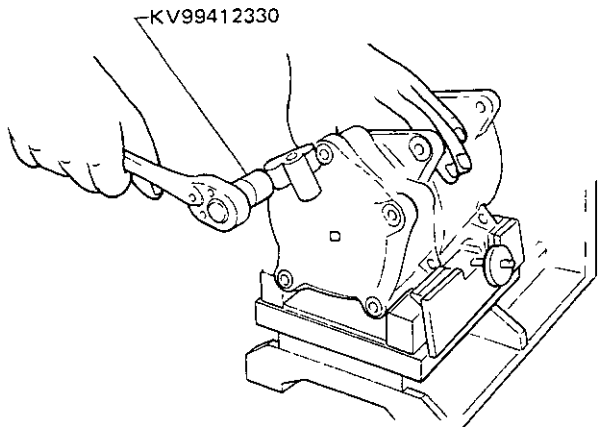


AC037

COMPRESSOR—Model MJS170

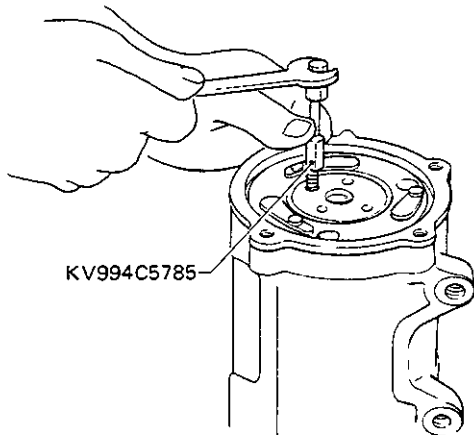
Valve Replacement

- Using Tool KV99412330, remove rear cover



SHA038A

- Using Tool KV994C5785, remove rear cylinder head

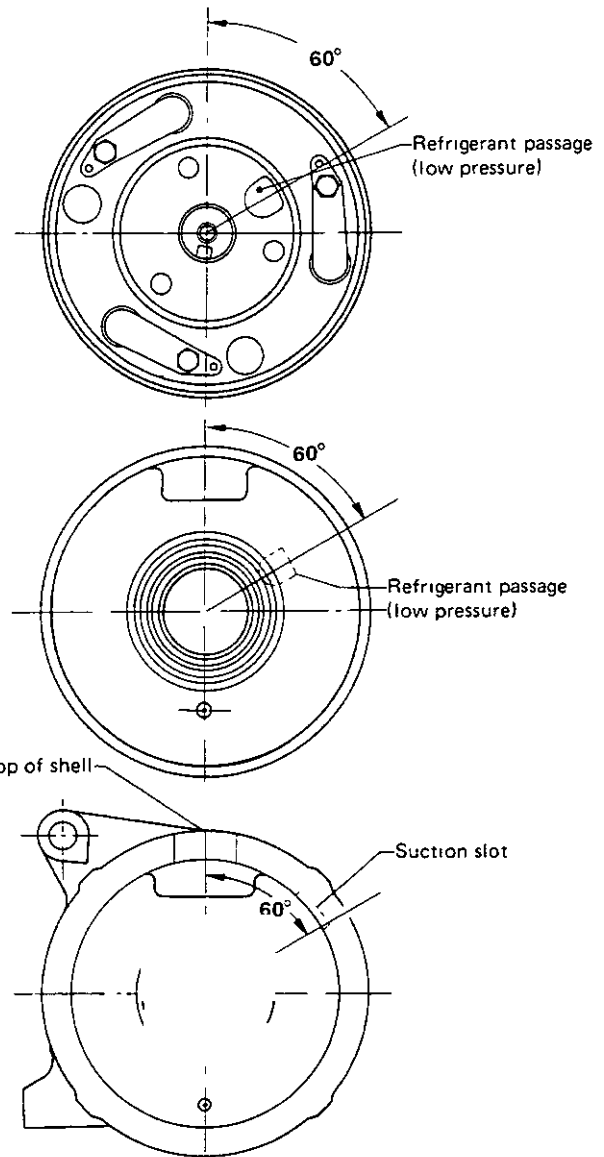


SHA909A

- When assembling

- 1) Front cover must be installed so that the cut-out portions of front cover and shell are aligned

For this purpose, install front cover on cylinder head so that angle between threaded hole in front cover and low pressure side refrigerant passage in cylinder head is about 60°

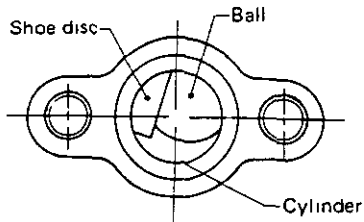
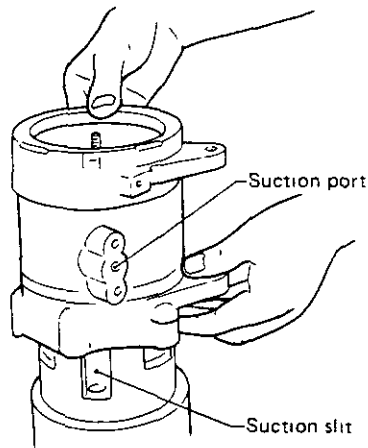
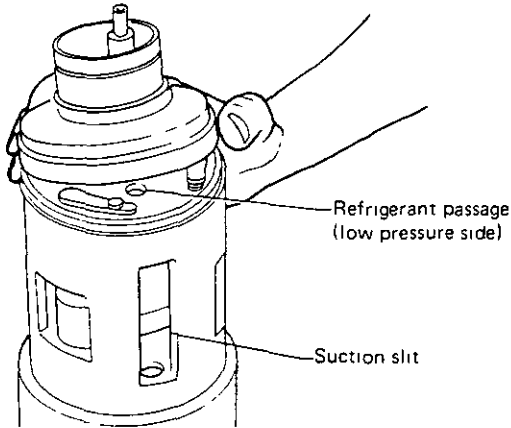


SHA276A

COMPRESSOR—Model MJS170

Valve Replacement (Cont'd)

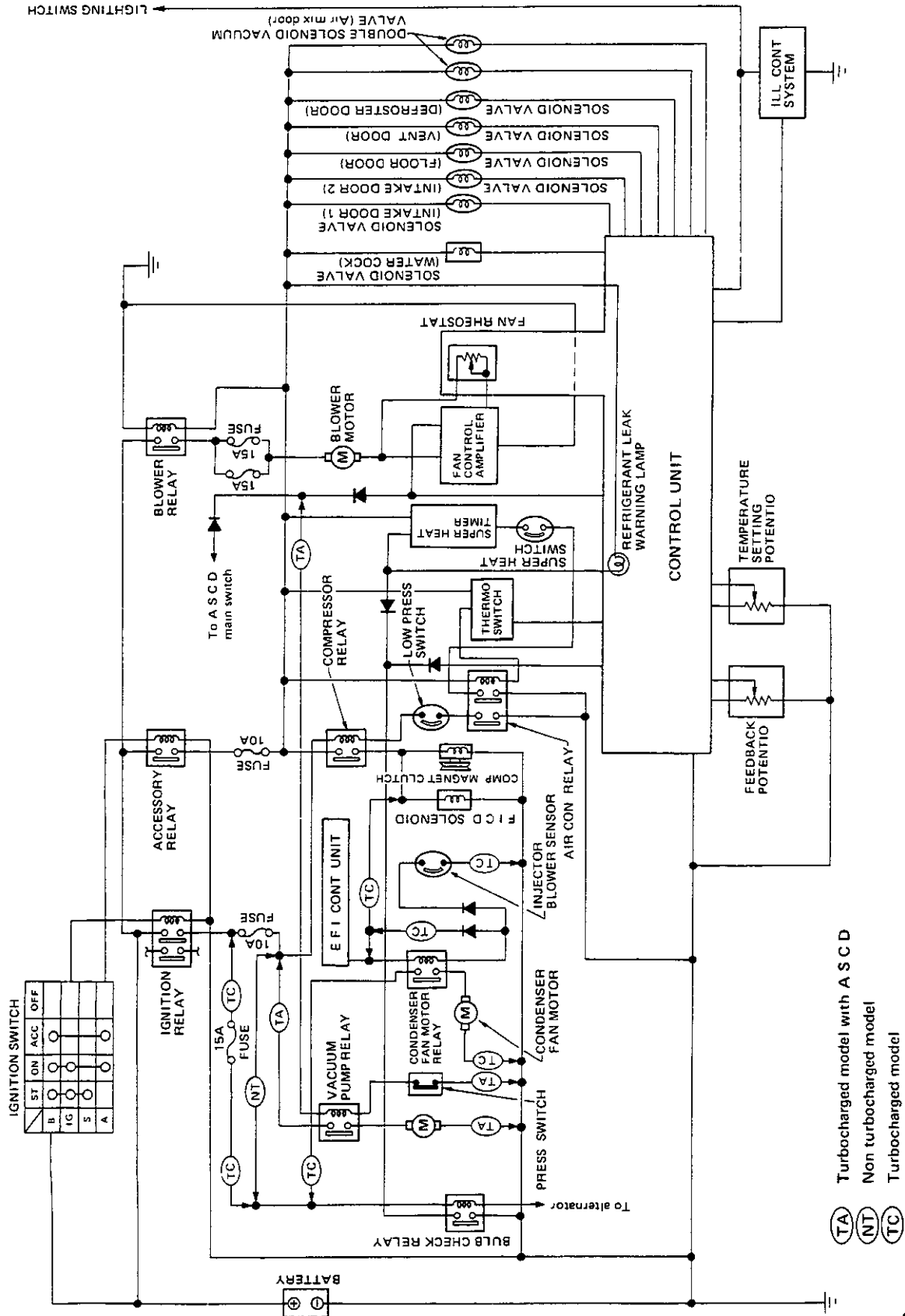
- 2) When installing shell on cylinder, adjust position of shell so that suction inlet of shell opens in the same direction as suction slot of cylinder assembly. Then, make sure swash plate is visible in suction inlet by removing suction valve.



SHA277A

A/C ELECTRICAL CIRCUIT (Manual)

Schematic



- (TA) Turbocharged model with A S C D
- (NT) Non turbocharged model
- (TC) Turbocharged model

SHA249B

A/C ELECTRICAL COMPONENTS (Manual)

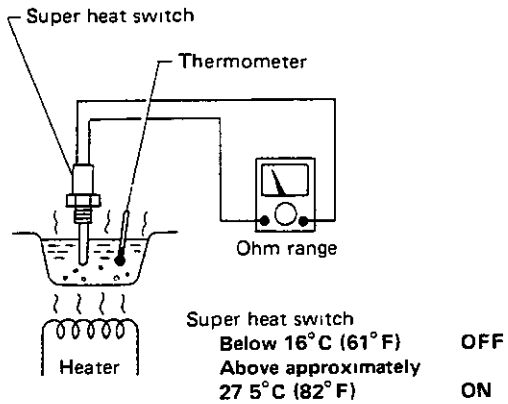
Inspection

SUPER HEAT SWITCH

- Dip the temperature sensor of the super heat switch in a container filled with cold water and increase the temperature of the water. The switch should turn "ON"

NOTICE

- Do not allow the switch to get into water.
- Wipe water from temperature sensor section after checking it

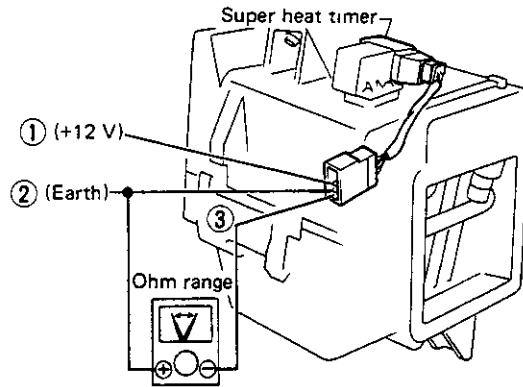


SHA251B

SUPER HEAT TIMER

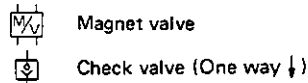
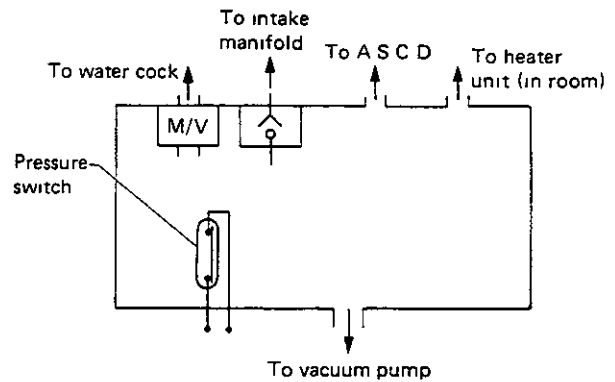
- Make sure contacts of super heat timer close (continuity exists) after a constant current has passed through the timer for a certain period of time

Time while applying voltage (12V) to the terminals between ① and ② (Sec)	Resistance between ② and ③ (Ω)
Less than 105	∞
More than 175	Less than 400



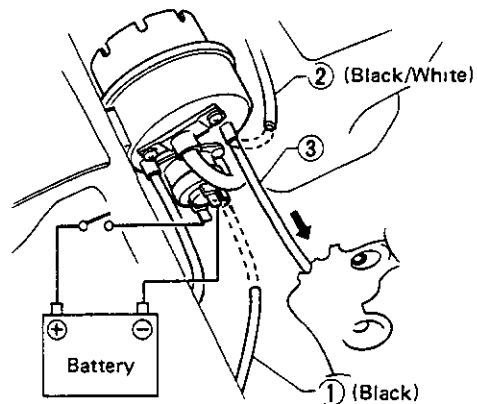
SHA252B

VACUUM TANK



SHA253B

Solenoid valve check for water cock



SHA254B

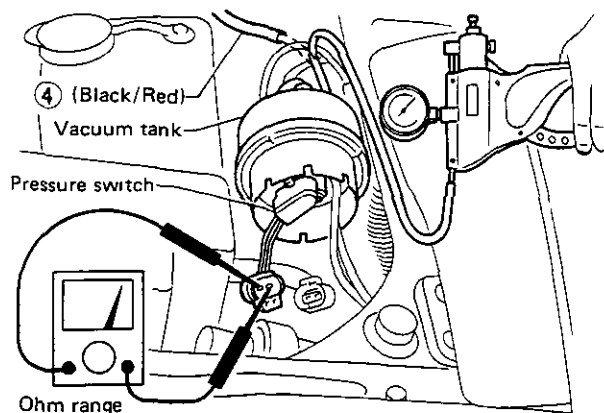
A/C ELECTRICAL COMPONENTS (Manual)

Inspection (Cont'd)

- 1 Disconnect vacuum hose ①
- 2 Disconnect vacuum hose ② and connect hose ③ instead Suck in through hose ③ to confirm that air does not flow through the hose and that check valve is closed
- 3 While sucking vacuum hose ③, change voltage to solenoid to check for open-close operation of solenoid valve

Applied voltage to solenoid (V)	Operation of solenoid valve
0	Close
12	Open

Pressure switch check for turbocharged model



Pressure	Resistance (Ω)
Atmospheric pressure	0
Vacuum pressure more than 46.7 kPa (350 mmHg, 13.78 inHg)	∞

SHA255B

1. Disconnect vacuum hose ④ from the terminal and connect a vacuum handy pump with the same terminal
2. Check pressure switch using a vacuum handy pump.

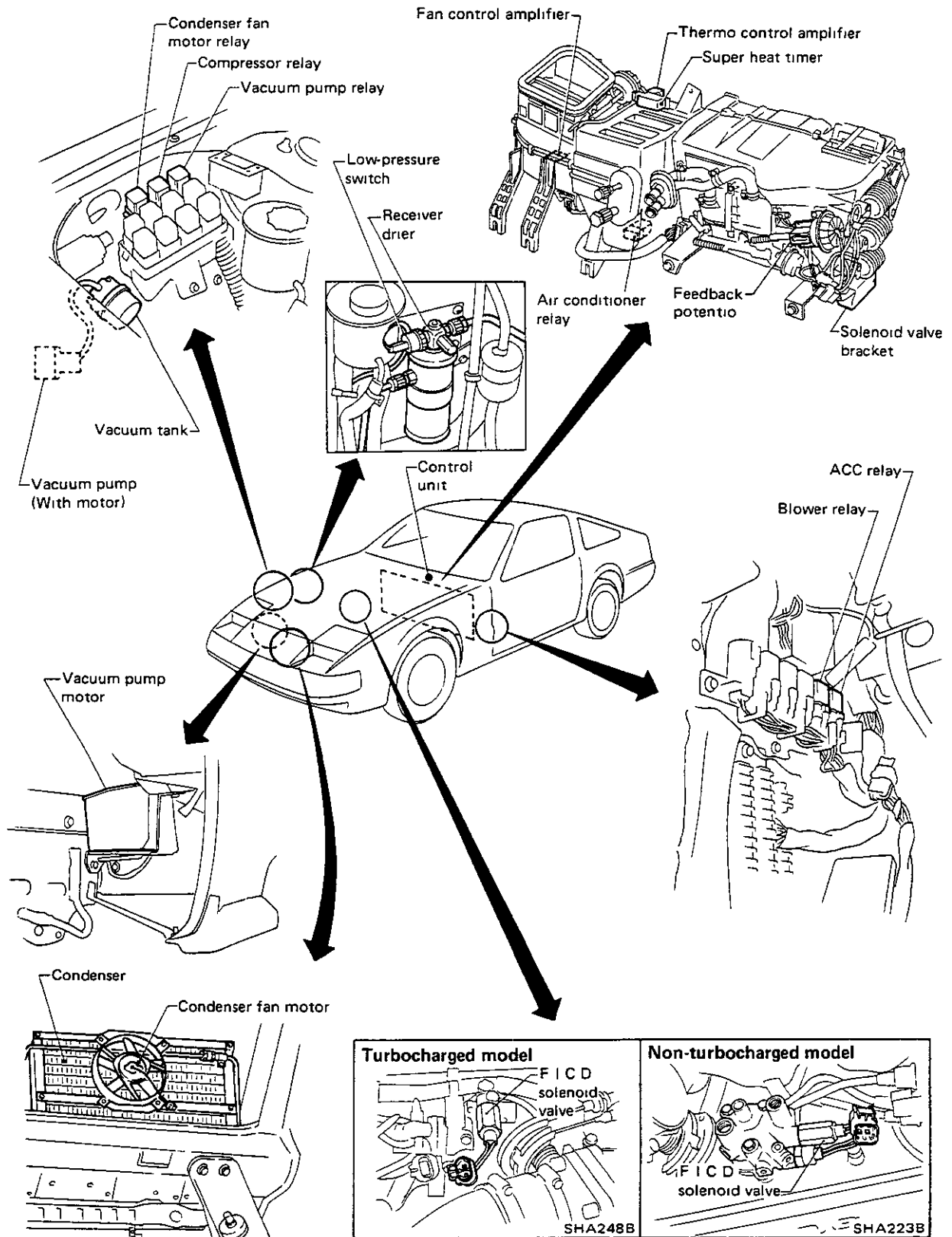
VACUUM PUMP MOTOR

- 1 Turn ignition switch "OFF" Disconnect vacuum hose ④ (Refer to "Pressure Switch Check") from vacuum tank and connect it again
- 2 Make sure air conditioner switch is "OFF"
- 3 Turn ignition switch "ON" (Do not start the engine)
- 4 Push cruise control main switch to make sure vacuum pump starts. (A sound should be heard from the pump)
- 5 The vacuum pump is operating properly if it stops within 20 seconds after it has started
- 6 If it fails to stop within 20 seconds, and vacuum hoses are in good order, it is malfunctioning

SOLENOID VALVE

Perform operational check, referring to the "Table of operation of solenoid valve in Air Flow (page HA-3) and Wiring Diagram (page HA-8 or HA-31)

LOCATION OF A/C ELECTRICAL COMPONENTS



SHA256B

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

General Specifications

COMPRESSOR

Model	MJS170
Type	Swash plate
Displacement	cm ³ (cu in)/rev 170 (10 37)
Cylinder bore x stroke	mm (in) 40 0 x 22 6 (1 57 x 0 89)
Direction of rotation	Clockwise (viewed from drive end)
Type of driving belt	HA type (Cogged belt)

LUBRICATING OIL

Model	MJS170
Type	SUNISO 5GS
Capacity	
mL (US fl oz, Imp fl oz)	
Amount of oil in the system	150 (5 1, 5 3)
Residual oil level in the system (After oil return operation and draining oil)	120 (4 1, 4 2)

REFRIGERANT

Type	R-12
Capacity	kg (lb) 0 9 - 1 1 (2 0 - 2 4)

ENGINE IDLING SPEED

Transmission		Non-turbocharged model	Turbocharged model
When A/C is OFF			
M/T	rpm	650 - 750	650 - 750
A/T	rpm	650 - 750 at "D" range	600 - 700 at "D" range
When A/C is ON			
M/T	rpm	750 - 850	750 - 850
A/T	rpm	750 - 850 at "D" range	750 - 850 at "D" range

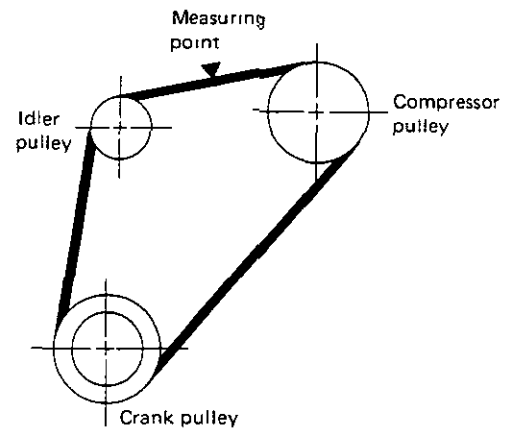
Inspection and Adjustment

COMPRESSOR

Model	MJS170
Clutch hub to pulley clearance	mm (in) 0 5 - 0 8 (0 020 - 0 031)

BELT TENSION

Type		Belt deflection [Applied pressure is 98 N (10 kg, 22 lb)]		
		Used	New	Limit
All models	mm (in)	9 0 - 11 0 (0 354 - 0 433)	7 0 - 9 0 (0 276 0 354)	16 (0 63)



SHA252B

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

Tightening Torque

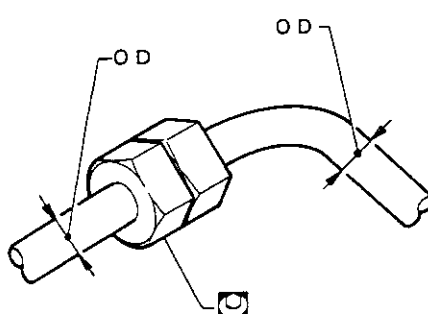
COMPRESSOR INSTALLATION

	N m	kg m	ft lb
Compressor bracket to cylinder block	30 - 40	3.1 - 4.1	22 - 30
Compressor to compressor bracket	30 - 40	3.1 - 4.1	22 - 30
Compressor shaft nut	19 - 21	1.9 - 2.1	14 - 15
Compressor rear cover fixing bolt	19 - 21	1.9 - 2.1	14 - 15

REFRIGERANT LINE

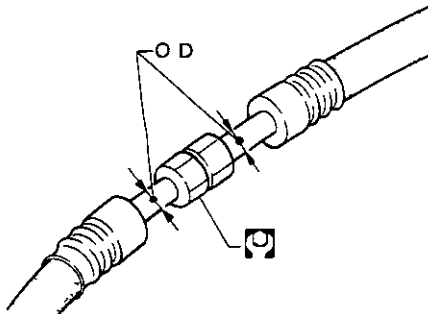
When connecting lines made of different material, basically use the lower tightening torque of the two

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
SHA669A 19 (3/4)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22

Union type (hose to hose)

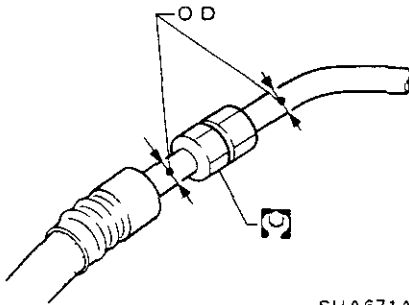


Pipe O D mm (in)	Material					
	Steel or copper			Aluminum		
	N m	kg-m	ft-lb	N m	kg m	ft-lb
6 (1/4)	10 - 20	1.0 - 2.0	7 - 14	—	—	—
8 (5/16)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
10 (3/8)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
12 (1/2)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22
SHA670A 16 (5/8)	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)

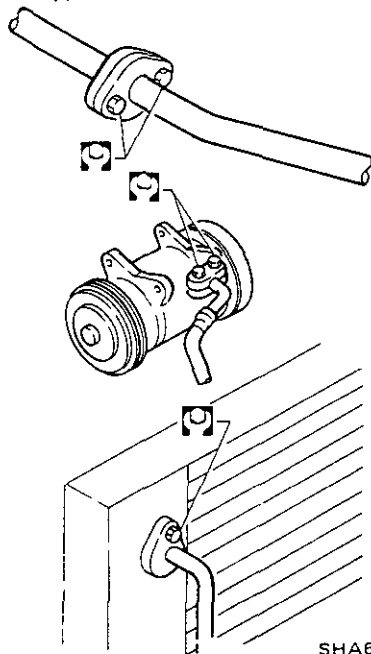
Union type (hose to pipe)



SHA671A

- Use tightening torque for flexible hose

Plate type



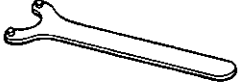
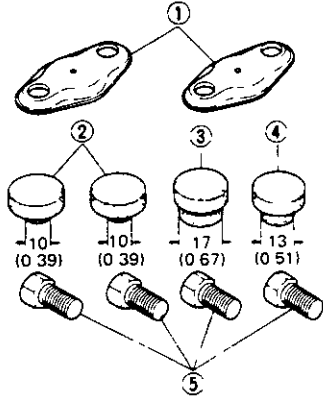
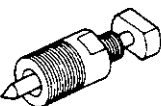
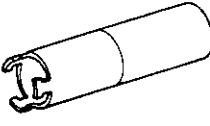
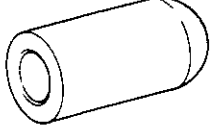
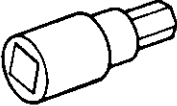

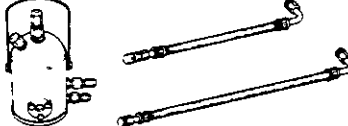
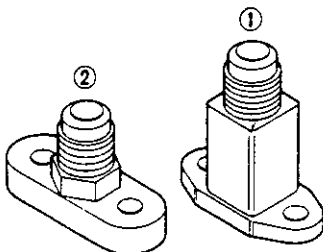
SHA672A

Grade	Nominal size	Bolt type		Tightening torque		
		Bolt diameter mm (in)	Pitch mm (in)	N m	kg-m	ft-lb
4T	M6	6.0 (0.236)	1.0 (0.039)	3 - 4	0.3 - 0.4	2.2 - 2.9
	M8	8.0 (0.315)	1.25 (0.0492)	8 - 11	0.8 - 1.1	5.8 - 8.0
	M10	10.0 (0.394)	1.5 (0.059)	16 - 22	1.6 - 2.2	12 - 16
7T	M6	6.0 (0.236)	1.0 (0.039)	6 - 7	0.6 - 0.7	4.3 - 5.1
	M8	8.0 (0.315)	1.25 (0.0492)	14 - 18	1.4 - 1.8	10 - 13
	M10	10.0 (0.394)	1.5 (0.059)	25 - 35	2.6 - 3.6	19 - 26



SPECIAL SERVICE TOOLS

* Special tool or a commercial equivalent

Tool number (Kent-Moore No) Tool name	Tool	Tool number (Kent-Moore No) Tool name	Tool
KV99412302 (J24878-1)* Clutch hub wrench		KV994C4548 (-) Blind cover set	 <p style="text-align: center;">Unit mm (in)</p>
KV994C5780 (-) Clutch hub puller		① KV994C4531 (-) Blind cover	
KV994C1143 (-) Shaft seal remover and installer		② KV994C4532 (-) Gasket	
KV994C5784 (-)* Shaft seal pilot		③ KV994C4533 (-) Gasket (Useless)	
KV99412330 (-)* Allen socket		④ KV994C4534 (-) Gasket (Useless)	
KV994C5785 (-)* Cylinder head remover		⑤ KV994C4559 (-) Bolt	
KV994A9690 (-) Oil separator kit			
KV992C5079 (-)		① KV992C5081 (-) Adapter connector A	
② KV992C5082 (-) Adapter connector B			
KV994C1552 (-) Charge nozzle	