SECTION AC

AIR CONDITIONING

CONTENTS

DESCRIPTION

REFRIGERATION SYSTEM

If you were to paint your finger with alcohol, your finger would feel cold. This is because the liquid alcohol takes heat away from your finger while it evaporates. If a quickly evaporating liquid such as alcohol is placed in a container inside a box, the temperature inside the box will drop. This is because the alcohol is evaporated absorbing the heat from the air inside the box. If the gaseous alcohol is collected and cooled with cold water, it will be changed back into a liquid by absorption of its heat by the cold water.

The cooler operates on this principle. The liquid used is the refrigerant R-12. The heat inside the passenger compartment is absorbed by changing the refrigerant from a liquid to a gas and then dissipated to the outside by changing the refrigerant from a gas back to a liquid.

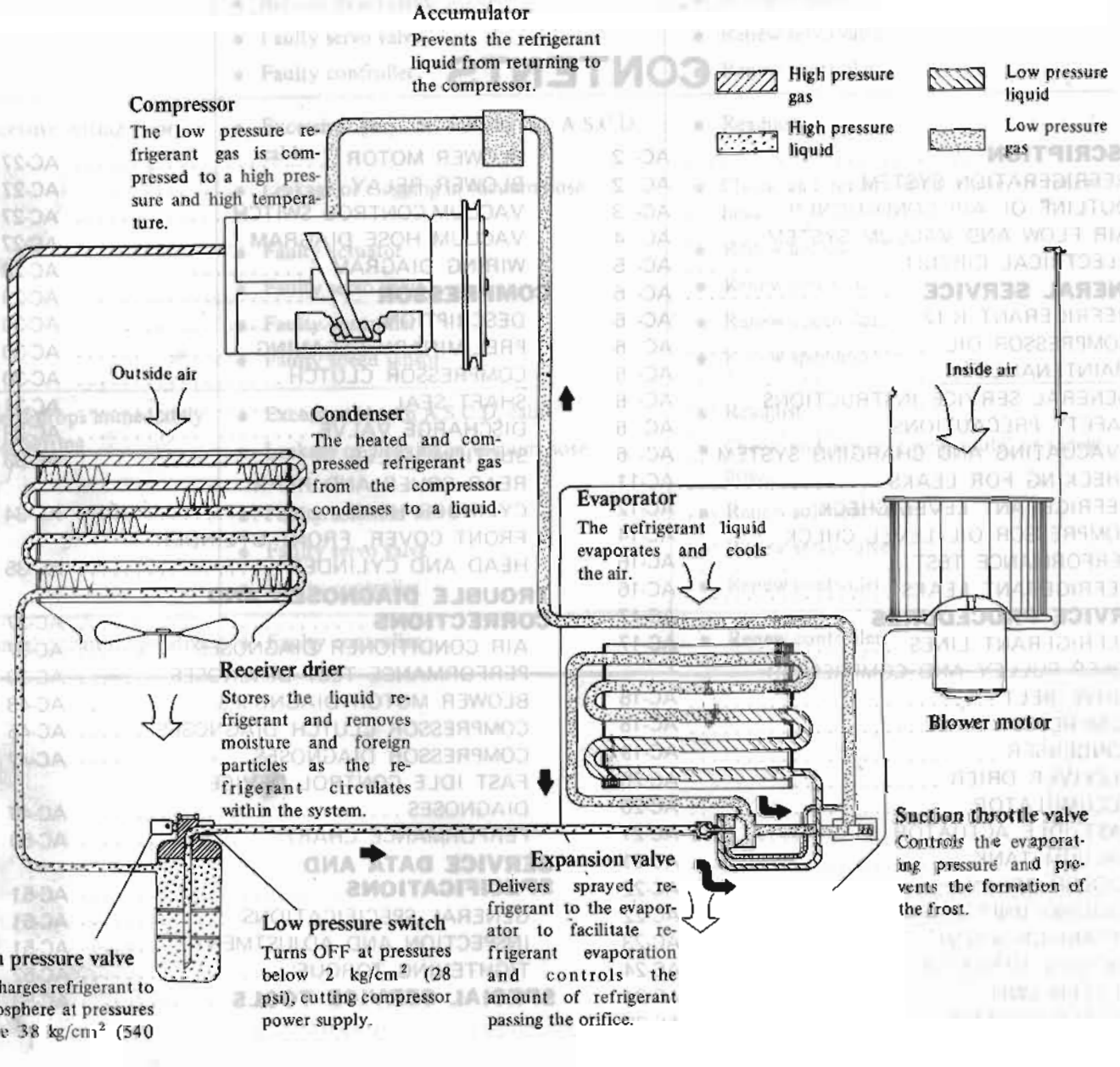

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Fig. AC-1 Refrigeration Cycle

OUTLINE OF AIR CONDITIONER

The air conditioner is a combined unit of an evaporator, heater and blower and provides heating and cooling functions. In addition, it has bi-level and ventilation functions. Its control system consists of a mechanical system using cables and engine vacuum.

The air conditioning unit is installed in the passenger compartments.

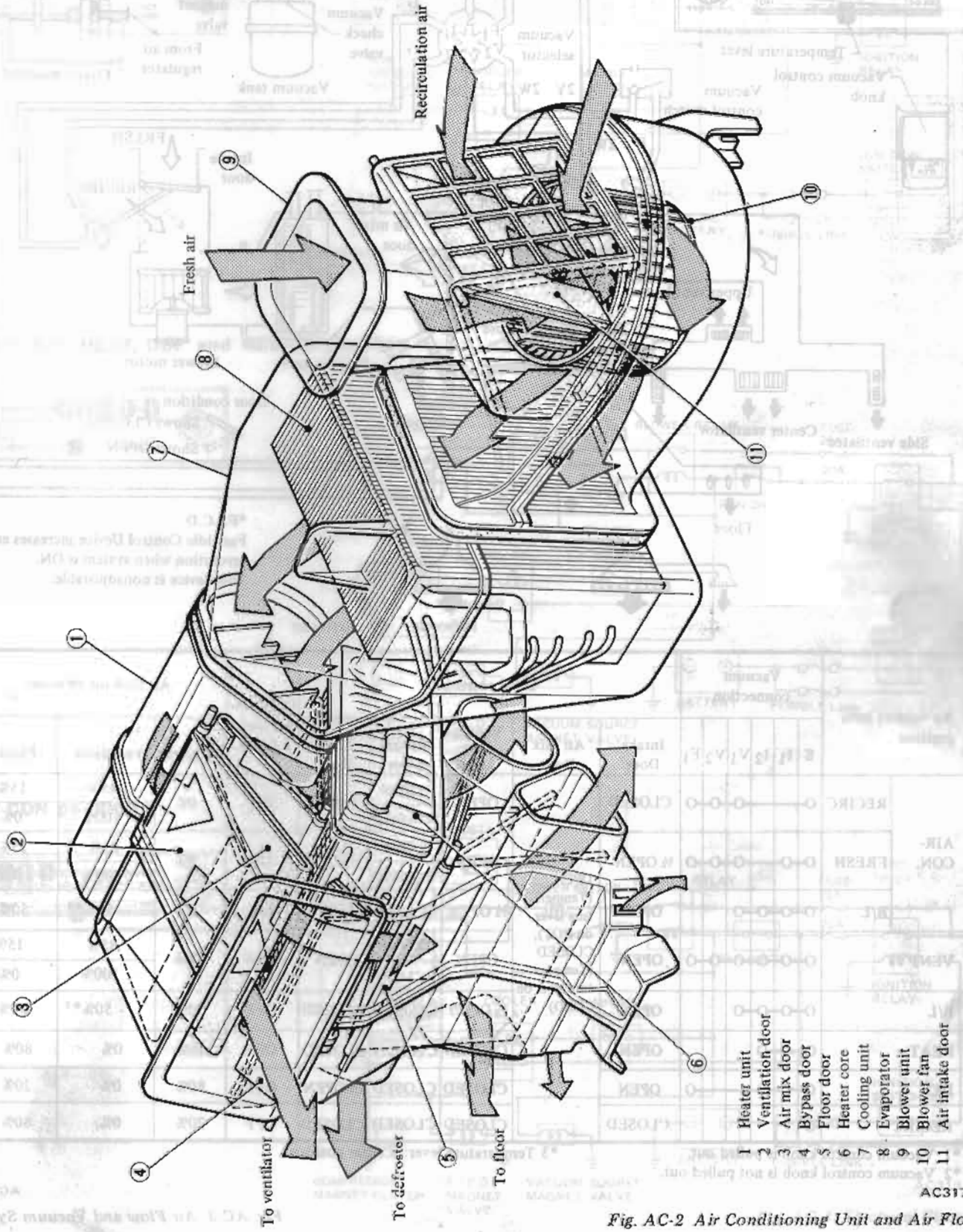
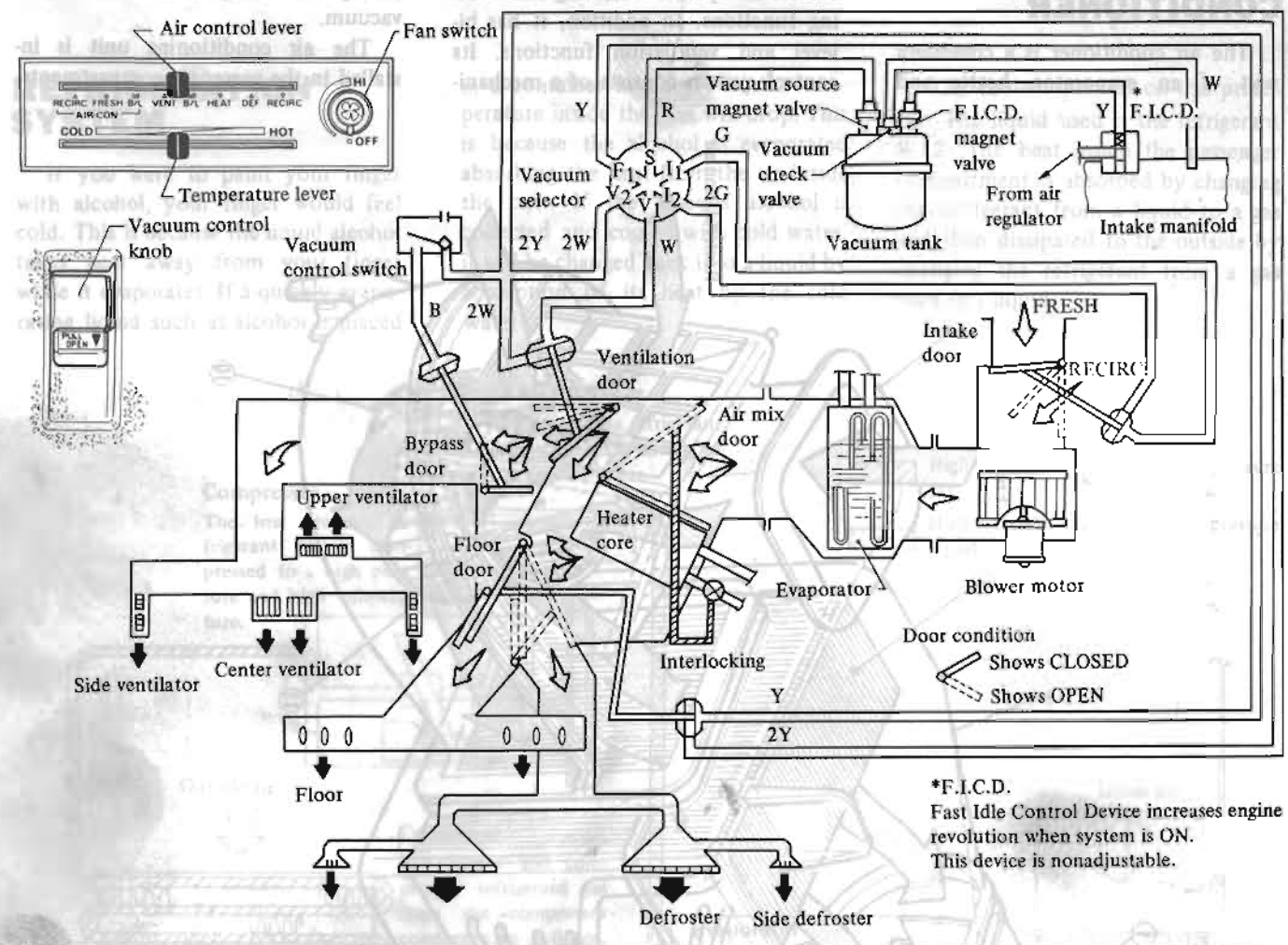


Fig. AC-2 Air Conditioning Unit and Air Flow

AIR FLOW AND VACUUM SYSTEM



*F.I.C.D.
Fast Idle Control Device increases engine revolution when system is ON.
This device is nonadjustable.

Air control lever position		Vacuum connection						Door position					Compressor and F.I.C.D.	Air flow distribution		
		S	I_1	I_2	V_1	V_2	F_1	Intake Door	Air Mix Door	Ventilation Door	Bypass Door	Floor Door		Defroster	Ventilator	Floor
AIR-CON.	RECIRC	O				O	O	CLOSED	OPEN (Temperature lever on HOT); CLOSED (Temperature lever on COLD)	OPEN	*1 OPEN	OPEN	ON	0%	85%	15%
											*2 CLOSED				100%	0%
	FRESH	O	O			O	O	½ OPEN		OPEN	*1 OPEN	OPEN	ON	0%	85%	15%
											*2 CLOSED				100%	0%
	B/L	O	O	O	O			OPEN		½ OPEN	CLOSED	CLOSED	ON	0%	50%*3	50%*3
VENT		O	O	O	O	O	O	OPEN		OPEN	*1 OPEN	OPEN	OFF	0%	85%	15%
											*2 CLOSED				100%	0%
B/L		O	O	O	O			OPEN		½ OPEN	CLOSED	CLOSED	OFF	0%	50%*3	50%*3
HEAT		O	O	O				OPEN		CLOSED	CLOSED	CLOSED	OFF	20%	0%	80%
DEF		O	O	O			O	OPEN		CLOSED	CLOSED	½ OPEN	OFF	80%	0%	20%
RECIRC		O						CLOSED		CLOSED	CLOSED	CLOSED	OFF	20%	0%	80%

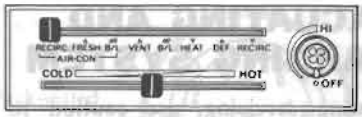
*1 Vacuum control knob is pulled out.
*2 Vacuum control knob is not pulled out.
*3 Temperature lever: Center position

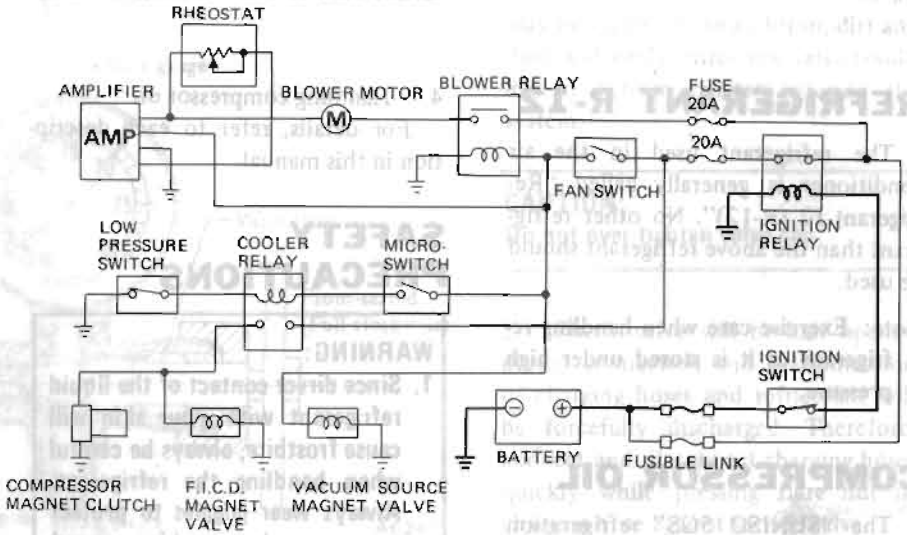
AC318A

Fig. AC-3 Air Flow and Vacuum System

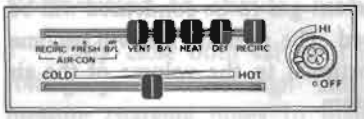
ELECTRICAL CIRCUIT

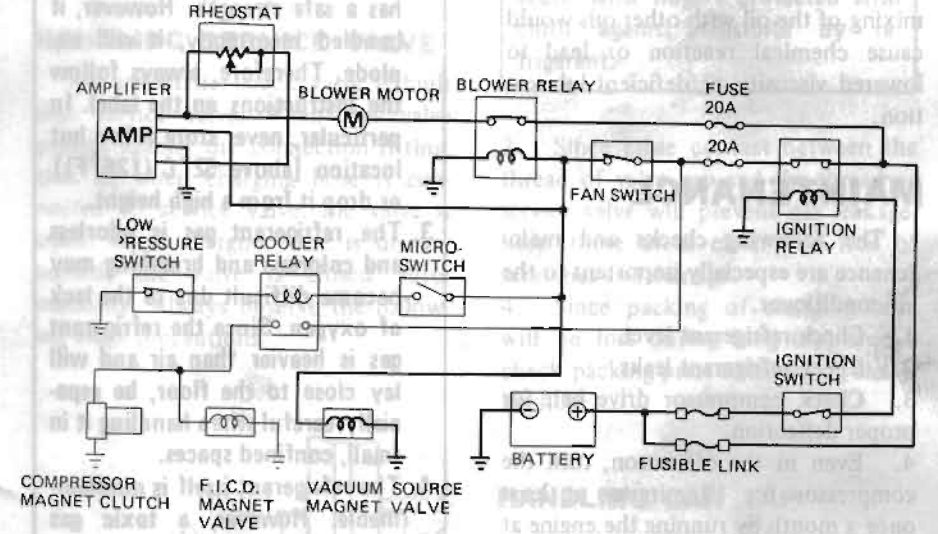
OFF position



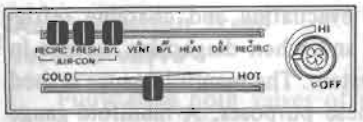


VENT, B/L, HEAT, DEF and RECIRC position





AIR-CON position



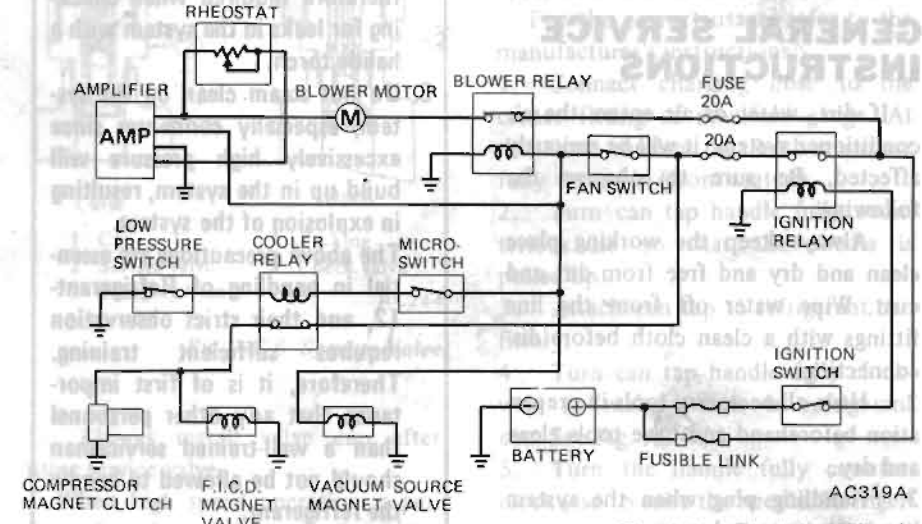


Fig. AC-4 Electrical Circuit

GENERAL SERVICE

REFRIGERANT R-12

The refrigerant used in the air conditioner is generally called "Refrigerant-12 (R-12)". No other refrigerant than the above refrigerant should be used.

Note: Exercise care when handling refrigerant as it is stored under high pressure.

COMPRESSOR OIL

The "SUNISO 5GS" refrigeration lubricant should be used to assure the successful compressor operation. Use of oils other than recommended or mixing of the oil with other oils would cause chemical reaction or lead to lowered viscosity or deficient lubrication.

MAINTENANCE

The following checks and maintenance are especially important to the air conditioner.

1. Check refrigerant level.
2. Check refrigerant leaks.
3. Check compressor drive belt for proper deflection.
4. Even in the off-season, turn the compressor for 10 minutes at least once a month by running the engine at 1,500 rpm.

GENERAL SERVICE INSTRUCTIONS

If dirt, water or air enters the air conditioner system, it will be seriously affected. Be sure to observe the following:

1. Always keep the working place clean and dry and free from dirt and dust. Wipe water off from the line fittings with a clean cloth before disconnecting.
2. Have all necessary tools in preparation beforehand and have tools clean and dry.
3. Handling plug when the system line is disconnected.
4. Handling compressor oil

For details, refer to each description in this manual.

SAFETY PRECAUTIONS

WARNING:

1. **Since direct contact of the liquid refrigerant with your skin will cause frostbite, always be careful when handling the refrigerant. Always wear goggles to protect your eyes when working around the system.**
2. **The refrigerant service container has a safe strength. However, if handled incorrectly, it will explode. Therefore, always follow the instructions on the label. In particular, never store it in a hot location [above 52°C (126°F)] or drop it from a high height.**
3. **The refrigerant gas is odorless and colorless and breathing may become difficult due to the lack of oxygen. Since the refrigerant gas is heavier than air and will lay close to the floor, be especially careful when handling it in small, confined spaces.**
4. **The refrigerant itself is nonflammable. However, a toxic gas (phosgene gas) is produced when it contacts fire and special care is therefore required when checking for leaks in the system with a halide torch.**
5. **Do not steam clean on the system, especially condenser since excessively high pressure will build up in the system, resulting in explosion of the system.**

The above precautions are essential in handling of Refrigerant-12, and their strict observation requires sufficient training. Therefore, it is of first importance that any other personnel than a well-trained serviceman should not be allowed to handle the refrigerant.

EVACUATING AND CHARGING SYSTEM

During servicing, use caution to keep air from getting into refrigerant. When air enters the system, all refrigerant must be evacuated from system prior to charging new refrigerant. Air in refrigerant has the following deleterious effects:

1. Since the condensation temperature of the air is extremely low, the air will not be condensed when refrigerant gas is condensed in the condenser, and the air will thus remain in gaseous form. Consequently, the effective thermal transmission area of condenser for refrigerant gas will be reduced and refrigerant gas to be condensed will be reduced. The pressure rise will become proportional to the volume of the air in system.
2. When air and refrigerant are mixed in system, a chemical reaction will be produced and hydrochloric acid which will adversely affect the aluminum, copper, iron, and other materials in system may be generated.

HANDLING MANIFOLD GAUGE

The pressure at the high- and low-sides of system should be measured when evacuating and charging refrigerant and when diagnosing trouble in the system. The manifold gauge is used for these purposes. A manifold gauge has two pressure gauges; a low pressure gauge and a high pressure gauge. These gauges are connected to the high- and low-side service valves of system through flexible charging hoses. The construction of manifold gauge is shown in Fig. AC-5.

When valve stem is fully screwed, the valve is front-seated and valve path and the center path are blocked. When valve stem is backed off, the paths are opened.

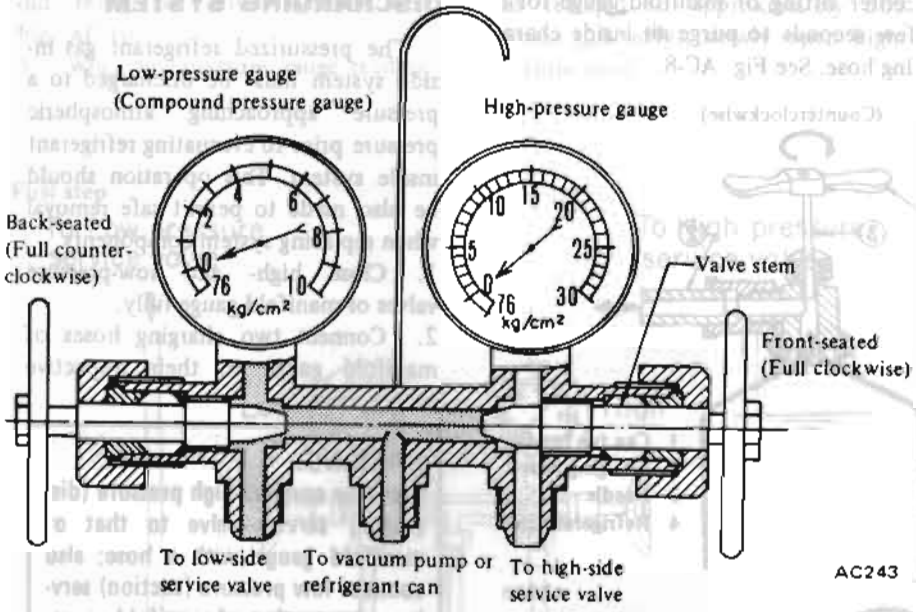


Fig. AC-5 Manifold Gauge

Connection to service valve

1. Fully close both valves of manifold gauge. Connect high- and low-pressure charging hoses to manifold gauge.
2. Remove caps from service valves. Connect high- and low-pressure charging hoses to service valves in system. The refrigerant gas will be discharged since check valve is open when pressing charging hose onto service valve.
3. Next, loosen the connection fitting of charging hose at manifold gauge side for 2 to 3 seconds to purge any air inside charging hose by the pressurized gas in system.

Disconnection from service valve

1. Fully close both valves of manifold gauge.
2. Disconnect two charging hoses from service valves. At this time, the gas will be discharged until check valve is closed. Therefore, disconnect hose quickly.

WARNING:
Work with fingers protected with cloth against frostbite by refrigerant.

HANDLING SERVICE VALVE

An automatic check valve is built into service valve. When this valve presses against the connection fitting, that is, when charging hose is connected to service valve, the valve is open. When charging hose is disconnected, the valve is closed automatically. Always observe the following usage precautions:

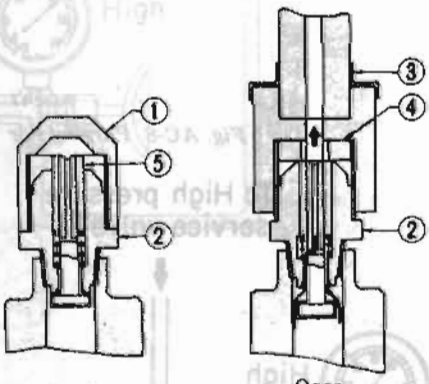


Fig. AC-6 Service Valve

1. Always install valve cap after using service valve.

When high speed operation is performed without valve cap, a negative pressure will gradually build up at the low pressure side of system and air may be sucked in. In addition, dirt and dust will easily enter the valve resulting in foreign matter entering the system.

CAUTION:
Do not over-tighten valve cap.

2. Check valve will be half opened during connection and disconnection of charging hoses and refrigerant will be forcefully discharged. Therefore, connect and disconnect charging hoses quickly while pressing flare nut of charging hose against service valve.

WARNING:
Work with fingers protected with cloth against frostbite by refrigerant.

3. Since close contact between the thread of valve cap and the thread of service valve will prevent gas leakage, keep these areas clean and free of scratches and damage.
4. Since packing of charging hose will be lost during long use, always check packing prior to installing charging hose.

HANDLING CAN TAP

A wide variety of can taps are available. The following procedures apply to conventional can taps.

For the correct usage, refer to the manufacturer's instructions.

1. Connect charging hose to the center fitting of manifold gauge. At this time, confirm that both stems are fully turned in (front-seated).
2. Turn can tap handle fully counterlockwise so that the needle is pulled up.
3. Attach can tap to refrigerant can firmly.
4. Turn can tap handle fully clockwise to make a hole in refrigerant can. See Fig. AC-7.
5. Turn the handle fully counterclockwise to raise the needle. Refrigerant gas will flow up to the center

fitting of manifold gauge. See Fig. AC-7.

6. Loosen the connection at the center fitting of manifold gauge for a few seconds to purge air inside charging hose. See Fig. AC-8.

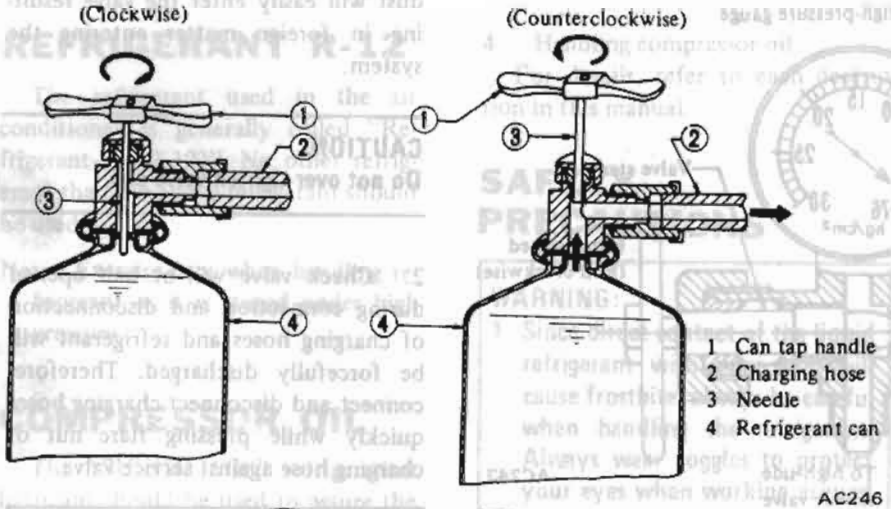


Fig. AC-7 Can Tap

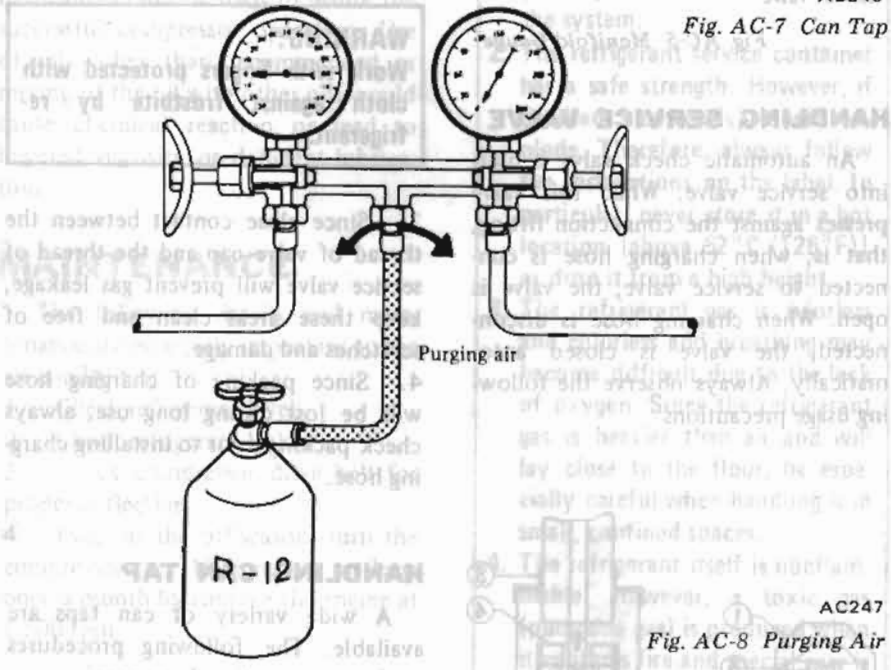


Fig. AC-8 Purging Air

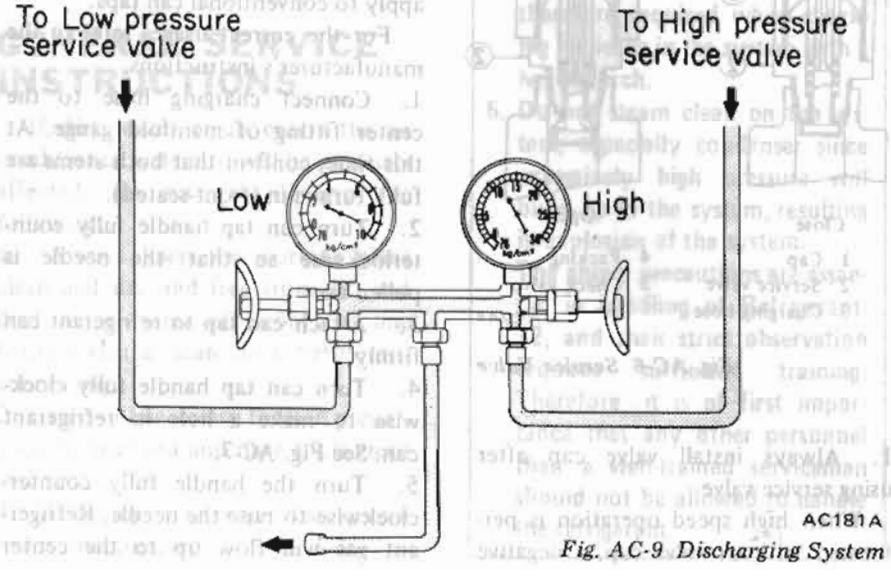


Fig. AC-9 Discharging System

DISCHARGING SYSTEM

The pressurized refrigerant gas inside system must be discharged to a pressure approaching atmospheric pressure prior to evacuating refrigerant inside system. This operation should be also made to permit safe removal when replacing system components.

1. Close high- and low-pressure valves of manifold gauge fully.
2. Connect two charging hoses of manifold gauge to their respective service valves.

WARNING:
Securely connect high pressure (discharge) service valve to that of manifold gauge with a hose; also connect low pressure (suction) service valve to that of manifold gauge. For locations of high and low pressure (discharge and suction) service valves, see Fig. AC-55.

3. Open both manifold gauge valves slightly and slowly discharge refrigerant from system. See Fig. AC-9.

WARNING:
Protect fingers with cloth against frostbite by refrigerant when connecting the charging hose to the service valve or disconnecting it therefrom.

Note: Do not allow refrigerant to rush out. Otherwise, compressor oil will be discharged along with refrigerant.

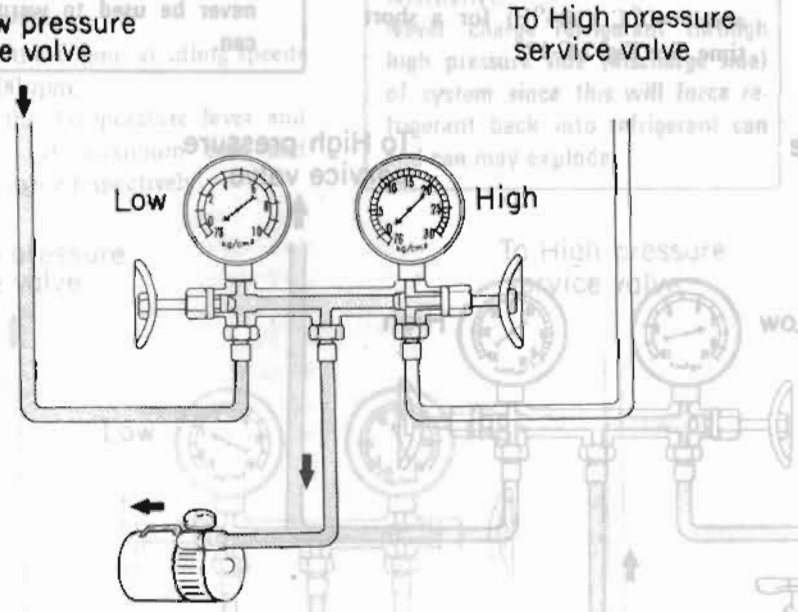
EVACUATING SYSTEM

1. Connect high- and low-pressure charging hoses of manifold gauge to their respective service valves of system and discharge refrigerant from system. Refer to Discharge System.
2. When refrigerant has been discharged to a pressure approaching atmospheric pressure, connect center charging hose to a vacuum pump.
3. Close both valves of manifold gauge fully. Then start vacuum pump.
4. Open low-pressure valve and suck

old refrigerant from system. See Fig. AC-10.

5. When low-pressure gauge reading has reached to approximately 500 mmHg (20 inHg), slowly open high-pressure valve.

First step



Second step

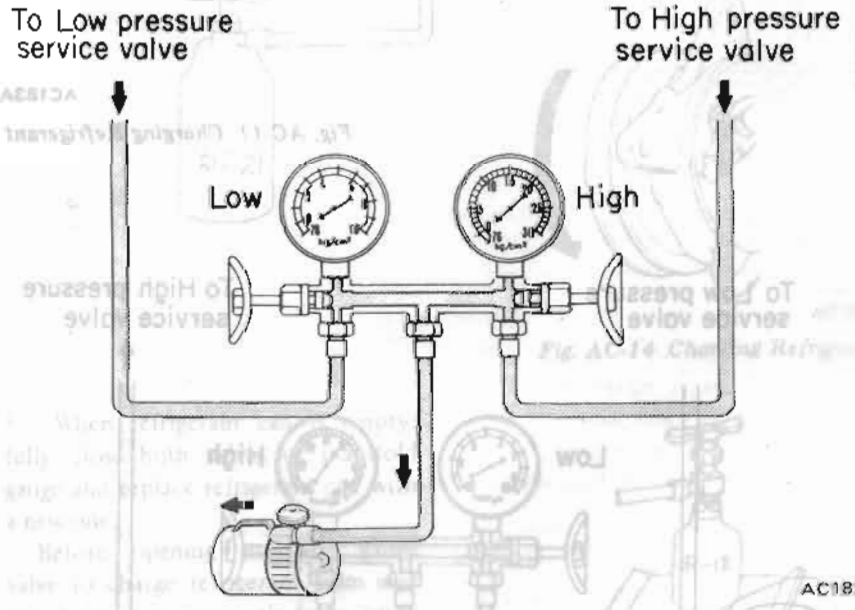


Fig. AC-10 Evacuating System — First and Second Steps

6. When pressure inside system has dropped to 710 mmHg (28 inHg), fully close both of valves of manifold gauge and stop vacuum pump. Let stand it for 5 to 10 minutes in this state and confirm that the reading does not rise.

Note:

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

Elevation m (ft)	Vacuum of system* mmHg (inHg)
0 (0)	710 (28)
300 (1,000)	685 (27)
600 (2,000)	660 (26)
900 (3,000)	635 (25)

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

b. The rate of ascension of the low-pressure gauge should be less than 25 mmHg (1 inHg) in five minutes.

If the pressure rises or the specified negative pressure can not be obtained, there is a leak in the system. In this case, immediately charge system with refrigerant and repair the leak described in the following.

(1) Charge system with a can of refrigerant [about 0.4 kg (0.9 lb)]. Refer to Charging Refrigerant.

(2) Check for refrigerant leakage with a leak detector. Repair any leakages found. Refer to Checking for Leaks.

(3) Discharge refrigerant again, and then evacuate system.

CHARGING REFRIGERANT

1. Install manifold gauge to system. Refer to Handling Manifold Gauge.

WARNING:
Securely connect high pressure (discharge) service valve to that of manifold gauge with a hose; also connect low pressure (suction) service valve to that of manifold gauge. For locations of high and low pressure (discharge and suction) service valves, see Fig. AC-55.

CAUTION:

a. Be sure to purge air from the high- and low-pressure charging hoses.

b. If air is mixed with refrigerant gas in system, evacuation of system should be performed. Refer to Evacuating System.

2. Attach center charging hose of manifold gauge to refrigerant can through can tap. Break seal of refrigerant can to allow refrigerant to enter manifold gauge. Loosen charging hose at the center fitting of manifold gauge and purge air from inside charging hose. Refer to Handling Can Tap.
3. Open high- and low-pressure valves of manifold gauge and charge refrigerant into system. See Fig. AC-11.

Note: When refrigerant charging speed is slow, immerse refrigerant can in water heated to a temperature of about 40°C (104°F) for a short time. See Fig. AC-12.

WARNING:
a. Under any circumstances the refrigerant can must not be warmed in water heated to a temperature of over 52°C (126°F).
b. A blow torch or stove must never be used to warm up the can.

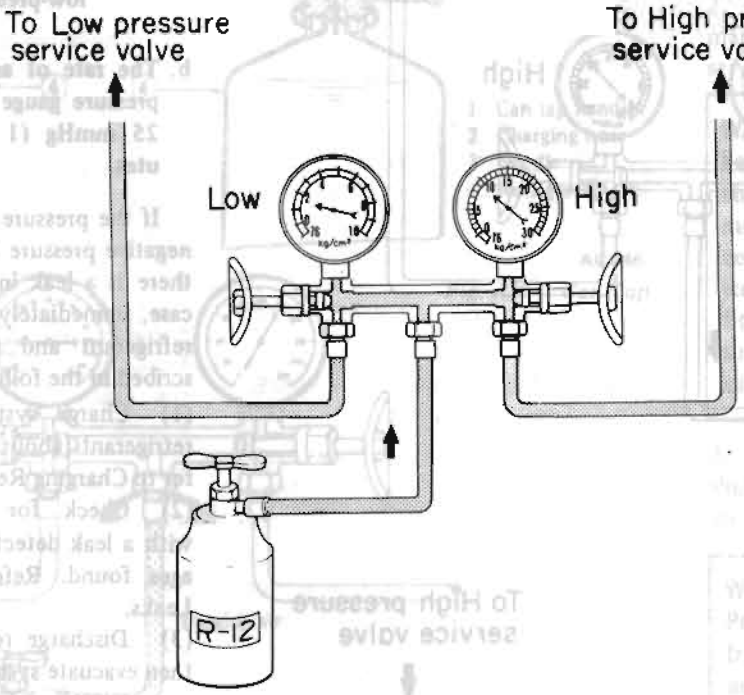


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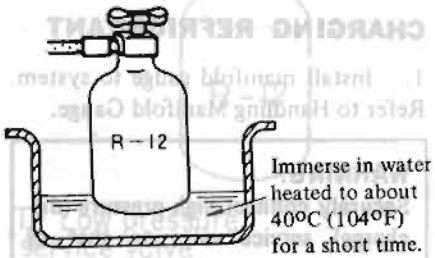
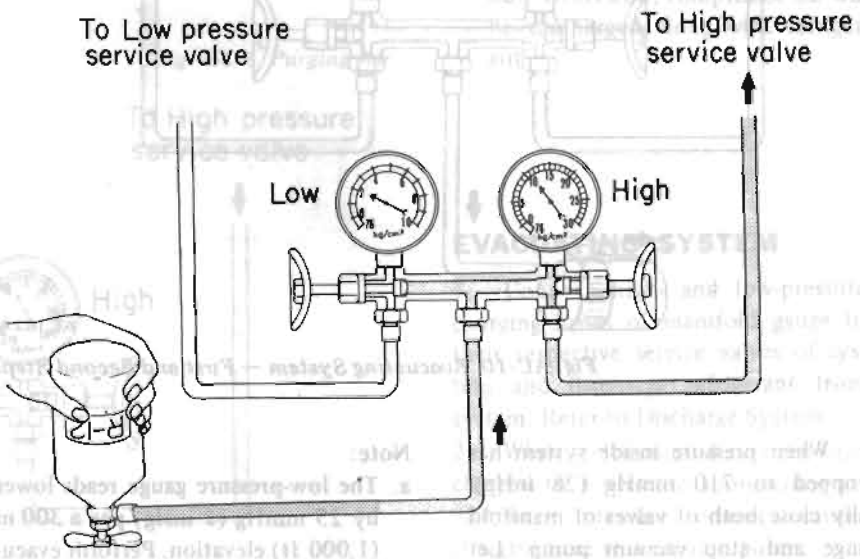
Fig. AC-11 Charging Refrigerant



AC184A

Fig. AC-12 Charging Refrigerant

CAUTION:
When 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, but not through low pressure (suction) service valve. See Fig. AC-13. After completion of charging, the compressor should always be turned several times manually.



AC185A

Fig. AC-13 Charging Liquefied Refrigerant

4. If refrigerant charging speed slows down, charge it while running the compressor for ease of charging. After having taken the steps up to 3 above, proceed with charging in the following order.

(1) Shut off high pressure valve of manifold gauge.

(2) Run the engine at idling speeds below 1,500 rpm.

(3) Set the Temperature lever and Fan switch at maximum cool and maximum speed respectively.

(4) Charge refrigerant while controlling low-pressure gauge reading at 2.8 kg/cm² (40 psi) or less by turning in or out low-pressure valve of manifold gauge. See Fig. AC-14.

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.

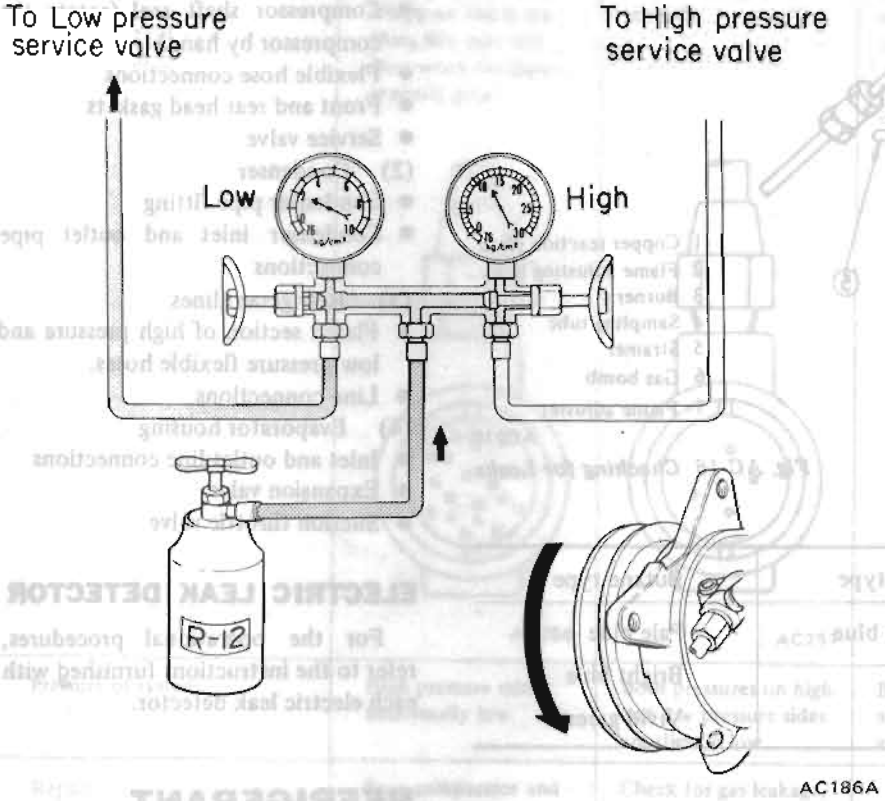


Fig. AC-14 Charging Refrigerant

5. When refrigerant can is empty, fully close both valves of manifold gauge and replace refrigerant can with a new one.

Before opening manifold gauge valve to charge refrigerant from new can, be sure to purge air from inside charging hose.

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

Fig. AC-15 Charging Refrigerant

Refrigerant capacity:
0.8 to 1.0 kg
(1.8 to 2.2 lb)

Note: The presence of bubbles in sight glass of receiver drier is an unsuitable method of checking the amount of refrigerant charged in system. 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. Refer to Refrigerant Level Check.

7. After the specified amount of refrigerant has been charged into system, close manifold gauge valves. Then detach charging hoses from service valves of system. Be sure to install valve cap to service valve.

8. Confirm that there are no leaks in system by checking with a leak detector.

Refer to Checking for Leaks.

Note: Conducting a performance test prior to removing manifold gauge is a good service operation. Refer to Performance Test.

CHECKING FOR LEAKS

Conduct a leak test whenever leakage of refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening of connection fittings.

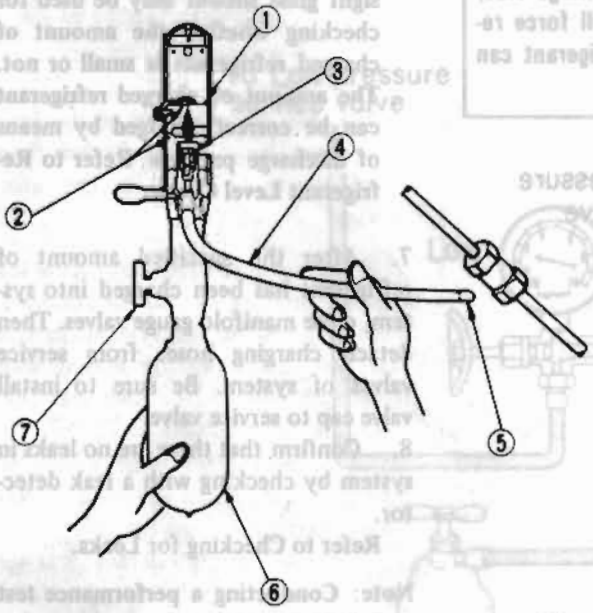
Refrigerant is a colorless, odorless gas and leakage from system is difficult to detect. Accordingly, the use of a leak detector facilitates check for leaks. Two methods of checking are available: one employs a halide leak detector which burns propane gas or butane gas and the other is an electric type leak detector.

If any trace of oil is noted at and around connection fittings, it is a sure indication that refrigerant is leaking. This condition can be corrected easily by retightening the joints. If any joint on line is suspected of small amount of leakage, use a leak detector to locate leaking points.

HALIDE LEAK DETECTOR

Since the propane leak detector and butane leak detector are the same in respect to their operation, this section describes the operation of the propane leak detector.

The copper screen is heated by the burning of propane. Refrigerant gas decomposes to color the flame when it contacts the heated screen. The gas to be checked is drawn into the sampling tube and sent out to the burner. A refrigerant leak can clearly be detected by variations in the color of the flame.



1 Copper reaction plate
2 Flame adjusting lines
3 Burner
4 Sampling tube
5 Strainer
6 Gas bomb
7 Flame adjuster

AC010

Fig. AC-16 Checking for Leaks

	Propane type	Butane type
NO LEAK	Greenish blue	Pale blue
SMALL LEAK	Yellow	Bright blue
LARGE LEAK	Purple	Vivid green

1. Discharge refrigerant in one or two seconds to ascertain that system has a sufficient pressure needed for leak detection. Charge with 0.4 kg (0.9 lb) of refrigerant, if necessary.
2. Light leak detector. Adjust the height of the flame between flame adjusting lines at the top and bottom of combustion tube. A reaction plate will immediately become red hot.
3. Place the end of sampling tube near the point of the suspected leak in system.

Note:

a. Since refrigerant gas is heavier than air, small leaks can be easily detected by placing sampling tube directly below the check point.
b. Suitable ventilation is required. If refrigerant gas is mixed with the surrounding air, leak detector will always indicate a response and detection of the actual leak will be difficult.
c. Never hold leak detector at an angle.

WARNING:

a. Never inhale the fumes produced by combustion of refrigerant gas since they are toxic.
b. Never use halide torch in a place where combustible or explosive gas is present.

4. The flame will be almost colorless when there is no refrigerant gas being burned. When there is a small refrigerant gas leak, the flame will be green or yellowgreen. When refrigerant gas leakage is large, the flame will be brilliant blue or purple. Since the color of the flame will be yellow when dust is being burned or there is aging scale on copper reaction plate, always keep the strainer of sampling tube and reaction plate clean.
5. Major check points

(1) Compressor
- Compressor shaft seal (rotate the compressor by hand)
- Flexible hose connections
- Front and rear head gaskets
- Service valve

(2) Condenser
- Condenser pipe fitting
- Condenser inlet and outlet pipe connections

(3) Refrigerant lines
- Flared section of high pressure and low pressure flexible hoses.
- Line connections

(4) Evaporator housing
- Inlet and outlet line connections
- Expansion valve
- Suction throttle valve

ELECTRIC LEAK DETECTOR

For the operational procedures, refer to the instructions furnished with each electric leak detector.

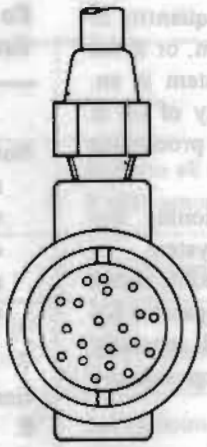
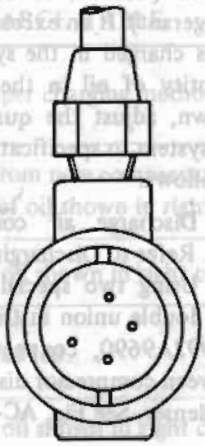
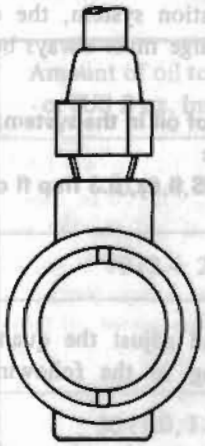
REFRIGERANT LEVEL CHECK

SIGHT GLASS

Sight glass is provided at the top of receiver drier. One guide for whether there is enough refrigerant in system is given by observing refrigerant flow through sight glass. However, this method is unsuitable for judging the amount of refrigerant. The correct refrigerant level can be judged by measuring the system pressures in accordance with the procedures as described in Performance Test.

1. Start the engine and hold engine speed at 1,500 rpm.
2. Set AIR lever to AIR-CON position.

3. Set temperature lever to maximum cold position.
4. Set blower to maximum speed.
5. Check sight glass after the lapse of about five minutes. Judge according to the following table.

Check item \ Amount of refrigerant	Almost no refrigerant	Insufficient	Suitable	Too much refrigerant
Temperature of high pressure and low pressure lines.	Almost no difference between high pressure and low pressure side temperature.	High pressure side is warm and low pressure side is fairly cold.	High pressure side is hot and low pressure side is cold.	High pressure side is abnormally hot.
State in sight glass.	Bubbles flow continuously. Bubbles will disappear and something like mist will flow when refrigerant is nearly gone.	The bubbles are seen at intervals of 1 - 2 seconds.	Almost transparent. Bubbles may appear when engine speed is raised and lowered.	No bubbles can be seen.
			No clear difference exists between these two conditions.	
	 AC256	 AC257	 AC258	
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 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.

Note:

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.

PERFORMANCE TEST

Check for the amount of refrigerant in the system can be made by measuring pressure on discharge side.

The correct amount of refrigerant is in the system, if pressure on the discharge side is within the specified range. For details, refer to Trouble Diagnoses and Corrections for performance test.

Overcharging will show up in higher pressure on discharge side.

COMPRESSOR OIL LEVEL CHECK

A completely sealed system will be free from compressor oil leakage. As long as the system operates satisfactorily, a compressor oil level check is unnecessary. Because of its structure, almost all compressor oil is circulating in the system together with refrigerant. If an excessive quantity of oil is charged into the system, most of the oil goes around the system and stays in the condenser or in the evaporator, thus causing considerable reduction in the cooling capacity of the system. Insufficient compressor oil leads to poor lubrication of the compressor. Whenever replacing any component of the refrigeration system, the original total oil charge must always be maintained.

Amount of oil in the system:
150 cc
(5.1 US fl oz, 5.3 Imp fl oz)

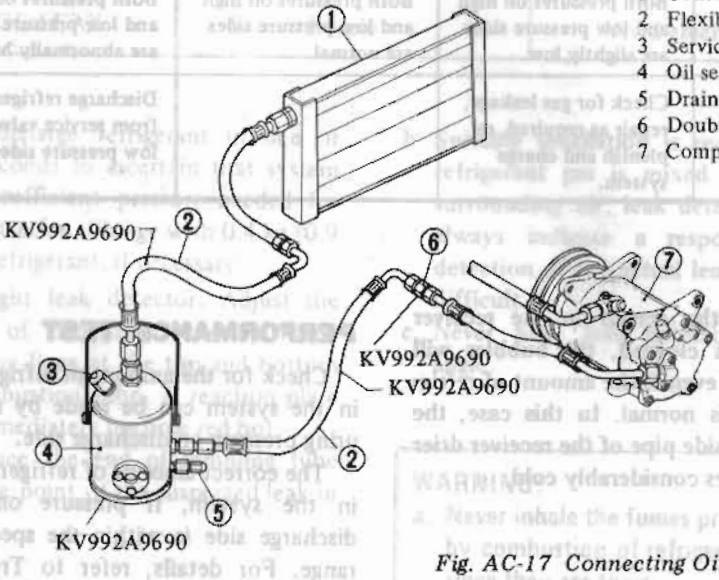
Check and adjust the quantity of oil according to the following procedures.

CAUTION:
a. The oil should not be transfused from a container into another, as the failure will possibly cause moisture to mix with the oil.
b. The used oil should not be returned into a container.
c. The oil should not be used if its state of preservation is not clear enough.

Checking and adjusting (Using oil separator)

The Oil Separator Kit KV992A9690 is used to efficiently withdraw the oil in the refrigeration system (that is, to separate oil and refrigerant). If an excessive quantity of oil is charged in the system, or if the quantity of oil in the system is unknown, adjust the quantity of oil in the system to specification, proceeding as follows:

1. Discharge air conditioning system. Refer to Discharging System.
2. Using two special flexible hoses and double union in Oil Separator Kit KV992A9690, connect oil separator between compressor discharge side and condenser. See Fig. AC-17.



1 Condenser
2 Flexible hose
3 Service valve
4 Oil separator
5 Drain cap
6 Double union
7 Compressor

Fig. AC-17 Connecting Oil Separator

3. Evacuate and charge system. Refer to General Service for evacuating and charging system.
4. Fully open all windows or all doors of car.
5. Operate compressor at engine idling with air conditioner set for maximum cooling and high fan speed.

Note: Never allow engine speed to exceed idling speed.

6. Observe oil separator oil level gauge. If rise of oil level has stopped, immediately stop compressor operation. (This indicates that oil has been withdrawn.)

CAUTION:
Do not continue oil withdrawal operation more than 10 minutes.

Note: In some cases, fluid refrigerant may be mixed with oil, causing unusual rise of oil level. In such a case, stop compressor operation after ten minutes of withdrawal operation.

7. Discharge system. Refer to General Service for discharging system.
8. Disconnect oil separator, two flexible hoses and double union from system.
9. Connect refrigerant lines to original positions.
10. Disconnect low flexible hose from compressor suction valve.
11. Add oil from compressor suction valve.

Amount of oil to be added:
120 cc
(4.1 US fl oz, 4.2 Imp fl oz)

Note:
a. Oil remains unremoved in the system about 30 cc (1.0 US fl oz, 1.1 Imp fl oz)
b. To facilitate replenishment, it is a good practice to disconnect the low-pressure (flexible) hose to the evaporator and add oil to the compressor through the hose.

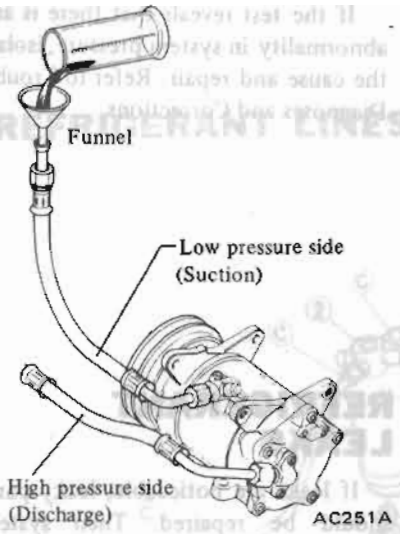


Fig. AC-18 Adding Oil

12. After charging, rotate compressor clutch with hand 5 to 10 turns.
13. Connect low flexible hose to compressor suction valve. Evacuate and charge system. Refer to General Service for evacuating system and charging refrigerant.
14. Conduct leak test and performance test.
15. Gradually loosen drain cap of oil separator to release residual pressure. Remove cap and drain oil.
16. 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 two flexible hoses and double union securely.
(2) Cap oil separator, evacuate it from service valve, and charge refrigerant.

Checking and adjusting (Alternate method)

If the Oil Separator is not available, control the quantity of oil in accordance with the table below when charging compressor oil into the system.

OIL CHARGE TABLE

Condition		Proper charging method	Amount of oil to be added cc (US fl oz, Imp fl oz)
Replacement of compressor		Remove all oil from new compressor* and charge it with amount of oil shown in right column.	70 (2.4, 2.5)
Replacement of evaporator		Add amount of oil shown in right column.	70 (2.4, 2.5)
Replacement of receiver dryer (liquid tank)		Oil need not be added.	—
Replacement of accumulator		Add amount of oil shown in right column.	30 (1.0, 1.1)
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.	Add amount of oil shown in right column.	50 (1.7, 1.8)
Replacement of flexible hose or copper tube	There is no sign of oil leakage.	Oil need not be added.	—
	There are evidences of a large amount of oil leakage.	Add amount of oil shown in right column.	50 (1.7, 1.8)
Gas leakage	There is no sign of oil leakage.	Oil need not be added.	—
	There are evidences of a large amount of oil leakage.	Add amount of oil shown in right column.	50 (1.7, 1.8)

* Remove compressor oil as follows

1. With the compressor upside down, completely drain the oil through the suction port (cast-out letter "S" mark side).
   Be sure to use a clean container to receive the oil.
2. When the oil stops flowing out, rotate the clutch hub (compressor shaft) two or three times to completely drain the oil.

Note: When replacing two or more of the parts indicated in the above chart, follow each instruction under the proper charging method column for the proper amount of oil to be added.

– Example –

When replacing the evaporator and compressor, drain all oil out of the new compressor and then charge the compressor with the total amount of 140 cc (4.7 US fl oz, 4.9 Imp fl oz) oil (70 cc (2.4 US fl oz, 2.5 Imp fl oz) for the evaporator and 70 cc (2.4 US fl oz, 2.5 Imp fl oz) for the compressor).
If total amount of oil to be added exceeds 150 cc (5.1 US fl oz, 5.3 Imp fl oz), add 150 cc (5.1 US fl oz, 5.3 Imp fl oz).
The method of adding oil is the same as in the case of using the oil separator. Oil is added into the compressor. Refer to Fig. AC-18.

PERFORMANCE TEST

The cooling performance of the air conditioner changes considerably with changes in surrounding conditions. Testing must be performed using the correct method. This test is used to judge whether system is operating correctly and can also be used as a guide in checking for problems.

1. Park the car indoors or in the shade.
2. Open all the windows of the car fully. However, close the doors.
3. Open the hood.
4. Connect manifold gauge to high- and low-side service valves of the system. Refer to Handling Manifold Gauge.
5. Set air lever to AIR-CON RECIRC position.
6. Set temperature lever to maximum cold position.
7. Set blower to its highest speed.
8. Start the engine and hold engine speed at 1,500 rpm.
9. After the air conditioner has been operated for about 10 minutes, measure system pressures at high-pressure (discharge) side and low-pressure (suction) side.
10. Measure the temperature of discharge air at the center outlet grille.
11. Measure the temperature and humidity of the evaporator intake air at the recirculating air inlet of the evaporator.
12. Measure the temperature and humidity of the ambient air at a point 1 m (3.3 ft) front of condenser. However, a dry bulb and wet bulb must not be placed in direct sunlight.
13. Check for any abnormalities by comparing the test results with standard pressure. Refer to Performance Chart.

Note:

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.

If the test reveals that there is any abnormality in system pressure, isolate the cause and repair. Refer to Trouble Diagnoses and Corrections.

REFRIGERANT LEAKS

If leaks are noticeable, leaky parts should be repaired. Then system should be filled with refrigerant.

CAUTION:
Do not operate compressor with refrigerant level excessively low.
If this caution is neglected, a burnt compressor will result since heavy loss of refrigerant usually indicates heavy loss of compressor oil.

If system has been exposed to atmosphere for an extended period of time, receiver drier must be replaced. If leaks are slight and no air is present in system, add refrigerant as necessary.

To detect leaks, refer to Checking for Leaks. Here is how leaks are stopped.

1. Check torque on the connection fitting and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been retightened, discharge refrigerant from system, disconnect the fittings, and check its seating face for damage. Always replace even if damage is slight.
3. Check compressor oil and add oil if required.
4. Charge refrigerant and recheck for gas leaks. If no leaks are found, evacuate and charge system.

SERVICE PROCEDURES

REFRIGERANT LINES

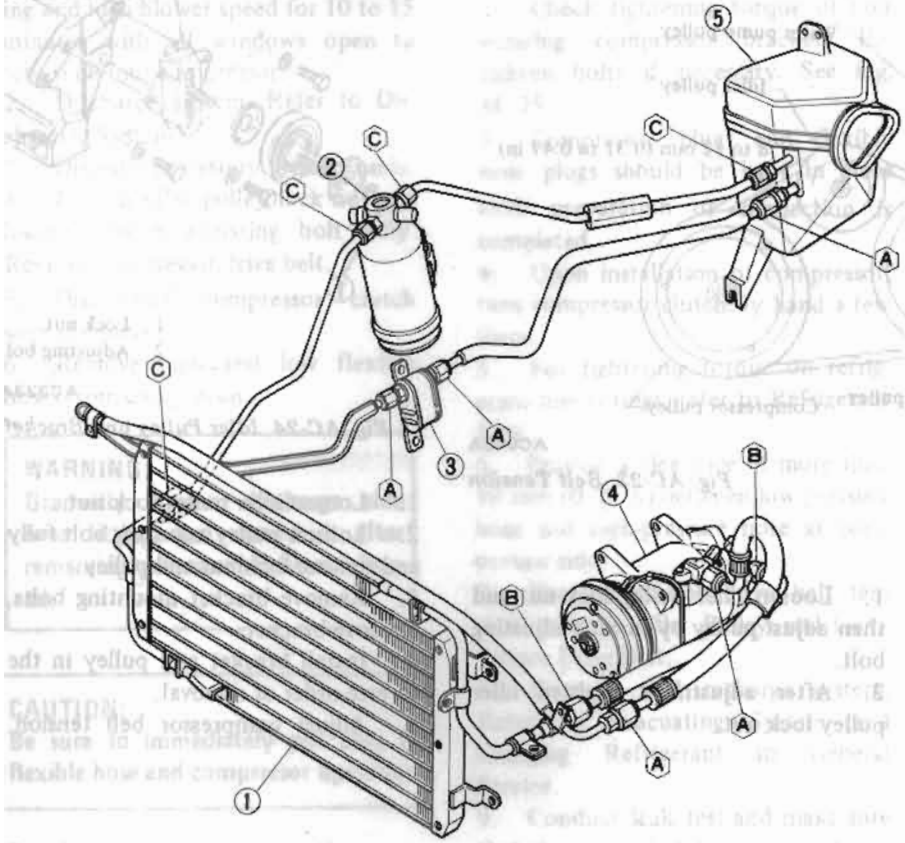


Fig. AC-19 Refrigerant Lines

When replacing flexible hose and tube, observe the following:

1. Before starting work, be sure to discharge system.
2. When disconnecting tubes, be sure to use two wrenches on both tubes.

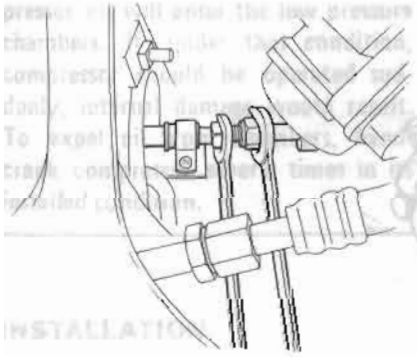


Fig. AC-20 Disconnecting Tube

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

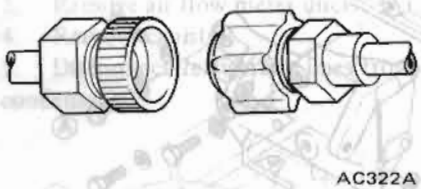


Fig. AC-21 Plug Opening of Tube

4. Compressed air must never be used to clean dirty line. Clean with refrigerant gas.
5. In connecting tubes, be sure to apply compressor oil to seating surface and then tighten tubes to specified tightening torque.

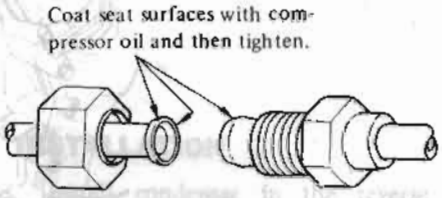
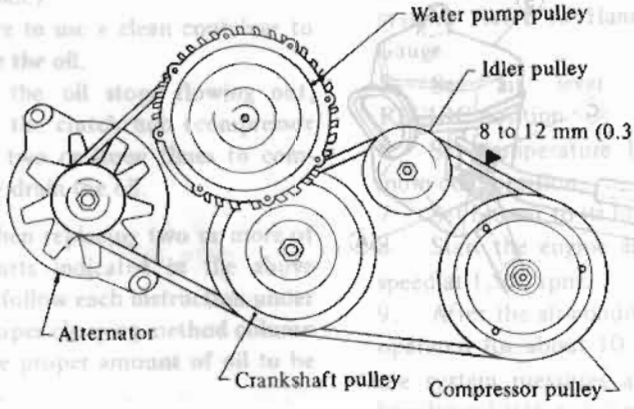


Fig. AC-22 Line Connection

6. Be sure to use two wrenches when tightening a flare nut of tube.
7. Make sure refrigerant line is clamped securely. Start engine and raise engine speed to inspect if there is vibration or unusual noise.
8. Conduct leak test and make sure that there is no leak from connections.
9. For evacuating and charging system, refer to General Service.

IDLER PULLEY AND COMPRESSOR DRIVE BELT

ADJUSTMENT OF BELT TENSION



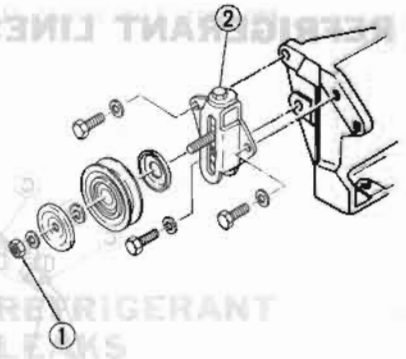
AC045A

Fig. AC-23 Belt Tension

Specified compressor belt tension is 8 to 12 mm (0.31 to 0.47 in) when thumb pressure of 10 kg (22 lb) is applied midway between idler pulley and compressor pulley.

1. Loosen idler pulley lock nut and then adjust pulley by turning adjusting bolt.
2. After adjustment, tighten idler pulley lock nut.

REMOVAL AND INSTALLATION



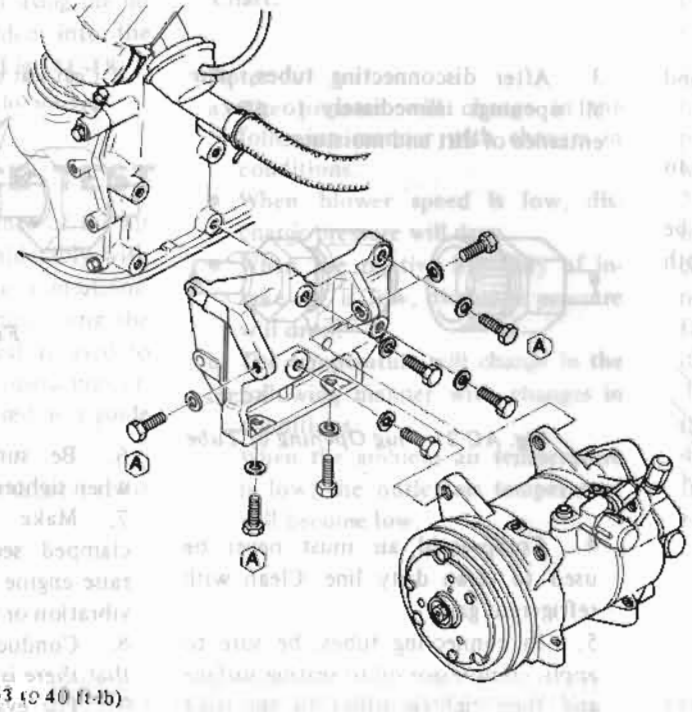
1 Lock nut
2 Adjusting bolt

AC323A

Fig. AC-24 Idler Pulley and Bracket

1. Loosen idler pulley lock nut.
2. Loosen pulley adjusting bolt fully and remove lock nut and pulley.
3. Remove bracket mounting bolts. Remove bracket.
4. Install bracket and pulley in the reverse order of removal.
5. Adjust compressor belt tension.

COMPRESSOR



Tightening torque
Ⓐ : 4.5 to 5.5 kg-m (33 to 40 ft-lb)

AC324A

Fig. AC-25 Compressor and Bracket

REMOVAL

1. Operate compressor, if possible, at engine idling speed with air conditioner controls set for maximum cooling and high blower speed for 10 to 15 minutes with all windows open to return oil into compressor.
2. Discharge system. Refer to Discharging System.
3. Disconnect battery ground cable.
4. Loosen idler pulley lock nut and loosen tension adjusting bolt fully. Remove compressor drive belt.
5. Disconnect compressor clutch wire at connector.
6. Remove high and low flexible hoses from compressor.

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

CAUTION:
Be sure to immediately put plug in flexible hose and compressor openings.

7. Remove two bolts mounting compressor's top side.
8. Jack up front of car and remove under cover.
9. Holding compressor, remove bolts mounting compressor's lower side.
10. Remove compressor with compressor clutch facing up.

CAUTION:
Do not attempt to leave the compressor on its side or upside down for more than 10 minutes, as the compressor oil will enter the low pressure chambers. If, under that condition, compressor should be operated suddenly, internal damage would result. To expel oil from chambers, hand-crank compressor several times in its installed condition.

INSTALLATION

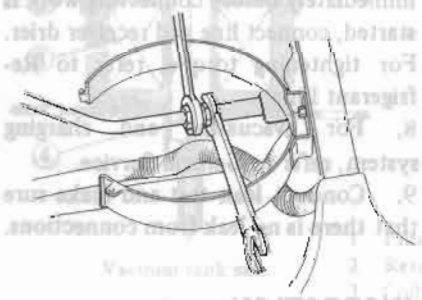
Install in the reverse order of removal, observing the following:

1. Determine quantity of oil to be charged into compressor by referring to Compressor Oil Level Check in General Service.
2. Check tightening torque of bolt securing compressor bracket. Retighten bolts if necessary. See Fig. AC-25.
3. Compressor plugs and flexible hose plugs should be kept in place until preparation of connection is completed.
4. Upon installation of compressor, turn compressor clutch by hand a few turns.
5. For tightening torque on refrigerant line fittings, refer to Refrigerant Line.
6. Provide a clearance of more than 10 mm (0.39 in) between low pressure hose and high-pressure hose at compressor side.
7. For compressor drive belt tension, refer to Idler Pulley and Compressor Drive Belt.
8. Evacuate and recharge system. Refer to Evacuating System and Charging Refrigerant in General Service.
9. Conduct leak test and make sure that there is no leak from connections.

CONDENSER

REMOVAL

1. Disconnect battery ground cable.
2. Discharge system. Refer to General Service for discharging system.
3. Remove air flow meter duct.
4. Remove canister.
5. Disconnect refrigerant lines from condenser.



AC325A

Fig. AC-26 Disconnecting refrigerant Lines from Condenser

CAUTION:
a. Use wrench to fix union on condenser, and then loosen flare nut of refrigerant line with another wrench.
b. Plug up all openings in condenser and system.

6. Remove condenser tube clamp
7. Remove air cleaner and duct.
8. Remove four mounting bolts, then remove condenser from car.

INSPECTION

Inspect joints of inlet and outlet pipes for cracks and scratches. Upon finding any problem which may cause gas to leak, repair or replace condenser.

Condenser fins or air passages clogged with dirt, insects or leaves will reduce cooling efficiency of condenser. In such a case, clean fins or air passages with compressed air.

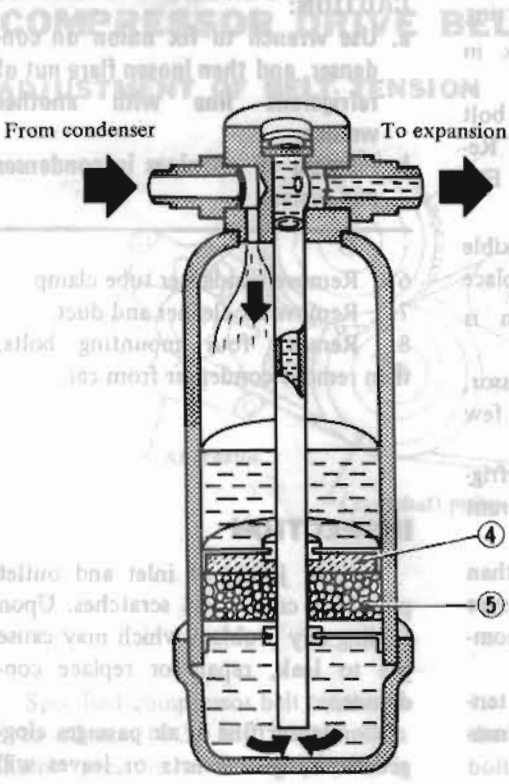
CAUTION:
Do not clean condenser with steam. Be sure to use cold water or compressed air.

INSTALLATION

Install condenser in the reverse order of removal, observing the following:

1. Keep plugs in place until immediately before connecting work is started.
2. For tightening torque on line connections, refer to Refrigerant Line.
3. Determine quantity of oil to be charged into compressor by referring to Compressor Oil Level Check in General Service.
4. For evacuating and charging system, refer to General Service.
5. Conduct leak test and make sure that there is no leak from connections.

RECEIVER DRIER



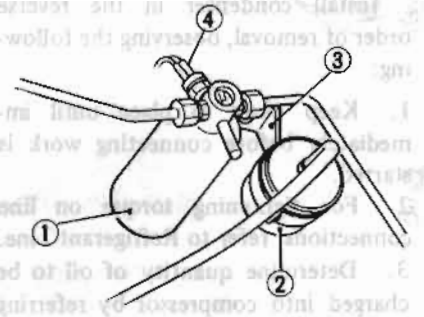
1. Low pressure switch: Turns off at pressures below 2 kg/cm^2 (28 psi), cutting compressor power supply.
2. High pressure valve: Opens at pressures above 38 kg/cm^2 (540 psi), thereby discharging refrigerant to the atmosphere.
3. Sight glass
4. Strainer: Remove foreign material in refrigerant.
5. Desiccant: Removes water in refrigerant.

AC326A

Fig. AC-27 Receiver Drier

REMOVAL AND INSTALLATION

1. Disconnect battery ground.
2. Discharge system. Refer to Discharging System in General Service.
3. Remove low pressure switch leads.
4. Remove fuel filter and bracket.



1 Receiver drier
2 Fuel filter
3 Fuel filter bracket
4 Low pressure switch leads

AC327A

Fig. AC-28 Layout of Receiver Drier

5. Disconnect refrigerant lines from receiver driver.

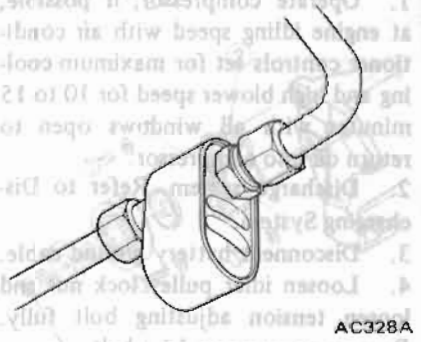
CAUTION:
Plug all openings to prevent entrance of dirt and moisture.

6. Remove receiver drier mounting screws. Remove receiver drier.
7. Install receiver drier in the reverse order of removal. With plugs taken off immediately before connecting work is started, connect line and receiver drier. For tightening torque, refer to Refrigerant Line.
8. For evacuating and charging system, refer to General Service.
9. Conduct leak test and make sure that there is no leak from connections.

INSPECTION

Check receiver drier for leaks or damage. If necessary, replace.

ACCUMULATOR



AC328A

Fig. AC-29 Accumulator

REMOVAL

1. Disconnect battery ground cable.
2. Discharge system Refer to General Service for discharging system.
3. Disconnect refrigerant lines from accumulator.

CAUTION:
a. Use wrench to fix union on condenser, and then loosen flare nut of refrigerant line with another wrench.
b. Plug up all openings in accumulator and system.

INSPECTION

Inspect joints of inlet and outlet pipes for cracks and scratches. Upon finding any problem which may cause gas to leak, repair or replace condenser.

INSTALLATION

Install accumulator in the reverse order of removal, observing the following:

1. Keep plugs in place until immediately before connecting work is started.
2. For tightening torque on line connections, refer to Refrigerant Line.

3. Determine quantity of oil to be charged into compressor by referring to Compressor Oil Level Check in General Service.
4. For evacuating and charging system, refer to General Service.
5. Conduct leak test and make sure that there is no leak from connections.

FAST IDLE ACTUATOR

Being a non-adjustable type, this fast idle actuator requires no adjustment.

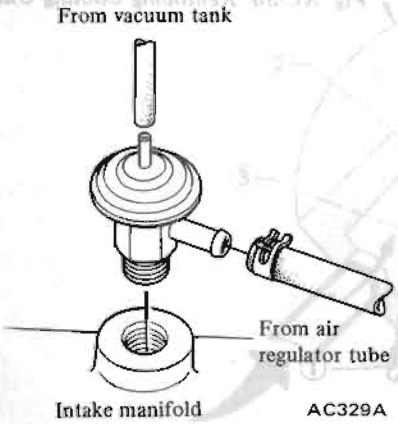


Fig. AC-30 Fast Idle Actuator

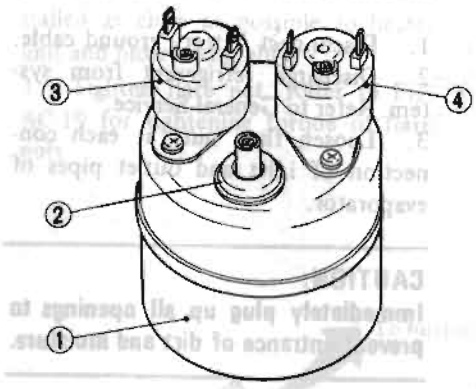
REMOVAL AND INSTALLATION

1. Remove vacuum hoses from actuator.
2. Remove actuator.
3. Install actuator in the reverse order of removal.

INSPECTION

1. Remove actuator. Refer to Removal and Installation.
2. Install vacuum hose from vacuum tank.
3. Plug hole in intake manifold and hose to air regulator tube.
4. With air conditioner on, set engine to idling speed.
5. Make sure that air regulator side of actuator is open to intake manifold side.
6. Remove vacuum hose and make sure that air regulator side is closed to intake manifold side.

VACUUM TANK



1 Vacuum tank
2 Vacuum check valve
3 Vacuum source magnet valve
4 F.I.C.D. magnet valve

Fig. AC-31 Vacuum Tank

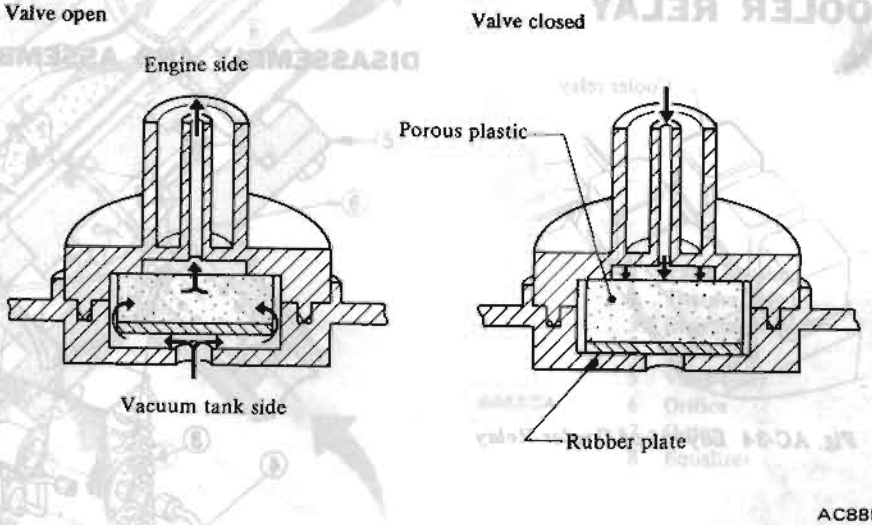
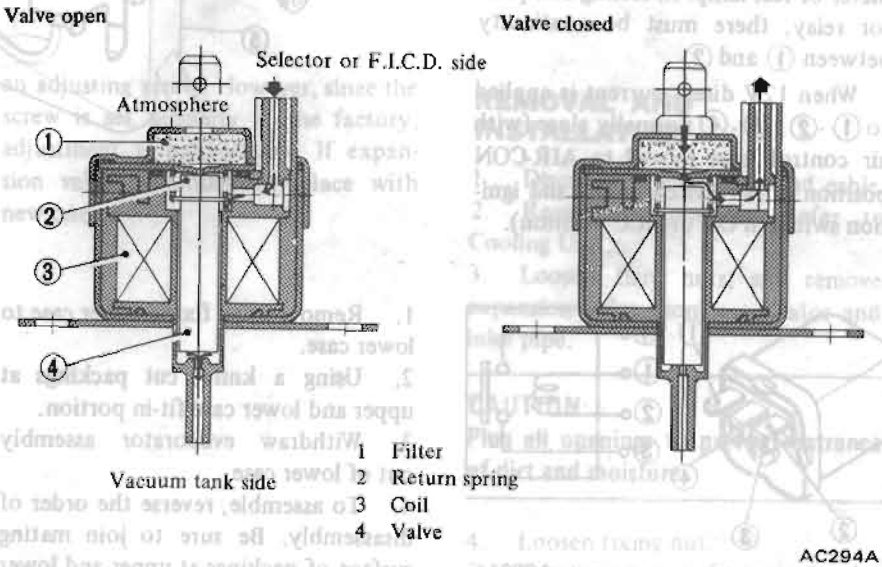


Fig. AC-32 Vacuum Check Valve



1 Filter
2 Return spring
3 Coil
4 Valve

Fig. AC-33 Magnet Valve

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove vacuum hose and wire at connector.
3. Remove vacuum tank with bracket.
4. Remove vacuum tank from bracket.
5. Install vacuum tank in the reverse order of removal.

INSPECTION

1. Check vacuum tank for leak.
2. Check vacuum check valve and magnet valves.

COOLER RELAY

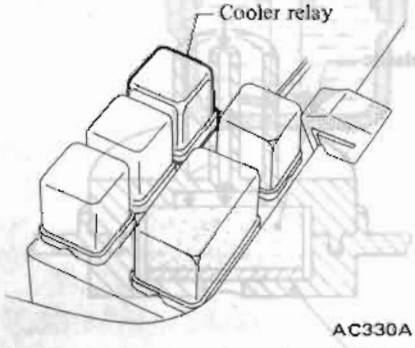


Fig. AC-34 Layout of Cooler Relay

INSPECTION

Test continuity of relay with ohmmeter or test lamp. In testing compressor relay, there must be continuity between ① and ②.

When 12V direct current is applied to ①-②, ③-④ normally close (with air control lever moved to AIR-CON position ☆, fan switch in ON and ignition switch in ON or ACC position).

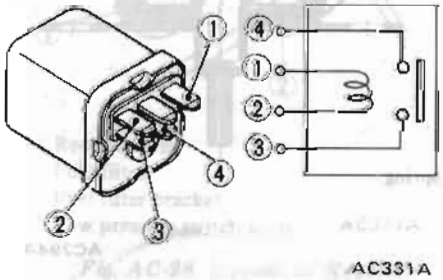


Fig. AC-35 Cooler Relay

COOLING UNIT

REMOVAL

1. Disconnect battery ground cable.
2. Discharge refrigerant from system. Refer to General Service.
3. Loosen flare nuts at each connection of inlet and outlet pipes of evaporator.

CAUTION:
Immediately plug up all openings to prevent entrance of dirt and moisture.

4. Remove heater unit.
5. Remove defroster duct on passenger's side.
6. Remove mounting bolt and then remove cooling unit from dash panel.

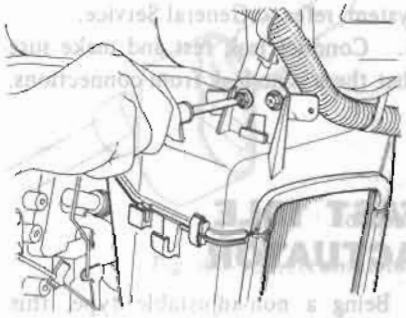
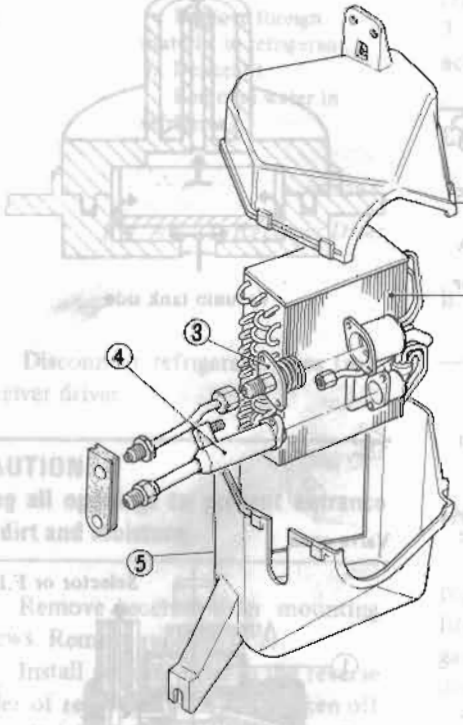


Fig. AC-36 Removing Cooling Unit

DISASSEMBLY AND ASSEMBLY



1 Upper case
2 Evaporator
3 Expansion valve
4 Suction throttle valve
5 Lower case

Fig. AC-37 Cooling Unit

1. Remove clips fixing upper case to lower case.
2. Using a knife, cut packings at upper and lower case fit-in portion.
3. Withdraw evaporator assembly out of lower case.
4. To assemble, reverse the order of disassembly. Be sure to join mating surface of packings at upper and lower case fit-in portion.

INSPECTION

In case evaporator core, suction throttle valve or expansion valve shows gas leaking, repair or replace it with a new one as necessary.

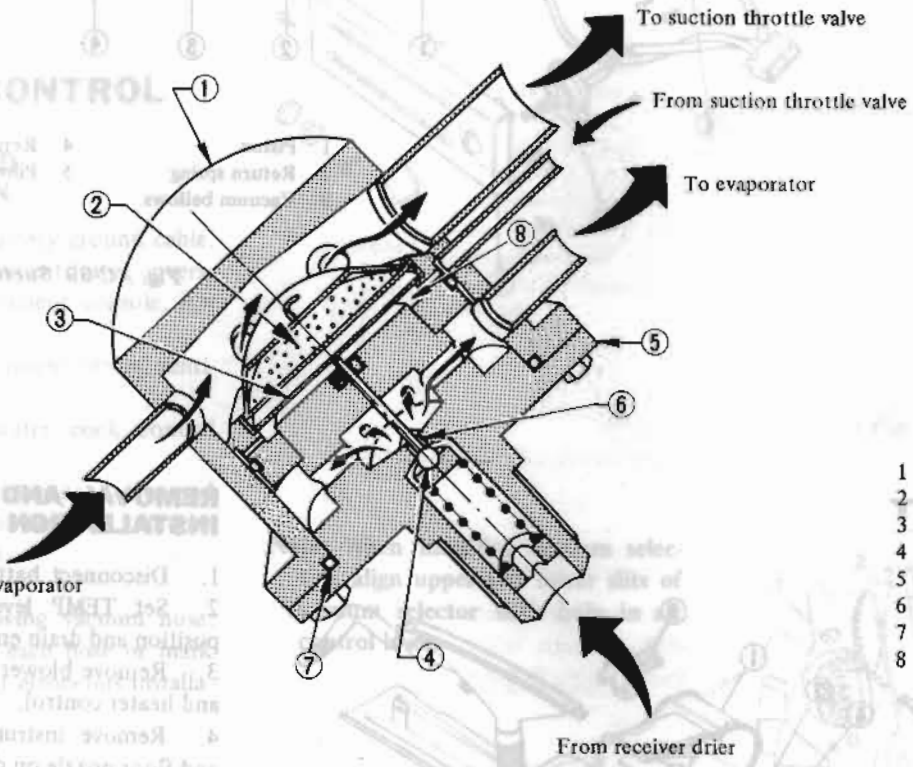
Dirt and nicotine accumulation on evaporator case will go bad and smell. This means that you have to remove them from time to time to assure healthful fresh air inside car.

INSTALLATION

Install evaporator in the reverse order of removal, observing the following:

1. When replacing evaporator with new one, determine quantity of oil to be charged into compressor by referring to Compressor Oil Level Check in General Service.
2. Evaporator case should be installed as close as possible to heater unit and blower assembly.
3. Tighten flare nut. Refer to Fig. AC-19 for tightening torque of flare nuts.
4. As to evacuating and charging system, refer to section concerned in General Service.
5. Conduct leak test and ensure that there is no gas leak from connection.

EXPANSION VALVE



1 Valve housing
2 Thermo bulb
3 Diaphragm
4 Valve ball
5 Valve body
6 Orifice
7 O-ring
8 Equalizer

AC334A

Fig. AC-38 Expansion Valve

The expansion valve restricts the flow of liquid refrigerant as it passes through it and delivers sprayed refrigerant to the evaporator to facilitate refrigerant evaporation.

The refrigerant within the thermo bulb changes in pressure through the super heat condition of vaporized refrigerant gas which comes out of the evaporator, causing the deflection of the diaphragm. The lift of the ball valve attached to the diaphragm is changed by the deflection of the diaphragm, thus controlling the amount of refrigerant passing the orifice.

Expansion valve is equipped with an adjusting screw. However, since the screw is set properly at the factory, adjustment is unnecessary. If expansion valve is damaged, replace with new one.

REMOVAL AND INSTALLATION

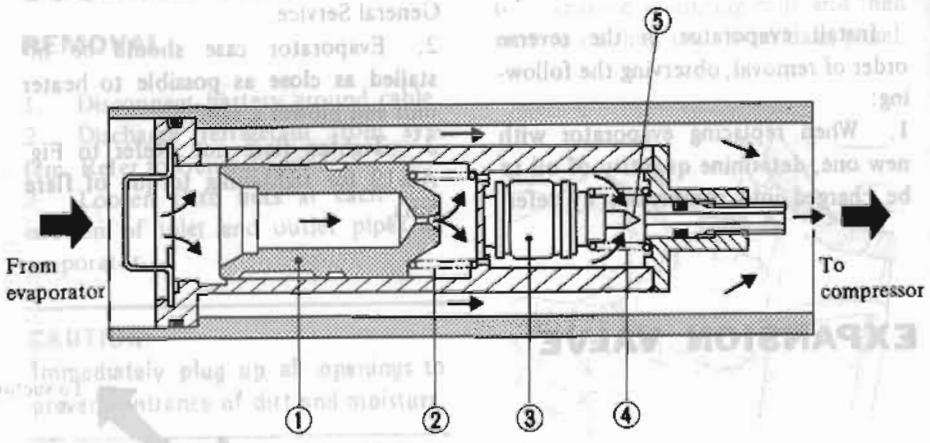
1. Disconnect battery ground cable.
2. Remove evaporator. Refer to Cooling Unit.
3. Loosen flare nuts, and remove expansion valve from evaporator and inlet pipe.

CAUTION:
Plug all openings to prevent entrance of dirt and moisture.

4. Loosen fixing nut.
5. Installation is in the reverse order of removal.

SUCTION THROTTLE VALVE

This device makes it possible to use air conditioning in locations having a wide range of temperatures throughout the year. When operating the cooler in cold weather, frost will form on the fins of the evaporator. The suction throttle valve is used to prevent the formation of this frost.

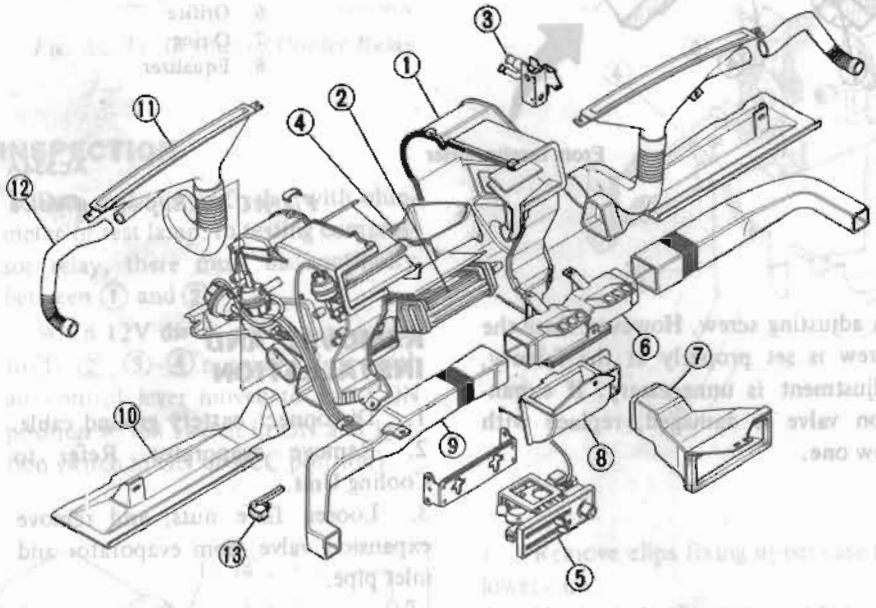


1 Piston
2 Return spring
3 Vacuum bellows
4 Return spring
5 Pilot valve

AC335A

Fig. AC-39 Suction Throttle Valve

HEATER UNIT



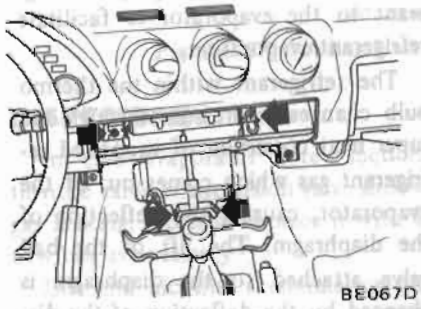
1 Heater case
2 Heater core
3 Water cock
4 Felt
5 Heater control
6 4-way connector
7 Center ventilation duct
8 2-way connector
9 Side ventilation duct
10 Floor nozzle
11 Defroster nozzle
12 Side defroster duct
13 Vacuum control switch

AC336A

Fig. AC-40 Heater Unit

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Set TEMP lever to max. HOT position and drain engine coolant.
3. Remove blower unit, cooling unit and heater control.
4. Remove instrument lower cover and floor nozzle on driver's side.
5. Disconnect inlet and outlet heater hoses.
6. Remove attaching bolts and then remove heater unit.



BE067D

Fig. AC-41 Removing Heater Unit

7. Install heater unit in the reverse order of removal.

DISASSEMBLY AND ASSEMBLY

See Fig. AC-40.

1. Remove heater unit. Refer to Heater Unit Removal and Installation.
2. Remove water cock.
3. Remove clips securing right and left heater cases, then separate heater cases.
4. Take out heater core.
5. Assemble heater unit in the reverse order of removal.

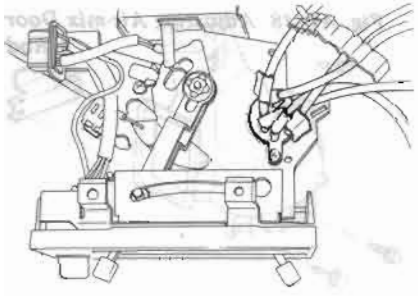
HEATER CONTROL

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove instrument lower covers.
3. Remove instrument console. Refer to Section BF.
4. Remove instrument center ventilator and duct.
5. Disconnect water cock control cable.
6. Disconnect wiring connector and vacuum hoses, or remove vacuum selector with hoses.

Note: When removing vacuum hose, put a mark on each hose or mark color to prevent erroneous installation.

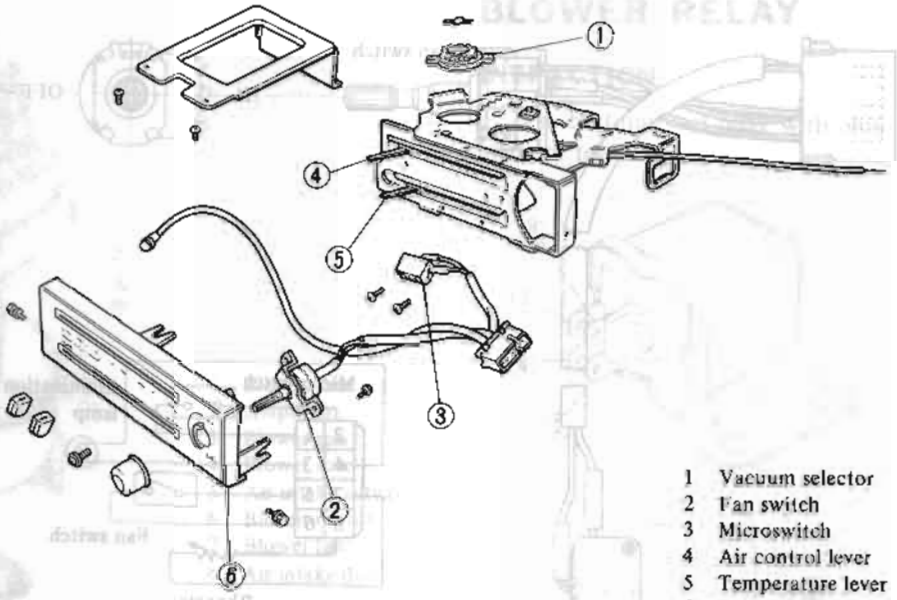
7. Remove heater control assembly by loosening attaching screws.
8. Install heater control assembly in the reverse order of removal. After installing heater control assembly, control cables and rod must be adjusted by referring to Adjusting Temperature Control Cable.



AC337A

Fig. AC-42 Disconnecting Vacuum Hoses

DISASSEMBLY AND ASSEMBLY

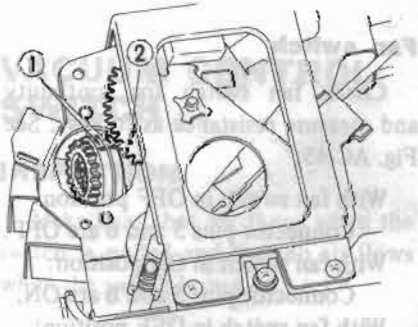


1 Vacuum selector
2 Fan switch
3 Microswitch
4 Air control lever
5 Temperature lever
6 Finisher plate

AC338A

Fig. AC-43 Heater Control

Note: When installing vacuum selector, align upper and lower slits of vacuum selector with hole in air control lever.

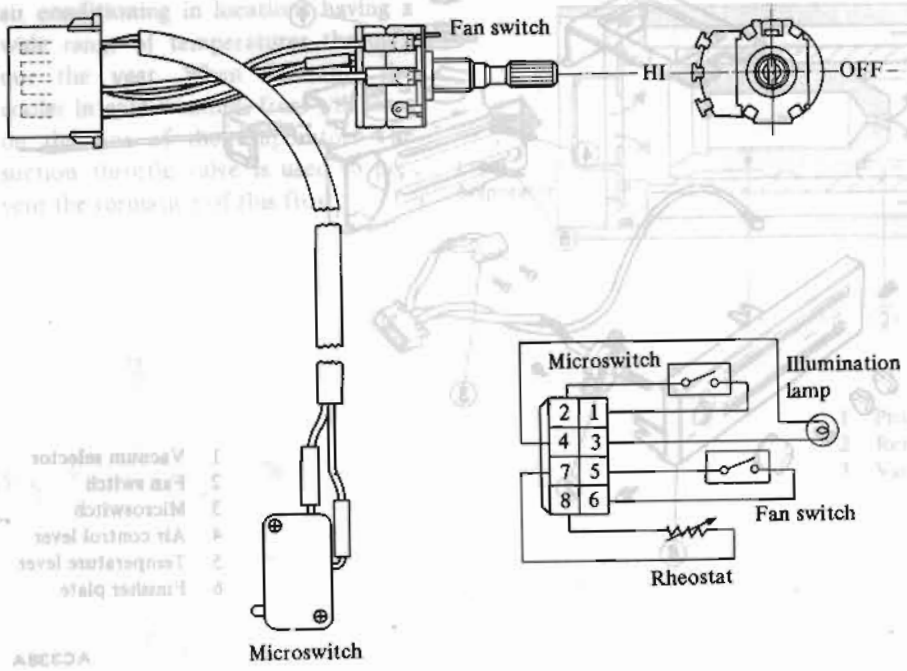


1 Slit
2 Hole

AC339A

Fig. AC-44 Vacuum Selector

INSPECTION



AC340A

Fig. AC-45 Fan Switch and Microswitch

Fan switch

Check fan switch for continuity and measure resistance as follows. See Fig. AC-45.

With fan switch in OFF position:
Connector pins 5 and 6 are OFF.
With fan switch in ON position:
Connector pins 5 and 6 are ON.
With fan switch in OFF position:
Resistance across pins 7 and 8 is 0 kΩ.
With fan switch in Max. HI position:
Resistance across pins 7 and 8 is about 1.1 kΩ.

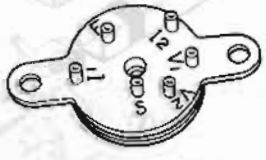
Microswitch

Check microswitch for continuity as follows. See Fig. AC-45.

With air control lever in AIR-CON position:
Connector pins 1 and 2 are ON.
With air control lever in a position other than AIR CON:
Connector pins 1 and 2 are OFF.

Vacuum selector

Make sure that continuity exists with vacuum selector connected as shown in Fig. AC-3.

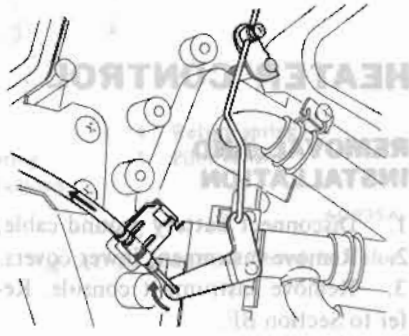


AC341A

Fig. AC-46 Vacuum Selector

Adjusting temperature control cable

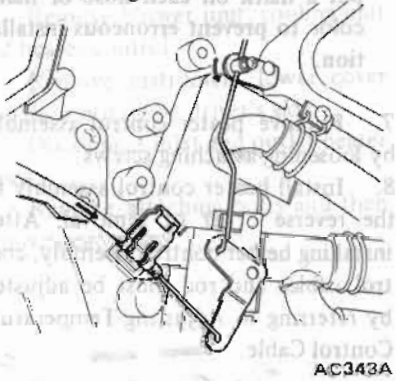
1. Set temperature lever in maximum cold position.
2. Temporarily tighten control rod mounting screw.
3. Push water cock lever in the direction of arrow (to closing side), and press temperature control cable outer case in the direction of arrow (to temperature lever side). While doing so, secure outer case with clip.



AC342A

Fig. AC-47 Adjusting Temperature Control Lever

4. Set temperature lever in maximum HOT position, and tighten securely control rod to air-mix door lever while pushing lever in direction of arrow in Fig. AC-48.



AC343A

Fig. AC-48 Adjusting Air-mix Door Rod

BLOWER UNIT

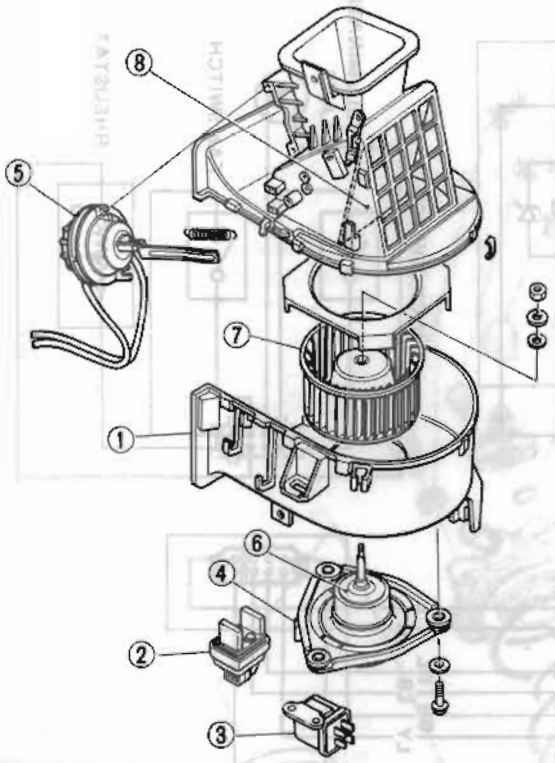


Fig. AC-49 Blower Unit

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove instrument lower cover on passenger's side and glove box.
3. Remove floor nozzle, defroster duct and side defroster duct on passenger's side.
4. Disconnect wire harness at blower motor harness connector.
5. Disconnect two vacuum hoses.
6. Remove bolts securing blower assembly and then remove blower assembly.

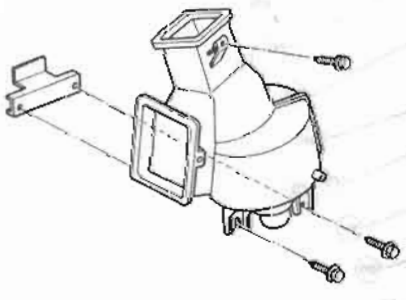


Fig. AC-50 Removing Blower Assembly

7. Installation is in the reverse order of removal.

BLOWER MOTOR

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove instrument lower cover and floor nozzle on passenger's side.
3. Disconnect wire harness at blower motor harness connector.
4. Remove blower motor attaching screws, and then remove blower motor with fan.

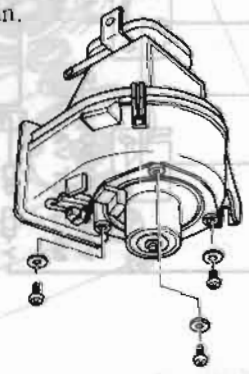


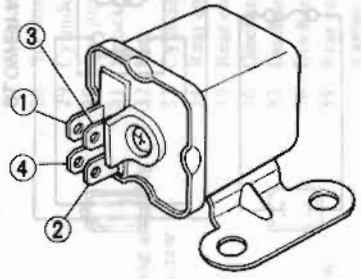
Fig. AC-51 Removing Blower Motor

5. Installation is in the reverse order of removal.

BLOWER RELAY

INSPECTION

Test continuity of relay with ohmmeter or test lamp.



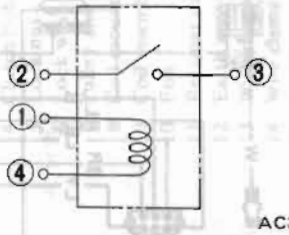


Fig. AC-52 Blower Relay

VACUUM CONTROL SWITCH

INSPECTION

Make sure that air flows when the switch is pulled and that no air flows when the switch is pushed.

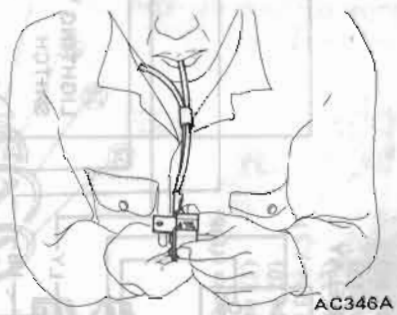
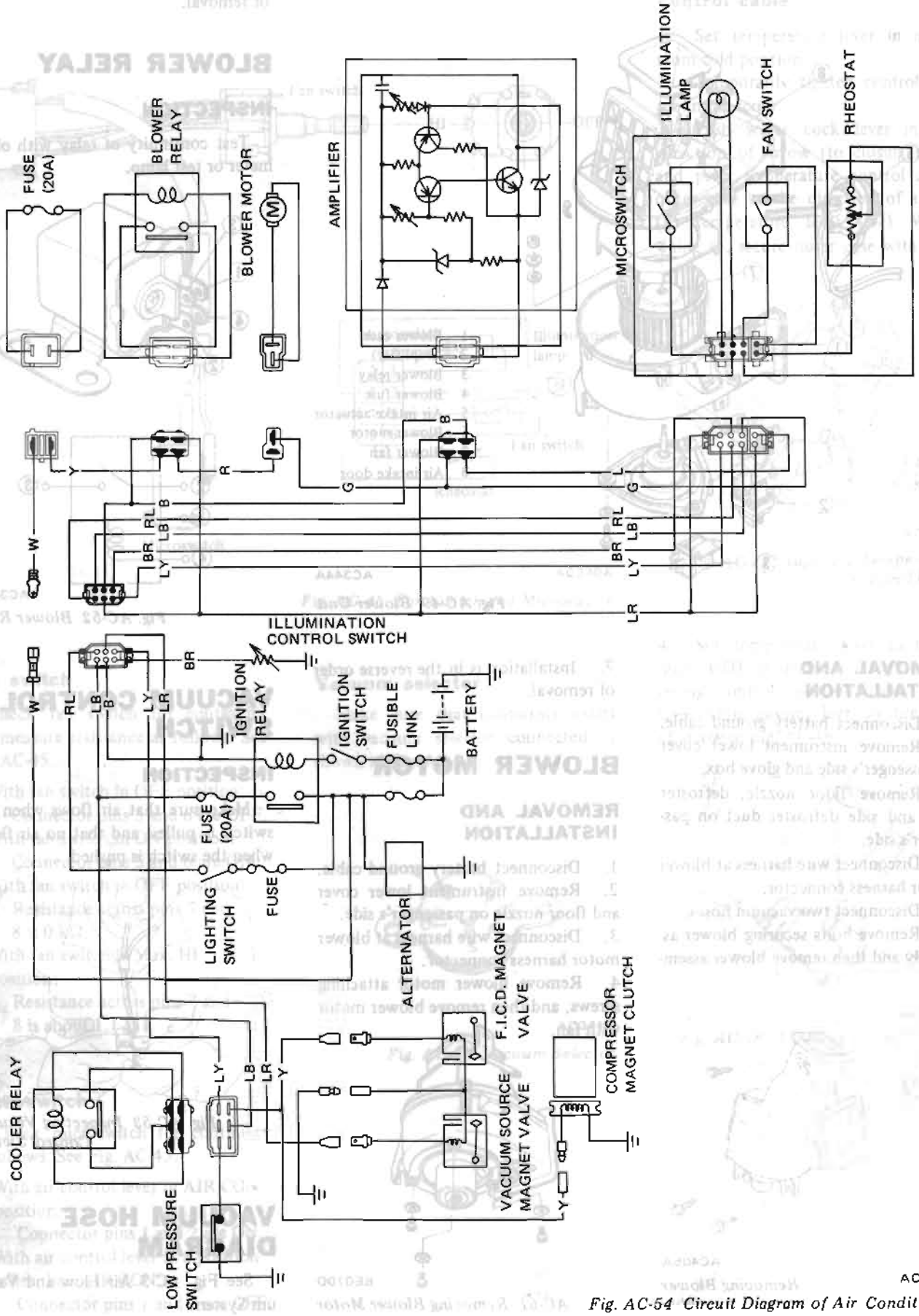


Fig. AC-53 Inspecting Vacuum Control Switch

VACUUM HOSE DIAGRAM

See Fig. AC-3 Air Flow and Vacuum System.

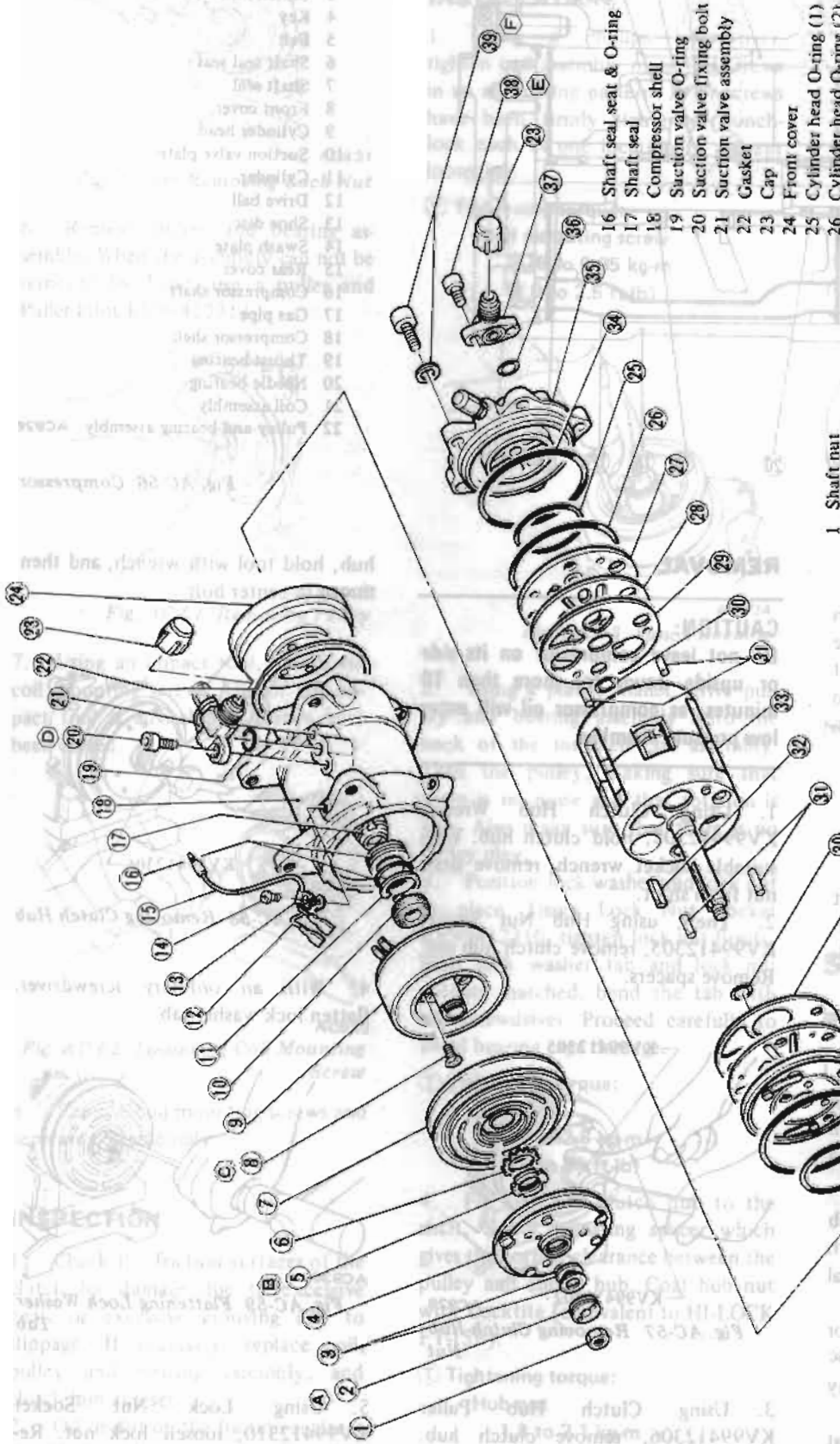
WIRING DIAGRAM



AC347A

Fig. AC-54 Circuit Diagram of Air Conditioner

COMPRESSOR

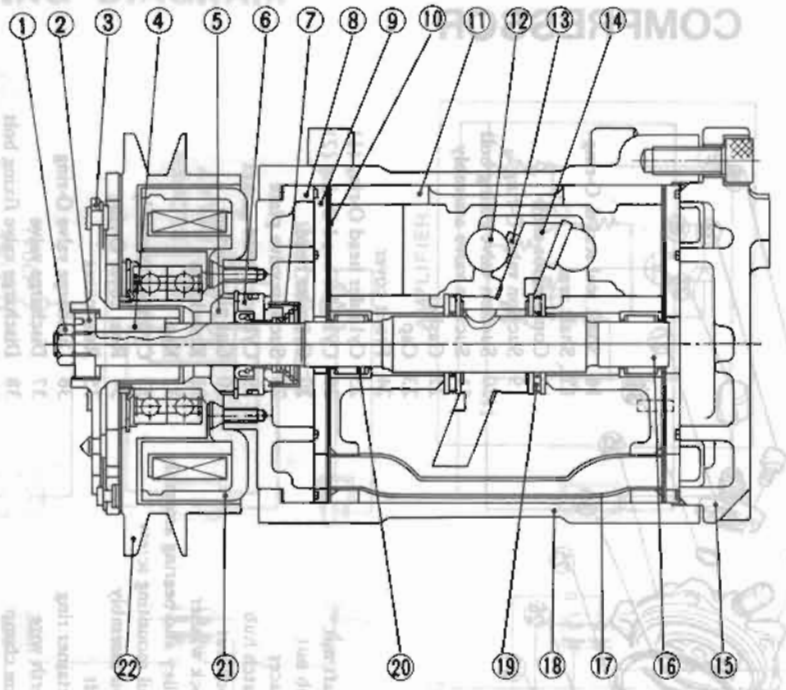


1 Shaft nut
2 Hub nut
3 Spacer
4 Clutch hub
5 Lock nut
6 Lock washer
7 Pulley and bearing assembly
8 Coil mounting screw
9 Coil assembly
10 Felt
11 Retainer ring
12 Earth wire
13 Wire clamp
14 Wire clamp screw
15 Lead wire
16 Shaft seal seat & O-ring
17 Shaft seal
18 Compressor shell
19 Suction valve O-ring
20 Suction valve fixing bolt
21 Suction valve assembly
22 Gasket
23 Cap
24 Front cover
25 Cylinder head O-ring (1)
26 Cylinder head O-ring (2)
27 Cylinder head
28 Suction valve plate
29 Cylinder head gasket
30 Gas pipe O-ring
31 Knock pin
32 Key
33 Cylinder assembly
34 Rear cover O-ring
35 Rear cover
36 Discharge valve O-ring
37 Discharge valve
38 Discharge valve fixing bolt
39 Rear cover fixing bolt and washer

Tightening torque: kg-m (ft-lb)
Ⓐ 1.8 to 2.1 (13 to 15)
Ⓑ 2.5 to 2.8 (18 to 20)
Ⓒ 0.28 to 0.35 (2.0 to 2.5)
Ⓓ 1.7 to 1.8 (12 to 13)
Ⓔ 1.7 to 1.8 (12 to 13)
Ⓕ 1.9 to 2.1 (14 to 15)

AC204A

Fig. AC-55 Compressor



1 Shaft nut
2 Hub nut
3 Clutch hub
4 Key
5 Felt
6 Shaft seal seat
7 Shaft seal
8 Front cover
9 Cylinder head
10 Suction valve plate
11 Cylinder
12 Drive ball
13 Shoe disc
14 Swash plate
15 Rear cover
16 Compressor shaft
17 Gas pipe
18 Compressor shell
19 Thrust bearing
20 Needle bearing
21 Coil assembly
22 Pulley and bearing assembly AC926

Fig. AC-56 Compressor

DESCRIPTION

The MJ167 compressor employs an oil-mist jet system in which some lubricant is mixed in the refrigerant and the mixture is sprayed directly to the sliding portions from the compressor suction side.

PRELIMINARY CLEANING

Before starting work, remove dirt from outside the detached compressor. Clean the workbench, tool, and your hands.

COMPRESSOR CLUTCH

The most likely source of problem is clutch slippage. Factors are listed here. Exercise ample care.

1. Clearance between clutch hub and pulley should be 0.5 to 0.8 mm (0.020 to 0.031 in) at all peripheral points.
2. Make sure that there is no oil or dirt on friction surfaces of clutch disc (clutch hub) and pulley. Remove any oil or dirt with a dry rag.
3. Make sure that terminal voltage at magnetic coil is above 10.5V.

REMOVAL

CAUTION:
Do not leave compressor on its side or upside down for more than 10 minutes, as compressor oil will enter low pressure chamber.

1. Using Clutch Hub Wrench KV99412302, hold clutch hub. With suitable socket wrench, remove shaft nut from shaft.
2. Then, using Hub Nut Socket KV99412305, remove clutch hub nut. Remove spacers.

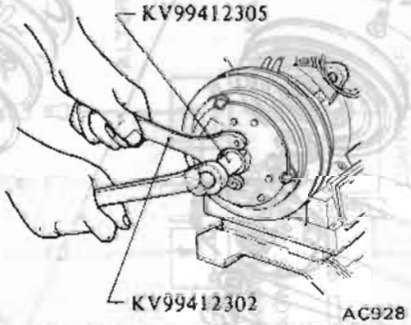


Fig. AC-57 Removing Clutch Hub Nut

3. Using Clutch Hub Puller KV99412306, remove clutch hub. Thread tool into the bore of clutch hub, hold tool with wrench, and then thread in center bolt.

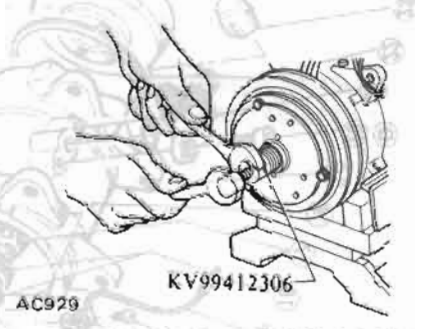


Fig. AC-58 Removing Clutch Hub

4. With an ordinary screwdriver, flatten lock washer tab.

Fig. AC-59 Flattening Lock Washer Tab

5. Using Lock Nut Socket KV99412310, loosen lock nut. Remove lock nut and lock washer.

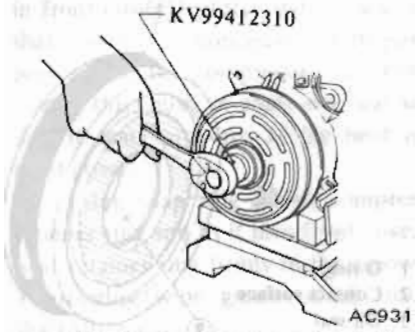


Fig. AC-60 Removing Lock Nut

6. Remove pulley and bearing assembly. When the assembly can not be removed by hand, use a puller and Puller Pilot KV99412312.

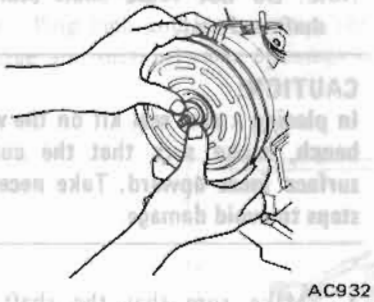


Fig. AC-61 Removing Pulley

7. Using an impact tool, loosen six coil mounting screws. Use of the impact tool is advisable as screws have been calked.

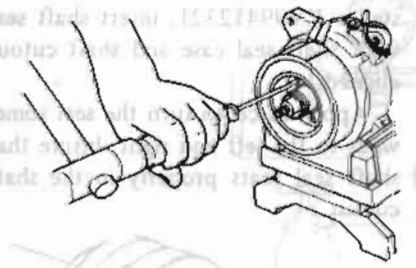


Fig. AC-62 Loosening Coil Mounting Screw

8. Remove coil mounting screws and separate coil assembly.

INSPECTION

1. Check the friction surfaces of the clutch for damage due to excessive heat, or excessive grooving due to slippage. If necessary, replace coil, pulley and bearing assembly, and clutch hub as a set.
2. Oil or dirt on the friction surfaces should be cleaned with a suitable solvent and a dry rag.
3. Check coil for shorted or opened binding leads.

INSTALLATION

1. Using a Phillips screwdriver, tighten coil assembly mounting screws in an alternating pattern. After screws have been firmly tightened, punch-lock each at one location to prevent loosening.

Ⓣ Tightening torque:
Coil mounting screw
0.28 to 0.35 kg-m
(2.0 to 2.5 ft-lb)

Fig. AC-63 Punch-Locking

2. Using a plastic mallet, drive pulley and bearing assembly onto the neck of the installed coil assembly. Turn the pulley, making sure that there is no noise and that rotation is free. Also make sure that there is no pulley play.
3. Position lock washer and lock nut in place. Using Lock Nut Socket KV99412310, tighten lock nut firmly. With lock washer tab and lock nut cutouts matched, bend the tab with the screwdriver. Proceed carefully to avoid bearing cage damage.

Ⓣ Tightening torque:
Lock nut
2.5 to 2.8 kg-m
(18 to 20 ft-lb)

4. Fit key and clutch hub to the shaft. Select adjusting spacer which gives the correct clearance between the pulley and clutch hub. Coat hub nut with Locktite (equivalent to HI-LOCK FT-15B).

Ⓣ Tightening torque:
Hub nut
1.8 to 2.1 kg-m
(13 to 15 ft-lb)

5. Coat shaft nut with Locktite (equivalent to HI-LOCK FT-15B).

Ⓣ Tightening torque:
Shaft nut
1.9 to 2.1 kg-m
(14 to 15 ft-lb)

6. Using a thickness gauge, measure the clutch hub-to-pulley clearance.

Hub-to-pulley clearance:
0.5 to 0.8 mm
(0.020 to 0.031 in)

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

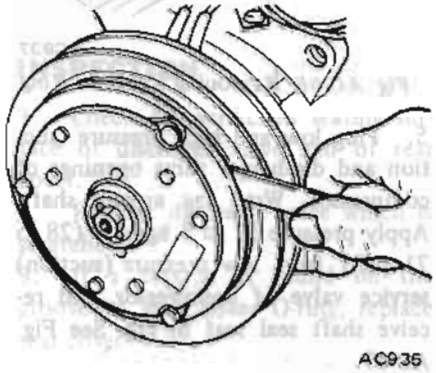


Fig. AC-64 Checking Clutch Hub-to-Pulley Clearance

Note: 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.

SHAFT SEAL

REMOVAL

1. Turn compressor upside down, and drain oil from suction valve.

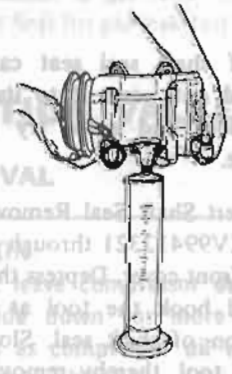
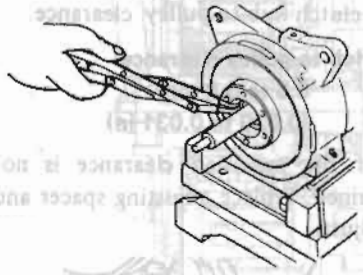


Fig. AC-65 Draining Compressor Oil

2. Remove clutch hub, pulley and bearing assembly, and coil assembly. Refer to Compressor Clutch for removal.
3. Remove felt.
4. Using snap ring pliers, compress and remove retainer ring.

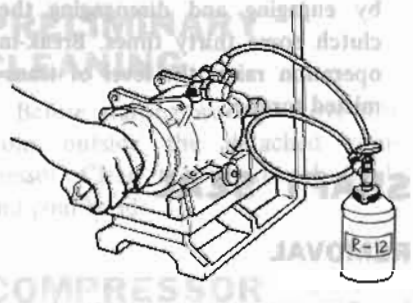


AC937

Fig. AC-66 Removing Retainer Ring

5. Plug low and high pressure (suction and discharge) valve openings of compressor. Wrap rag around shaft. Apply pressure [2 to 5 kg/cm² (28 to 71 psi)] from low pressure (suction) service valve of compressor, and receive shaft seal seat in rag. See Fig. AC-67.

CAUTION:
Use refrigerant for pressurizing. Do not use compressed air as it involves moisture in the system.

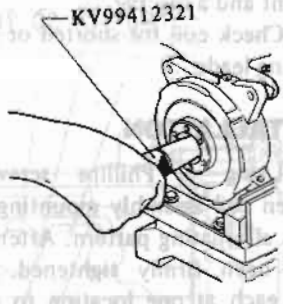


AC938

Fig. AC-67 Removing Shaft Seal Seat

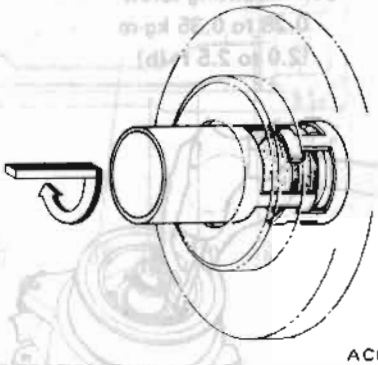
Note: If shaft seal seat cannot be pulled out, reset it to its original position, and again try to pressurize.

6. Insert Shaft Seal Remover & Installer KV99412321 through the open end of front cover. Depress the carbon seal and hook the tool at the case projection of shaft seal. Slowly pull out the tool, thereby removing shaft seal.



AC939

Fig. AC-68 Inserting Shaft Seal Remover and Installer

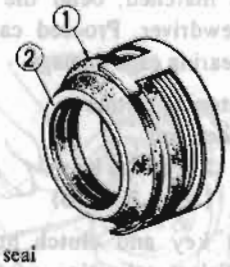


AC685

Fig. AC-69 Hooking Shaft Seal

INSPECTION

1. Check the carbon seal surface of shaft seal for damage.

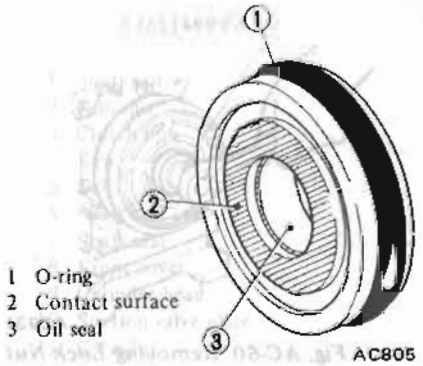


1 Carbon seal
2 Contact surface

AC035

Fig. AC-70 Checking Shaft Seal

2. Check O-ring and the carbon seal contact surface of shaft seal seat for damage. Make sure that O-ring contact surface at front cover is not damaged. Make sure that grease is applied to oil seal in shaft seal seat.



1 O-ring
2 Contact surface
3 Oil seal

AC805

Fig. AC-71 Checking Shaft Seal Seat

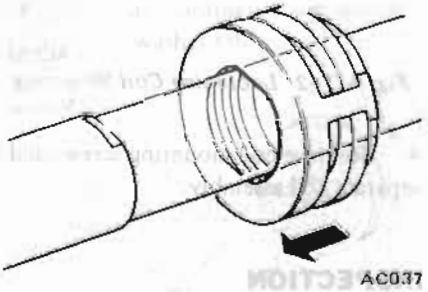
INSTALLATION

Note: Do not reuse shaft seal and shaft seal seat.

CAUTION:
In placing a new seal kit on the workbench, make sure that the contact surface faces upward. Take necessary steps to avoid damage.

1. Make sure that the shaft seal contact surface is free of dirt and amply lubricated with compressor oil.
2. Cap Shaft Seal Pilot KV99412322 to the top end of compressor shaft.
3. Using Shaft Seal Remover & Installer KV99412321, 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

Fig. AC-72 Inserting Shaft Seal

4. Fit O-ring to the outside groove of shaft seal seat, making sure that it seats properly.
5. Apply quite a bit of compressor oil on contact surface and around shaft seal seat so that it can slide easily

in front cover. Lightly coat surface of shaft with recommended multi-purpose grease (or compressor oil). Following this, push in shaft seal seat so that it seats properly at the land of front cover.

6. Using snap ring pliers, compress retainer ring and fit it into front cover. Seat retainer ring firmly in the groove. Thoroughly wipe grease or oil from shaft surface.
7. Install felt.
8. Install clutch hub and key to the shaft of compressor, and turn the shaft 5 to 6 turns in the clockwise direction.
9. Then, check for gas leakage as follows. See Fig. AC-73.

(1) Plug high and low pressure (discharge and suction) valve openings on compressor with blind caps.

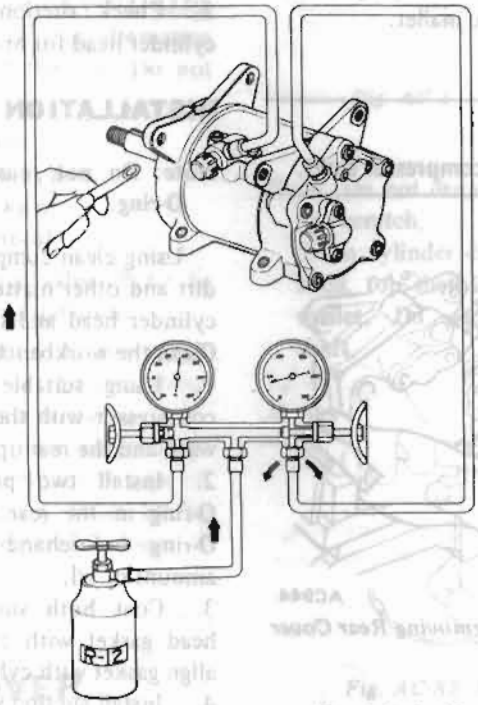
Note: To plug low pressure (suction) valve, use cap to which seal rubber is fitted.

(2) Connect charging hoses in the lines between manifold gauge and high and low pressure (discharge and suction) service valves.

Connect refrigerant can to the middle hose of manifold gauge.

(3) Open valve of can tap, charge refrigerant through low pressure (suction) service valve and purge air from high pressure (discharge) service valve.

(4) Conduct a leak test. If there is a leak, remove and then install parts again.



AC940

Fig. AC-73 Checking for Gas Leaks

9. Install compressor clutch assembly. Refer to Compressor Clutch for installation.
10. From suction valve, charge compressor with same amount of new oil as was drained before. Refer to Oil Level Check for required amount of oil.

DISCHARGE VALVE

REMOVAL

CAUTION:
Do not leave compressor on its side or upside down for more than 10 minutes as compressor oil will enter low pressure chamber.

1. Using Allen Socket KV99412324, remove hex. socket head bolts.

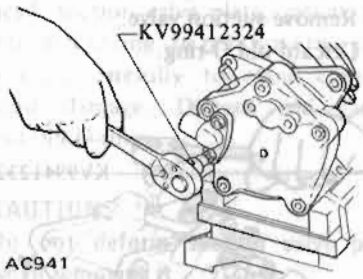


Fig. AC-74 Removing Discharge Valve

2. Remove discharge valve.
3. Discard the old O-ring.

INSPECTION

1. Check for scratched seating surface of discharge valve and of rear cover.
2. Replace discharge valve which is scratched.
3. If a scratch is found on the groove of rear cover O-ring, replace rear cover.

INSTALLATION

Note: Do not reuse old O-ring.

1. Apply a coating of compressor oil to the groove of discharge valve and O-ring, and install these parts in their proper positions on rear cover.
2. Using Allen Socket KV99412324, secure discharge valve to rear cover with hex. socket head bolts.

Ⓣ Tightening torque:
Discharge valve fixing bolt
1.7 to 1.8 kg-m
(12 to 13 ft-lb)

3. Conduct a gas leak test. Refer to Shaft Seal for gas leak test.

SUCTION VALVE

REMOVAL

CAUTION:
Do not leave compressor on its side or upside down for more than 10 minutes as compressor oil will enter low pressure chamber.

1. Using Allen Socket KV99412324, remove hex. socket head bolts.
2. Remove suction valve.
3. Discard old O-ring.

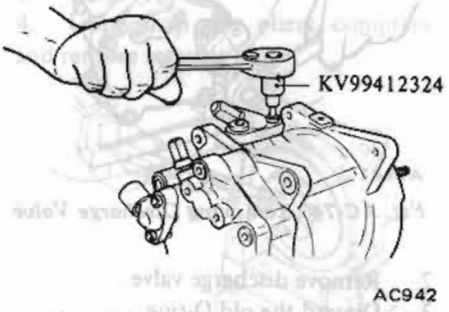


Fig. AC-75 Removing Suction Valve

INSPECTION

1. Check for scratched seating surface of suction valve and shell.
2. Replace suction valve which is scratched.
3. If a scratch is found on groove of shell O-ring, replace shell.

INSTALLATION

Note: Do not reuse old O-ring.

1. Apply a coating of compressor oil to groove of suction valve and O-ring, and install these parts in their proper positions on shell.
2. Using Allen Socket KV99412324, secure suction valve to shell with hex. socket head bolts.

Ⓣ Tightening torque:
Suction valve fixing bolt
1.7 to 1.8 kg-m
(12 to 13 ft-lb)

3. Conduct a gas leak test. Refer to Shaft Seal for gas leak test.

REAR COVER AND REAR CYLINDER HEAD

REMOVAL

1. Turn compressor upside down, and drain oil from suction valve.
2. Remove discharge valve.
3. Using Allen Socket KV99412330, remove rear cover mounting bolts. Starting at the top, loosen all bolts one turn in an alternating pattern. Then remove bolts in turn.

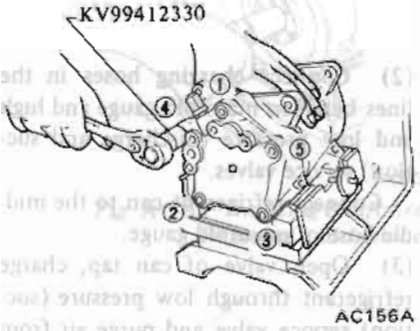


Fig. AC-76 Sequence of Removing Rear Cover Mounting Bolts

4. Grasp rear cover and carefully separate it from compressor. Tap the flange lightly and alternately as required with a plastic mallet.

CAUTION:
Do not tap on the compressor shaft.

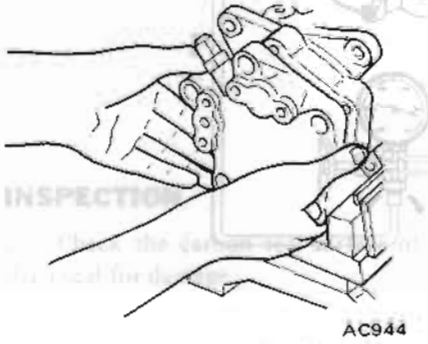


Fig. AC-77 Removing Rear Cover

5. Remove three O-rings. Discard used O-rings.
6. Remove rear cylinder head, suction valve plate, gasket, two pins and O-ring. Discard the gasket. Carefully remove suction valve plate, avoiding deformation.
7. When removal proves difficult, use Cylinder Head Remover KV99412315. Insert this tool into hole in cylinder head. With the nut in firm contact with the back side of cylinder head, tighten the bolt slowly to break loose the head.

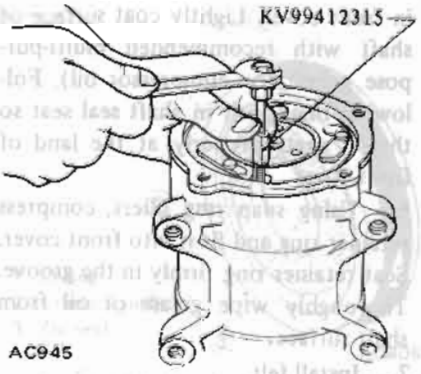


Fig. AC-78 Removing Rear Cylinder Head

INSPECTION

1. Make sure that the gasket contact surface is free of damage.
2. If replacement of low pressure (suction) service valve is necessary, replace rear cover with a new one.
3. Check suction valve plate and cylinder head for broken valves.

INSTALLATION

Note: Do not reuse old gasket and O-ring.

Using clean compressor oil, remove dirt and other matter from rear cover, cylinder head and suction valve plate. Clean the workbench.

1. Using suitable blocks, position compressor with the front face downward and the rear upward.
2. Install two pins and gas pipe O-ring in the rear of cylinder. Coat O-ring beforehand with an ample amount of oil.
3. Coat both surfaces of cylinder head gasket with compressor oil and align gasket with cylinder.
4. Install suction valve plate, making sure that the three valves properly align with cylinders and gasket cutouts.

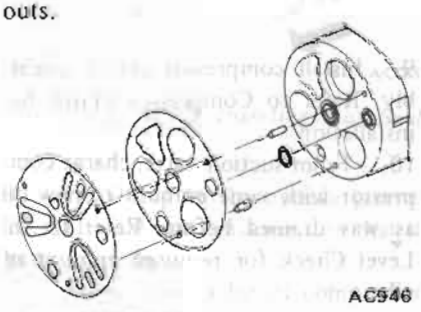


Fig. AC-79 Cutouts of Cylinder and Gasket

5. Assemble cylinder head and install three O-rings in their respective positions. Coat O-rings with ample amount of oil before installation.
6. Carefully fit rear cover to the rear of compressor.

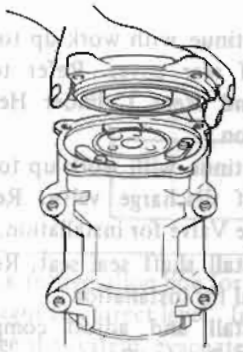

AC947

Fig. AC-80 Installing Rear Cover

7. Using Allen Socket KV99412330, tighten up five bolts in an alternating pattern, starting at the top. Do not forget lock washers.

Ⓣ **Tightening torque:**
Rear cover fixing bolt
1.9 to 2.1 kg-m
(14 to 15 ft-lb)

8. Install discharge valve. Refer to Discharge Valve for installation.
9. Upon completion of the above operation, conduct a leak test. Refer to Shaft Seal for gas leak test.
10. From suction valve, charge compressor with same amount of new oil as was drained before. Refer to Oil Level Check for required amount of oil.

FRONT COVER, FRONT CYLINDER HEAD AND CYLINDER

REMOVAL

1. Turn compressor upside down, and drain oil from suction valve.
2. Remove compressor clutch assembly. Refer to Compressor Clutch.
3. Using snap ring pliers, remove shaft seal retainer ring. Then remove shaft seal seat. Refer to Shaft Seal. Removal of shaft seal is not absolutely necessary. It may be removed when cylinder assembly is removed from front cover. In fact, this approach facilitates work.
4. Remove discharge valve. Refer to Discharge Valve for removal.
5. Remove rear cover, three O-rings, cylinder head, suction valve plate, gasket, two pins and O-ring in that order. Refer to Rear Cover and Rear Cylinder Head. This exposes the rear part of cylinder.
6. Remove cylinder assembly from compressor shell.

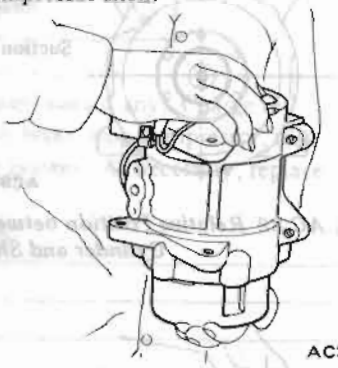

AC348A

Fig. AC-81 Removing Cylinder Assembly

Note: Do not drop cylinder assembly and scratch.
When cylinder does not drop from shell, top shell lightly with plastic mallet. Do not top compressor shaft.

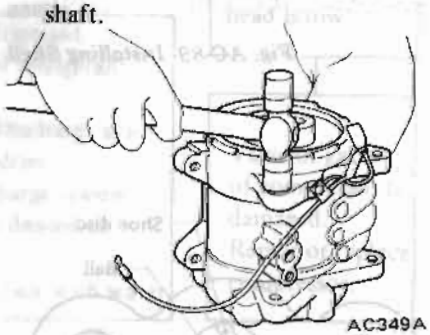

AC349A

Fig. AC-82 Removing Cylinder Assembly

7. Detach front cover from shell.

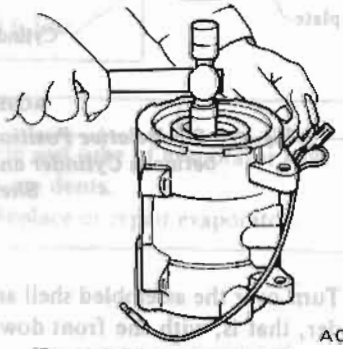

AC350A

Fig. AC-83 Removing Front Cover

8. Remove shaft seal from the shaft.
9. Remove two O-rings, cylinder head, suction valve plate, gasket, two pins and O-ring. In removing two pins, proceed carefully to avoid cylinder head damage. Discard old gasket and old O-rings.

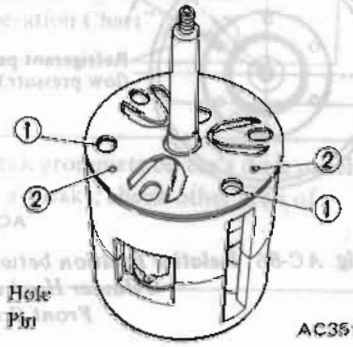
CAUTION:
Do not deform suction valve plate when removing it.

INSTALLATION

Gasket, suction valve plates and cylinder heads are the same as those of front and rear.

Note: Do not reuse old gasket and O-ring.

1. Using suitable blocks, face cylinder assembly upward. Install two pins and O-ring. Lubricate O-ring before assembly.
2. Position gasket and suction valve plate in the order listed while making sure that three valves of suction valve plate are aligned with the cylinder and gasket cutouts. Coat both surfaces of gasket with oil prior to assembly. Install cylinder head.



1 Hole
2 Pin
AC351A

Fig. AC-84 Installing Suction Valve Plate

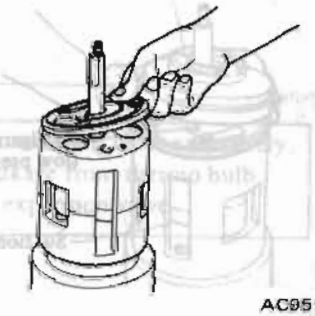

AC951

Fig. AC-85 Installing Cylinder Head

3. Align shaft seal with the shaft cutaway. Firmly seat shaft seal at the shaft land. Attempt to turn shaft seal to clockwise and counterclockwise, confirming that it is seated properly.
4. Install two O-rings on cylinder head. Coat O-rings with ample amount of oil before installation.
5. Install front cover as follows:

Front cover must be installed in such a manner that clutch terminal can be positioned in cut portion of shell when these three parts are assembled. See Fig. AC-91. For this purpose, install front cover on cylinder head so that angle between 5 mm (0.20 in) threaded hole in front cover and low pressure side refrigerant passage in cylinder head is about 45°. See Fig. AC-86 for correct installation.

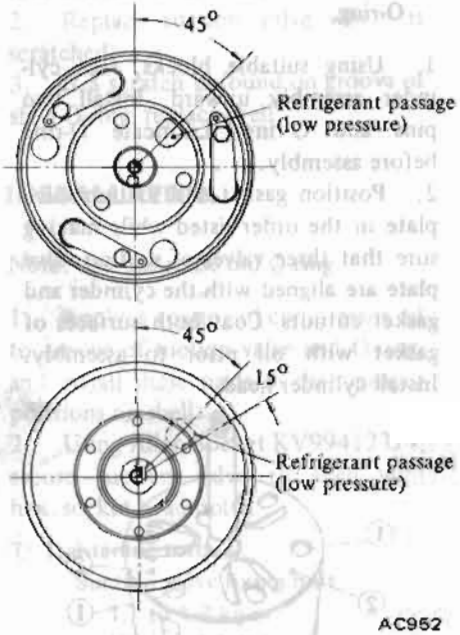


Fig. AC-86 Relative Position between Cylinder Head and Front Cover

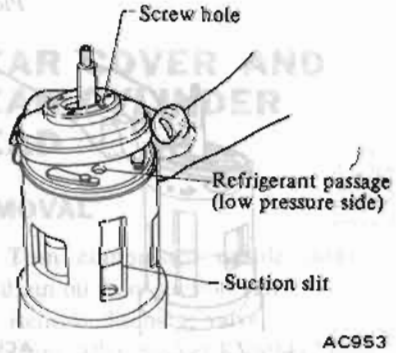


Fig. AC-87 Installing Front Cover

6. Install gasket on front cover. Install shell on cylinder head. In this case, 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. See Fig. AC-90.

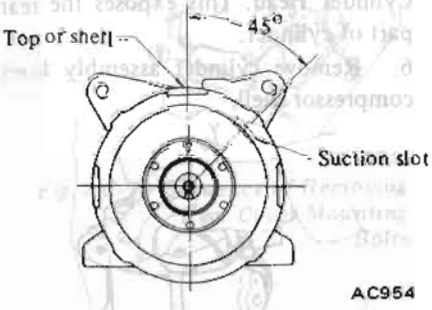


Fig. AC-88 Relative Position between Cylinder and Shell

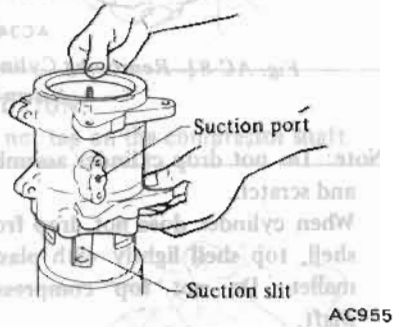


Fig. AC-89 Installing Shell

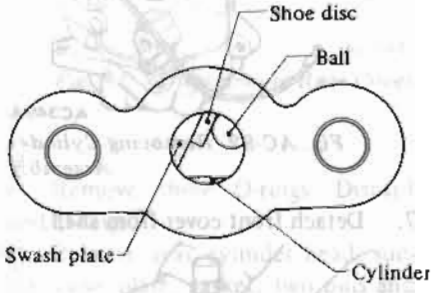


Fig. AC-90 Relative Position between Cylinder and Shell

7. Turn over the assembled shell and cylinder, that is, with the front downward.

CAUTION:
Hold securely with hand shell and cylinder assembly to prevent possible mismatching. Otherwise, O-ring will be deflected or moved.

8. Continue with work up to installation of rear cover. Refer to Rear Cover and Rear Cylinder Head for installation.
9. Continue with work up to installation of discharge valve. Refer to Discharge Valve for installation.
10. Install shaft seal seat. Refer to Shaft Seal for installation.
11. Install and adjust compressor clutch. Refer to Compressor Clutch for installation.
12. Make sure that clutch terminal is in cut portion provided on top of shell. If no coincidence is observed, repeat installation procedure starting from step 3.

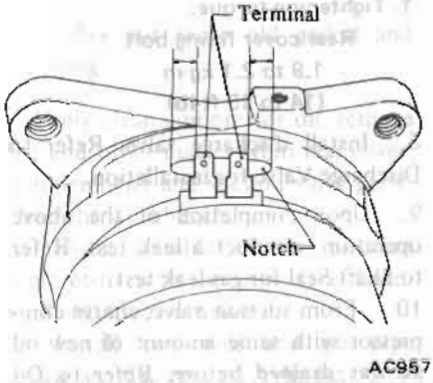


Fig. AC-91 Placing Clutch Terminal in Cut Portion of Shell

13. Conduct a leak test. Refer to Shaft Seal for gas leak test.
14. From suction valve, charge compressor with same amount of new oil as was drained before. Refer to Oil Level Check for required amount of oil.

TROUBLE DIAGNOSES AND CORRECTIONS

AIR CONDITIONER DIAGNOSES

Insufficient cooling

Bubbles in sight glass

Check refrigeration line for gas leaks, and repair leaks if any. Charge refrigerant to correct level. In case of too many leaks, stop compressor, discharge the system, evacuate and recharge the system. As necessary, replace receiver drier.
Air in system may cause bubbles in sight glass.

No bubbles in sight glass

With manifold gauge, check system pressures.
Measure temperature of discharge air.
Refer to "Performance Test".

System pressure and temperature of discharge air are abnormal. Refer to "Performance Test Diagnoses" for detail.

Suction pressure is high.

Expansion valve is open excessively.
Replace expansion valve.

Head pressure is high.

Overcharge of refrigerant.
Discharge some of refrigerant to correct level.
Air is mixed in. Discharge system, and replace drier.
Evacuate and recharge system.
Condenser's fin is dented or clogged with dust.
Clean exterior surface with water.

Suction pressure is high, while head is low.

Valve or gasket of compressor is damaged.
Repair or replace compressor.

Temperature of discharge air is abnormal, but system pressure is normal.

Check air flow system.
Refer to "Air Conditioner Operation Chart".

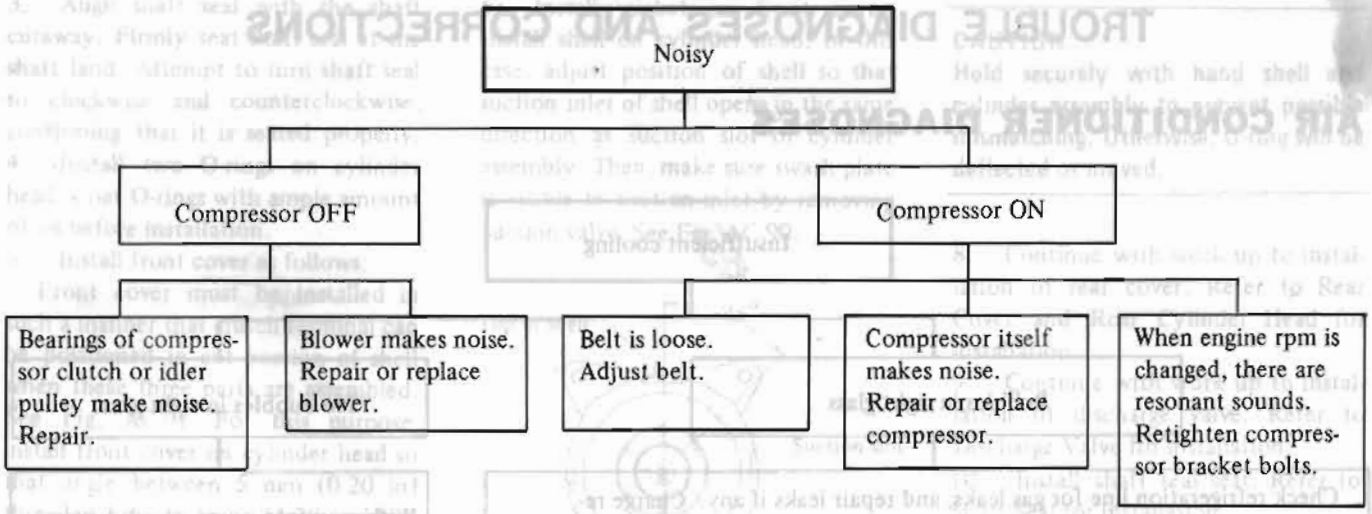
Check grommets on car's dash panel for air leaks; check other seals of car.

Suction pressure is low.

Strainer in pipe line is restricted.
Replace strainer.
Pipe at receiver drier outlet has low temperature. Receiver drier is restricted. Replace receiver drier.

Fin and tube of evaporator have some dents.
Replace or repair evaporator.

Expansion valve is close excessively, or gas leakage from thermo bulb.
Replace expansion valve.


Noisy
Compressor OFF
Compressor ON
Bearings of compressor clutch or idler pulley make noise. Repair.
Blower makes noise. Repair or replace blower.
Belt is loose. Adjust belt.
Compressor itself makes noise. Repair or replace compressor.
When engine rpm is changed, there are resonant sounds. Retighten compressor bracket bolts.

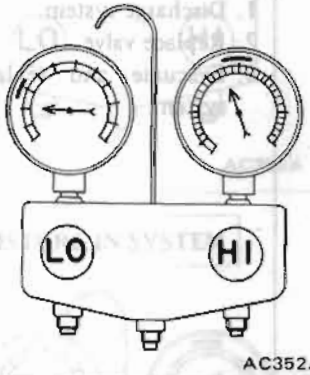
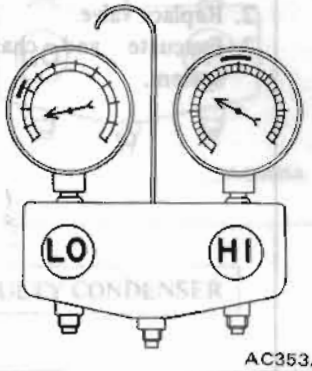
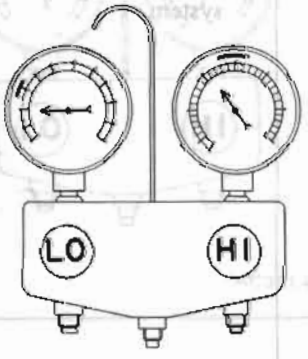

Blower does not rotate.
Refer to "Blower Motor Diagnoses".
Compressor does not run.
Refer to "Compressor Diagnoses".

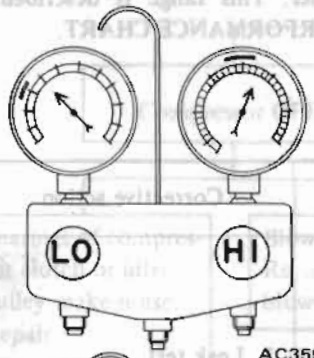
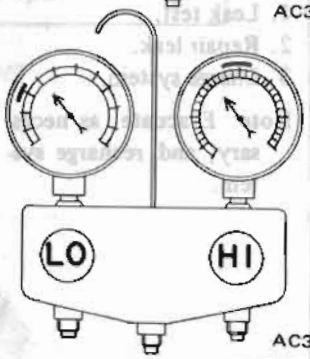
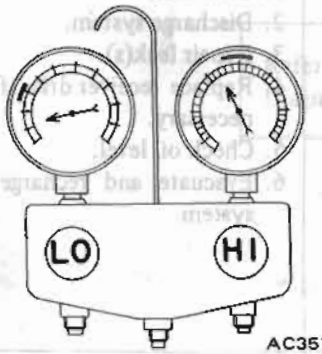
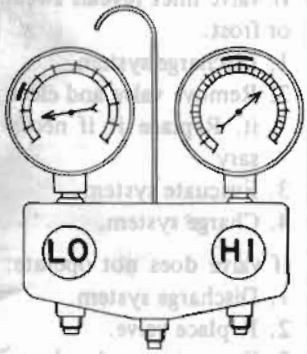
PERFORMANCE TEST DIAGNOSES

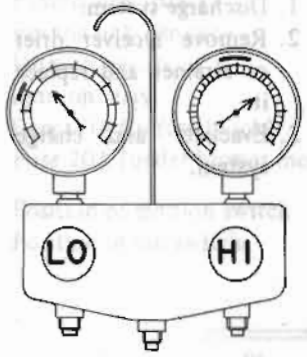
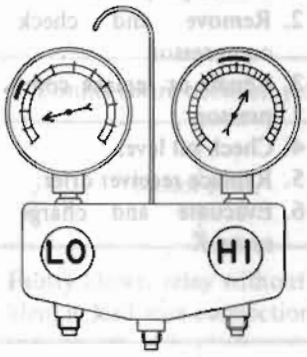
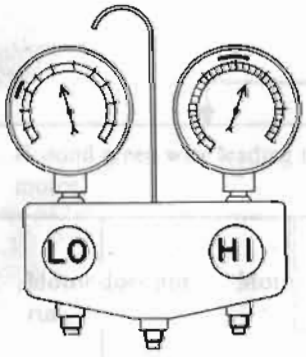
Of various conditions caused to the air conditioning system, the characteristics revealed on manifold gauge reading are shown in the following.

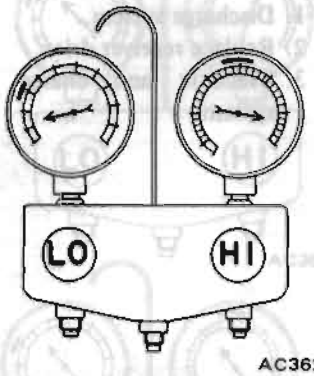
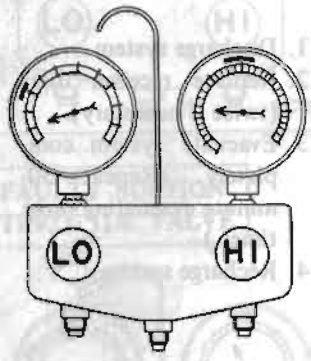
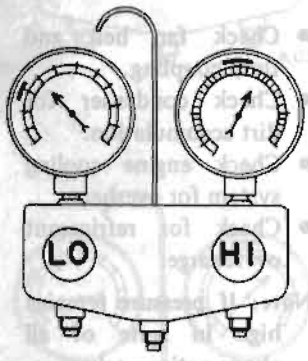
As to the method of a performance test, refer to the item of "Performance Test".

Note: In the following table, the portion smeared with ink on each gauge scale indicates a range based on the assumption that the air conditioning system is in good order. This range is described in PERFORMANCE CHART.

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

Condition	Probable cause	Corrective action
 AC355A Insufficient cooling. Sweated suction line.	Expansion valve allows too much refrigerant through evaporator.	Check valve for operation. If suction side does not show a pressure decrease, replace valve.
 AC356A No cooling. Sweating or frosted suction line.	Faulty expansion valve.	1. Discharge system. 2. Replace valve. 3. Evacuate and replace system.
FAULTY SUCTION THROTTLE VALVE  AC357A Insufficient cooling. Frosted evaporator.	Suction throttle valve is inoperative.	1. Discharge system. 2. Replace valve. 3. Evacuate and charge system.
 AC358A Insufficient cooling.	Suction throttle valve restricts refrigerant flow.	1. Discharge system. 2. Replace valve. 3. Evacuate and charge system.

Condition	Probable cause	Corrective action
AIR IN SYSTEM  AC359A Insufficient cooling. Sight glass shows occasional bubbles.	Air mixed with refrigerant in system.	1. Discharge system. 2. Replace receiver drier. 3. Evacuate and charge system.
MOISTURE IN SYSTEM  AC360A After operation for a while, pressure on suction side may show vacuum pressure reading. During this condition, discharge air will be warm. As warning of this, reading shows 0.4 kg/cm² (6 psi) vibration.	Drier is saturated with moisture. Moisture has frozen at expansion valve. Refrigerant flow is restricted.	1. Discharge system. 2. Replace receiver drier (twice if necessary). 3. Evacuate system completely. (Repeat 30-minute evacuating three times.) 4. Recharge system.
FAULTY CONDENSER  AC361A No cooling action: engine may overheat. Bubbles appear in sight glass of drier. Suction line is very hot.	Condenser is often found not functioning well.	• Check fan belt and fluid coupling. • Check condenser for dirt accumulation. • Check engine cooling system for overheat. • Check for refrigerant overcharge. **Note: If pressure remains high in spite of all above actions taken, remove and inspect the condenser for possible oil clogging.**

Condition	Probable cause	Corrective action
HIGH PRESSURE LINE BLOCKED  AC362A Insufficient cooling. Frosted high pressure liquid line.	Drier clogged, or restriction in high pressure line	1. Discharge system. 2. Remove receiver drier or strainer and replace it. 3. Evacuate and charge system.
FAULTY COMPRESSOR  AC363A Insufficient cooling.	Internal problem in compressor, or damaged gasket and valve.	1. Discharge system. 2. Remove and check compressor. 3. Repair or replace compressor. 4. Check oil level. 5. Replace receiver drier. 6. Evacuate and charge system.
TOO MUCH OIL IN SYSTEM (Excessive)  AC364A Insufficient cooling.	Too much oil circulates with refrigerant, causing the cooling capacity of the system to be reduced.	Refer to Oil Level Check for correcting oil level.

BLOWER MOTOR DIAGNOSES

: Condition
: Check
: Probable cause

Test conditions

Battery : OK
Fusible link (Black) : OK
Fusible link (Brown) : OK
Ignition switch : OK
Ignition relay : OK
Fuse 20A (in fuse block) : OK
Fuse 20A (under blower motor) : OK

Quick check : Check that wiper, radio, stereo and power window operate.

Position of ignition switch : ACC
Position of fan switch : ON

Quick check : Check that magnet clutch operates.

Blower motor does not run.

(Remove instrument lower cover and floor nozzle on passenger's side.) → Fig. AC-92

Connect wire between yellow wire and red wire leading to blower relay.

Motor runs.

Faulty blower relay without problem in lead wire connection.

Replace.

Motor does not run.

Connect test light to red wire leading to fan motor. → Fig. AC-93

Light ON

Light OFF

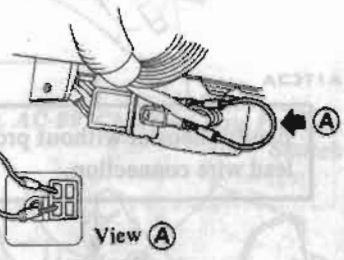
Ground green wire leading to fan motor. → Fig. AC-94

Motor does not run.

Motor runs.

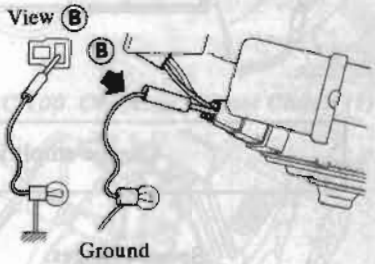
Faulty blower motor without problem in lead wire connection.

Replace.



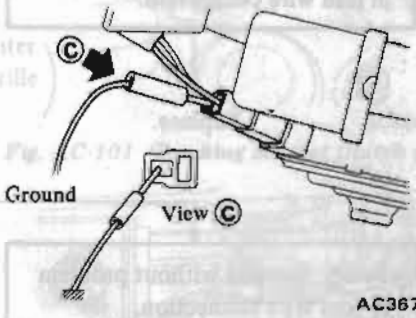
AC365A

Fig. AC-92 Checking Blower Relay



AC366A

Fig. AC-93 Checking Blower Motor (1)



AC367A

Fig. AC-94 Checking Blower Motor (2)

Broken ground wire of system.

Change amplifier with new one.

→ Fig. AC-95

Repair.

Motor runs.

Motor does not run.

(Remove center ventilator grille and duct.)

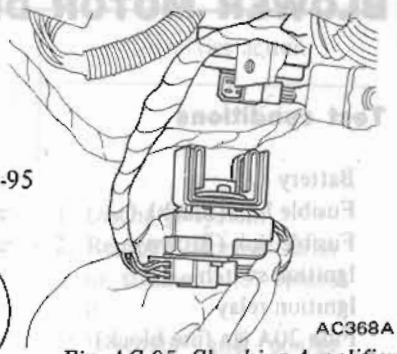

AC368A

Fig. AC-95 Checking Amplifier

Faulty amplifier without problem in lead wire connection.

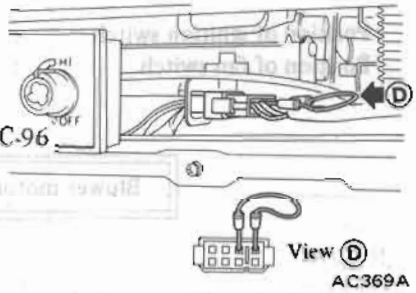
Connect wire between blue-red wire and blue-black wire leading to heater control.

Replace.

→ Fig. AC-96

Motor runs.

Motor does not run.



AC369A

Fig. AC-96 Checking Fan Switch

Faulty rheostat without problem lead wire connection.

Check other lead wire and connection.

Replace.

Speed of blower motor does not change.

(Remove instrument lower cover and floor nozzle on passenger's side.)

Change amplifier with new one.

→ Fig. AC-97

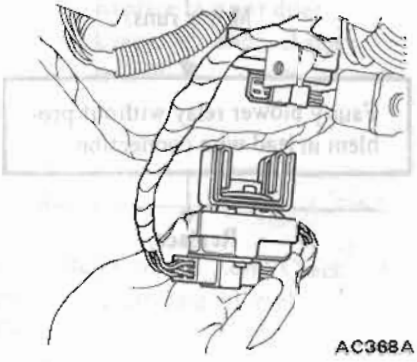

AC368A

Fig. AC-97 Checking Amplifier

Speed changes.

Speed does not change.

Faulty amplifier without problem in lead wire connection.

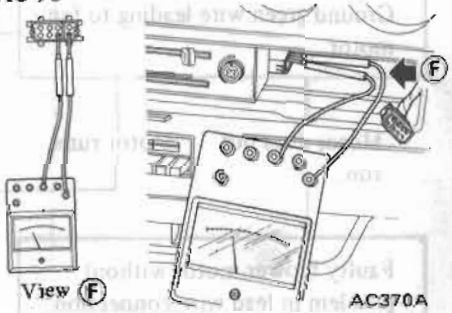
Check resistance of rheostat. Refer to page AC-26 **Fan switch.**

→ Fig. AC-98

Replace.

N.G.

OK



AC370A

Fig. AC-98 Checking Rheostat

Faulty rheostat without problem in lead wire connection.

Check other lead wire and connection.

Replace.

COMPRESSOR CLUTCH DIAGNOSES

: Condition
: Check
: Probable cause

Test conditions

Battery	: OK	Quick check	: Check that wiper, radio, stereo and power window operate.
Fusible link (Black)	: OK		
Fusible link (Brown)	: OK		
Ignition switch	: OK		
Ignition relay	: OK		
Fuse 20A (in fuse block)	: OK	Quick check	: Check that blower motor operates.

Position of ignition switch : ACC
Position of fan switch : ON
Position of air control lever : AIR-CON

Compressor clutch is not engaged.

Connect two wires leading to low pressure switch.

→ Fig. AC-99

Clutch is engaged.

Clutch is not engaged.

Check refrigerant level.

OK

N.G.

Faulty low pressure switch without problem lead wire connection.

Replace.

Insufficient refrigerant.

Add.

→ Fig. AC-100

Connect test light to yellow wire leading to magnet clutch.

Light ON

Light OFF

(Remove center ventilator grille and duct.)

→ Fig. AC-101

Ground earth terminals leading to magnet clutch.

Clutch is not engaged.

Clutch is engaged.

Connect wire between blue-red wire and blue-black wire leading to heater control.

→ Fig. AC-102

Clutch is engaged

Clutch is not engaged.

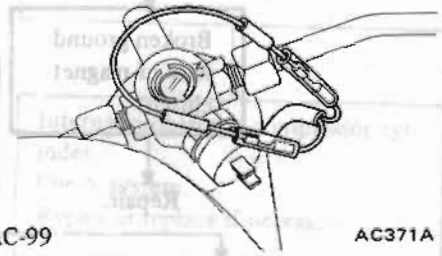


Fig. AC-99 Checking Low Pressure Switch

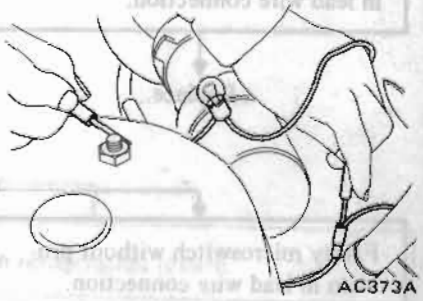


Fig. AC-100 Checking Magnet Clutch (1)

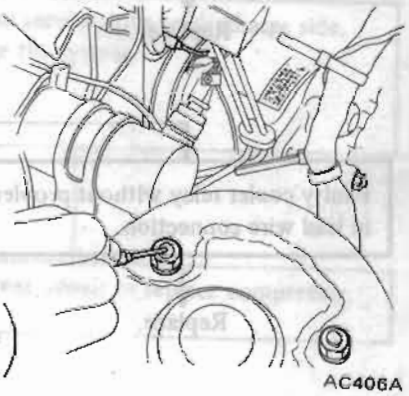


Fig. AC-101 Checking Magnet Clutch (2)

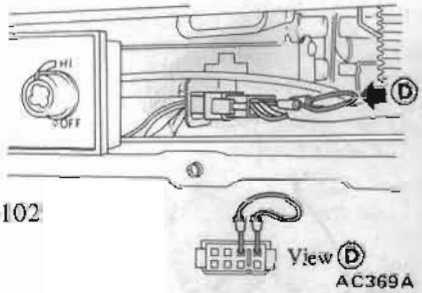


Fig. AC-102 Checking Fan Switch

Faulty magnet clutch without problem in lead wire connection.

Repair.

Broken ground wire of magnet clutch.

Repair.

Faulty fan switch without problem in lead wire connection.

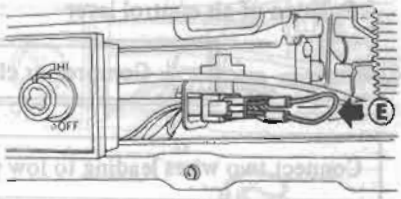
Replace.

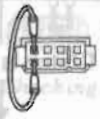
Fig. AC-103

Connect wire between blue-red wire and blue-yellow wire leading to heater control.

Clutch is engaged.

Clutch is not engaged.





View (E)

AC374A

Fig. AC-103 Checking Microswitch

Faulty microswitch without problem in lead wire connection.

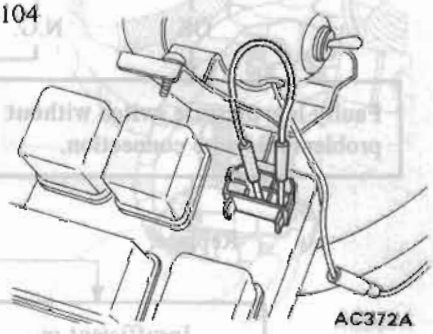
Replace.

Fig. AC-104

Connect wire between two terminals leading to cooler relay.

Clutch is engaged.

Clutch is not engaged.



AC372A

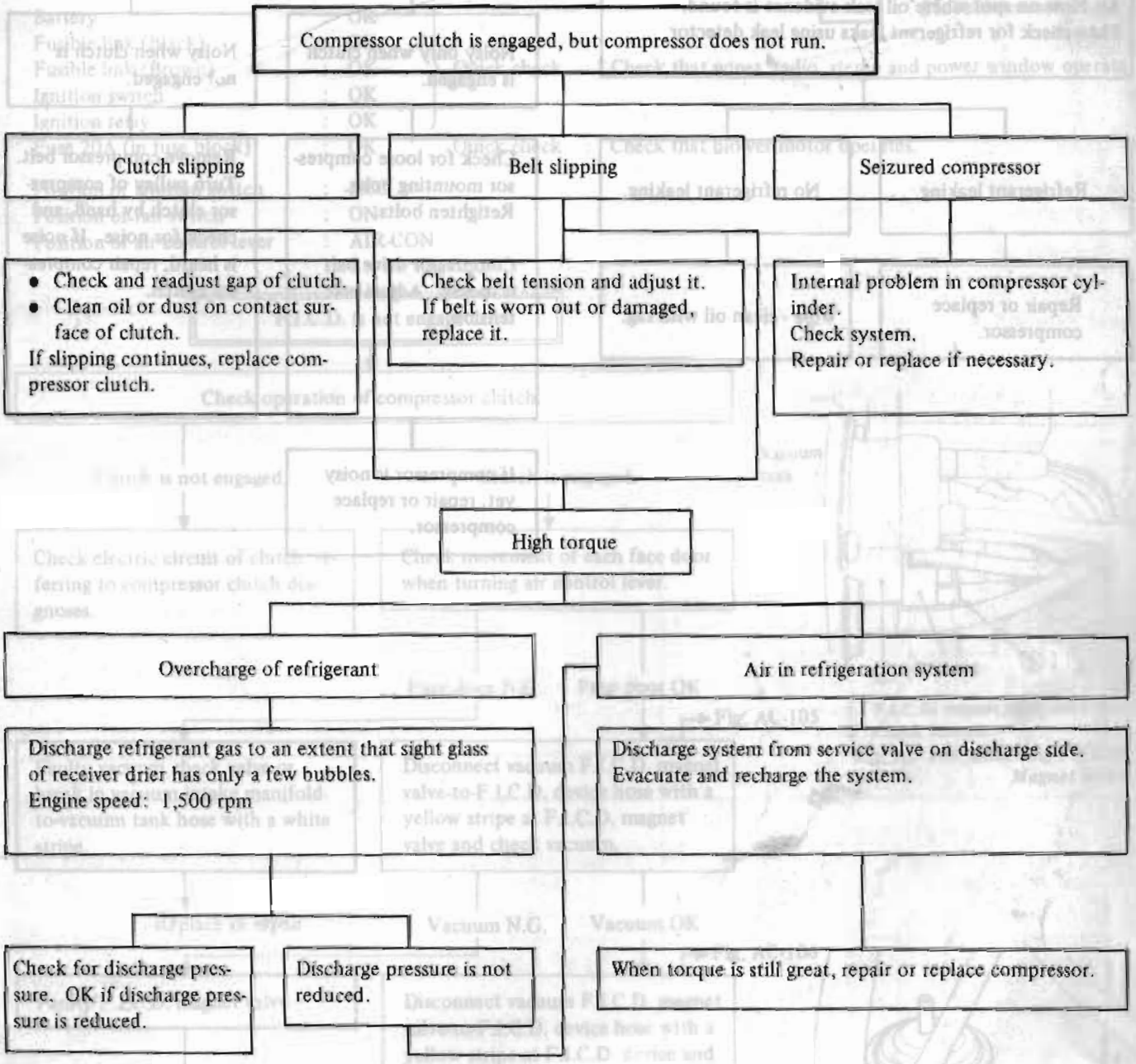
Fig. AC-104 Checking Cooler Relay

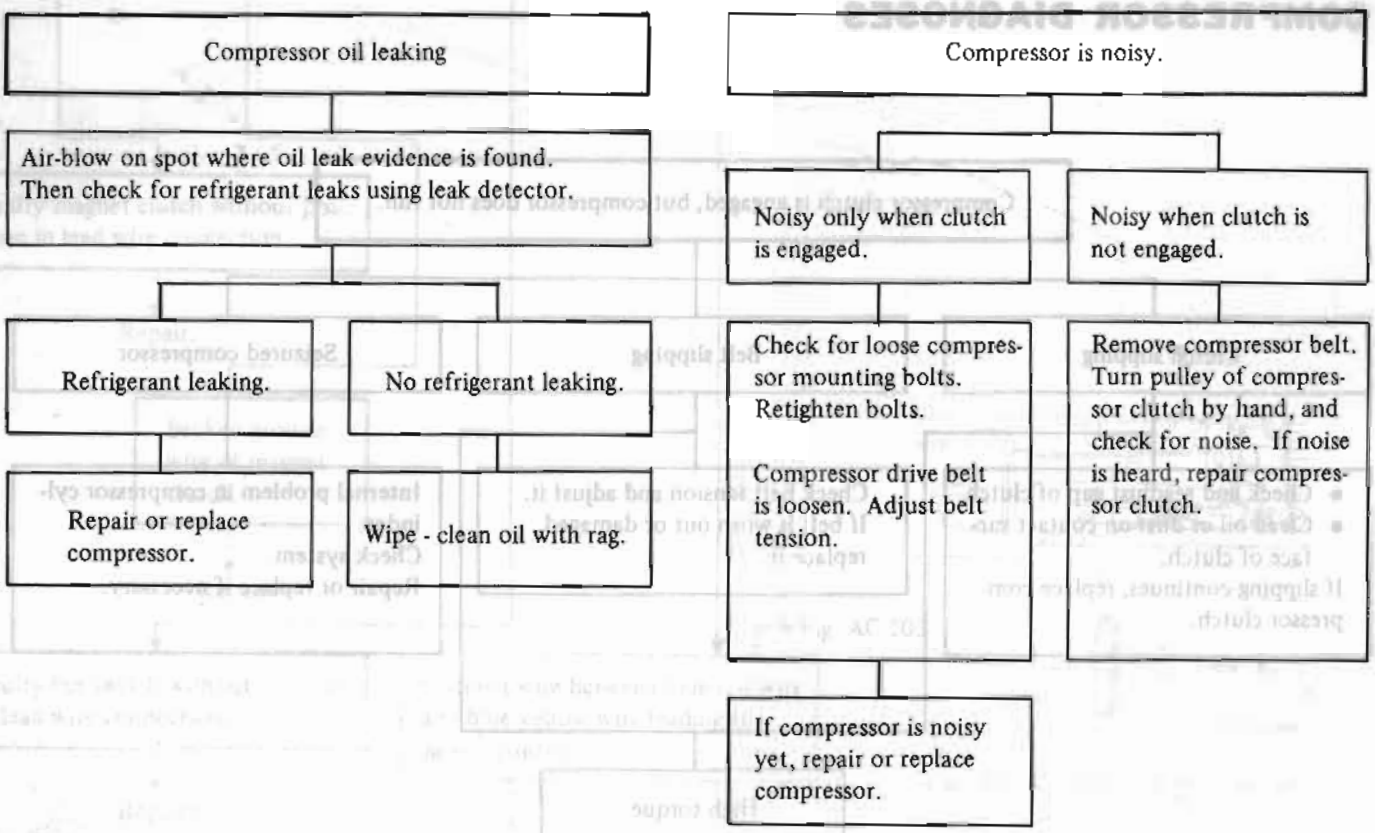
Faulty cooler relay without problem in lead wire connection.

Replace.

Check other lead wire and connection.

COMPRESSOR DIAGNOSES




Compressor oil leaking
Air-blow on spot where oil leak evidence is found. Then check for refrigerant leaks using leak detector.
Refrigerant leaking.
No refrigerant leaking.
Repair or replace compressor.
Wipe - clean oil with rag.
Compressor is noisy.
Noisy only when clutch is engaged.
Noisy when clutch is not engaged.
Check for loose compressor mounting bolts. Retighten bolts.
Compressor drive belt is loosen. Adjust belt tension.
Remove compressor belt. Turn pulley of compressor clutch by hand, and check for noise. If noise is heard, repair compressor clutch.
If compressor is noisy yet, repair or replace compressor.

FAST IDLE CONTROL DEVICE DIAGNOSES

: Condition
: Check
: Probable cause

Test conditions

Battery	: OK	Quick check	:	Check that wiper, radio, stereo and power window operate.
Fusible link (Black)	: OK			
Fusible link (Brown)	: OK			
Ignition switch	: OK			
Ignition relay	: OK			
Fuse 20A (in fuse block)	: OK	Quick check	:	Check that blower motor operates.
Position of ignition switch	: ACC			
Position of fan switch	: ON			
Position of air control lever	: AIR-CON			

F.I.C.D. is not engaged.

Check operation of compressor clutch.

Clutch is not engaged.

Check electric circuit of clutch, referring to compressor clutch diagnoses.

Replace or repair.

Faulty F.I.C.D. magnet valve.

Replace.

Faulty F.I.C.D. device.

Replace.

Clutch is engaged.

Check movement of each face door when turning air control lever.

Face door N.G.

Faulty vacuum check valve or break in vacuum intake manifold-to-vacuum tank hose with a white stripe.

Replace or repair.

Face door OK

Fig. AC-105

Disconnect vacuum F.I.C.D. magnet valve-to-F.I.C.D. device hose with a yellow stripe at F.I.C.D. magnet valve and check vacuum.

Vacuum N.G.

Broken vacuum hose.

Repair.

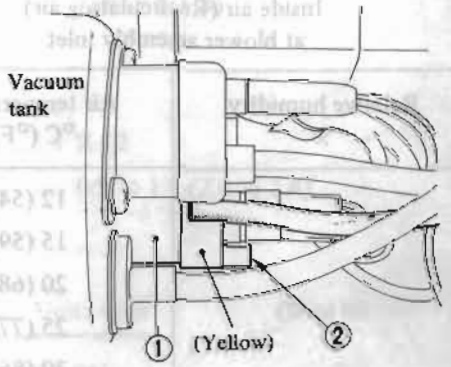
Vacuum OK

Fig. AC-106

Disconnect vacuum F.I.C.D. magnet valve-to-F.I.C.D. device hose with a yellow stripe at F.I.C.D. device and check vacuum.

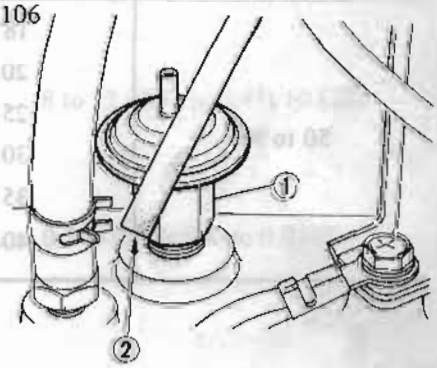
Vacuum OK

Vacuum N.G.



1 F.I.C.D. magnet valve
2 Check vacuum

Fig. AC-105 Checking F.I.C.D. Magnet Valve



1 F.I.C.D. device
2 Check vacuum

Fig. AC-106 Checking F.I.C.D. Device

PERFORMANCE CHART

Test conditions

Test car location	:	Indoors or in the shade (Outside wind velocity: Less than 2 m/sec)
Doors	:	Closed
Door window	:	Open
Hood	:	Open
Air control lever	:	AIR-CON RECIRC
Temperature lever	:	Max. COLD
Fan switch	:	Max. HI
Engine speed	:	1,500 rpm

Test reading

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 to 90	12 (54)	1.2 to 4.9 (34.2 to 40.8)
	15 (59)	1.6 to 5.4 (34.9 to 41.7)
	20 (68)	2.8 to 7.4 (37.0 to 45.3)
	25 (77)	5.2 to 11.0 (41.4 to 51.8)
	30 (86)	9.8 to 17.0 (49.6 to 62.6)
	35 (95)	16.4 to 24.0 (61.5 to 75.2)

Ambient air		Pressure high (Discharge side) kg/cm^2 (psi)	Pressure low (Suction side) kg/cm^2 (psi)
Relative humidity %	Temperature °C (°F)		
50 to 90	18 (64)	7.1 to 8.2 (101 to 117)	0.75 to 1.20 (10.7 to 17.1)
	20 (68)	7.3 to 8.6 (104 to 122)	0.75 to 1.25 (10.7 to 17.8)
	25 (77)	8.5 to 10.4 (121 to 148)	0.90 to 1.55 (12.8 to 22.0)
	30 (86)	10.5 to 12.5 (149 to 178)	1.15 to 2.05 (16.4 to 29.2)
	35 (95)	12.7 to 14.8 (181 to 210)	1.50 to 2.60 (21.3 to 37.0)
	40 (104)	14.9 to 17.2 (212 to 245)	2.00 to 3.15 (28.4 to 44.8)

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

COMPRESSOR

Model		MJ167
Type		Swash plate
Displacement	cc (cu in)/rev.	167 (10.19)
Cylinder bore x stroke	mm (in)	37.2 x 25.7 (1.465 x 1.012)
Direction of rotation		Clockwise (Viewed from drive end)
Type of driving belt		B type

LUBRICATING OIL

Type		SUNISO 5GS
Capacity	cc (US fl oz, Imp fl oz)	150 (5.1, 5.3)

REFRIGERANT

Type		R-12
Capacity	kg (lb)	0.9 to 1.1 (2.0 to 2.4)

ENGINE IDLING SPEED

Unit: rpm

Transmission	When A/C is OFF	When A/C is ON
Manual	800	800
Automatic	700 at "D" range	800 at "N" range

INSPECTION AND ADJUSTMENT

BELT TENSION

Fan belt/Applied pressure	mm (in)/kg (lb)	8 to 12 (0.31 to 0.47)/10 (22)

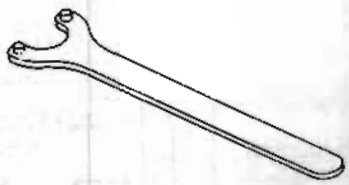
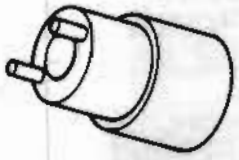
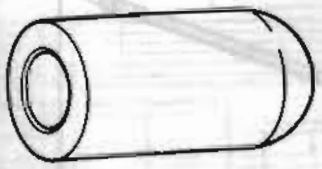
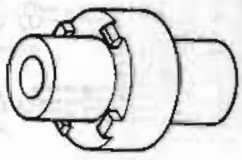
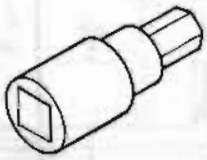
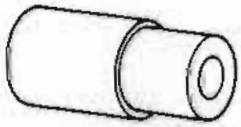
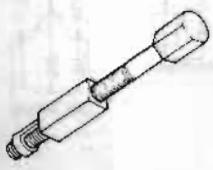
COMPRESSOR

Clutch hub to pulley clearance	mm (in)	0.5 to 0.8 (0.020 to 0.031)

TIGHTENING TORQUE

	kg-m (ft-lb)
Compressor bracket to cylinder block	4.5 to 5.5 (33 to 40)
Compressor to compressor bracket	4.5 to 5.5 (33 to 40)
Refrigerant line connection	
Outside diameter of pipe 9.53 mm (3/8 in)	3.0 to 4.0 (22 to 29)
12.7 mm (1/2 in)	4.0 to 5.0 (29 to 36)
15.88 mm (5/8 in)	5.0 to 6.0 (36 to 43)
Compressor	
Shaft nut	1.9 to 2.1 (14 to 15)
Lock nut	2.5 to 2.8 (18 to 20)
Clutch hub nut	1.8 to 2.1 (13 to 15)
Clutch coil screw	0.28 to 0.35 (2.0 to 2.5)
Rear cover bolt	1.9 to 2.1 (14 to 15)
Discharge valve bolt/Discharge connector bolt	1.7 to 1.8 (12 to 13)
Suction valve bolt/Suction connector bolt	1.7 to 1.8 (12 to 13)

SPECIAL SERVICE TOOLS

Tool number & tool name	Kent-Moore No. / Reference page or Fig. No.	Tool number & tool name	Kent-Moore No. / Reference page or Fig. No.
KV99412302 Clutch hub wrench 	J 24878-1 Fig. AC-57	KV99412321 Shaft seal remover and installer 	J 26067 Fig. AC-68 Fig. AC-69
KV99412305 Hub nut socket 	J 24878-2 Fig. AC-57	KV99412322 Shaft seal pilot 	J 25473 Page AC-33
KV99412306 Clutch hub puller 	J 24878-3 Fig. AC-58	KV99412324 Allen socket 	— Fig. AC-74 Fig. AC-75
KV99412310 Lock nut socket 	J 24878-4 Fig. AC-60	KV99412330 Allen socket 	— Fig. AC-76
KV99412312 Puller pilot 	J 25472 Fig. AC-61	KV99412315 Cylinder head remover 	— Fig. AC-78

Tool number & tool name	Kent-Moore No. / Reference page or Fig. No.	Tool number & tool name	Kent-Moore No. / Reference page or Fig. No.
KV992A9690 Oil separator kit	—— / Fig. AC-17