

SERVICE MANUAL

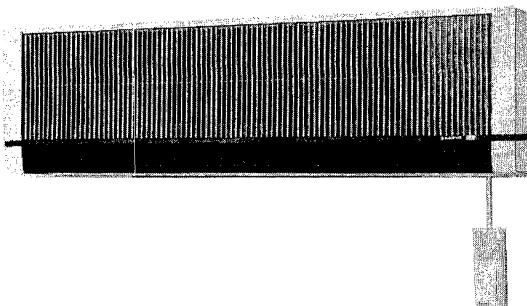
SANYO

SAP243KC (USA)

SPLIT SYSTEM AIR CONDITIONER

April 1987

MODEL NO.	PRODUCT CODE NO.	VOLT—PHASE—HERTZ
SAP243K	85264359	230/208—1—60
SAP243C	85274188	230/208—1—60



SAP243K
Indoor Unit



SAP243C
Outdoor Unit

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1. SPECIFICATIONS

1) Unit Specifications

Model No.		SAP243KC	
Unit Model No.	Indoor unit	SAP243K	
	Outdoor unit	SAP243C	
PERFORMANCE & ELECTRICAL RATINGS			
Capacity	Cooling	BTU/hr.	22,400/22,000
	Heating	BTU/hr.	—
Air circulation (High)	Cu.ft/min.		565/530
Moisture removal (High)	Pints/hr.		6.5
SEER	BTU/Whr.		9.5/9.6
COP			—
Frequency	Hz		60
Rated voltage	V		230/208
Running amperes	A		10.7/11.5
Power input	W		2,345/2,390
Back-up heater	kW		—
Fuse (or Circuit breaker) capacity	A		30
FEATURES			
Controls		IC	
Fan speeds	Indoor fan		2
	Outdoor fan		1
Timer		—	
Ventilator		—	
Air deflection	Horizontal		Manual
	Vertical		Manual
Air filter		Washable, easy access	
Temperature control		IC thermostat	
Compressor		Rotary	
Refrigerant (R22)	lbs.(g)	6.8 (3,100)	
Compressor oil	cc	1,350	
Refrigerant tubing connections		Flare type	
Refrigerant control		Capillary tube	
Max. refrigerant line length	ft(m)	100(30)	
Max. outdoor unit height	ft(m)	50(15)	
Refrigerant tube o.d.	Narrow tube In.(mm)	1/4(6.35)	
	Wide tube In.(mm)	5/8(15.88)	
Drain pipe o.d.	PVC pipe In.(mm)	3/4(26.67)	
Refrigerant tube kit		Optional	
DIMENSIONS & WEIGHT		Indoor unit	Outdoor unit
Height	In.(mm)	14-9/16(370)	30-1/8(765)
Width	In.(mm)	49-7/32(1,250)	26-3/8(670)
Depth	In.(mm)	7-13/32(188)	26-3/8(670)
Net weight	lbs.(kg)	50.6(23)	178(81)
Shipping size	Cu.ft(Cu.m)	6.7(0.19)	18(0.51)
Shipping weight	lbs.(kg)	57.2(26)	193.06(88)

DATA SUBJECT TO CHANGE WITHOUT NOTICE

2) Major Component Specifications

Unit Model No.		SAP243C	
COMPRESSOR		Hermetic Rotary Type	
Compressor Model No.		C-R 170H6S	
Source		230/208 V, 60 Hz, Single Phase	
Pole		2	
Nominal Output (W)		1700	
Displacement (cc/rev.)		13.3	
Ampere	Full Load (A)	4.4/4.6	
	Locked Rotor (A)	24/27	
Type of Oil		Special Oil for Rotary Compressor	
Compressor Oil Amount (cc)		1,350	
Coil Resistance (Ω) (Ambient Temperature 77°F)		C-R: 2.51 C-S: 5.58	
Protective Device		Internal Protector	
Run Capacitor	MFD	17.5	
	VAC	370	
Unit Model No.	SAP243K	SAP243C	
Fan Motor	Capacitor-Run Induction Motor		
Fan Motor Model No.	KFH4T-21B6SP	KFC8S-101A6P	
Source	230/208V, 60 Hz, Single Phase		
Pole	8		
Nominal Output (W)	20	100	
Ampere	Full Load (A)	0.41/0.39	1.17/1.14
	Locked Rotor (A)	0.53/0.59	2.13/2.26
Protective Device	Internal Protector		
	17AM-037A5-4		17AM-035A5-4
Run Capacitor	MFD	2	5
	VAC	440	
Coil Resistance (Ω) at 68°F	WHT-BRN 141.3 WHT-VLT 83.0 VLT-YEL 72.9 YEL-PNK 21.4		
	WHT-BRN 24.1 BLK-PNK53.1		

Unit Model No.	SAP243C	
OVERLOAD RELAY, COMPRESSOR		
OLR Model No.		Internal Type
Temperature	Operating	293 \pm 9°F
	Reset	189 \pm 20°F
Ampere at 77°F (Cold Start)		Operates within 6-16 sec. at 45A
Ampere at 176°F (Cold Start)		*Should not operate for 30 min. at 13.5A
Reset		Automatic

*1Reference value: measure at 280°F

Major Component Specifications

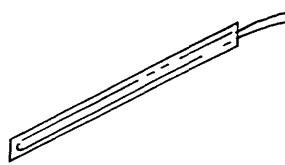
Unit Model No.	SAP243K
Room Temperature Sensor*1	OCS5K-UL
Resistance (kΩ)	65°F: 6.5—7 73°F: 5.2—5.8 83°F: 4.2—4.5

*1: Thermistor

Figure

Incorporated in the remote control unit.

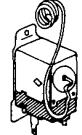
Unit Model No.	SAP243K
Dew proof Warmer	
Rating	230 V, 13 W



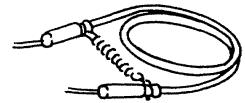
Unit Model No.	SAP243K
Power Transformer (for controller PCB)	ATR-J122U
Resistance (Ω)	Primary: WHT-WHT 143.5 Secondary: BRN-BRN 1.2



Unit Model No.	SAP243K
Freeze Protection Thermostat	RTB-4U302
Operating Temperature	50°F ON, 23°F OFF



Unit Model No.	SAP243C
Crankcase Heater	CH 5700
Rating	230 V, 30 W

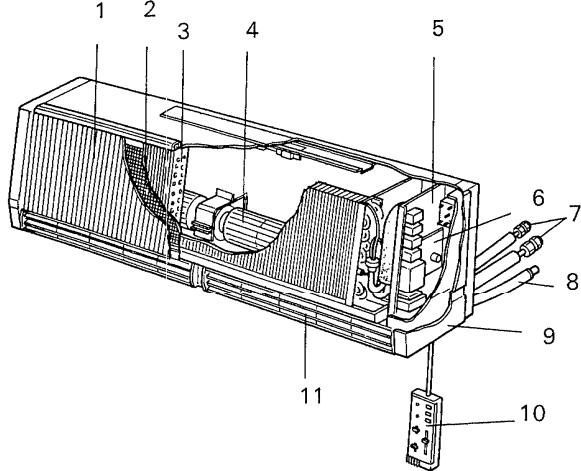


Unit Model No.	SAP243C
Outdoor Temperature Thermostat	YTB-4U201F
Operating Temperature	75°F ON, 78°F OFF



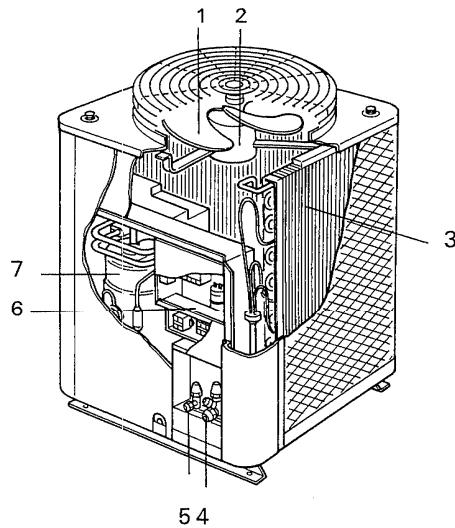
2. CONSTRUCTION OF THE UNIT

Indoor Unit SAP243K



1. Air Intake grille
2. Air filter (Slide-out)
3. Evaporator (= Indoor heat exchanger)
4. Indoor fan
5. Electrical component box
6. Controller P.C.B.
7. Refrigerant tubing
8. Drain hose
9. Cabinet
10. Remote control unit
11. Air outlet grille

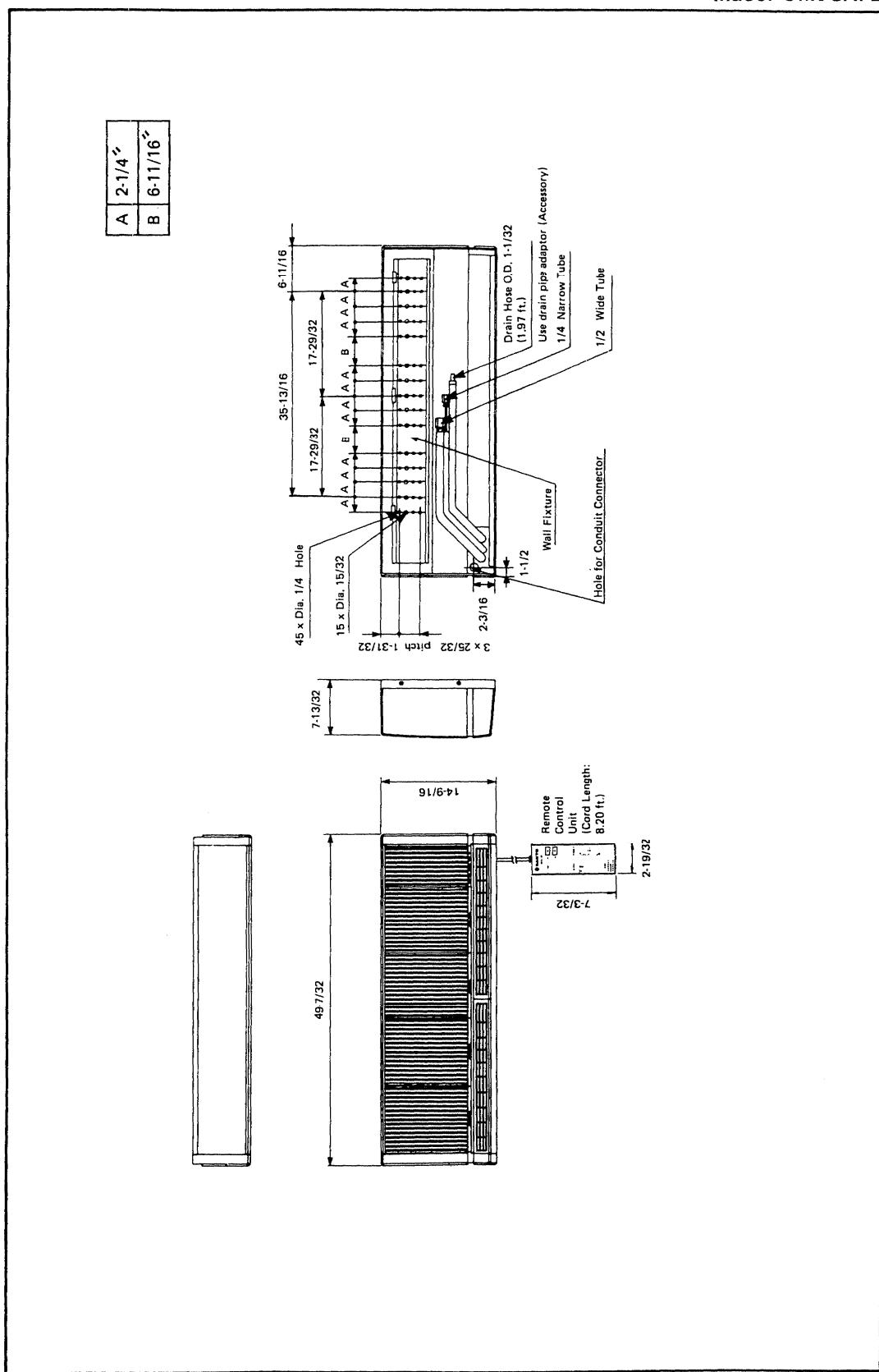
Outdoor Unit SAP243C



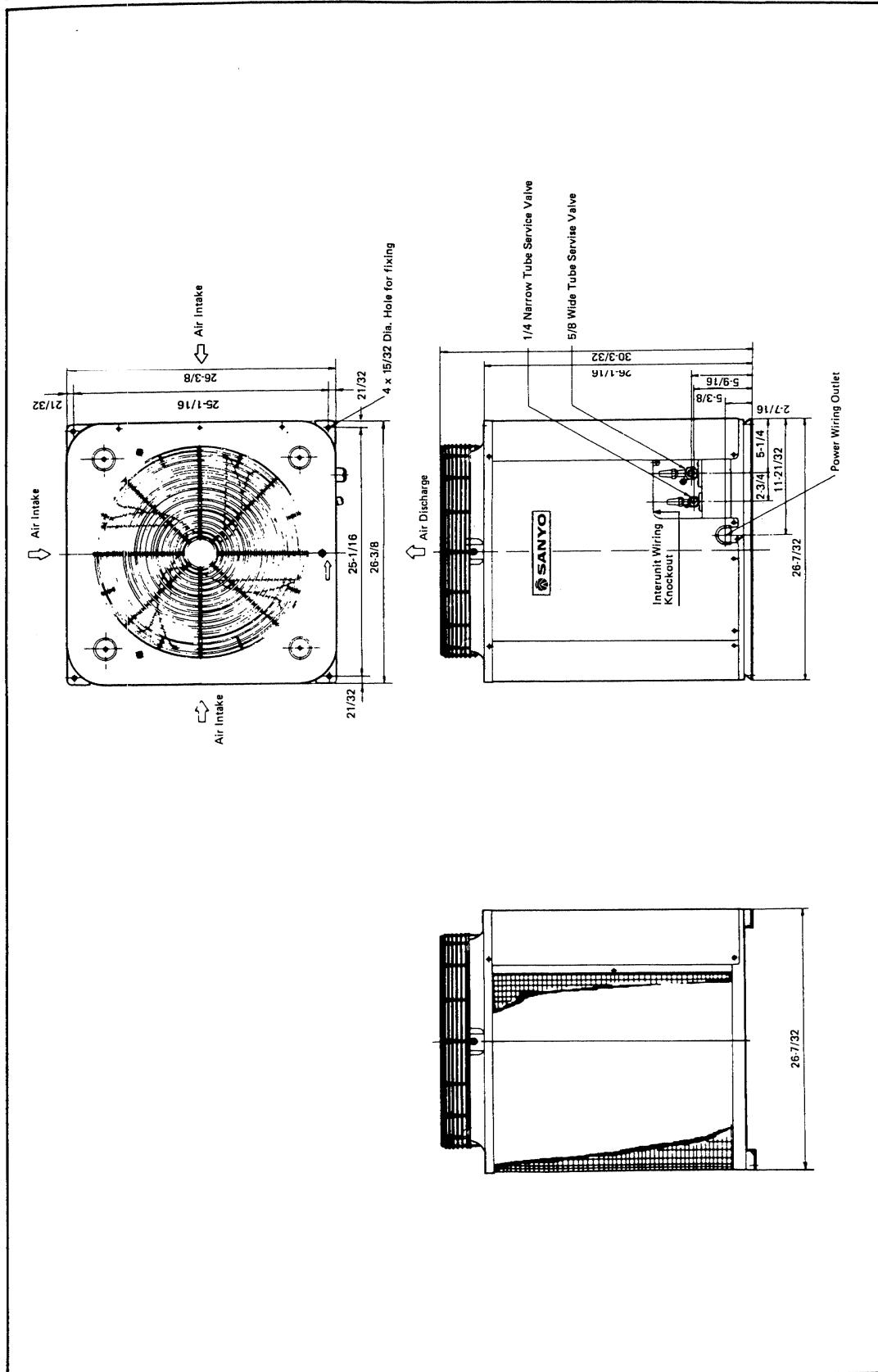
1. Propeller fan
2. Fan motor
3. Condenser (= Outdoor heat exchanger)
4. Service valve (Wide tube)
5. Service valve (Narrow tube)
6. Electrical component box
7. Compressor

3. DIMENSIONAL DATA

Indoor Unit SAP243K



Outdoor Unit SAP243C



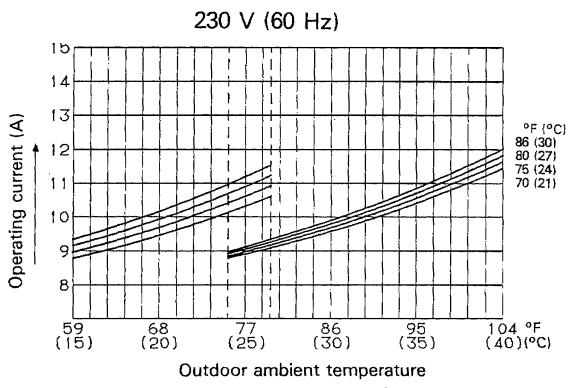
4. PERFORMANCE CHARTS

Cooling characteristics

Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High, overall value for indoor and outdoor shown.)

NOTE When the outdoor temperature drops to 76°F (24°C) or lower, the outdoor fan speed is switched to Low. Adversely, when the outdoor temperature rises to 78.5°F (26.5°C) or higher, the outdoor fan speed is turned to HIGH.

Therefore, fan speed may vary with outdoor ambient conditions within the dotted line area shown in the chart at right.

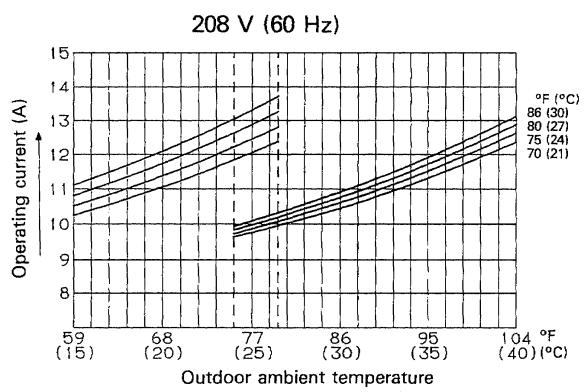


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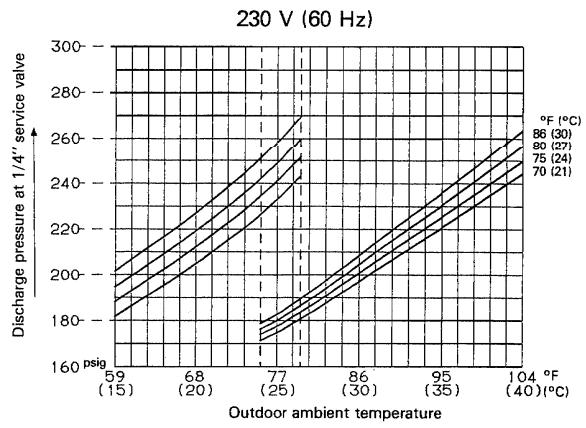
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Cooling characteristics

High pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High.)

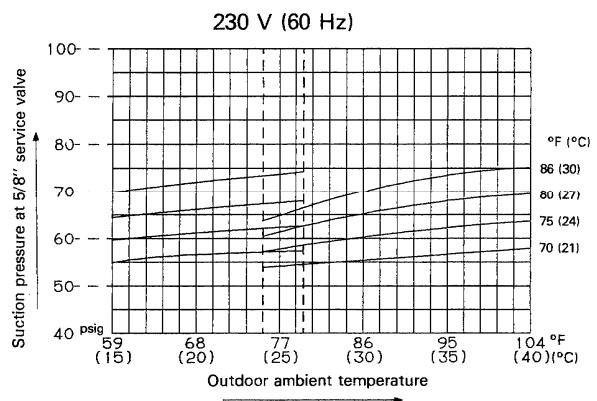
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Cooling characteristics

Low pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High.)

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PERFORMANCE CHARTS

Cooling characteristics

High pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High.)

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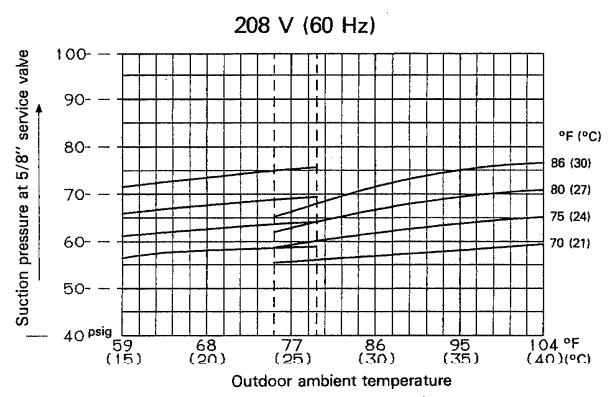
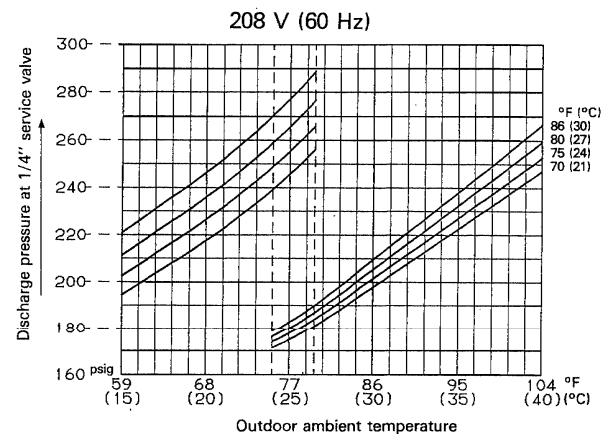
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5. OPERATING INSTRUCTIONS

Controls and Indicators

A. OPERATION OFF

Push this button to stop the air conditioner.

B. OPERATION ON

Push this button to start the air conditioner.

C. THERMOSTAT AND SERVICE TEST RUN SWITCH

This automatically turns the air conditioner on and off to keep the room at a comfortable temperature. The lower the number you select, the cooler the room will be. TEST RUN is to be used by the contractor for test operation. So, DO NOT set knob at the test run position.

NOTE

The numbers on the graduated scale are meant to serve as a guideline only. The actual room temperature may differ from the thermostat setting depending on room size and the cooling load.

D. OPERATION LAMP

This lamp lights when the system is in operation.

E. FAN SPEED

Use this control to select the desired fan speed.

HIGH	High speed
LOW	Low speed

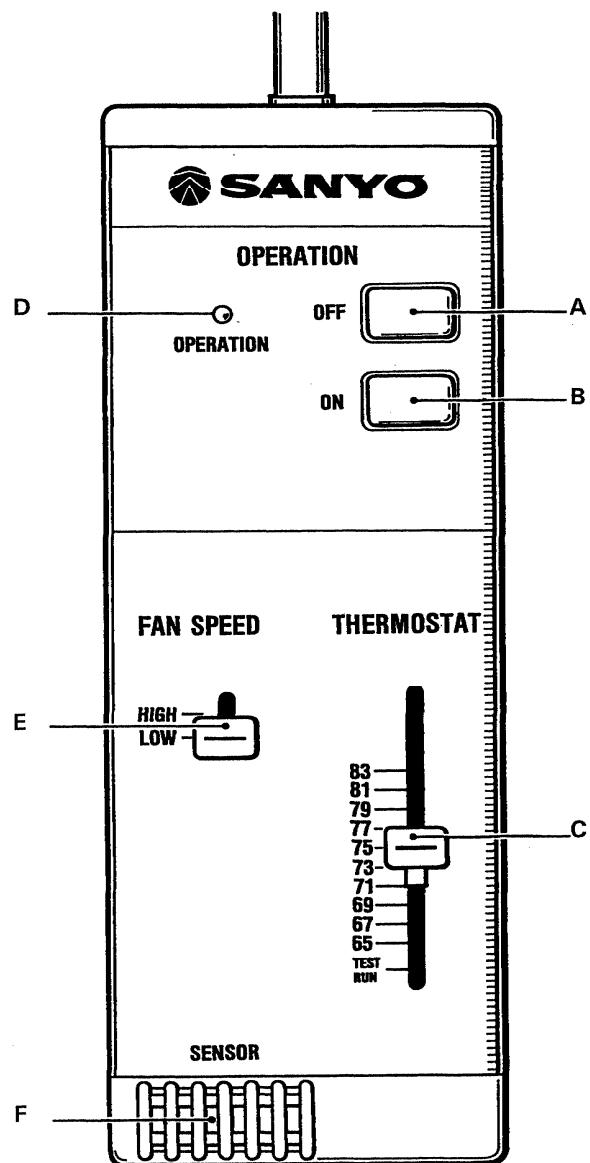
F. SENSOR

The sensor detects any change in the room temperature.

CAUTION

THERMOSTAT SETTING

Moving the thermostat lever so quickly will cause the unit to stop for three minutes. Therefore, it should be avoided. Unit will start again automatically after three minutes pause.



Operation

COOLING

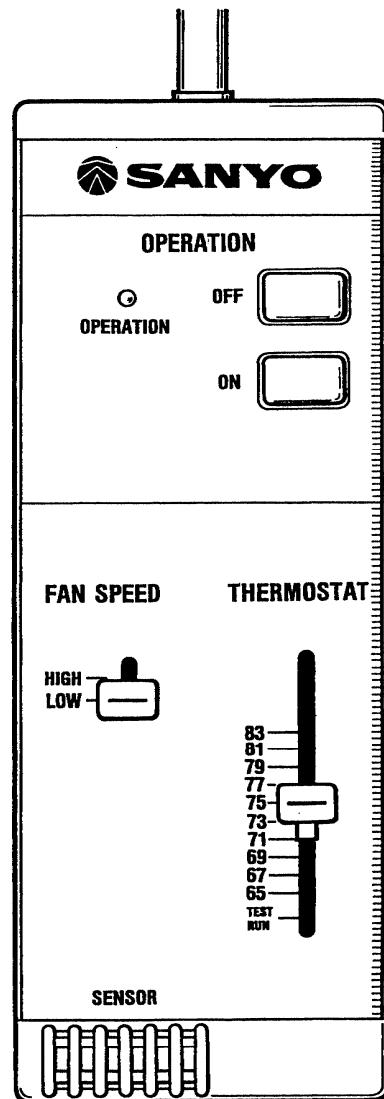
- STEP 1:** Set the THERMOSTAT to the desired temperature.
- STEP 2:** Set the FAN SPEED.
- STEP 3:** Press the OPERATION ON button.
- STEP 4:** To stop the air conditioner, press the OPERATION OFF button.

NOTE

To protect the compressor from overloading, a 3-minute time delay circuit is built into the air conditioner. The compressor starts running after 3 minutes when the operation ON button is pressed.

EMERGENCY SHUTDOWN

If the air conditioner does not stop even when the OFF button is pressed, disconnect the power supply.



Operation

ADJUSTING THE AIR FLOW DIRECTION

1. Horizontal

The horizontal air flow can be adjusted by moving the vertical vane to the left or right.

2. Vertical

Hold the air outlet grille with fingers and move it up and down to adjust the vertical air flow.

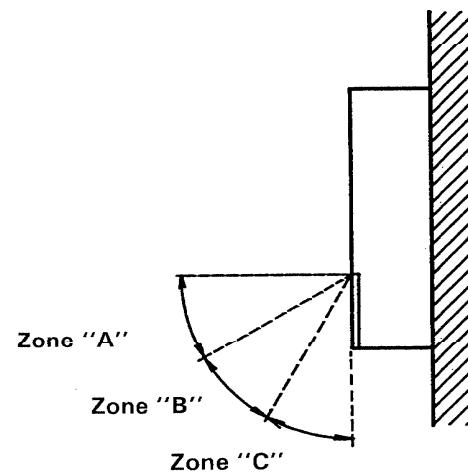
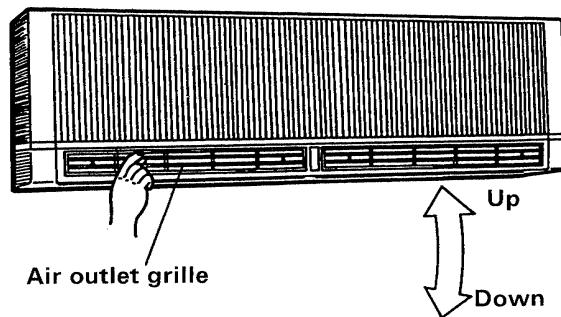
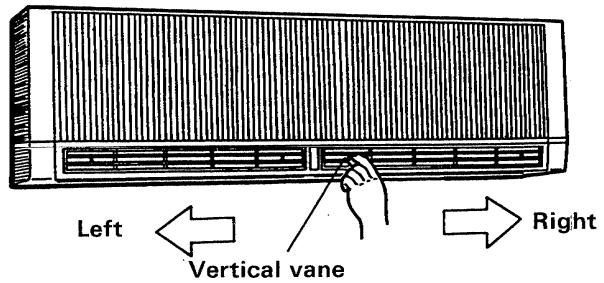
Recommended flap positions:

COOLING

- Be sure to set the flap within zone "A" or "B".

NOTE

- If the flap is set within zone "C", condensation may form near the air outlet grille and drip onto the floor. So, it should be avoided.



6. INSTALLATION INSTRUCTIONS

1. Installation Site Selection

Indoor Unit SAP243K

AVOID:

- area where leakage of flammable gas may be expected.
- place where large amount of oil mist exist.
- direct sunlight.
- nearby heat source that may affect performance of the unit.
- location where remote control will be splashed with water or affected by dampness or humidity.
- installing remote control unit behind curtains or furniture that obstruct air circulation.

DO:

- select an appropriate position from which every corner of the room can be uniformly air-conditioned.
(High on the wall is best.)
- select a location that will hold the weight of the unit.
- select a location where tubing and drain pipe have shortest run to the outside.
- allow room for operation and maintenance as well as unrestricted air flow around the unit. See Fig. 1
- allow room for mounting control unit about 4' off the floor, in an area that is not in direct sunlight or in the flow of cold (or hot) air from the unit.

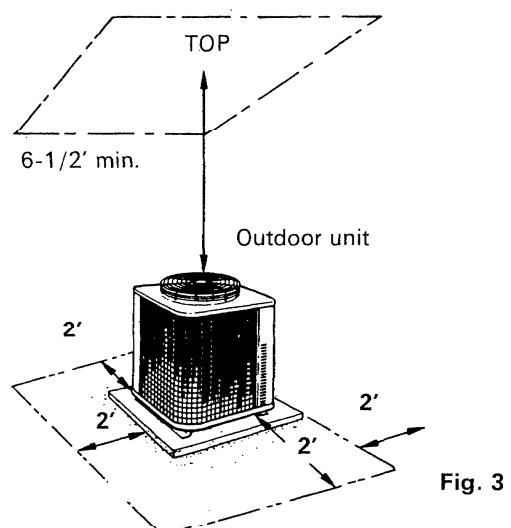
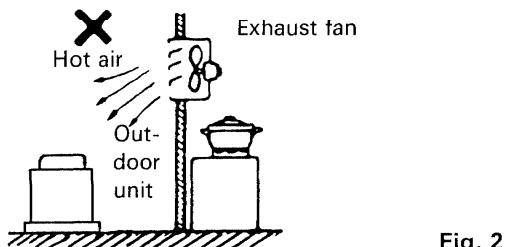
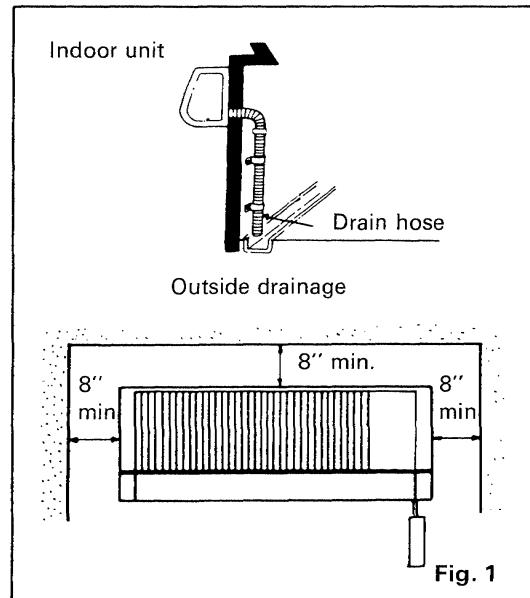
Outdoor Unit SAP243C

AVOID:

- heat sources, exhaust fans, etc., Fig. 2
- damp, humid or uneven locations.

DO:

- choose a place that is well ventilated and outside air temperature does not exceed 115°F constantly.
- allow enough room around unit for air intake/exhaust and possible maintenance. Fig. 3
- provide a solid base; concrete, about 4" above ground level to reduce humidity and possible water damage in unit and decrease service life.
- use leg bolts or equal to bolt down unit, reducing vibration and noise.



2. Connecting Tubes between Indoor and Outdoor Unit

Connect the indoor side refrigerant tubing extended from the wall with the outdoor side tubing tightly. (Refer to Table-1)

3. Insulation of Refrigerant Tubing

To prevent heat loss and wet floors due to dripping of condensation, wide tube must be well insulated with proper insulation material. Thickness of insulation material should be min. 5/16". Fig. 4

- **Insulation material**

The material must of course have good insulation characteristics, be easy to use, age resistant, and must not easily absorb moisture.

4. Wiring Instructions on Outdoor Unit

- Remove front panel and access panel "C", then punch knockout holes on the panel. Fig. 5
- Connect interunit control line and power line per drawing on inside of the panel "C". Fig. 6
- Be sure to size each wire allowing several inches longer than the required length for wiring.
- When connections are completed secure both connectors on the panel with lock nuts and then close the panel.
- Ground unit in accordance with local codes.

CAUTION

- Be sure to comply with local codes on running the wire from the indoor unit to outdoor unit. (size of wire and wiring method etc.)
- Every wire must be connected firmly.
- No wire should touch refrigerant tubing, compressor or any moving part.

Tube diameter	Tightening torque
6.35 mm (1/4")	Approx. 130—170 lbs. in.
15.88 mm (5/8")	Approx. 510—550 lbs. in.

Table-1

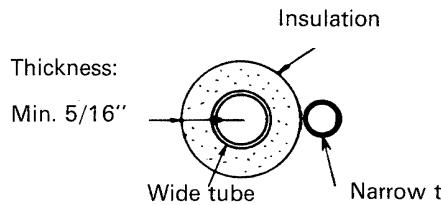


Fig. 4

CONNECTOR SIZE

POWER SUPPLY 1/2"	INTERUNIT LINE 1/2"

Outdoor unit

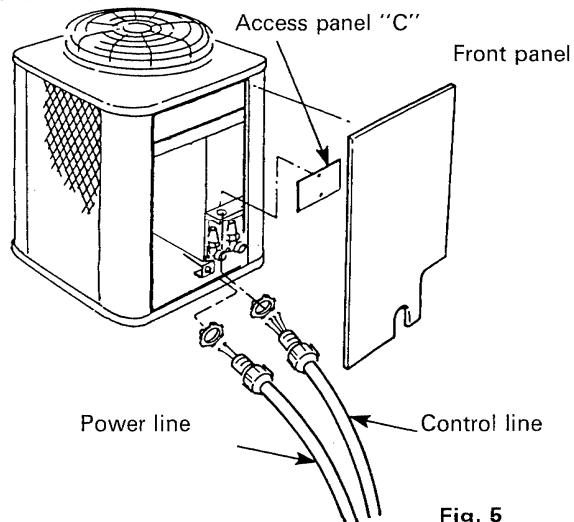


Fig. 5

WIRING SYSTEM DIAGRAM

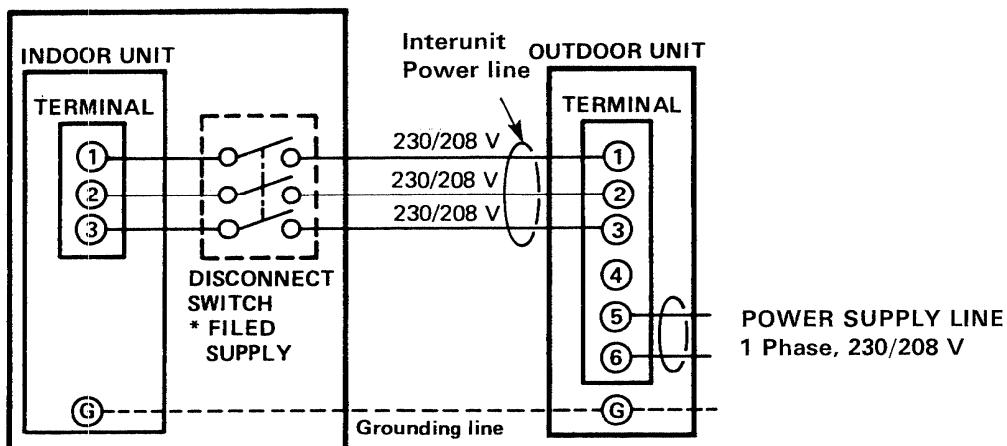


Fig. 6

5. Air Purging

Air does not function as a refrigerant, because it cannot be liquefied in the condenser. Air and moisture remaining in the refrigerant system have undesirable effects as indicated at below. Therefore, they must be purged completely.

- The pressure in the narrow tube rises.
- The operating current rises.
- Cooling and heating efficiency drops.
- Water contained in the air may freeze and block the capillary tubing.
- Water may lead to corrosion of parts in the refrigerant circuit.

CAUTION

Refrigerant has factory charged in the outdoor unit at the time of shipment. Don't use this refrigerant gas for air purging.

TUBING DIAGRAM FOR AIR PURGING

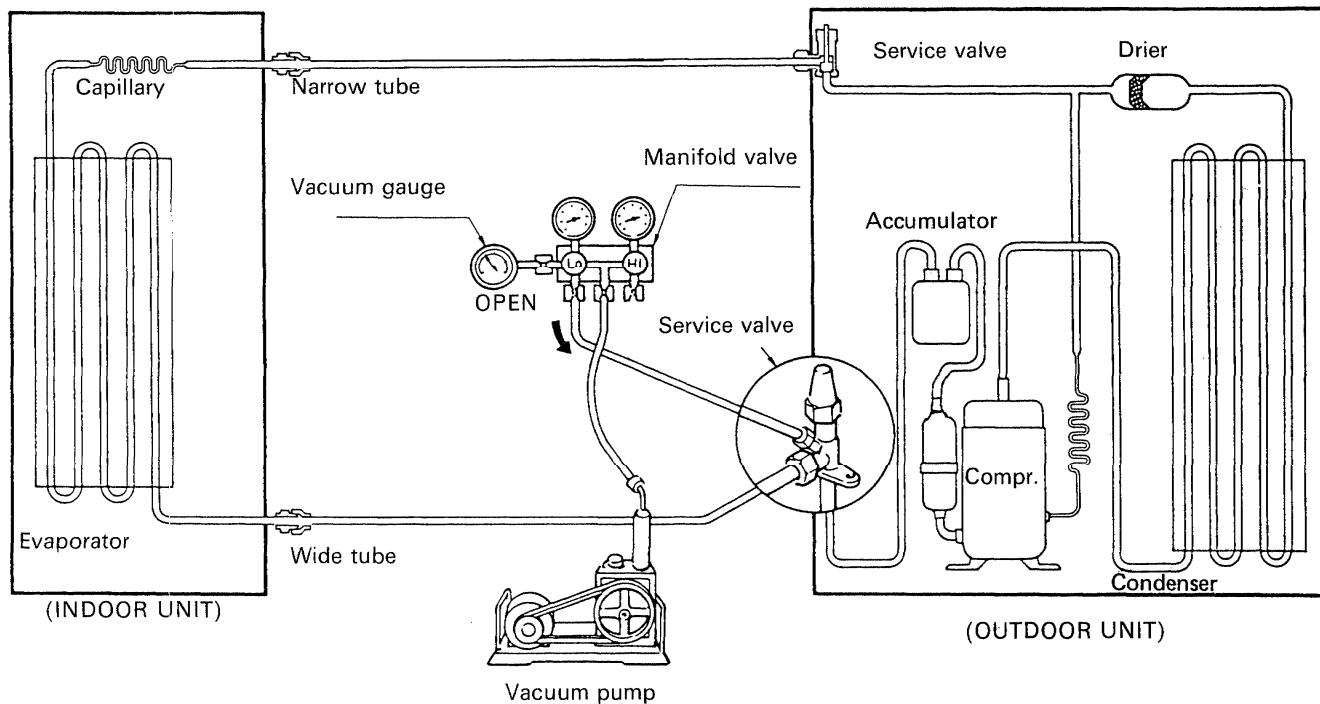


Fig. 7

1) Air Purging Procedure (Conventional evacuation system)

- a) Check gas leakage of all joints with liquid soap. Fig. 8
- b) If no gas leakage is confirmed, Connect both vacuum pump and vacuum gauge to service valve through 1/4" port with a flare nut. See Fig. 7
- c) Next, run the vacuum pump until the pressure reaches to 1.5 mmHg abs. or less value than that.
- d) Close the low pressure side knob on the gauge manifold valve and stop evacuation.
- e) Remove the cap from the wide tube service valve and turn the stem gradually until it is back seated. Fig. 9
- f) Disconnect vacuum pump and gauge manifold valve from the service valve. Then replace bonnet and flare nut to 1/4" port of service valve.
- g) The stem of narrow tube service valve shall be fully back seated. Then, tighten the valve seal cap with the copper gasket.
- h) The all air purge procedure has been completed and the unit is ready for trial operation.

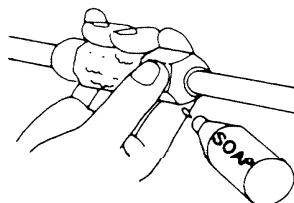


Fig.8

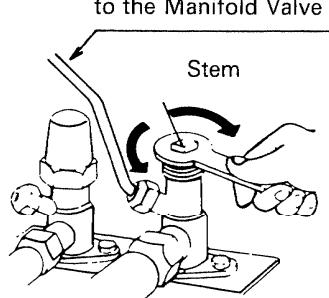


Fig.9

2) Air Purging Procedure (If tubing length will not exceed more than 50 ft.)

- a) Connect refrigerant charging cylinder to narrow tube service valve, and open the valve of the charging cylinder. Fig. 10
- b) When gas begins to be expelled, stop the flow for about 5 seconds by holding your finger over the outlet, then remove it and allow gas to flow out freely for about 10 seconds.
Repeat this operation 6 or 7 times.
- c) Tighten the flare nuts quickly with bonnets on both charging ports right after hold no pressure before air comes in.
- d) The stem of both service valves shall be fully back seated. Then, tighten the valve seal cap with the copper gasket.

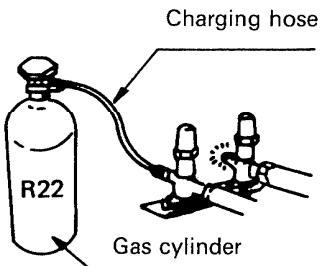


Fig. 10.

SERVICE VALVE CONSTRUCTION

• Valve Position -a-

The valve stems of both wide and narrow tubes are turned all the way in. The unit is shipped from the factory in this position. Fig. 11-a

• Valve Position -b-

The valve stems of both wide and narrow tubes are turned all the way out ("BACK SEAT" position). This is the normal operating position. Fig. 11-b

• Valve Position -c-

The valve stems of both wide and narrow tubes are turned halfway-down position.

This position is used for pressure measurement and gas charging. Fig. 11-c

• Valve Position -d-

Like position -a-, but with the flare nut of wide tube open. This position is used for air purging. Fig. 11-d

CAUTION

Be sure to use the valve tool or ratchet wrench when opening or closing the shut-off valve stem.

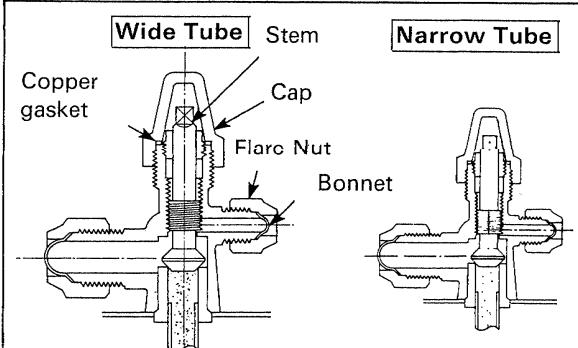
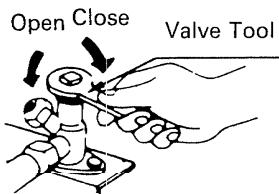


Fig. 11-a -a- Condition at Shipping

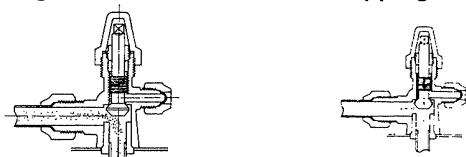


Fig. 11-b -b- Condition for Operation

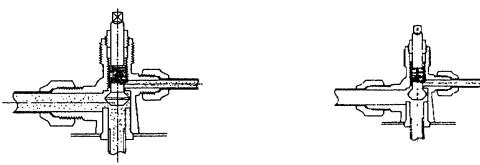


Fig. 11-c -c- Condition at Gas Charging

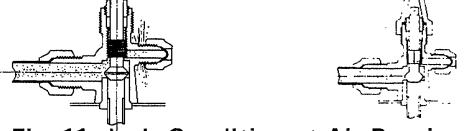


Fig. 11-d -d- Condition at Air Purging

PUMP DOWN

Pump down means collecting all refrigerant in the system back into the outdoor unit without losing refrigerant gas. Pump down is used when unit is moved or for servicing the refrigerant circuit.

- 1) Close valve on wide tube halfway (2 turns).
- 2) Close valve on narrow tube all the way (4 turns).
- 3) Turn unit on (cooling) for approximately 3 minutes then shut off.
- 4) Close valve on wide tube all the way (2 additional turns).
- 5) Disconnect tubes slowly allowing pressure to equalize inside and out.
- 6) When tubing is disconnected, provide dust covers for both valves and tubes until unit is reconnected.

7. TROUBLESHOOTING

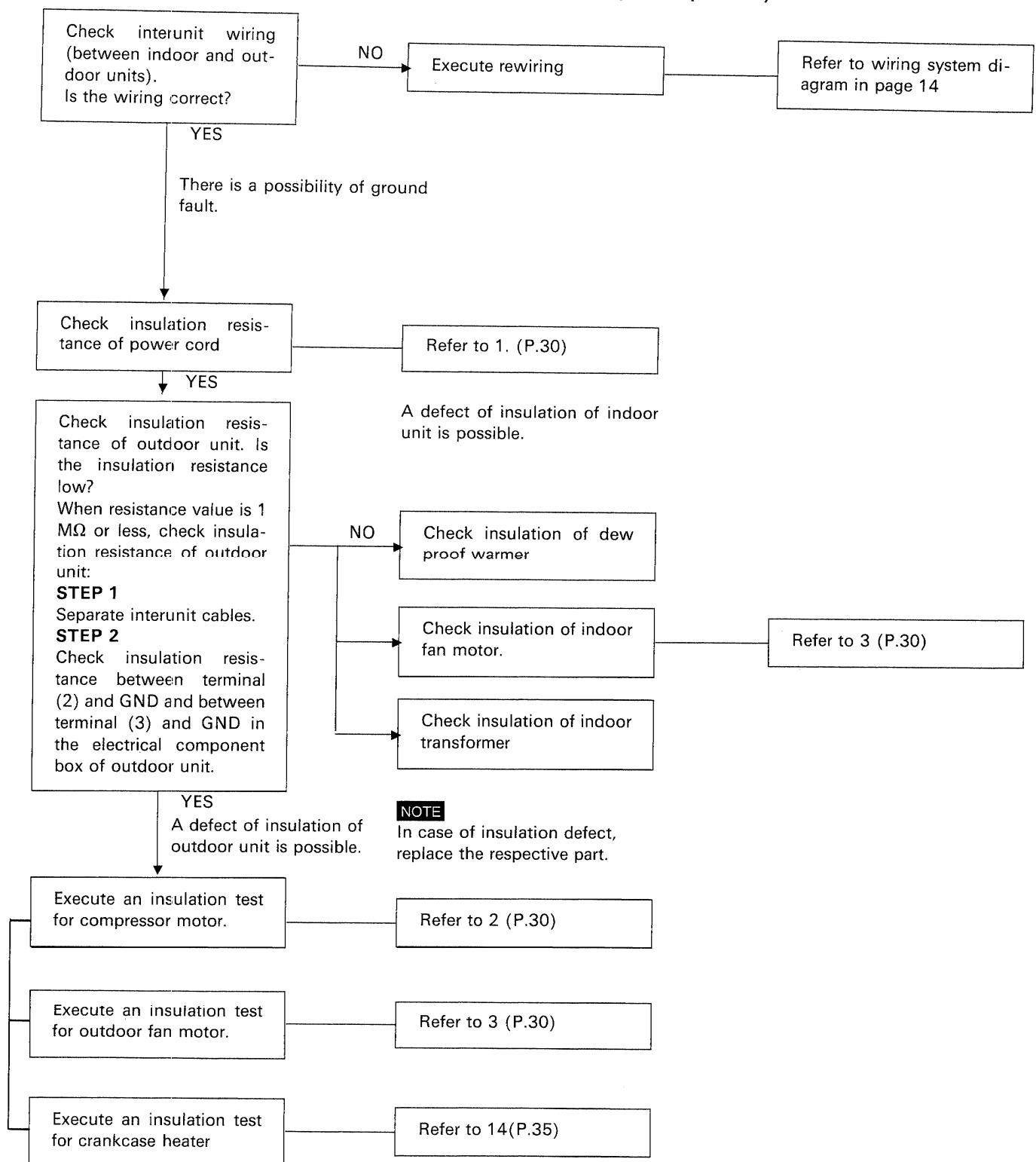
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① When circuit breaker is set to ON, it trips soon (Resetting is not possible)	19
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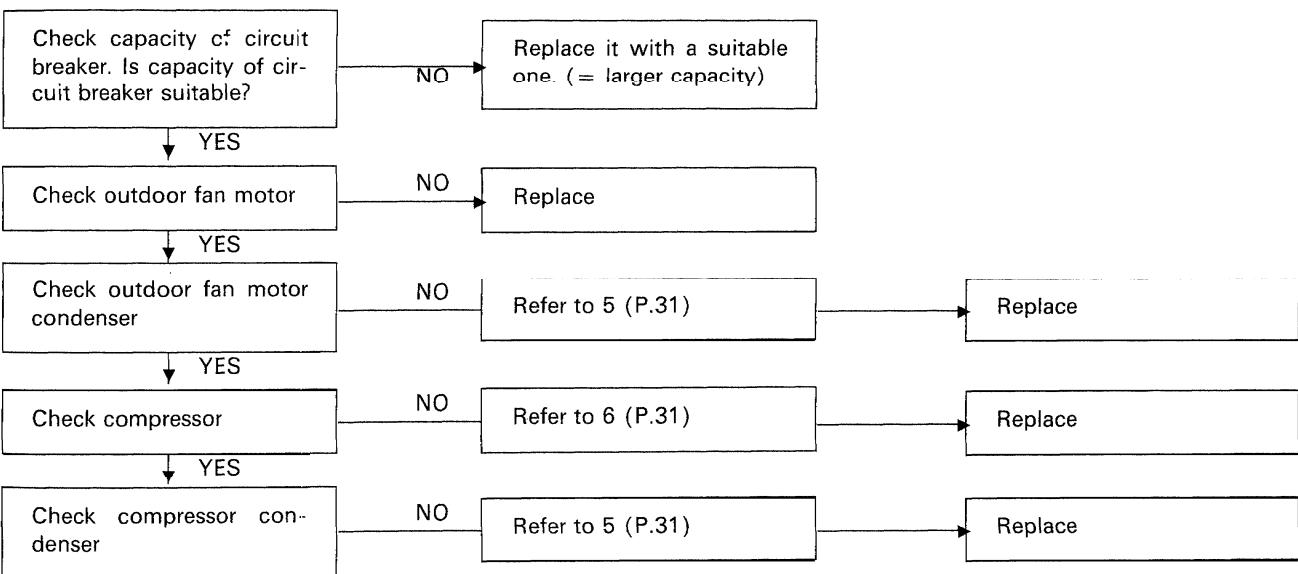
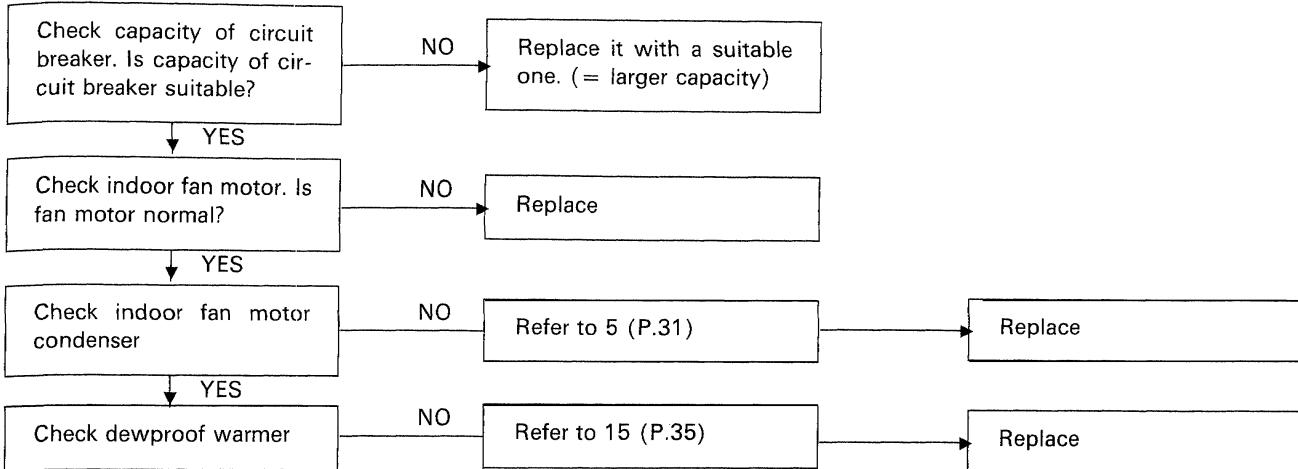
1. Air conditioner does not operate

1) Circuit breaker trips (or fuse blows)

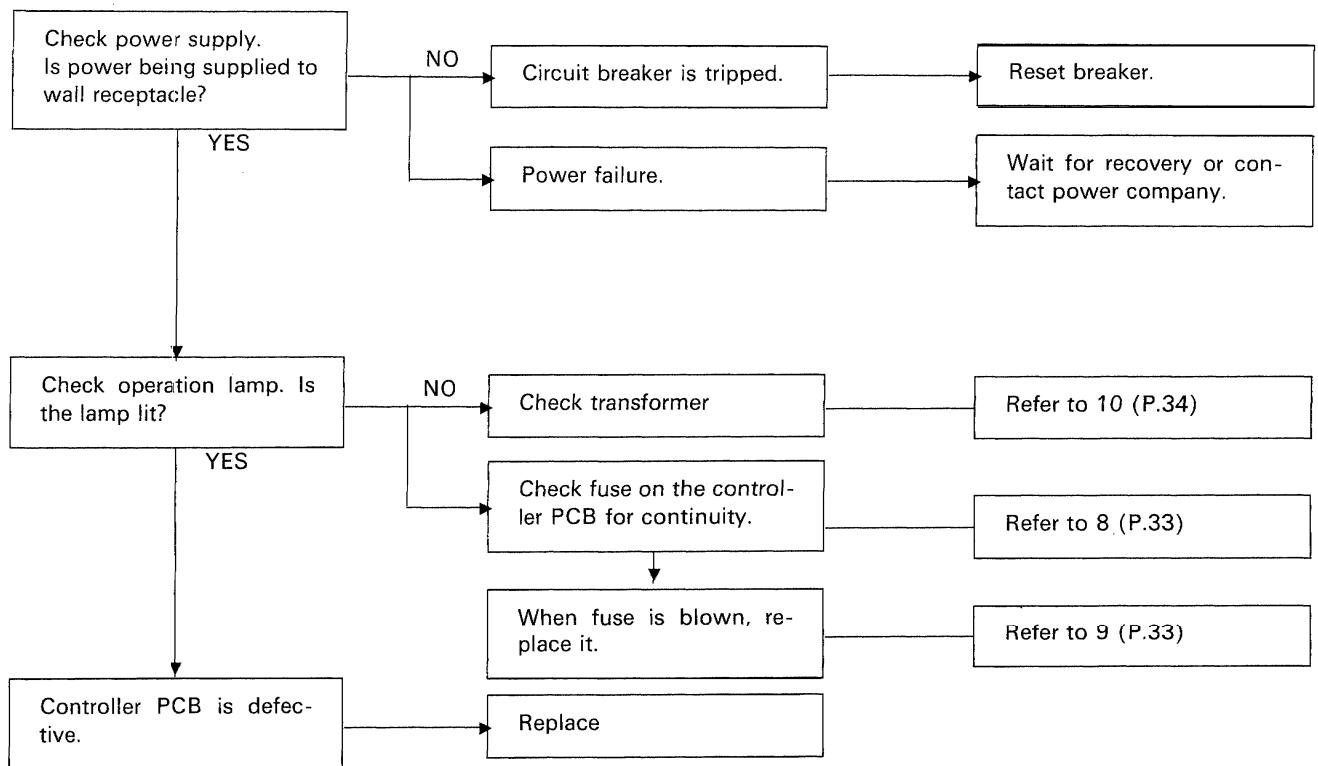
① When circuit breaker is set to ON, it trips soon (Resetting is not possible)



② Circuit breaker trips when the operation switch is depressed.

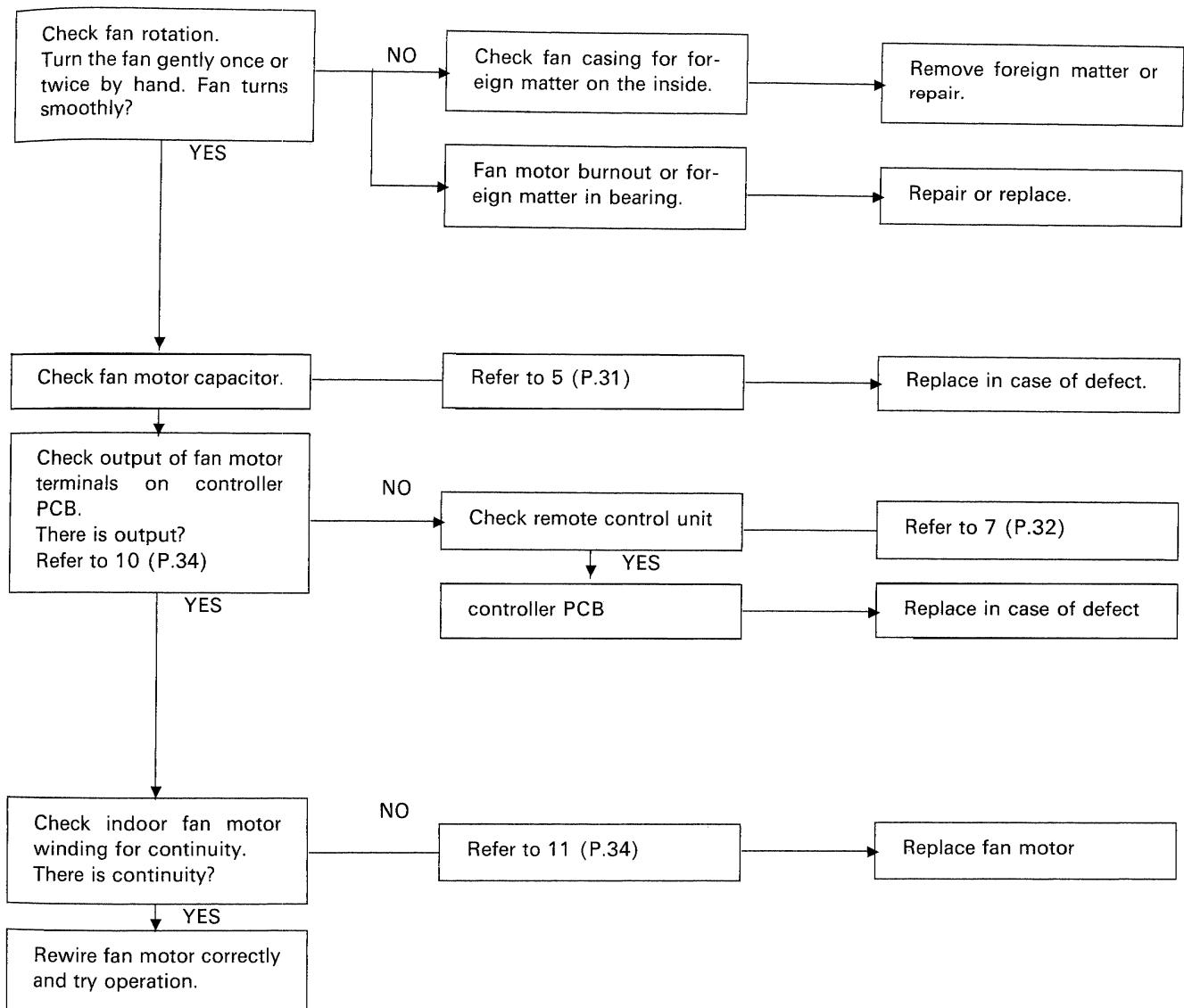


2) Neither indoor unit nor outdoor unit runs



2. Some part of air conditioner does not operate

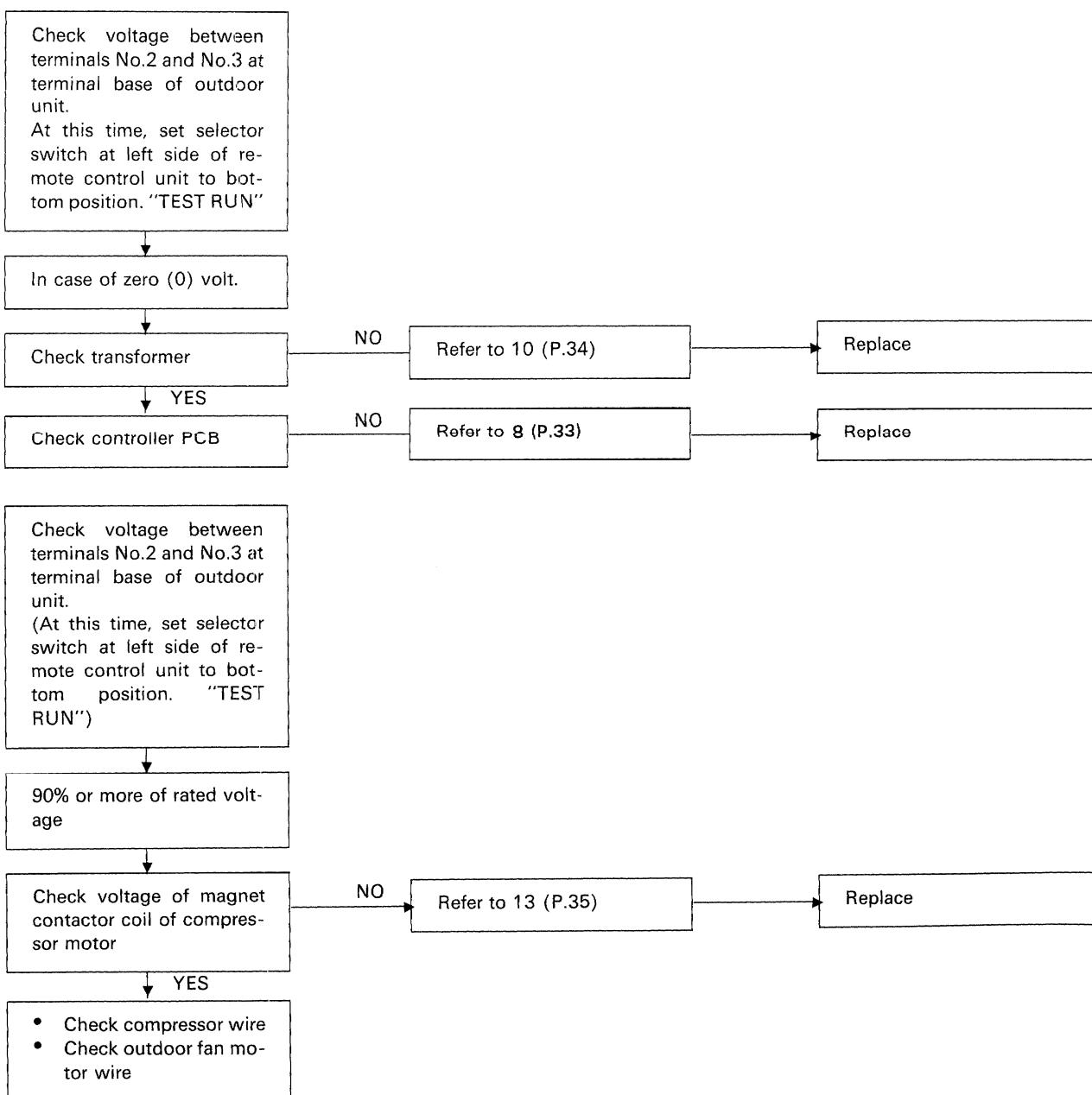
1) Indoor fan does not run



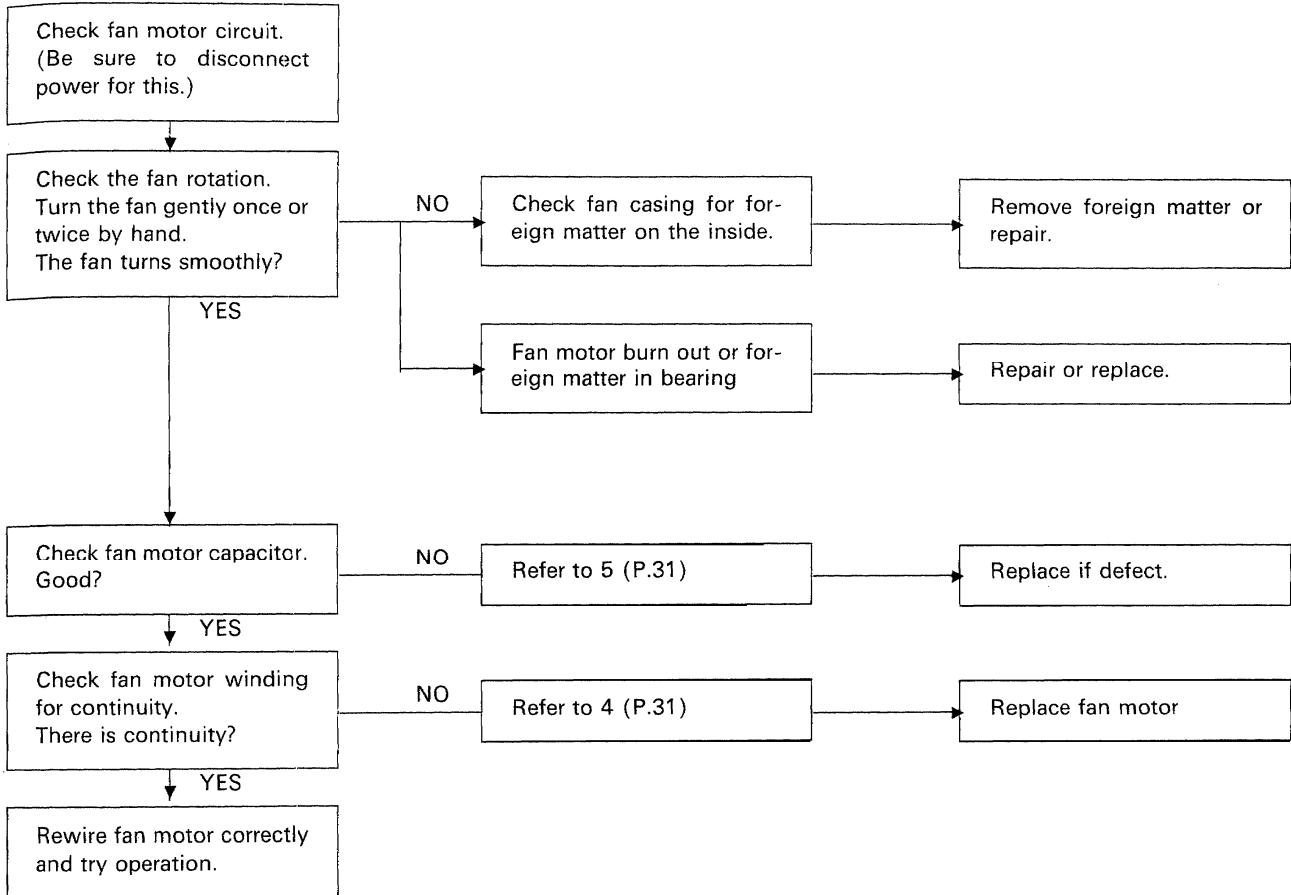
2) Neither outdoor fan nor compressor runs

NOTE Check following points at first:

1. Is thermostat setting suitable?
2. Has 3 minute timer operated?



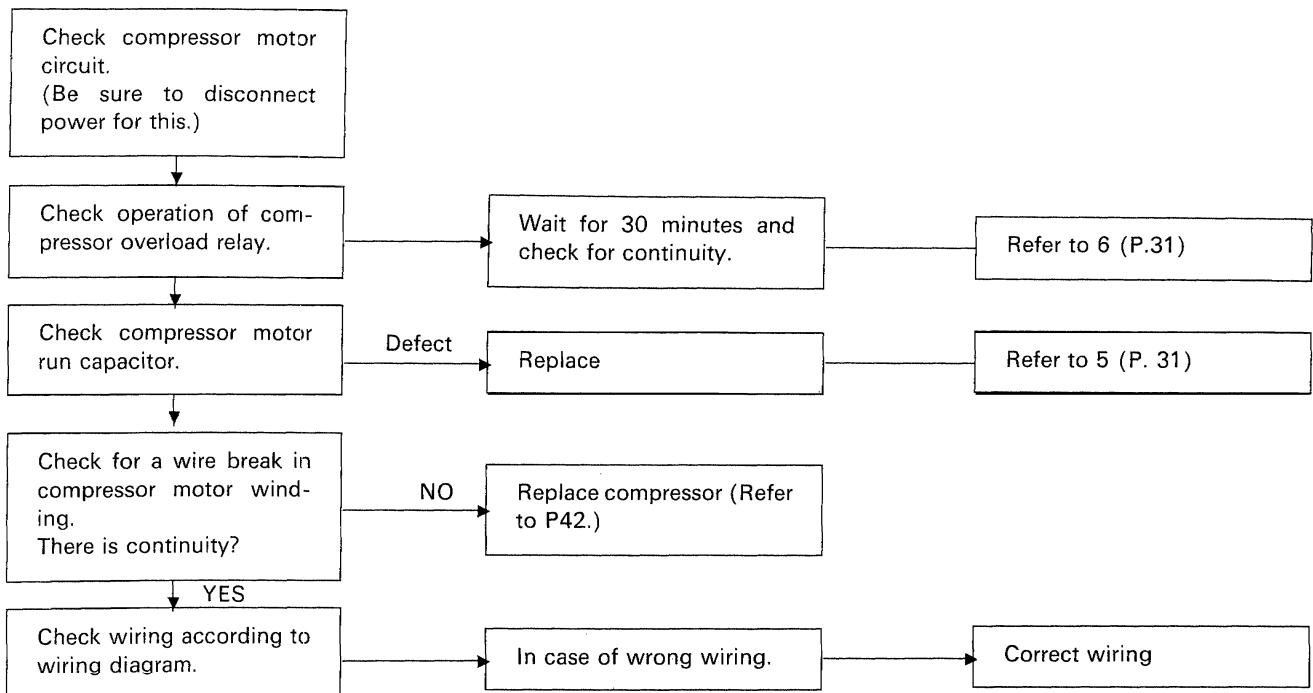
3) Only outdoor fan does not run



NOTE

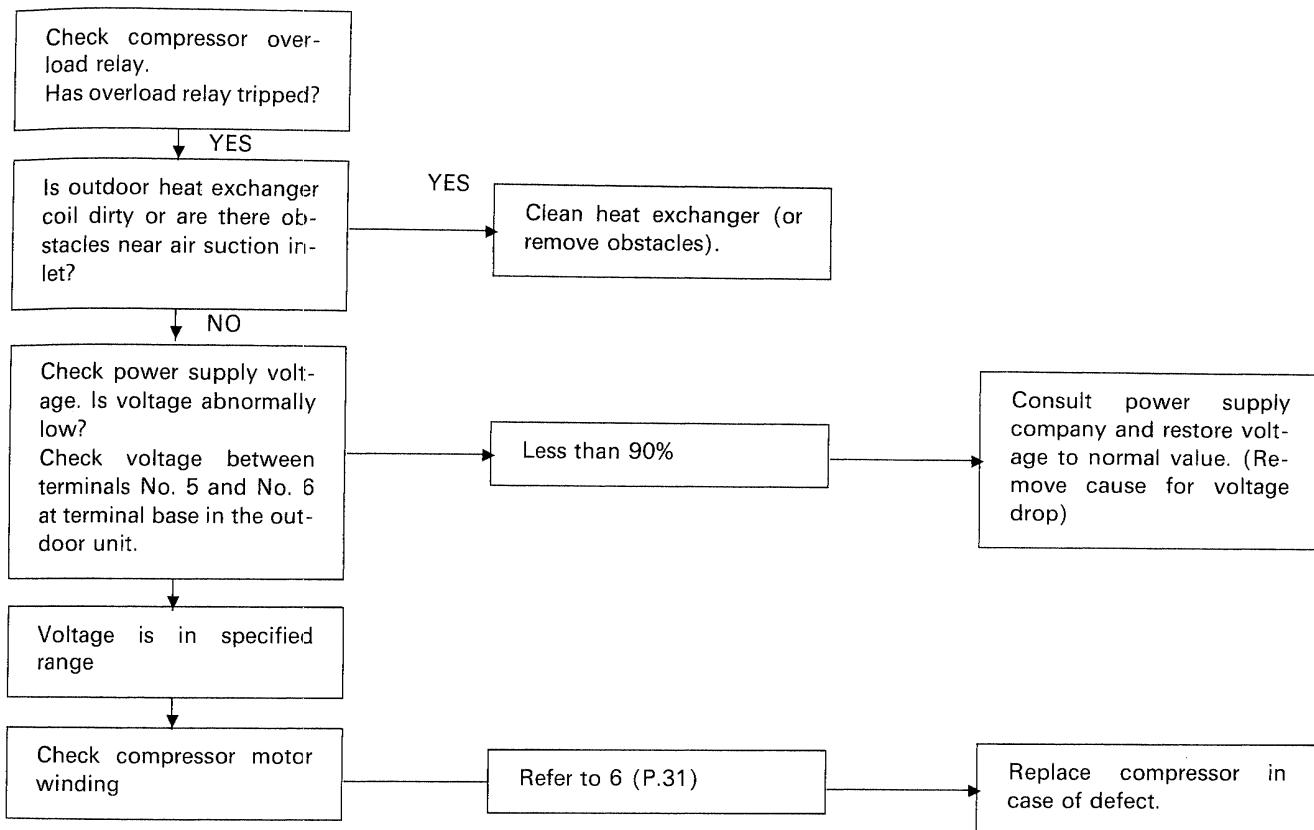
The fan motor does not run until the winding temperature lowers and automatic resetting works if the internal thermostat operates.

4) Only compressor does not run



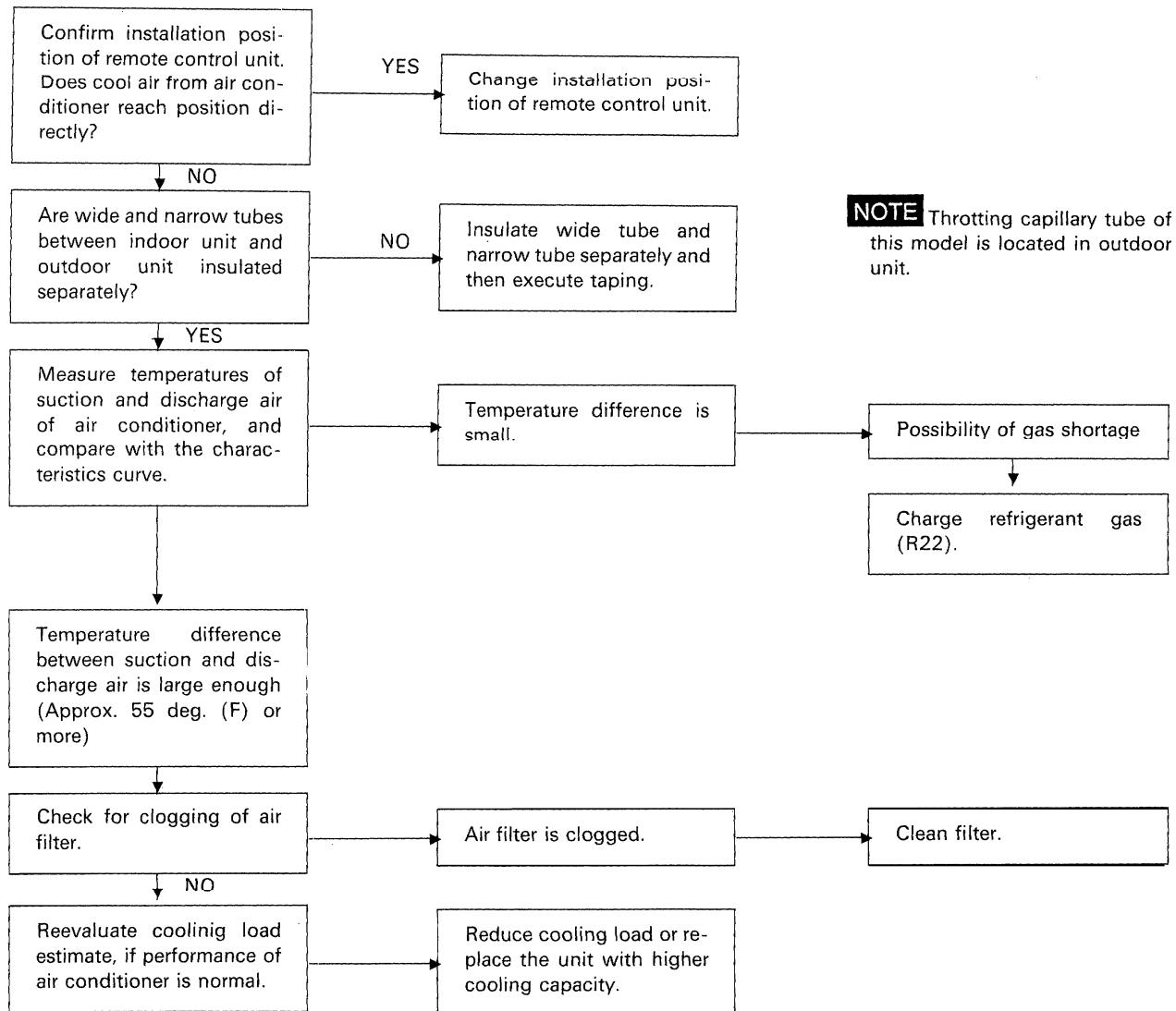
5) Compressor frequently repeats ON and OFF

(Only compressor repeats ON and OFF, while indoor unit and outdoor fan run without fail.)

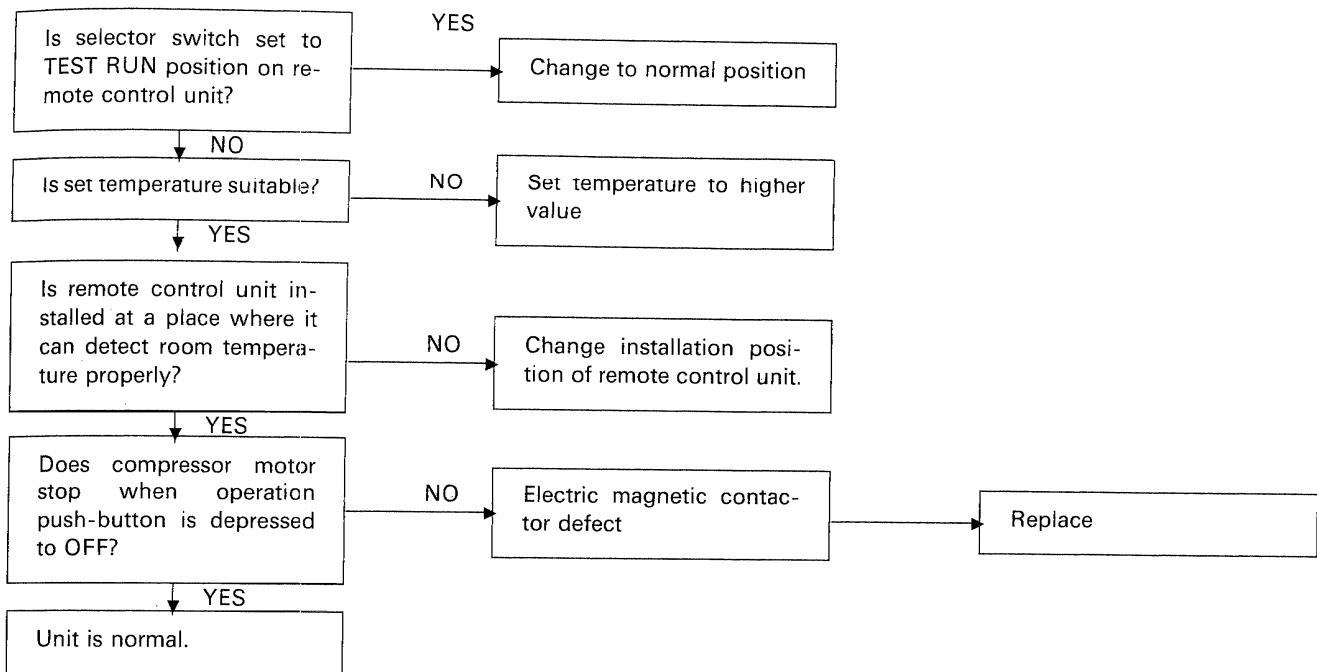


3. Air conditioner operates, but abnormalities are observed

1) Poor cooling



2) Excessive cooling



8. CHECKING AND REPLACING ELECTRICAL COMPONENTS

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3. Measurement of Insulation Resistance of the Fan Motor	30
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6. Checking of the Compressor Motor Winding	31
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1. Measurement of Insulation Resistance of the Power Cord

Clamp the ground (GND) line of the Power Cord with a lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the two power lines.

Then also measure the resistance between the GND line and the other power line. The insulation is in good condition if the resistance exceeds $1\text{ M}\Omega$. Fig. 1

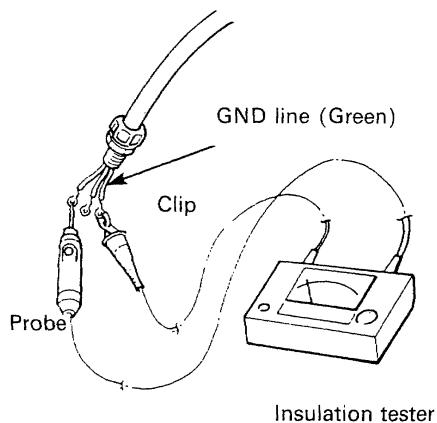


Fig. 1

2. Measurement of Insulation Resistance of the Compressor

Remove the red lead wire connected to the compressor motor from (4) on the terminal base. Clamp the removed black lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND, to which green lead wire is connected.

The insulation is in good condition if the resistance exceeds $1\text{ M}\Omega$. Fig. 2.

3. Measurement of Insulation Resistance of the Fan Motor

1) In case of indoor fan motor

Remove the fan motor connector from controller PCB (P45). Clamp the green lead wire (at the bear section) extended from the terminal GND in the electrical component box and measure insulation resistance by placing a probe of the insulation tester to either pole of this connector.

The insulation is in good condition if the resistance exceeds $1\text{ M}\Omega$. Fig. 3.

NOTE If the probe does not enter the pole because the hole is too narrow then use a probe with a thinner pin.

2) In case of outdoor fan motor

Disconnect the grey lead wire connected to Terminal (2) of the terminal plate. Clamp this lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND.

The insulation is in good condition if the resistance exceeds $1\text{ M}\Omega$. Fig. 4.

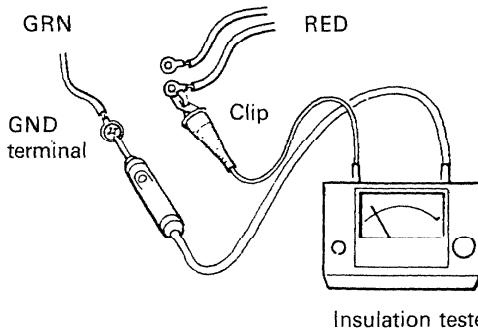


Fig. 2

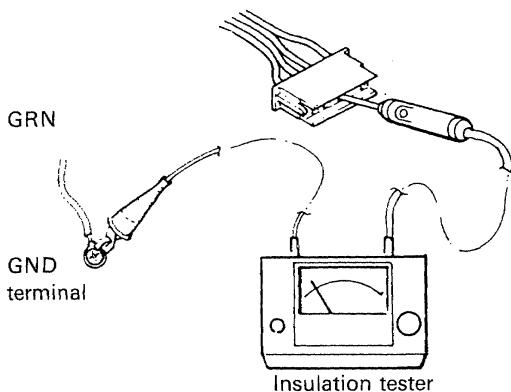


Fig. 3

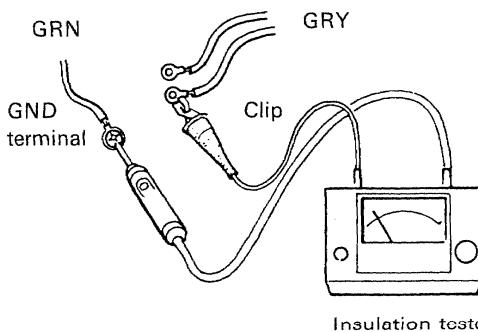


Fig. 4

4. Checking of the Outdoor Fan Motor

Disconnect and check the connector (6p) of the fan motor.
(Refer to P.44)

Set the resistance measuring range of the multimeter to "X1Ω" and measure the resistance between the fan motor lead wires.

Lead wire color	Coil resistance
WHT-BRN	$24\Omega \pm 10\%$
BLK-PNK	$53\Omega \pm 10\%$

Table-1

NOTE When ambient temp is 70°F

5. Checking of the Motor Capacitor

Checking of any of the indoor fan motor capacitor, outdoor fan motor capacitor and compressor motor capacitor can be done by the same method.

Remove both the lead wire terminals connected to the capacitor, place the probe on the capacitor terminals as shown in the Fig. 5 and observe the deflection of the pointer, setting the resistance measuring range of the multimeter to the maximum value.

For good condition of the capacitor, the pointer bounces to a great extent and then gradually returns to its original position.

The range of deflection and deflection time differ according to the capacity of the capacitor.

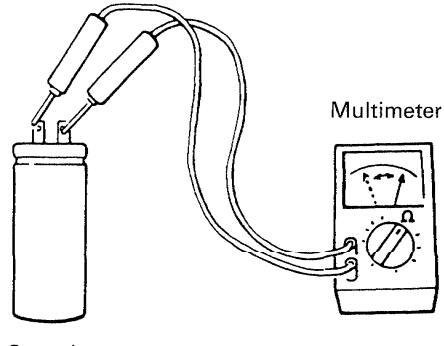


Fig. 5

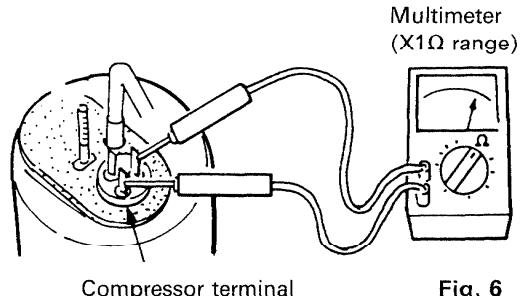


Fig. 6

6. Checking of the Compressor Motor Winding

Remove the terminal cover of the compressor motor, set the resistance measuring range of the multimeter to "X1Ω" and check the continuity between each pair out of the 3 terminals as indicated in Fig. 6

It is in good working condition if there is continuity among each pair of terminals. Fig. 7

Lead wire color	Coil resistance
C-R	$2.51\Omega \pm 10\%$
C-S	$5.58\Omega \pm 10\%$

Table-2

NOTE When ambient temp is 77°F.

Compressor Wire Orientation

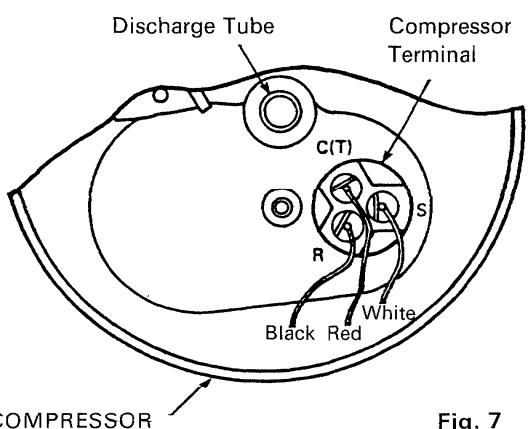


Fig. 7

7. Checking of the Remote Control Unit Proper

1) CAUTION Use of the Test Switch (TEST RUN)

The position of the switch which is used to operate the air conditioner for a room temperature below 69°F (21°C) is the position of the switch for this TEST RUN.

If this operation is continued for a long time, there would be a bad effect on the air conditioner because of over-cooling. Therefore, use this switch only for checking, and in any case, **DO NOT KEEP ON COOLING FOR MORE THAN 15 MIN. UNDER TEST RUN MODE.**

When the checking is over, **TURN THE SWITCH BACK TO ITS ORIGINAL POSITION (= RUN) WITHOUT FAIL.**

REFERENCE TEST RUN

Check that all tubing and wiring have been completed correctly. Check again that wide and narrow tube service valves are fully opened. Turn on power and run the unit.

NOTE If the room temperature is too low, cooling operation may not be possible even if the thermostat knob is set at the lowest position.

In this event, perform test run as follows:

- Pull off the thermostat knob. Fig. 8
- Set the thermostat lever to the lowest position. (The central position of the lever becomes the TEST RUN position.) Fig. 9
- Press OPERATION "ON" button to start the air conditioner.
- After completion of test run, press "OFF" button to stop the unit.
- Reinstall the thermostat knob. (The stopper position facing down.)

2) Checking of the Items of the Remote Control Unit

At first, pull out the connector (7P) of the remote control unit from the controller PCB of the unit Fig. 10.

① Fan Speed Selector

Check the continuity of the connector No. 3 against No. 4 (Place the negative (-) probe on No. 4 and positive (+) probe on No. 3.

Checking points	Position of the selector	
	High	Low
3-4	NO	YES

Table-3

NOTE

YES.....Continuity
NO.....Discontinuity

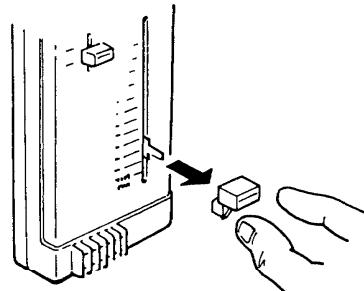


Fig. 8

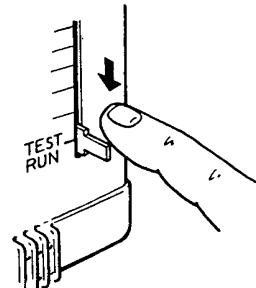


Fig. 9

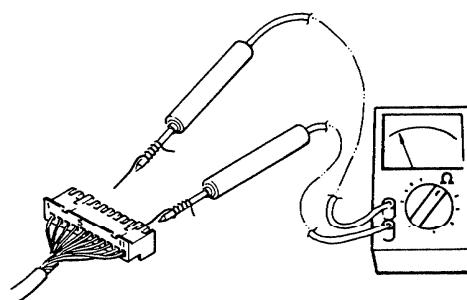


Fig. 10

② Checking of the Operation Pushbutton

The operating switch is in good working condition if there is continuity between No. 2 (placing the negative (-) probe and No. 3 (placing positive (+) probe) while the pushbutton is pressed.

CAUTION

Do not disassemble the Remote Control Unit.

It is supplied as a complete assembly and is carefully adjusted in the factory by skillful workmanship. Inexperienced disassembly will cause trouble and malfunction in the unit.

8. Checking of the Continuity of Fuse on the Controller PCB

Check the continuity by the multimeter as shown in Fig. 11. If it is difficult to check in this way, remove the lamp board ass'y connector and then check it.

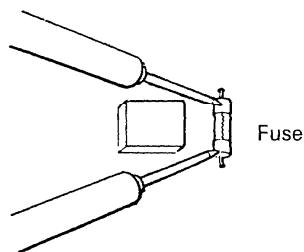


Fig. 11

9. Method to Replace Fuse on the Controller PCB

1. Remove the controller PCB
2. Pull out the fuse at the metal clasp by a pair of pliers while heating the soldered leads on the back side of the controller PCB with a soldering iron (30W or 60W). Fig. 12.
3. Remove the fuse ends one by one. For replacement, insert a fuse of the same rating and solder it.
(Allow time to radiate heat during soldering so that the fuse does not melt).

CAUTION

Be sure to replace the varistor adjacent to the fuse either when the fuse is blown.

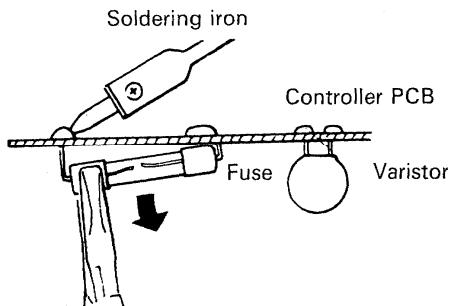


Fig. 12

10.Checking of the Power Transformer

1. Remove connectors TRANS-1 and TRANS-2 from the controller PCB.
2. Set the resistance measuring range of multimeter to "X1Ω" and measure the resistance of the lead wires between WHT-WHT and BRN-BRN (Refer to P.44)
It will be completely satisfactory if all measured values agree with those indicated in Table-5.

Lead wires	Value of resistance
WHT—WHT	About 143.5Ω
BRN—BRN	1.2Ω

Table-5

NOTE Ambient room temp 70°F

11.Checking of the Indoor Fan Motor

Remove the fan motor connector FM from controller PCB and measure the resistance between each lead wires of the fan motor connector setting the resistance measuring range to "X1Ω".

The motor is in very good working condition if all the values agree with those indicated in Table-6.

Lead wires	Value of resistance
WHT-BRN	about 141Ω
WHT-VLT	83Ω
VLT-YEL	73Ω
YEL-PNK	21Ω

Table-6

NOTE Ambient room temp 68°F

12.Checking of the Auxiliary Relay

- 1) Disconnect either violet (VLT) lead wire from terminal 7 or grey (GRY) lead wire from terminal 8 on the auxiliary relay (IX).
- 2) Check the continuity at the auxiliary relay between terminals 7 and 8.
Satisfactory if continuity is assured. Replace if continuity cannot be verified.

13. Checking of the Electric Magnetic Contactor

Disconnect (21) and (22) and check continuity using a multimeter. Satisfactory if continuity is assured. If continuity cannot be verified, the coil must be broken. Check and replace the coil.

14. Checking of the Crankcase Heater

Disjoin both ends and check continuity. Satisfactory if continuity is assured. If continuity cannot be verified, the heater must have broken wire. Check and replace broken wire.

15. Checking of the Dewproof Warmer

Disconnect connector 2P for the dewproof warmer located by the power transformer and check continuity. Satisfactory if continuity is assured. If continuity cannot be verified, replace the connector.

9. DISASSEMBLY PROCEDURES

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8. Compressor-Removal	42

1. Electrical Component Box-Removal

- 1) Remove the side cover (A) by unfastening four black color screws.
- 2) Remove the front panel (B) by unfastening two black color screws.
- 3) Remove the cover plates (C) and (D) of the electrical component box. Fig. 1

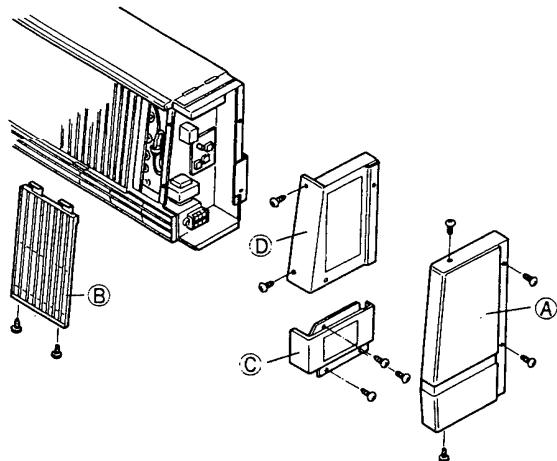


Fig. 1

- 4) Disconnect the interunit wires from the terminal block.
- 5) Remove or loosen the connector socket and lead wires.

CAUTION Do not apply an excessive force when removing the connector socket or lead wires.

- 6) The electrical component box can be pulled out by unfastening six screws. Fig. 2

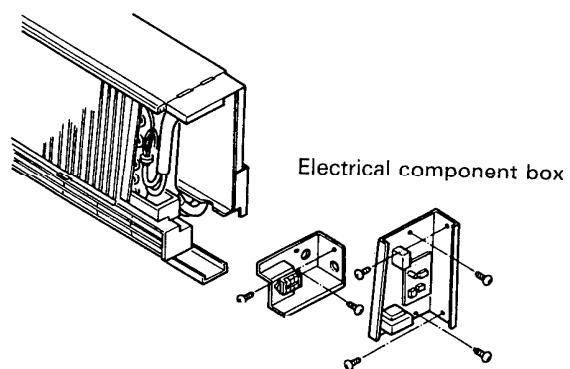


Fig.2

2. Evaporator (Indoor Heat Exchanger) and Drain Pan-Removal

- 1) Remove the electrical component box.
- 2) Remove the side cover (A).
- 3) Slide the sash (B) sideways to remove, then remove the four air intake grilles (with filters). Fig. 3

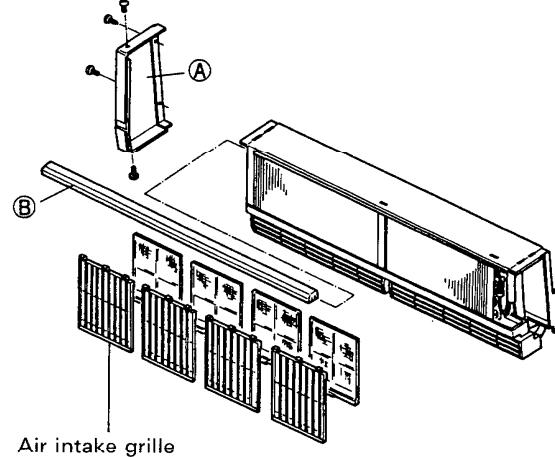


Fig. 3

- 4) Remove the two mounting metals (A).
- 5) Remove the refrigerant tubing holder (B).
- 6) The evaporator and drain pan can be pulled out after removing the screws. Fig. 4

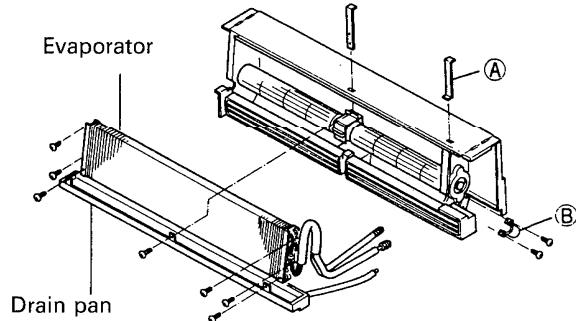


Fig. 4

3. Fan and Fan Motor-Removal

- 1) Remove the three support louvers (A), (B) and (C).
- 2) Pull the two blades (D) out.
- 3) Remove the bottom plate (E).
- 4) Slide and pull out the mounting metal (G) from the bottom plate (E) to remove the dewproof warmer (F).
Fig. 5

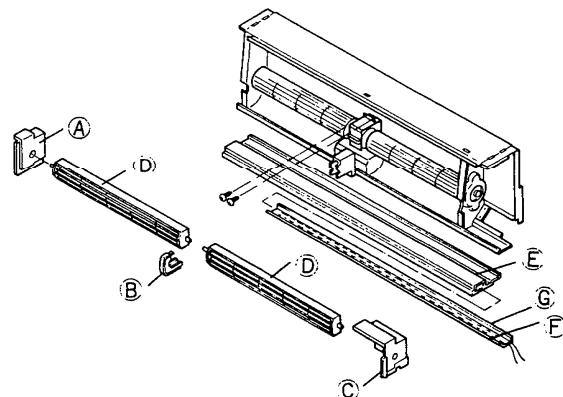


Fig. 5

- 5) Remove the two bearing cases (A) and bearing assemblies (B).
- 6) Loosen the two fan fixing bolts (C) using a hexagonal key.
- 7) Slide the two fans (G) left and right to remove them.
- 8) Remove the motor cover (D) and unscrew the two screws (E) fixing the fan motor (H) to open the two motor fixing arms (F).
- 9) The fan motor can be removed forward. Fig. 6

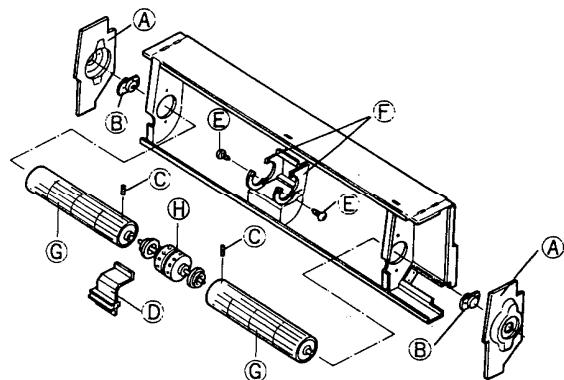


Fig. 6

Outdoor Unit SAP243C

4. Cabinet-Removal

- 1) Remove the exterior panels in the order of the front panel (A), side panel (B) and side panel (C).
- 2) Remove the cover plates (D) and (E).
- 3) Remove the mounting plate (F). Fig. 7

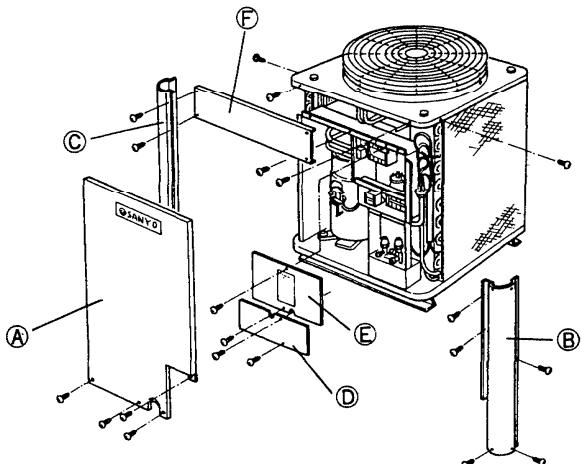


Fig. 7

5. Fan and Fan Motor-Removal

- 1) Remove the fan (B) and fan motor (D) by lifting up after removing the guard (A) and loosening one screw (a) of the fan.
- 2) Disconnect the fan motor wires (E) from the electrical component box (F) and then, remove the top cover (C) with fan motor Fig. 8

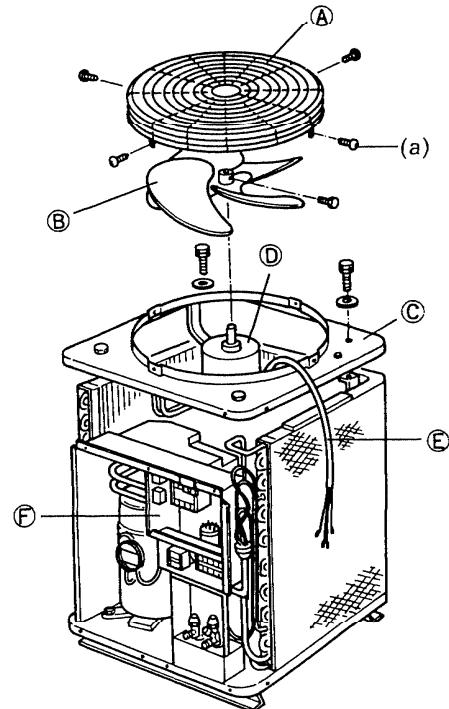


Fig. 8

6. Electrical Component Box-Removal

- 1) Disconnect the following wires from the electrical component box.
 1. Compressor wire
 2. Crankcase heater wire
- 2) Remove the cover plate (A) and the sensor (B).
- 3) The electrical component box can now be removed by unscrewing one screw (C). Fig. 9

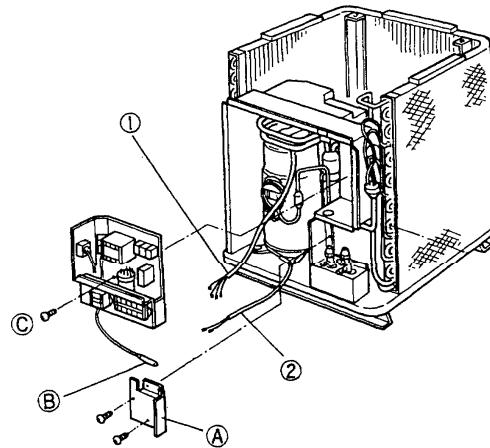


Fig. 9

7. Compressor Cover-Removal

Unfasten four screws fixing the cover (A). The cover can be removed by lifting it upward. Fig. 10

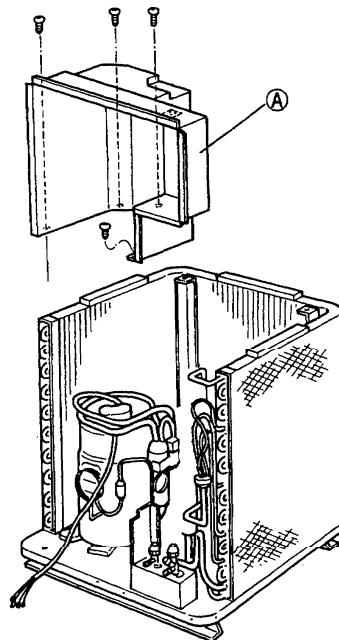


Fig. 10

8. Compressor-Removal

Take apart three joints (A), (B) and (C) brazed to the compressor by brazing torch (Fig. 11)

CAUTION

- 1) Many wires have to be removed. When removing wires, carefully check the electric diagram on the rear side of the cover plate (D) Fig. 7
Reconnect the wires correctly after replacing the compressor.
- 2) Three sections of the replacement compressor (A) (B) and (C) are sealed to avoid entry of dust and water. Remove this seals, then connect to the unit tubing when replacing the compressor Fig. 12

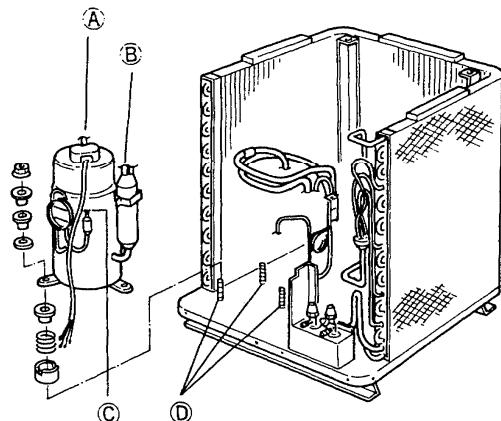


Fig. 11

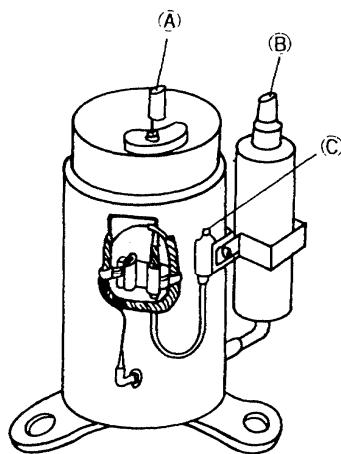
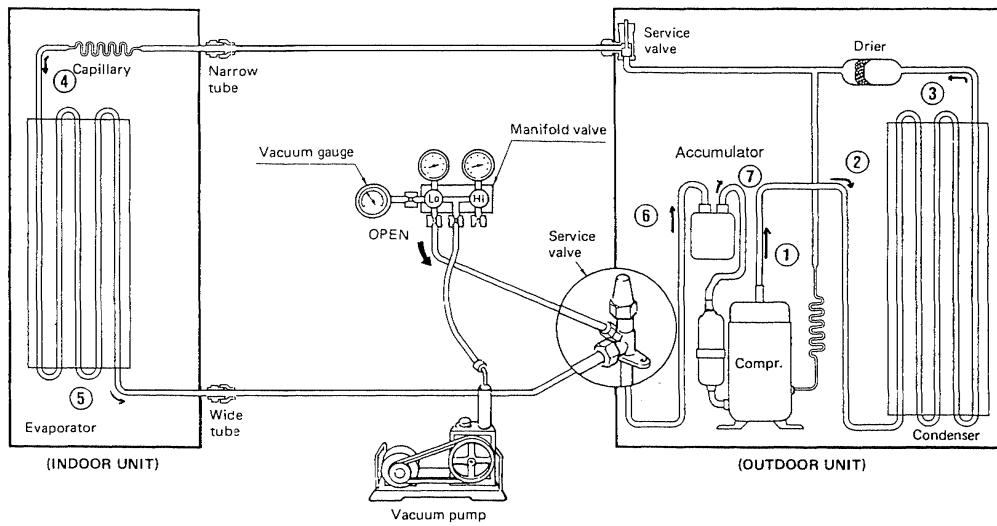


Fig. 12

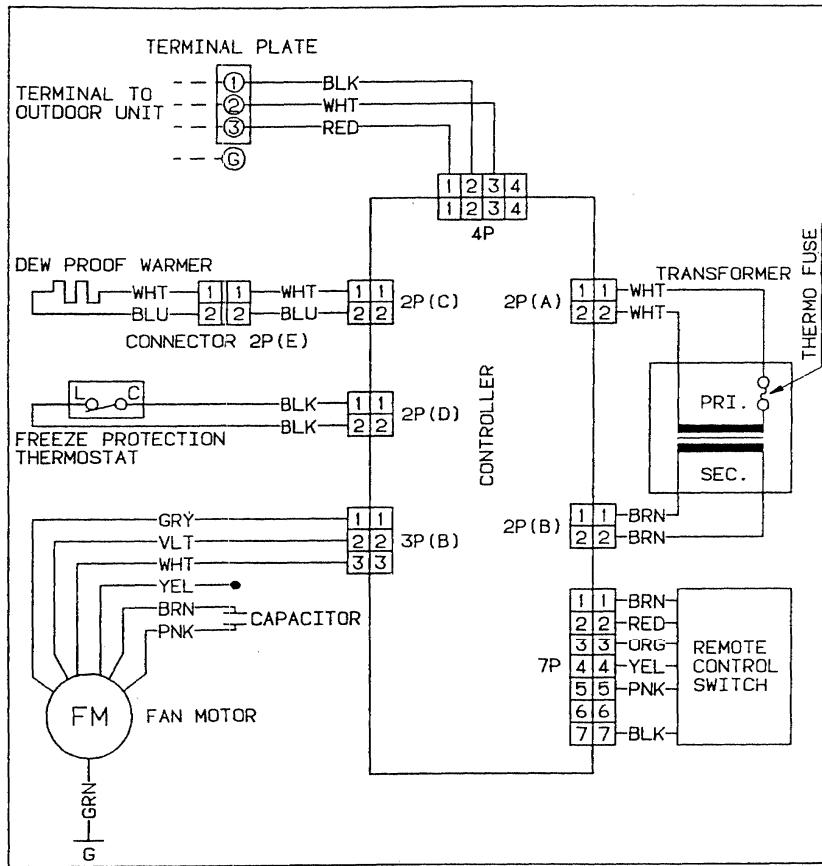
10. REFRIGERANT FLOW DIAGRAM



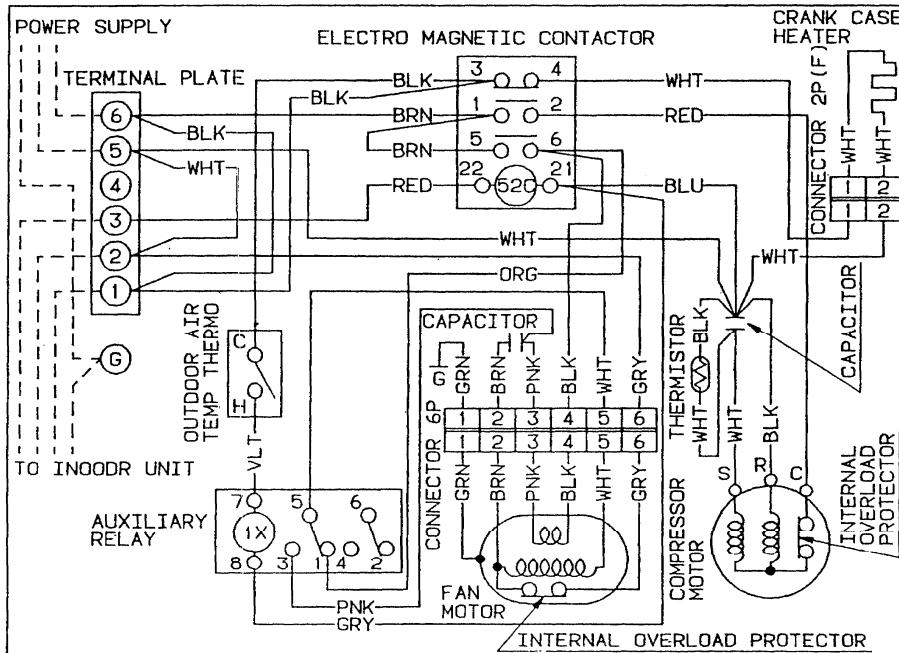
NOTE → with sequential number shows flow of refrigerant in COOLING CYCLE.

11. ELECTRIC WIRING DIAGRAMS

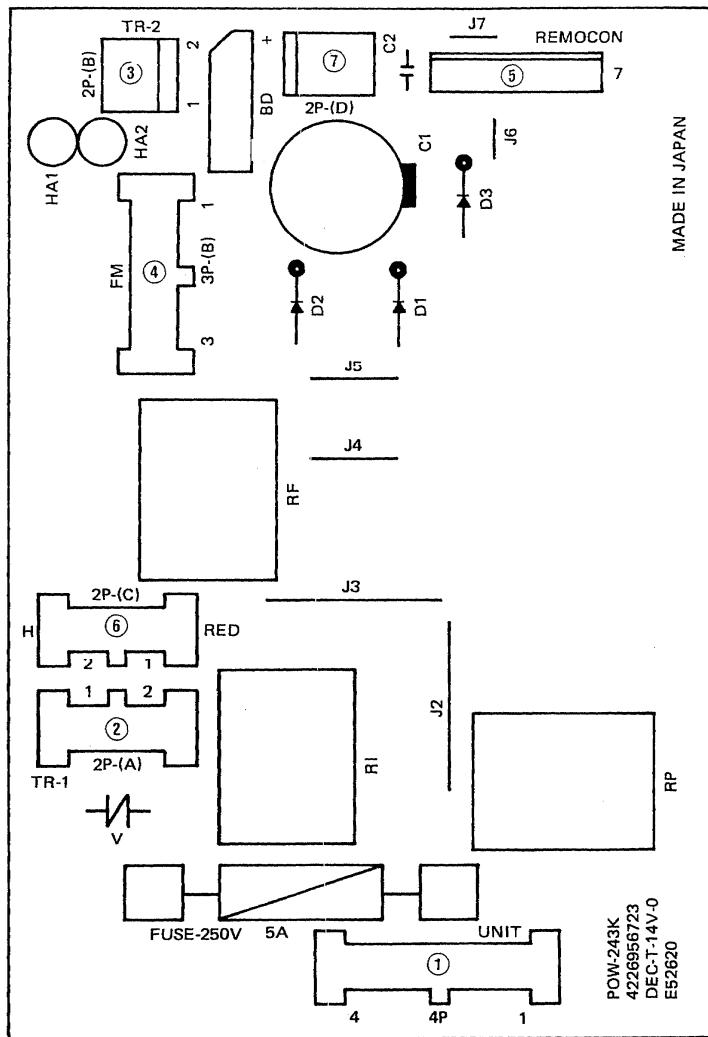
Ind Unit: SAP243K 60Hz, 230/208V



Outdoor Unit: SAP243C 60Hz, 230/208V



CONTROLLER P.C.B. (PRINTED PATTERN)
POW-243K (for SAP243K)



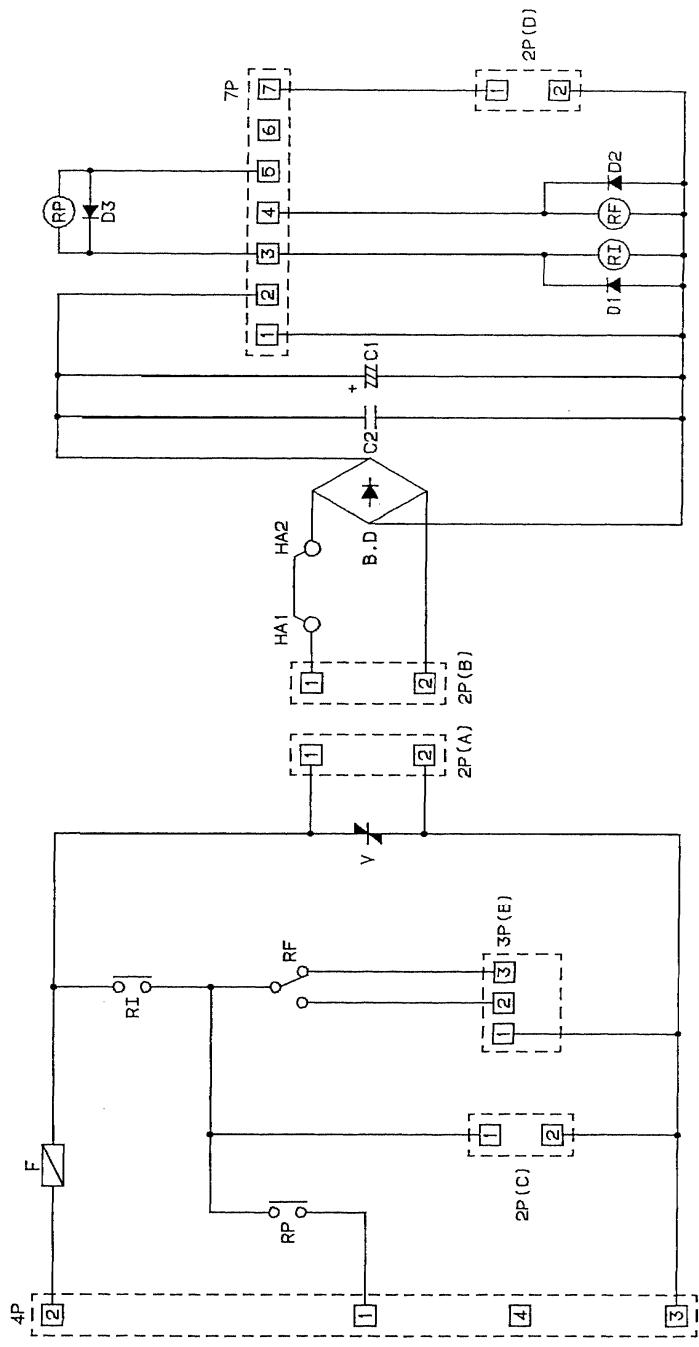
1. Connector, Power Supply to PCB:*
2. Connector, Transformer (Primary:*)
3. Connector, Transformer (Secondary: 19 V)
4. Connector, Fan Motor:*
5. Connector, Remote Control Unit: 24 V
6. Connector, Dew Proof Warmer:*
7. Connector, Freeze Protection Thermostat: 24 V

*Line voltage

ELECTRIC WIRING DIAGRAM (CONTROLLER P.C.B.)
POW-243K (for SAP243K)

Mark	Material	Specification	Mark	Material	Specification
2P (A)	Connector	UL-TREX 2P (BLK)	V	Varistor	SNR-A420K
2P (B)	Connector	SL-156	F	Fuse	250 V 5A
2P (C)	Connector	UL-TREX 2P (RED)	B.D	Bridge Diode	DBA-10C
2P (D)	Connector	5273-02A-BL (BLK)	C1	Capacitor	470 μ F 50 V
3P (B)	Connector	UL-TREX 3P (BLK)	C2	Capacitor	0.047 μ F 50 V
4P	Connector	UL-TREX 4P (BLK)	D1	Diode	DS-442X
7P	Connector	EL-7P	D2	Diode	DS-442X
RI	Relay	LZG-24HE (DC24 V)	D3	Diode	DS-442X
RP	Relay	LZG-24HE (DC24 V)			
RF	Relay	LZG-24HE (DC24 V)			

Mark	Material	Specification
2P		
4P		
3P (E)		
2P (C)		
2P (A)		
2P (B)		



For parts or service contact



SFS CORPORATION: 210 RISER ROAD LITTLE FERRY, NEW JERSEY 07643

Apr./1987/TA 1500

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