SERVICE MANUAL

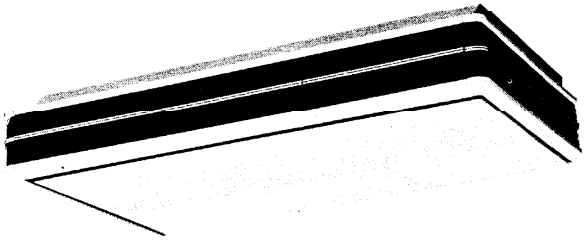
SANYO

SAP244TCH (USA)

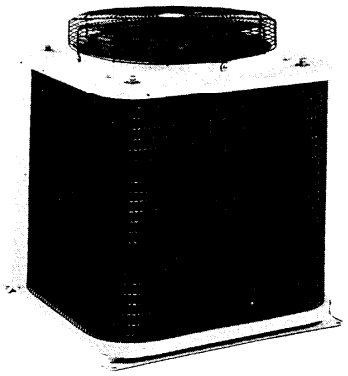
SPLIT SYSTEM HEAT PUMP

Apr.1988

MODEL NO.	PRODUCT CODE NO.	VOLT—PHASE—HERTZ
SAP244TH	85264435	230/208—1—60
SAP244CH	85274188	230/208—1—60



SAP244TH
Indoor Unit



SAP244CH
Outdoor Unit

Table of Contents

REFERENCE NO. WM–22135

1. SPECIFICATIONS

(1) Unit Specifications

Model No.			SAP244TCH	
Unit Model No.		Indoor unit	SAP244TH	
		Outdoor unit	SAP244CH	
PERFORMANCE & ELECTRICAL RATINGS			Cooling	Heating
Capacity		BTU/hr.	22,400/21,800	24,200/23,800
Air circulation (High)		Cu.ft/min.	565/530	
Moisture removal (High)		Pints/hr.	6.7	
SEER		BTU/Whr.	8.9/9.0	—
COP			—	2.6/2.6
Phase			Single	
Frequency		Hz	60	
Rated voltage		V	230/208	
Running amperes		A	11.3/12.2	12.1/13.1
Power input		W	2,540/2,470	2,700/2,670
Back-up heater		kW	—	2.71/1.71
Fuse (or Circuit breaker)		A	30	
FEATURES				
Controls			IC	
Fan speeds		Indoor fan	2	
		Outdoor fan	1	
Timer			—	
Ventilator			—	
Air deflection		Horizontal	Automatic	
		Vertical	Manual	
Air filter			Washable, easy access	
Temperature control			IC Thermostat	
Compressor			Rotary	
Refrigerant (R22)		lbs. (g)	7.3 (3,300)	
Compressor oil		cc	1,350	
Refrigerant tubing connections			Flare type	
Refrigerant control			Capillary tube	
Max. refrigerant line length		ft (m)	100 (30)	
Max. refrigerant line elevation		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	
Accessories			Mounting bracket	
DIMENSIONS & WEIGHT			Indoor unit	Outdoor unit
Height		In. (mm)	9-1/16 (230)	30-1/8 (765)
Width		In. (mm)	46-27/32 (1,190)	26-3/8 (670)
Depth		In. (mm)	26-9/16 (675)	26-3/8 (670)
Net weight		lbs. (kg)	75.8 (34)	185 (84)
Shipping size		Cu.ft (Cu.m)	11.6 (0.33)	18 (0.51)
Shipping weight		lbs. (kg)	99.8 (45)	200 (91)

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

(2) Major Component Specifications

Unit Model No.			SAP244CH	
COMPRESSOR			Hermetic Rotary Type	
Compressor Model No.			C-R 170H6S	
Source			230/208 V, 60 Hz, Single Phase	
Pole			2	
Nominal Output		W (H.P.)	1,700 (2-$^{9}/_{32}$)	
Displacement		cc/rev.	35.9	
Ampere	Full Load	A	11.2/12.4	
	Locked Rotor	A	72/65	
Type of Oil			Special Oil for Rotary Compressor	
Compressor Oil Amount		cc	1,350	
Coil Resistance (Ambient Temperature 77°F)		Ω	C-R: 0.73 C-S: 1.91	
Protective Device			Internal Protector	
Run Capacitor	MFD		35	
	VAC		370	
Unit Model No.			SAP244TH	SAP244CH
Fan Motor			Capacitor-Run Induction Motor	
Fan Motor Model No.			KFG4T-61A6P	KFC8S-101A6P
Source			230/208V, 60 Hz, Single Phase	
Pole			4	8
Nominal Output		W(H.P.)	60 ($^{3}/_{32}$)	100 ($^{5}/_{32}$)
Ampere	Full Load	A	0.36/0.31	1.17/1.14
	Locked Rotor	A	0.65/0.61	2.26/2.13
Protective Device			Internal Protector	
			9,700K-01-215	17AM-035A5-4
Run Capacitor	MFD		2	5
	VAC		440	
Coil Resistance (Ω) at 68°F			WHT-BRN 52.7 WHT-VLT 30.6 VLT-YEL 56.1 YEL-PNK 17.4	WHT-BRN 24.1 BLK-PNK 53.1

Unit Model No.		SAP244CH
OVERLOAD RELAY, COMPRESSOR		
OLR Model No.		Internal Type
Temperature	Operating	320°F±9°F
	Reset	198°F±20°F
Ampere at 77°F (Cold Start)		Operates within 6-16 sec. at 60 A
Ampere at 280°F (Cold Start)		Should not operate for 30 min. at 21.0 A
Reset		Automatic

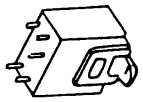
Major Component Specifications

Unit Model No.	SAP244TH
Room Temperature Sensor	OCS5K-UL
Resistance (kΩ)	69 °F: 6 — 6.5 86 °F: 3.9 — 4.2 77 °F: 4.9 — 5.2

Incorporated in the remote control unit.

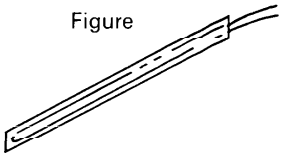
Figure

Unit Model No.	SAP244TH
Heater Relay	G5D-22423TUS
Rating	Contact 240 VAC 20 A, Coil 230 VAC



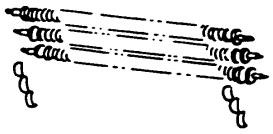
Figure

Unit Model No.	SAP244TH
Dew proof Warmer	—
Rating	230 V, 10 W



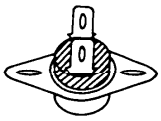
Figure

Unit Model No.	SAP244TH
Heater,	AH-2.1 TH244
Kw Rating	2.1 Kw 230V



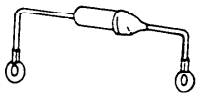
Figure

Unit Model No.	SAP244TH
Thermostat	CS-7L
Operating Temperature	113 °F ON 140 °F OFF
Rating	240 V, 10 A



Figure

Unit Model No.	SAP244TH
Fuse	SF169U
Operating Temperature	378 °F



Figure

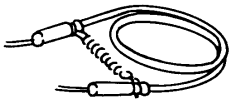
Unit Model No.	SAP244TH
Freeze Protection Thermostat	RTB-4U302
Operating Temperature	50 °F ON, 34 °F OFF

Unit Model No.	SAP244TH
Power Transformer (for controller PCB)	ATR-J122U
Resistance (Ω)	Primary: WHT-WHT 143.5 Secondary: BRN-BRN 1.2

Figure

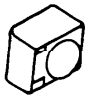
Unit Model No.	SAP244CH
Crankcase Heater	CH 5700
Rating	230 V, 30 W

Figure



Unit Model No.	SAP244CH
Defrost Timer	STMN-2-TO918
Rating	Contact: 250 V, 5A Coil: 230 V/208 V

Figure

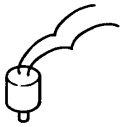


Unit Model No.	SAP244CH
Outdoor Defrost Thermostat	RTB-4U201F
Operating Temperature	23°F ON, 50°F OFF

Figure

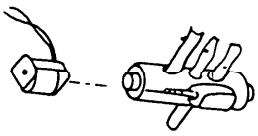
Unit Model No.	SAP244CH
Outdoor Pressure Switch	ACB-1UB04W
Operating Pressure	170.7 psig OFF, 99.6 psig ON

Figure



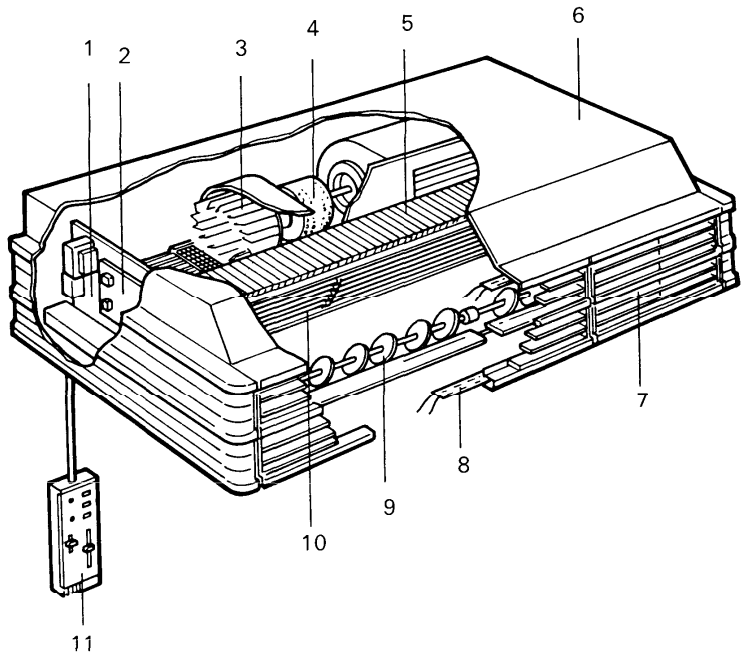
Unit Model No.	SAP244CH
4-way Reversing Valve	L27-9072 (Coil) V26-9000 (Valve Assy)
Coil voltage	230 V/208 V, 60 Hz

Figure



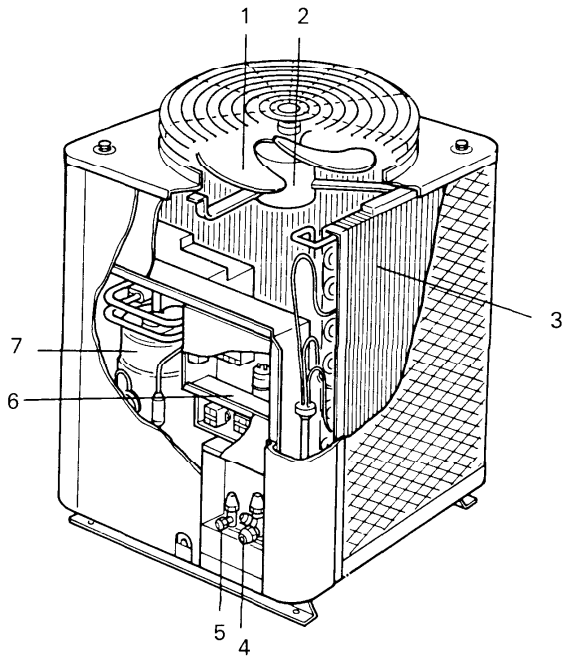
2. CONSTRUCTION OF THE UNIT

Indoor Unit SAP244TH



1. Electrical component box
2. Controller P.C.B.
3. Centrifugal fan
4. Fan motor
5. Indoor heat exchanger
6. Cabinet
7. Air discharge grille
8. Dew proof warmer
9. Auto deflector
10. Electric heater
11. Remote control unit

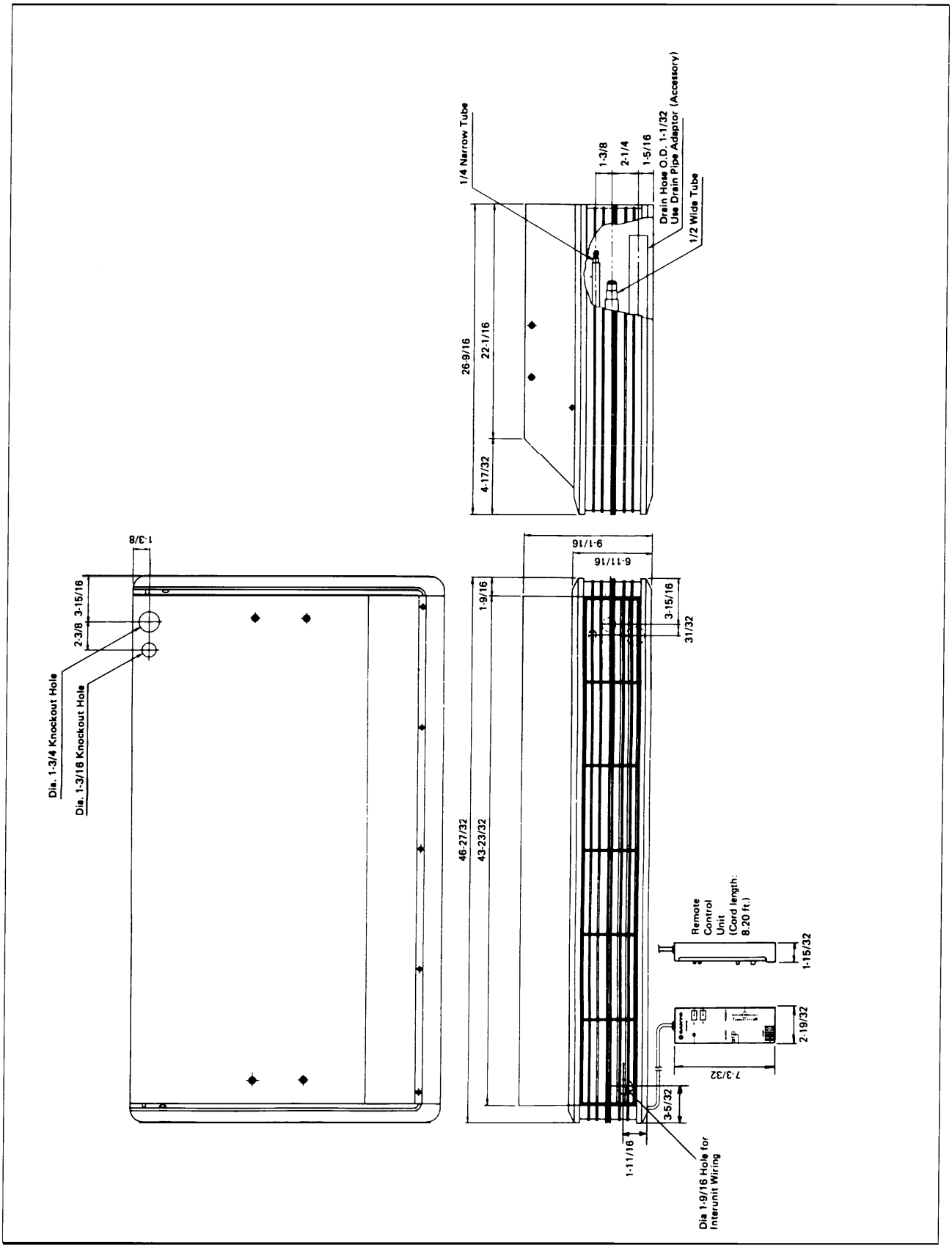
Outdoor Unit SAP244CH



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

3. DIMENSIONAL DATA

Indoor Unit SAP244TH



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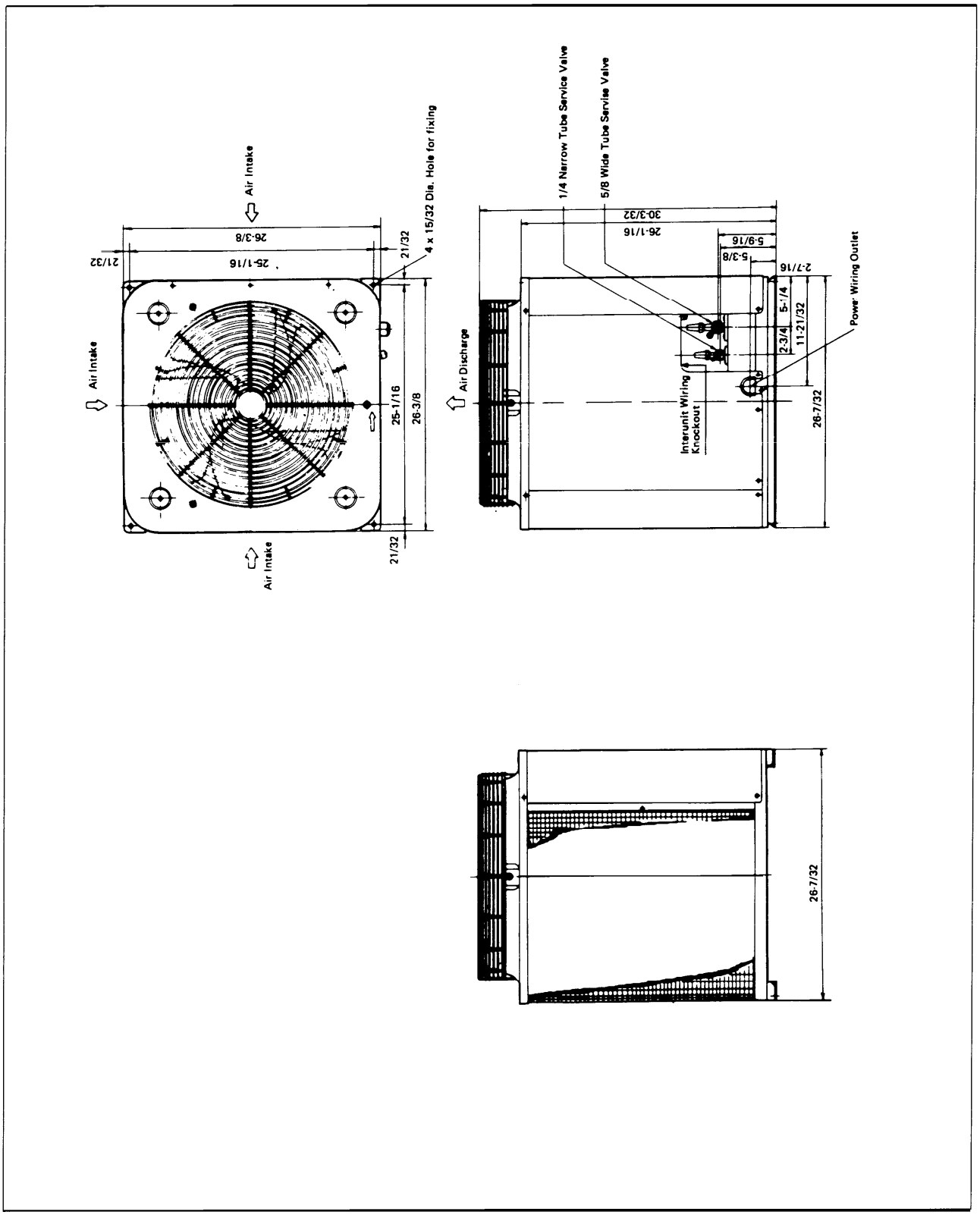
DIMENSIONAL DATA

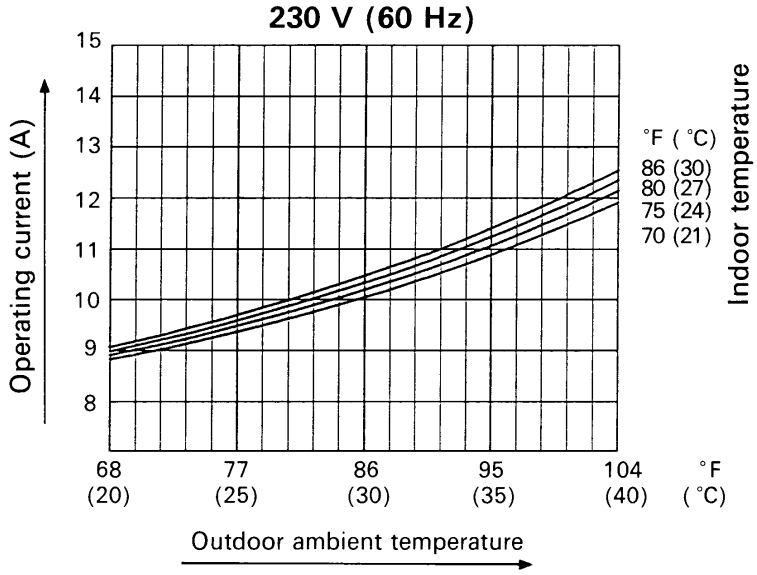
Outdoor Unit SAP244CH



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.)



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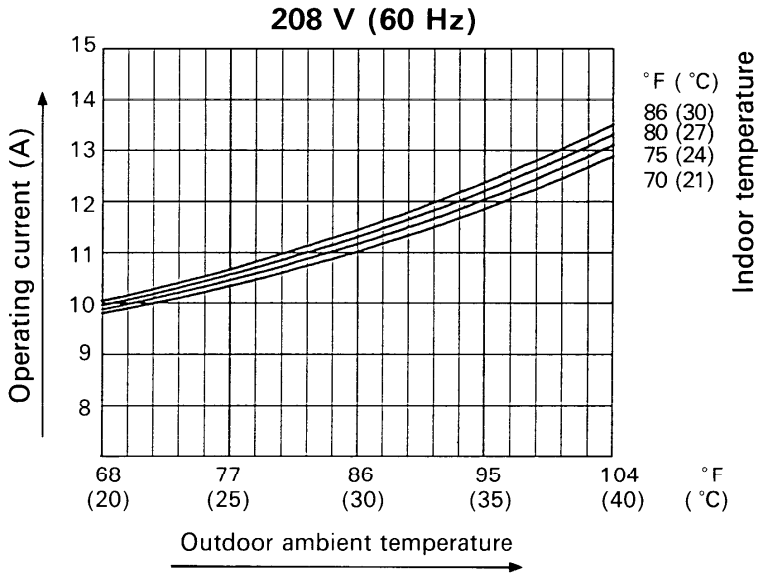
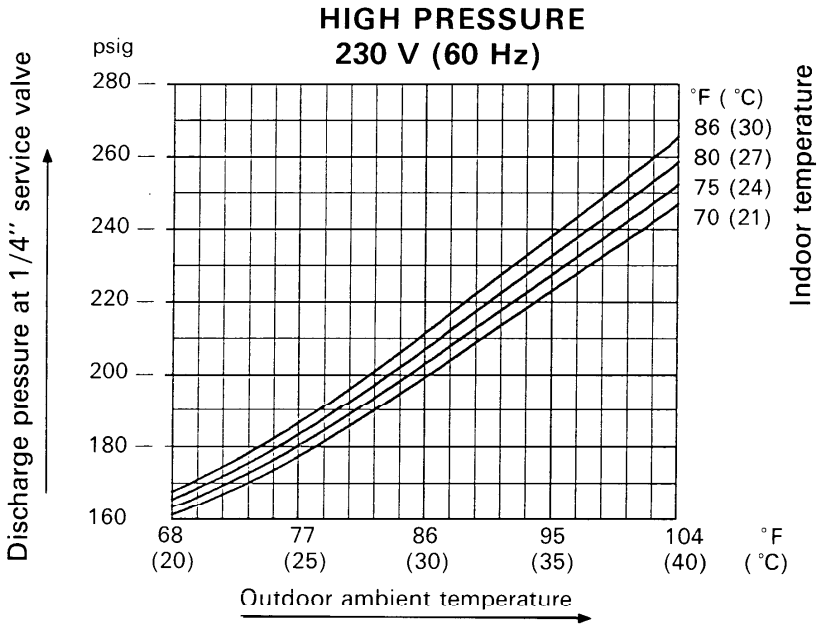


PERFORMANCE CHARTS

Cooling characteristics

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



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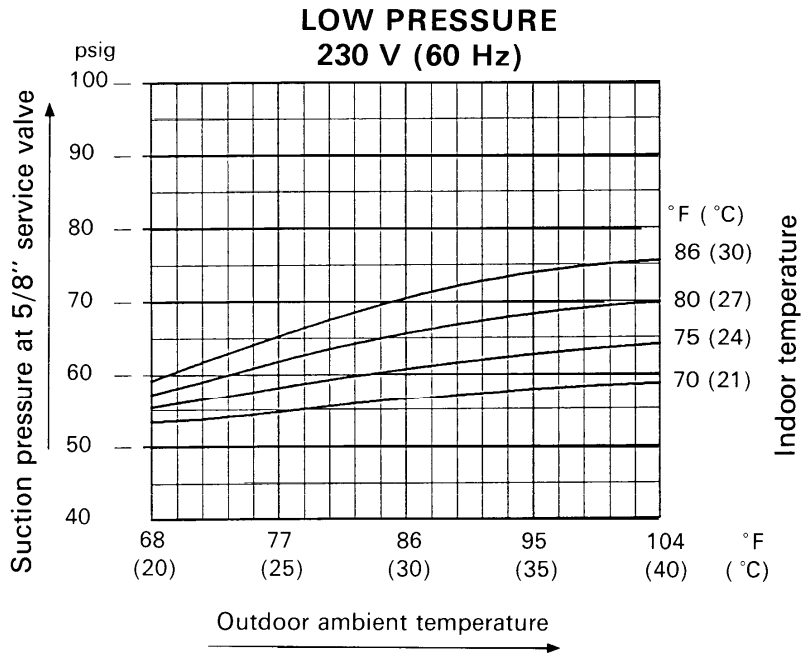

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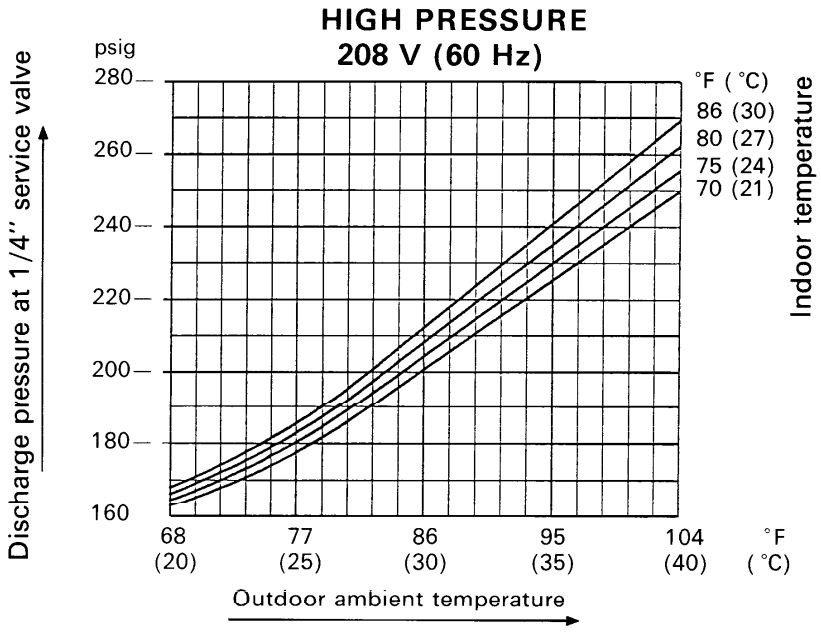

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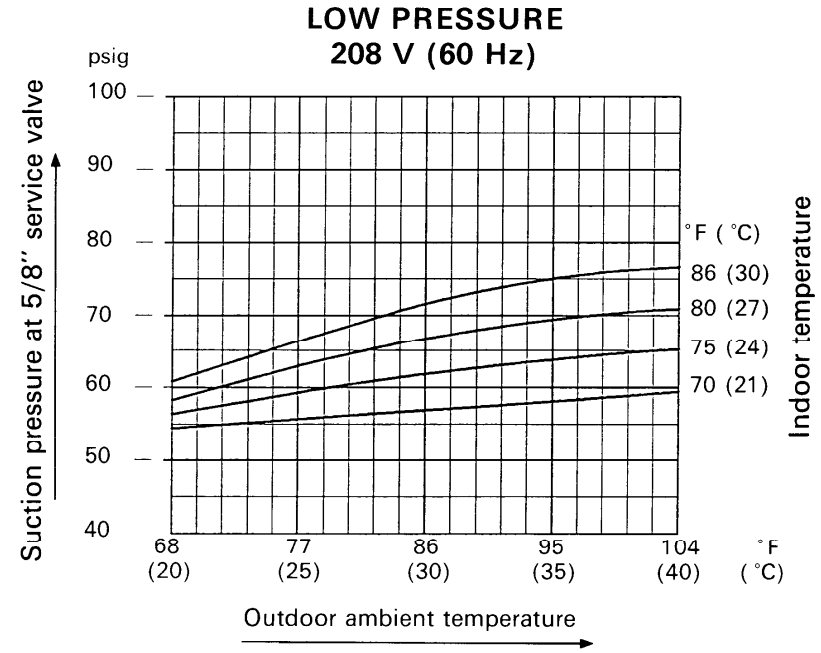
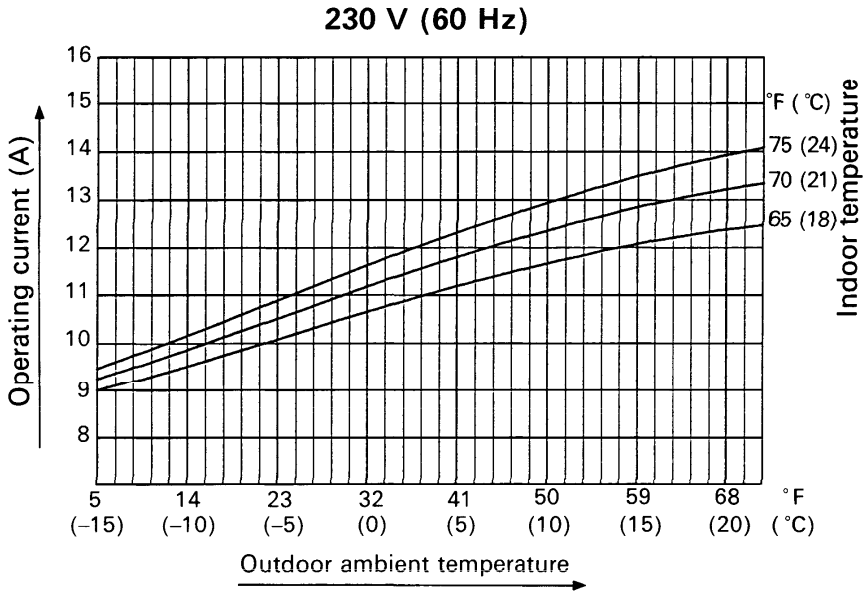


PERFORMANCE CHARTS

Heating characteristics

Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 75%, indoor air velocity: High, overall value for indoor and outdoor shown.) (However, the heater shall be excluded.)

NOTE The by-pass opens when the high pressure level surpasses 327.12 psig (23 kg/cm^2).



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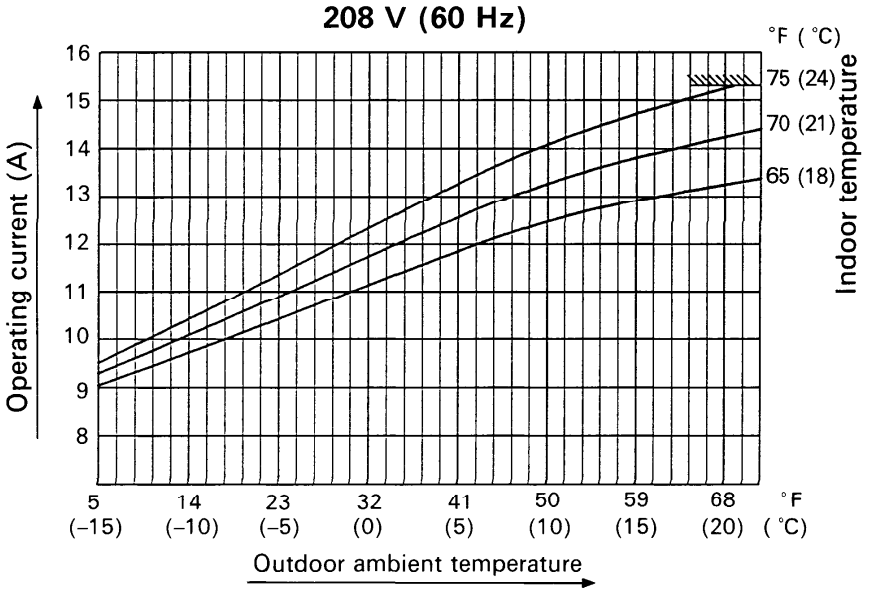

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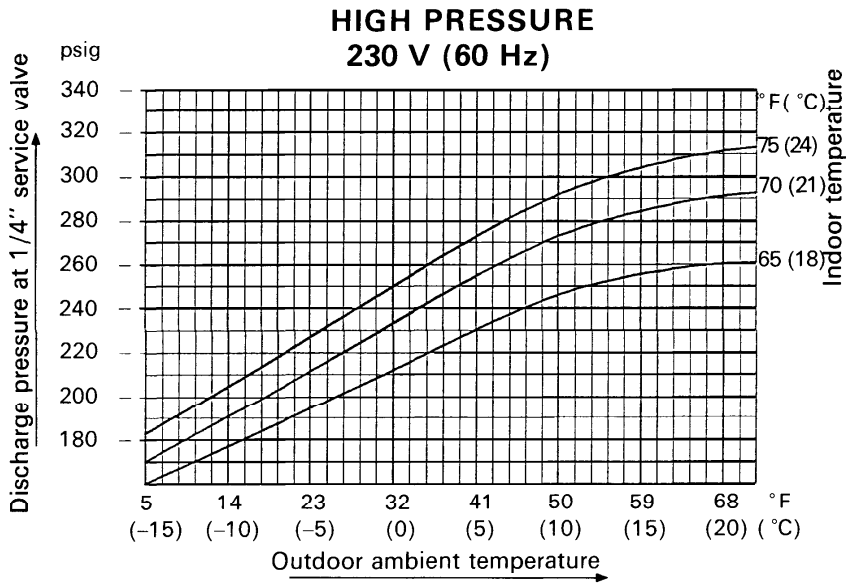

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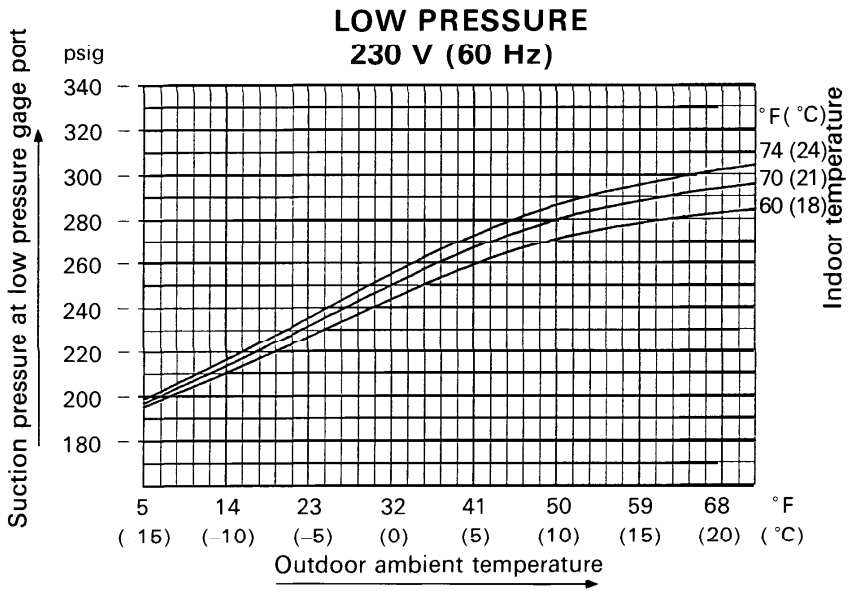

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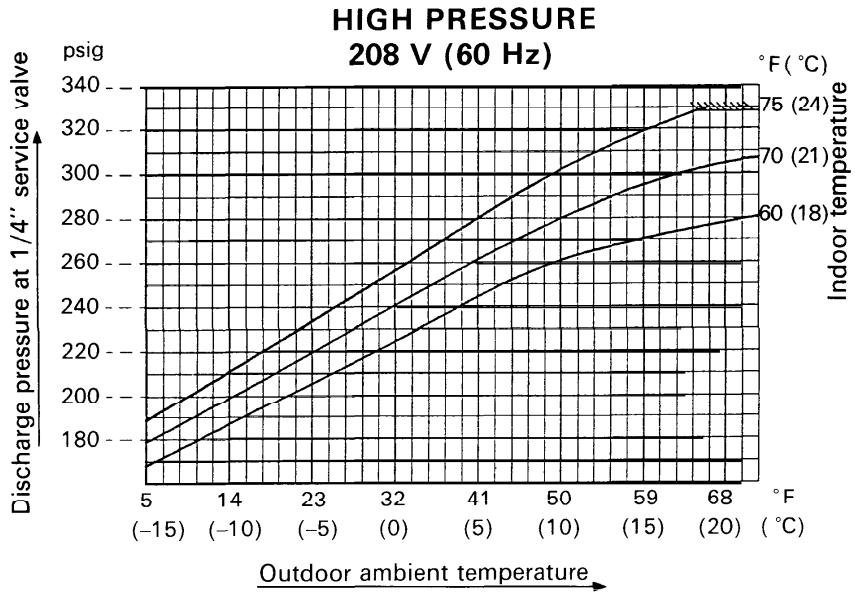

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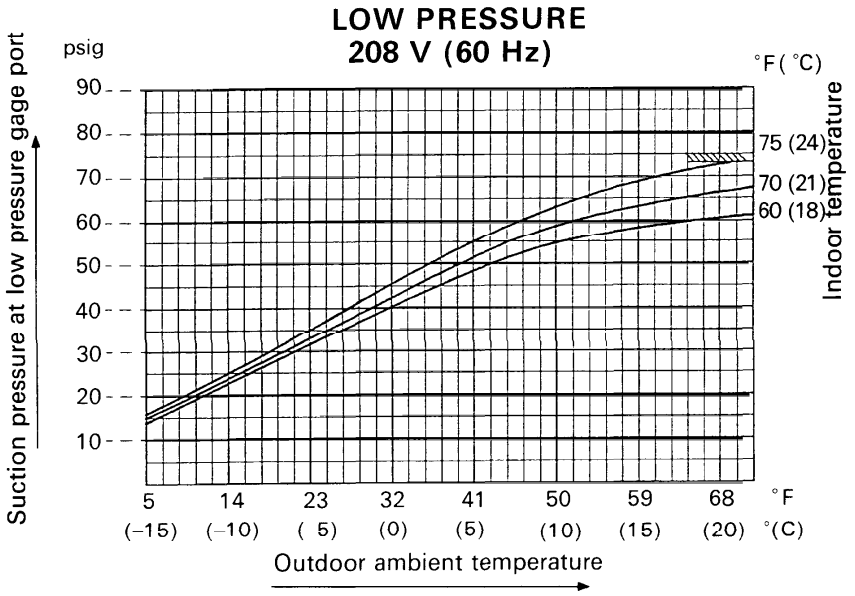


5. OPERATING INSTRUCTIONS
Controls and Indicators

A. OPERATION OFF
Push this button to stop the heat pump.

B. OPERATION ON
Push this button to start the heat pump.

C. AUTO DEFLECTOR SWITCH
To start automatic air sweep, press the AUTO DEFLECTOR button.
To stop, press the button again.

D. THERMOSTAT AND SERVICE TEST RUN SWITCH
This automatically turns the heat pump 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.

E. OPERATION LAMP
This lamp lights when the system is in operation.

F. STANDBY LAMP
This lamp lights in the following cases:

1. When the heat pump is in HEAT mode (when the indoor coil is not warm enough).
2. While the defrosting system is working.

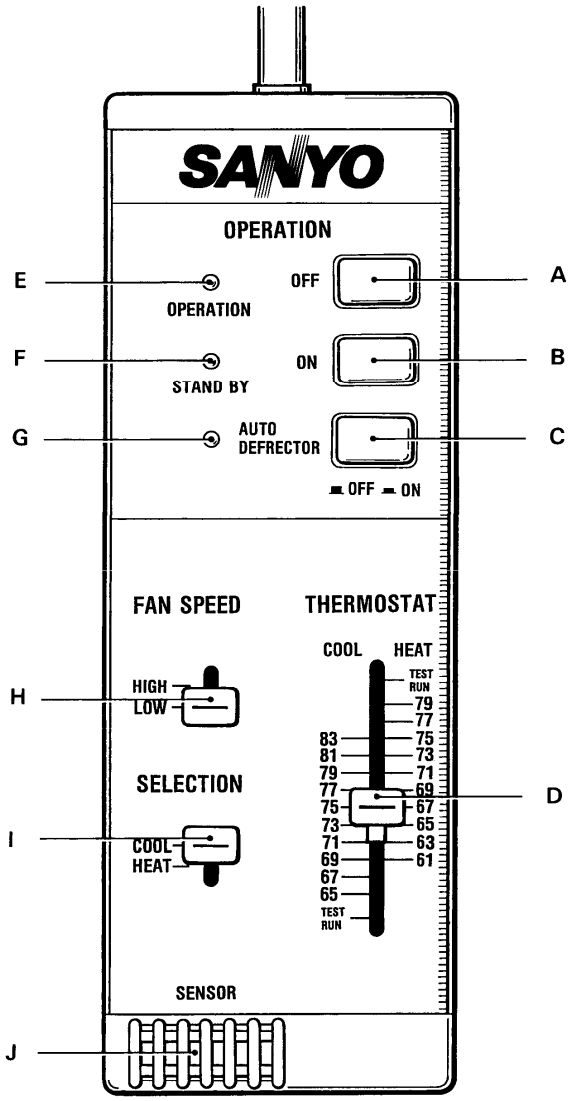
G. AUTO DEFLECTOR LAMP
This lamp lights when air sweep function is operating.

H. FAN SPEED
Use this control to select the desired fan speed.

HIGH	High speed
LOW	Low speed

I. HEAT/COOL SELECTOR
Use this control to select the desired operating mode.

J. SENSOR
The sensor detects any change in the room temperature.



Operation

COOLING

STEP 1: Set the COOLING/HEATING selector to COOL.

STEP 2: Set the THERMOSTAT to the desired temperature.

STEP 3: Set the FAN SPEED.

STEP 4: Press the OPERATION ON button.

STEP 5: *To stop the heat pump,* press the OPERATION OFF button.

NOTE

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

HEATING

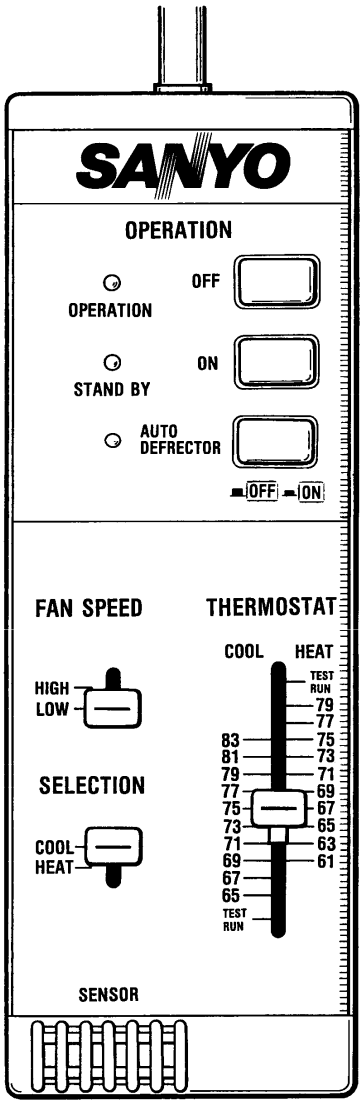
STEP 1: Set the COOLING/HEATING selector to HEAT.

STEP 2: Set the THERMOSTAT to the desired temperature.

STEP 3: Set the FAN SPEED as desired.

STEP 4: Press the OPERATION ON button.

STEP 5: *To stop the heat pump,* press the OPERATION OFF button.



SPECIAL REMARKS ON HEATING

Heating Performance

If the outdoor temperature is very low, the heat pump will not work so well, as it absorbs its heat from the outside air.

Defrosting

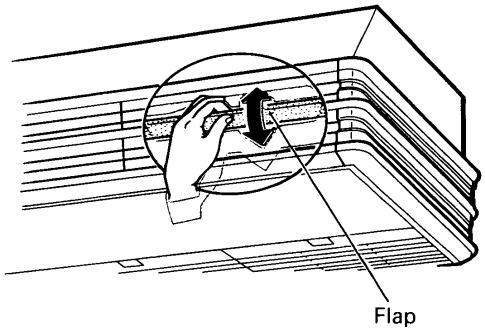
If the outdoor temperature is low and frost forms on the heat exchanger coil, a built-in defrosting system operates. At the same time, the fan speed on the indoor unit rotates at very low speed and the STANDBY lamp remains lit until defrosting is completed. Heating operation restarts after several minutes, depending on the outdoor temperature and the amount and type of frost.

STANDBY lamp

When the heat pump is switched on, in heating mode, the indoor fan will start running at very low speed until the indoor heat exchanger coil has warmed up. This takes several minutes, or more depending on the condition of frosting. During which time the STANDBY lamp remains lit.

Operation

ADJUSTING THE AIR FLOW DIRECTION



1. Horizontal

- Right and left adjustment (Automatic)

Variable mode

Press the AUTO DEFLECTOR pushbutton to start automatic air sweep. AUTO DEFLECTOR lamp lights during operation.

Fixed mode

To select a fixed air direction, press the pushbutton again when the air is flowing in the desired direction. The lamp will go out at this time.

2. Vertical

Hold both ends of the flap and move the flap up and down to adjust the vertical air flow.

6. INSTALLATION INSTRUCTIONS

1. Installation Site Selection

Indoor Unit

AVOID:

- areas where leakage of flammable gas may be expected.
- places where large amounts of oil mist exist.
- direct sunlight.
- nearby heat sources that may affect performance of the unit.
- locations 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.
- 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. 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 cool (or hot) air from the unit.

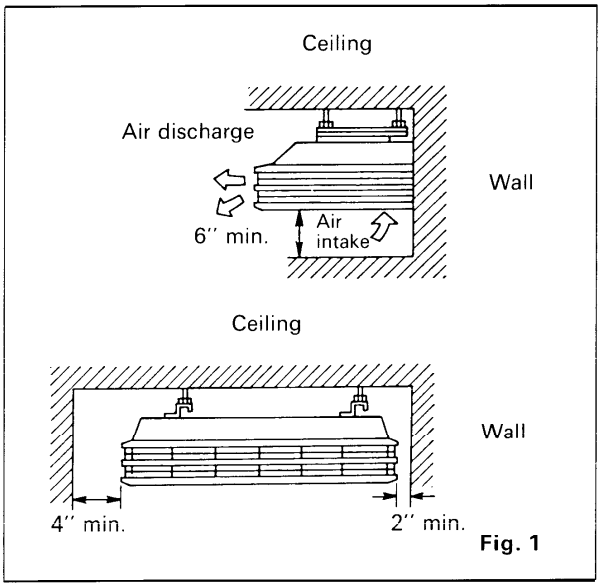


Fig. 1

Outdoor Unit

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; about 4" above ground level to reduce humidity and possible water damage in unit and decrease service life.
- use lug bolts or equal to bolt down unit, reducing vibration and noise.

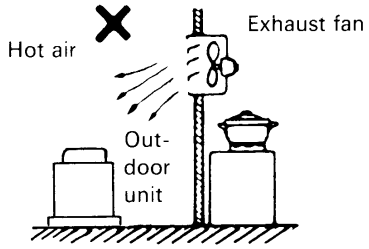


Fig.2

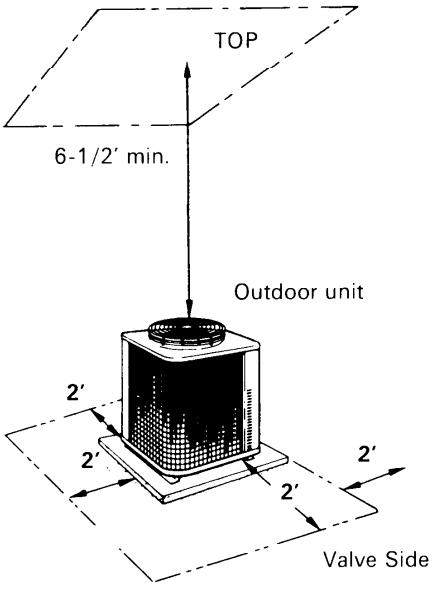


Fig. 3

2. Connecting Tubes between Indoor and Outdoor Units

1. Connect the indoor side refrigerant tubing extended from the wall with the outdoor side tubing tightly.
2. Flare nut on large dia. tube should be torqued to 510 — 550 lbs. in. Flare nut small dia. tube should be torqued to 130 — 170 lb. in. Fig. 4
3. After performing a leak test on the connecting part, insulate it with INSUL. NIPPLE and finish with a vinyl masking tape over it. Fig. 5

NOTE Never connect up tubes by brazing them. If it is inevitable, be sure to blow nitrogen gas while brazing to avoid oxidation of inside copper tube.

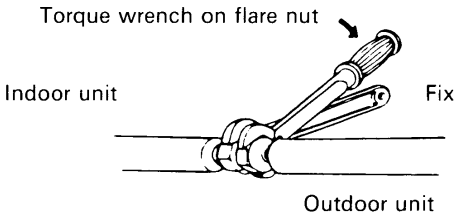


Fig. 4

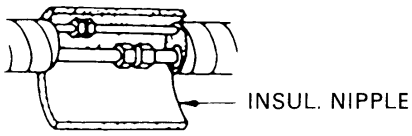


Fig. 5

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. 6

- **Insulation material**

The material must of course have good insulation characteristics, be easy to use, age resistant, and must not easily absorb moisture. In heating mode, the temperature at the wide tube may rise to about 230 °F, therefore the tube must be insulated with a heat resisting insulation material.

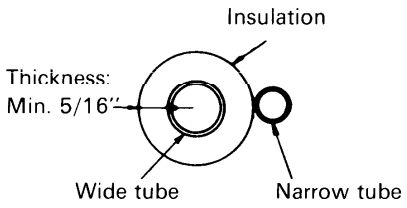


Fig. 6

4. Wiring Instructions on Outdoor Unit

a) Remove access panel "C" and punch knockout holes on the panel. Fig. 7
b) Connect interunit control line and power line per drawing on inside of the panel "C". Fig. 8
c) Be sure to size each wire allowing several inches longer than the required length for wiring.
d) When connections are completed secure both connectors on the panel with lock nuts and then close the panel.
e) 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.

CONNECTOR SIZE

POWER SUPPLY	INTERUNIT LINE
3/4"	3/4"

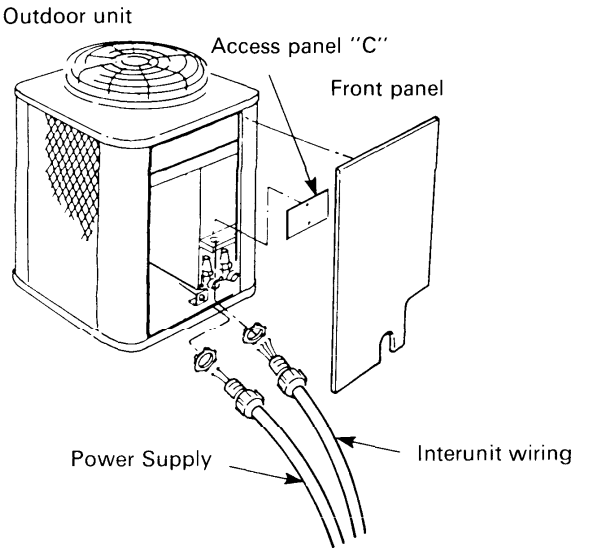


Fig. 7

WIRING SYSTEM DIAGRAM

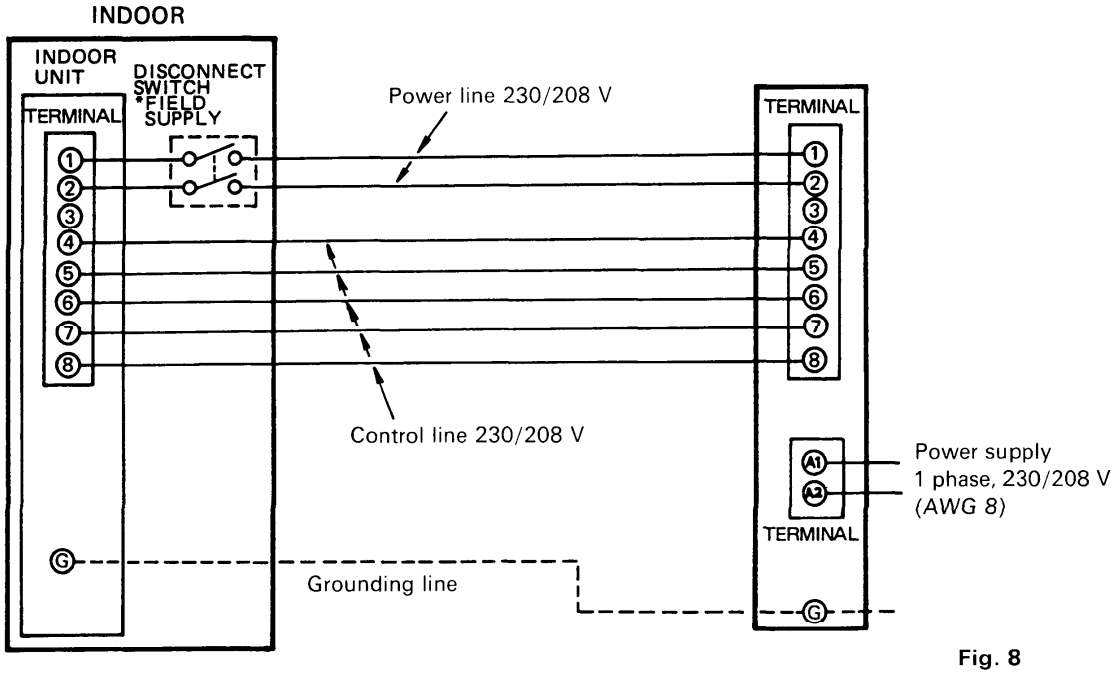


Fig. 8

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 right. 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

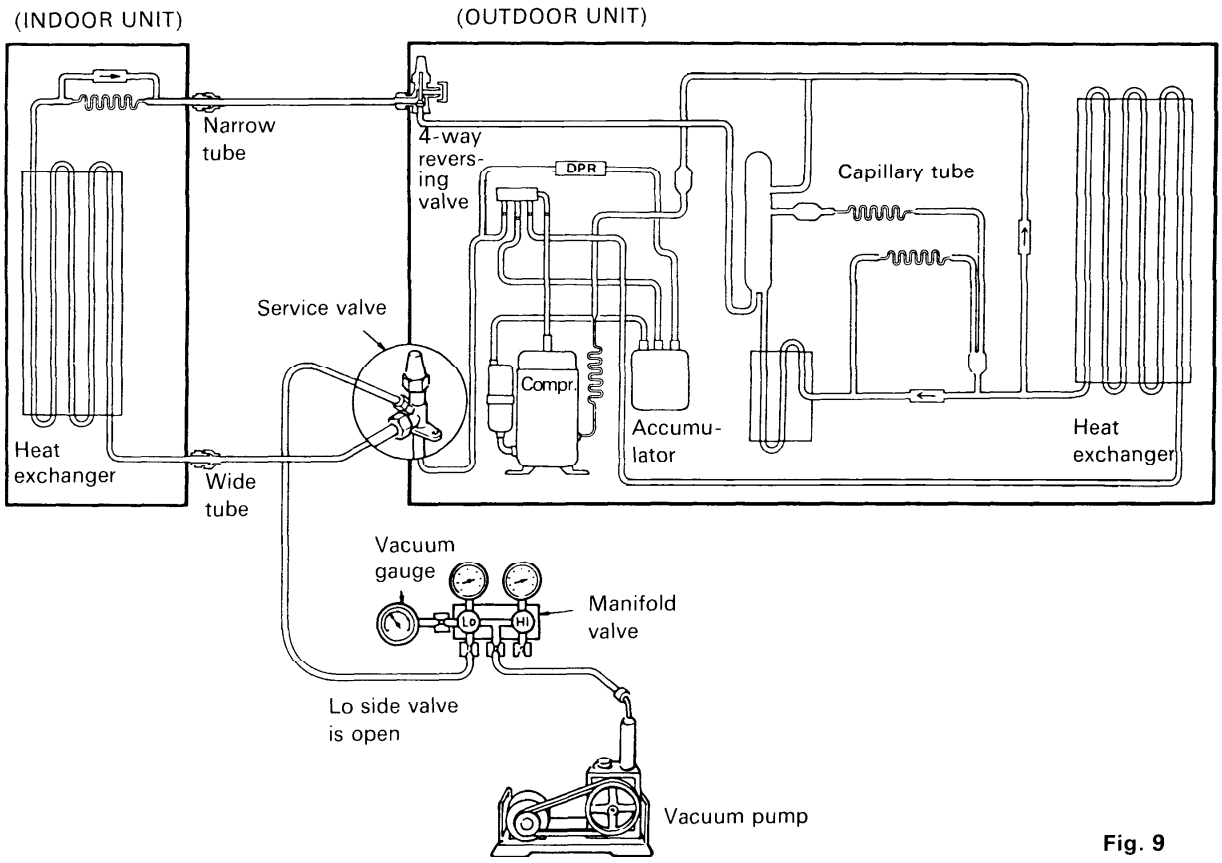


Fig. 9

(1) Air Purging Procedure (Conventional evacuation system)

a) Check gas leakage of all joints with liquid soap. Fig. 10
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. 9
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. 11
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.

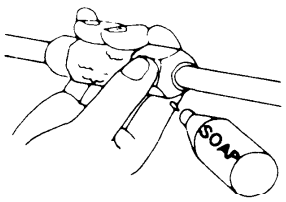


Fig. 10

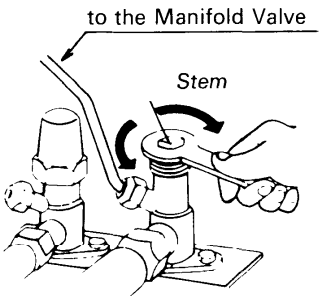


Fig. 11

(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. 12
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 caps with the copper gasket.

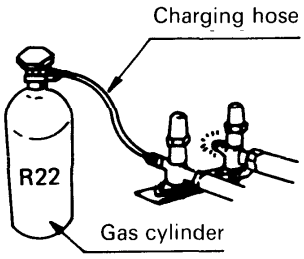


Fig. 12

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. 13-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. 13-b

- **Valve Position -c-**

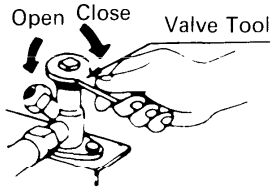
The valve stems of both wide and narrow tubes are turned halfway-down position.
This position is used for pressure measurement and gas charging. Fig. 13-c

- **Valve Position -d-**

Like position -a-, but with the flare nut of wide tube open. This position is used for air purging. Fig. 13-d

CAUTION

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



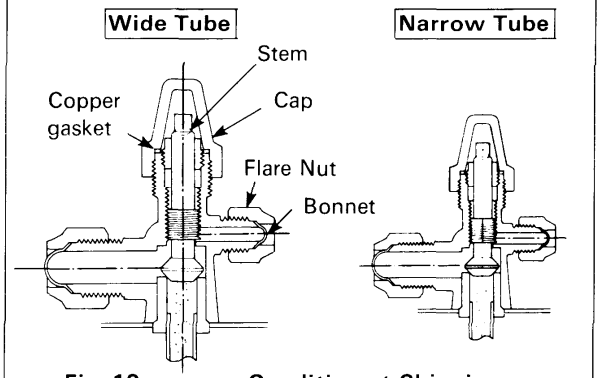


Fig. 13-a -a- Condition at Shipping

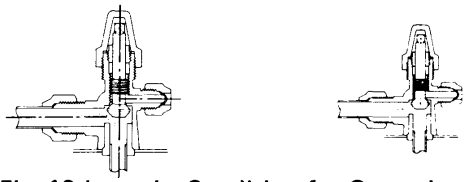


Fig. 13-b -b- Condition for Operation

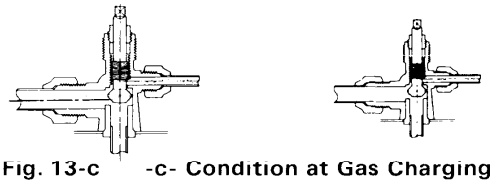


Fig. 13-c -c- Condition at Gas Charging

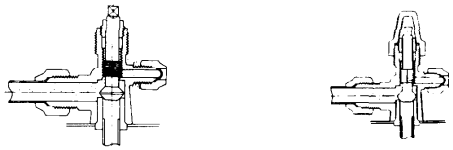


Fig. 13-d -d- Condition at Air Purging

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.

CAUTION

Set the COOLING/HEATING selector knob to the 'COOL' side and operate in cooling mode.

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.

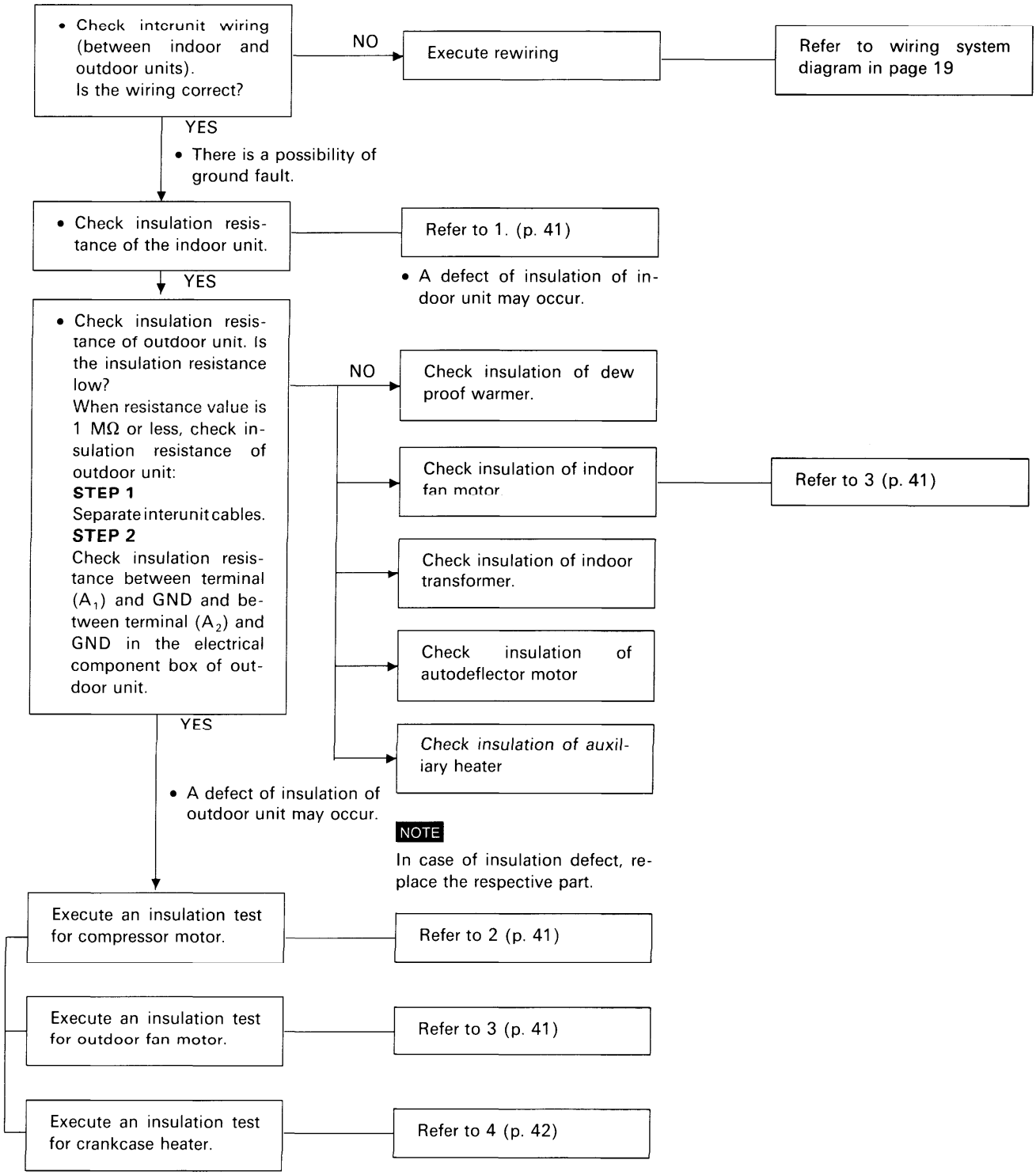
7. TROUBLESHOOTING

— Quick Access Index —

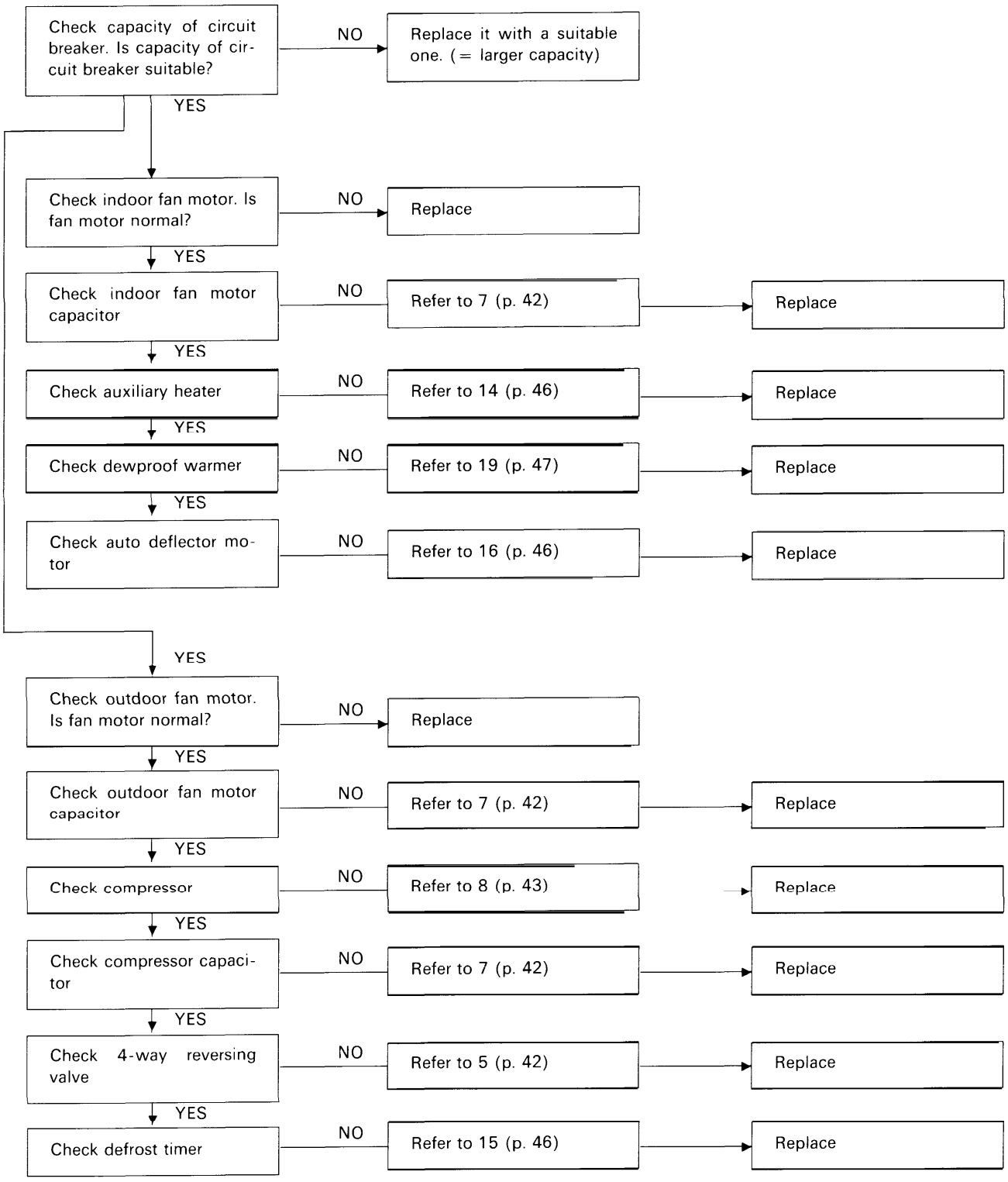
1. Air conditioner does not operate

1) Circuit breaker trips (or fuse blows)

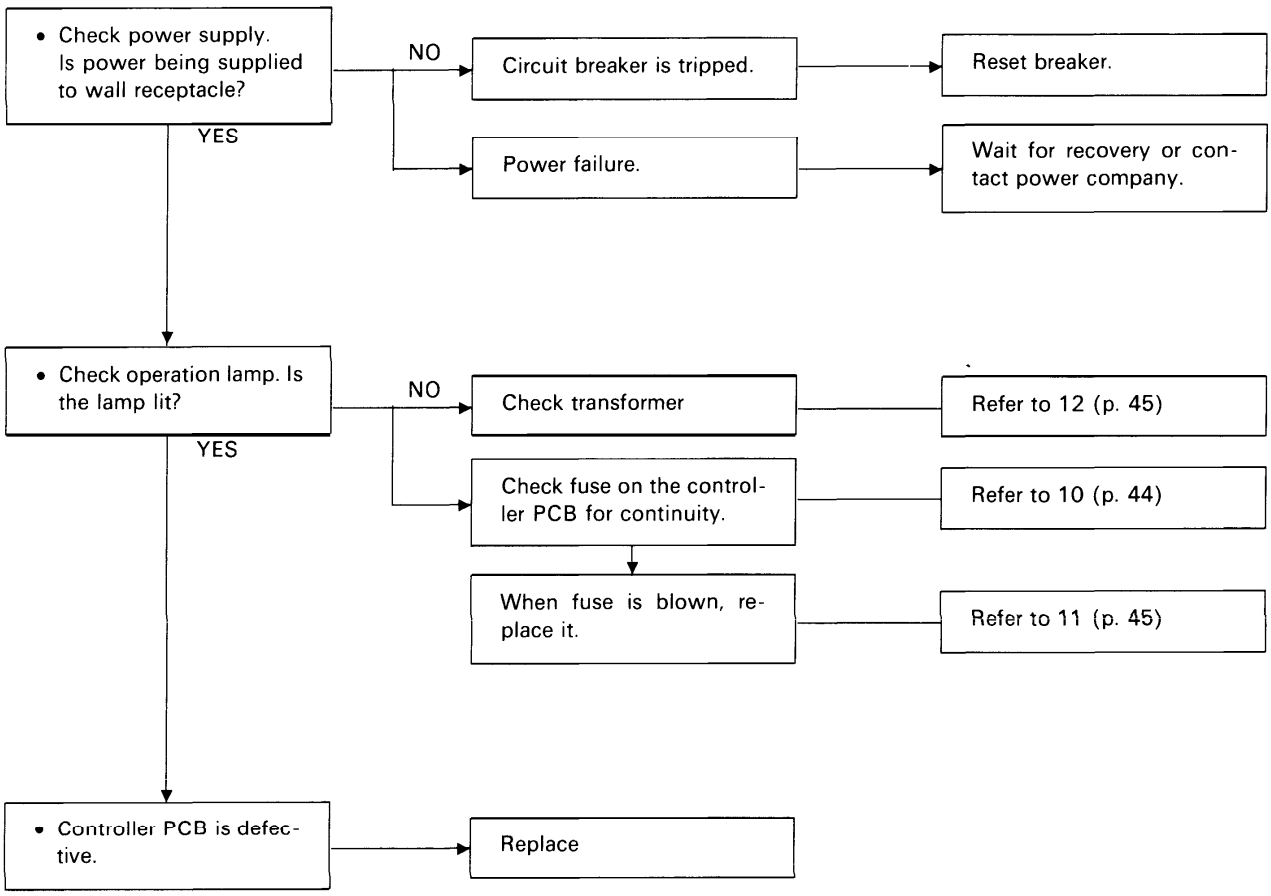
① When circuit breaker is set to ON, it trips soon (Resetting is not possible)



② **Circuit breaker trips, when the operation switch is depressed.**

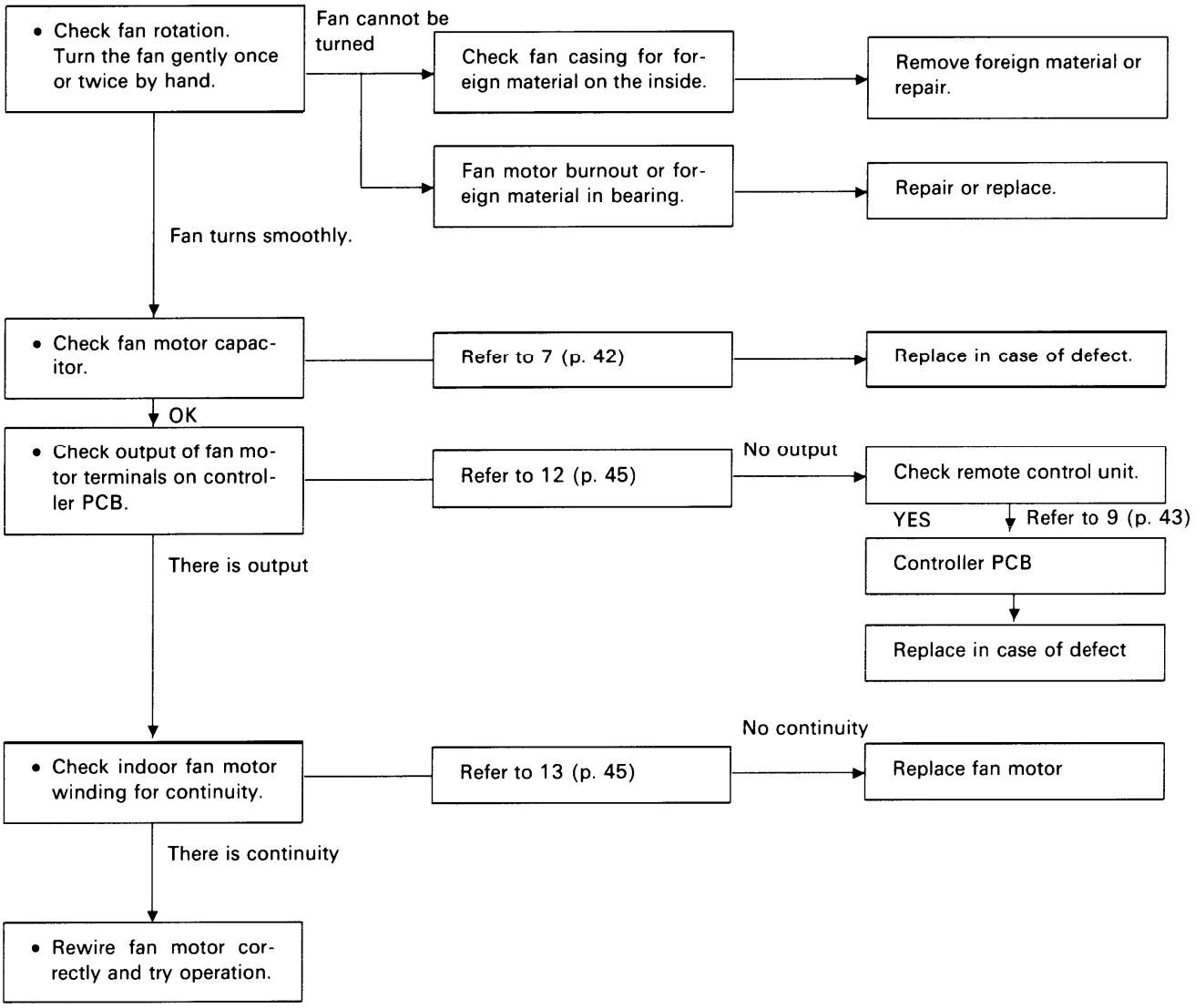


2) Neither indoor unit nor outdoor unit runs



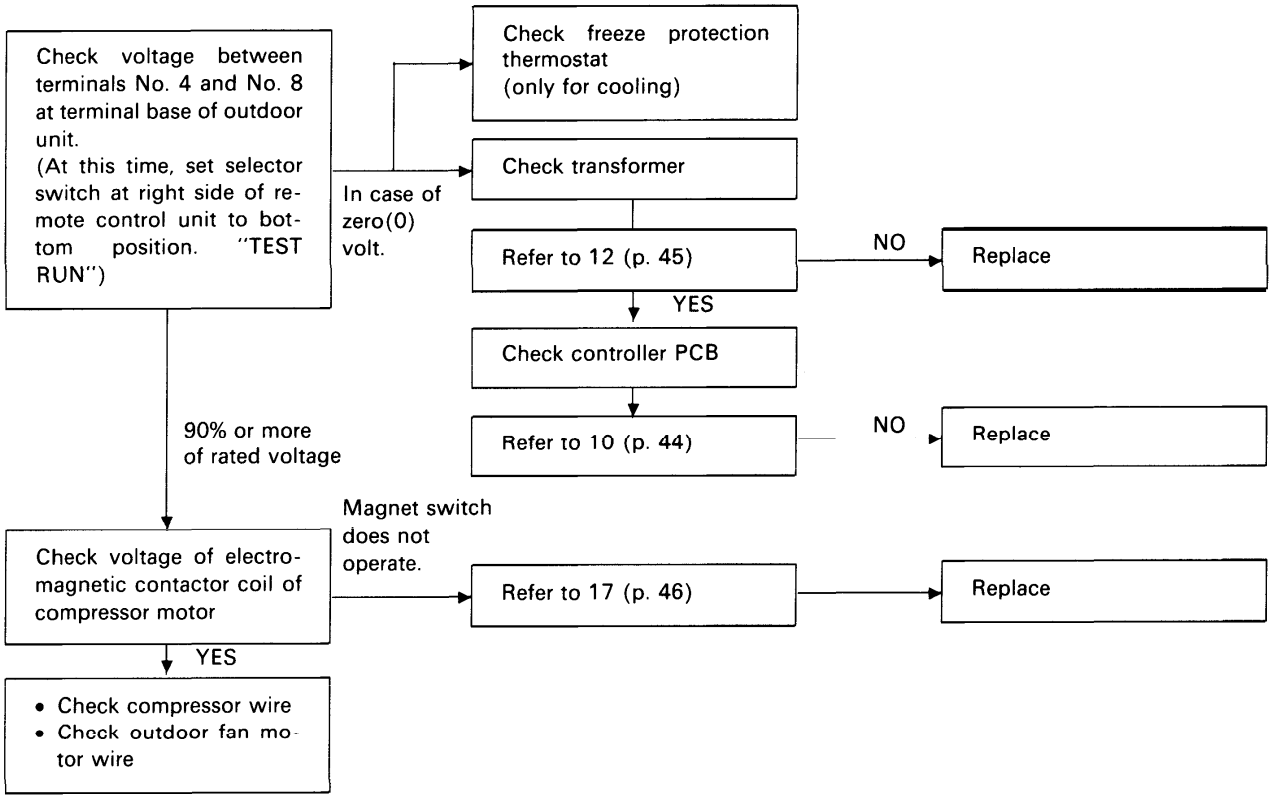
2. Some part of air conditioner does not operate

1) Indoor fan does not run

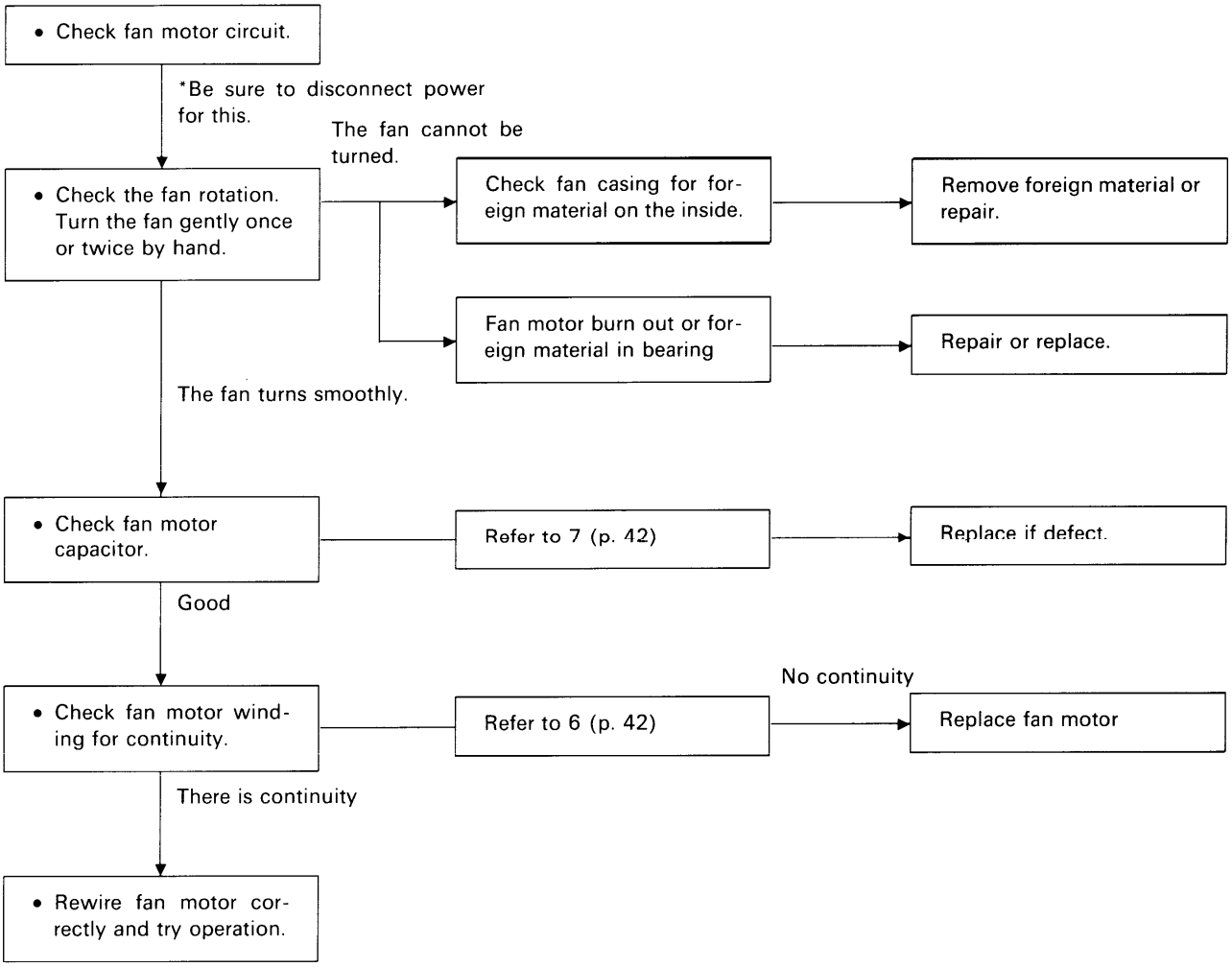


2) Neither outdoor fan nor compressor runs

NOTE Check following points at first:
1. Is thermostat setting suitable?
2. Has 3 minute timer operated?



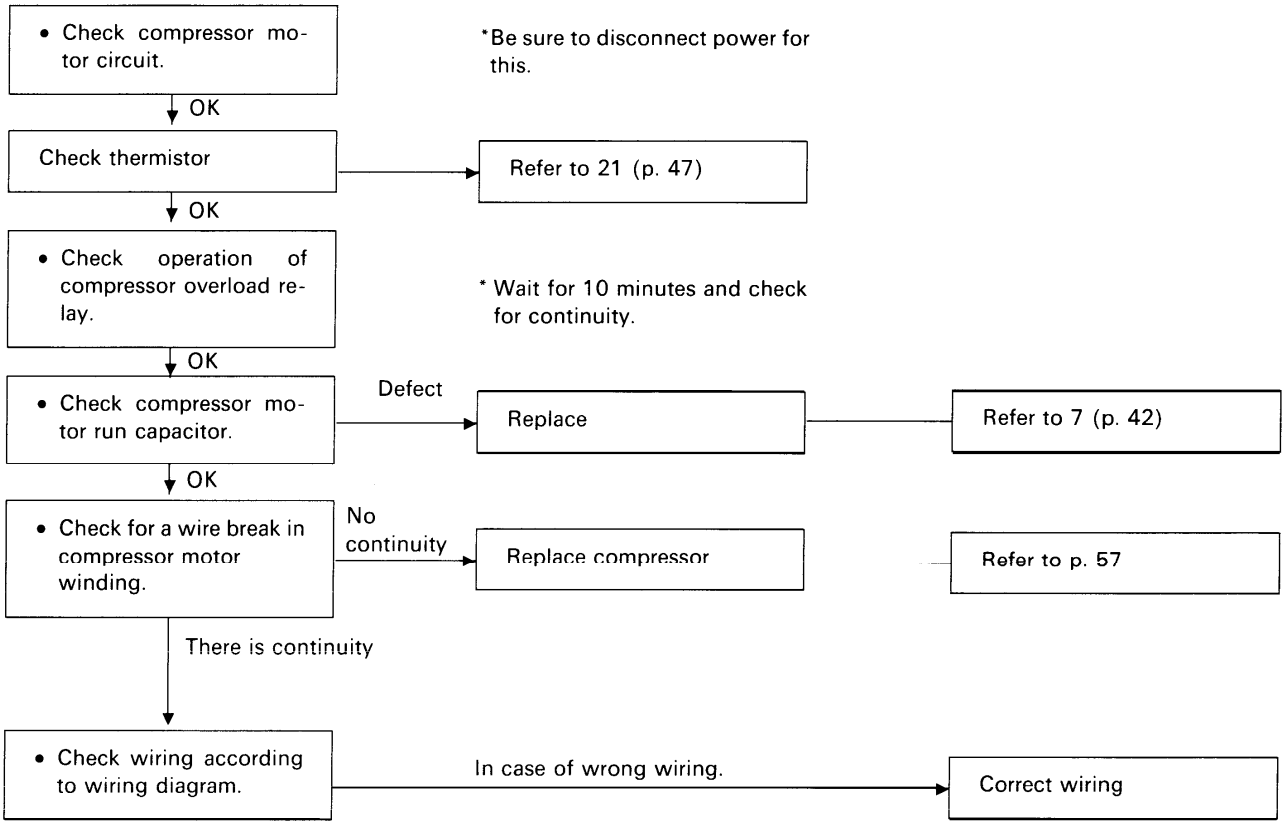
3) Only outdoor fan does not run



NOTE

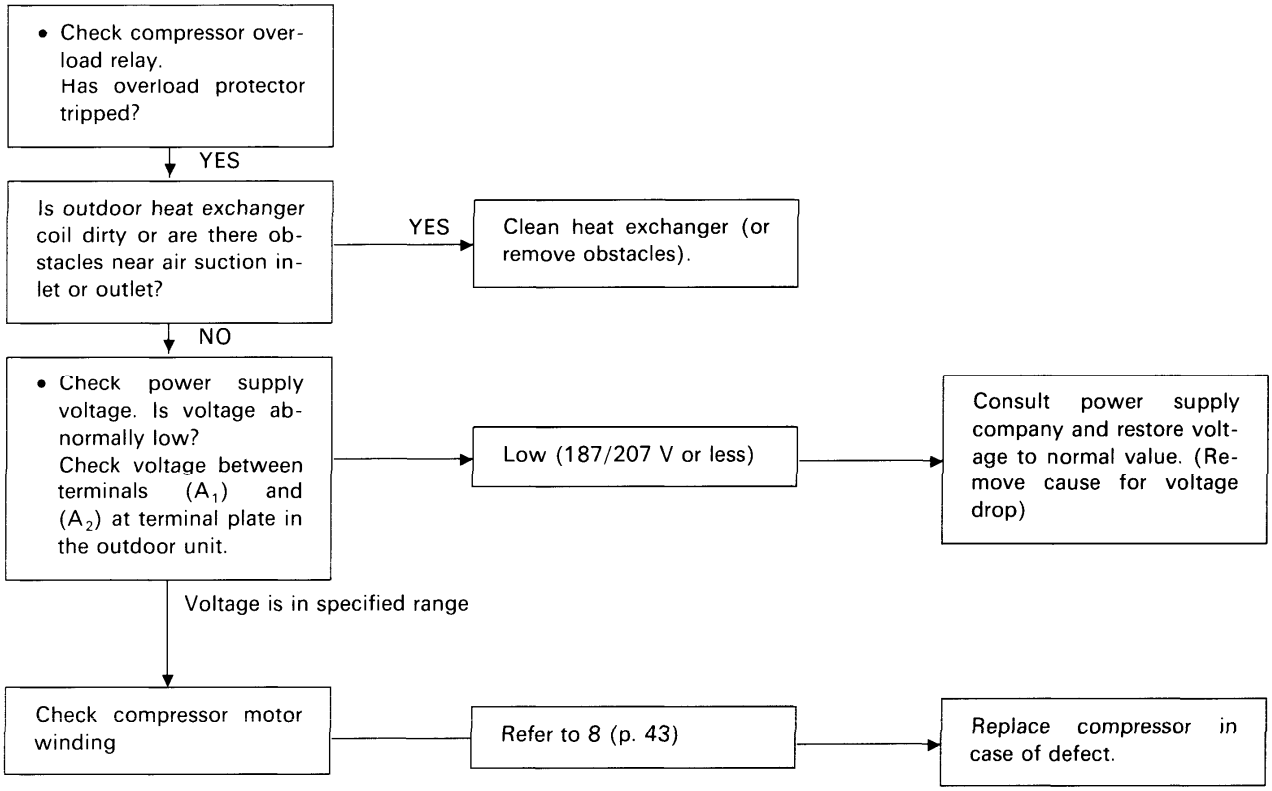
1. The fan motor does not run until the winding temperature lowers and automatic resetting works if the internal thermostat operates.
2. The indoor fan motor rotates at very low speed during defrosting.

4) Only compressor does not run



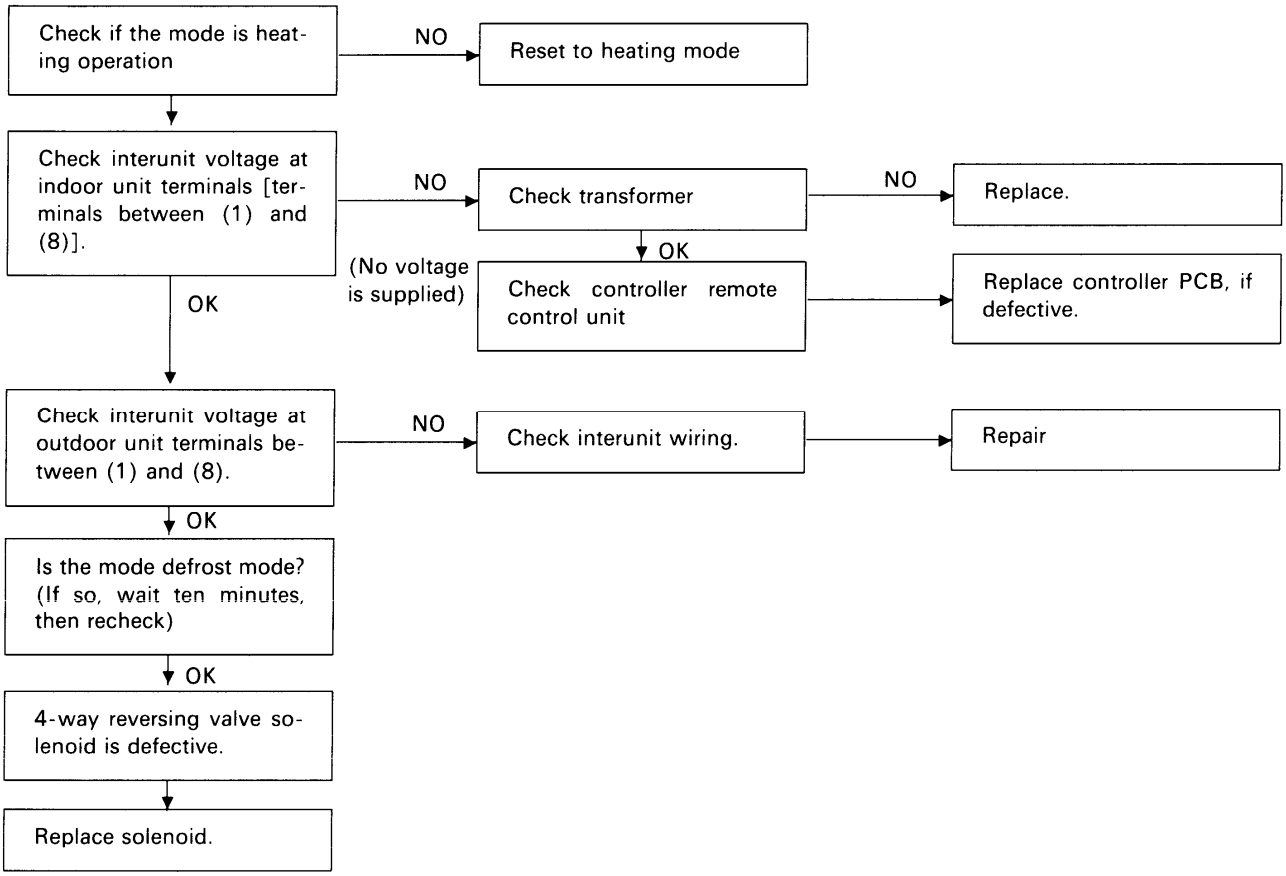
5) Compressor frequently repeats ON and OFF

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



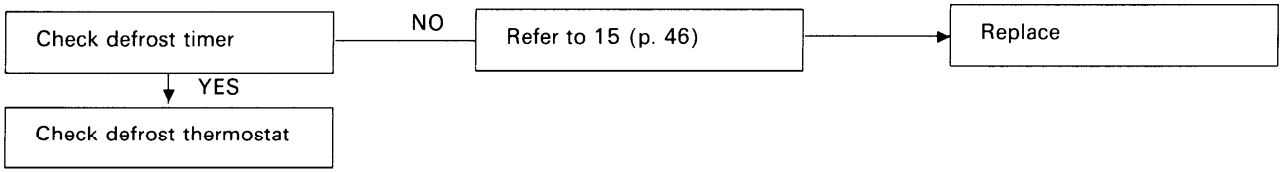
6) Air conditioner will not enter into heating mode (Only cooling is possible)

① Heating operation cannot be done (4-way reversing valve malfunction).



② Defrosting system malfunction

(a) Defrosting can be achieved after continuous operation of the unit for a long time.

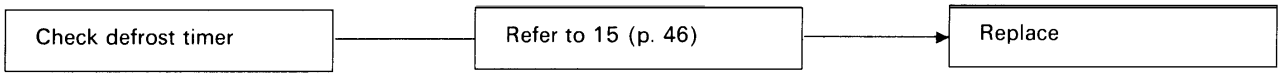


Defrost thermostat is normal if following conditions will be satisfied:

OFF	Maximum 50 °F	ON	Minimum 23 °F

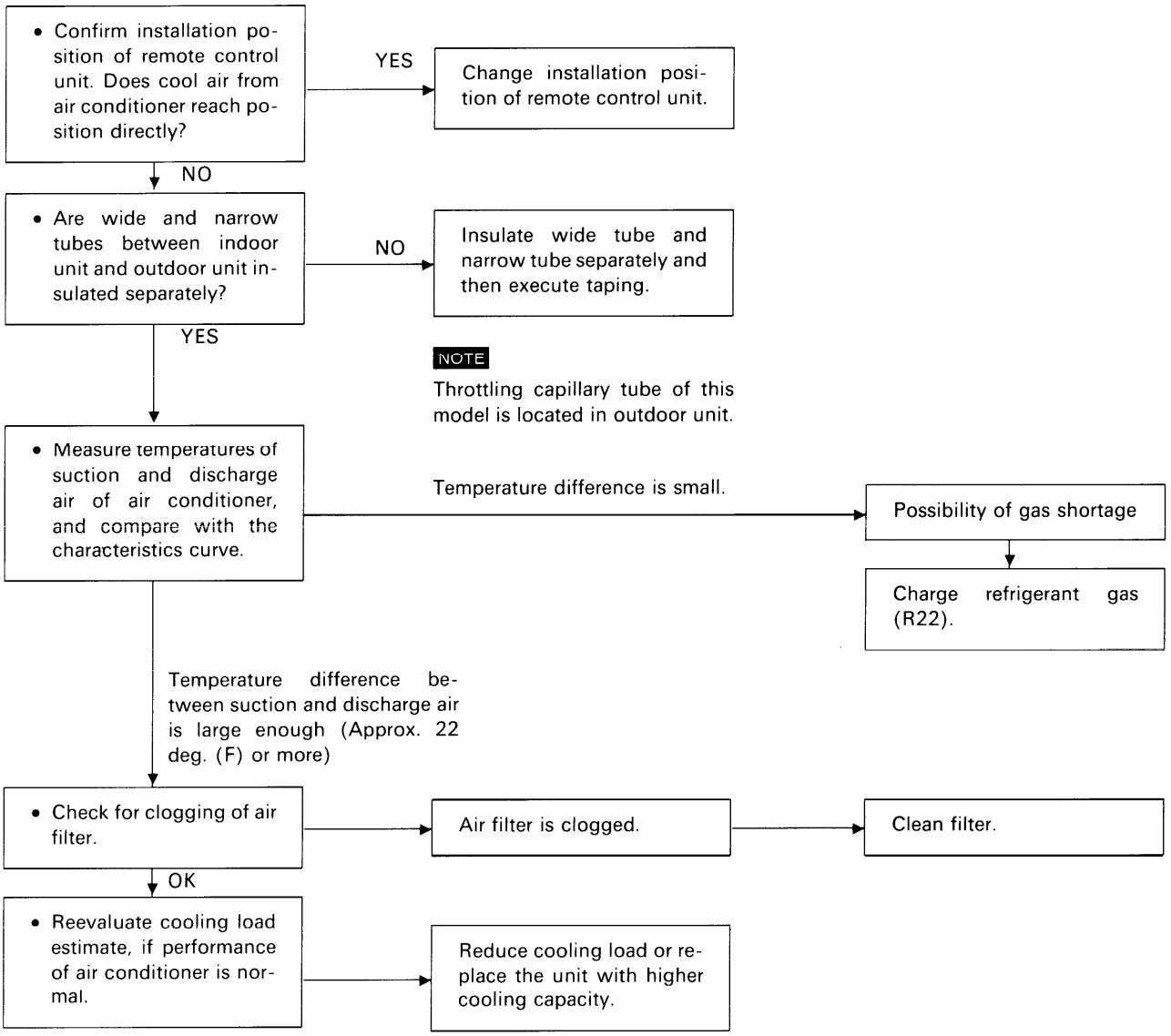
If the thermostat stays ON below 50 °F, it is defective. →Replace the thermostat.

(b) No defrosting will be taken place at all.

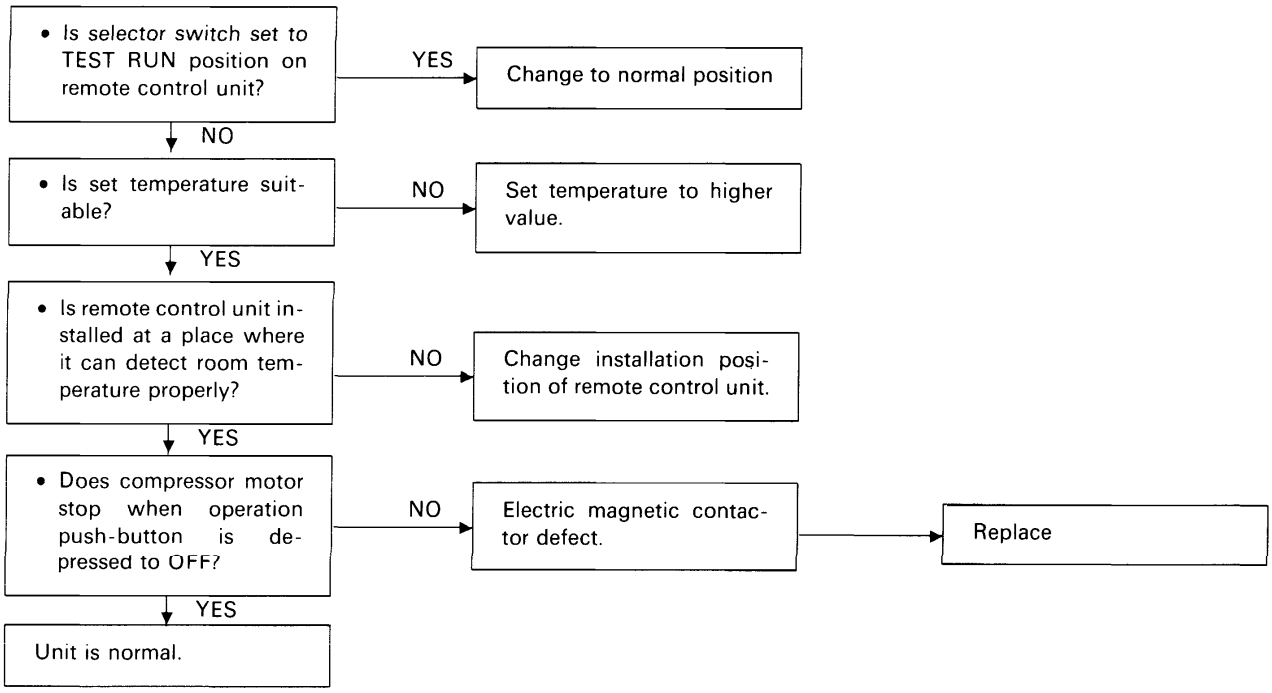


3. Air conditioner operates, but abnormalities are observed

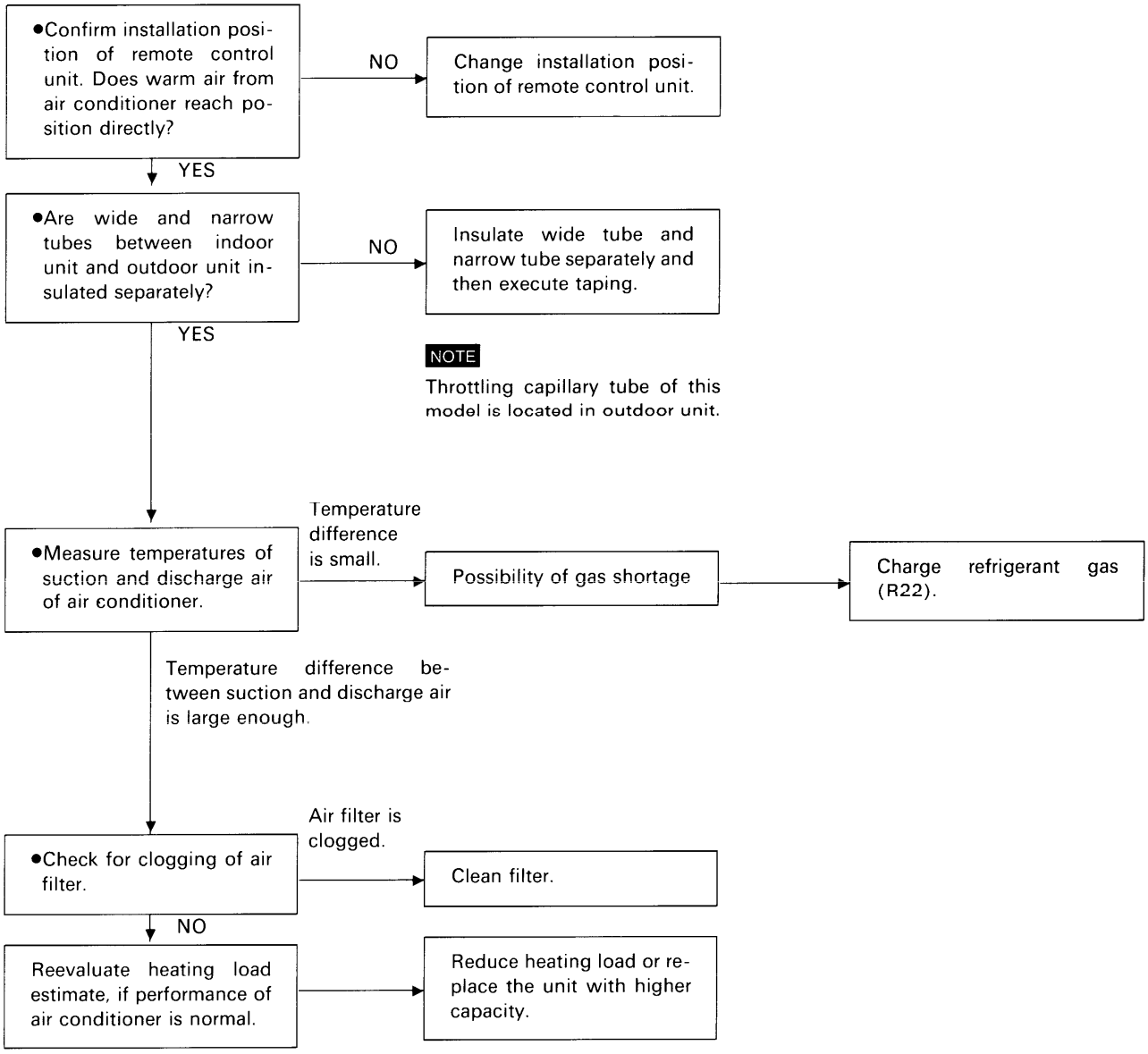
1) Poor cooling



2) Excessive cooling



3) Poor heating

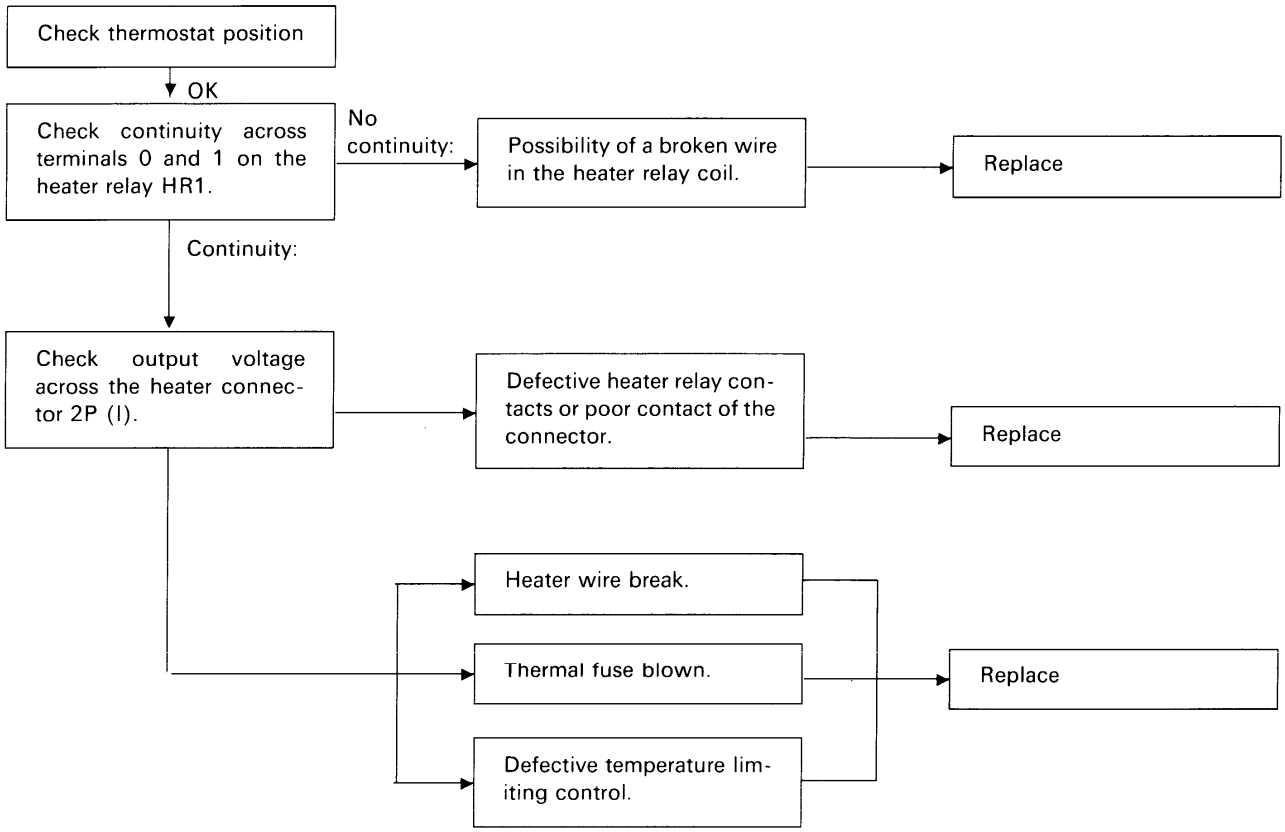


Heating

NOTE

*If outdoor ambient temp. falls below 35 °F, heating capacity may be reduced greatly. In this case, use supplementary heating appliances.

4) The electric heater does not work



4. Respective Operation Modes at the Time of Heating

This system is so designed as to maintain a comfortable room temperature during heating operation according to the sequences described below.

1) Cold Draft Prevention (= Standby) Mode:

When the standby lamp lights on, the indoor fan motor rotates at very low speed. Thus blowout of cold air is prevented. This takes place in the following cases.

a) When compressor is turned off by the thermostat at the beginning of heating operation, and when the system pressure is below 170.64 psig.

b) During defrosting (normally, 7 — 8 min.) and right after changeover to heating from defrosting.

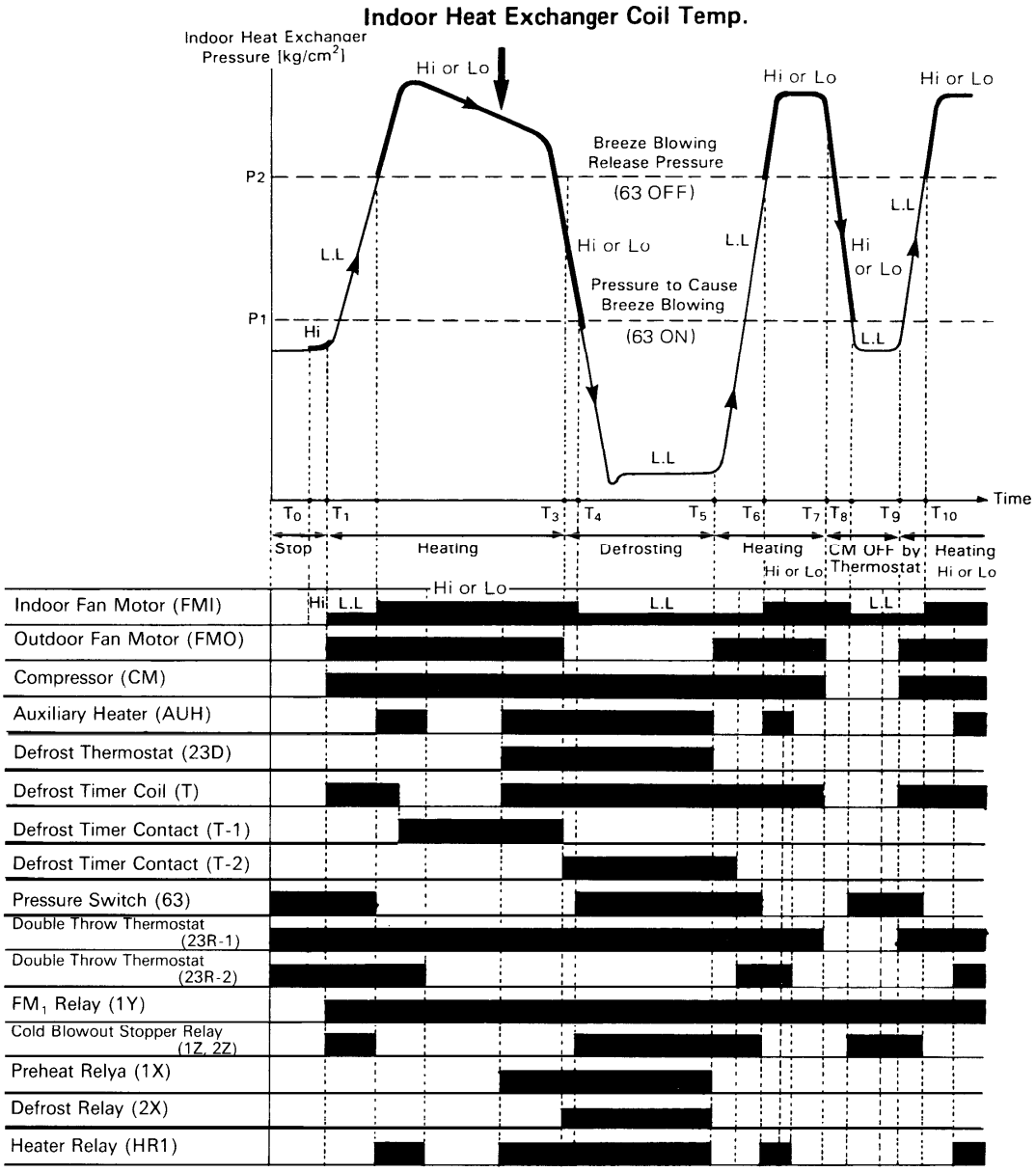
2) Defrosting Mode:

When the capacity of unit has been decreased due to frost sticking to the outdoor heat exchanger during heating, the temperature drop gradient is detected by the defrost thermostat mounted at the inlet to the outdoor heat exchanger, and defrosting operation is started. At this time, the indoor fan motor rotates at very low speed, and the system is automatically changed to cooling operation mode.

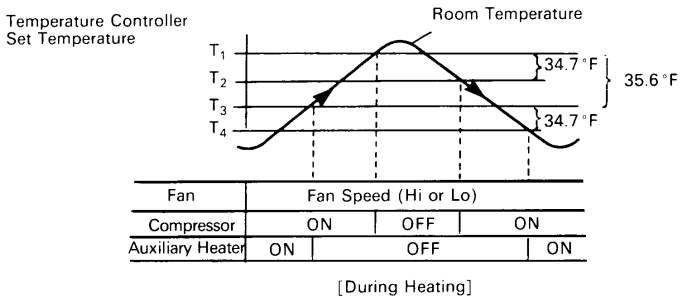
3) Thermo. Cycle Operation Mode:

The indoor fan motor rotates at very low speed to prevent cool air from being blown out when the pressure in the refrigerant system lowers below 99.54 psig after the compressor is stopped by thermostat operation.

The sequence described in 1) — 3) are as illustrated in the following flow chart.

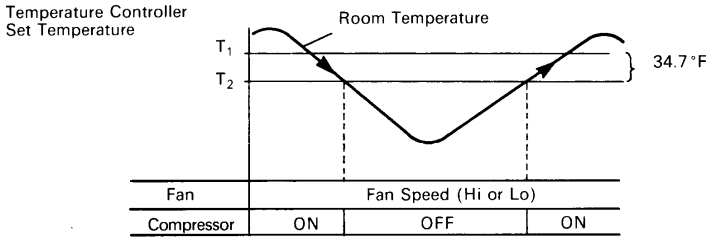


Heating Mode:



[During Heating]

Cooling Mode:



[During Cooling]

8. CHECKING AND REPLACING ELECTRICAL COMPONENTS

— Quick Access Index —

1. Measurement of Insulation Resistance of the Unit

Turn off power supply (Terminal A_1 and A_2 on the outdoor terminal plate). Clamp the ground (GND) line of the Power Line with a lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the two power lines. (Terminal A_1 and A_2) 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 MΩ. Fig. 1

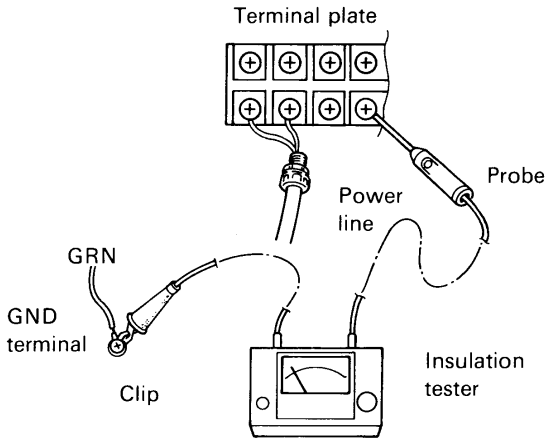


Fig. 1

2. Measurement of Insulation Resistance of the Compressor

Remove the blue lead wire connected to the compressor motor from A_2 on the terminal plate. Clamp the removed blue 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 MΩ Fig. 2.

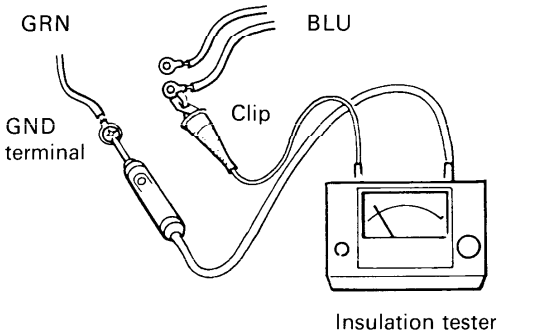


Fig. 2

3. Measurement of Insulation Resistance of the Fan Motor

1) Indoor fan motor

Disconnect the fan motor connector 6P (B) (p. 66). 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 MΩ. 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) Outdoor fan motor

Disconnect the fan motor connector (6P). Clamp the gray 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 MΩ. Fig. 3.

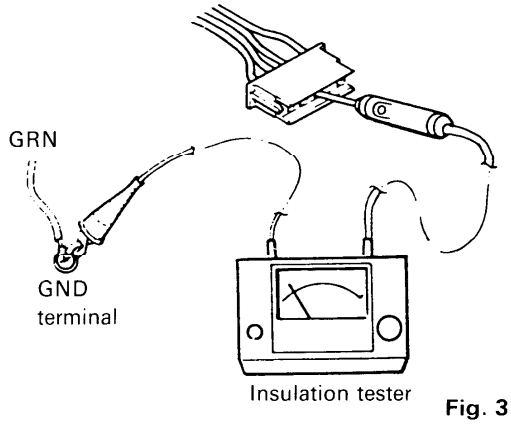


Fig. 3

4. Measurement of Insulation Resistance of the Crankcase Heater

Disconnect the connector 2P (E) to the crankcase heater.
Check the continuity between two removed white lead wires.
The insulation is in good condition if the resistance exceeds 1 MΩ.

5. Measurement of Insulation Resistance of the Four-way Solenoid Valve (20S)

Disconnect the connector 2P (G) to the four-way solenoid valve.
Check the continuity between the removed black and gray lead wires.
The four-way solenoid valve is normal if there is continuity.

6. Checking of the Outdoor Fan Motor

(Refer to p. 65)

Disconnect the connector (6P) of the outdoor fan motor.

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

The motor is in very good working condition if all the valves agree with those indicated in Table-1.

SAP 244CH

Lead wire color	Coil resistance
WHT-BRN	24 Ω ± 10%
BLK-PNK	54 Ω ± 10%

Table-1

NOTE When ambient temperature is 68 °F

7. Checking of the Motor Capacitor

Check any of the indoor fan motor capacitor, outdoor fan motor capacitor and compressor motor capacitor.

Remove both the lead wire terminals connected to the capacitor, place the probe on the capacitor terminals as shown in the Fig. 4 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.

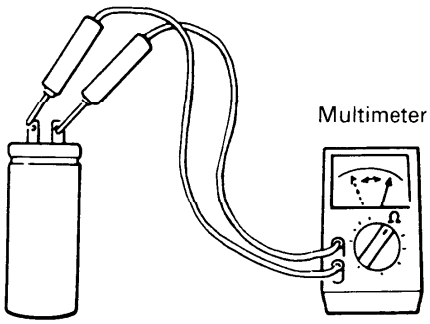


Fig. 4

8. 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. 5 and 6.
It is in good working condition if there is continuity among each pair of terminals. Table-2

Lead wire color	Coil resistance
C-R	0.73 Ω ± 10%
C-S	1.91 Ω ± 10%

Table-2

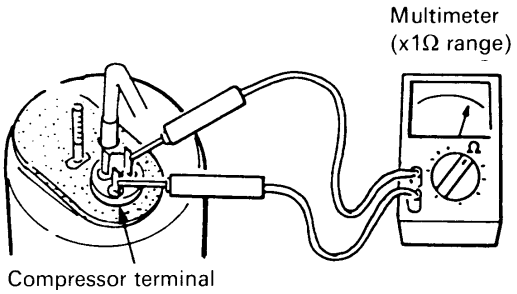


Fig. 5

NOTE When ambient temperature is 77 °F.

Compressor Wire Orientation

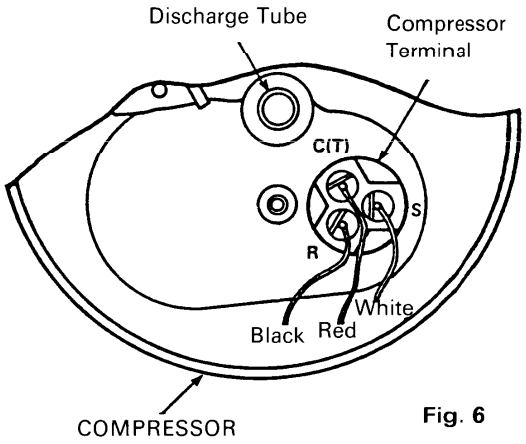


Fig. 6

9. 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 65 °F (18.3 °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:

① Pull off the thermostat knob. Fig. 7
② Set the thermostat lever to the lowest position. (The central position of the lever becomes the TEST RUN position.) Fig. 8
③ Press OPERATION "ON" button to start the air conditioner.
④ After completion of test run, press "OFF" button to stop the unit.
⑤ Reinstall the thermostat knob. (The stopper position facing down.)

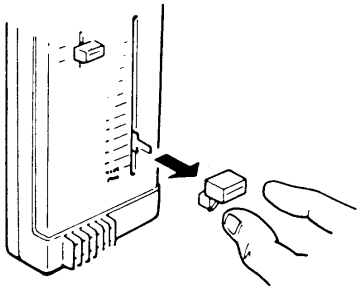


Fig. 7

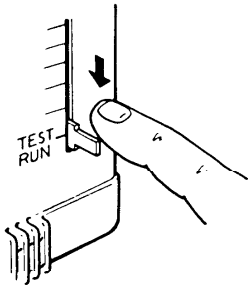


Fig. 8

2) Checking of the Items of the Remote Control Unit

At first, pull out the connector (10P) of the remote control unit from the controller PCB of the unit Fig. 9.

① Fan Speed Selector
Check the continuity of the connector No. 3 against No. 4 (placing 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

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.

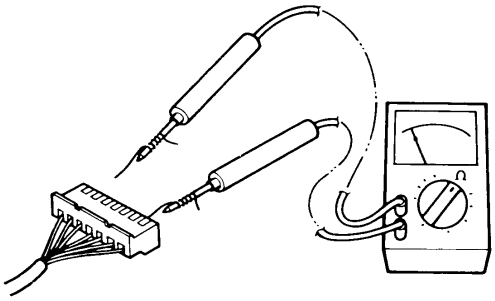


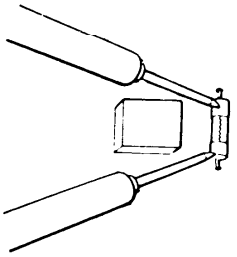
Fig. 9

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.

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

Check the continuity by the multimeter as shown in Fig. 10.

If it is difficult to check in this way, remove the lamp board ass'y connector and then check it.



Fuse

Fig. 10

11. 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. 11.
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.

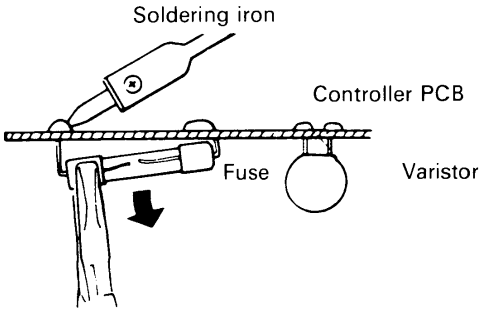


Fig. 11

12. Checking of the Power Transformer

1) Remove connectors TR-1 and TR-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. 65)

It will be completely satisfactory if all measured values agree with those indicated in Table-4.

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

Table-4

NOTE Ambient room temperature .... 70°F

13. Checking of the Indoor Fan Motor

Disconnect the fan motor connector 6P (B) and measure the resistance between each lead wires of the fan motor connector setting the resistance measuring range to "X1Ω". (Refer to p.65)
The motor is in very good working condition if all the values agree with those indicated in Table-5.

Lead wires	Value of resistance
WHT-BRN	About 53Ω
WHT-VLT	31Ω
VLT-YEL	56Ω
YEL-PNK	17Ω

Table-5

NOTE Ambient temperature 68°F.

14. Checking of the Heater Circuit

Disconnect power to the air conditioner before accessing the controller PCB.

(1) Disconnect the connector 2P (I).
(2) Set a multimeter to "x 10 Ω" range and meaure the resistance between connector pins No. 1 and 2 for connector 2P (I). Table-6

Any one of the following cases may be considered when there is no continuity.

(1) Blown thermal cut-off (fuse)
(2) Heater wire is broken. Replace the defective part after it has been identified.

Connector (1)	
1 — 2	17.63 Ω

Table-6

15. Checking of the Defrost Timer (T)

Remove Lead Wires ORG and GRY from Therminals (7) and (8) of the defrost timer motor. Set the multimeter to the Ω range and check continuity of Terminals (7) and (8) of the defrost timer motor. Satisfactory if continuity is assured. If continuity cannot be verified, the coil wire of the defrost timer motor must be broken. Check and replace the wire.

16. Checking of the Auto Deflector Motor

Disconnect Connector 2P(G) on the auto deflector motor and measure the winding resistance value between Lead Wires (1) and (2) on both ends of the motor. Satisfactory if the resistance value is as shown below.

Coil Resistance (Ω) Ambient temp. 77 °F	About 10, 629 or 11,150

Table-7

17. Checking of the Compressor Motor Magnetic Contactor (52C)

Disconnect the connected terminals and check the contactor itself. Satisfactory if continuity is assured. Replace if continuity cannot be verified.

18. Checking of the Defrost Thermostat (23D)

Satisfactory if the value is as follows:

ON: 23 °F	OFF: 50 °F

Table-8

NOTE Ambient temp 32 °F

19. Checking of the Dewproof Warmer

Disconnect connectors for the dewproof heater 2P (F) and 2P (H) and check continuity. Satisfactory if continuity is assured. If continuity cannot be verified, replace the connector.

20. Checking of the Freeze Protection Thermostat

Disconnect the connector 2P (E) with lead wires (BLK) from the controller PCB. Check continuity/discontinuity of the thermostat as follows:

Temperature	Normal Condition
23 °F or below	Discontinuous
50 °F and above	Continuous

Table 9

1) Prepare a cup of water with ice.
2) Add several spoonful of salt in it and stir well.
3) Measure the water temperature with a thermometer.
4) Dip the end of thermostat sensor in the cup and check continuity while measuring change in water temperature.
5) If discontinuity around 23 °F is confirmed, pour lukewarm water (not boiling hot) and observe continuity around 50 °F. Fig 13

Above conditions are confirmed, functions of the thermostat is normal. Table-9

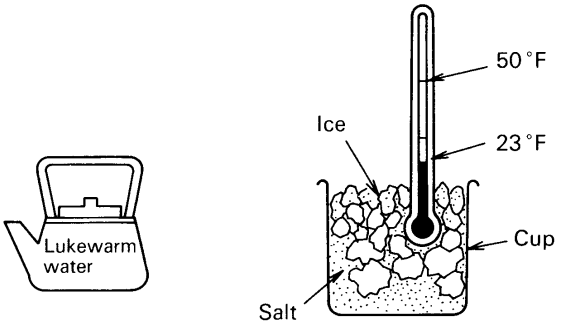


Fig. 13

21. Checking of the Thermistor

Disconnect lead wires (WHT and BLK) connected to the thermistor (THM2). Check the thermistor resistance with a multimeter (x 1Ω range).

Desirable resistance at 77 °F	Approx. 100 Ω

Table-10

9. DISASSEMBLY PROCEDURES

— Quick Access Index —

Indoor Unit **SAP244TH**

1. Side Panel — Removal

(1) Remove the four screws ⓐ of the cover plate on the underside.
(2) Slide the side panels on both sides towards the front ⓑ of the unit in order to remove them. Fig 1

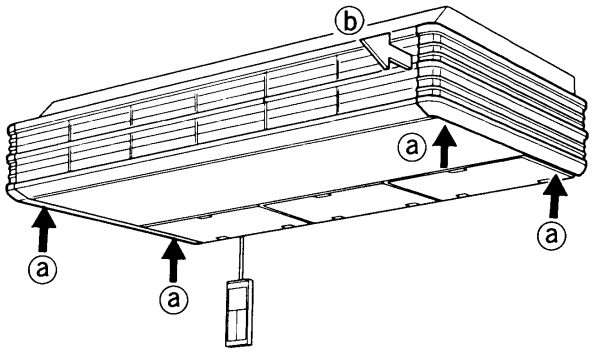


Fig. 1

2. Suction Grille — Removal

(1) The suction grille opens when the tab ⓐ of the suction grille is pulled.
(2) Raise the suction grille lightly and shift it in the direction of the arrows ⓑ to remove it from the hooks. Fig.2

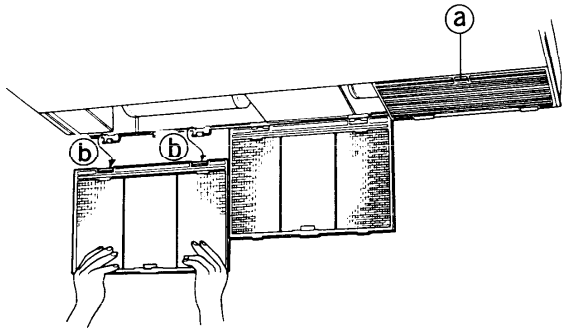


Fig. 2

3. Electrical Component Box — Removal

(1) Remove the two screws ⓐ of the electrical component box, and remove the cover plate. Fig. 3

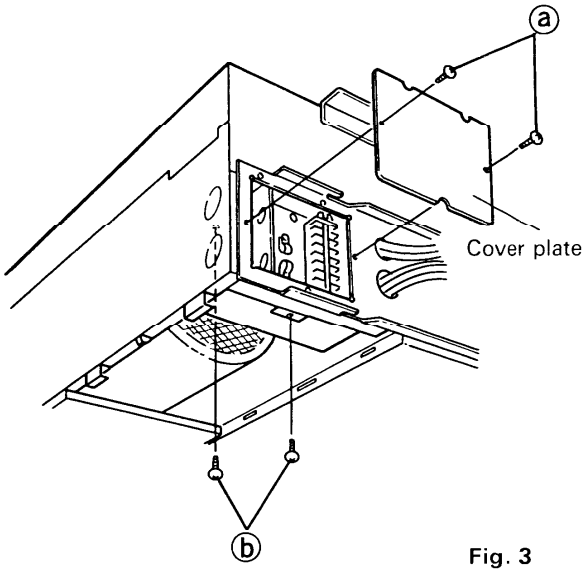


Fig. 3

(2) Unclamp and stretch the temperature sensing capillary tube for the anti-freeze thermostat. Fig. 4
(3) When the three screws ⓑ are removed, the electrical component box can be pulled out to the lower side of the unit. (The one other screw ⓑ is at the rear between box and casing.) Fig.3

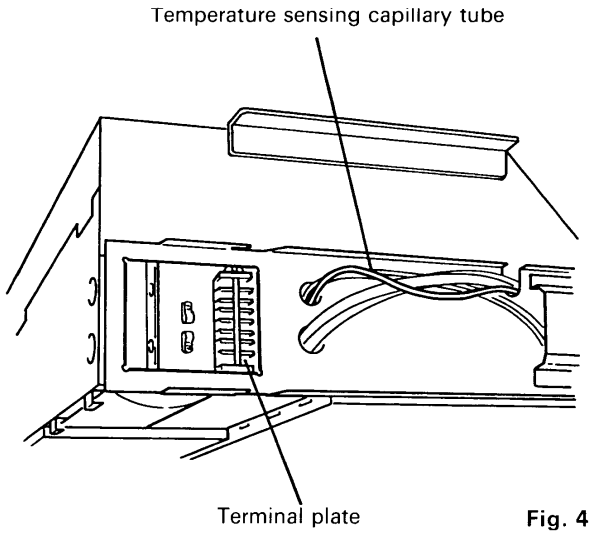


Fig. 4

(4) When the three fixing screws are removed, the electric protection cover can be removed.
(5) The electrical components in the electrical component box all can be checked in this condition. Fig. 5

NOTE

For checking of the electrical components, refer to "CHECKING AND REPLACING ELECTRICAL COMPONENTS, page 40"

① Heater Relay
② Fixed capacitor for fan motor
③ Controller P.C.B
④ Transformer
⑤ Thermostat

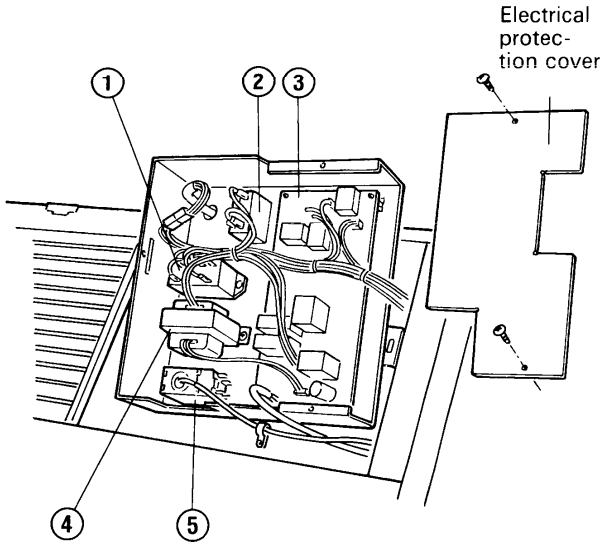


Fig. 5

4. Drain Pan — Removal

(1) Remove the drain pipe.
(2) Remove the suction grille from the unit body.
(3) Remove the four screws ⓐ fixing the fan motor cover. Fig. 6

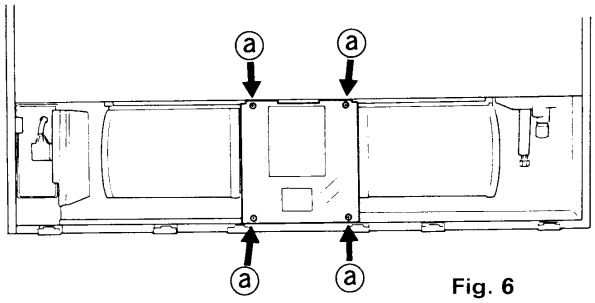


Fig. 6

(4) Slide the discharge grille at the unit front about 0.38" to the side, remove it, and remove the screw (black color) at the center on the inside.
(5) Remove the four screws ⓐ at the lower part on both sides. Fig. 7

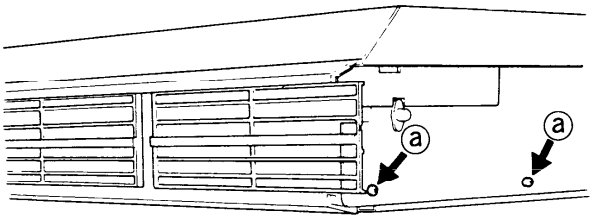


Fig. 7

(6) Remove the five screws ⓐ fixing the bottom plate and the partition plate.
(7) Remove the drain pan in this condition.
(8) Remove the two screws ⓑ to remove the rear panel Ⓐ. Fig. 8

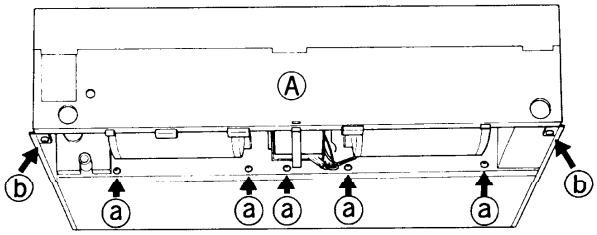


Fig. 8

(9) As the drain pan is made of foamed styrene, take care not to damage the inside.
Damage becomes the cause for water leakage.
Fig. 9

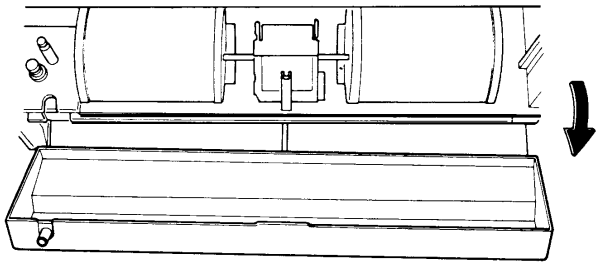


Fig. 9

5. Fan — Removal

(1) Remove the four screws ⓐ fixing the fan casing.
(2) Rotate the fan casing for 90° in the direction of the arrows ⓑ. Fig. 10

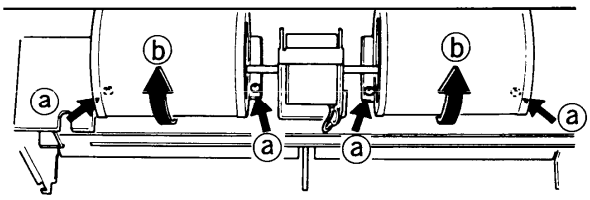


Fig.10

(3) Loosen the screw ⓐ fixing the fan boss on the motor shaft with a screwdriver.
(4) In this condition, slide the fan and the fan casing together to the side for removal from the motor shaft. Fig. 11

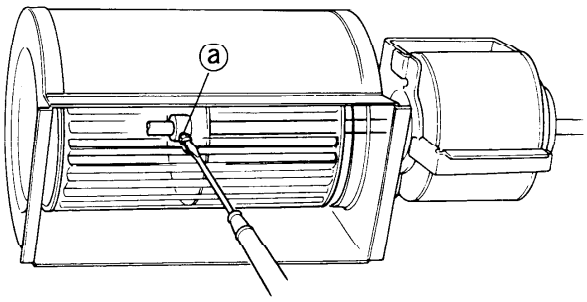


Fig. 11

(5) The fan can be removed as shown in the figure when the four screws ⓐ fixing the back plate of the fan casing are removed. Fig. 12

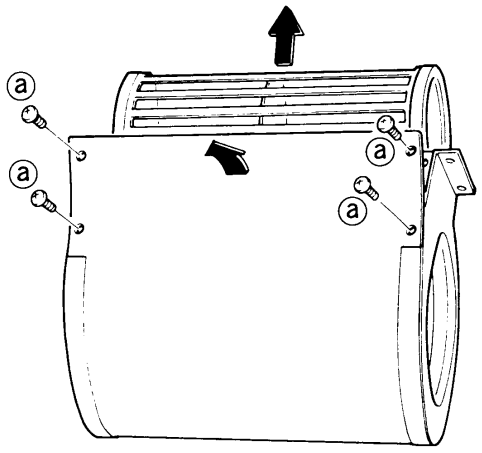


Fig. 12

6. Fan Motor — Removal

(1) Remove the four nuts ⓐ fixing the motor stand. Fig. 13

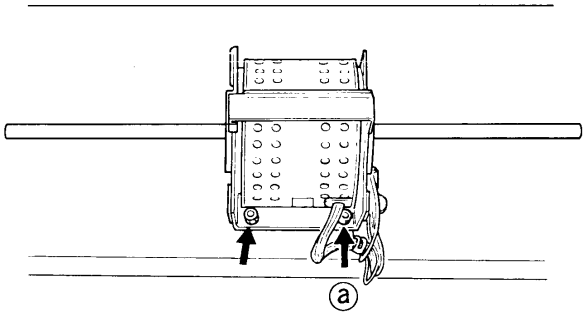


Fig. 13

(2) The fan motor stand is taken out as shown in the figure. Fig. 14

NOTE

Take care not to apply a strong force onto the motor wiring.

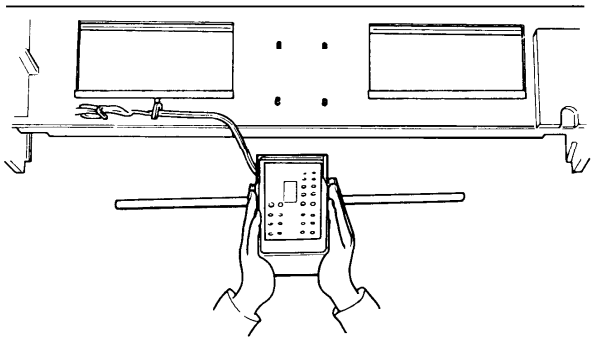


Fig. 14

(3) Remove the four screws ⓐ fixing the motor. Fig. 15

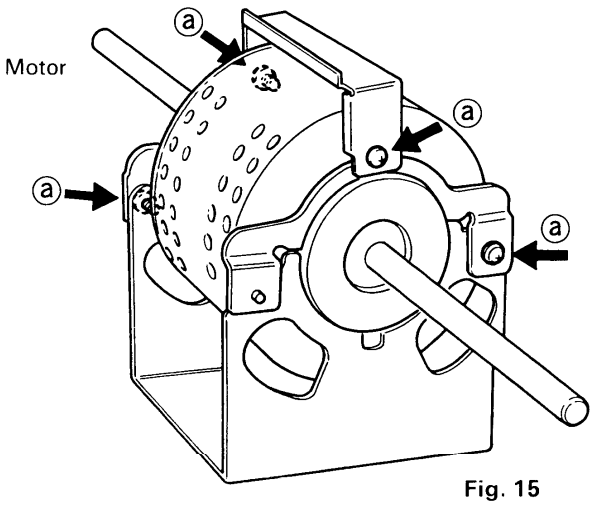


Fig. 15

(4) Open the fixing arms as shown in the figure.
Then the fan motor can be removed from the fan motor stand. Fig.16

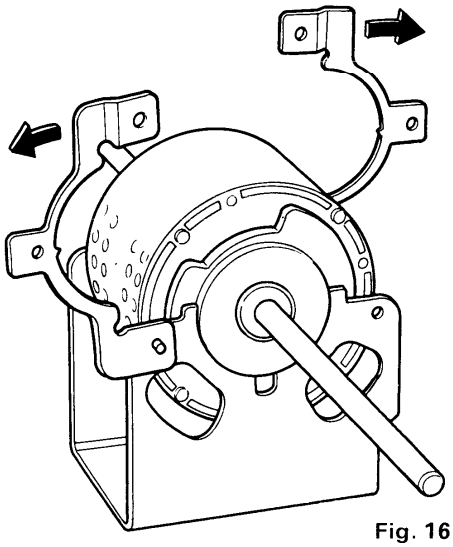


Fig. 16

7. Cabinet — Removal

1) Remove the exterior panels in the order of the front panel Ⓐ, side panel Ⓑ and side panel Ⓒ.
2) Remove the cover plates Ⓓ and Ⓔ.
3) Remove the mounting plate Ⓕ. Fig. 17

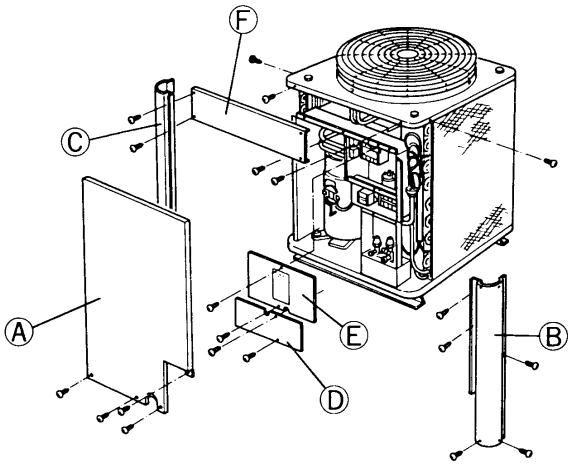


Fig. 17

8. Fan and Fan Motor — Removal

1) Remove the fan Ⓑ and fan motor Ⓓ by lifting up after removing the guard Ⓐ and loosening one screw ⓐ of the fan.
2) Disconnect the fan motor wires Ⓔ from the electrical component box Ⓕ and then, remove the top cover Ⓒ with fan motor. Fig. 18

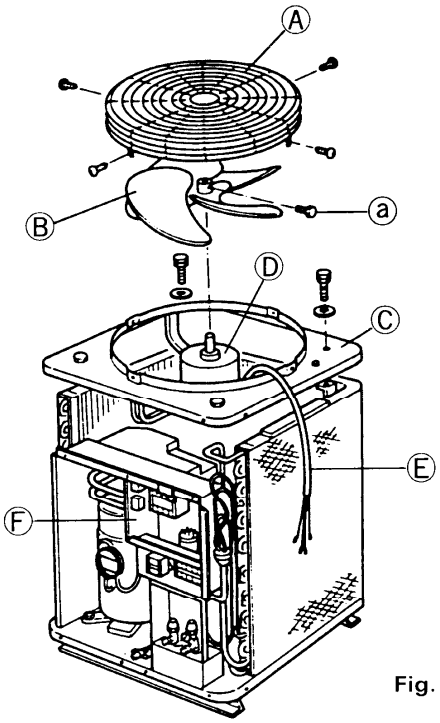


Fig. 18

9. Electrical Component Box — Removal

1) Disconnect the following wires from the electrical component box.
   ① Compressor wire
   ② Crankcase heater wire
   ③ Four-way reversing valve wire
2)
   ① Remove the cover plate Ⓐ.
   ② Remove insulation Ⓑ. Loosen and remove the sensor Ⓒ.
3) The electrical component box can now be removed by unscrewing one screw Ⓓ. Fig. 19

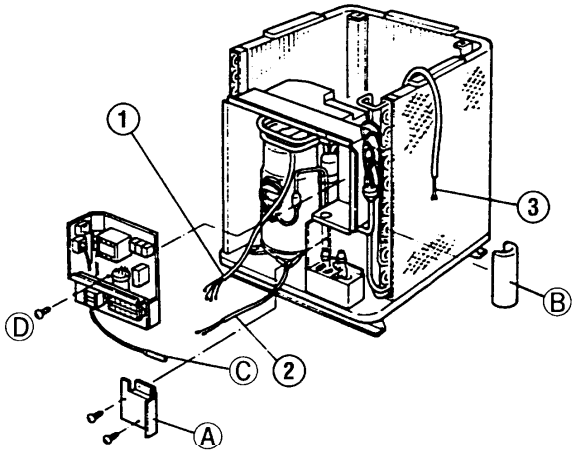


Fig. 19

10. Compressor Cover — Removal

1) Unfasten four screws fixing the cover Ⓐ. The cover can be removed by lifting it upward. Fig. 20

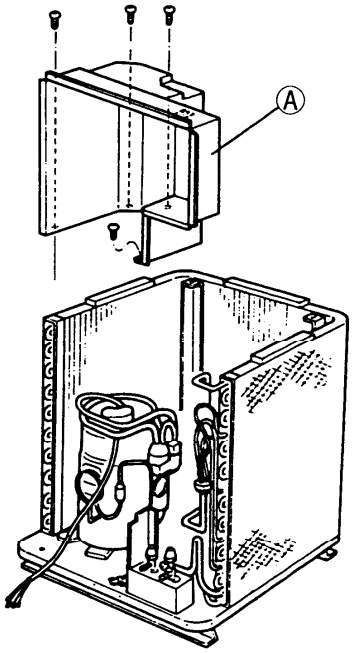


Fig. 20

11. Compressor — Removal

Take apart three joints Ⓐ, Ⓑ and Ⓒ brazed to the compressor by brazing torch. Fig. 21

CAUTION

1) Many wires have to be removed. When removing wires, carefully check the electric diagram on the rear side of the cover plate Ⓓ. Fig. 17
   Reconnect the wires correctly after replacing the compressor.
2) Three sections of the replacement compressor Ⓐ Ⓑ and Ⓒ are sealed to avoid entry of dust and water. Remove this seals, then connect to the unit tubing when replacing the compressor. Fig. 22

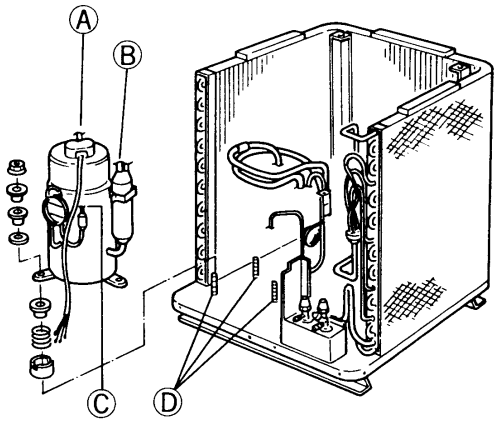


Fig. 21

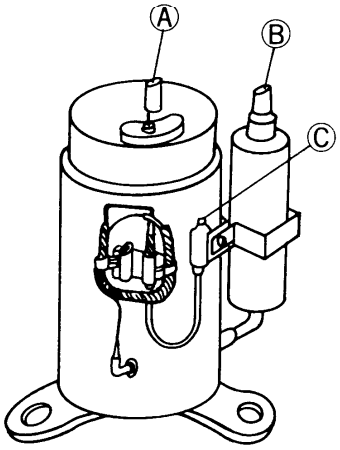
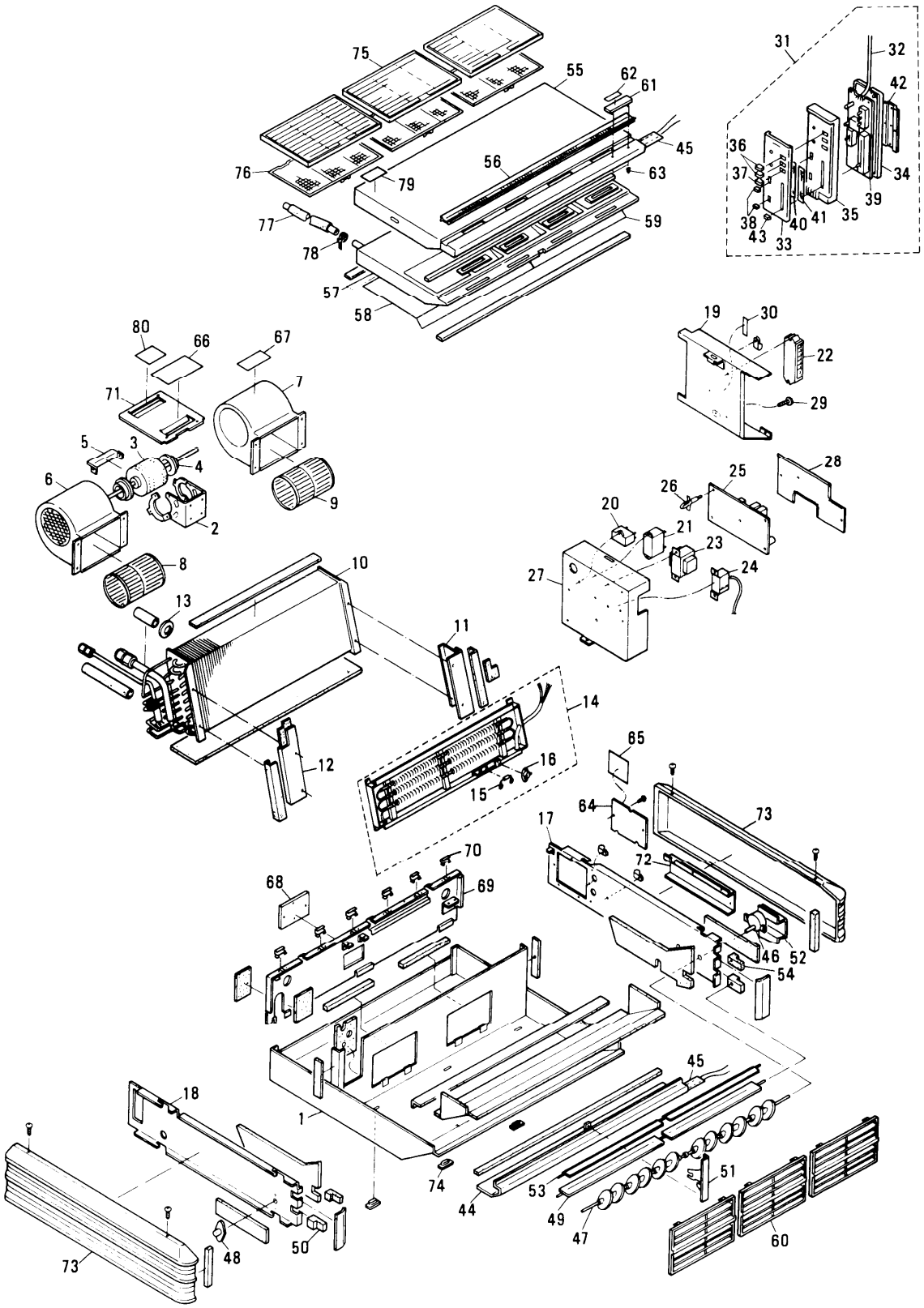


Fig. 22

10. PARTS LIST

SAP244TH
INDOOR UNIT



WM-22135

A T T E N T I O N !

To ensure correct parts supply, please let us know followings, when you make service parts order:

1. Part No. 2. Description 3. Q'ty 4. Volts-Hz-Ph 5. Product Model No.

Key No.	Part No.	Description	Q'ty
1	854-0-1105-271H1	Top Plate Ass'y	1
2	854-0-2511-14601	Support Motor Ass'y	1
3	851-0-5291-286M2	Fan Motor Ass'y KFG4T-61A6P	1
4	854-2-2534-13530	Cushion Rubber	2
5	854-2-2518-26100	Mounting Plate	1
6	854-0-2502-21701	Fan Casing Ass'y	1
7	854-0-2502-21801	Fan Casing Ass'y	1
8	854-0-2501-18300	Centrifugal Fan Ass'y	1
9	854-0-2501-18200	Centrifugal Fan Ass'y	1
10	854-0-4118-50200	Evaporator Ass'y (incl. No. 11)	1
11	854-0-2317-158H0	Cover Ass'y, Evaporator	1
12	854-2-2303-202H5	Mounting Plate Ass'y, Evaporator	1
13	854-2-2338-14500	Eyelet Rubber	1
14	851-0-0052-03200	Heater Ass'y AH-2.1TH244 2.1KW 230V	1
15	4-2349-56208	Fuse SF169U	1
16	4-2339-56266	Thermostat CS-7L	1
17	854-0-1114-115H2	Side Cover Ass'y	1
18	854-0-1114-114H1	Side Cover Ass'y	1
19	854-0-5301-38501	Elec. Component Box Ass'y	1
20	4-2239-56218	Fixed Capacitor 440V 2MFD	1
21	4-2329-56313	Relay G5D-22423TUS	1
22	4-2379-56171	Terminal Base JTU20-8	1
23	851-0-5291-286P1	Transformer Ass'y ATR-J122U	1
24	4-2339-56226	Thermostat RTB-4U302	1
25	851-0-5158-42200	Controller Ass'y POW-244TH	1
26	851-2-5366-01400	Spacer	4
27	854-2-5301-56501	Elec. Component Box	1
28	854-2-5304-30201	Cover Plate	1
29	852-2-2396-10103	Screw Special	1
30	852-6-4729-17300	Label	1
31	851-0-0051-25600	Remote Control Unit Ass'y RCS-244TH	1
32	851-0-5292-19600	Remote Control Cable	1
33	851-2-5365-05102	Indicator Plate	1
34	851-2-5358-00620	Bottom Plate	1
35	800-2-5318-14921	Lid, Remote Control	1
36	800-2-5328-12602	Switch Knob	2
37	851-2-5375-00601	Knob	1
38	854-2-1311-12002	Knob	2
39	851-0-5158-33100	Controller P.C.B. Ass'y	1
40	800-2-5367-11300	Filter	1
41	851-2-5308-02300	Filter	1
42	800-2-5352-14801	Mounting Plate	1
43	854-2-1311-12401	Knob	1
44	854-0-1101-268L2	Front Panel Ass'y (incl. No. 45)	1
45	851-0-5291-286H1	Heater Ass'y 230V 10W	2
46	851-0-5291-286M1	Synchro Motor Ass'y M12	1
47	854-0-1505-21000	Blade Louver Ass'y	1
48	854-2-1111-17810	Support Louver	1
49	854-0-1505-17401	Blade Louver Ass'y	1
50	854-2-1111-18000	Support Louver	2

NOTE: Metal and plastic parts will be supplied basically with necessary heat insulation pads or packing.

ATTENTION !

To ensure correct parts supply, please let us know followings, when you make service parts order:

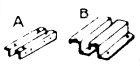
1. Part No. 2. Description 3. Q'ty 4. Volts-Hz-Ph 5. Product Model No.

Key No.	Part No.	Description	Q'ty
51	854-2-1111-20301	Support Louver	1
52	854-2-2342-26701	Cover Plate	1
53	854-0-1505-28301	Blade Louver Ass'y	1
54	854-2-1111-20400	Support Louver	2
55	854-0-1101-266L2	Front Panel Ass'y (incl. No. 45, 56~59)	1
56	854-2-1330-15911	Ornamental Sash	1
57	854-0-2301-35600	Drain Pan Ass'y	1
58	854-2-2343-13300	Cover Plate, Drain Pan	1
59	854-2-2343-13400	Cover Plate, Drain Pan	1
60	854-2-1101-45115	Front Panel	3
61	852-2-1504-16414	Badge	1
62	854-2-1354-19602	Badge	1
63	852-2-1314-11901	Stopper	2
64	854-2-5304-30101	Cover Plate	1
65	854-2-1358-46800	Label	1
66	851-2-5251-37401	Elec. Wiring Diagram	1
67	851-2-5251-37501	Elec. Wiring Diagram	1
68	854-2-1133-22900	Cover Plate	1
69	854-0-1109-208H1	Rear Panel Ass'y	1
70	854-2-1130-12513	Hook Plate	6
71	854-2-2307-13201	Cover Plate, Fan Motor	1
72	854-2-2342-32401	Cover Plate	1
73	854-2-1102-240H1	Side Panel Ass'y	2
74	854-2-1114-10820	Cap, Top Panel	3
75	854-2-1104-12613	Suction Grille	3
76	854-0-1302-13800	Air Filter Ass'y	3
77	854-0-4297-11900	Drain Pipe Ass'y	1
78	851-2-5354-00200	Clamper	1
79	854-2-1367-70000	Name Plate	1
80	854-6-4729-71600	Label	1
●	854-6-4139-50300	Installation Instructions	1
●	854-6-4119-47300	Operation Manual	1

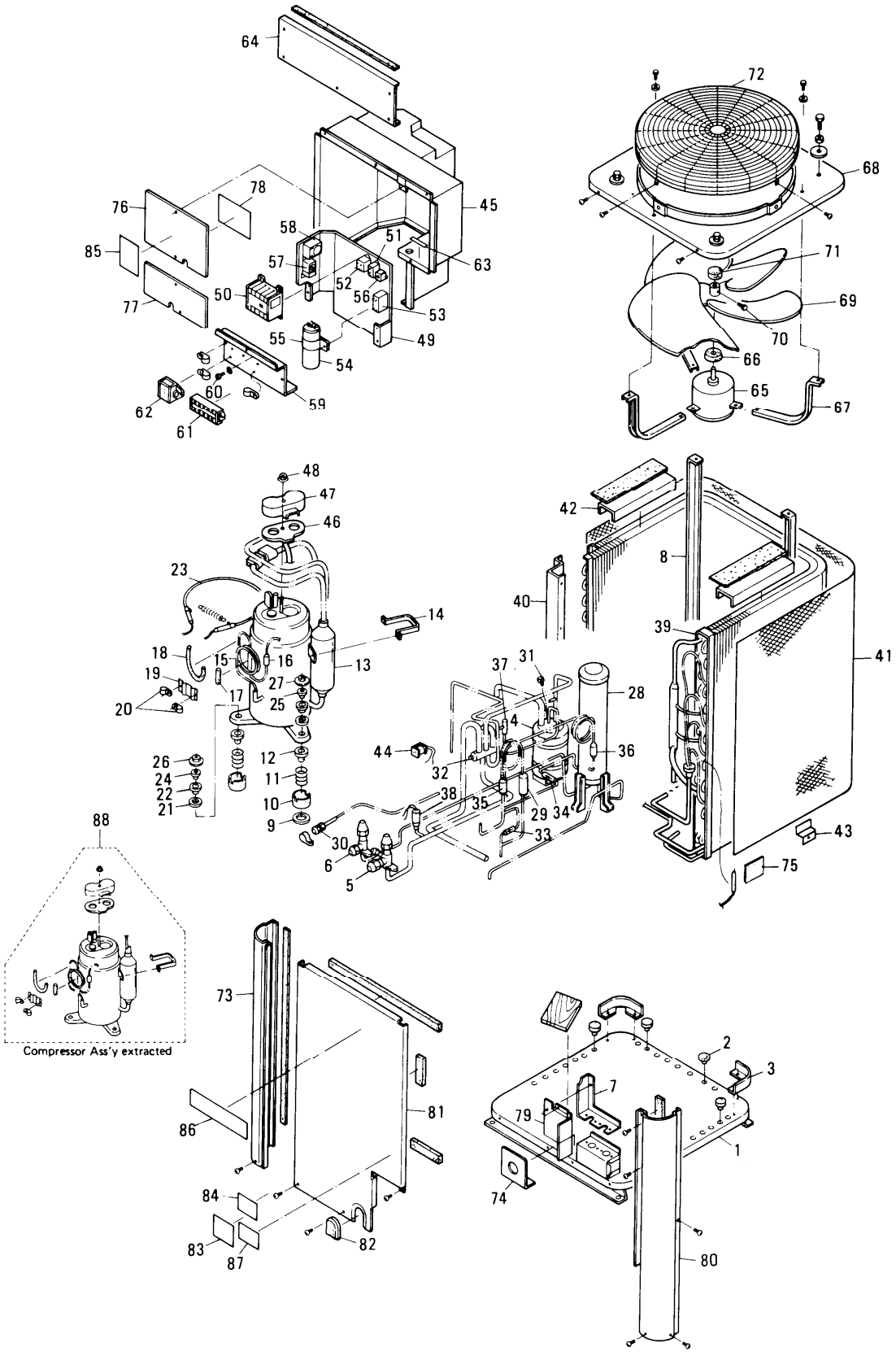
NOTE: Metal and plastic parts will be supplied basically with necessary heat insulation pads or packing.

Accessories

SAP362TH

Description	Shape	Q'ty	Parts No.
Suspension fitting		4 A	854 2 1127 13703
		4 B	854 2 1127 13903
Suspension bolt (M8 x 200)		4	854 2 1356 11901
M8 hex. nut with flat washer		8	851 0 2395 10201
M8 bolt		4	3 9240 81601
M8 flat washer		4	3 9280 08011

Description	Shape	Q'ty	Parts No.
M8 spring washer		4	3 9282 08001
Woodscrew (M3.1 x 13)		2	3 9261 21301
Heat insulating material		1	854 2 2410 45500
		1	854 2 2410 32600
Drain hose		1	854 2 2334 13600
Drain-hose clamp		1	851 2 5354 00200
Drain hose		1	854 0 4297 11900



A T T E N T I O N !

To ensure correct parts supply, please let us know followings, when you make service parts order:

1. Part No. 2. Description 3. Q'ty 4. Volts-Hz-Ph 5. Product Model No.

Key No.	Part No.	Description	Q'ty
1	854-0-2204-37801	Bottom Plate Ass'y	1
2	854-2-1353-11000	Sheet Rubber	4
3	854-2-2360-19100	Mounting Plate	2
4	854-0-4517-19701	Accumulator Ass'y	1
5	854-0-4506-18000	Valve Ass'y 5/8 in.	1
6	854-0-4521-12800	Valve Ass'y 1/4 in.	1
7	854-2-1133-17501	Cover Plate	1
8	854-0-2206-18100	Frame Ass'y	2
9	3-9022-01000	Washer	1
10	851-2-2390-14000	Cushion Rubber	3
11	851-2-2330-13201	Spring	3
12	854-2-2356-10500	Protection Rubber	3
13	854-0-4517-19100	Accumulator Ass'y	1
14	851-2-2356-16901	Band Mounting	1
15	854-2-4219-58100	Capillary Tube	1
16	852-0-4506-14000	Strainer Ass'y	1
17	852-2-2353-19500	Packing	1
18	853-2-4310-10300	Mounting Rubber, Capillary	1
19	852-2-2309-34101	Mounting Plate	1
20	3-9030-00508	Clamper F-6	1
21	854-2-2356-10600	Protection Rubber	3
22	854-2-2349-12201	Spacer	3
23	851-0-5291-132H1	Heater Ass'y CH5700 230V 30W	1
24	854-2-2356-10400	Protection Rubber	2
25	854-2-2356-10700	Protection Rubber	1
26	854-0-2321-10201	Nut Special Ass'y	2
27	851-0-2395-10702	Nut Special Ass'y	1
28	854-0-4110-19501	Receiver Tank Ass'y	1
29	852-0-4505-13600	Dehydrater Ass'y	1
30	854-0-4514-10200	Charge Port Ass'y	1
31	854-2-4306-10600	Fusible Plug	1
32	4-2649-56162	Solenoid V26-9000	1
33	854-0-4518-12700	Check Valve Ass'y TCV-2-S1	1
34	854-0-4518-10900	Check Valve Ass'y TCV-2-U3	1
35	852-0-4506-13700	Strainer Ass'y	1
36	852-0-4506-13300	Strainer Ass'y	1
37	852-0-4205-10300	Discharge Pres. Regulator Ass'y	1
38	851-0-5291-132S1	Switch Ass'y ACB-1UB04W	1
39	854-0-4118-46600	Evaporator Ass'y (incl. No. 40)	1
40	854-2-4134-32100	Mounting Plate	1
41	854-2-1113-12400	Guard	1
42	854-2-2360-189H0	Mounting Plate Ass'y	2
43	854-2-2360-21111	Mounting Plate	3
44	851-0-5291-132C1	Solenoid Ass'y L27-9072	1
45	854-0-2325-17000	Cover Ass'y	1
46	801-2-5303-13100	Gasket Terminal	1
47	801-2-6194-12100	Cover Terminal	1
48	819-2-6919-10100	Nut, Compressor	1
49	854-0-5301-33001	Elec. Component Box Ass'y	1
50	4-2329-56318	Relay HE-A21	1

NOTE: Metal and plastic parts will be supplied basically with necessary heat insulation pads or packing.

PARTS LIST

SAP244CH
OUTDOOR UNIT

A T T E N T I O N !

To ensure correct parts supply, please let us know followings, when you make service parts order:

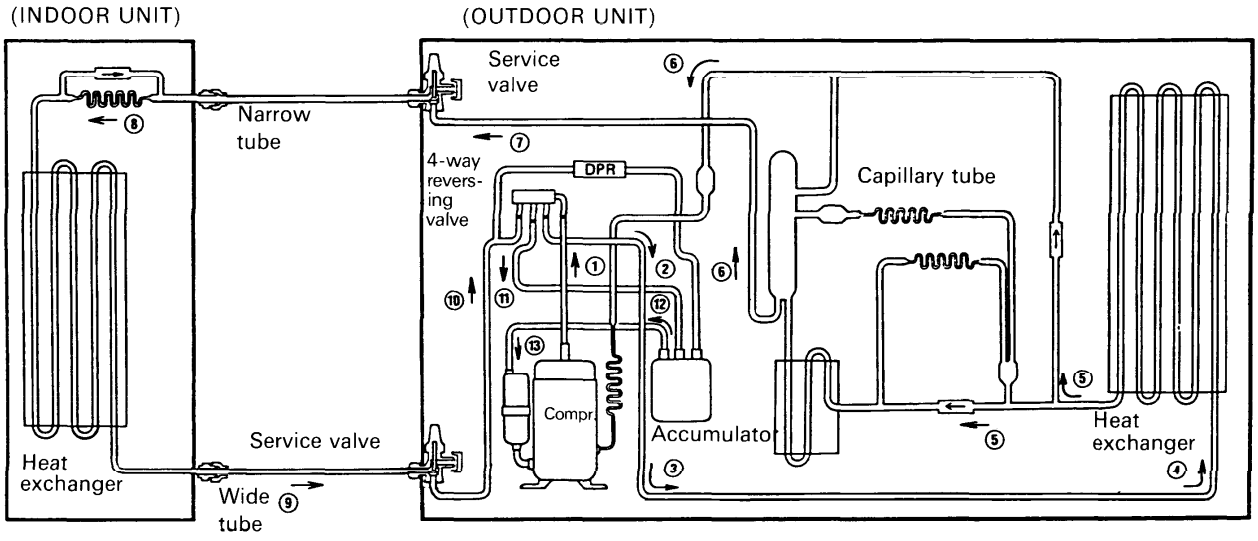
1. Part No. 2. Description 3. Q'ty 4. Volts-Hz-Ph 5. Product Model No.

Key No.	Part No.	Description	Q'ty
51	4-2329-56287	Relay MY2F-T1-USTS	1
52	4-2329-56289	Relay LY3F-US-TS	1
53	4-2239-56224	Fixed Capacitor 440V 5MFD	1
54	4-2239-56339	Fixed Capacitor 400V 35MFD	1
55	852-2-5301-20600	Clip, Capacitor	1
56	4-2049-60102	Thermistor TDK 101YV	1
57	4-2339-56196	Thermostat RTB-4U201F	1
58	4-2489-56168	Time Switch STMN-2-T0918	1
59	854-0-5301-35301	Elec. Component Box Ass'y	1
60	852-2-2396-10103	Screw Special	1
61	4-2379-56171	Terminal Base JTU20-8	1
62	4-2379-56178	Terminal Base KTU60-2J	1
63	852-6-4729-17300	Label	1
64	854-2-2208-195H0	Mounting Plate Ass'y	1
65	851-0-5291-132M1	Fan Motor Ass'y KFC8S-101A6P	1
66	852-2-2514-10700	Cover Rubber	1
67	854-0-2511-14401	Support Motor Ass'y	3
68	854-0-1106-20201	Top Cover Ass'y	1
69	854-0-2501-18100	Propeller Fan Ass'y (incl.No.70)	1
70	854-2-2529-10101	Set Screw, Blower	1
71	854-2-2346-11400	Cap	1
72	854-0-1113-13801	Guard Ass'y	1
73	854-0-1102-233H0	Side Panel Ass'y	1
74	854-2-2360-41101	Mounting Plate	1
75	852-2-4380-10800	Insulation, Thermostat	1
76	854-2-5304-26000	Cover Plate	1
77	854-2-5304-26100	Cover Plate	1
78	851-2-5251-26001	Elec. Wiring Diagram	1
79	854-2-1133-20101	Cover Plate	1
80	854-0-1102-234H0	Side Panel Ass'y	1
81	854-0-1101-301H0	Front Panel Ass'y (incl.No.82)	1
82	852-2-1320-10500	Eyelet Rubber	1
83	854 6 4729 77900	Label	1
84	854-6-4729-71600	Label	1
85	854-2-1358-46800	Label	1
86	852-2-1316-26201	Mark	1
87	854-2-1367-60200	Name Plate	1
88	852-0-4516-17700	Compressor Ass'y C-R170H6S	1

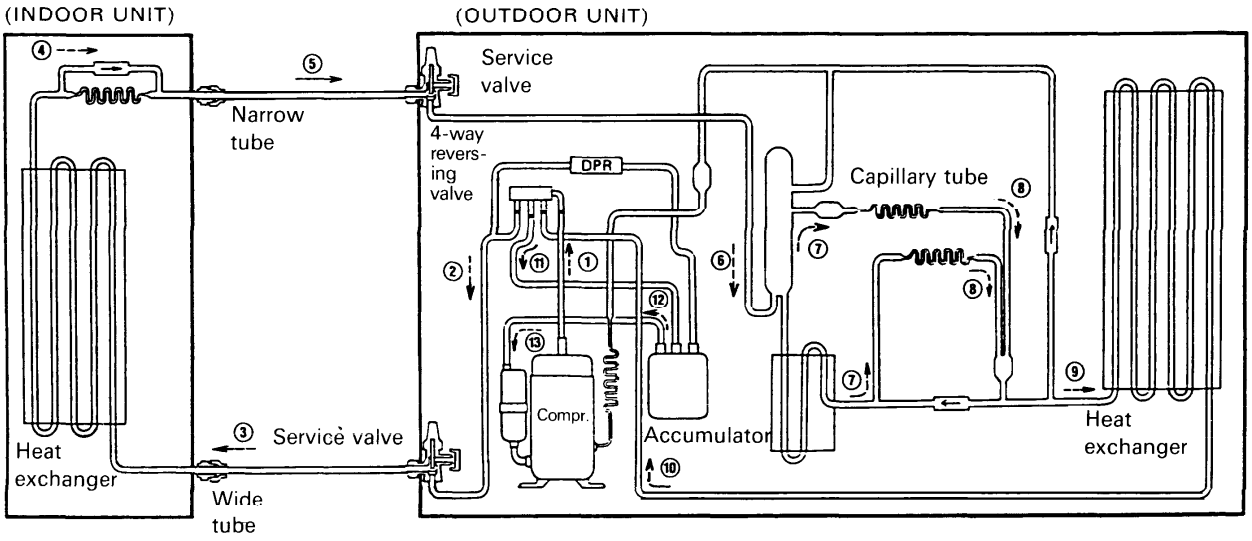
NOTE: Metal and plastic parts will be supplied basically with necessary heat insulation pads or packing.

11. REFRIGERANT FLOW DIAGRAMS

COOLING CYCLE



HEATING CYCLE



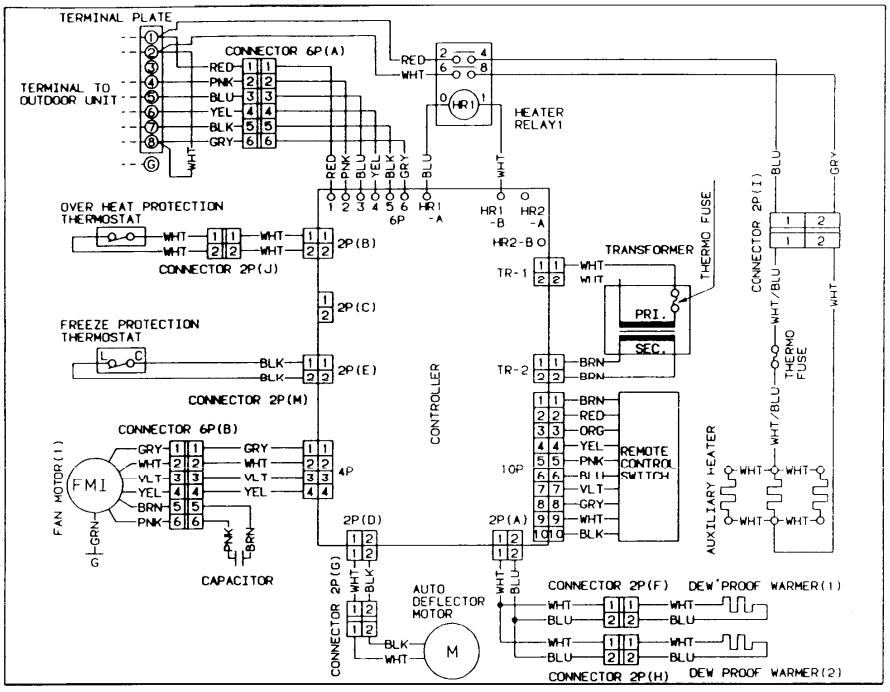
NOTE

→ with sequential number in circle shows flow of refrigerant in COOLING CYCLE

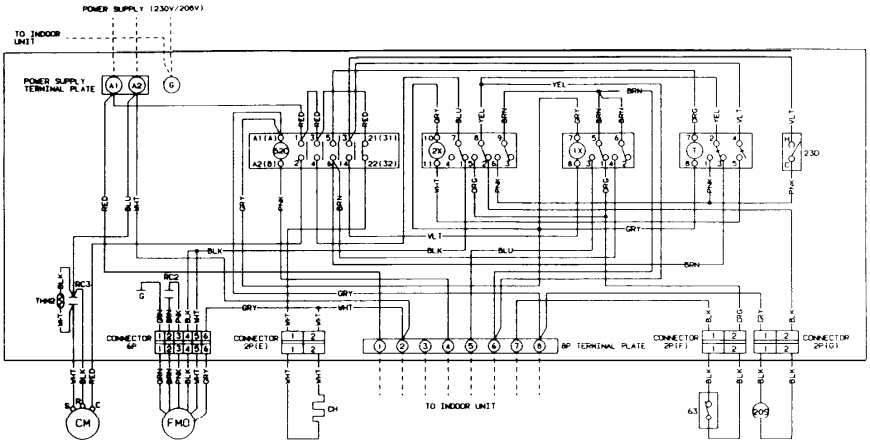
- - → with sequential numbers in circle shows flow of refrigerant in HEATING (= Reverse) CYCLE

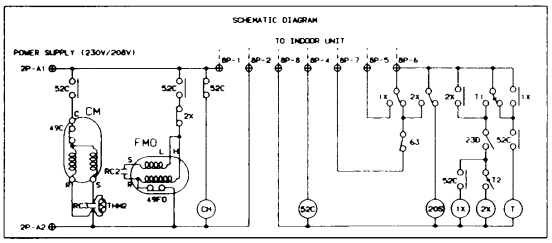
12. ELECTRIC WIRING DIAGRAMS

SAP244TH ELECTRIC WIRING DIAGRAM



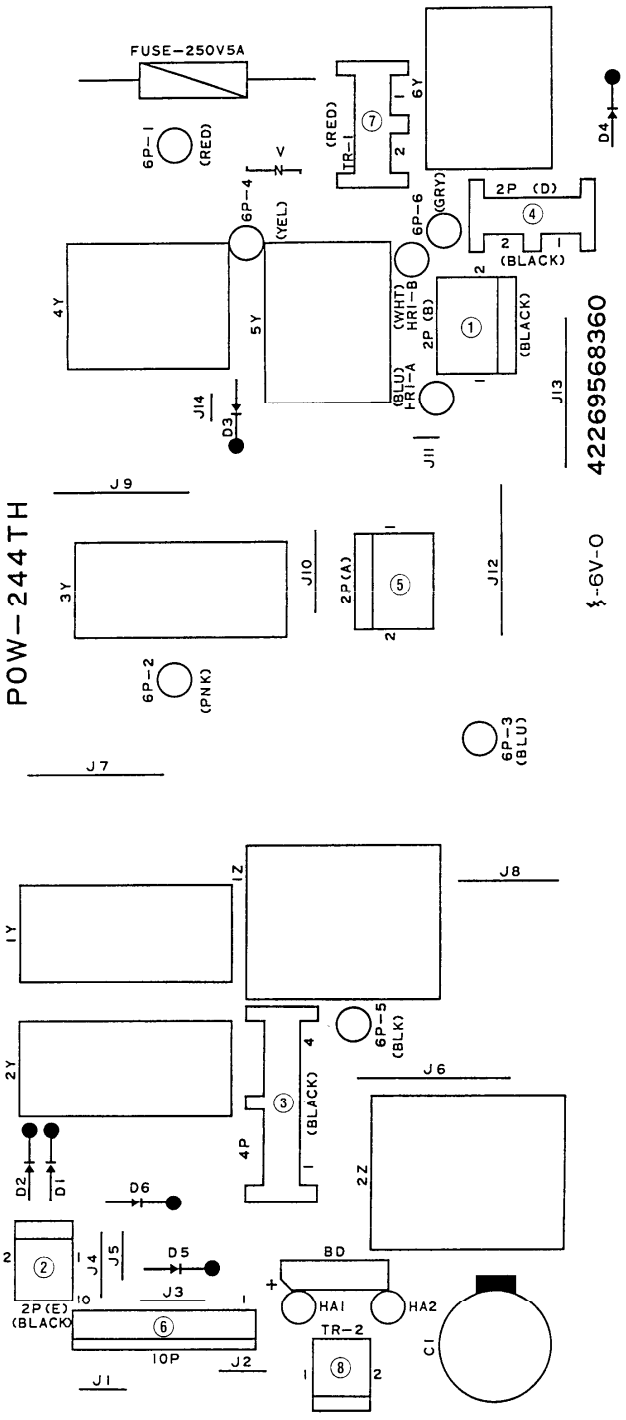
SAP244CH ELECTRIC WIRING DIAGRAM





SYMBOL	PARTS NAME
CM	COMPRESSOR MOTOR
FMO	OUTDOOR FAN MOTOR
52C	COMPRESSOR MOTOR MAGNETIC CONTACTOR
1X,2X	AUXILIARY RELAY
49C	CM INTERNAL OVERLOAD PROTECTOR
49FO	FMO INTERNAL OVERLOAD PROTECTOR
63	PRESSURE SWITCH
CH	CRANK CASE HEATER
23O	DEFROST THERMOSTAT
T	DEFROST TIMER
20S	FOUR WAY VALVE SOLENOID
THM2	THERMISTOR
RC2,RC3	CAPACITOR
⊕	TERMINAL PLATE

CONTROLLER P.C.B. (PRINTED PATTERN)
POW-244TH (for SAP244TH)



① Connector, Over Heat Protection Thermostat:*
② Connector, Freeze Protection Thermostat: 24 V. D.C.
③ Connector, Fan Motor:*
④ Connector, Auto Deflector Motor:*
⑤ Connector, Dew Proof Warmer:*

⑥ Connector, Remote Control Unit: 24 V. D.C.
⑦ Connector, Transformer (Primary: *)
⑧ Connector, Transformer (Secondary: 19 V. A.C.)

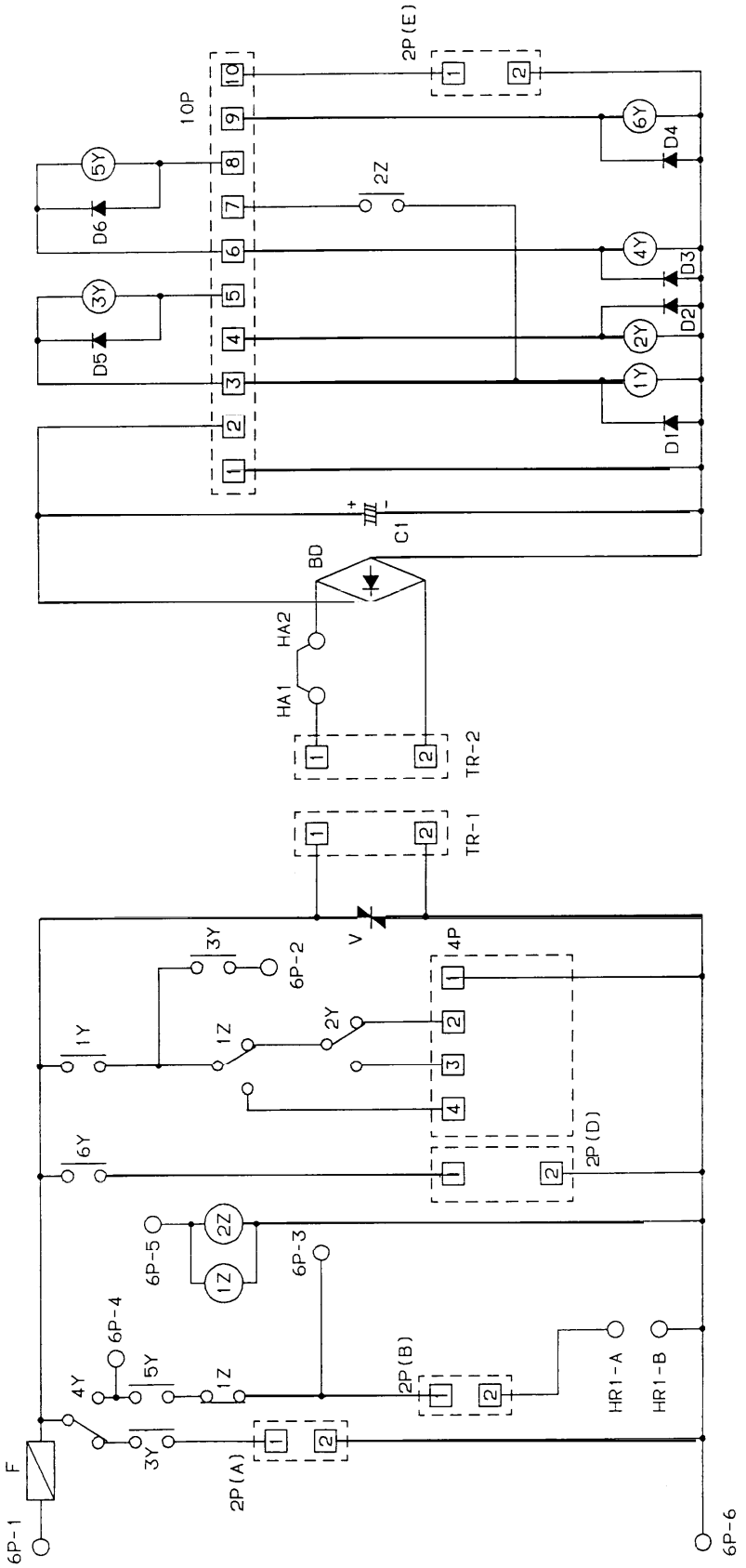
The asterisk "*" indicates that line voltage is applied.

ELECTRIC WIRING DIAGRAM (CONTROLLER P.C.B.)
POW-244TH (for SAP244TH)

Mark	Material	Specifications
TR-1	Connector	ULTREX 2P (RED)
TR-2	Connector	SL-156
2P (A)	Connector	5289-02A (WHT)
2P (B)	Connector	5289-02A-BL (BLK)
2P (D)	Connector	ULTREX 2P (BLK)
2P (E)	Connector	5273-02A-BL (BLK)
6P-1~6P-6	Board pin	AMP 170338-1
HA1, HA2	Board pin	WIRE K
HR1-A, B	Board pin	AMP 170338-1

Mark	Material	Specifications
4P	Connector	ULTPEX 4P (BLK)
10P	Connector	EI 10P
1Y	Relay	VB24TBU (DC24V)
2Y	Relay	VB24TBU (DC24V)
3Y	Relay	VB24TBU (DC24V)
4Y	Relay	LZG-24HE (DC24V)
5Y	Relay	LZG-24HE (DC24V)
6Y	Relay	LZG-24HE (DC24V)
1Z	Zener Diode	MY2-02-US-TS (AC230V)
1Z	Zener Diode	MY2-02-US-TS (AC230V)

Mark	Material	Specifications
V	Varistor	SNR-A420K
F	Fuse	250V 5A
BD	Bridge Diode	DBA-10C
C1	Capacitor	470MF 50V
D1	Diode	DS-442X
D2	Diode	DS-442X
D3	Diode	DS-442X
D4	Diode	DS-442X
D5	Diode	DS-442X
D6	Diode	DS-442X



For parts or service contact

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

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