

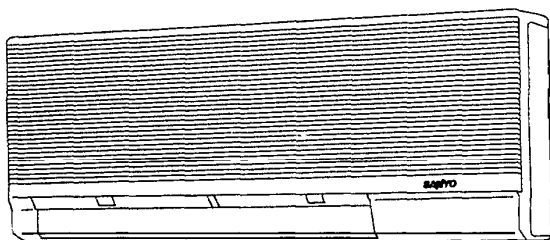
SERVICE MANUAL (Expanded Information)



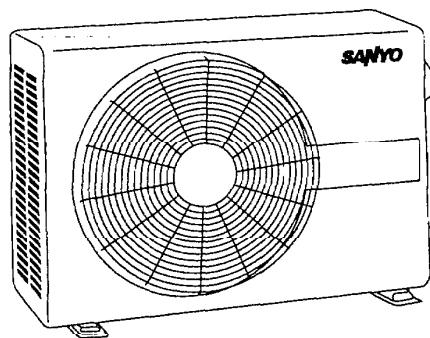
CMH1822 / KMH0922 (×2)

SPLIT SYSTEM AIR CONDITIONER

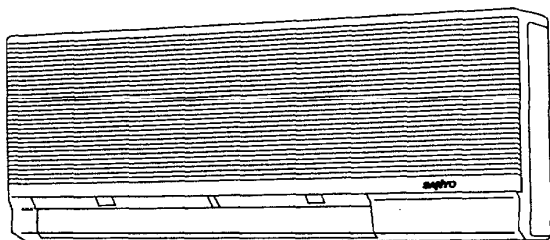
Indoor Unit



Outdoor Unit



CMH1822



KMH0922



SERVICE MANUAL

CMH1822 / KMH0922 (×2)

(Expanded Information)

IMPORTANT!

Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning
- Follow each installation or repair step exactly as shown
- Observe all local, state, and national electrical codes
- Pay close attention to all warning and caution notices given in this manual



WARNING:

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.



CAUTION:

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- **Ground the unit** following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

...In a Ceiling or Wall

Make sure the ceiling/wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

...In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes *before connecting them, then tighten the nut with a torque wrench for a leak-free connection.*
- Check carefully for leaks before starting the test run.

NOTE:

Depending on the system type, liquid and gas lines may be either narrow or wide. Therefore, to avoid confusion the refrigerant tubing for your particular model is specified as either "narrow" or "wide" rather than as "liquid" or "gas."

When Servicing

- Turn the power **OFF** at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.

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1. SPECIFICATIONS

1-1 Unit Specifications

(1) Outdoor Unit

Model No.		Outdoor unit	CMH1822			
		Applicable indoor unit	KMH0922			
Performance	No. of indoor units		1 (cooling)	1 (heating)	2 (cooling)	2 (heating)
	Capacity	BTU/h kW	8,800 / 8,700 2.58 / 2.55	10,000 / 9,800 2.93 / 2.87	16,800 / 16,300 4.92 / 4.78	19,000 / 18,000 5.57 / 5.27
Electrical Rating	Phase, Frequency	Hz	Single, 60	Single, 60	Single, 60	Single, 60
	Voltage rating	V	230 / 208	230 / 208	230 / 208	230 / 208
	Available voltage range	V	187 to 253	187 to 253	187 to 253	187 to 253
	Running amperes	A	4.1 / 4.3	4.1 / 4.3	8.2 / 8.7	7.5 / 7.9
	Power input	W	900 / 870	900 / 870	1,820 / 1,780	1,640 / 1,590
	Power factor	%	95 / 97	95 / 97	97 / 98	95 / 97
	Starting amperes	A	27	27	27 × 2	27 × 2
	S. E. E. R. (H. S. P. F.)	BTU/Wh	10.0 / 10.0	(7.0 / 7.0)	10.0 / 10.0	(7.0 / 7.0)
Features	Fan speeds		1			
	Compressor ... number		Rotary ... 2			
	Refrigerant amount charged at shipment	lbs. (kg)	R22: 2.34 (1.06) × 2			
	Refrigerant control		Capillary tube			
	Operation sound	dB-A	56			
	Refrigerant tubing connections		Flare type			
	Max. allowable tubing length at shipment	ft. (m)	33 (10)			
	Limit of tubing length	ft. (m)	50 (15)			
	Limit of elevation difference between the 2 units	ft. (m)	23 (7)			
	Refrigerant tube o.d.	Narrow tube	1/4 (6.35)			
		Wide tube	3/8 (9.52)			
	Refrigerant tube kit		Optional			
Dimensions & Weight	Height	in. (mm)	24-13/16 (630)			
	Width	in. (mm)	32-11/16 (830)			
	Depth	in. (mm)	12-13/32 (315)			
	Net weight	lbs. (kg)	134 (60.8)			
	Shipping volume	cu. ft. (cu. m)	10.3 (0.96)			
	Shipping weight (approx.)	lbs. (kg)	140.8 (64)			

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are:

Cooling: Outside air temperature 95°F DB/75°F WB
Indoor unit entering air temperature 80°F DB/67°F WB
Heating: Outside air temperature 47°F DB/43°F WB
Indoor unit entering air temperature 70°F WB

(2) Applicable Indoor Unit

Model No.			KMH0922		
Type			Wall-mounted		
Performance			Cooling	Heating	
	Capacity	BTU/h	8,800 / 8,700	10,000 / 9,800	
		kW	2.58 / 2.55	2.93 / 2.87	
	Air circulation (High)		cu. ft. / min.	220 / 210	
Moisture removal (High)		pints/h	2.2		
Electrical Rating	Phase, Frequency		Hz	Single, 60	
	Voltage rating		V	230 / 208	
	Available voltage range		V	187 to 253	
	Heater element		kW-HSPF	—	1.0 / 0.82 – 6.6 / 6.6
Features	Controls		Microprocessor		
	Control unit		Remote control unit		
	Temperature control		IC thermostat		
	Timer		ON/OFF, 12-hours		
	Fan speeds		3		
	Air deflector		Horizontal / Vertical		
	Air filter		Manual / Manual		
	Operation sound		Hi / Me / Lo	dB-A	40 / 35 / 30
	Refrigerant tubing connections		Flare type		
	Refrigerant tube o.d.	Narrow tube	in. (mm)	1/4 (6.35)	
		Wide tube	in. (mm)	3/8 (9.52)	
	Refrigerant tube kit		Optional		
Accessories		Mounting bracket			
Dimensions & Weight	Height		in. (mm)	13-19/32 (345)	
	Width		in. (mm)	31-1/2 (800)	
	Depth		in. (mm)	7-3/32 (180)	
	Net weight		lbs. (kg)	24 (11)	
	Shipping volume		cu. ft. (cu. m)	3.3 (0.093)	
	Shipping weight		lbs. (kg)	29 (13)	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are:

Cooling: Outside air temperature 95°F DB/75°F WB
Indoor unit entering air temperature 80°F DB/67°F WB
Heating: Outside air temperature 47°F DB/43°F WB
Indoor unit entering air temperature 70°F WB

1-2 Major Component Specifications

(1) Outdoor Unit

Unit Model No.		CMH1822	
Control PCB			POW-CMH1822
	Control circuit fuse		250V - 3A
Compressor	Type		Rotary (hermetic)
	Model ... Number		C-R71H6U ... 2
	No. of cyl. ... rpm		1 ... 3,500
	Nominal output W (H.P.)		700 (1) × 2
	Compressor lubricant cc		560 × 2
	Coil resistance (Ambient temp. 77°F) Ω		C R: 2.32 C - S: 4.73
	Safety devices	Type	Internal
		Overload relay models	—
		Operating temp.	—
		Open °F	—
		Close °F	—
	Operating amp. (Ambient temp. 77°F)		Trips in 6 to 16 sec. at 16.5 A
	Run capacitor μF		17.5 × 2
	VAC		370
	Crank case heater		—
Fan	Type		Propeller
	Number ... Dia. in. (mm)		1 ... 15-3/4 (400)
Fan Motor	Model		SFG6S-61B6P
	No. of pole ... rpm (230V, High)		6 ... 1,030
	Nominal output W (H.P.)		60 (1/12)
	Coil resistance (Ambient temp. 68°F) Ω		WHT - BRN: 88.2 WHT - YEL: 116.3 WHT - PNK: 116.4
	Safety devices	Type	Internal
		Operating temp.	—
		Open °F	266 ± 14
		Close °F	174 ± 27
	Run capacitor μF		2.5
	VAC		440
Heat Exch.	Coil		Aluminum plate fin / Copper tube
	Rows ... Fins per inch		2 ... 15.9
	Face area ft. ² (m ²)		4.92 (0.45)
External Finish		Acrylic baked-on enamel finish	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

(2) Indoor Unit

Unit Model No.				KMH0922				
Remote Control Unit				RCS-KMH2412W				
Controller PCB				POW-KMH0912				
	Control circuit fuse			AC 250V - 3A				
Heat Element (Aux. Heater)	Model ... Number			AH-KH0912				
	Input			kW				
	Protective thermostat			1 / 0.82, 230 / 208V				
	Thermo fuse			OFF 131 ± 5°F, ON 111 ± 9°F Cut-off 336 ± 2, -5°F, 277V - 15A				
Fan	Type			Cross-flow				
	Number ... Dia. and length			in. (mm)				
Fan Motor	Model ... Number			SV4T-11D6P ... 1				
	No. of pole ... rpm (230V, High)			4 ... 1,450				
	Nominal output			W(H.P.)				
	Coil resistance			Ω				
	(Ambient temp. 68°F)			WHT - GRY: 464.8 WHT - VLT: 209.8 VLT - YEL: 93.4 YEL - PNK: 539.6				
	Safety devices	Type		Internal				
		Operating temp.	Open	°F			266 ± 14	
			Close	°F			174 ± 27	
	Run capacitor				μF		0.6	
					VAC		440	
	Heat Exch.	Coil			Aluminum plate fin / Copper tube			
		Rows ... Fins per inch			2 ... 14.1			
		Face area			ft. ² (m ²)			

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

1-3 Other Component Specifications

(1) Outdoor Unit

Power Relay	G4F-11123T-TS
Coil rating	DC 12V
Coil resistance Ω (at 77°F)	160 \pm 10%
Contact rating	AC 250V, 20A

Thermistor		PBC-41E-S15			
Resistance	kΩ	14°F	23.7 ± 5%	77°F	5.3 ± 5%
		32°F	15.0 ± 5%	86°F	4.4 ± 5%
		50°F	9.7 ± 5%	104°F	3.1 ± 5%
		68°F	6.5 ± 5%		

Solenoid Valve (4-way valve)	CHV-01AQ020UA1 (Coil), CHV-01U1 (Valve)
Coil rating	AC 208 to 240V, 60Hz, 6W

(2) Indoor Unit

Transformer	ATR-J122U
Rated	AC 220V, 60Hz
Primary	19V, 0.63A
Secondary	12VA
Capacity	Primary (WHT – WHT): 143.5
Coil resistance Ω (at 79°F)	Secondary (BRN – BRN): 1.2
Thermal cut-off temp.	259°F, 2A 250V

Heater Relay	G4E-2123T-US
Coil rating	DC 24V
Coil resistance Ω (at 68°F)	533 \pm 15%
Contact rating	AC 240V, 15A

Thermistor (coil sensor)		PTC-51H-S3			
Resistance	kΩ	32°F	185.5 ± 5%	86°F	45.1 ± 5%
		50°F	112.2 ± 5%	104°F	29.7 ± 5%
		68°F	70.1 ± 5%	122°F	20.0 ± 5%

Thermistor (room sensor)		SDT-500B6-2			
Resistance	kΩ	50°F	10.3 ± 4%	86°F	4.0 ± 4%
		59°F	8.0 ± 4%	104°F	2.6 ± 4%
		68°F	6.3 ± 4%	122°F	1.8 ± 4%
		77°F	5.0 ± 4%		

2. PERFORMANCE CHARTS

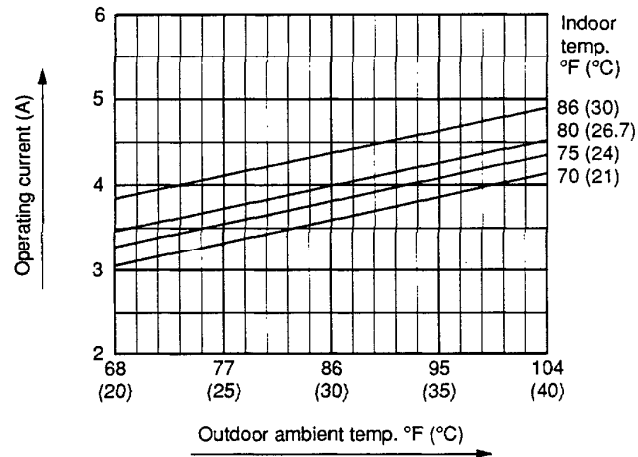
2-1 Cooling Characteristics

(1) Operating Current

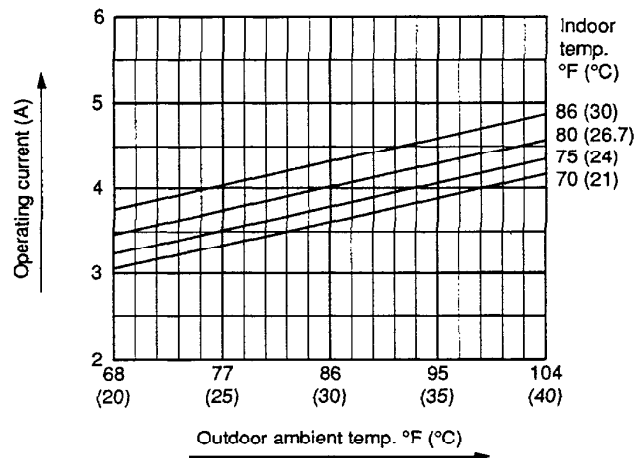
■ KMH0922 × 1 / CMH1822

Operating current characteristics versus outdoor ambient temperature and indoor temperature
(Indoor relative humidity: 50%, Indoor fan speed: High)

230V



208V

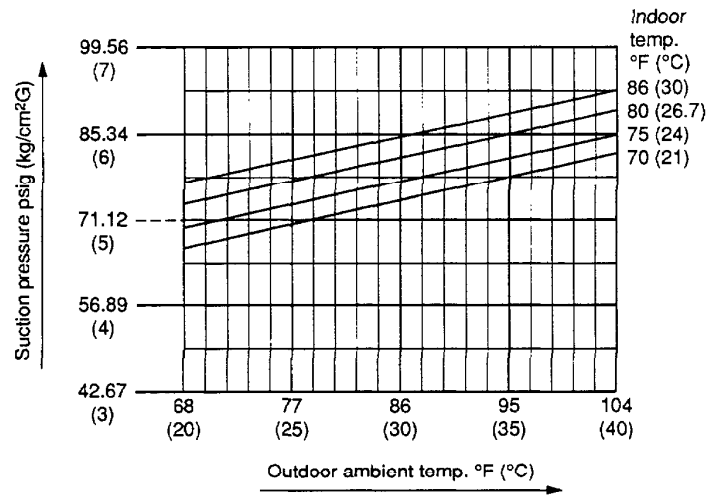


(2) Operating Pressure

● Low Pressure

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

230 / 208V



2-2 Heating Characteristics

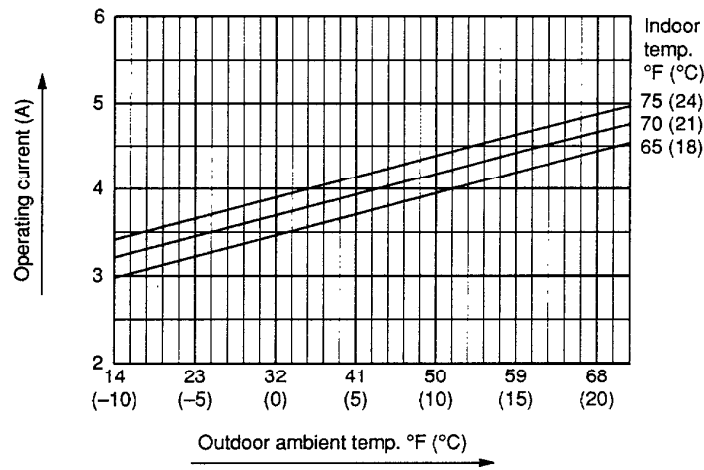
(1) Operating Current

■ KMH0922 × 1 / CMH1822

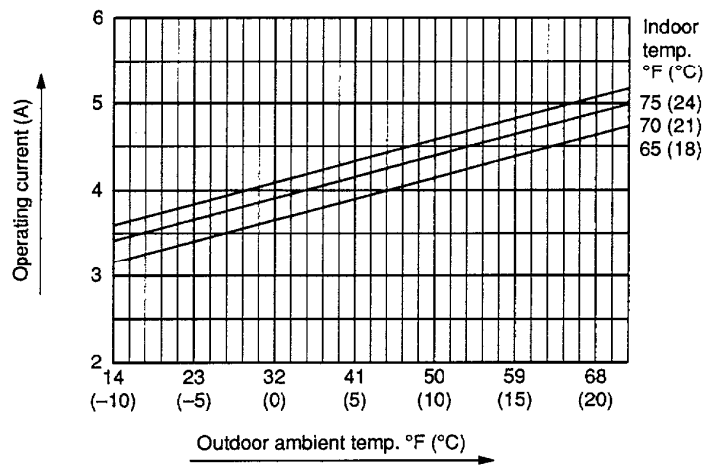
Operating current characteristics versus outdoor ambient temperature and indoor temperature (not including the electric heater).

(Indoor relative humidity: 50%, Indoor fan speed: High)

230V



208V

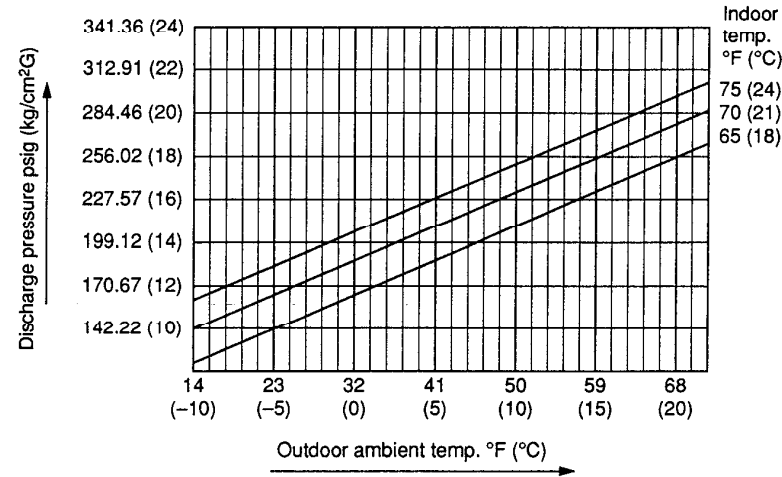


(2) Operating Pressure

● High Pressure

High pressure characteristics versus outdoor ambient temperature and indoor temperature
(Indoor relative humidity: 50%, Indoor fan speed: High)

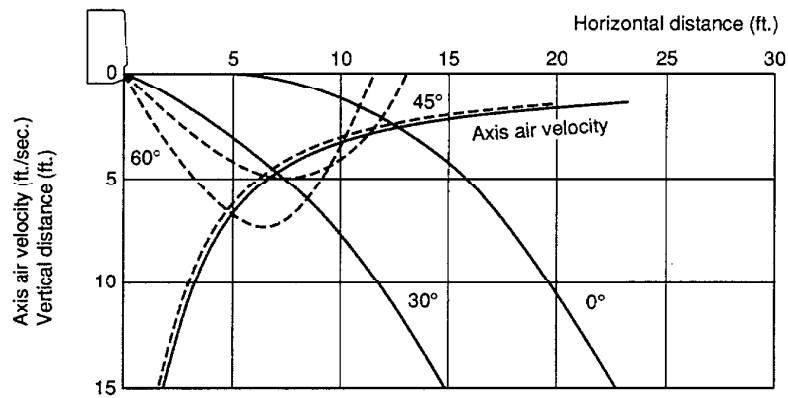
230 / 208V



3. AIR THROW DISTANCE CHART

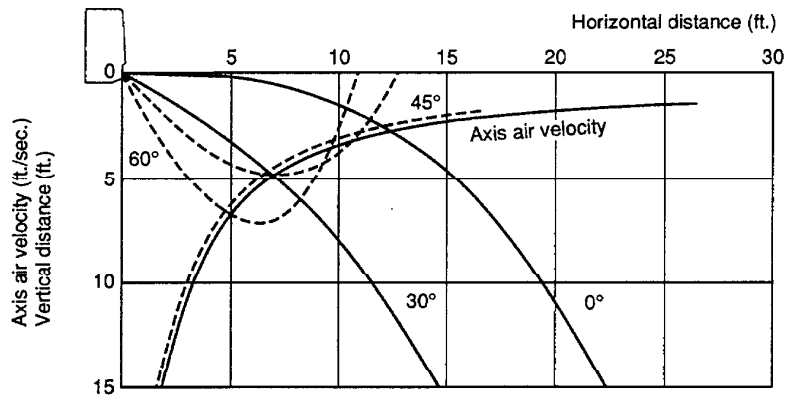
Model: KMH0922 230V / 60Hz

	— Cooling	---- Heating
Fan speed	High	High
Room air temp.	80°F	70°F
Louver angle	0°, 30°	45°, 60°



Model: KMH0922 208V / 60Hz

	— Cooling	---- Heating
Fan speed	High	High
Room air temp.	80°F	70°F
Louver angle	0°, 30°	45°, 60°

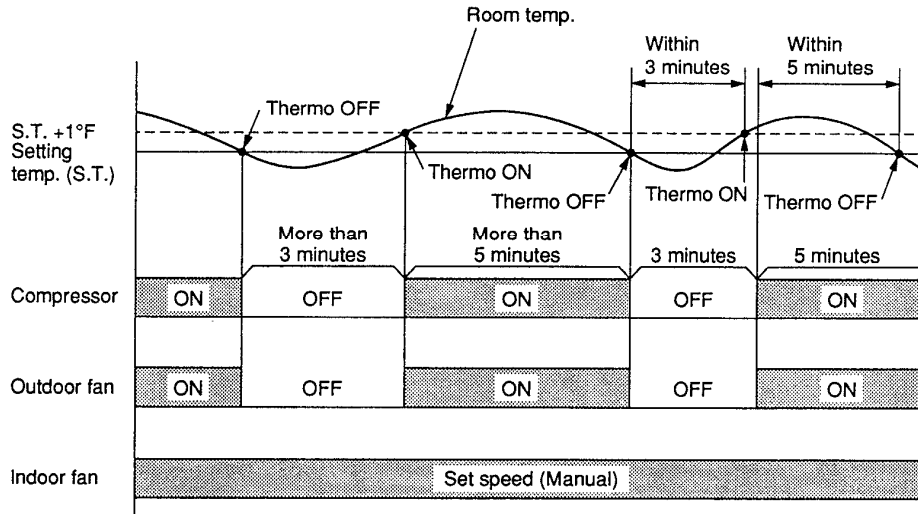


4. FUNCTION

4-1 Room Temperature Control

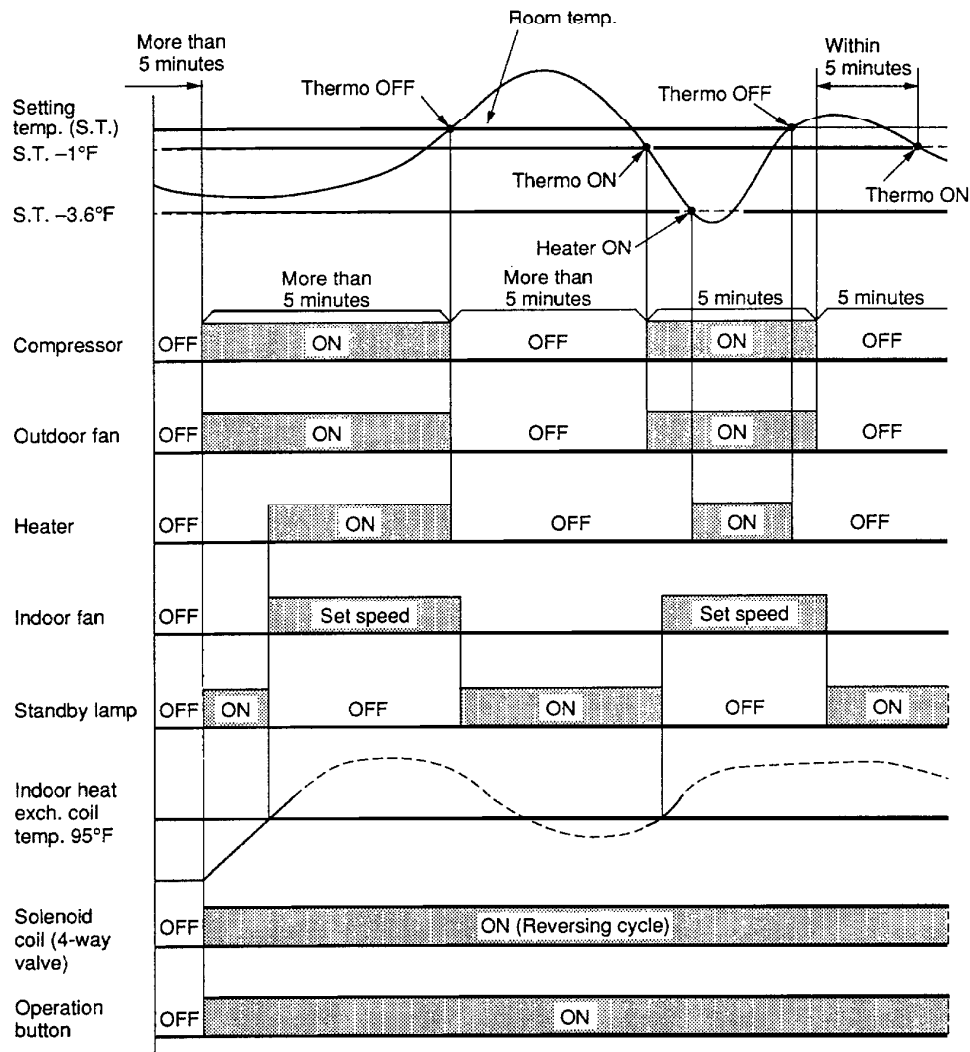
- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.

■ Cooling



- The control circuit will not attempt to turn the compressor ON until the compressor has been OFF for at least 3 minutes. To protect the compressor from stalling out when trying to start against the high side refrigerant pressure, the control circuit has a built-in automatic time delay to allow the internal pressure to equalize.
- As a protective measure, the control circuit switches the compressor OFF after 5 minutes or more of compressor operation.
- Thermo ON : When the room temperature is above $T + 1^{\circ}\text{F}$ ($T^{\circ}\text{F}$ is set temperature).
Compressor \rightarrow ON
- Thermo OFF : When the room temperature is equal to or below set temperature $T^{\circ}\text{F}$.
Compressor \rightarrow OFF

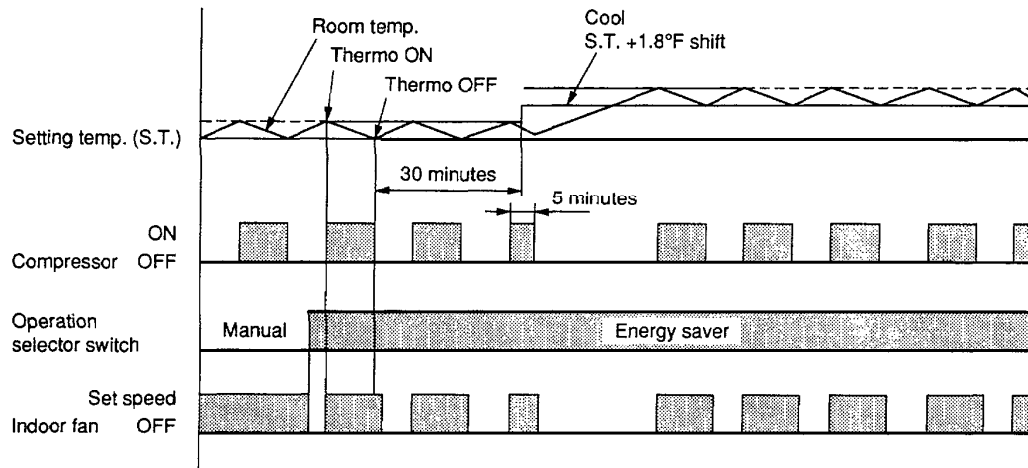
■ Heating



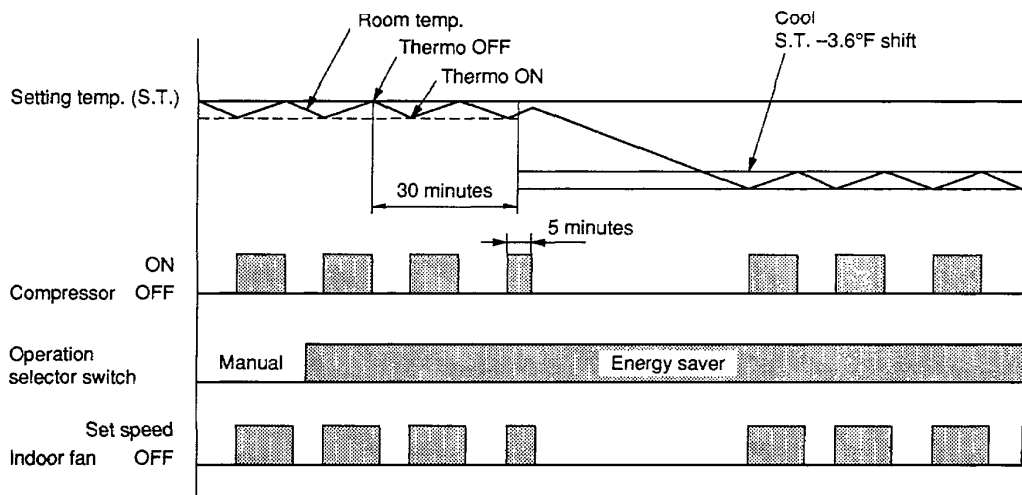
- The control circuit will not attempt to turn the compressor ON until the compressor has been OFF for at least 5 minutes. To protect the compressor from stalling out when trying to start against the high side refrigerant pressure, the control circuit has a built-in automatic time delay to allow the internal pressure to equalize.
- As a protective measure, the control circuit switches the compressor OFF after 5 minutes or more of compressor operation.
- Thermo ON : When the room temperature is equal to or below set temperature $T^{\circ}\text{F}$.
Compressor \rightarrow ON
- Thermo OFF : When the room temperature is equal to or above $T - 1^{\circ}\text{F}$ ($T^{\circ}\text{F}$ is set temperature).
Compressor \rightarrow OFF
- At the initial run, the electric heater continues the ON operation until thermo OFF.
When the room temperature falls below $T - 3.6^{\circ}\text{F}$, the electric heater turns ON.

4-2 Energy Saver Modes Timing Charts

■ Cooling

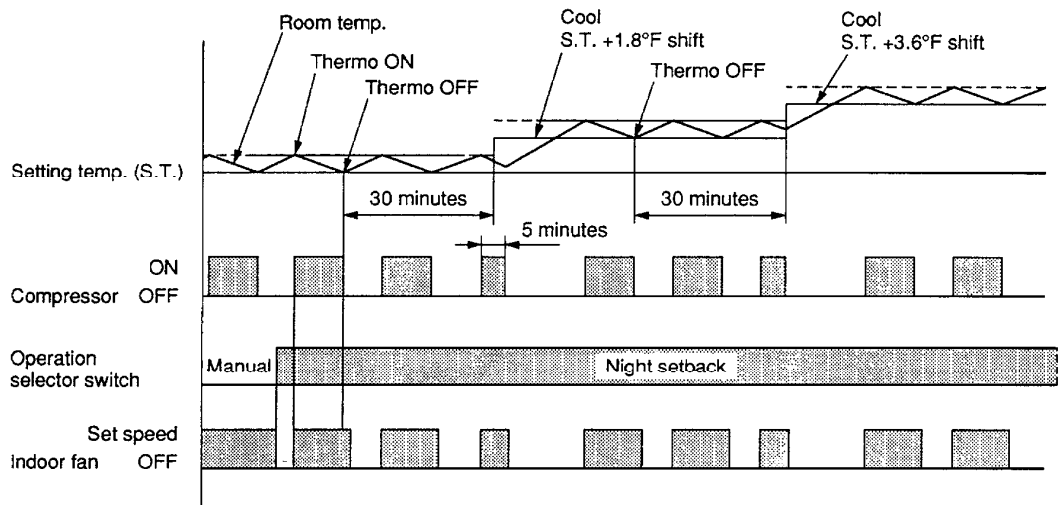


■ Heating

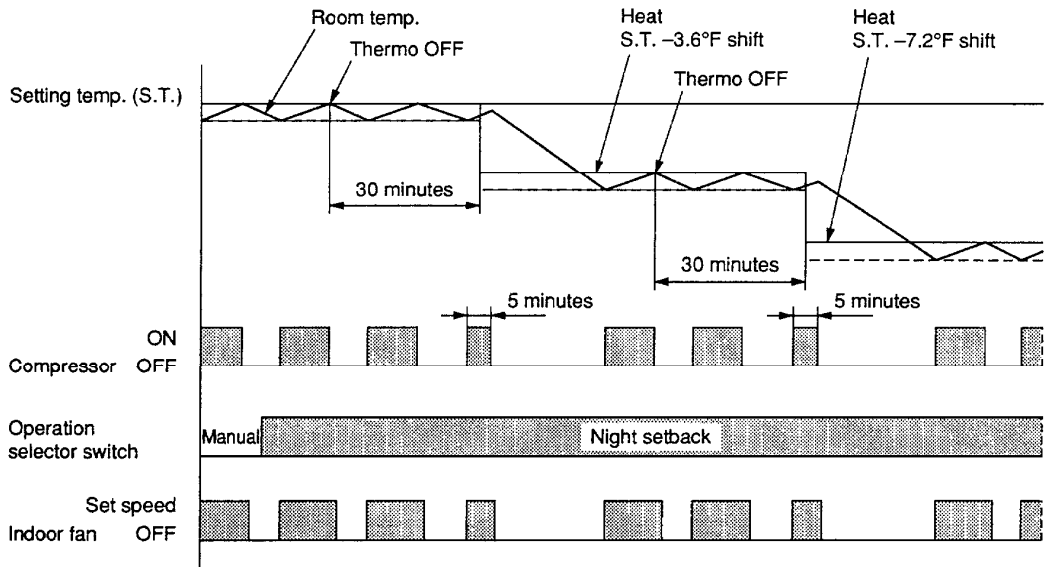


4-3 Night Setback Modes Timing Charts

■ Cooling



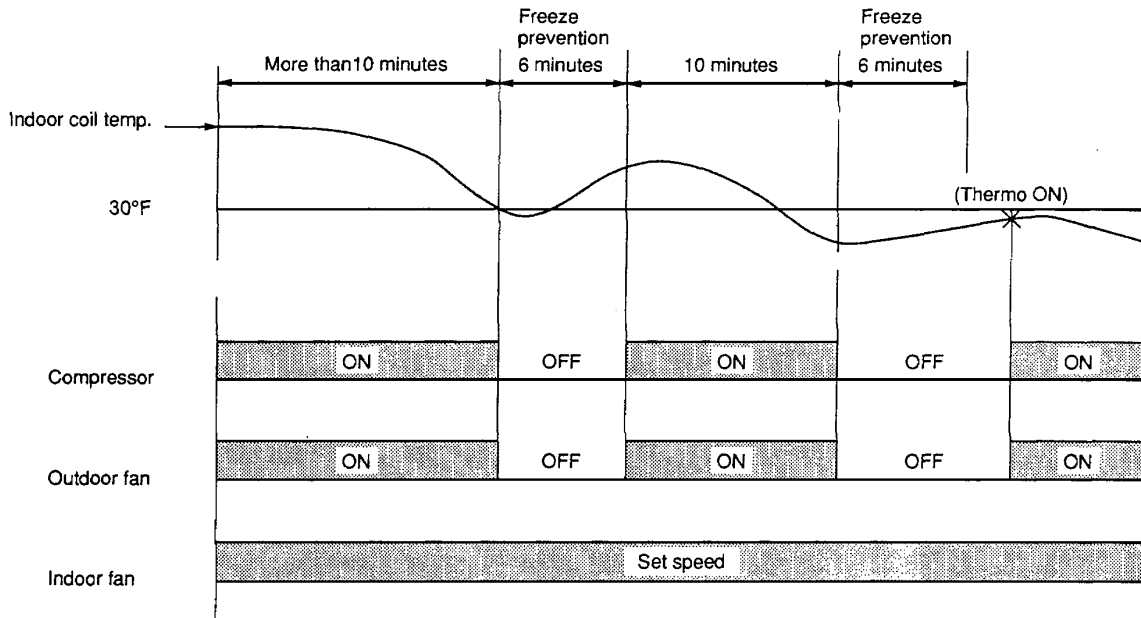
■ Heating



4-4 Freeze Prevention

■ Cooling

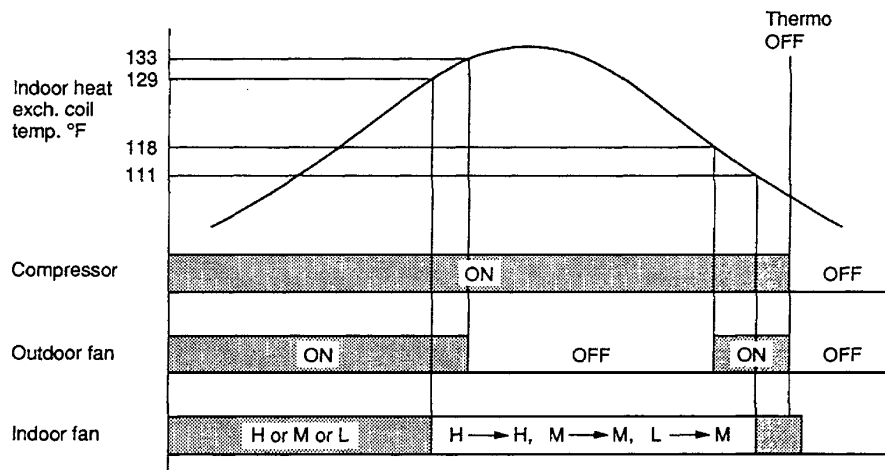
- This function prevents freezing of the indoor heat exchange coil.
- When the compressor has been running for 10 minutes or more and the temperature of the indoor heat exchange coil falls below 30°F, the control circuit stops the compressor for at least 6 minutes.



4-5 Overload Prevention

■ Heating

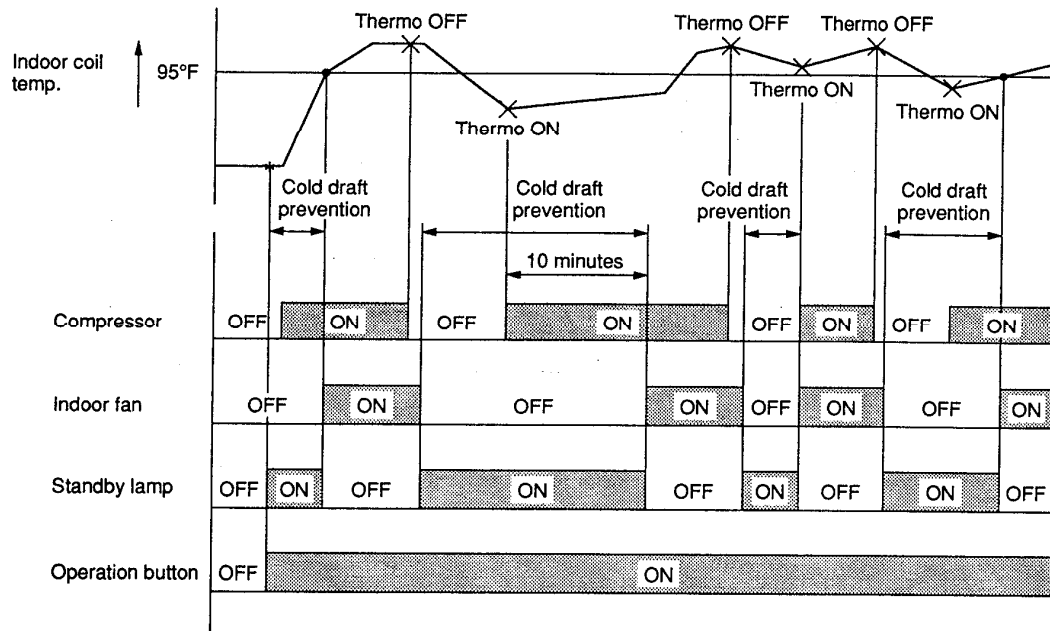
- Extremely high temperature in the indoor heat exchanger coil causes the air conditioner to overload. To lower the indoor heat exchanger coil temperature, the air conditioner temporarily stops the outdoor fan and controls the indoor fan speeds as shown below.



4-6 Cold Draft Prevention

■ Heating

- When the standby lamp lights, the indoor fan stops to prevent fan-driven release of cool air.

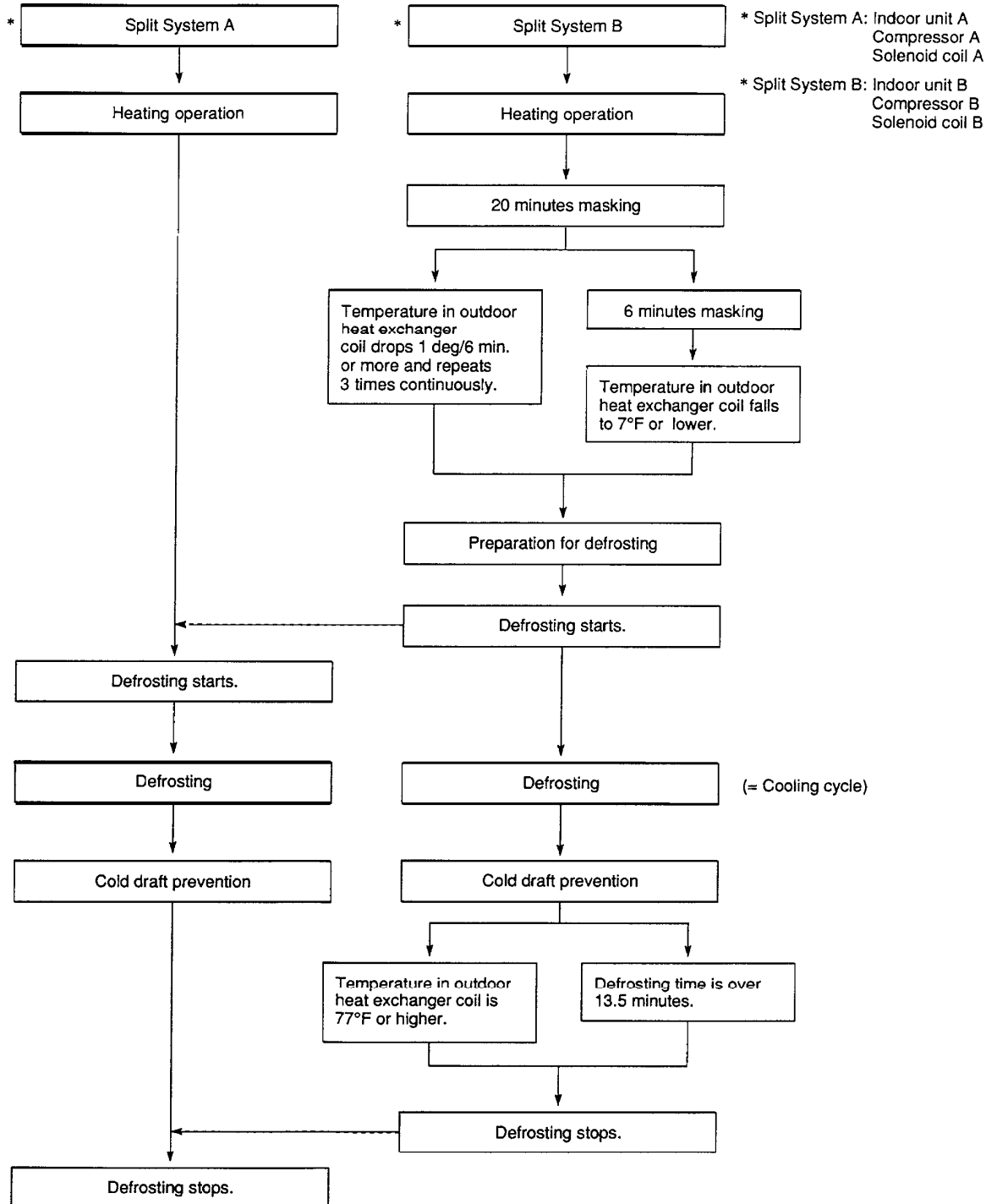


4-7 Defrosting Mode

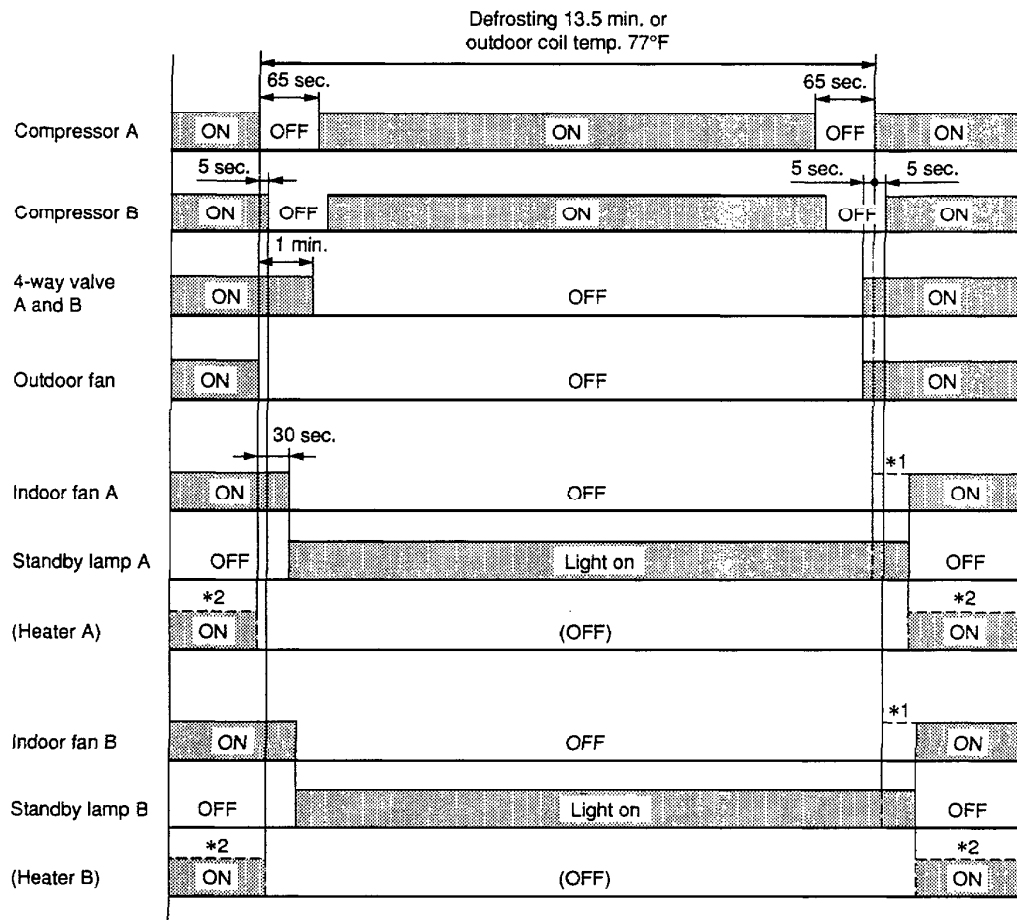
■ Heating

When the capacity of the unit has been decreased due to frosting up of the outdoor heat exchanger during heating, the temperature drop gradient is detected by the microcomputer-controlled temperature sensing system, and defrosting operation is started.

● Sequence of Defrosting



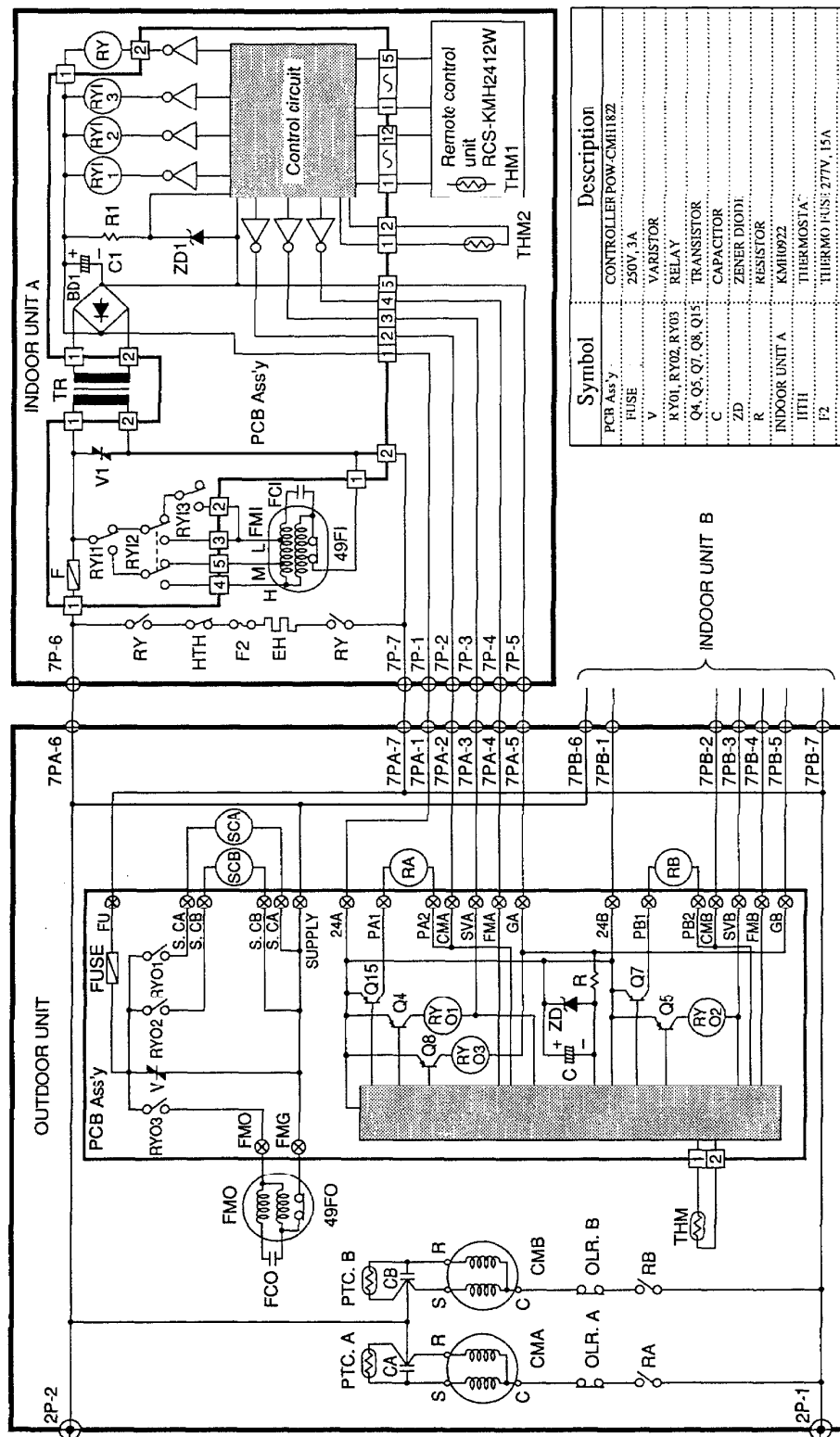
● Defrosting Mode Timing Chart



Note: *1. If cold draft prevention occurs.
 *2. At those times when the electric heater was OFF.

● Schematic Diagram

CMH1822 / KMH0922



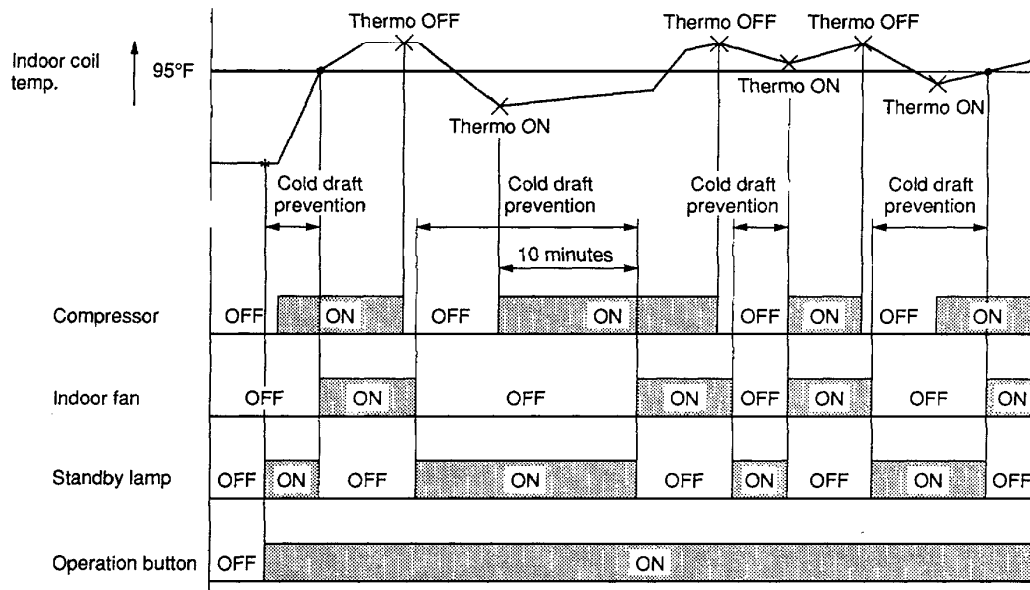
Symbol	Description
PCB Assy	CONTROLLER POW. CM1H182
FUSE	250V, 3A
V	VARIABLE
RY01, RY02, RY03	RELAY
Q4, Q5, Q7, Q8, Q15	TRANSISTOR
C	CAPACITOR
ZD	ZENER DIODE
R	RESISTOR
INDOOR UNIT A	KM1H0922
HT11	THERMISTOR
F2	THERMO FUSE, 277V, 15A
EH	ELECTRIC HEATER
FM1	INDOOR FAN MOTOR
FC1	INDOOR FAN MOTOR CAPACITOR
49F1	PMI INTERNAL PROTECTOR
TR	TRANSFORMER
RY	HEATER RELAY
THM1	THERMISTOR (ROOM TEMP. SENSOR)
THM2	THERMISTOR (COIL TEMP. SENSOR)
PCB Assy	CONTROLLER POW. KM1H0912A
F	FUSE 250V, 3A
V1	VARIABLE
BD1	BRIDGE DIODE
C1	CAPACITOR
R1	RESISTOR
ZD1	ZENER DIODE
RY11, RY12, RY13	RELAY

Symbol	Description
OUTDOOR UNIT	CMH1822
PTC A, PTC B	THERMISTOR
CA, CB	CAPACITOR
CMA, CMB	COMPRESSOR MOTOR
OLR A, OLR B	OVERLOAD RELAY
FMO	OUTDOOR FAN MOTOR
FCO	CAPACITOR
49FO	FAN MOTOR INTERNAL PROTECTOR
THM	THERMISTOR
SCA, SCB	SOLENOID COIL
RA, RB	POWER RELAY

4-6 Cold Draft Prevention

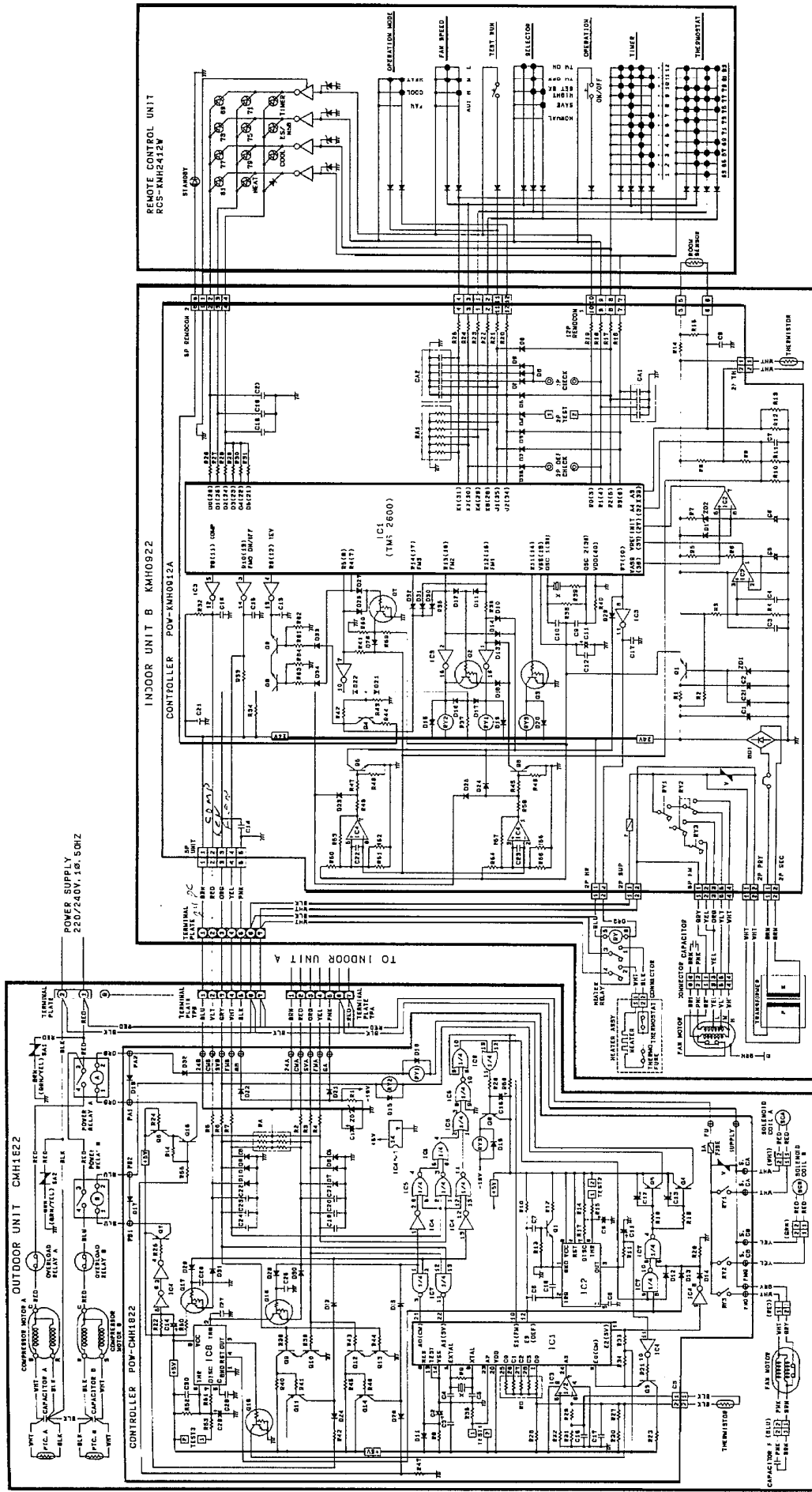
■ Heating

- When the standby lamp lights, the indoor fan stops to prevent fan-driven release of cool air.



● Electric Wiring Diagram (PCB Ass'y)

CMH1822 / KMH0922



POW-CMH1822

Symbol	Description	Specifications
C1	CAPACITOR	220 μ F 16V
C2	CAPACITOR	22 μ F 16V
C3	CAPACITOR	0.1 μ F 50V
C4	CAPACITOR	0.00022 μ F 50V
C5	CAPACITOR	0.00022 μ F 50V
C6	CAPACITOR	0.047 μ F 50V
C7	CAPACITOR	0.022 μ F 50V
C8	CAPACITOR	0.01 μ F 50V
C9	CAPACITOR	100 μ F 16V
C11	CAPACITOR	22 μ F 16V
C12	CAPACITOR	2.2 μ F 25V
C13	CAPACITOR	2.2 μ F 16V
C14	CAPACITOR	22 μ F 16V
C15	CAPACITOR	2.2 μ F 25V
C16	CAPACITOR	0.022 μ F 50V
C17	CAPACITOR	0.022 μ F 50V
C18	CAPACITOR	0.001 μ F 50V
C19	CAPACITOR	0.001 μ F 50V
C20	CAPACITOR	0.001 μ F 50V
C21	CAPACITOR	0.001 μ F 50V
C22	CAPACITOR	0.001 μ F 50V
C23	CAPACITOR	0.001 μ F 50V
C24	CAPACITOR	0.001 μ F 50V
C25	CAPACITOR	0.022 μ F 50V
C26	CAPACITOR	0.022 μ F 50V
C27	CAPACITOR	0.022 μ F 50V
C28	CAPACITOR	0.01 μ F 50V
C29	CAPACITOR	330 μ F 16V
C30	CAPACITOR	0.022 μ F 50V
D5 to D19	DIODE	DS442X
D21	DIODE	DS135E
D22	DIODE	DS135E
D23 to D31	DIODE	DS442X
D32	DIODE	DS442X
FUSE	FUSE	250V, 3A
IC1	IC	LM6416E336
IC2	IC	HA17555PS
IC3	IC	LA6358
IC4	IC	MC14584BCP
IC5	IC	LC4001B
IC6	IC	LC4071B
IC7	IC	LC4011B
IC8	IC	HA17555PS
Q1	TRANSISTOR	2SC536E, F
Q3	TRANSISTOR	2SC536E, F
Q4	TRANSISTOR	2SA608F, G
Q8	TRANSISTOR	2SA608F, G
Q9	TRANSISTOR	2SC536E, F
Q10	TRANSISTOR	2SA608E, F
Q11	TRANSISTOR	2SA608E, F
Q12	TRANSISTOR	2SC536E, F
Q13	TRANSISTOR	2SA608F, G
Q14	TRANSISTOR	2SA608F, G
Q15	TRANSISTOR	2SA608F, G
Q16	TRANSISTOR	2SC3402
Q17	TRANSISTOR	2SC3402
Q18	TRANSISTOR	2SC3402

POW-CMH1822

Symbol	Description	Specifications
R1	RESISTOR (OXIDE)	300 Ω \pm 10% 3W
R2	RESISTOR (CARBON)	10k Ω \pm 5% 4W
R3	RESISTOR (CARBON)	10k Ω \pm 5% 4W
R4	RESISTOR (CARBON)	10k Ω \pm 5% 4W
R5	RESISTOR (CARBON)	10k Ω \pm 5% 4W
R6	RESISTOR (CARBON)	10k Ω \pm 5% 4W
R7	RESISTOR (CARBON)	10k Ω \pm 5% 4W
R8	RESISTOR (CARBON)	22k Ω \pm 5% 4W
R9	RESISTOR (CARBON)	1M Ω \pm 5% 4W
R10	RESISTOR (CARBON)	5.6k Ω \pm 5% 4W
R11	RESISTOR (CARBON)	390k Ω \pm 5% 4W
R12	RESISTOR (CARBON)	7.5k Ω \pm 5% 4W
R13	RESISTOR (CARBON)	47k Ω \pm 5% 4W
R14	RESISTOR (METAL)	620k Ω \pm 1% 1/4W
R15	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R17	RESISTOR (CARBON)	100 Ω \pm 5% 1/4W
R18	RESISTOR (CARBON)	12k Ω \pm 5% 1/4W
R19	RESISTOR (CARBON)	12k Ω \pm 5% 1/4W
R20	RESISTOR (CARBON)	75k Ω \pm 5% 1/4W
R21	RESISTOR (CARBON)	56k Ω \pm 5% 1/4W
R22	RESISTOR (CARBON)	430k Ω \pm 5% 1/4W
R23	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R24	RESISTOR (CARBON)	7.5k Ω \pm 5% 1/4W
R25	RESISTOR (CARBON)	7.5k Ω \pm 5% 1/4W
R26	RESISTOR (CARBON)	7.5k Ω \pm 5% 1/4W
R27	RESISTOR (METAL)	18k Ω \pm 1% 1/4W
R28	RESISTOR (METAL)	3.6k Ω \pm 1% 1/4W
R29	RESISTOR (METAL)	330k Ω \pm 1% 1/4W
R30	RESISTOR (CARBON)	1.3k Ω \pm 5% 1/4W
R31	RESISTOR (METAL)	16k Ω \pm 1% 1/4W
R32	RESISTOR (METAL)	8.2k Ω \pm 1% 1/4W
R33	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R34	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R35	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R38	RESISTOR (CARBON)	100k Ω \pm 5% 1/4W
R39	RESISTOR (CARBON)	100k Ω \pm 5% 1/4W
R40	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R41	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R42	RESISTOR (CARBON)	100 Ω \pm 5% 1/4W
R43	RESISTOR (CARBON)	100k Ω \pm 5% 1/4W
R44	RESISTOR (CARBON)	100k Ω \pm 5% 1/4W
R45	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R46	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
R47	RESISTOR (CARBON)	3.6k Ω \pm 5% 1/4W
R50	RESISTOR (CARBON)	56k Ω \pm 5% 1/4W
R51	RESISTOR (CARBON)	100 Ω \pm 5% 1/4W
R52	RESISTOR (METAL)	1M Ω \pm 1% 1/4W
R53	RESISTOR (CARBON)	15k Ω \pm 5% 1/4W
R54	RESISTOR (CARBON)	7.5k Ω \pm 5% 1/4W
R55	RESISTOR (CARBON)	3.6k Ω \pm 5% 1/4W
R56	RESISTOR (CARBON)	10k Ω \pm 5% 1/4W
RA	RESISTOR	20K Ω -6 \pm 5% 1/4W
RD	RESISTOR	15K Ω to 24K Ω -5
RY1	RELAY	LZG-24HE
RY2	RELAY	LZG-24HE
RY3	RELAY	LZG-24HE
V	VARISTOR	SNR-A420K
X	CRYSTAL	CSB-400P
ZD	ZENER DIODE	GZA 6.1V
TEST 1	CONNECTOR	171825-2
TEST 2	CONNECTOR	171825-2
TEST 3	CONNECTOR	171825-2
CS	CONNECTOR	2-171825-2

POW-KMH0912A

Symbol	Description	Specifications
C1	CAPACITOR	470μF 50V
C2	CAPACITOR	1μF 50V
C3	CAPACITOR	0.047μF 50V
C4	CAPACITOR	0.022μF 50V
C5	CAPACITOR	1μF 50V
C6	CAPACITOR	10μF 50V
C7	CAPACITOR	0.047μF 50V
C8	CAPACITOR	0.047μF 50V
C9	CAPACITOR	0.0001μF 50V
C10	CAPACITOR	0.00027μF 50V
C11	CAPACITOR	10μF 16V
C12	CAPACITOR	0.047μF 50V
C13	CAPACITOR	0.022μF 60V
C14	CAPACITOR	0.001μF 50V
C15	CAPACITOR	0.001μF 50V
C16	CAPACITOR	0.001μF 50V
C17	CAPACITOR	0.047μF 50V
C18	CAPACITOR	0.001μF 50V
C19	CAPACITOR	0.001μF 50V
C20	CAPACITOR	0.001μF 50V
C21	CAPACITOR	0.047μF 50V
C22	CAPACITOR	0.1μF 50V
C26	CAPACITOR	10μF 50V
CA1	CAPACITOR	0.0047μF-4 50V
CA2	CAPACITOR	0.0047μF-6 50V
BD	BRIDGE DIODE	DBA10C
D1 to D35	DIODE	DS442X
F	FUSE	250V, 3A
IC1	IC	TMS 2600-94002
IC2	IC	LA6458
IC3	IC	LB1234
IC4	IC	LA6458
Q1	TRANSISTOR	2SD313EF
Q2	TRANSISTOR	2SC3402
Q3	TRANSISTOR	2SC3402
Q4	TRANSISTOR	2SC536
Q5	TRANSISTOR	2SC536
Q6	TRANSISTOR	2SC536
Q7	TRANSISTOR	2SC3402
Q8	TRANSISTOR	2SC536
Q9	TRANSISTOR	2SC536
R1	RESISTOR (OXIDE)	100Ω ± 5% 1W
R2	RESISTOR (OXIDE)	1kΩ ± 5% 1W
R3	RESISTOR (METAL)	30kΩ ± 1% 1/4W
R4	RESISTOR (METAL)	56kΩ ± 1% 1/4W
R5	RESISTOR (METAL)	1.5kΩ ± 1% 1/4W
R6	RESISTOR (METAL)	1.3kΩ ± 1% 1/4W
R7	RESISTOR (CARBON)	56kΩ ± 5% 1/4W
R8	RESISTOR (METAL)	150kΩ ± 1% 1/4W
R9	RESISTOR (METAL)	18kΩ ± 1% 1/4W
R10	RESISTOR (METAL)	390kΩ ± 1% 1/4W
R11	RESISTOR (METAL)	900kΩ ± 1% 1/4W
R12	RESISTOR (METAL)	9.1kΩ ± 1% 1/4W
R13	RESISTOR (METAL)	220kΩ ± 1% 1/4W
R14	RESISTOR (METAL)	100Ω ± 1% 1/4W
R15	RESISTOR (METAL)	7.5kΩ ± 1% 1/4W
R16	RESISTOR (CARBON)	240Ω ± 5% 1/4W
R17	RESISTOR (CARBON)	240Ω ± 5% 1/4W
R18	RESISTOR (CARBON)	240Ω ± 5% 1/4W

POW-KMH0912A

Symbol	Description	Specifications
R19	RESISTOR (CARBON)	240Ω ± 5% 1/4W
R20	RESISTOR (CARBON)	470Ω ± 5% 1/4W
R21	RESISTOR (CARBON)	470Ω ± 5% 1/4W
R22	RESISTOR (CARBON)	470Ω ± 5% 1/4W
R23	RESISTOR (CARBON)	470Ω ± 5% 1/4W
R24	RESISTOR (CARBON)	470Ω ± 5% 1/4W
R25	RESISTOR (CARBON)	470Ω ± 5% 1/4W
R26	RESISTOR (CARBON)	270Ω ± 5% 1/4W
R27	RESISTOR (CARBON)	270Ω ± 5% 1/4W
R28	RESISTOR (CARBON)	620Ω ± 5% 1/4W
R29	RESISTOR (CARBON)	620Ω ± 5% 1/4W
R30	RESISTOR (CARBON)	620Ω ± 5% 1/4W
R31	RESISTOR (CARBON)	620Ω ± 5% 1/4W
R32	RESISTOR (CARBON)	20kΩ ± 5% 1/4W
R33	RESISTOR (CARBON)	20kΩ ± 5% 1/4W
R34	RESISTOR (CARBON)	20kΩ ± 5% 1/4W
R35	RESISTOR (CARBON)	4.7kΩ ± 5% 1/4W
R36	RESISTOR (CARBON)	4.7kΩ ± 5% 1/4W
R37	RESISTOR (CARBON)	30kΩ ± 5% 1/4W
R38	RESISTOR (CARBON)	56kΩ ± 5% 1/4W
R39	RESISTOR (CARBON)	100Ω ± 5% 1/4W
R40	RESISTOR (CARBON)	3.3kΩ ± 5% 1/4W
R41	RESISTOR (CARBON)	330kΩ ± 5% 1/4W
R42	RESISTOR (CARBON)	10kΩ ± 5% 1/4W
R43	RESISTOR (CARBON)	20kΩ ± 5% 1/4W
R44	RESISTOR (CARBON)	150Ω ± 5% 1/4W
R45	RESISTOR (CARBON)	5.6kΩ ± 5% 1/4W
R46	RESISTOR (CARBON)	1.8kΩ ± 5% 1/4W
R47	RESISTOR (CARBON)	5.6kΩ ± 5% 1/4W
R48	RESISTOR (CARBON)	1.8kΩ ± 5% 1/4W
R49	RESISTOR (CARBON)	2.7kΩ ± 5% 1/4W
R50	RESISTOR (CARBON)	4.7kΩ ± 5% 1/4W
R51	RESISTOR (CARBON)	10kΩ ± 5% 1/4W
R53	RESISTOR (CARBON)	160kΩ ± 5% 1/4W
R54	RESISTOR (CARBON)	4.7kΩ ± 5% 1/4W
R55	RESISTOR (CARBON)	11kΩ ± 5% 1/4W
R56	RESISTOR (CARBON)	270kΩ ± 5% 1/4W
R57	RESISTOR (CARBON)	82kΩ ± 5% 1/4W
R58	RESISTOR (CARBON)	2.7kΩ ± 5% 1/4W
R59	RESISTOR (CARBON)	4.7kΩ ± 5% 1/4W
R60	RESISTOR (CARBON)	24kΩ ± 5% 1/4W
R61	RESISTOR (CARBON)	5.6kΩ ± 5% 1/4W
R62	RESISTOR (CARBON)	2.7kΩ ± 5% 1/4W
R63	RESISTOR (CARBON)	5.6kΩ ± 5% 1/4W
R64	RESISTOR (CARBON)	2.7kΩ ± 5% 1/4W
RA1	RESISTOR	56KΩ-6 ± 5% 1/4W
RY1	RELAY	LZG-24HE
RY2	RELAY	VB24TBU
RY3	RELAY	LZG-24HME
V	VARISTOR	SNR420K20
X	CRYSTAL	C8B-400P
ZD1	ZENER DIODE	GZB9. 1
ZD2	ZENER DIODE	GZA2. 4X
2P SUP	CONNECTOR	2-173270-2
5P FM	CONNECTOR	2-173270-5
2P PRY	CONNECTOR	8-173270-2
2P SEC	CONNECTOR	5273-02A
2P TH	CONNECTOR	5273-02A-RE
2P TEST	CONNECTOR	171825-2
12P REMO CON1	CONNECTOR	W-P5112#51
5P REMO CON2	CONNECTOR	W-P5105#51
2P HR	CONNECTOR	5273-02A-BL
5P UNIT	CONNECTOR	5273-05A

6. TROUBLESHOOTING

6-1 Check before and after troubleshooting

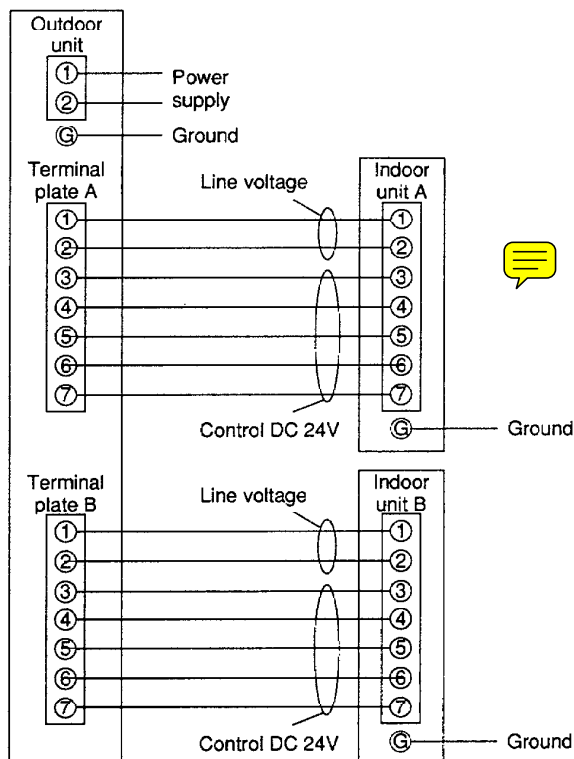
(1) Check power supply wiring.

- Check that power supply wires are correctly connected to terminals No. 1 and No. 2 on the 2P terminal plate in the outdoor unit.

(2) Check inter-unit power wiring and inter-unit control wiring.

- Check that inter-unit lines are correctly connected to the indoor unit from the outdoor unit.

Power supply:
60Hz, single-phase, 230/208V



(3) Check power supply.

- Check that voltage is in specified range ($\pm 10\%$ of the rating).
- Check that power is being supplied.



WARNING:

If the following troubleshooting must be done with power being supplied, be careful about any uninsulated live part that can cause **ELECTRIC SHOCK**.

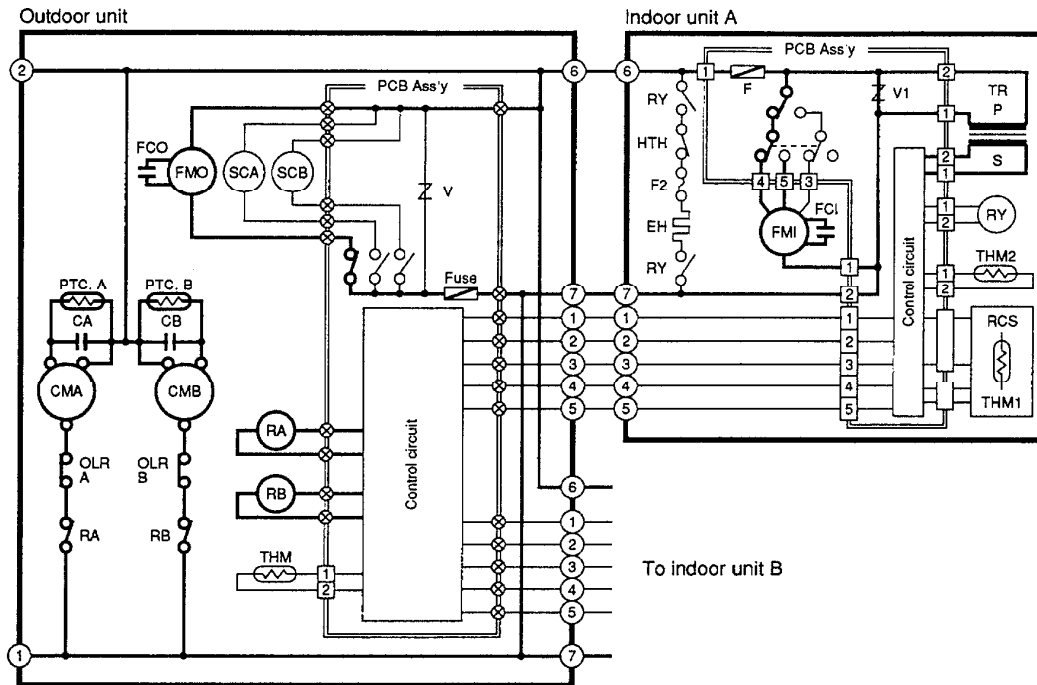
(4) Check lead wires and connectors in indoor and outdoor units.

- Check that coating of lead wires is not damaged.
- Check that lead wires and connectors are connected firmly.
- Check that wiring is correct.

(5) Reference

(a) Condition of general cooling operation

ON/OFF operation button..... ON
 MODE selector switch..... COOL
 Indoor fan speed HIGH
 Thermo. ON



(b) Condition of general heating operation

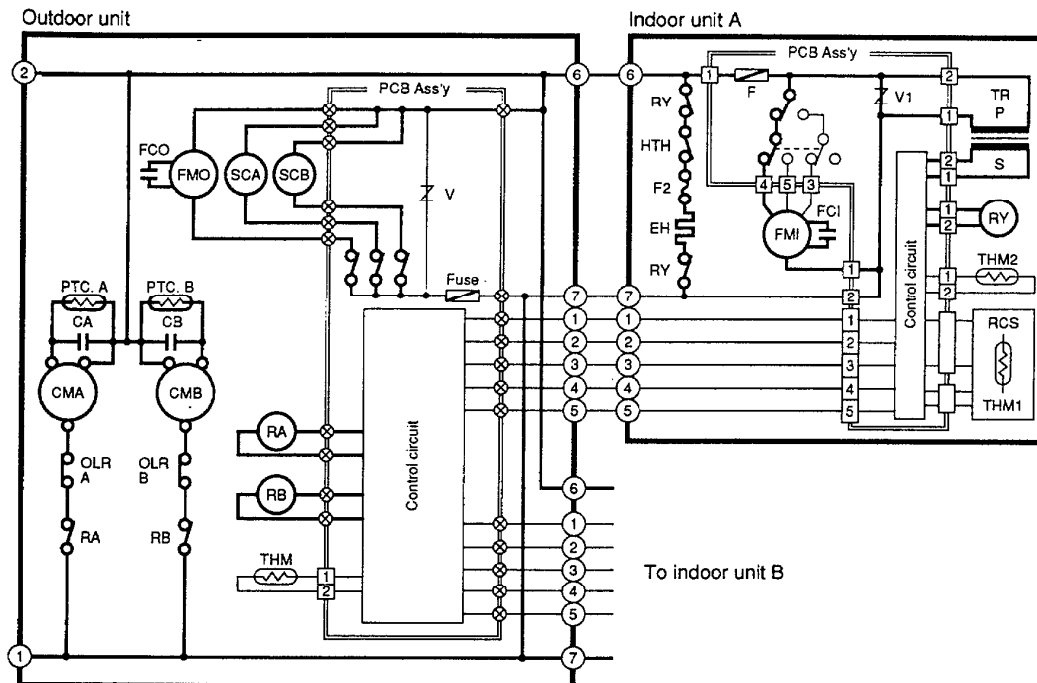
ON/OFF operation button..... ON

MODE selector switch..... HEAT

Indoor fan speed HIGH

Thermo. ON

(Heater ON)



6-2 Air conditioner does not operate.

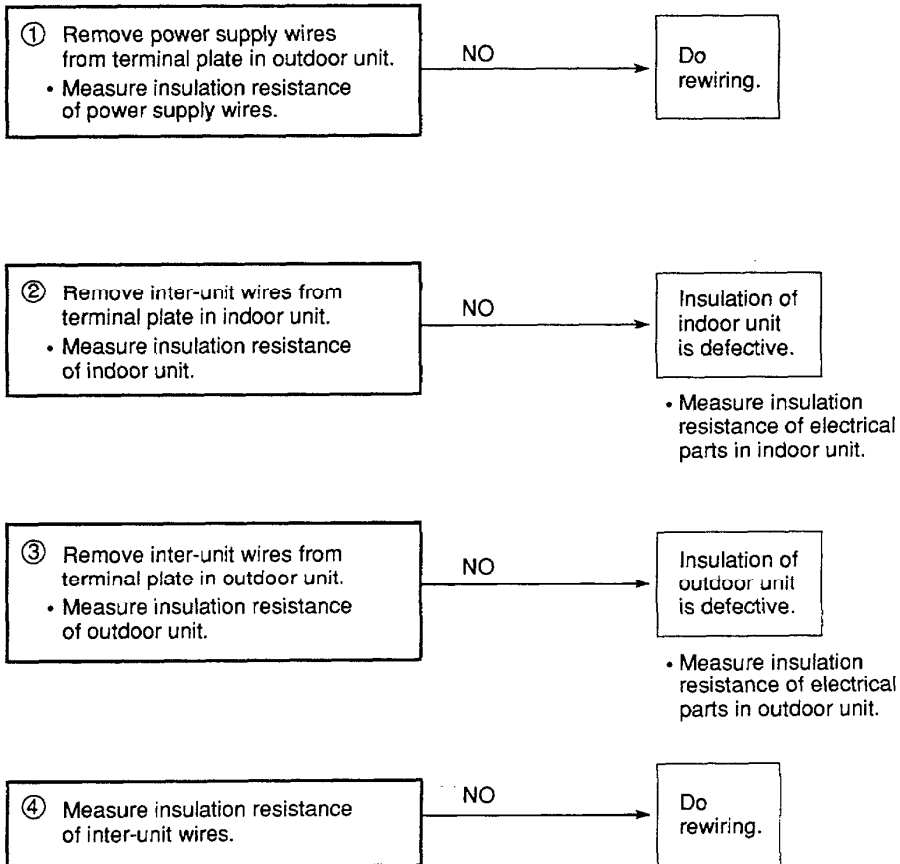
(1) Circuit breaker trips (or fuse blows).

(a) When circuit breaker is set to ON, it trips in a few moments (resetting is not possible).

- There is a possibility of ground fault.
- Measure insulation resistance.

If resistance value is $1\text{M}\Omega$ or less, insulation is defective ("NO").

*Set circuit breaker to OFF.



(b) Circuit breaker trips in several minutes after turning air conditioner ON.

- There is a possibility of short circuit. (Below figure is a case of indoor unit A turning on.)

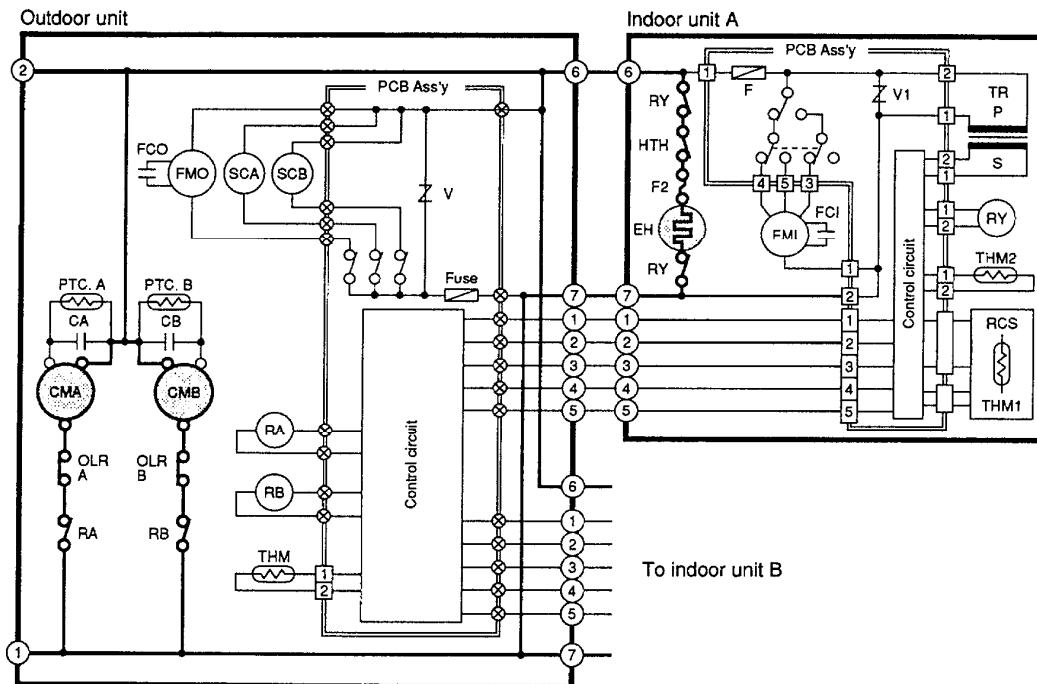
- Check capacity of circuit breaker.

Is capacity of circuit breaker suitable?

Replace it with suitable one (larger capacity).

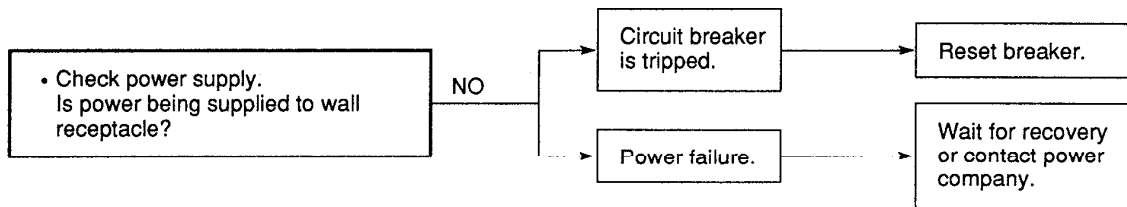
- Measure resistance of compressor motor winding.

- Measure resistance of electric heater.



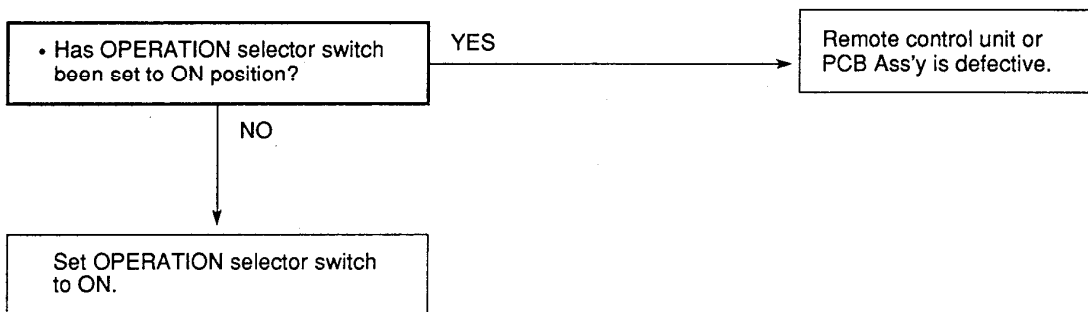
(2) Neither indoor units nor outdoor unit runs.

(a) Power is not supplied.

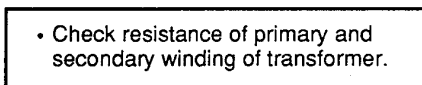


(3) Indoor unit A (or B) and compressor A (or B) do not run.

(a) Check OPERATION selector switch in remote control unit.



(b) Check transformer.



(Indoor unit A (or B) and compressor A (or B) do not run.) (con't)

(c) Check fuse on PCB Ass'y in indoor unit.

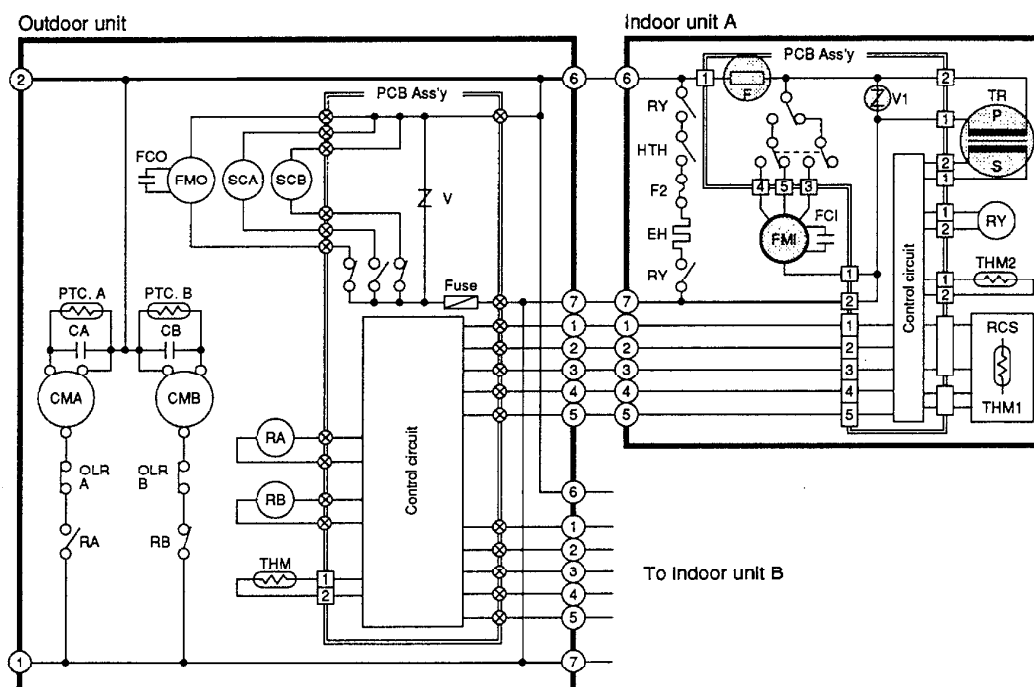
• Check fuse on PCB Ass'y in indoor unit for continuity.

If fuse blows,

• Measure resistance of primary winding of transformer.

OK

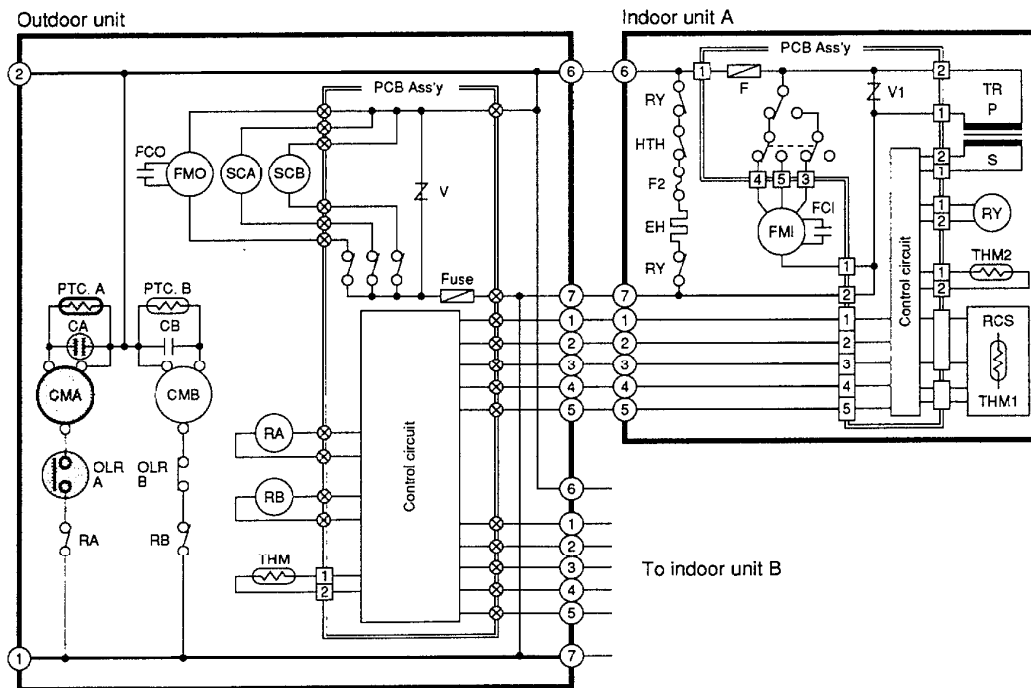
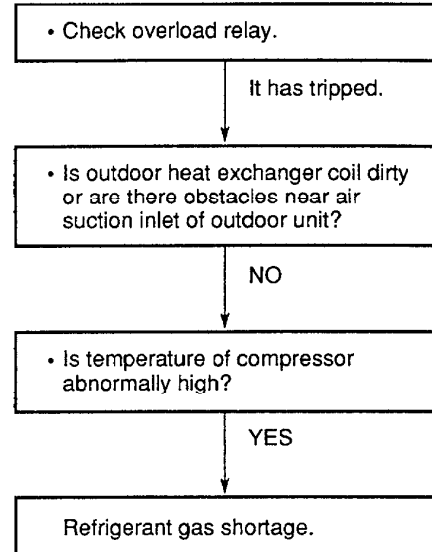
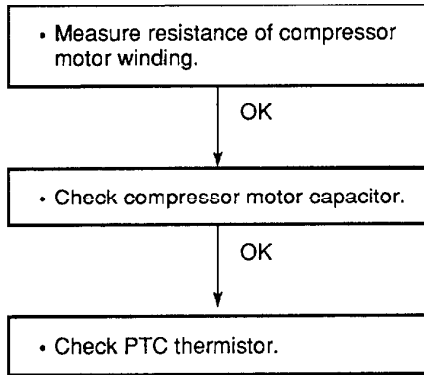
• Measure resistance of indoor fan motor winding.



6-3 A particular component of air conditioner does not operate.

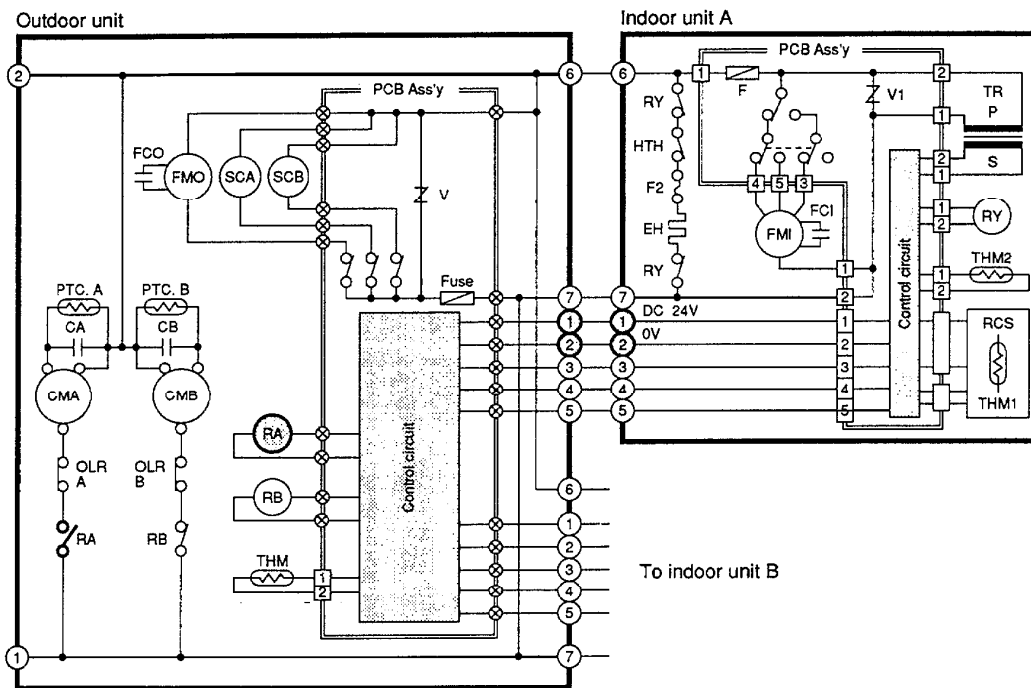
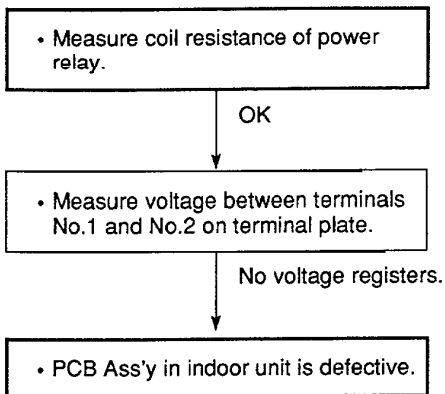
(1) Only compressor motor A (or B) does not run.

● Check compressor.

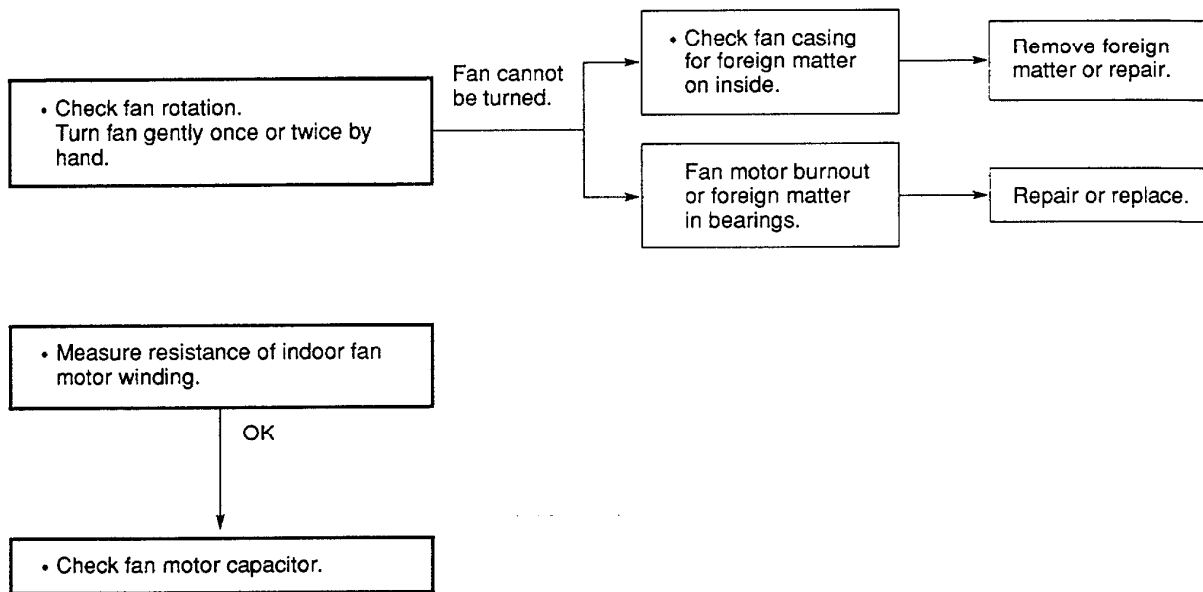


(Only compressor motor A (or B) does not run.) (con't)

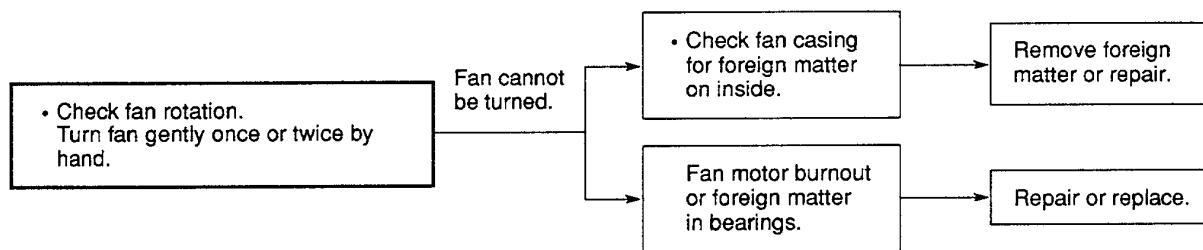
● Check relay or PCB Ass'y.



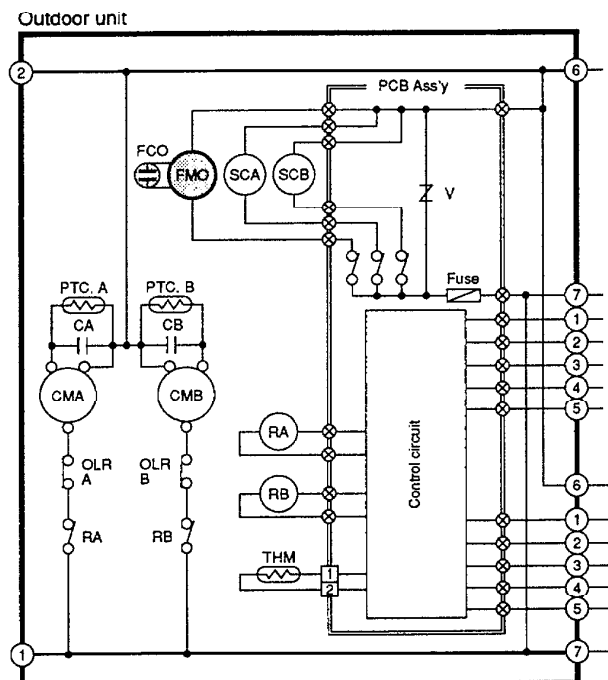
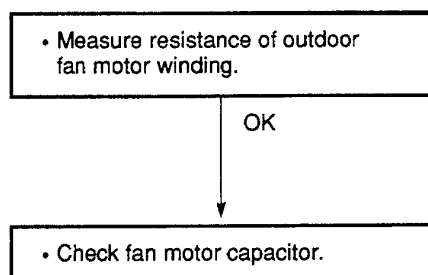
(2) Only indoor fan does not run.



(3) Only outdoor fan does not run.

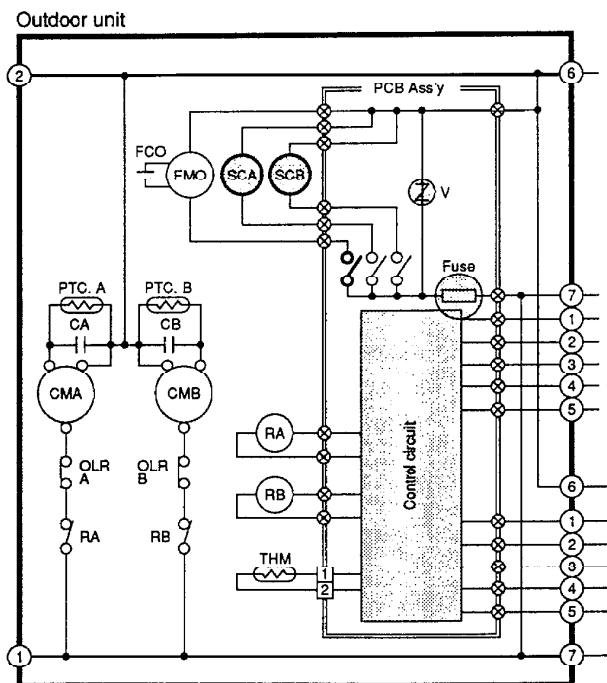
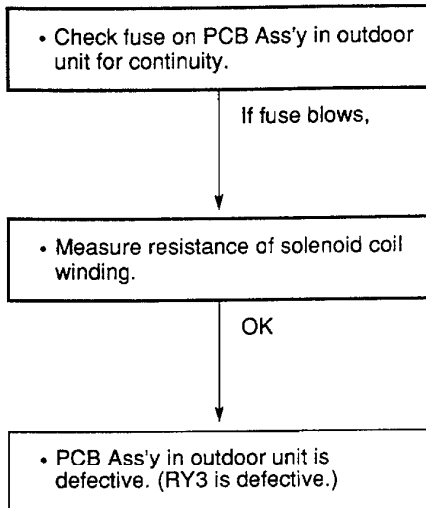


● Check fan motor.



(Only outdoor fan does not run.) cooling only (con't)

● Check fuse on PCB Ass'y in outdoor unit.



7. CHECKING ELECTRICAL COMPONENTS

7-1 Measurement of Insulation Resistance

- The insulation is in good condition if the resistance exceeds 1 MΩ.

(1) Power Supply Wires

Clamp the grounded wire of the power supply wires with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the power wires. (Fig. 1)

Then measure the resistance between the grounded wire and the other power wire. (Fig. 1)

(2) Indoor Unit

Clamp an aluminum plate fin or copper tube with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on ⑥, and then ⑦ on the terminal plate. (Fig. 2)

(3) Outdoor Unit

Clamp a metallic part of the unit with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on ①, and then ② on the terminal plate. (Fig. 2)

(4) Measurement of Insulation Resistance for Electrical Parts

Disconnect the lead wires of the desired electric part from terminal plate, PCB Ass'y, capacitor, etc. Similarly disconnect the connector. Then measure the insulation resistance. (Figs. 1 to 4)

Refer to Electric Wiring Diagram.

Note: If the probe cannot enter the poles because the hole is too narrow then use a probe with a thinner pin.

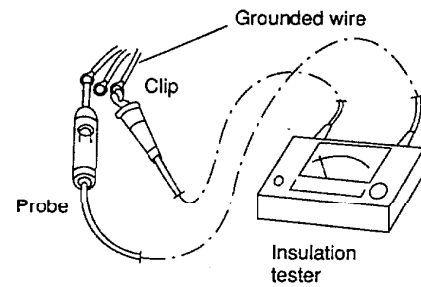


Fig. 1

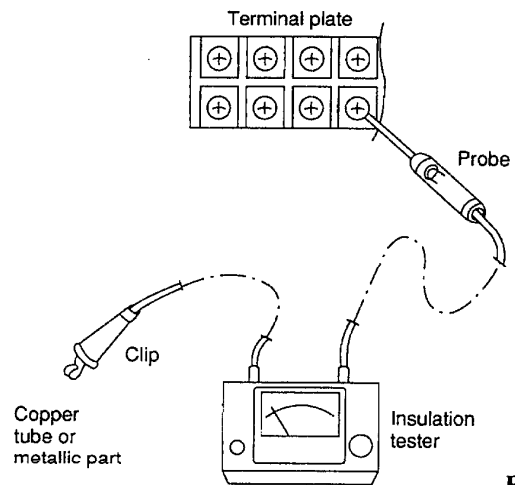


Fig. 2

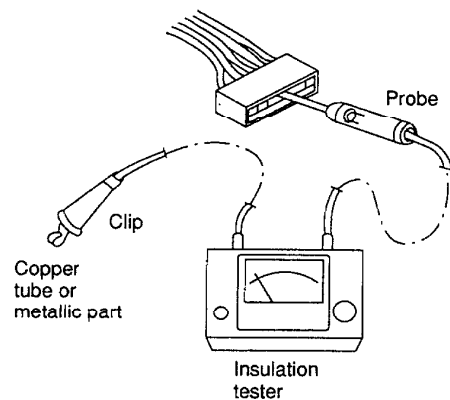


Fig. 3

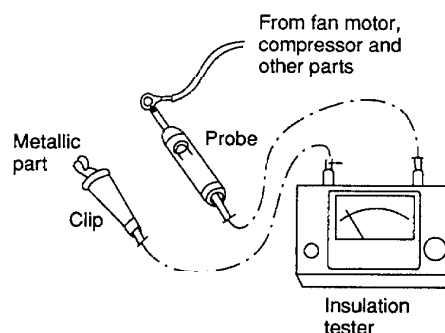


Fig. 4

7-2 Checking Continuity of Fuse on PCB Ass'y

- Check for continuity using a multimeter as shown in Fig. 5.

Note:

Method Used to Replace Fuse on PCB Ass'y

1. Remove the PCB Ass'y from the electrical component box.
2. Pull out the fuse at the metal clasp using pliers while heating the soldered leads on the back side of the PCB Ass'y with a soldering iron (30W or 60W). (Fig. 6)
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:

When replacing the fuse, be sure not to break down the varistor.

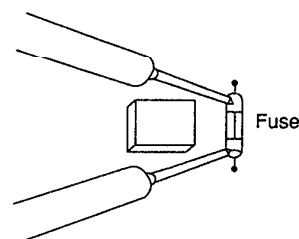


Fig. 5

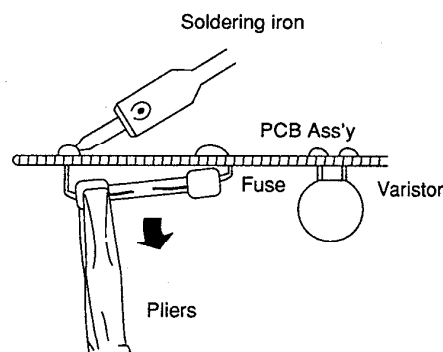


Fig. 6

7-3 Checking Motor Capacitor

Remove the lead wires from the capacitor terminals, and then place a probe on the capacitor terminals as shown in Fig. 7. Observe the deflection of the pointer, setting the resistance measuring range of the multimeter to the maximum value.

The capacitor is "good" if 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.

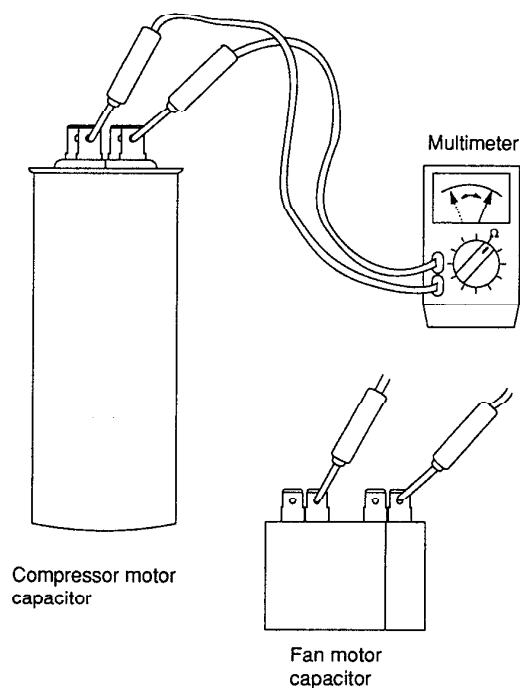


Fig. 7

7-4 Appearance of Electrical Parts

(1) Power Relay

G4F-11123T-TS

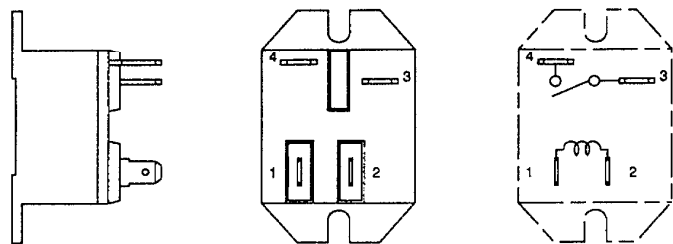


Fig. 8

(2) Heater Relay

G4E-2123T-US

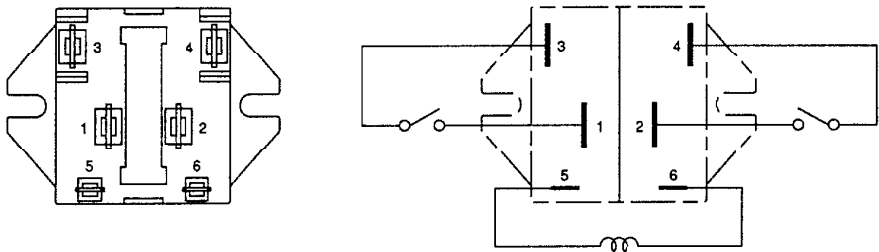


Fig. 9