

# SERVICE MANUAL



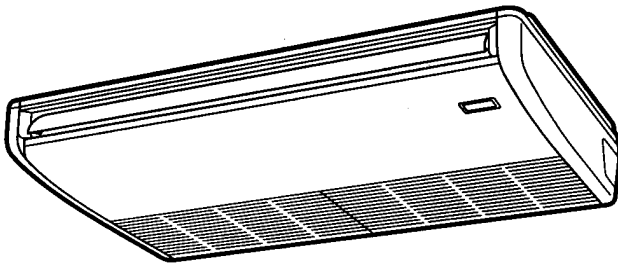
FILE NO.

TS2432 / C2432, CL2432

## SPLIT SYSTEM AIR CONDITIONER

INDOOR MODEL No.	PRODUCT CODE No.	OUTDOOR MODEL No.	PRODUCT CODE No.
TS2432	854 013 38	C2432	854 013 43
		CL2432	854 013 39

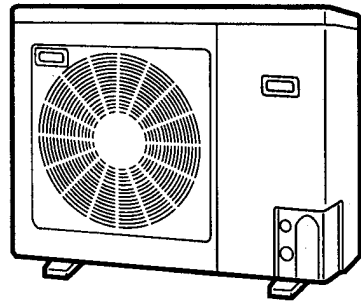
Indoor Unit



TS2432



Outdoor Unit



C2432  
CL2432

Section

1

2

3

4

(2) Air Conditioner does not Operate

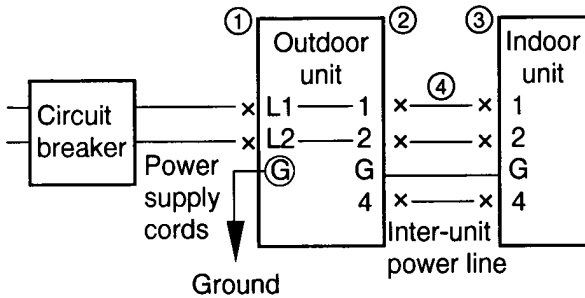
① Circuit breaker trips (or fuse blows).

(a) When the circuit breaker is set to ON, it is tripped soon.

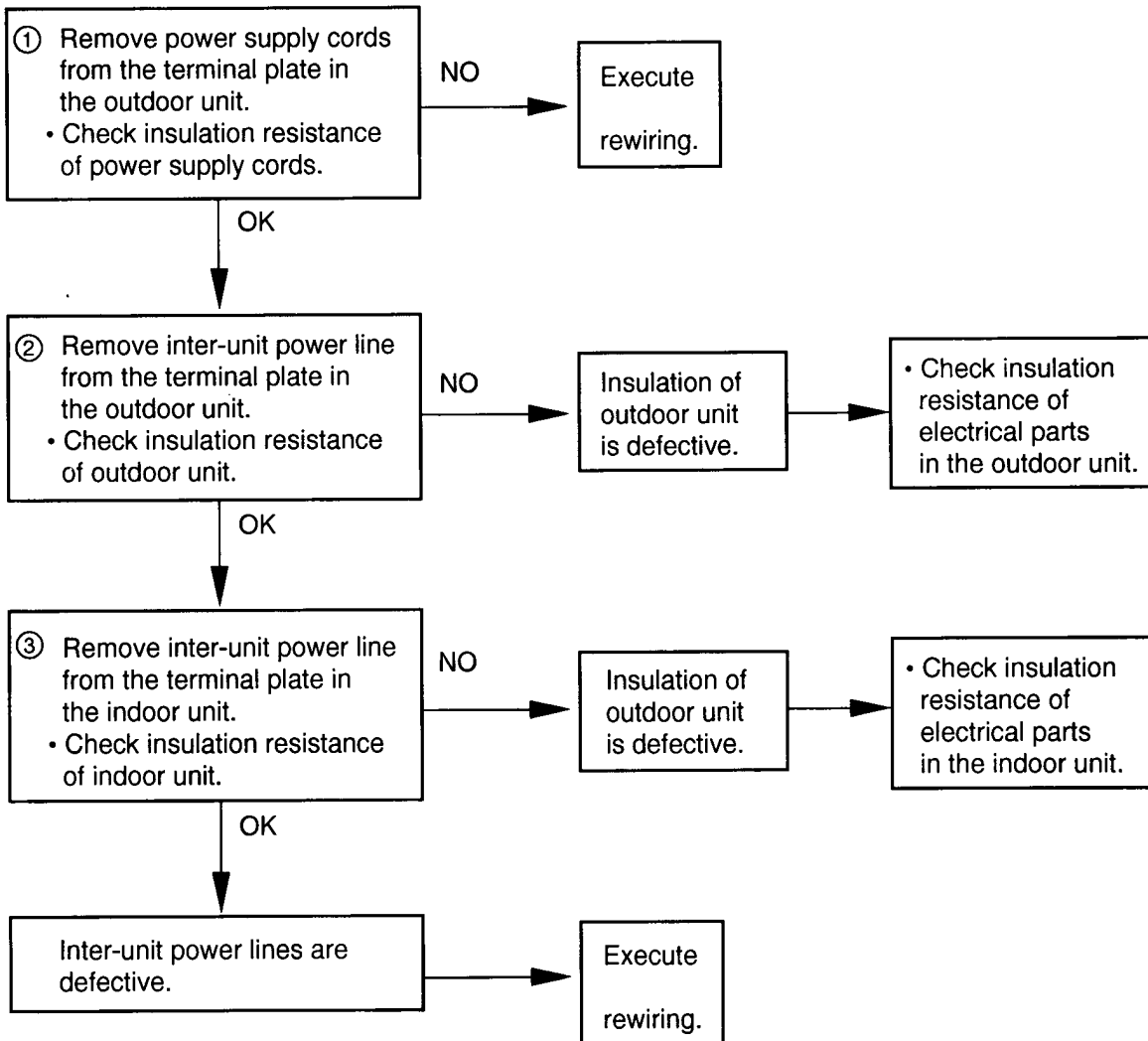
- There is a possibility of ground fault.
- Check insulation resistance.

If resistance value is 1 MΩ or less, it is a defect of insulation.

(Example)



\*Set the circuit breaker to OFF.



# WHO SHOULD USE THIS MANUAL

This service manual is made to assist the service technician apply his knowledge and training to this model air conditioner. This manual is written both for **experienced service persons** and **those who are new** to air conditioning service. To help those with less experience or who are new to this kind of unit we have included more explanations of basic procedures in simple language than is usual in some service manuals. The **experienced technician** will of course find he knows many of these things already and can go directly to the procedures and information he needs; the less experienced technician will better understand what to do even before he arrives on the job, and therefore be better able to work by himself as well as assist the more experienced technician.

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# Introduction: *Read Me First!*

This manual will help you understand and service the air conditioner. To help you find the information you need, we have divided it into 5 main sections. Each section is divided into chapters with charts, tables and explanations to help you find and repair problems.

- ❑ **Section 1: Specifications**, tells you about the physical and electrical make up of the unit, as well as its heating and cooling capacities. Look in this section to find the correct values for components and functions.
- ❑ **Section 2: Processes and Functions**, explains each different part of the cooling and heating cycle, and how each control function reacts to changing conditions to keep the room at the set temperature range.
- ❑ **Section 3: Electrical Data**, which has fold-out schematic and wiring diagrams so you can find the parts you need to check when something is wrong, and see how they should be connected.
- ❑ **Section 4: Service Procedures**, has two main parts, a *diagnostic* chapter to help you find the specific component to replace or adjust, and a chapter with specific procedures and values to guide you in checking the electrical components in the unit.

## HOW TO USE THIS MANUAL

You can use this manual both as a *reference* to find specific information about the capacity, functions and construction of this unit, and as a source of information to help you set up and maintain the unit.

When this unit is not working properly, and the cause is not known, you can use the procedures in **Section 3: Servicing Procedures** to find the problem, fix it, and restore the unit to its proper functioning.

This air conditioner has many helpful self diagnostic features to help you identify problem areas quickly.

So you will be ready when a problem happens, we suggest you look this manual over and become familiar with it by following these steps:

1. **Look at the TABLE OF CONTENTS** to get an idea of what is in this manual and where to find it.
2. **Look at the chapter about TROUBLE SHOOTING**, so you are familiar with the way the flow charts work. They are designed to guide you quickly through the possible causes for each kind of problem that is likely to happen to the Unit. Particularly read the introduction to this section, and the parts about the self-diagnosis and error codes which show on the display.
3. **Look at the chapter about CHECKING ELECTRICAL COMPONENTS**. You already know about most of these procedures. This chapter gives you the specific values and methods for these components. If you don't know some of these procedures, you can easily learn them here.
4. **Read the Instruction Manual!** The Instruction Manual is included here because it helps you help the user to set the temperature controls properly and know how to take care of any simple problems that may happen, as well as know when to call for service. The Instruction Manual also has illustrations, care, and installation information not found in the rest of the service manual. It is short, and if you read it carefully, you will be able to answer the customers questions easily, and also know the most efficient ways for setting times and temperatures.

Please use this manual to make your work easier, keep the air conditioner functioning well, and keep your customers satisfied.

# 1. SPECIFICATIONS

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**1-1 Unit Specifications**

1

MODEL No.		Indoor Unit		TS2432			
		Outdoor Unit		C2432			
POWER SOURCE				230 - 208 V / 1 Phase / 60 Hz			
PERFORMANCE				Cooling			
Capacity	BTU / h	24,000	23,400				
	kW	7.03	6.86				
Air circulation (Hi)	cu.ft. / min.	460	410				
Moisture removal (High)	Pints / h	7.1	6.9				
ELECTRICAL RATINGS							
Voltage rating	V	230	208				
Available voltage range	V	187 - 253					
Running amperes*	A	11.3	11.9				
Max. running amperes**	A	13.0	13.9				
Power input	W	2,420	2,360				
Power factor	%	93	95				
S.E.E.R	BTU / Wh	10.0	10.0				
Max. starting amperes	A	68	62				
FEATURES							
Controls			Microprocessor				
Timer			ON / OFF 24-hours & Program				
Fan speed Indoor / Outdoor			3 and Automatic control / 2 (Auto)				
Air deflection	Horizontal / Vertical		Manual / Automatic				
Air filter			Washable, easy access				
Remote controller (Accessory)			RCS - 5PS4U				
Refrigerant control			Capillary tube				
Refrigerant tubing connections			Flare type				
Compressor			Rotary				
Operation sound	Indoor - Hi / Me / Lo	dB - A	39 / 37 / 33				
	Outdoor - Hi	dB - A	53				
REFRIGERANT TUBING							
Limit of tubing length	ft. (m)	132 (40)					
Limit of tubing length at shipment	ft. (m)	50 (15)					
Limit of elevation difference between the two units	ft. (m)	Outdoor unit is higher than indoor unit: 132 (40) Outdoor unit is lower than indoor unit: 83 (25)					
Refrigerant tube outer diameter	Narrow tube	in. (mm)	1 / 4 (6.35)				
	Wide tube	in. (mm)	3 / 4 (19.05)				
Refrigerant amount at shipment	lbs. (kg)	R22 : 5.3 (2.4)					
DIMENSIONS & WEIGHT				Indoor unit		Outdoor unit	
Unit dimensions	Height	in. (mm)	7-15/32	(190)	28-15/16	(735)	
	Width	in. (mm)	51-3/16	(1,300)	37	(940)	
	Depth	in. (mm)	26-3/8	(670)	13-3/8	(340)	
Package dimensions	Height	in. (mm)	9-14/32	(240)	32-17/32	(826)	
	Width	in. (mm)	54-19/32	(1,387)	40	(1,016)	
	Depth	in. (mm)	29-31/32	(761)	16-12/32	(416)	
Net weight	lbs. (kg)	57	(26)	150	(68)		
Shipping weight	lbs. (kg)	75	(34)	165	(75)		
Shipping volume	cu.ft. (m³)	8.9	(0.253)	12.3	(0.349)		

Cooling :

DATA SUBJECT TO CHANGE WITHOUT NOTICE

Rating conditions (\*) : Indoor air temperature 80 °F DB / 67 °F WB, Outdoor air temperature 95 °F DB / 75 °F WB

Full load conditions (\*\*) : Indoor air temperature 80 °F DB / 67 °F WB, Outdoor air temperature 115 °F DB

1-1 Unit Specifications

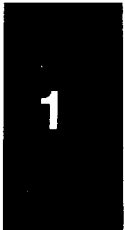
MODEL No.		Indoor Unit		TS2432	
		Outdoor Unit		CL2432	
POWER SOURCE				230 - 208 V / 1 Phase / 60 Hz	
PERFORMANCE				Cooling	
Capacity	BTU / h	24,000		23,400	
	kW	7.03		6.86	
Air circulation (Hi)	cu.ft. / min.	460		410	
Moisture removal (High)	Pints / h	7.1		6.9	
ELECTRICAL RATINGS					
Voltage rating	V	230		208	
Available voltage range	V	187 - 253			
Running amperes*	A	11.3		11.9	
Max. running amperes**	A	13.0		13.9	
Power input	W	2,420		2,360	
Power factor	%	93		95	
S.E.E.R	BTU / Wh	10.0		10.0	
Max. starting amperes	A	68		62	
FEATURES					
Controls		Microprocessor			
Low ambient control		Built-in 0 °F			
Timer		ON / OFF 24-hours & Program			
Fan speed Indoor / Outdoor		3 and Automatic control / 3 (Auto)			
Air deflection	Horizontal / Vertical	Manual / Automatic			
Air filter		Washable, easy access			
Remote controller (Accessory)		RCS - 5PS4U			
Refrigerant control		Capillary tube			
Refrigerant tubing connections		Flare type			
Compressor		Rotary			
Operation sound	Indoor - Hi / Me / Lo Outdoor - Hi	dB - A dB - A	39 / 37 / 33 53		
REFRIGERANT TUBING					
Limit of tubing length		ft. (m)	132 (40)		
Limit of tubing length at shipment		ft. (m)	50 (15)		
Limit of elevation difference between the two units		ft. (m)	Outdoor unit is higher than indoor unit: 132 (40) Outdoor unit is lower than indoor unit: 83 (25)		
Refrigerant tube outer diameter	Narrow tube	in. (mm)	1 / 4 (6.35)		
	Wide tube	in. (mm)	3 / 4 (19.05)		
Refrigerant amount at shipment		lbs. (kg)	R22 : 5.5 (2.5)		
DIMENSIONS & WEIGHT				Indoor unit	
Unit dimensions	Height	in. (mm)	7-15/32 (190)	28-15/16 (735)	
	Width	in. (mm)	51-3/16 (1,300)	37 (940)	
	Depth	in. (mm)	26-3/8 (670)	13-3/8 (340)	
Package dimensions	Height	in. (mm)	9-14/32 (240)	32-17/32 (826)	
	Width	in. (mm)	54-19/32 (1,387)	40 (1,016)	
	Depth	in. (mm)	29-31/32 (761)	16-12/32 (416)	
Net weight		lbs. (kg)	57 (26)	152 (69)	
Shipping weight		lbs. (kg)	75 (34)	168 (76)	
Shipping volume		cu.ft. (m³)	8.9 (0.253)	12.3 (0.349)	

Cooling :

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Rating conditions (\*) : Indoor air temperature 80 °F DB / 67 °F WB, Outdoor air temperature 95 °F DB / 75 °F WB

Full load conditions (\*\*) : Indoor air temperature 80 °F DB / 67 °F WB, Outdoor air temperature 115 °F DB



**1-2 Major Component Specifications**

**(A) Indoor Unit**

<b>MODEL No.</b>		<b>TS2432</b>	
<b>Source</b>		<b>230 - 208 V / 1 phase / 60 Hz</b>	
<b>Remote controller (Accessory)</b>		<b>RCS - 5PS4U</b>	
<b>Controller P. C. B Ass'y</b>		<b>CR - TS2432</b>	
<b>Control circuit fuse</b>		<b>250 V, 3 A</b>	
<b>Switch Ass'y</b>		<b>SW - X363GS</b>	
<b>Fan (Number ... diameter)</b>	<b>in. (mm)</b>	<b>Centrifugal (4 ... 5-1/8(130))</b>	
<b>Fan motor</b>			
<b>Model</b>		<b>SR4X - 51A6P</b>	
<b>Source</b>		<b>230 - 208 V / 1 phase / 60 Hz</b>	
<b>No. of pole ... r.p.m. (230 V, High)</b>	<b>rpm</b>	<b>1,187</b>	
<b>Nominal output</b>	<b>W</b>	<b>31</b>	
<b>Coil resistance (Ambient temperature 68 °F)</b>	<b>Ω</b>	<b>BRW - WHT : 111.0 , ORG - YEL : 16.7</b> <b>WHT - VLT : 35.4 , BLK - PNK : 23.9</b> <b>VLT - ORG : 13.4 , YEL - BLK : 136.6</b>	
<b>Safety device</b>			
<b>Operating temperature</b>	<b>Open °F</b>	<b>266 ± 14.4</b>	
	<b>Close °F</b>	<b>174.2 ± 27</b>	
<b>Run capacitor</b>	<b>VAC, μF</b>	<b>440 V, 1.5 μF</b>	
<b>Heat exchanger</b>			
<b>Coil</b>		<b>Aluminum plate fin / Copper tube</b>	
<b>Rows ... Fins per inch</b>		<b>3 ... 14.9</b>	
<b>Face area</b>	<b>ft.<sup>2</sup> (m<sup>2</sup>)</b>	<b>1.81 (0.168)</b>	
<b>Auto louver motor</b>			
<b>Model No.</b>		<b>MT8 - 3C</b>	
<b>Auto louver motor ... Rated</b>	<b>V, W, rpm</b>	<b>240 VAC, 3 W, 3 rpm</b>	
<b>Coil resistance (Ambient temperature 77 °F)</b>	<b>Ω</b>	<b>16,430 Ω ± 8 %</b>	

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**1-2 Major Component Specifications  
(B) Outdoor Unit**

<b>MODEL No.</b>		<b>C2432</b>	
<b>Source</b>		<b>230 - 208 V / 1 phase / 60 Hz</b>	
<b>Compressor</b>		Rotary (Hermetic)	
Model		C - 2R170H6S	
Source		230 - 208 V / 1 phase / 60 Hz	
Nominal output	W	1,700	
Compressor oil	cc	800	
Coil resistance (Ambient temperature 77 °F)	Ω	C - R : 0.885 , C - S : 1.773	
<b>Safety device</b>		Internal type	
Overload relay models		—	
Operating temperature	Open °F	297 ± 9	
	Close °F	198 ± 20	
Operating ampere (at 77 °F)	A	—	
Run capacitor	VAC, μF	400 V, 40 μF	
<b>Refrigerant amount charged at shipment</b>	lbs. (kg)	R22 : 5.3 (2.4)	
<b>High pressure switch</b>		ACB - 1UB11	
Set pressure	OFF kg/cm <sup>2</sup>	30 ± 0.5	
	ON kg/cm <sup>2</sup>	24 ± 2.0	
<b>Fan</b>		Propeller	
Number...diameter	in. (mm)	1 ... 18-3/32 (460)	
<b>Fan speeds</b>		2 (AUTO)	
<b>Fan motor</b>		KFC6T - 91D6P	
Source		230 - 208 V / 1 phase / 60 Hz	
No. of pole ... rpm (230 V, High)	rpm	6 ... 879	
Nominal output	W	110	
Coil resistance (Ambient temperature 68 °F)	Ω	BRW - WHT : 67.14 , VLT - YEL : 11.42 WHT - VLT : 64.85 , YEL - PNK : 10.60	
<b>Safety device</b>			
Operating temperature	Open °F	248 ± 41	
	Close °F	171 ± 59	
Run capacitor	VAC, μF	440 V, 4 μF	
<b>Heat exchanger</b>		Aluminum plate fin / Copper tube	
Coil		Aluminum plate fin / Copper tube	
Rows ... Fins per inch		2 ... 14.1	
Face area	ft. <sup>2</sup> (m <sup>2</sup> )	6.63 (0.616)	

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**1-2 Major Component Specifications**  
**(B) Outdoor Unit**

1

<b>MODEL No.</b>		<b>CL2432</b>	
<b>Source</b>		<b>230 - 208 V / 1 phase / 60 Hz</b>	
<b>Controller P.C.B. Ass'y</b>		CR - CL2432 (Microprocessor)	
Control circuit fuse		250 V, 3 A	
<b>Compressor</b>		Rotary (Hermetic)	
Model		C - 2R170H6S	
Source		230 - 208 V / 1 phase / 60 Hz	
Nominal output	W	1,700	
Compressor oil	cc	800	
Coil resistance (Ambient temperature 77 °F)	Ω	C - R : 0.885 , C - S : 1.773	
Safety device		Internal type	
Overload relay models		—	
Operating temperature	Open °F	297 ± 9	
	Close °F	198 ± 20	
Operating ampere (at 77 °F)	A	—	
Run capacitor	VAC, μF	400 V, 40 μF	
Crank case heater	V, W	230 V, 30 W	
<b>Refrigerant amount charged at shipment</b>	lbs. (kg)	R22 : 5.5 (2.5)	
<b>High pressure switch</b>		ACB - 1UB11	
Set pressure	OFF kg/cm <sup>2</sup>	30 + 2.0 + 0.5	
	ON kg/cm <sup>2</sup>	24 ± 2.0	
<b>Fan</b>		Propeller	
Number...diameter	in. (mm)	1 ... 18 - 3/32 (460)	
<b>Fan speeds</b>		3 (AUTO)	
<b>Fan motor</b>		KFC6T - 91D6P	
Model		KFC6T - 91D6P	
Source		230 - 208 V / 1 phase / 60 Hz	
No. of pole ..... rpm (230 V, High)		6 ... 879	
Nominal output	W	110	
Coil resistance (Ambient temperature 68 °F)	Ω	BRN - WHT : 67.14 , VLT - YEL : 11.42 WHT - VLT : 64.85 , YEL - PNK : 10.60	
Safety device		Internal type	
Operating temperature	Open °F	248 ± 41	
	Close °F	171 ± 59	
Run capacitor	VAC, μF	440 V, 4 μF	
<b>Heat exchange</b>		Aluminum plate fin / Copper tube	
Coil		Aluminum plate fin / Copper tube	
Rows ..... Fins per inch		2 ... 14.1	
Face area	ft. <sup>2</sup> (m <sup>2</sup> )	6.63 (0.616)	

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**1-3 Other Component Specifications**

**(A) Indoor Unit**

<b>MODEL No.</b>		<b>TS2432</b>	
<b>Power Transformer</b>		<b>ATR - I104A</b>	
Rated	Primary	AC 220 V, 60 Hz	
	Secondary	10.6 V, 0.93 A	
	Capacity	9.85 VAC	
Coil resistance (Ambient temprature 77 °F)	Ω	WHT - WHT : 101 , BRN - BRN : 0.42	
Thermistor cut off temperature	°F	266	
<b>Thermistor (Coil sensor)</b>		<b>PBC - 41E - S14</b>	
Coil resistance	kΩ	14 °F : 23.7	41 °F : 12.1
		23 °F : 18.8	50 °F : 9.7
		32 °F : 15.0	59 °F : 8.0
<b>Thermistor (Room or coil sensor)</b>		<b>KTEC - 35 - S6</b>	
Coil resistance	kΩ	32 °F : 16.5	104 °F : 2.7
		41 °F : 12.8	113 °F : 2.2
		50 °F : 10.0	122 °F : 1.8
		68 °F : 6.3	131 °F : 1.5
		86 °F : 4.0	
<b>Switch Ass'y</b>		<b>SW - X363GS</b>	
<b>Indicator Lamp Ass'y</b>		<b>IND - TS2432</b>	
<b>Synchronized Motor</b>		<b>MT8 - 3C</b>	

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**1-3 Other Component Specifications**  
**(B) Outdoor Unit**

<b>MODEL No.</b>		<b>C2432</b>
<b>Compressor Motor Magnetic Contactor</b>		<b>FMCA - 1UL</b>
Coil rated		AC 240 V, 60 Hz
Coil resistance (at 77 °F)	Ω	580 ± 15 %
Contact rated (Main)		AC 230 V, 20 A
Contact rated (Auxiliary)		AC 230 V, 3 A
<b>Power Relay</b>		<b>HH62S</b>
Coil rated		AC 240 V, 60 Hz
Coil resistance (at 77 °F)	kΩ	17.2
Contact rated		AC 220 V, 5 A
<b>Thermostat (Coil sensor)</b>		<b>YTB - 4U305F</b>
Operating Temperature	°F	79 ± 3 OFF 75 ± 1 ON
Contact rated		200 to 240 V, 1 A
<b>Thermistor (PTC)</b>		<b>TDK - 101YV</b>
Rated		
Max. voltage		AC 400 V
Max. ampere		11.5 A
Resistance (at 77 °F)	Ω	100 $\pm$ $\frac{30}{20}$ %

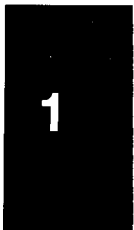
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**1-3 Other Component Specifications**

**(B) Outdoor Unit**

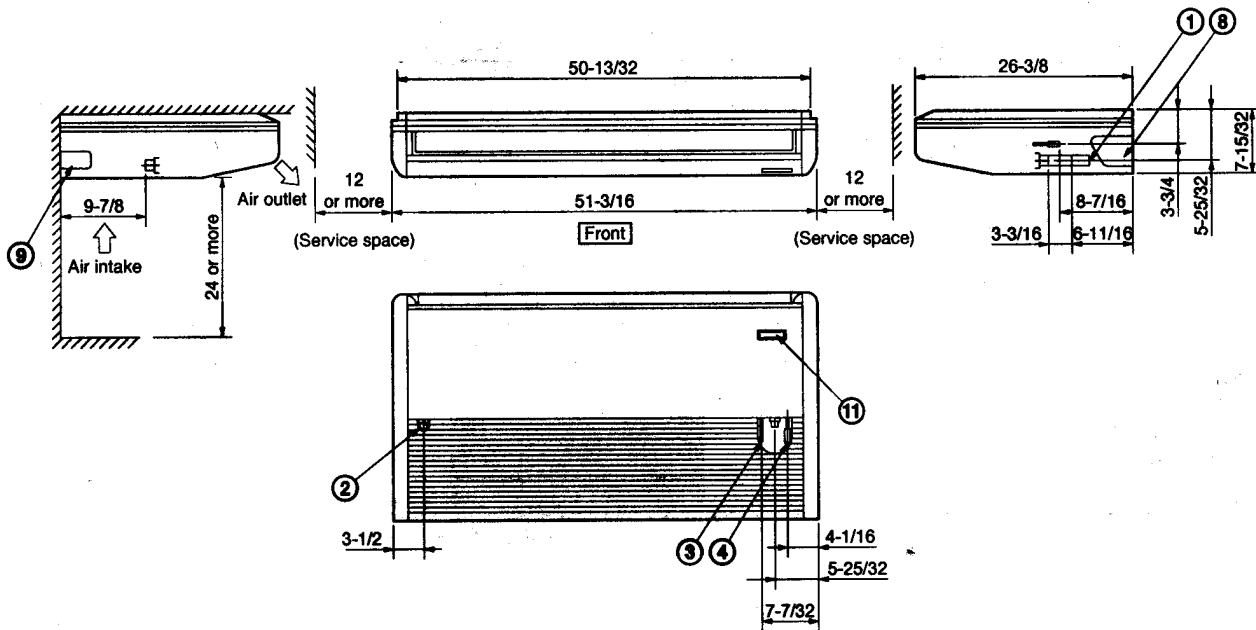
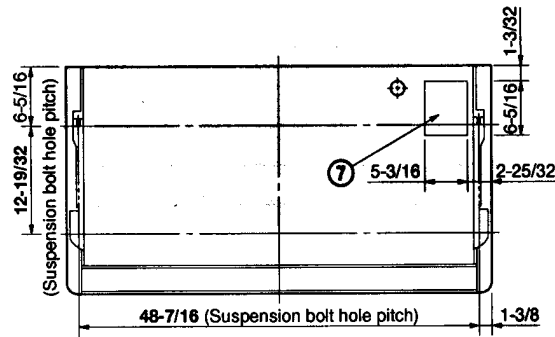
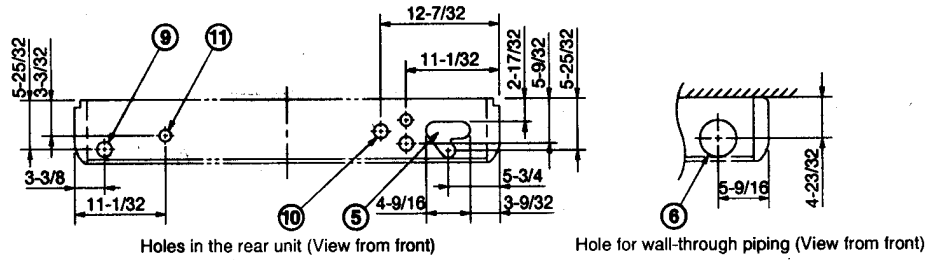
<b>MODEL No.</b>		<b>CL2432</b>	
<b>Compressor Motor Magnetic Contactor</b>		<b>FMCA - 1UL</b>	
Coil rated		AC 240 V, 60 Hz	
Coil resistance (at 77 °F)	Ω	580 ± 15 %	
Contact rated (Main)		AC 230 V, 20 A	
Contact rated (Auxiliary)		AC 230 V, 3 A	
<b>Power Relay</b>		<b>HH62S</b>	
Coil rated		AC 240 V, 60 Hz	
Coil resistance (at 77 °F)	kΩ	17.2	
Contact rated		AC 220 V, 5 A	
<b>Power Transformer</b>		<b>ATR - I35B</b>	
Rated			
Primary		AC 220 V, 60 Hz	
Secondary		14 V, 0.2 A	
Capacity		2.8 VAC	
Coil resistance (at 78 °F)	Ω	WHT – WHT : 482.5 , BRN – BRN : 3.95	
Thermal cut off temperature	°F	266	
<b>Thermistor (Outdoor Temp. sensor)</b>		<b>PBC - 41E - S26</b>	
Coil resistance	kΩ	14 °F : 23.7 , 50 °F : 9.7 23 °F : 18.8 , 68 °F : 6.5 32 °F : 15.0 , 86 °F : 4.4 41 °F : 12.1 , 104 °F : 3.1 , 113 °F : 2.6	
<b>Solenoid control valve or coil</b>			
Solenoid control valve		NEV - 603DXFU (HOT GAS BYPASS)	
Solenoid coil		NEV - MOAQ505UB0	
<b>Thermistor (PTC)</b>		<b>TDK – 101YV</b>	
Rated			
Max. voltage		AC 400 V	
Max. ampere		11.5 A	
Resistance (at 77 °F)	Ω	100 ± <sup>30</sup> / <sub>20</sub> %	

DATA SUBJECT TO CHANGE WITHOUT NOTICE



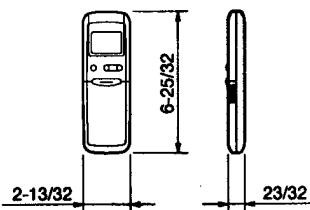
## 1-4 Dimensional Data

### (A) Indoor Unit: TS2432



Dimension : inch

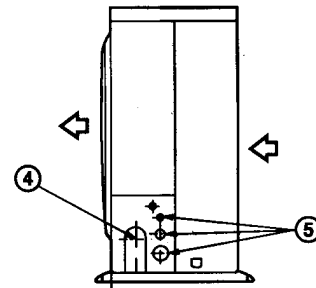
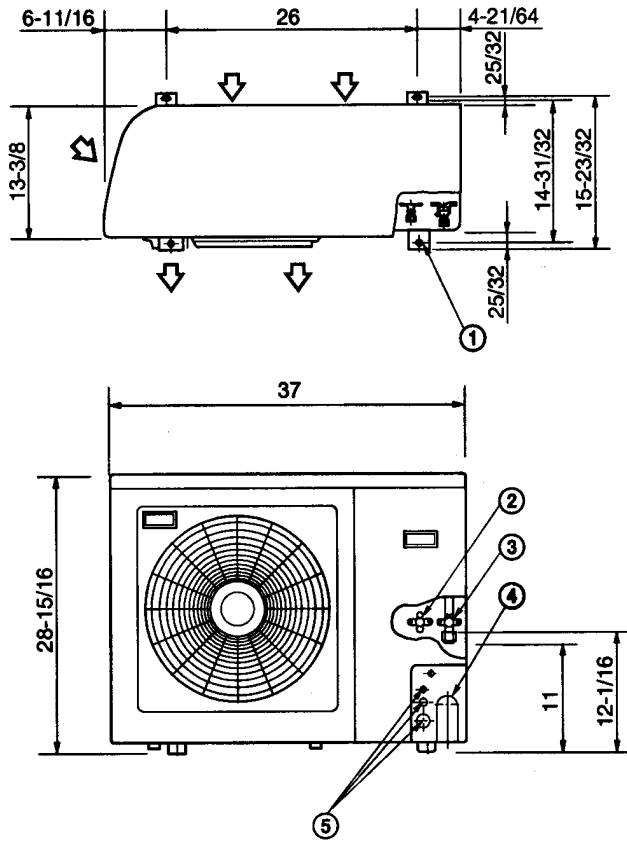
• Remote controller (Accessory)



- ① Drain connection
- ② Drain connection for left side
- ③ Refrigerant liquid line (1/4") Flare connection
- ④ Refrigerant gas line (3/4") Flare connection
- ⑤ Hole for rear side refrigerant tubing
- ⑥ Hole for through-the-wall refrigerant tubing (ø3-15/16" hole)
- ⑦ Hole for upper side refrigerant tubing (Knockout hole)
- ⑧ Hole for right side refrigerant tubing (Knockout hole)
- ⑨ Hole for left side drain connection (Knockout hole)
- ⑩ Hole for power supply cord (Knockout hole ø7/8")
- ⑪ Infrared rays receiver for wireless remote controller

**1-4 Dimensional Data**

**(B) Outdoor Unit: C2432, CL2432**



Dimension : inch

- ① Hole for anchor bolt (4- $\phi$ 1/2)
- ② Refrigerant tube joint (narrow tube)  
Flare connection 1/4 in (6.35 mm)
- ③ Refrigerant tube joint (wide tube)  
Flare connection 3/4 in (19.05 mm)
- ④ Refrigerant tubing inlet
- ⑤ Power supply inlet

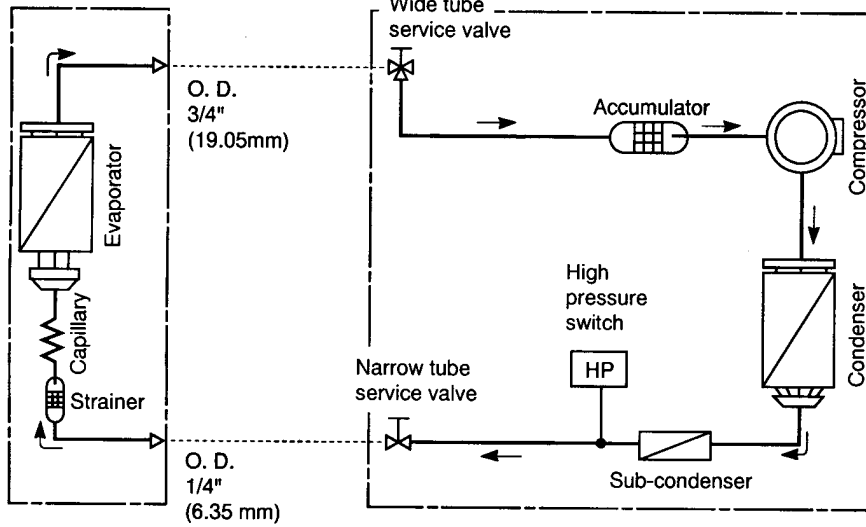
1025\_C\_5



1-5 Refrigerant Flow Diagram

Indoor Unit: TS2432

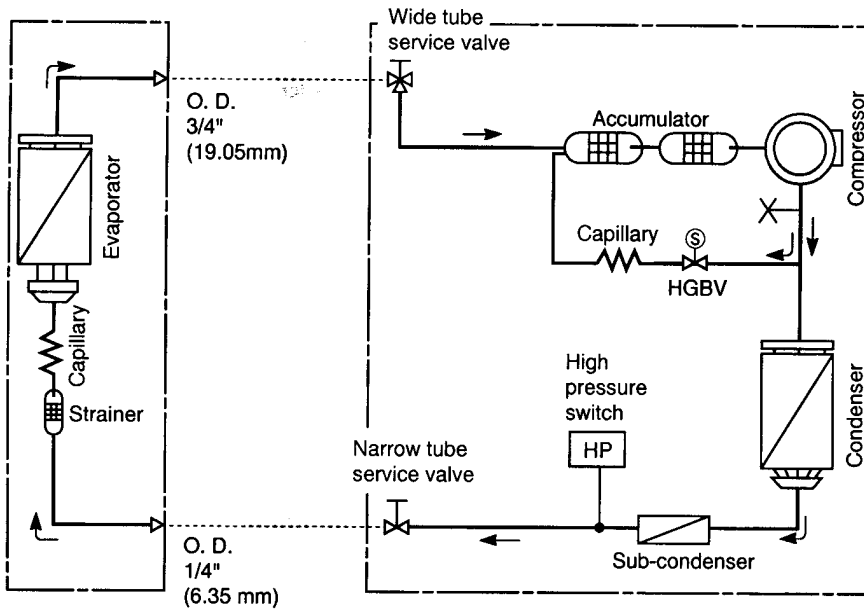
Outdoor Unit: C2432



1026\_X\_S

Indoor Unit: TS2432

Outdoor Unit: CL2432



1027\_X\_S



**1-6 Operating Range****• TS2432 / C2432**

Temperature	Indoor Air Intake Temp.	Outdoor Air Intake Temp.
Maximum	95 °F DB / 71 °F WB	115 °F DB
Minimum	67 °F DB / 57 °F WB	67 °F DB

**• TS2432 / CL2432**

Temperature	Indoor Air Intake Temp.	Outdoor Air Intake Temp.
Maximum	95 °F DB / 71 °F WB	115 °F DB
Minimum	67 °F DB / 57 °F WB	0 °F DB

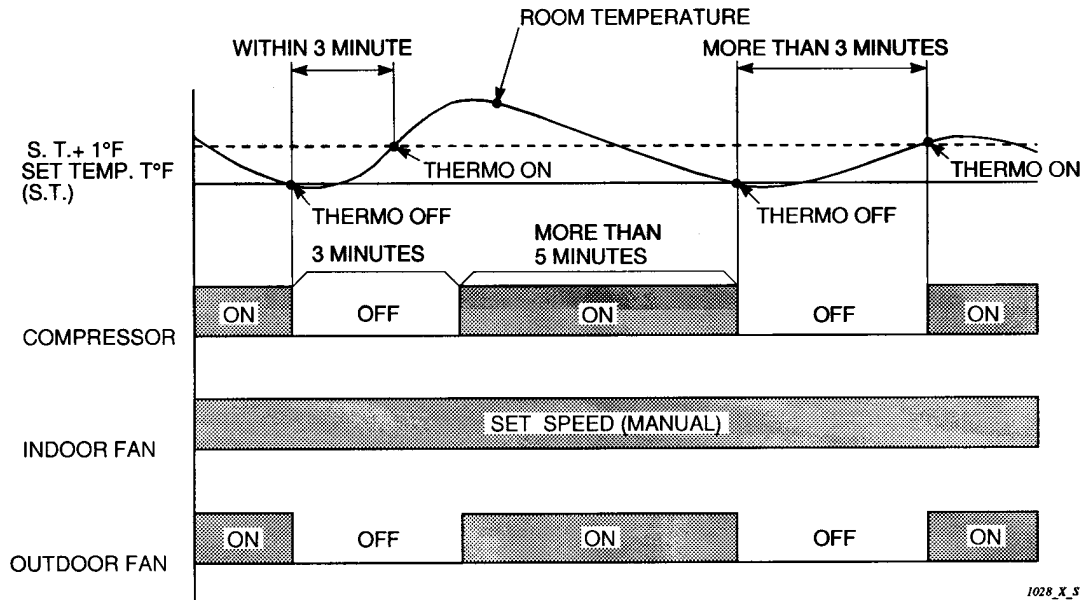


## 2. PROCESSES AND FUNCTIONS

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## 2-1 Room Temperature Control

The Unit adjusts room temperature by turning the outdoor unit's compressor ON and OFF. This process is controlled by the **thermostat** located in the remote control unit. The figures on this and the next pages show how each part of the system performs when the room temperature changes and the thermostat activates the compressor to start (**thermo ON**) or stop (**thermo OFF**). Fig. 1 shows about the cooling cycle.



1028\_X\_S

Fig. 1

### Chart Summary and Explanations

- ❑ Once the compressor **starts**, it keeps running for 5 minutes.
- ❑ Once the compressor **stops**, it will not start running again for 3 minutes.
- ❑ If you **change** the operation mode during the cooling cycle, the control circuit **stops** the compressor for 3 minutes.
- ❑ For 5 minutes after the compressor is first turned on, and for 3 minutes after it is turned off, the compressor is not controlled by the room sensor.
- ❑ **Thermo ON:** When room temperature rises 1 °F above the set temperature T°, (T °+1 °F):  
Compressor → **ON**
- ❑ **Thermo OFF:** When the room temperature is equal to or below the set temperature T°:  
Compressor → **OFF**

**2-2 Freeze Prevention**

Freeze Prevention keeps the indoor heat exchange coil from freezing. Freezing reduces the efficiency of the unit, and frost buildup on the coil blocks cool air circulation from the indoor unit's fan.

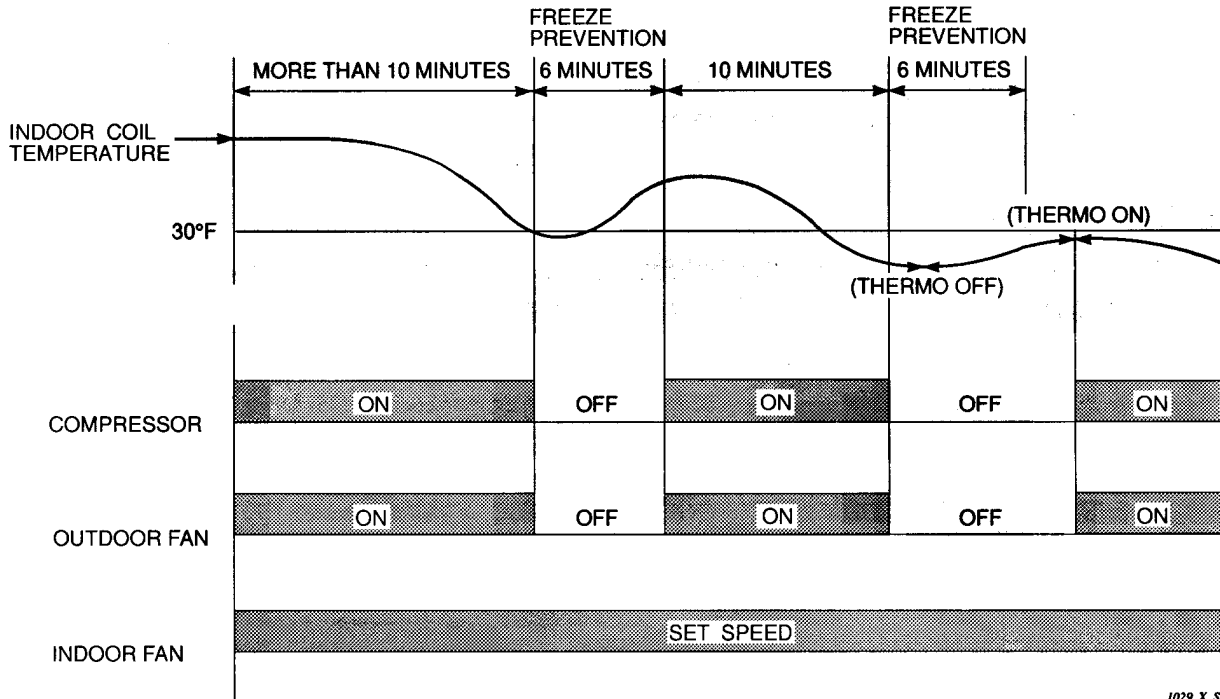


Fig. 2 1029\_X\_5



## 2-3 Outdoor Fan Speed Control

### (1) C2432 Type

- In low outdoor temperature, the outdoor fan is set automatically from HIGH to LOW to prevent the indoor heat exchanger from freezing.
- When the outdoor temperature falls below 78 °F, the outdoor fan is set from HIGH to LOW automatically. When the outdoor temperature rises to 82 °F, the outdoor fan is set from LOW to HIGH automatically.

### (2) CL2432 Type

- In low outdoor temperature, the outdoor fan is set automatically from HIGH to MED, LOW to prevent the indoor heat exchanger from freezing.
- When the outdoor temperature falls below 77 °F, the outdoor fan is set from HIGH to MED automatically. When the outdoor temperature rises to 81 °F, the outdoor fan is set from MED to HIGH automatically.
- When the outdoor temperature falls below 59 °F, the outdoor fan is set from MED to LOW automatically. When the outdoor temperature rises to 63 °F, the outdoor fan is set from LOW to MED automatically.

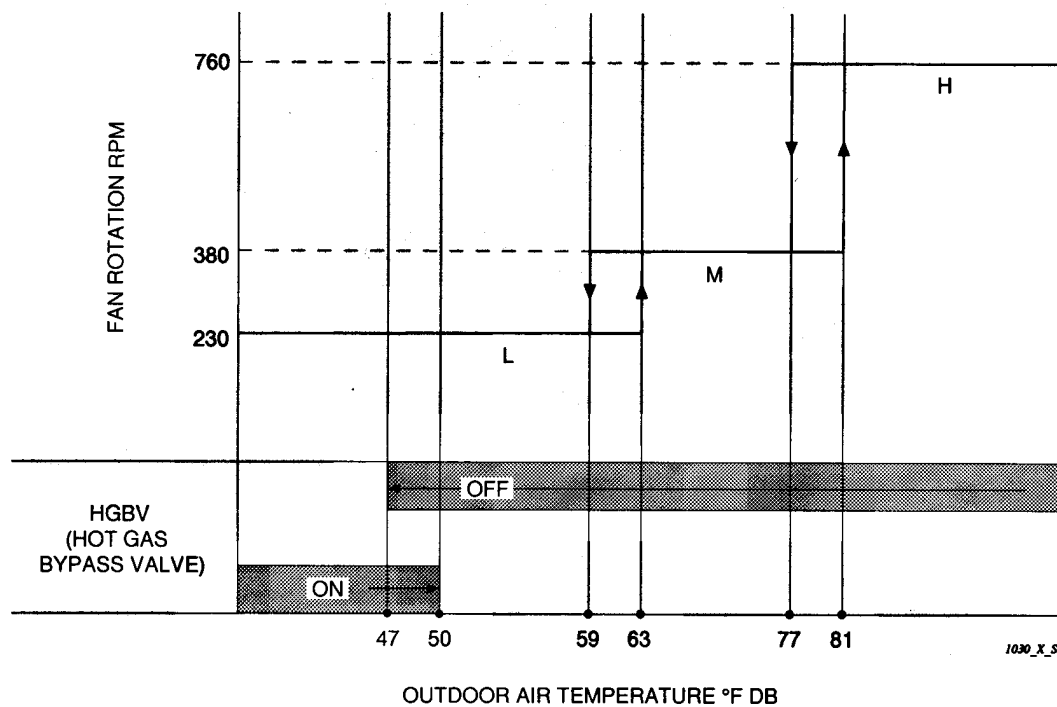


Fig. 3

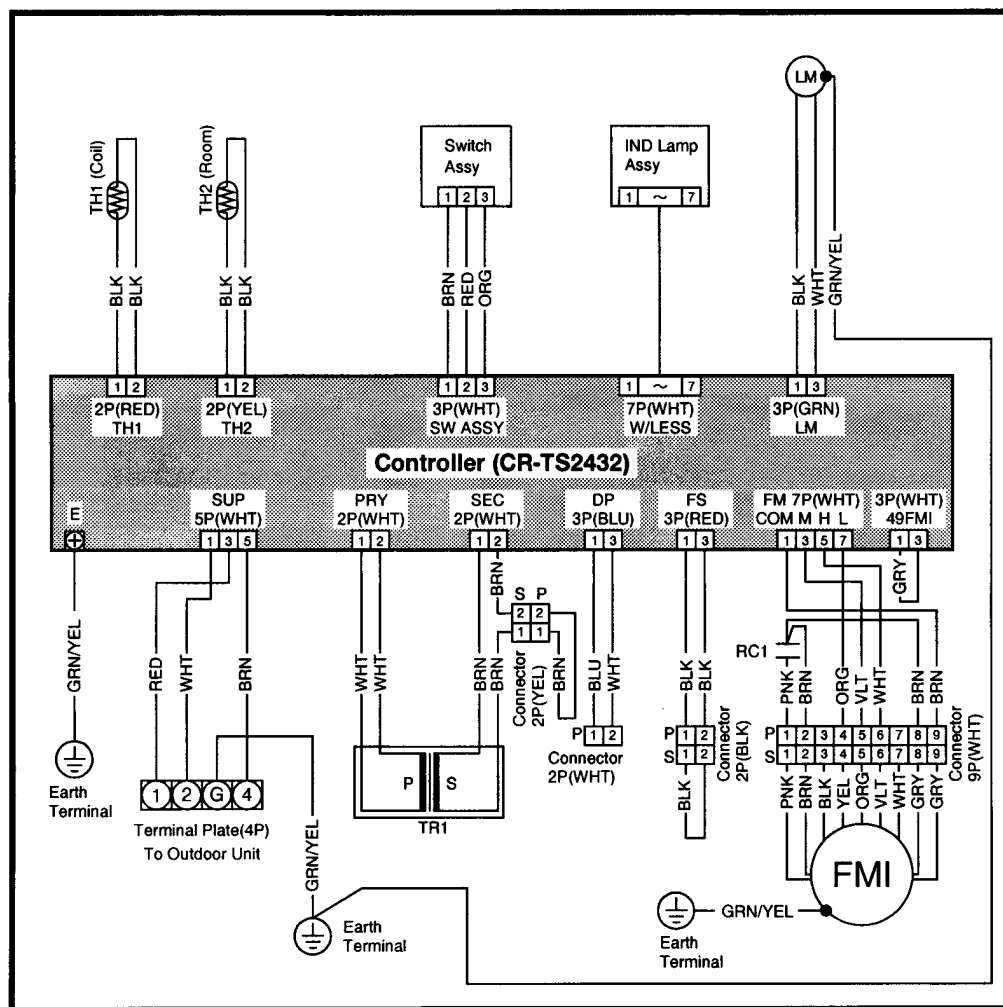
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3-1 Indoor Unit

① TS2432

• Electric Wiring Diagram



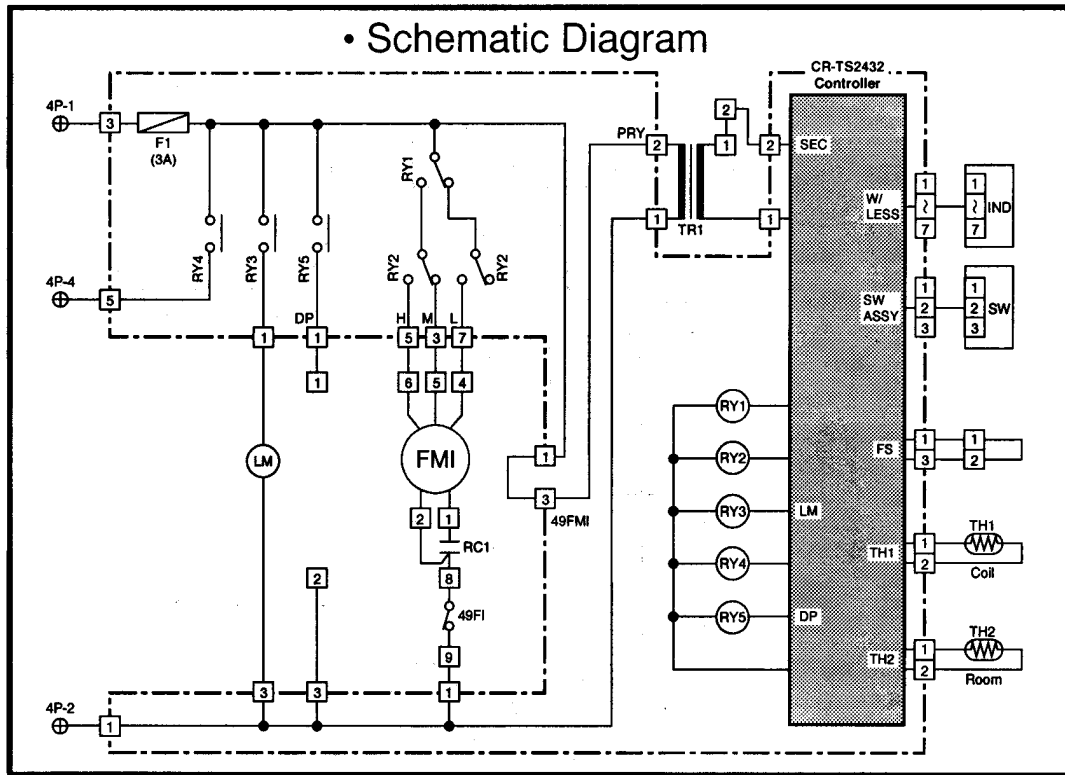
Ⓜ 854-2-5268-593-00-0 (TS2432)

3



3-1 Indoor Unit

① TS2432



Symbols	Description	Symbols	Description
FMI	Indoor Fan Motor	TH1	Thermistor (Indoor Coil)
49FI	Indoor Motor Thermal Protector	TH2	Room Thermistor
RC1	Running Capacitor	CR-TS2432	Indoor Controller
F1	Fuse	IND	Indicator Lamp Assy
DP	Drain Pump	SW	Switch Assy
LM	Auto Louver Motor	⊕	Terminal Plate
TR1	Power Transformer	□	Connector
RY1~RY5	Auxiliary Relay	⊙	Terminal
FS	Float Switch		

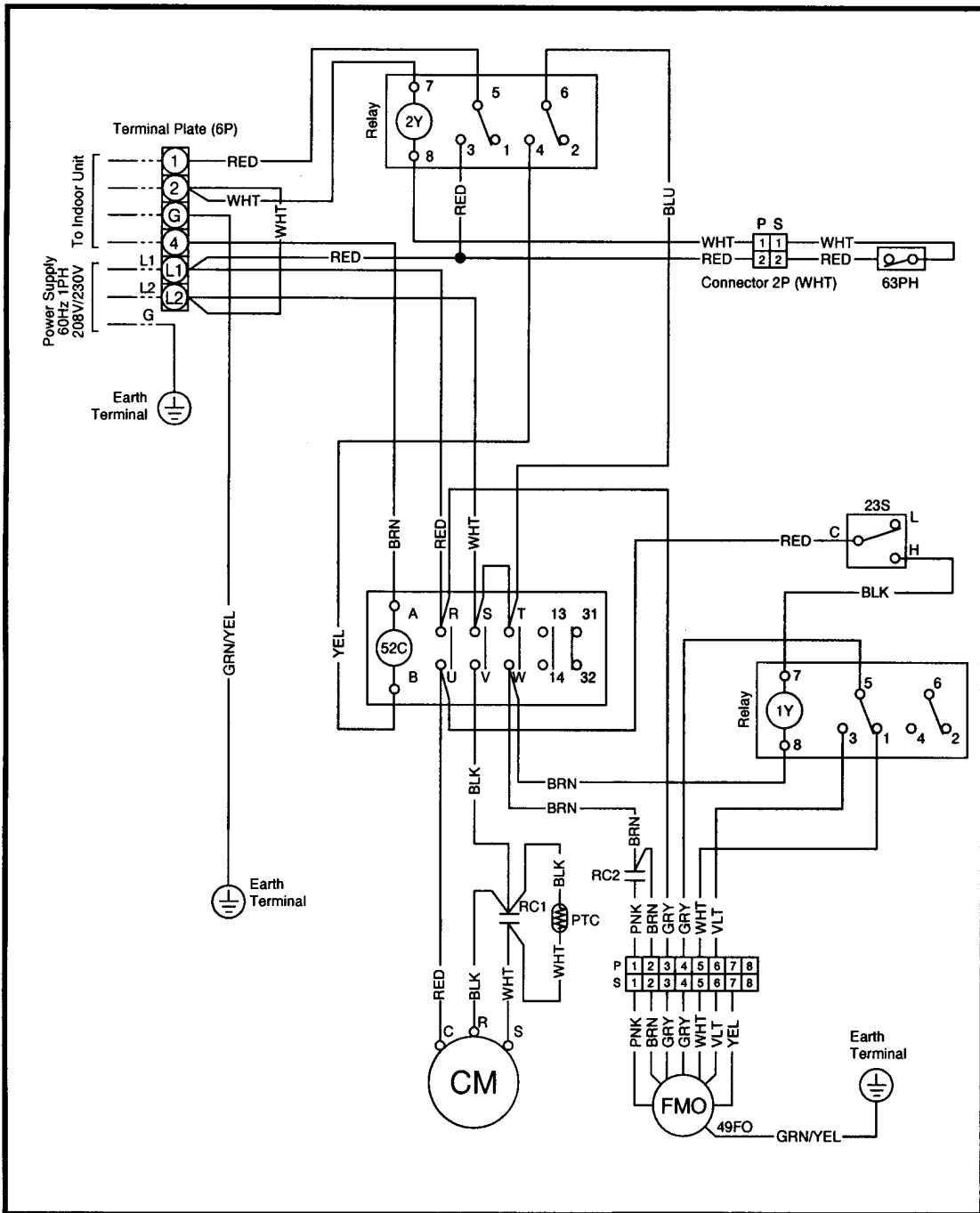
© 854-2-5268-593-00-0 (TS2432)

3

3-2 Outdoor Unit

① C2432

• Electric Wiring Diagram

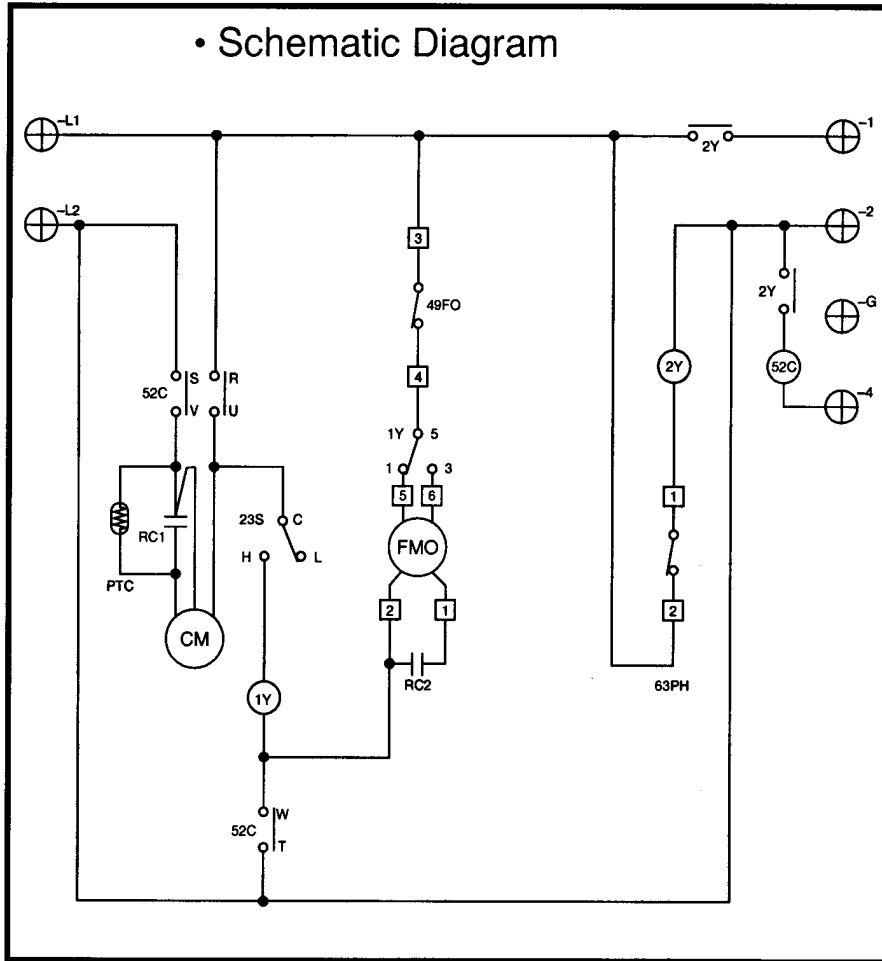


Ⓜ 854-2-5268-594-00-0 (C2432)

3

3-2 Outdoor Unit

① C2432



Symbols	Description
CM	Compressor motor
FMO	Outdoor Fan Motor
49FO	Outdoor Fan Motor Thermal Protector
52C	Compressor Motor Magnetic Contactor
63PH	High Pressure Switch
23S	Fan Speedcontrol Thermostat
RC1, 2	Running Capacitor
PTC	PTC Thermistor
1Y, 2Y	Auxiliary Relay
□	Connector
⊕	Terminal Plate

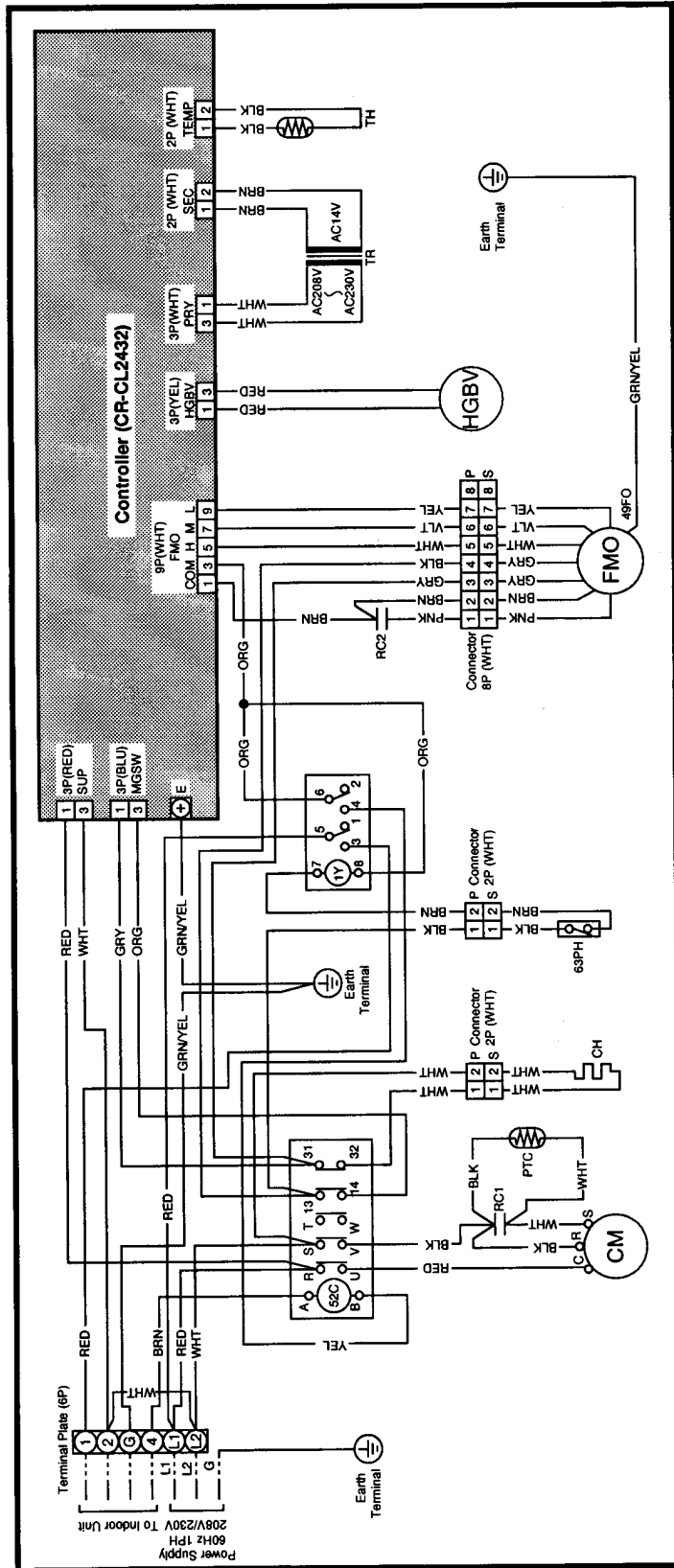
© 854-2-5268-594-00-0 (C2432)

3

3-2 Outdoor Unit

② CL2432

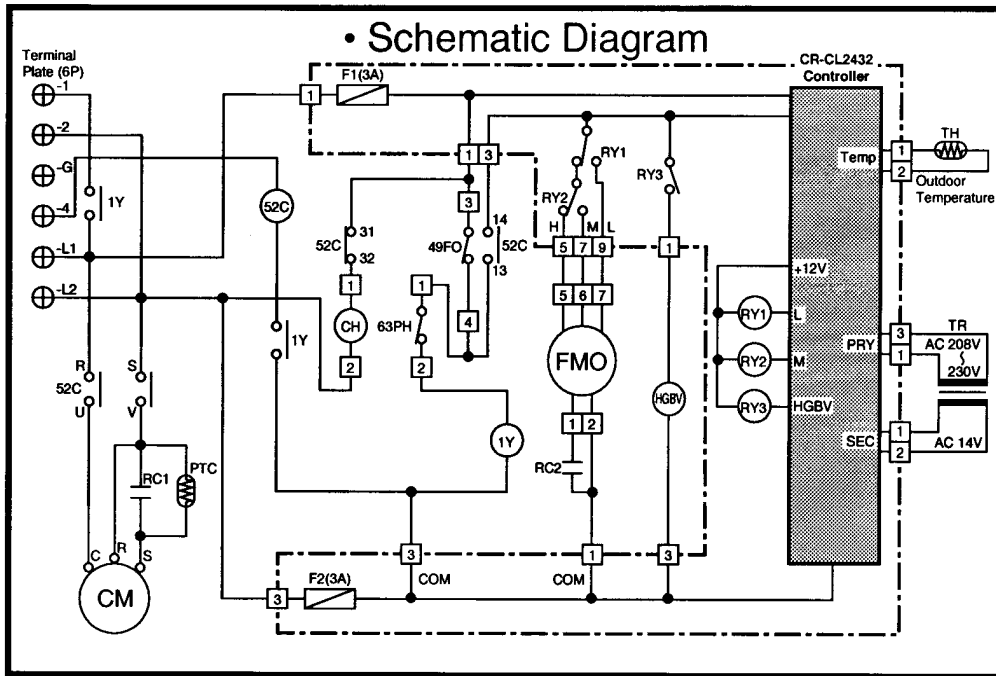
• Electric Wiring Diagram



© 854-2-5268-570-00-1 (CL2432)

3-2 Outdoor Unit

② CL2432



Symbols	Description
CM	Compressor Motor
CH	Crankcase Heater
FMO	Outdoor Fan Motor
49FO	Outdoor Fan Motor Thermal Protector
52C	Compressor Motor Magnetic Contactor
HGBV	Hot Gas Bypass Valve
PTC	PTC Thermistor
TR	Power Transformer
TH	Thermistor (Outdoor Temperature)
RC1, 2	Running Capacitor
RY1~3	Auxiliary Relay
1Y	Auxiliary Relay
CR-CL2432	Outdoor Controller
F1, 2	Fuse
⊕	Terminal Plate
□	Connector
⊕	Terminal
63PH	High Pressure Switch

© 854-2-5268-570-00-1 (CL2432)



## 4. SERVICE PROCEDURES

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## 4-1 Troubleshooting

## (1) Check before and after Troubleshooting

Many problems may happen because of wiring or power supply problems, so you should check these areas first. Problems here can cause false results in some of the other tests, and so should be corrected first.

## ① Check power supply wiring

## (a) Single-phase

- Check that power supply wires are correctly connected to terminal No. 1 through No. 4 on the 4P terminal plate in the indoor unit and L1 and L2 on the 6P terminal in the outdoor unit.

## ② Check inter-unit wiring

- Check that inter-unit control wiring (AC 230 - 208 V Line voltage) is correctly connected between the indoor unit and outdoor unit.

## Single-phase outdoor unit

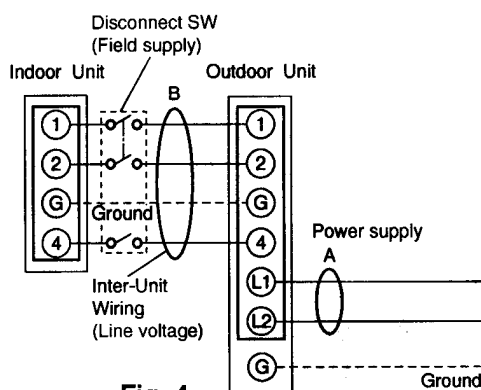


Fig. 4

1089\_M.1

## ③ Check power supply

- Check that voltage is within the 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 not to touch any uninsulated live part that can cause **ELECTRIC SHOCK**.

## ④ Check the lead wires and connectors in indoor and outdoor units.

- Check that the sheath of lead wires is not damaged.
- Check that the lead wires are firmly connected at the terminal plate.
- Check that the wiring is correct.

## ⑤ Reference

- Condition of general cooling operation (Thermo. ON)  
SWEEP ..... ON  
Indoor fan speed .... HIGH



## 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 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

- Ventilate the room well, in the event that refrigerant gas leaks during the installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of poisonous gas.
- 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 when installation is finished. Check that no metal scraps or bits of wiring have been left inside the unit.

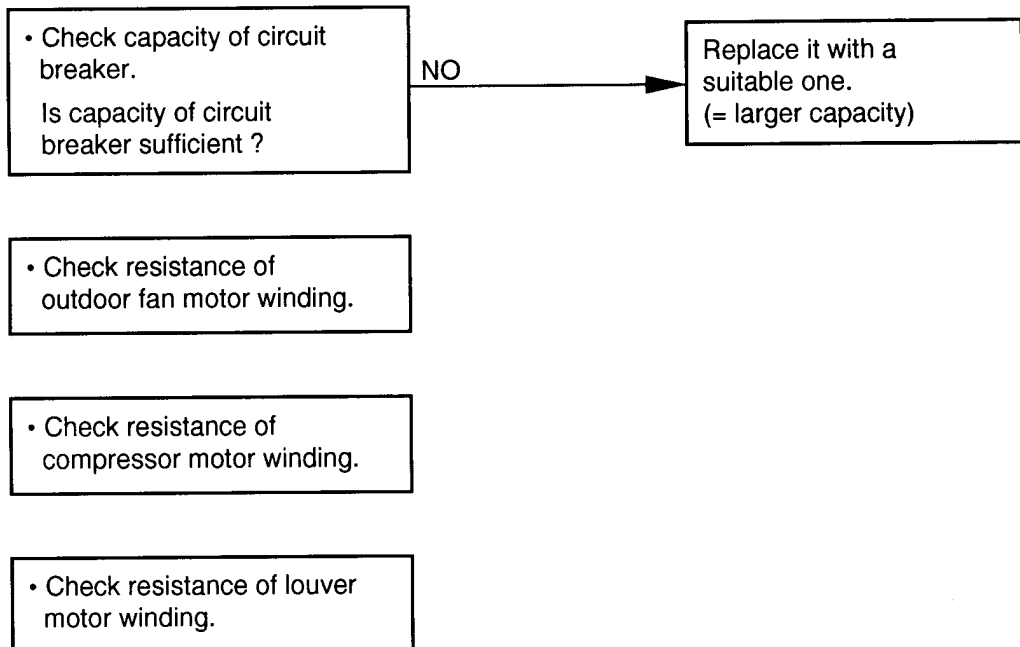


**CAUTION**

- Ventilate any enclosed areas when installing or testing the refrigeration system. Contact of refrigerant gas with fire or heat can produce poisonous gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove, gas water heater, electric room heater or other heat source, it can cause the generation of poisonous gas.

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

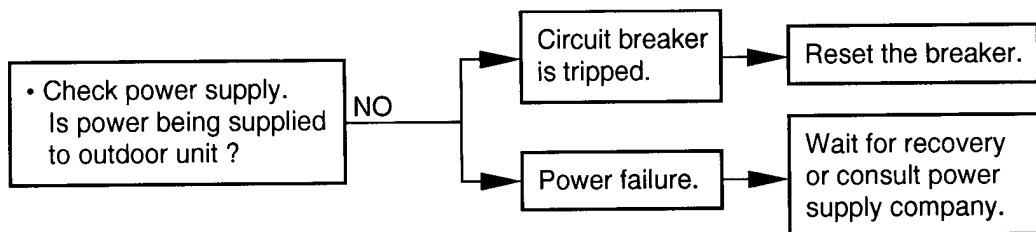
- There is a possibility of short circuit.



1056\_X\_S

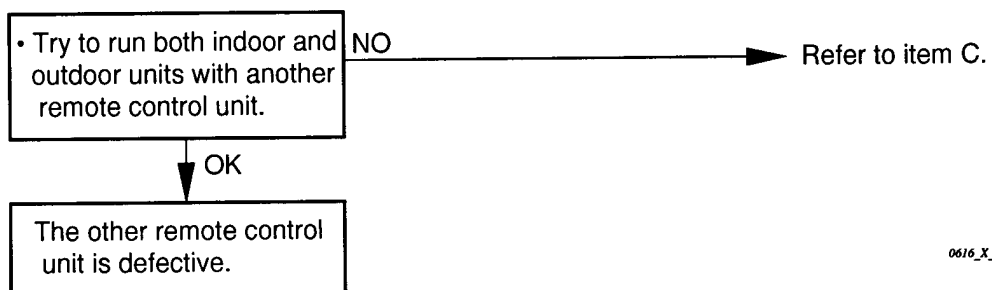
② Neither indoor unit nor outdoor unit runs.

A. Power is not supplied



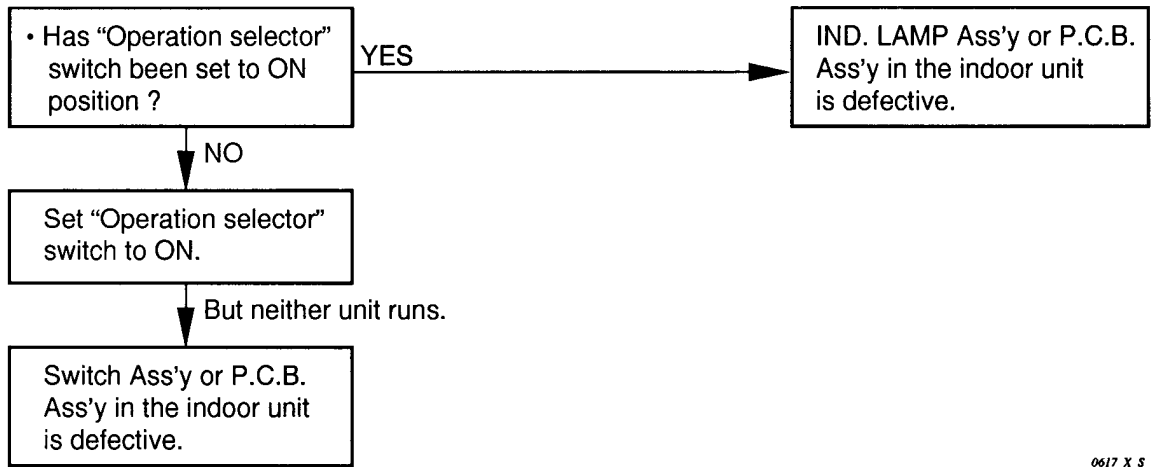
0615\_X\_S

B. Check remote control unit.



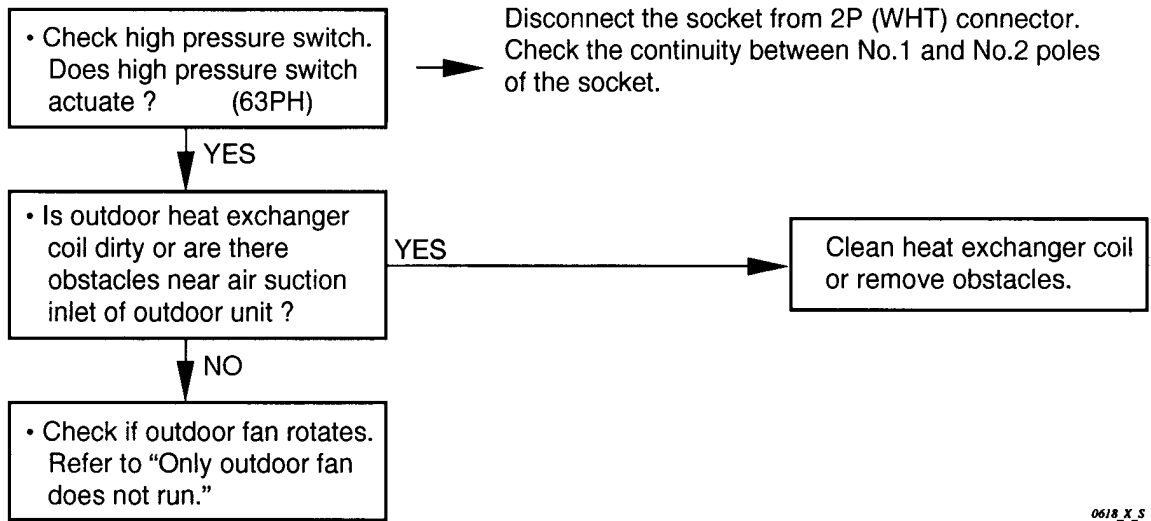
0616\_X\_S

C. Check "Operation selector" switch in the indoor unit.

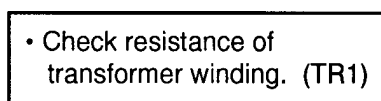


D. Check compressor motor protectors.

(a) High pressure switch (63PH)



E. Transformer in indoor unit.

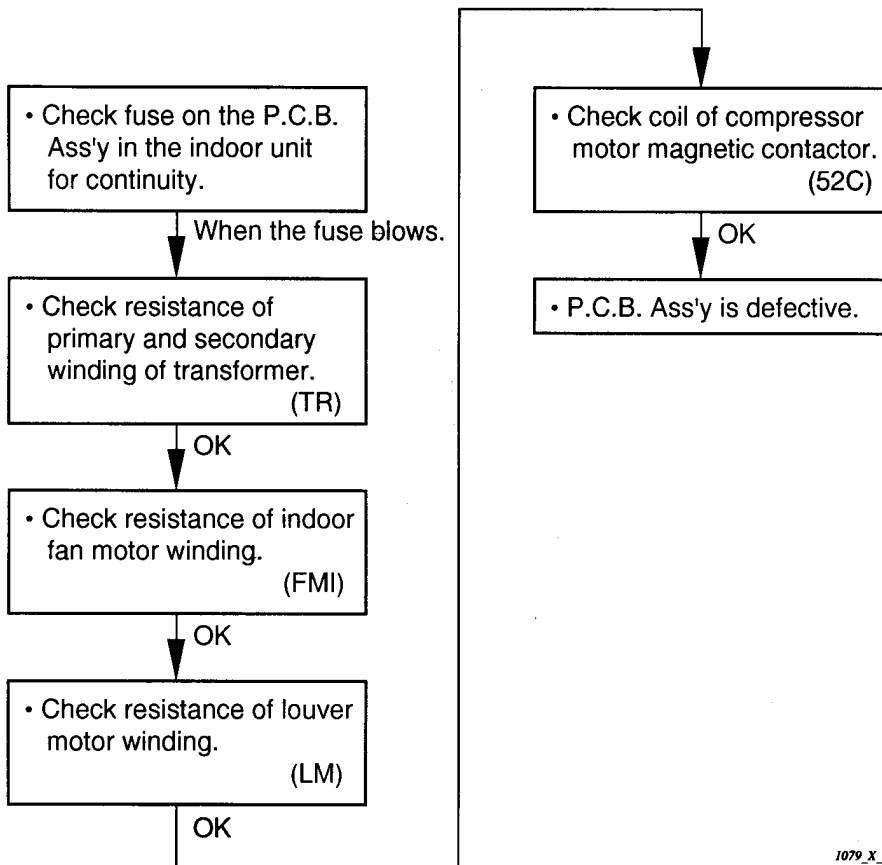


F. Check. auxiliary relay. (1Y or 2Y)

• Check coil resistance of auxiliary relay.  
(1Y or 2Y)

0620\_X\_S

G. Check fuse on the P.C.B. Ass'y in the indoor unit.

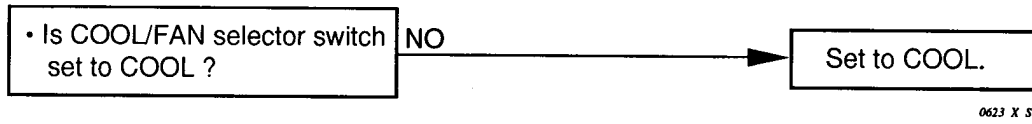


1079\_X\_S

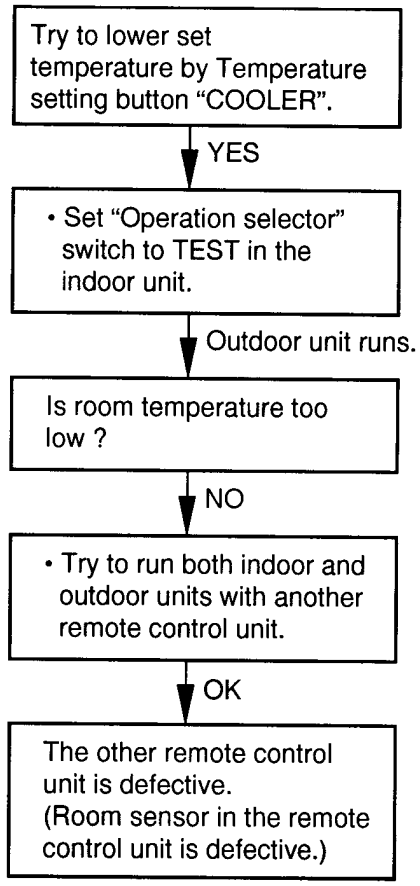
4

(3) Outdoor Unit does not Run.

A. Check COOL / FAN selector switch in the remote control unit.



B. Check set temperature.



C. Check compressor motor magnetic contactor.

• Check coil resistance of compressor motor magnetic contactor. (52C)

1035\_X\_S

D. Check indoor unit P.C.B.

• Check P.C.B. Ass'y.

• Check voltage between terminals No.2 and No.4 at terminal plate.

↓ No voltage appears.

P.C.B. Ass'y is defective.

0628\_X\_S

E. Check outdoor unit P.C.B. (CL2432 Type)

• Check P.C.B. Ass'y.

• Check voltage between terminals L1 and L2 at terminal plate.

↓ No voltage appears.

P.C.B. Ass'y is defective.

1036\_X\_S

**(4) Indoor Unit does not Run.**

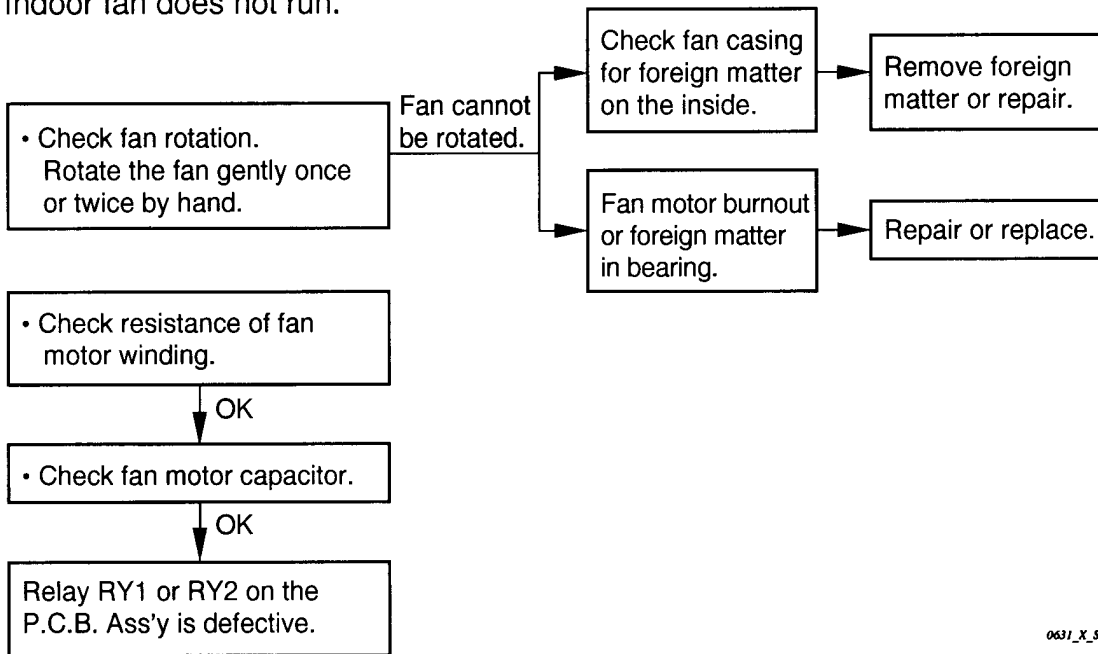
(Indoor fan and louver motor do not run.)

P.C.B. Ass'y is defective.

0630\_X\_5

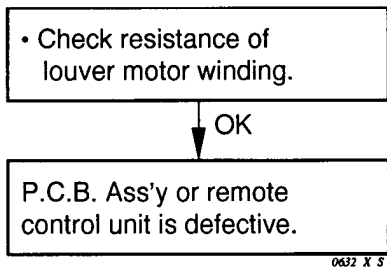
**(5) Some Part does not Operate.**

A. Indoor fan does not run.



0631\_X\_5

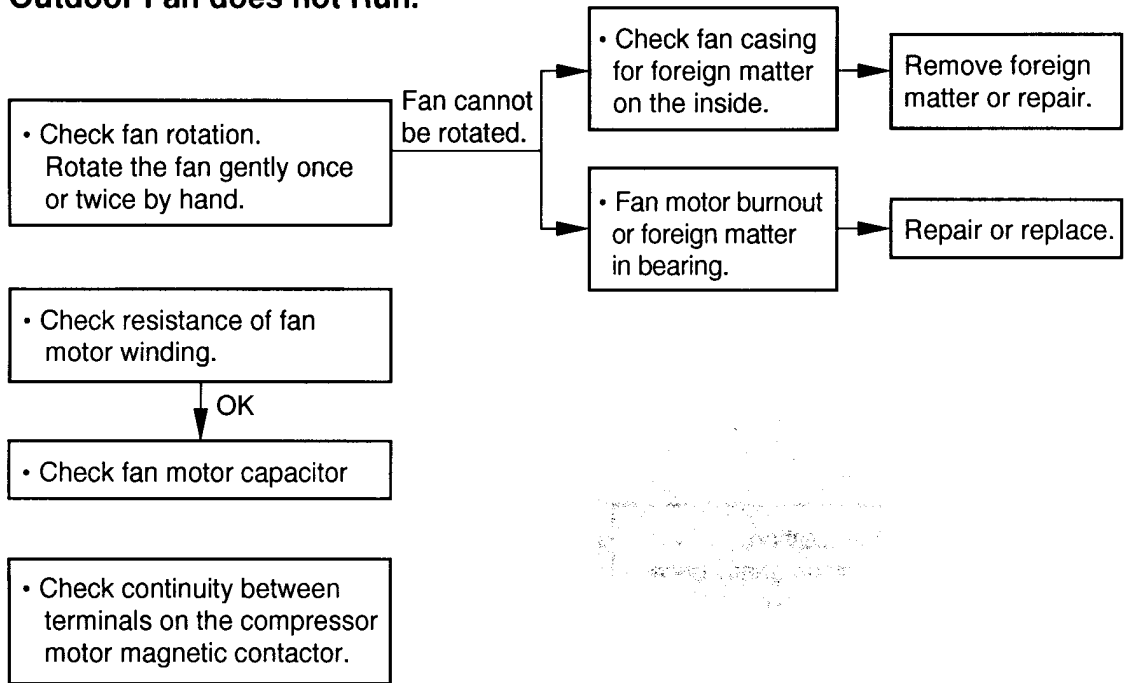
B. Louver motor does not run.



0632\_X\_5

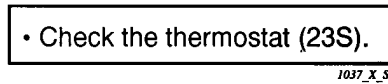


**(6) Outdoor Fan does not Run.**



0633 X 5

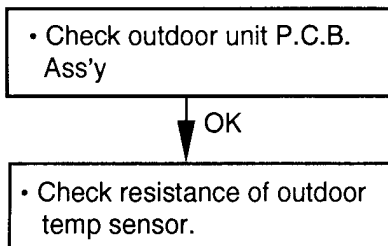
**(7) Outdoor Fan Speed is not Switched from High to Low even when the Outdoor Temperature Falls below 78 °F. (C2432 Type)**



1037 X 5

**(8) Outdoor Fan Speed is not Switched from High to Med even when the Outdoor Temperature Falls below 77 °F.**

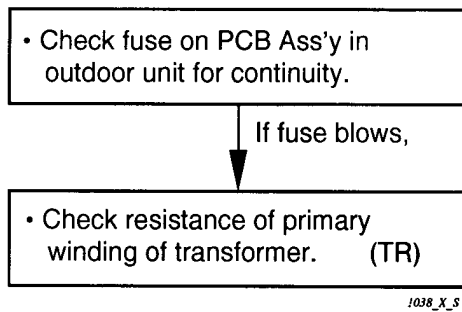
**Outdoor Fan Speed is not Switched from Med to Low even when the Outdoor Temperature Falls below 59 °F. (CL2432 Type)**



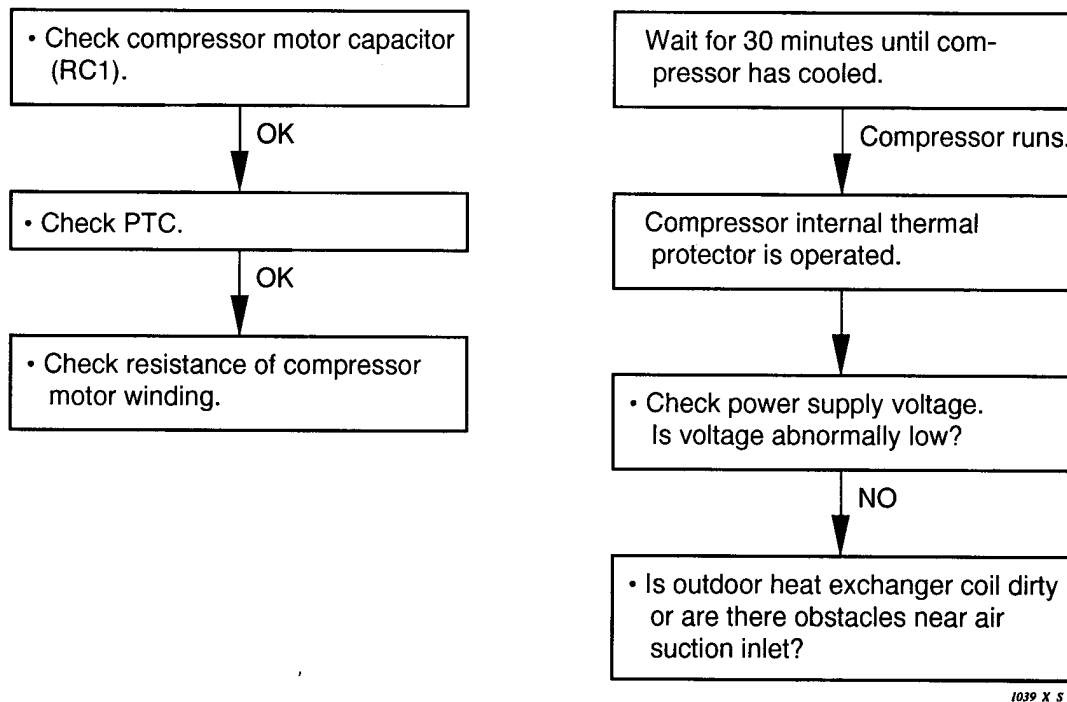
0722 X 5



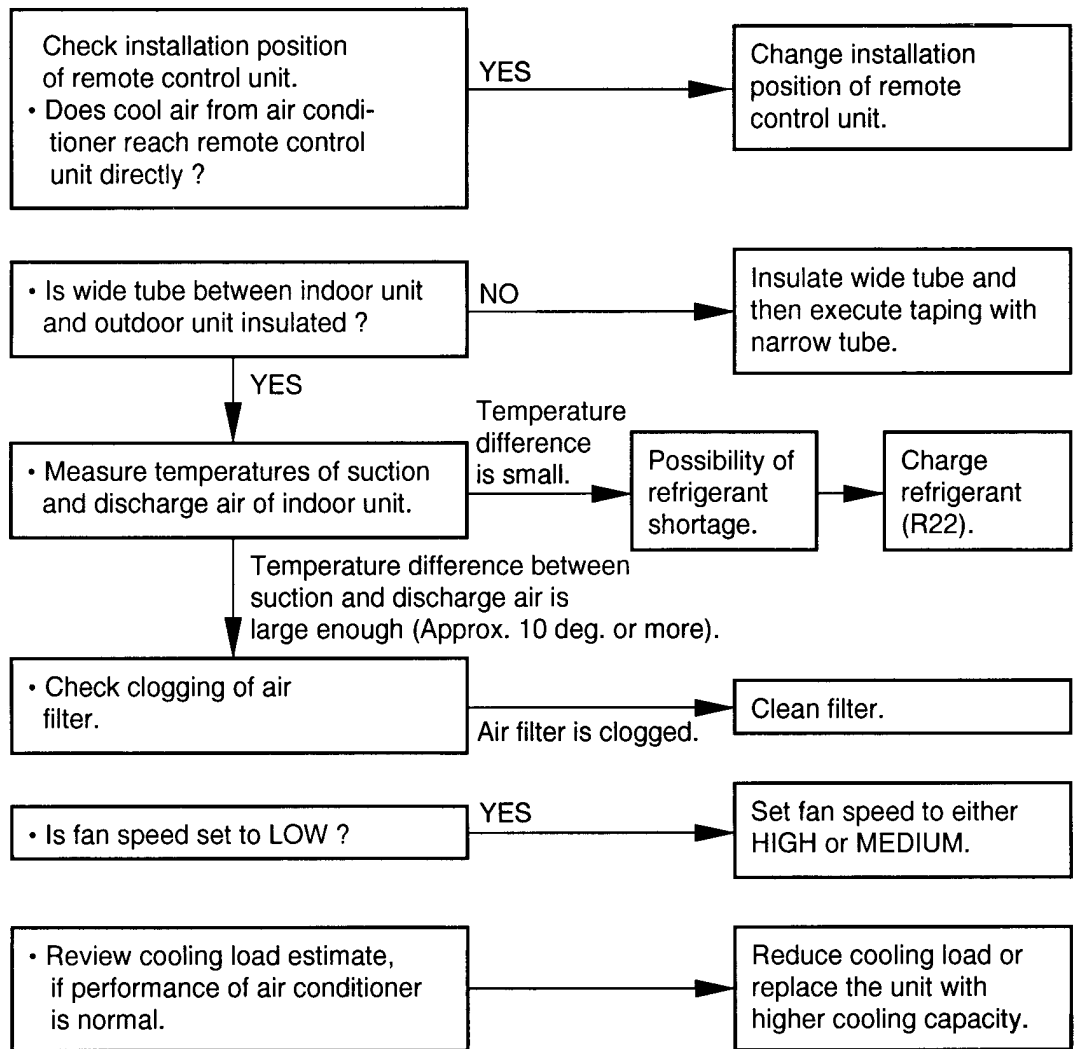
(9) Outdoor Fan does not Run for CL2432.



(10) Compressor does not Run.

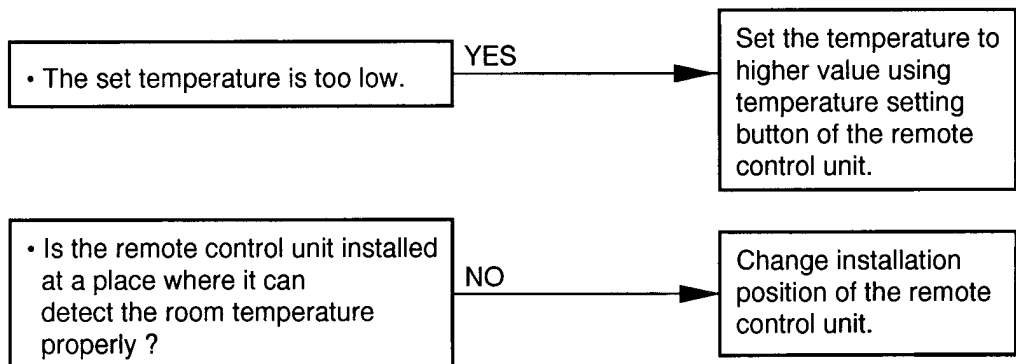


(11) Poor Cooling.



1040\_X\_5

(12) Excessive Cooling.



0637 X 5

4-2 A Sensor is Defective.

① Indoor (heat exchanger) coil temp. Sensor is defective.

(a) Open (=No continuity in sensor)

Compressor and outdoor fan repeat ON for 10 minutes and OFF for 6 minutes when sensor opens.

(b) Short

“Freeze Prevention” does not operate when dehumidified water is frozen on the indoor coil.

② Room temp. Sensor (in the remote control unit) is defective.

(a) Open (=No continuity in sensor)

Neither outdoor fan nor compressor runs.

(b) Short

Outdoor fan and compressor do not stop. — Excessive cooling.

4-3 Operation of Major Electrical Parts

Operation Mode (Function)		Operation	Indoor unit and Remote Control unit					Outdoor unit		
			Indicator lamps					Fan	Fan	Compressor
			Room Temp.	Cool	Timer	Night setback Energy saver	Sweep			
Cooling	Manual	Thermo.ON	○	○				○	○	○
		Thermo.OFF	○	○				○		
	Night setback	Thermo.ON	○	○		○		○	○	○
		Thermo.OFF	○	○		○				
	Timer (set)	ON Timer			○					
		OFF Timer	○	○	○			○	○	○
Freeze prevention			○	○			○			
Fan			○				○			
Flap	Sweep	Cool	○	○*		○*		○	○*	○*
		Fan	○					○		
	Stop	Cool	○	○*		○*		○	○*	○*
		Fan	○					○		

NOTE ○\* Refer to Cooling Mode.



## 4-4 Checking the Electrical Components

### (1) Measurement of Insulation Resistance

- The electrical insulation is acceptable when the resistance exceeds 1 MΩ.

#### ① Power Supply Wires

Clamp the earthed wire of the Power Supply wires with a lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the power wires. (Fig. 5)

Then measure the resistance between the earthed wire and the other power wires. (Fig. 5)

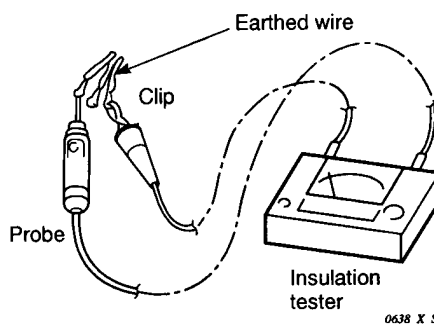


Fig. 5

#### 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 the terminal plate (Fig. 6)

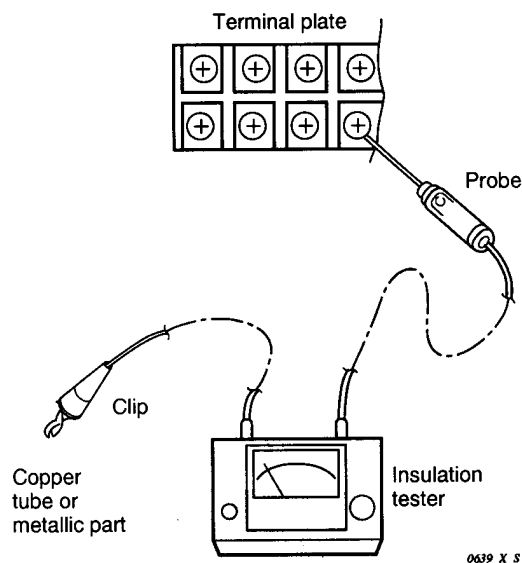


Fig. 6

#### ③ Outdoor Unit

Measure the resistance by placing a probe on the terminal plate in the same manner as explained above ②. (Fig. 6)

#### ④ Measurement of Insulation Resistance for Electrical parts

- Disconnect the connector of the desired electric part from terminal plate, P.C.B. Ass'y, etc. (Fig. 7)
- Similarly, disconnect the lead wires from compressor, capacitor, etc. (Fig. 8)
- Measure the resistance in the same manner as illustrated on the right.

Refer to Electrical Wiring Diagram.

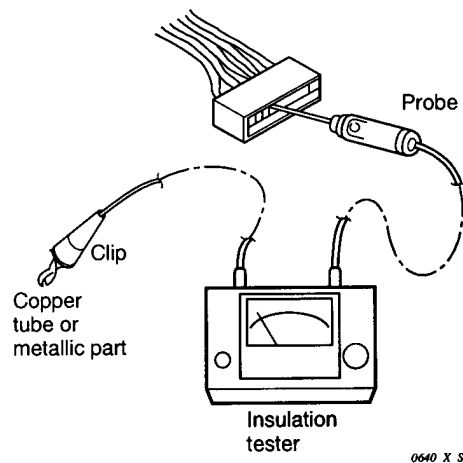


Fig. 7

#### NOTE

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

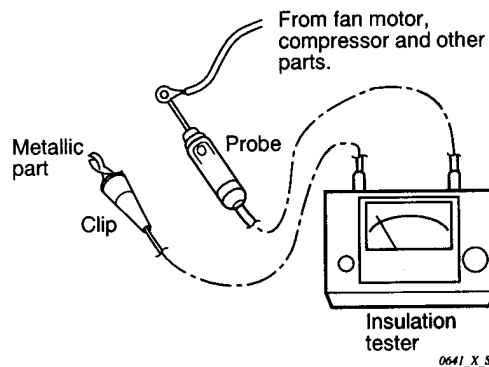
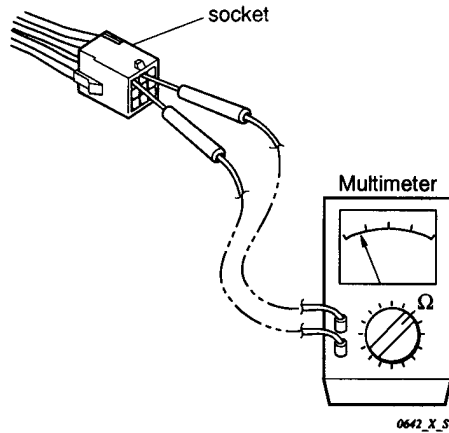


Fig. 8

**(2) Checking the Protective Devices**

- Disconnect the connector, which consists of P (plug) and S (socket) when you want to check the protective device.
- Then check continuity among plug's (and/or socket's) terminal as in **Fig. 9**.
- Normality of the protective device can be judged by the following table.  
The Protective Device is proved normal if there is a continuity between terminals.



**Fig. 9**

**① Indoor fan motor thermal protector (49FI) . . . . . Indoor unit**

- Disconnect the connector which leads to the indoor fan motor (FMI).
- Check the socket's terminals.

**② Compressor motor thermal protector . . . . . Outdoor unit**

- Disconnect the wires from terminals of compressor.
- Check the terminals of compressor.

**③ Outdoor fan motor thermal protector (49FO) . . . . . Outdoor unit**

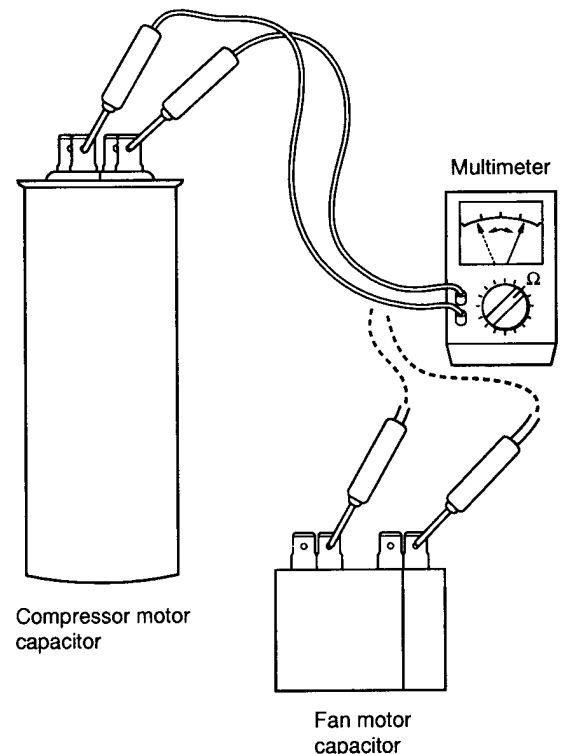
- Disconnect both the connector which leads to the outdoor fan motor (FMO).
- Check socket's terminal.

**(3) Checking the Electrical Parts**

- ① **Power transformer (TR1) ..... Indoor unit** \*Measure the coil resistance.
- Primary 230-208 V ; Measure the resistance between two WHT lead wire terminals of socket connected to power transformer.
  - Secondary 10.6 V ; Measure the resistance between two BRN lead wires.  
Refer to “1-3-(A) Other component specifications”.
- ② **Indoor fan motor (FMI) ..... Indoor unit** \*Measure the coil resistance.
- Measure the resistance between each terminal of the socket connected to the indoor fan motor.  
Refer to “1-2-(A) Major component specifications”.
- ③ **Outdoor fan motor (FMO) ..... Outdoor unit** \*Measure the coil resistance.
- Measure the resistance in the same manner as explained above ②.  
Refer to “1-2-(B) Major component specifications”.
- ④ **Motor capacitor ..... Both in indoor and outdoor unit**
- Remove the lead wires from the capacitor terminals, and then place a probe on the capacitor terminals as shown in **Fig. 10**. 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.

**NOTE**

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



1041\_X\_5

**Fig. 10**

⑤ Continuity of fuse on P.C.B. Ass'y

- Check for continuity using a multimeter as shown in Fig. 11.

**NOTE**

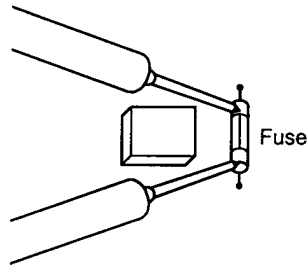
**Method Used to Replace Fuse on PCB Ass'y**

1. Remove the PCB Ass'y from the electrical component box.
2. Remove the fuse from PCB Ass'y using pliers while heating the soldered leads on the back side of the PCB Ass'y with a soldering iron (30W or 60W). (Fig. 12)
3. For replacement, insert a fuse of the same rating to the intended position and solder it. (Allow time to radiate heat during soldering so that the fuse does not melt.)



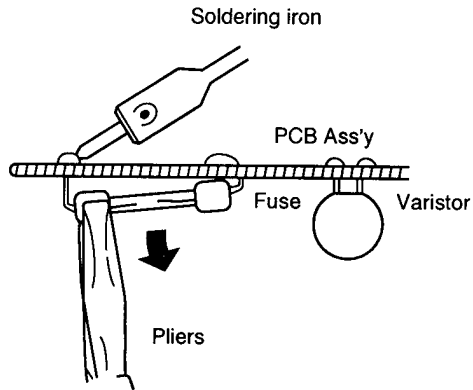
**CAUTION**

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



1042\_X\_S

Fig. 11

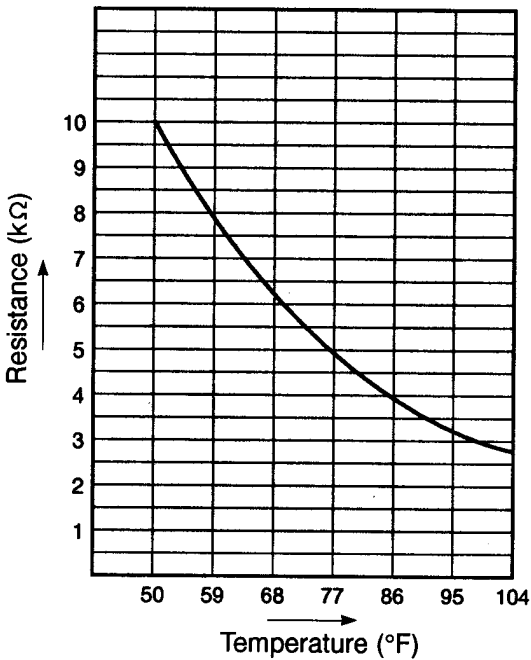


1043\_X\_S

Fig. 12

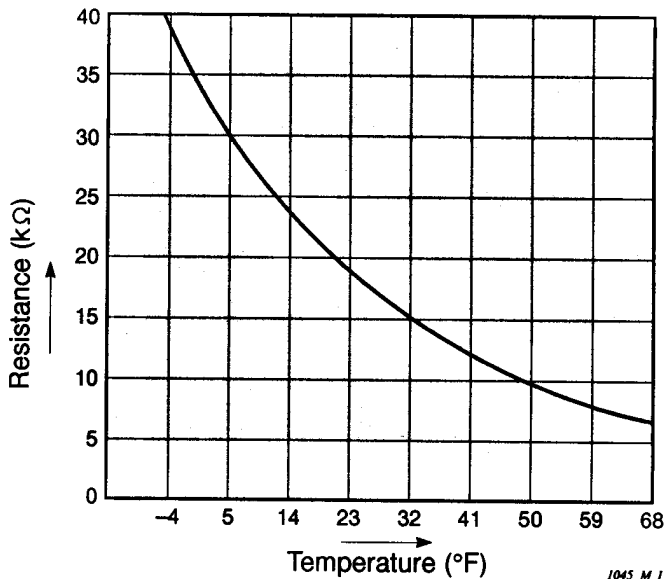
(4) Thermistor Characteristic Curve

- ① Room temp. sensor (KTEC - 35)



1044\_M\_1

- ① Coil sensor (PBC-41E)



1045\_M\_1



**SANYO FISHER Service Company**  
**CENTRAL REGION**

1739 Sands Place, Suite G  
Marietta, GA 30067  
Phone: (770) 951-8284  
Fax: (770) 951-2077

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