

*Euro-Line*®

## **TECHNICAL & SERVICE MANUAL**

FC512CL - AE512SC  
FC512CL - AE512SCL

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## **SPLIT SYSTEM AIR CONDITIONER**

## 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

**WARNING**

#### 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

- 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.

### 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.

### Others



**CAUTION**

- Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm upon completing installation that no refrigerant gas is leaking. If escaped gas comes in contact with a stove, gas water heater, electric room heater or other heat source, it can produce dangerously toxic gas.

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# 1. OPERATING RANGE

## ● For COOLING ONLY model : AE512SC

	Temperature	Indoor Air Intake Temp.	Outdoor Air Intake Temp.
Cooling	Maximum	32°C D.B. / 23°C W.B.	43°C D.B.
	Minimum	19°C D.B. / 14°C W.B.	19°C D.B.

## ● For LOW AMBIENT cooling model : AE512SCL

	Temperature	Indoor Air Intake Temp.	Outdoor Air Intake Temp.
Cooling	Maximum	32°C D.B. / 23°C W.B.	43°C D.B.
	Minimum	19°C D.B. / 14°C W.B.	-15°C D.B.

## 2. SPECIFICATIONS

### 2-1. Unit Specifications

Indoor Unit **FC512CL**  
 Outdoor Unit **AE512SC**

<b>Power Source</b>		220–240V ~ 50Hz			
<b>Voltage rating</b>		220/230/240 V			
<b>Performance</b>		Cooling			
Capacity	kW	3.45	/	3.50	/ 3.50
	BTU/h	11,800	/	11,900	/ 11,900
Air circulation (High)	m <sup>3</sup> /h	700			
Moisture removal (High)	Liters/h	1.5			
<b>Electrical Rating</b>		Cooling			
Available voltage range	V	198 ~ 264			
Running amperes	A	6.0	/	6.0	/ 6.1
Power input	W	1,270	/	1,310	/ 1,350
Power factor	%	96	/	95	/ 92
C.O.P.	W/W	2.7	/	2.7	/ 2.6
Compressor locked rotor amperes	A	32	/	33	/ 35
<b>Features</b>					
Controls / Temperature control		Microprocessor / I.C. thermostat			
Control unit		Wireless remote control unit			
Timer		ON/OFF 24 hours & Daily program, 1-hour OFF			
Fan speeds	Indoor / Outdoor	3 and Auto / 1(Hi)			
Airflow direction (Indoor)	Horizontal	Manual			
	Vertical	Auto			
Air filter		Washable, Anti-Mold			
Compressor		Rotary (Hermetic)			
Refrigerant / Amount charged at shipment	g	R22 / 900			
Refrigerant control		Capillary tube			
Operation sound	Indoor : Hi / Me / Lo	dB-A		44 / 40 / 35	
	Outdoor : Hi	dB-A		48	
Refrigerant tubing connections		Flare type			
Max. allowable tubing length at shipment	m	7.5			
Refrigerant tube diameter	Narrow tube	mm (in.)	6.35(1/4)		
	Wide tube	mm (in.)	12.7(1/2)		
Refrigerant tube kit / Air Clean Filter		Optional / Optional			
<b>Dimensions &amp; Weight</b>		Indoor Unit	Outdoor Unit		
Unit dimensions	Height	mm	680	530	
	Width	mm	900	750	
	Depth	mm	190	270	
Package dimensions	Height	mm	296	593	
	Width	mm	1,011	895	
	Depth	mm	813	348	
Weight	Net	kg	23.5	35.5	
	Shipping	kg	30.0	38.0	
Shipping volume		m <sup>3</sup>	0.24	0.18	

**Remarks:**

Rating conditions are:

Cooling : Indoor air temperature 27°C D.B. / 19°C W.B.  
 Outdoor air temperature 35°C D.B. / 24°C W.B.

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Indoor Unit **FC512CL**  
 Outdoor Unit **AE512SCL**

<b>Power Source</b>	220–240V ~ 50Hz
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<b>Voltage rating</b>	220/230/240 V
-----------------------	---------------

<b>Performance</b>		Cooling				
Capacity	kW	3.45	/	3.50	/	3.50
	BTU/h	11,800	/	11,900	/	11,900
Air circulation (High)	m³/h	700				
Moisture removal (High)	Liters/h	1.5				

<b>Electrical Rating</b>		Cooling				
Available voltage range	V	198 ~ 264				
Running amperes	A	6.0	/	6.0	/	6.1
Power input	W	1,270	/	1,310	/	1,350
Power factor	%	96	/	95	/	92
C.O.P.	W/W	2.7	/	2.7	/	2.6
Compressor locked rotor amperes	A	32	/	33	/	35

<b>Features</b>				
Controls / Temperature control		Microprocessor / I.C. thermostat		
Control unit		Wireless remote control unit		
Timer		ON/OFF 24 hours & Daily program, 1-hour OFF		
Fan speeds	Indoor / Outdoor	3 and Auto / Auto (Hi, Me, Lo)		
Airflow direction (Indoor)	Horizontal	Manual		
	Vertical	Auto		
Air filter		Washable, Anti-Mold		
Compressor		Rotary (Hermetic)		
Refrigerant / Amount charged at shipment		R407C / 900		
Refrigerant control		Capillary tube		
Operation sound	Indoor : Hi / Me / Lo	44 / 40 / 35		
	Outdoor : Hi	48		
Refrigerant tubing connections		Flare type		
Max. allowable tubing length at shipment		7.5		
Refrigerant tube diameter	Narrow tube	6.35(1/4)		
	Wide tube	12.7(1/2)		
Refrigerant tube kit / Air Clean Filter		Optional / Optional		

<b>Dimensions &amp; Weight</b>			Indoor Unit	Outdoor Unit
Unit dimensions	Height	mm	680	530
	Width	mm	900	750
	Depth	mm	190	270
Package dimensions	Height	mm	296	593
	Width	mm	1.011	895
	Depth	mm	813	348
Weight	Net	kg	23.5	35.5
	Shipping	kg	30.0	38.0
Shipping volume		m³	0.00	0.18

**Remarks:**

Rating conditions are:

Cooling : Indoor air temperature 27°C D.B. / 19°C W.B.  
 Outdoor air temperature 35°C D.B. / 24°C W.B.

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## 2-2. Major Component Specifications

### 2-2-1. Indoor Unit

Indoor Unit **FC512CL**

<b>Controller PCB</b>		
Part No.		POW-K185GS-N
Controls		Microprocessor
Control circuit fuse		250 V 3 A
<b>Remote Control Unit</b>		RCS-5PS3E
<b>Fan &amp; Fan Motor</b>		
Type		Cross-flow
Q'ty ... Dia. and length	mm	2 ... ø130 / L180
Fan motor model ... Q'ty		K48407-M01416 ... 1
No. of poles ... rpm (230 V, High)		4 ... 1,160
Nominal output	W	20
Coil resistance (Ambient temp. 20°C)	Ω	GRY-WHT : 311±7% WHT-VLT : 97.6±7% VLT-YEL : 97.6±7% WHT-PNK : 425±7% — —
Safety devices	Type	Internal protector
	Operating temp.	145±5
	Open	°C
	Close	Automatic reclosing
Run capacitor	μF	1.5
	VAC	440
<b>Flap Motor</b>		
Model		M2LJ24ZE31
Rating		AC 208 / 230 V, 50 / 60 Hz
No. of poles ... rpm		8 ... 2.5 / 3.0
Nominal output	W	3 / 2.5
Coil resistance (Ambient temp. 20°C)	kΩ	16.45 ± 15%
<b>Heat Exch. Coil</b>		
Coil		Aluminum plate fin / Copper tube
Rows		2
Fin pitch	mm	1.8
Face area	m <sup>2</sup>	0.192

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## 2-2-2. Outdoor Unit

Outdoor Unit **AE512SC**

<b>Compressor</b>				
Type	Rotary (Hermetic)			
Compressor model	C-R110H5H 80619445-S			
Nominal output	W	1,100		
Compressor oil ... Amount	cc	SUNISO 4GSD-T ... 550		
Coil resistance (Ambient temp. 25°C)	Ω	C-R : 1.962 C-S : 5.38		
Safety devices	Type	External(OLR A)	External(OLR T)	
	Overload relay	MRA98596-9201	CS-7C115	
	Operating temp.	Open °C	145±5	115±3
		Close °C	69±11	95±5
Operating amp.(Ambient temp. 25°C)	Trip in 6 to 16 sec. at 21A		—	
Run capacitor	μF	25.0		
	VAC	400		
Crank case heater	—			

<b>Fan &amp; Fan Motor</b>			
Type	Propeller		
Q'ty ... Dia.	1 ... ø400		
Fan motor model ... Q'ty	K35610-M01402 ... 1		
No. of poles ... rpm (230 V, High)	6 ... 760		
Nominal output	W	20	
Coil resistance (Ambient temp. 20°C)	Ω	BRN-WHT : 256±7% YEL-WHT : 227±7% PNK-YEL : 103±7%	
Safety devices	Type	Internal protector	
	Operating temp.	Open °C	150±10
		Close °C	Automatic reclosing
Run capacitor	μF	2.0	
	VAC	440	

<b>Heat Exch. Coil</b>			
Coil	Aluminum plate fin / Copper tube		
Rows	1		
Fin pitch	mm	1.3	
Face area	m <sup>2</sup>	0.379	

<b>External Finish</b>	
Acrylic baked-on enamel finish	

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Outdoor Unit **AE512SCL**

<b>Controller PCB</b>				
Part No.		POW-CL128E		
Control circuit fuse		250 V 3.15 A		
<b>Compressor</b>				
Type		Rotary (Hermetic)		
Compressor model		C-R110H5H 80619445-S		
Nominal output	W	1,100		
Compressor oil ... Amount	cc	SUNISO 4GSD-T ... 550		
Coil resistance (Ambient temp. 25°C)	Ω	C-R : 1.962 C-S : 5.38		
Safety devices	Type	External(OLR A)	External(OLR T)	
	Overload relay	MRA98596-9201	CS-7C115	
	Operating temp.	Open °C	145±5	115±3
		Close °C	69±11	95±5
Operating amp.(Ambient temp. 25°C)	Trip in 6 to 16 sec. at 21A		—	
Run capacitor	μF	25.0		
	VAC	400		
Crank case heater		240 V 20 W		
<b>Fan &amp; Fan Motor</b>				
Type		Propeller		
Q'ty ... Dia.		1 ... ø400		
Fan motor model ... Q'ty		UE6T-21H5P-S ... 1		
No. of poles ... rpm (230 V, High)		6 ... 770		
Nominal output	W	20		
Coil resistance (Ambient temp. 20°C)	Ω	WHT-BRN : 264.5 WHT-VLT : 227.9 VLT-YEL : 22.53 YEL-PNK : 42.37		
Safety devices	Type	Internal fuse		
	Operating temp.	Open °C	145±2	
		Close °C	—	
Run capacitor	μF	2.0		
	VAC	440		
<b>Heat Exch. Coil</b>				
Coil		Aluminum plate fin / Copper tube		
Rows		1		
Fin pitch	mm	1.3		
Face area	m <sup>2</sup>	0.379		
<b>External Finish</b>		Acrylic baked-on enamel finish		

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

## 2-3. Other Component Specifications

Indoor Unit **FC512CL**

<b>Thermistor (Room sensor TH2)</b>		<b>KTEC-35-S6</b>			
Resistance	kΩ	10°C	10.0 ± 4%	30°C	4.0 ± 4%
		15°C	7.9 ± 4%	35°C	3.3 ± 4%
		20°C	6.3 ± 4%	40°C	2.7 ± 4%
		25°C	5.0 ± 4%	50°C	1.8 ± 4%

<b>Thermistor (Coil sensor TH1)</b>		<b>PBC-41E-S14</b>			
Resistance	kΩ	-20°C	40.1 ± 5%	20°C	6.5 ± 5%
		-10°C	24.4 ± 5%	30°C	4.4 ± 5%
		0°C	15.3 ± 5%	40°C	3.0 ± 5%
		10°C	9.9 ± 5%	50°C	2.1 ± 5%

<b>Transformer (TR)</b>		<b>ATR-H85</b>			
Rating	Primary	AC 230V, 50/60Hz			
	Secondary	11V, 0.727A			
	Capacity	8VA			
Coil resistance	Ω (at 21°C)	Primary (WHT – WHT):	214 ± 10%		
		Secondary (BRN – BRN):	1.58 ± 10%		
Thermal cut-off temp.		145°C, 2A, 250V			

Outdoor Unit **AE512SC**

<b>Power Relay (PR)</b>		<b>G7L-2A-TUB</b>	
Coil rating		AC 200–240V, 50/60Hz	
Coil resistance	Ω (at 23°C)	21 ± 15%	
Contact rating		AC 220V, 25A	

Outdoor Unit **AE512SCL**

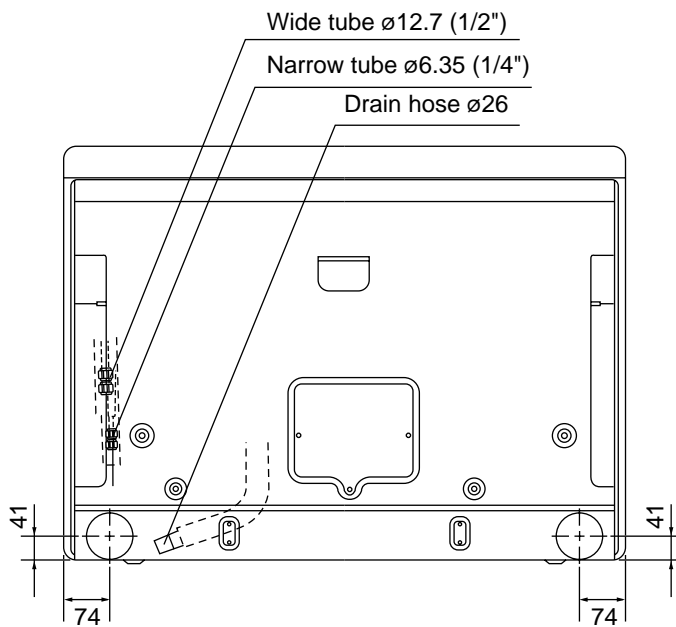
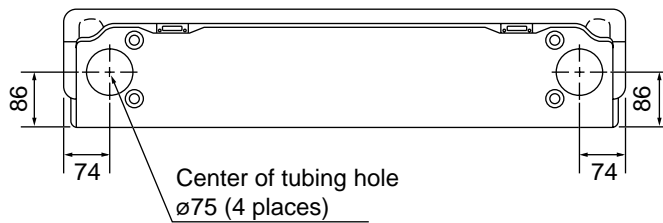
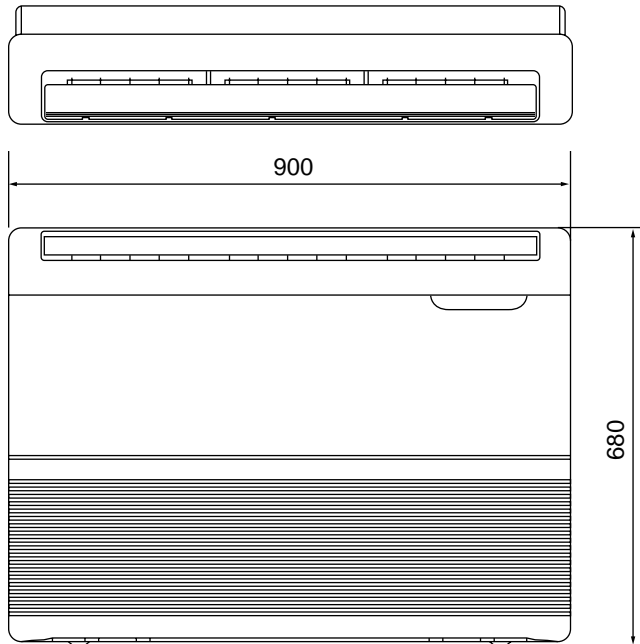
<b>Transformer (TR2)</b>		<b>ATR-J65</b>	
Rating	Primary	AC 230V, 50Hz	
	Secondary	19V, 0.315A	
	Capacity	6VA	
Coil resistance	$\Omega$ (at 22°C)	Primary (WHT – WHT):	455 ± 10%
		Secondary (BRN – BRN):	2.85 ± 10%
Thermal cut-off temp.		145°C	

<b>Power Relay (PR)</b>		<b>G7L-2A-TUB</b>	
Coil rating		AC 200–240V, 50/60Hz	
Coil resistance	$\Omega$ (at 23°C)	21 ± 15%	
Contact rating		AC 220V, 25A	

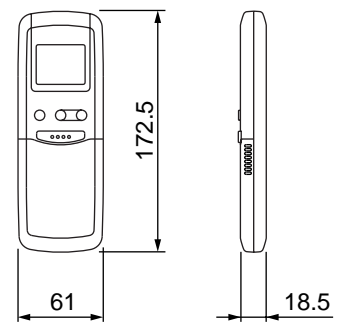
<b>Thermistor (Coil sensor TH1)</b>		<b>PBC-41E-S4</b>			
Resistance	k $\Omega$	-20°C	40.1 ± 5%	20°C	6.5 ± 5%
		-10°C	24.4 ± 5%	30°C	4.4 ± 5%
		0°C	15.3 ± 5%	40°C	3.0 ± 5%
		10°C	9.9 ± 5%	50°C	2.1 ± 5%

### 3. DIMENSIONAL DATA

Indoor Unit    FC512CL

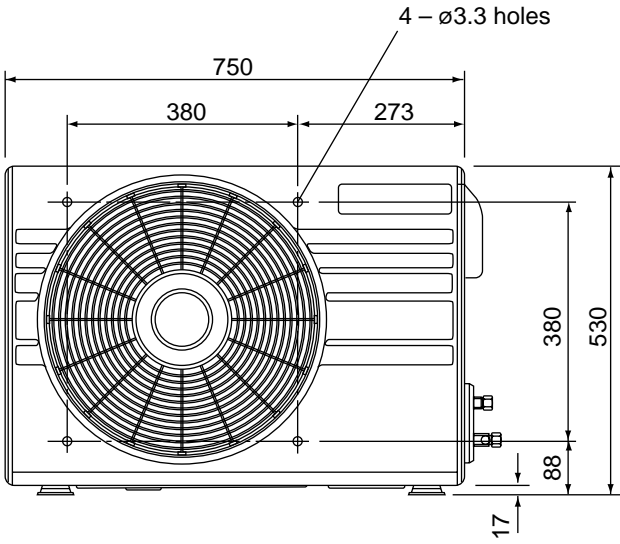
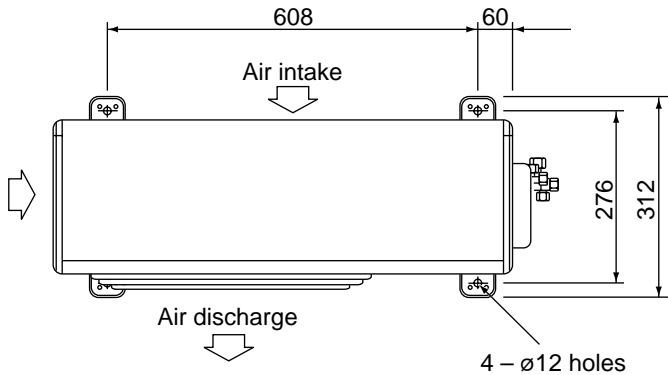


Remote control unit

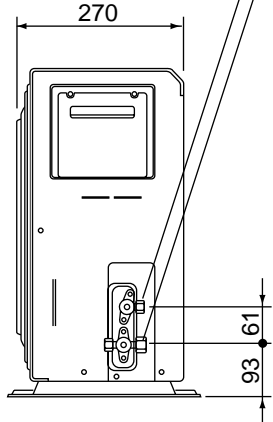


Unit : mm

Outdoor Unit **AE512SC**

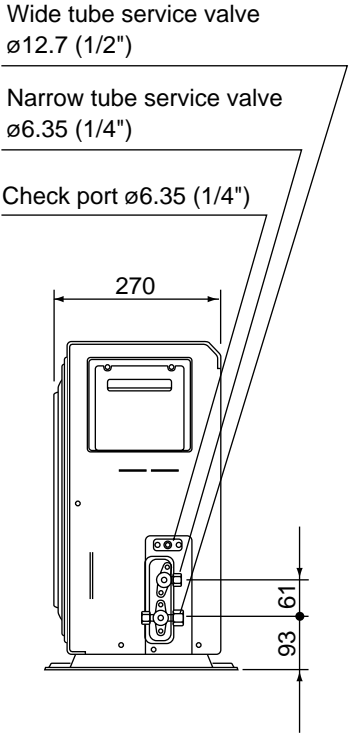
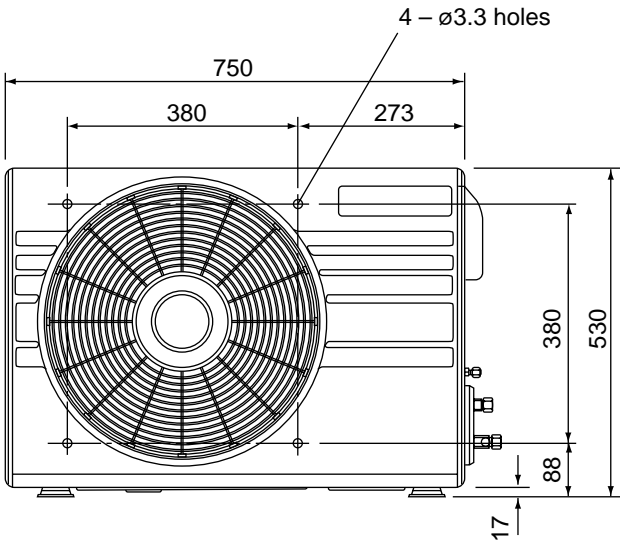
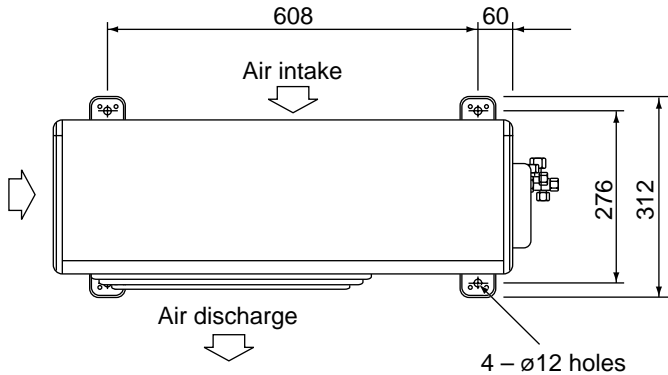


Wide tube service valve  
 ø12.7 (1/2")  
 Narrow tube service valve  
 ø6.35 (1/4")



Unit : mm

Outdoor Unit : AE512SCL

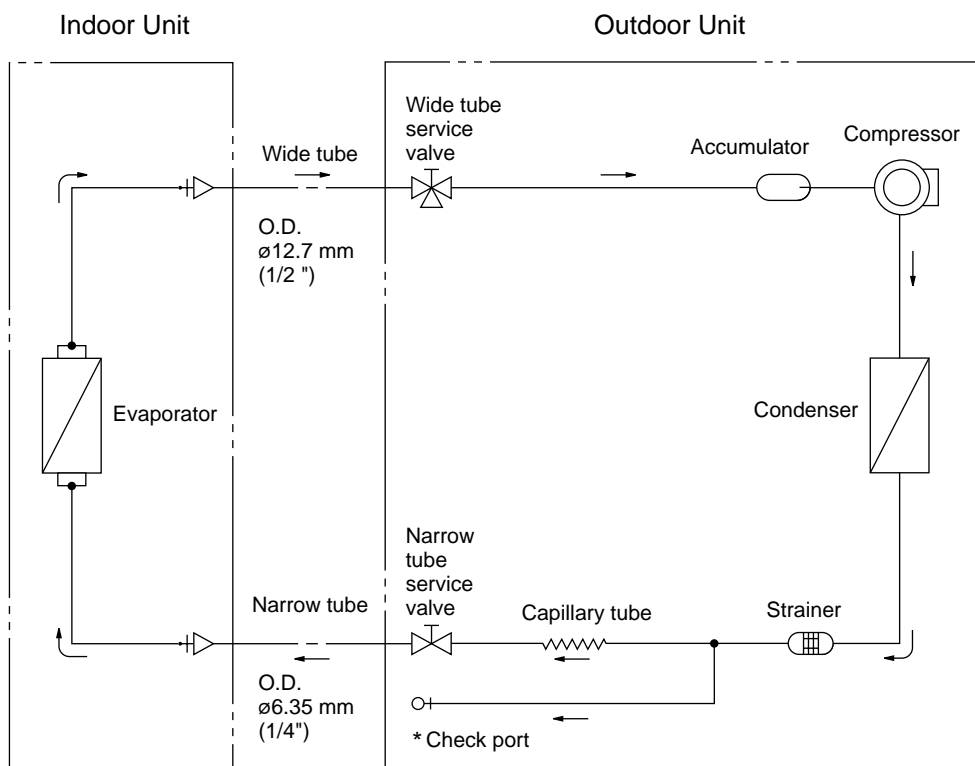


Unit : mm

# 4. REFRIGERANT FLOW DIAGRAM

Indoor Unit **FC512CL**

Outdoor Unit **AE512SC or AE512SCL**



\* Only for AE512SCL

## Insulation of Refrigerant Tubing

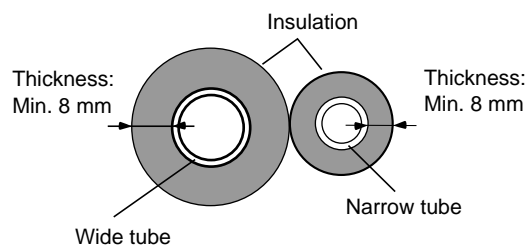
### IMPORTANT

Because capillary tubing is used in the outdoor unit, both the wide and narrow tubes of this air conditioner become cold. To prevent heat loss and wet floors due to dripping of condensation, **both tubes must be well insulated** with a proper insulation material. The thickness of the insulation should be a min. 8 mm.



**CAUTION**

After a tube has been insulated, never try to bend it into a narrow curve because it can cause the tube to break or crack.

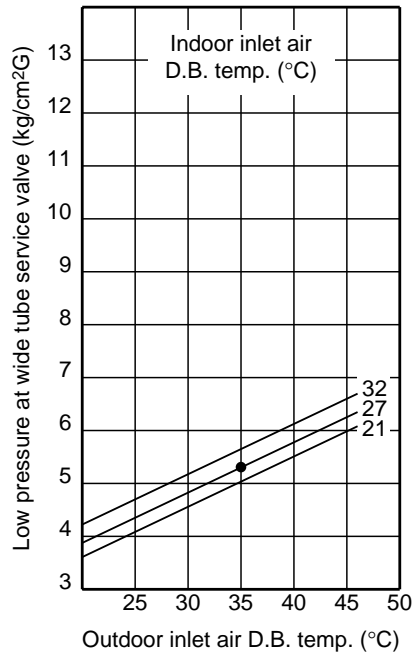
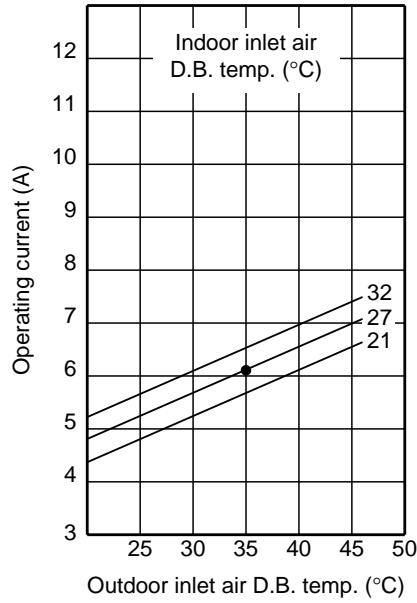


# 5. PERFORMANCE DATA

## 5-1. Performance charts

Indoor Unit      **FC512CL**  
 Outdoor Unit    **AE512CL or AE512SCL**

Cooling Characteristics



**NOTE**

- ..... Points of Rating condition  
 Black dots in above charts indicate the following rating conditions.

Cooling: Indoor air temperature 27°C D.B./19°C W.B.  
 Outdoor air temperature 35°C D.B./24°C W.B.



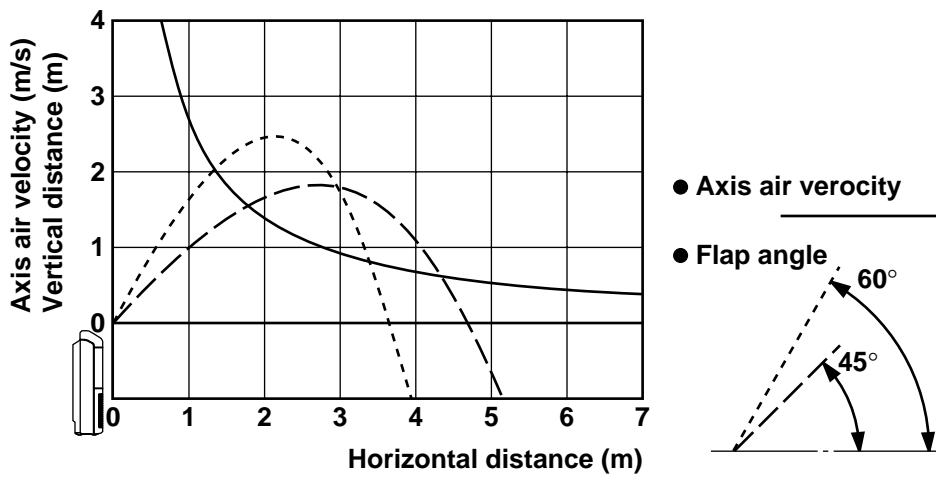
## 5-2. Air Throw Distance Chart

Indoor Unit      FC512CL

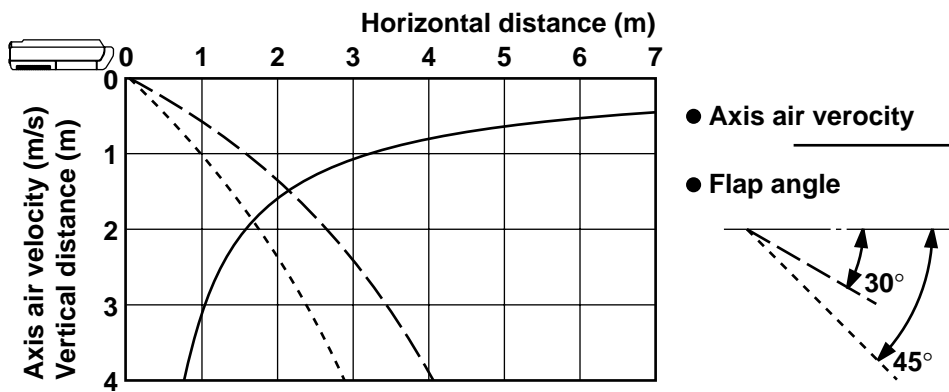
Room air temp. : 27°C

Fan speed : High

### ■ Floor mounted



### ■ Ceiling mounted



### 5-3. Cooling Capacity

Indoor Unit **FC512CL**  
 Outdoor Unit **AE512SC or AE512SCL**

240V Single Phase 50Hz

RATING CAPACITY		3.50 kW						
AIR FLOW RATE		700 m <sup>3</sup> /h						
EVAPORATOR		CONDENSER						
ENT. TEMP. °C		OUTDOOR AMBIENT TEMP. °C						
W.B.	D.B.		20	25	30	35	40	45
15		TC	3.53	3.37	3.22	3.07	2.88	2.65
		CM	0.91	0.99	1.06	1.14	1.23	1.33
	21	SHC	2.50	2.42	2.35	2.27	2.19	2.08
	23	SHC	2.84	2.77	2.69	2.62	2.53	2.43
	25	SHC	3.19	3.11	3.04	2.97	2.88	2.65
	27	SHC	3.53	3.37	3.22	3.07	2.88	2.65
	29	SHC	3.53	3.37	3.22	3.07	2.88	2.65
	31	SHC	3.53	3.37	3.22	3.07	2.88	2.65
17		TC	3.78	3.62	3.45	3.29	3.09	2.85
		CM	0.94	1.02	1.09	1.17	1.26	1.36
	21	SHC	2.14	2.06	1.99	1.92	1.83	1.73
	23	SHC	2.49	2.41	2.34	2.26	2.18	2.07
	25	SHC	2.83	2.76	2.68	2.61	2.52	2.42
	27	SHC	3.18	3.10	3.03	2.96	2.87	2.76
	29	SHC	3.52	3.45	3.38	3.29	3.09	2.85
	31	SHC	3.78	3.62	3.45	3.29	3.09	2.85
19		TC	4.03	3.85	3.68	# 3.50	3.29	3.03
		CM	0.97	1.05	1.12	1.20	1.30	1.40
	21	SHC	1.77	1.69	1.62	1.55	1.46	1.36
	23	SHC	2.11	2.04	1.97	1.89	1.81	1.71
	25	SHC	2.46	2.39	2.31	2.24	2.16	2.05
	27	SHC	2.81	2.73	2.66	2.59	2.50	2.40
	29	SHC	3.15	3.08	3.01	2.93	2.85	2.74
	31	SHC	3.50	3.42	3.35	3.28	3.19	3.03
21		TC	4.27	4.08	3.90	3.71	3.49	3.21
		CM	1.00	1.08	1.15	1.24	1.34	1.44
	23	SHC	1.74	1.67	1.59	1.52	1.44	1.34
	25	SHC	2.09	2.01	1.94	1.87	1.79	1.68
	27	SHC	2.43	2.36	2.29	2.22	2.13	2.03
	29	SHC	2.78	2.71	2.63	2.56	2.48	2.38
23		TC	4.53	4.33	4.13	3.90	3.65	3.39
		CM	1.02	1.10	1.18	1.27	1.37	1.47
	25	SHC	1.69	1.62	1.55	1.47	1.38	1.30
	27	SHC	2.04	1.97	1.89	1.81	1.73	1.64
	29	SHC	2.38	2.31	2.24	2.16	2.07	1.99
	31	SHC	2.73	2.66	2.59	2.51	2.42	2.33

TC : Total Cooling Capacity (kW)

SHC : Sensible Heat Capacity (kW)

CM : Compressor Input (kW)

Rating conditions (#Mark) are

Outdoor Ambient Temp. 35°C D.B.

Indoor Unit Entering Air Temp. 27°C D.B. / 19°C W.B.

## 6. ELECTRICAL DATA

### 6-1. Electrical Characteristics

Indoor Unit     **FC512CL**  
 Outdoor Unit   **AE512SC**

		Indoor Unit		Outdoor Unit		Complete Unit
		Fan Motor		Fan Motor	Compressor	
Performance at		220 – 240V ~ 50Hz				
Rating Conditions	Running Amps.   A	0.28 / 0.29	0.30 / 0.32	5.4 / 5.5	6.0 / 6.1	
	Power Input       kW	0.060 / 0.070	0.066 / 0.076	1.14 / 1.20	1.27 / 1.35	
Full Load Conditions	Running Amps.   A	0.28 / 0.29	0.30 / 0.32	6.8 / 6.7	7.4 / 7.3	
	Power Input       kW	0.060 / 0.070	0.066 / 0.076	1.43 / 1.47	1.56 / 1.62	

Rating Conditions   : Indoor Air Temperature 27°C D.B. / 19°C W.B.  
                           Outdoor Air Temperature 35°C D.B.

Full Load Conditions : Indoor Air Temperature 32°C D.B. / 23°C W.B.  
                           Outdoor Air Temperature 43°C D.B.

Indoor Unit     **FC512CL**  
 Outdoor Unit   **AE512SCL**

		Indoor Unit		Outdoor Unit		Complete Unit
		Fan Motor		Fan Motor	Compressor	
Performance at		220 – 240V ~ 50Hz				
Rating Conditions	Running Amps.   A	0.28 / 0.29	0.29 / 0.30	5.4 / 5.5	6.0 / 6.1	
	Power Input       kW	0.060 / 0.070	0.064 / 0.073	1.15 / 1.21	1.27 / 1.35	
Full Load Conditions	Running Amps.   A	0.28 / 0.29	0.29 / 0.30	6.8 / 6.7	7.4 / 7.3	
	Power Input       kW	0.060 / 0.070	0.064 / 0.073	1.44 / 1.48	1.56 / 1.62	

Rating Conditions   : Indoor Air Temperature 27°C D.B. / 19°C W.B.  
                           Outdoor Air Temperature 35°C D.B.

Full Load Conditions : Indoor Air Temperature 32°C D.B. / 23°C W.B.  
                           Outdoor Air Temperature 43°C D.B.

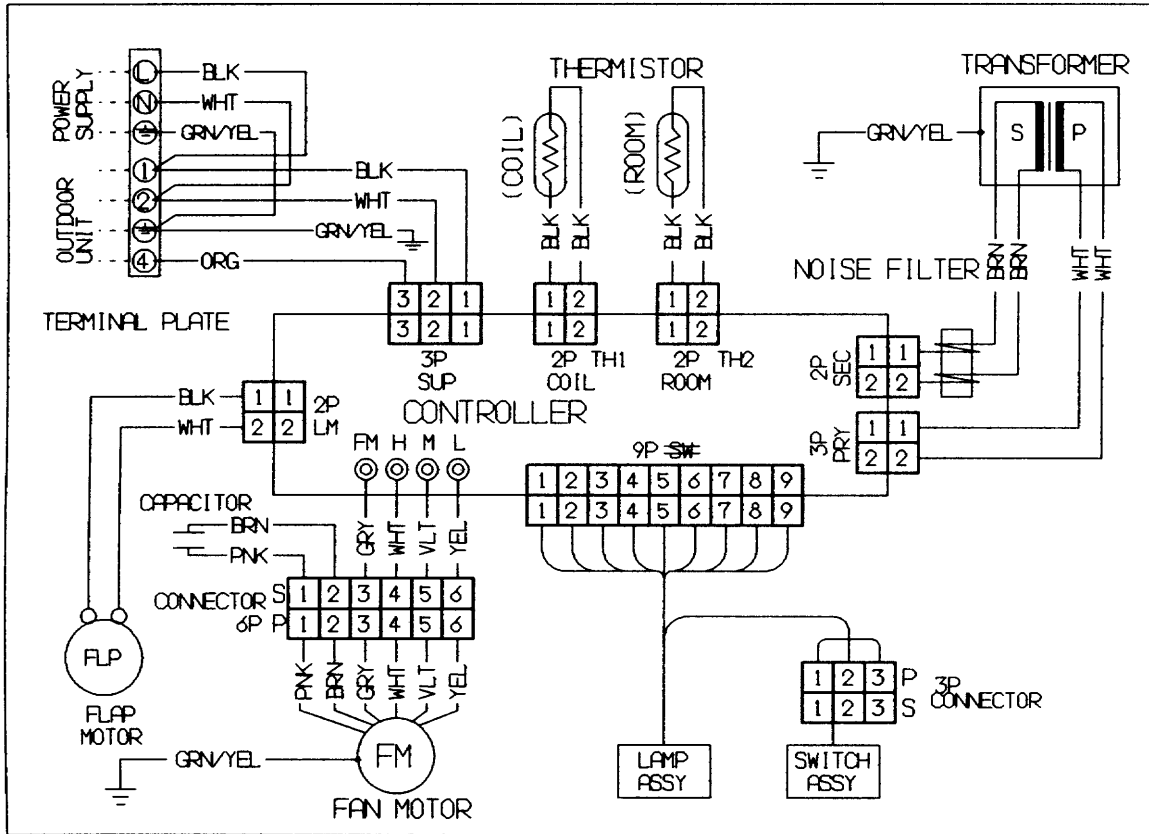
## 6-2. Electric Wiring Diagrams

Indoor Unit FC512CL



**WARNING**

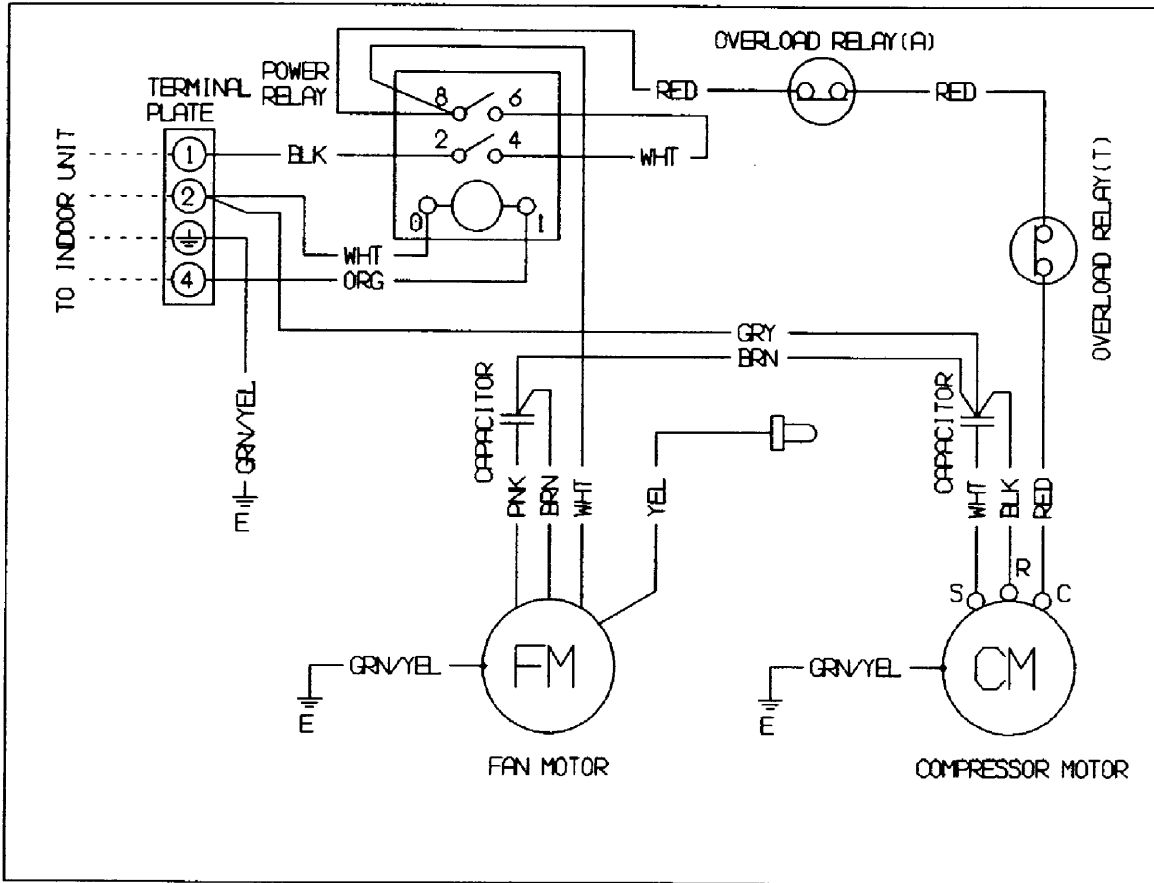
To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.





**WARNING**

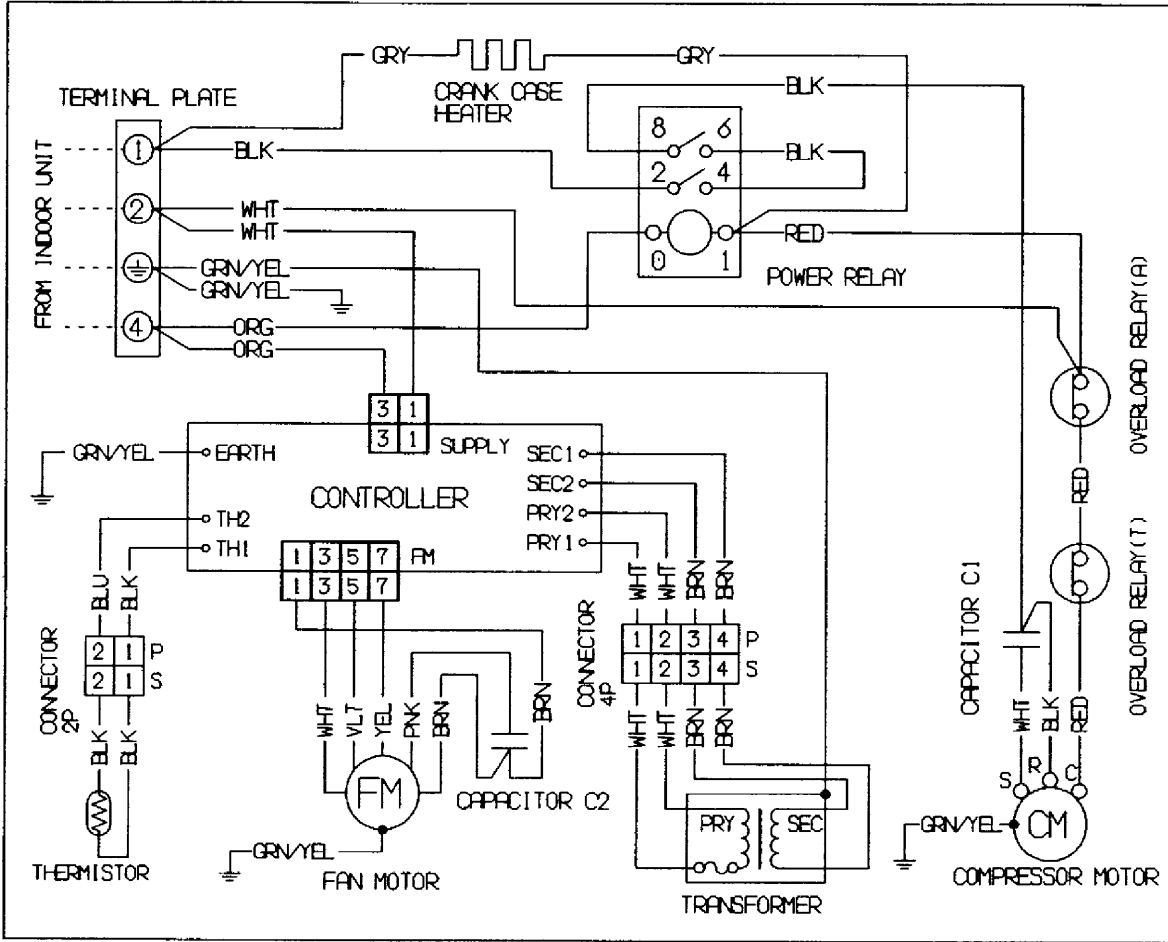
To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.





**WARNING**

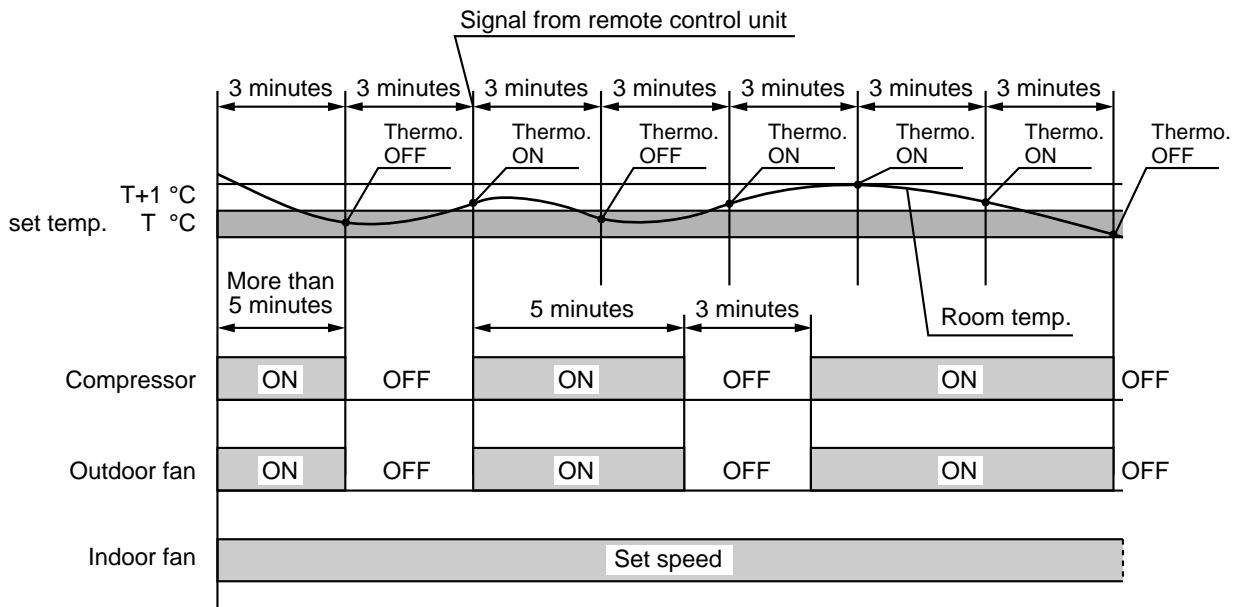
To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts.



# 7. FUNCTION

## 7-1. Room Temperature Control

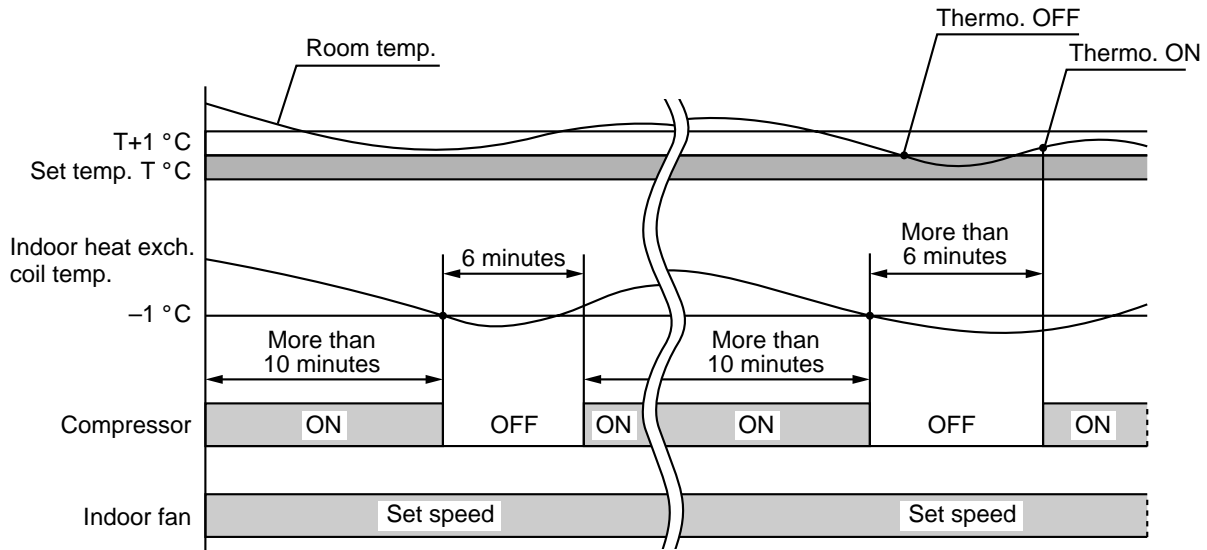
- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.
- The room temperature (and other information) is transmitted every 3 minutes by the remote control unit to the controller in the indoor unit.



- 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  $T + 1$  °C ( $T$  °C is set temperature).  
Compressor → ON
- Thermo. OFF : When the room temperature is equal to or below set temperature  $T$  °C.  
Compressor → OFF

## 7-2. Freeze Prevention

- 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  $-1^{\circ}\text{C}$ , the control circuit stops the compressor for at least 6 minutes. The compressor does not start again until the temperature rises above  $8^{\circ}\text{C}$  or 6 minutes has elapsed.

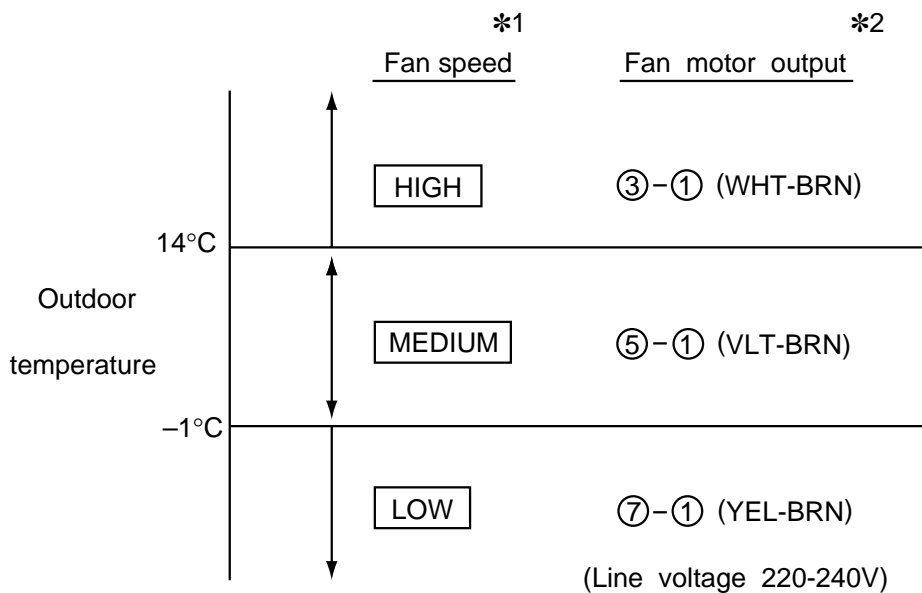




## 7-3. Outdoor Fan Speed Control (for model AE512SCL)

### Low ambient fan speed control

- This function protects the compressor from being damaged due to flowback of the liquid refrigerant to the compressor when the outdoor temperature is very low.
- When the air temp. thermistor (TH) on the outdoor unit detects a change in temperature, the controller (POW-CL128E) on the electrical component box activates to control the fan speed automatically.
- If the outdoor temperature falls below 14°C, the fan speed switches to MED.
- If the outdoor temperature falls below -1°C, the fan speed switches to LOW.



#### NOTE

- \*1. Regardless of outdoor temperature, outdoor fan motor operates at first at HIGH speed for  $23 \pm 5$  seconds to give the motor an initial boost.
- \*2. When the fan speed switches, the controller terminal's location where line voltage comes out (○-○) shifts accordingly.

## 8. TROUBLESHOOTING

### 8-1. Check before and after troubleshooting

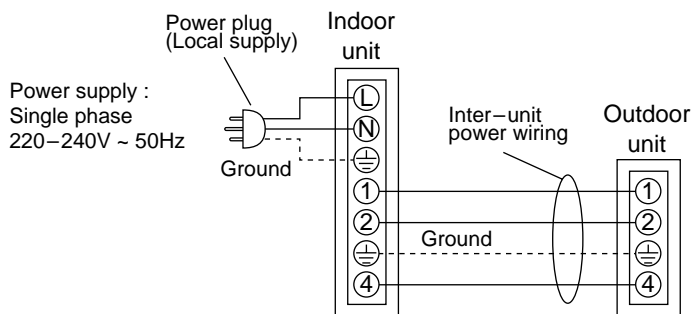


#### WARNING

Hazardous voltage can cause **ELECTRIC SHOCK** or **DEATH**. Disconnect power or turn off circuit breaker before you start checking or servicing.

#### 8-1-1. Check power supply wiring.

- Check that power supply wires are correctly connected to terminals **L** and **N** on the terminal plate in the indoor unit.



#### 8-1-2. Check inter-unit wiring.

- Check that inter-unit wiring is correctly connected to the outdoor unit from the indoor unit.

#### 8-1-3. Check power supply.

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

#### 8-1-4. 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 firmly connected.
- Check that wiring is correct.

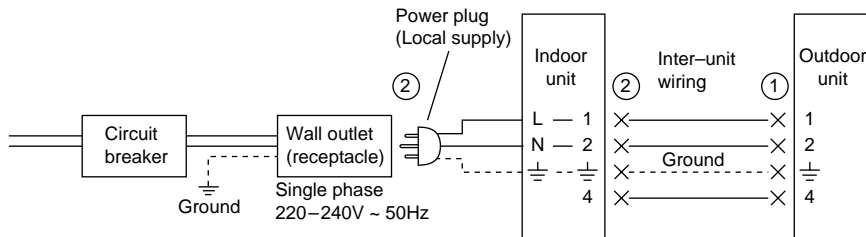
## 8-2. Air conditioner does not operate.

### 8-2-1. Circuit breaker trips (or fuse blows).

A. When the circuit breaker is set to ON, it is tripped soon. (Resetting is not possible.)

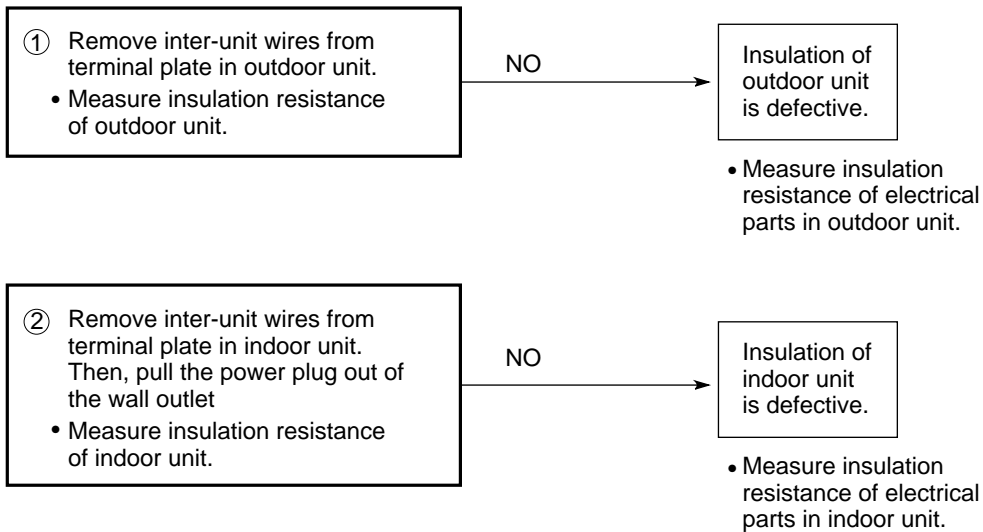
- There is a possibility of ground fault.
- Check insulation resistance.

If resistance value is  $2M\Omega$  or less, insulation is defective (“NO”).



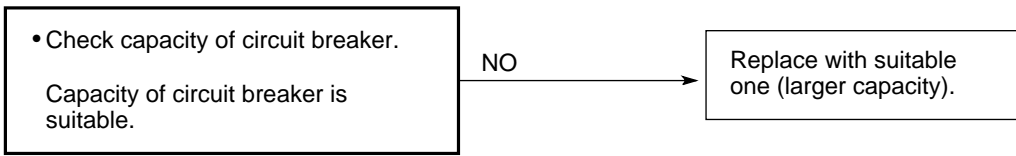
**WARNING**

\* Set circuit breaker to OFF.

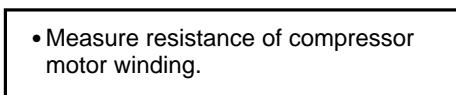
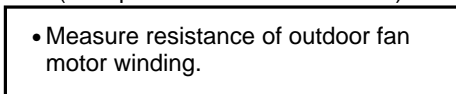


**B. Circuit breaker trips in several minutes after turning the air conditioner on.**

- There is a possibility of short circuit.

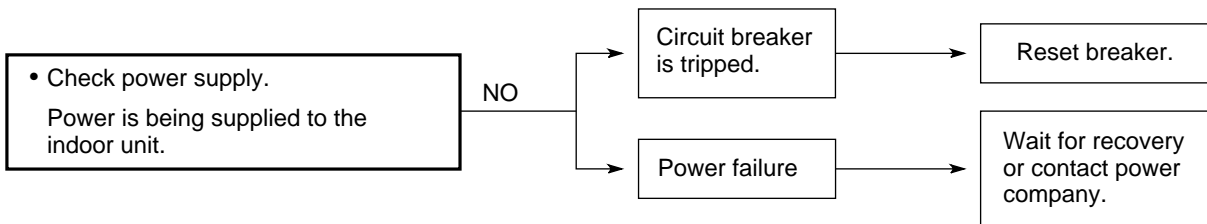


(Except for model SAP-CL128E)

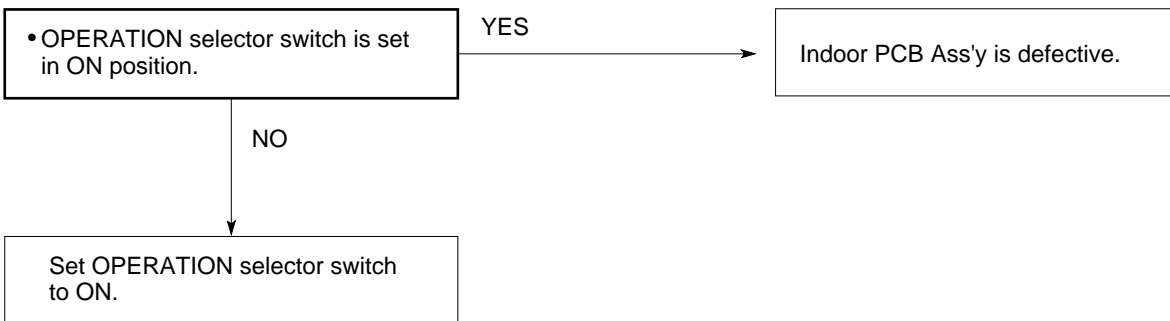


**8-2-2. Neither indoor nor outdoor unit runs.**

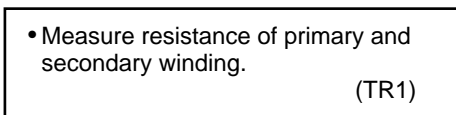
**A. Power is not supplied.**



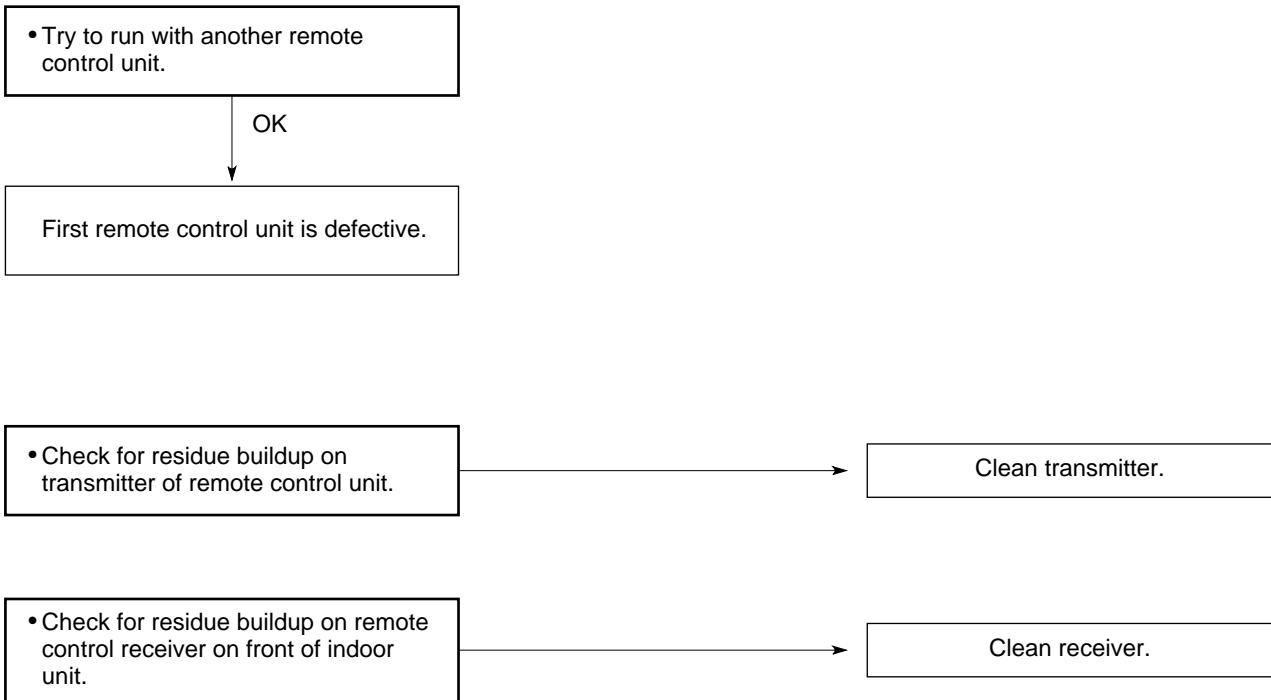
**B. Check "OPERATION selector" switch in the indoor unit.**



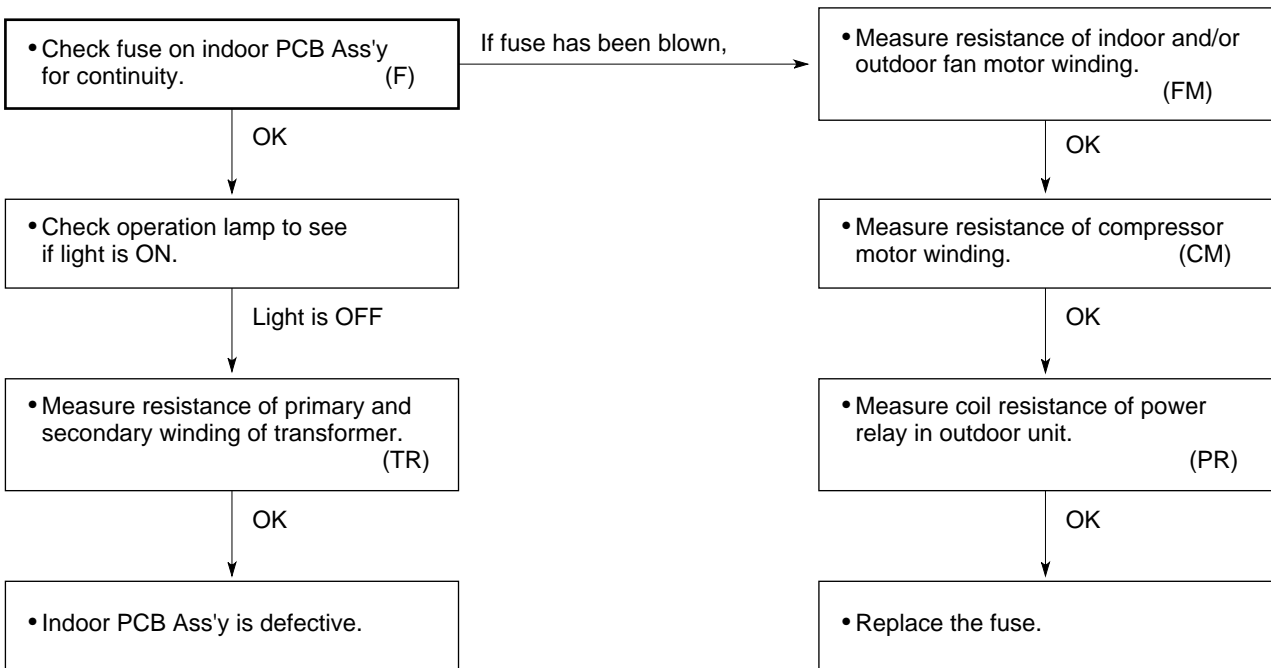
**C. Check transformer in indoor unit.**



**D. Check remote control unit.**



**E. Check fuse on the indoor PCB Ass'y.**

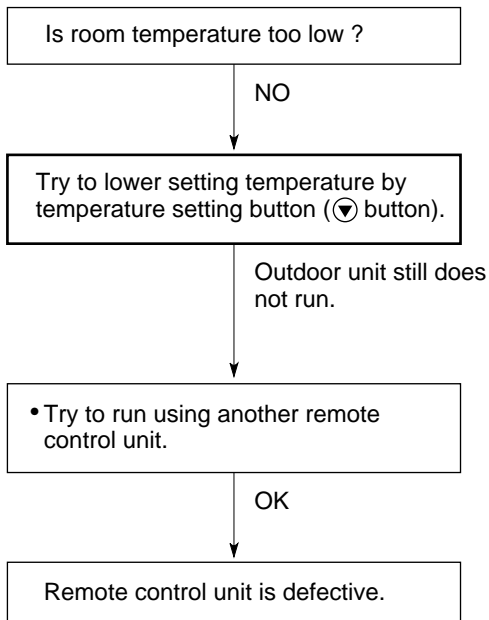


**F. Check TIMER on the remote control unit.**

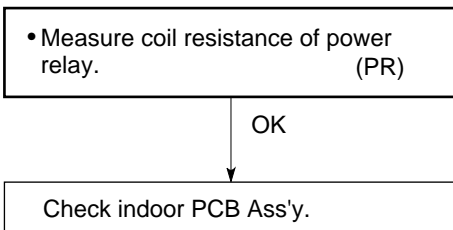


### 8-2-3. Only outdoor unit does not run.

#### A. Check setting temperature.

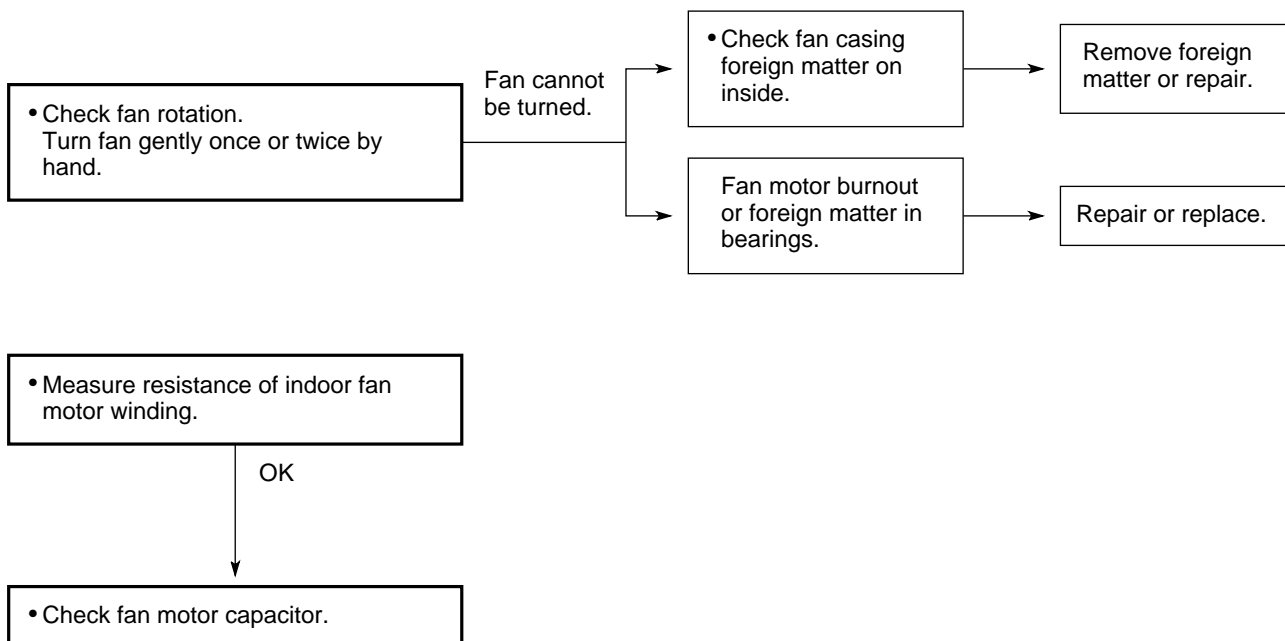


#### B. Check power relay in outdoor unit.

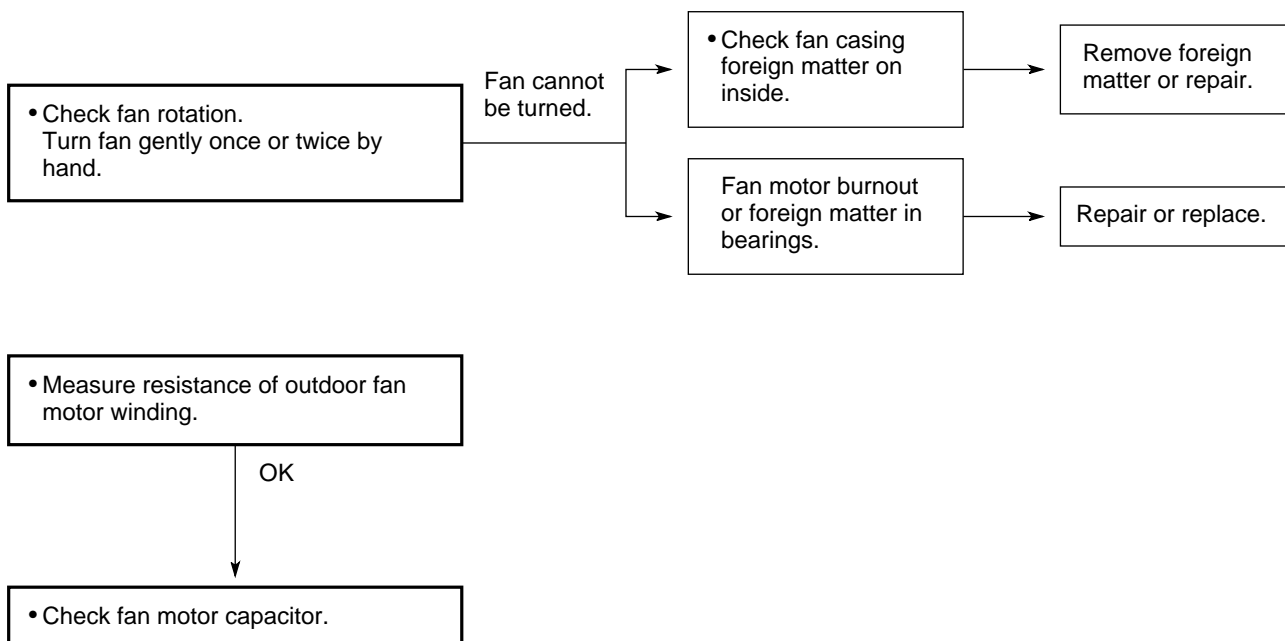


### 8-3. Some part of air conditioner does not operate.

#### 8-3-1. Only indoor fan does not run.



#### 8-3-2. Only outdoor fan does not run.



● **Check transformer in outdoor unit.** (for AE512SCL Only)

• Measure resistance of primary and secondary winding. (TR2)

● **Check fuse on outdoor PCB Ass'y.** (for AE512SCL Only)

• Check fuse on outdoor PCB Ass'y for continuity. (F)

If fuse blows,  
↓

• Measure resistance of primary winding of transformer. (TR2)

OK  
↓

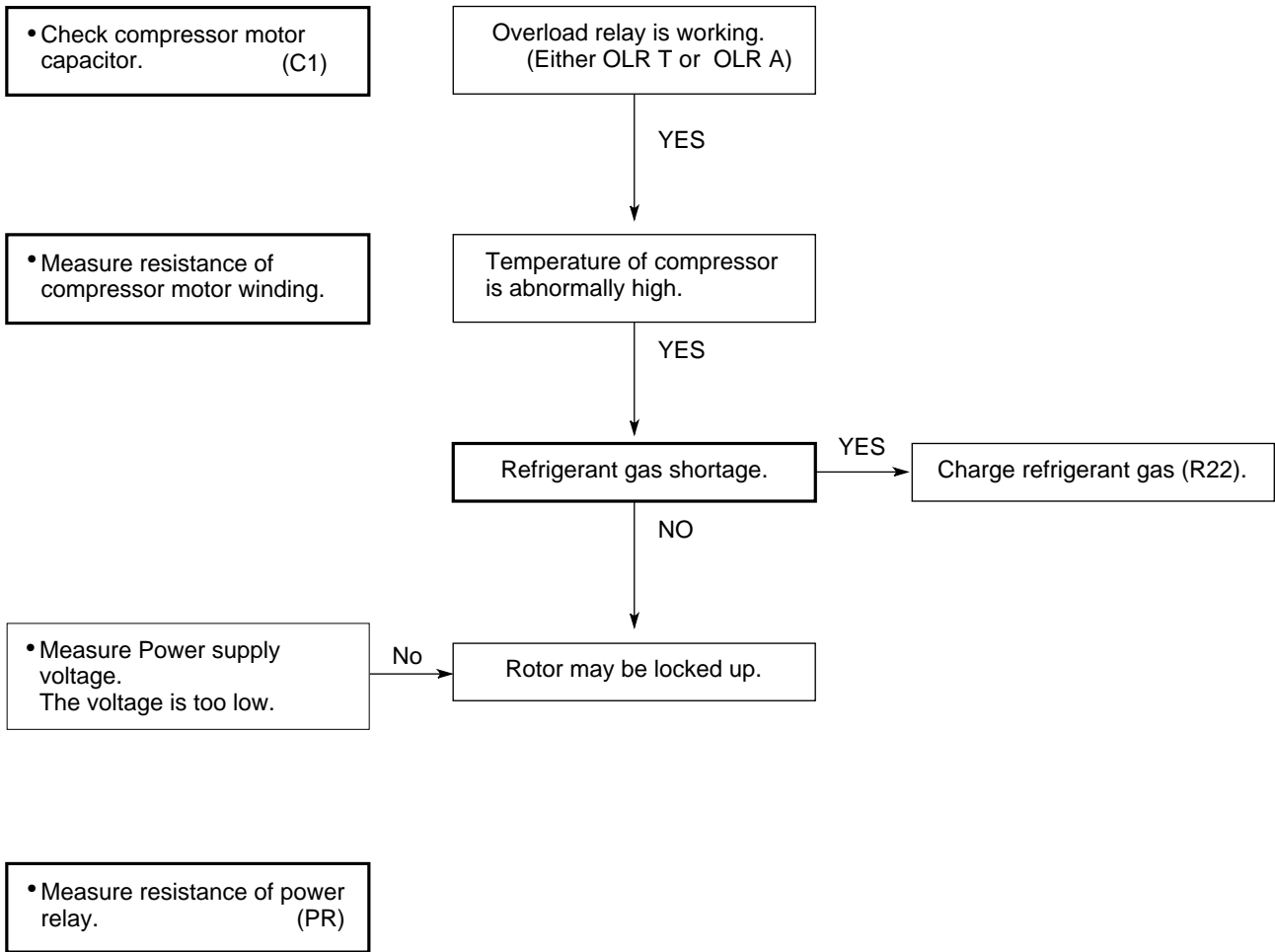
• Measure resistance of outdoor fan motor winding.

OK  
↓

• Outdoor PCB Ass'y is defective.



**8-3-3. Only compressor does not run.**



**8-3-4. Only flap motor does not run.**

• Measure resistance of flap motor winding.

**8-3-5. Function of outdoor fan speed control does not work properly. (AE512SCL Only)**

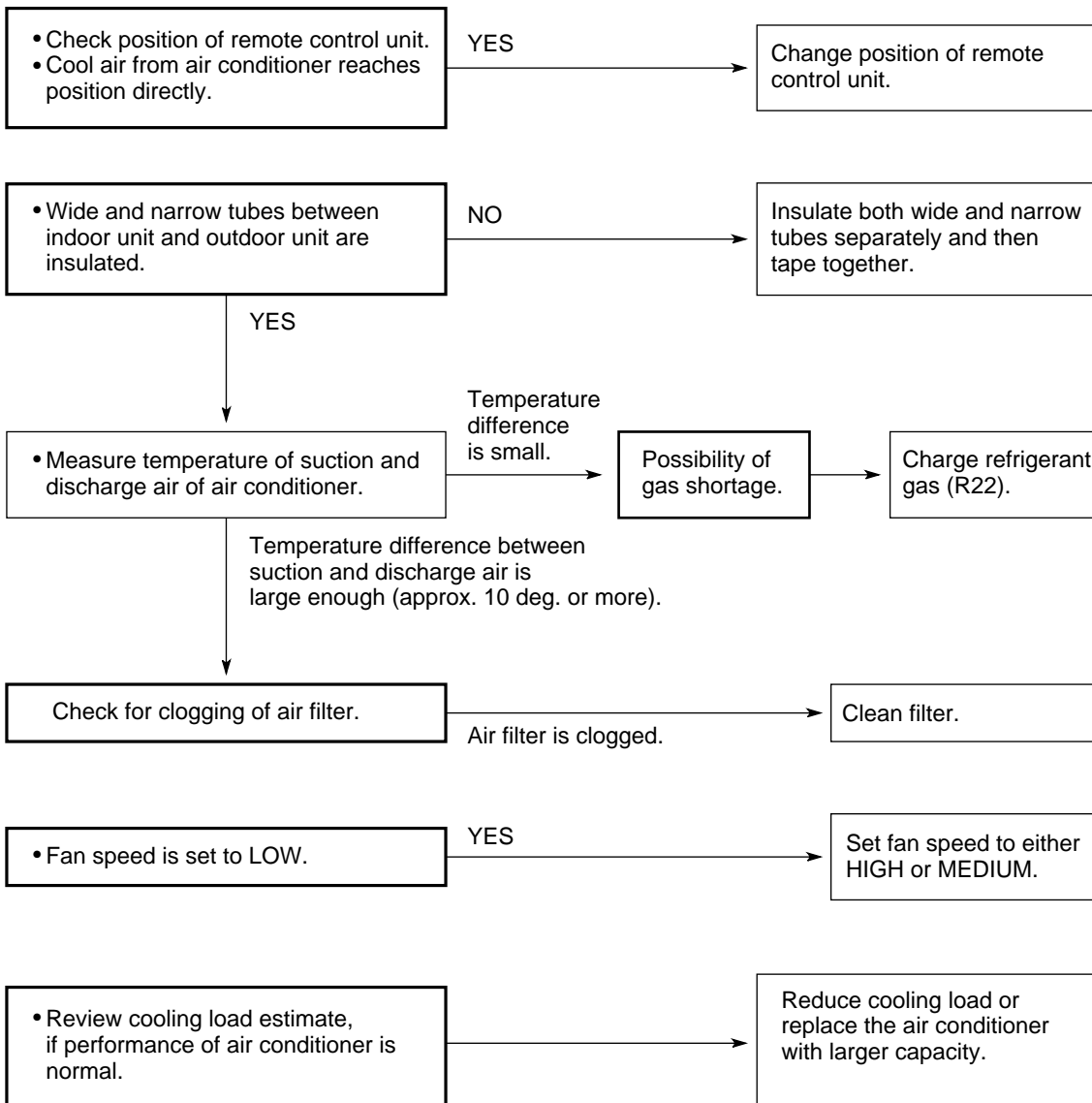
• Check controller in outdoor unit. (POW-CL128E)

• Check thermister in outdoor unit. (TH)

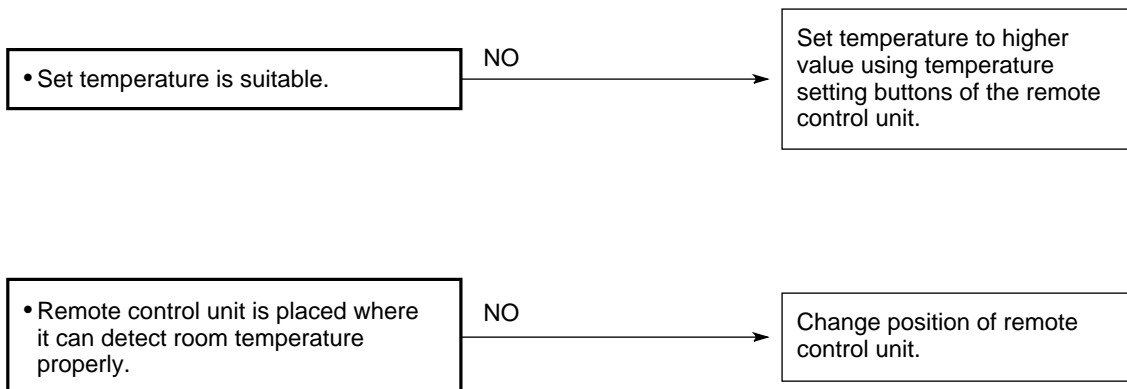
Refer to 8-3 "Outdoor Fan Speed Control."

## 8-4. Air conditioner operates, but abnormalities are observed.

### 8-4-1. Poor cooling.



### 8-4-2. Excessive cooling.



## 8-5. If a sensor is defective.

### 8-5-1. Indoor coil temp. thermistor (TH1) is defective.

#### A. Open

When thermistor opens, the air conditioner will be in the following conditions as the controller tries to detect extremely low indoor coil temperature.

In Cooling mode: Function of freeze prevention continues to work. That is, the controller turns both compressor and outdoor fan motor periodically ON and OFF for several minutes. (Refer to "8-2. Freeze Prevention")

#### B. Short

When thermistor is short, the air conditioner will be in the following conditions as the controller tries to detect extremely high indoor coil temperature.

In Cooling mode: Function of freeze prevention will not work even when the frost builds up on indoor heat exchanger coil

### 8-5-2. Room temp. thermistor (TH2) is defective.

#### A. Open

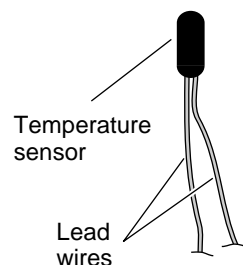
When thermistor opens, the air conditioner will be in the following conditions as the controller tries to detect extremely low room temperature.

In Cooling mode: The air conditioner soon stops and will not start again. (Thermo.OFF) Neither outdoor fan nor compressor runs.

#### B. Short

When thermistor is short, the air conditioner will be in the following conditions as the controller tries to detect extremely high room temperature.

In Cooling mode: The air conditioner continues to operate (Thermo.ON). Both the outdoor fan and compressor do not stop. As a result, the room becomes too cold.



### NOTE

#### Definition of Open or Short Circuit of Sensor (Thermistor)

#### Thermistor Structure

Open ... A lead wire is broken or disconnected or the circuit inside the temperature sensor is open .

Short ... The protective cover of a lead wire has been damaged, and the exposed wire is touching another metal part, or both lead wires have become exposed and are touching each other. Alternatively, the circuit inside the temperature sensor is closed.

# 9. CHECKING ELECTRICAL COMPONENTS

## 9-1. Measurement of Insulation Resistance

- The insulation is in good condition if the resistance exceeds  $2M\Omega$ .

### 9-1-1. Power Supply Wires

Clamp the grounding terminal of the power plug with a lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the two power terminals. (Fig. 1)

Then, also measure the resistance between the grounding and other power terminals. (Fig. 1)

### 9-1-2. 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 each terminal screw where power supply lines are connected on the terminal plate. (Fig. 2)

### 9-1-3. Outdoor 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 each terminal screw on the terminal plate. (Fig. 2)

Note that the ground line terminal should be skipped for the check.

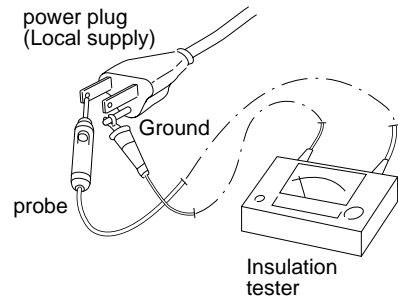
### 9-1-4. Measurement of Insulation Resistance for Electrical Parts

Disconnect the lead wires of the desired electric part from terminal plate, capacitor, etc. Similarly disconnect the connector. Then measure the insulation resistance. (Figs. 3 and 4)

**NOTE**

Refer to Electric Wiring Diagram.

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



**NOTE**

The shape of the power plug may differ from that of the air conditioner which you are servicing.

Fig. 1

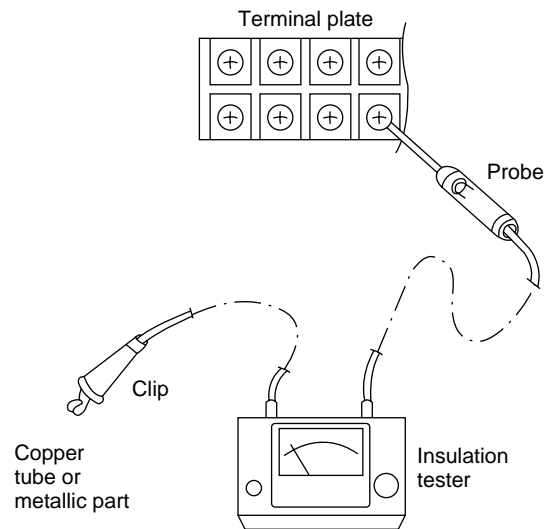


Fig. 2

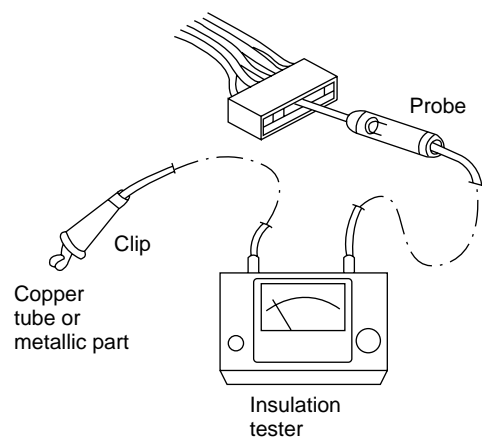


Fig. 3

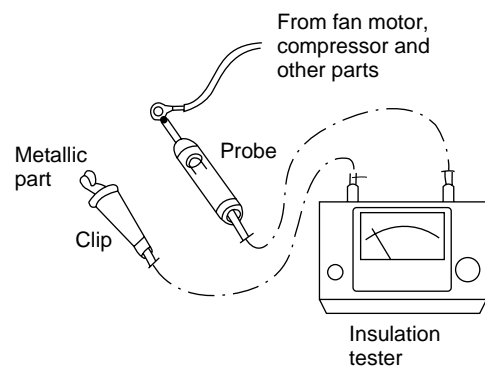


Fig. 4

## 9-2. Checking Continuity of Fuse on PCB Ass'y

- Remove the PCB Ass'y from the electrical component box. Then pull out the fuse from the PCB Ass'y. (Fig. 5)
- Check for continuity using a multimeter as shown in Fig. 6.

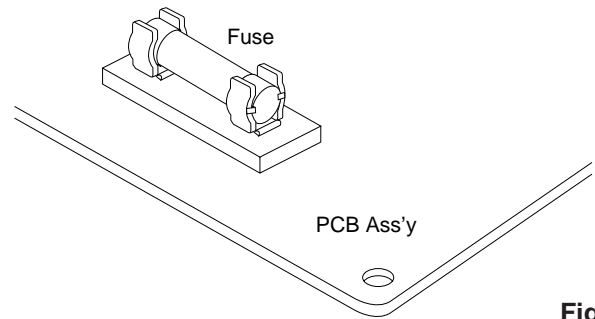


Fig. 5

## 9-3. 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.

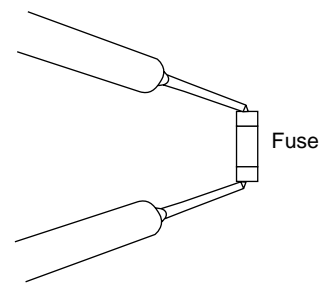


Fig. 6

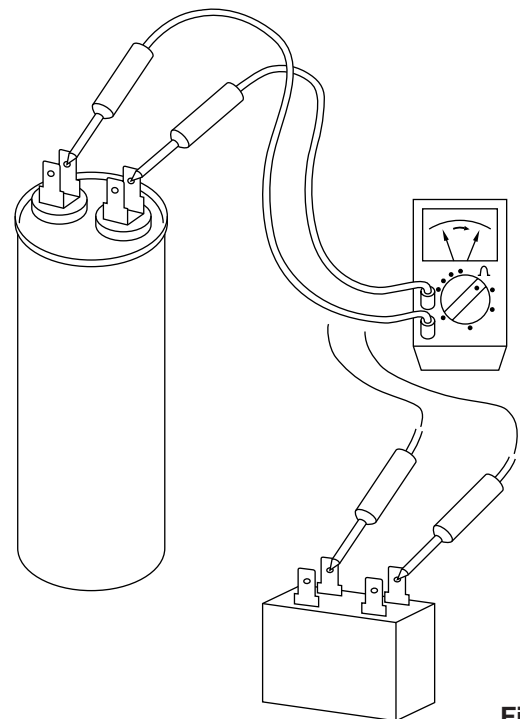


Fig. 7

## 10. DISASSEMBLY PROCEDURE FOR INDOOR UNIT



### IMPORTANT! Please Read Before Starting

#### Safety precautions for servicing the CEILING-MOUNTED indoor unit

- Before attempting to replace heavy and bulky parts such as the evaporator and fan motor, disconnect the indoor unit from the system and place it on the floor. Refer to the steps given below.
- When checking or servicing the air intake grille, side panels, or electrical component box, first check that power is completely disconnected. Pay utmost care that your working platform is stable enough. Also, do not drop any replaced parts and tools on the floor.

### For Floor Installation

#### 10-1. Removing Air Intake Grille

- (1) Hold both ends and pull forward to open the air intake grille. (Fig. 1)
- (2) Remove the metal clips connecting the unit and the grille. First, with a screwdriver, loosen the \* marked screw a little at the right side clip (DO NOT loosen it too much, otherwise, the screw and small metal parts will fall off inside.), then press on the stopper and pull off. (Fig. 2)
- (3) Do the same procedure for the left metal clip.
- (4) Unlatch the 2 tabs on the lower part of the grille to take it off completely.

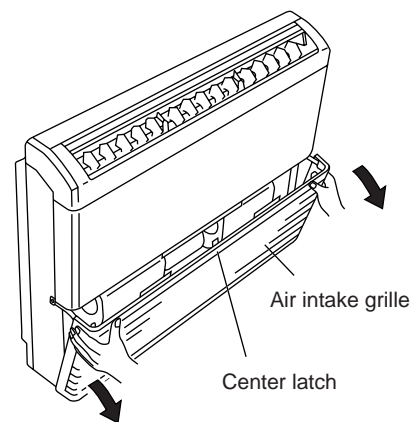


Fig.1

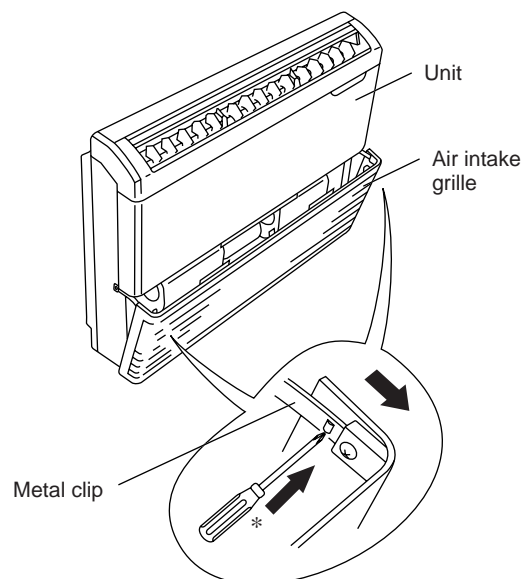


Fig.2

## 10-2. Removing Side Panels

- (1) Remove the 3 screws attaching the left side panel. (Fig. 3)
- (2) Note the position of the hook on the inside of the left side panel. To disengage the hook from the slot, slide down the panel for removal. (Fig. 3)
- (3) Do the same procedure for the right side panel.

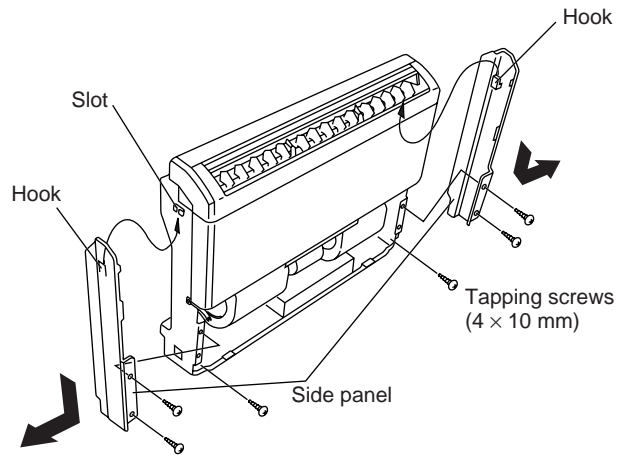


Fig.3

## 10-3. Access and Removal of Electrical Component Box



**WARNING**

**Hazardous voltage can cause ELECTRIC SHOCK or DEATH. Disconnect the power or turn off circuit breaker before you start checking or servicing.**

- (1) Remove the front screw with a screwdriver. (Fig. 4)
- (2) Slide the lid out and up. (Fig. 4)
- (3) Disconnect the wiring as necessary.
- (4) Remove the 4 screws, then pull out the electrical component box. (Fig. 5)

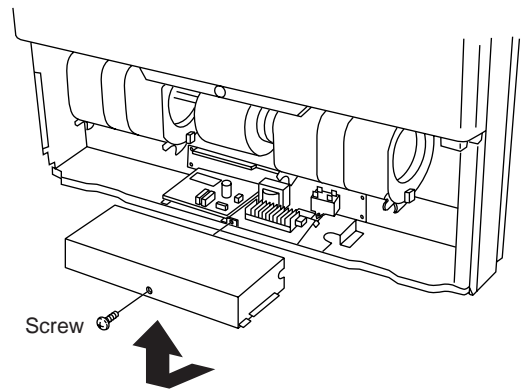


Fig.4

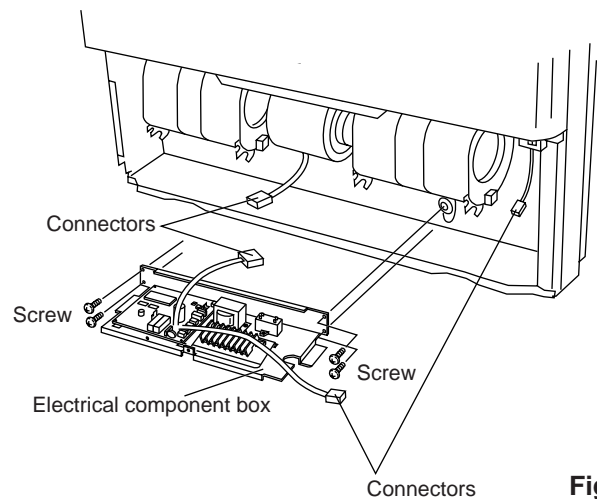


Fig.5

## 10-4. Removing Flap Motor

- (1) Remove the 3 screws used to mount the top panel.  
(Fig. 6)
- (2) While unlatching the 2 tabs inside the back of the top panel, lift the top panel diagonally in the direction of the arrow.(Fig. 6)
- (3) Remove the 2 screws to pull off the flap motor.  
The arm and cam come off together with the motor.  
(Fig. 7)

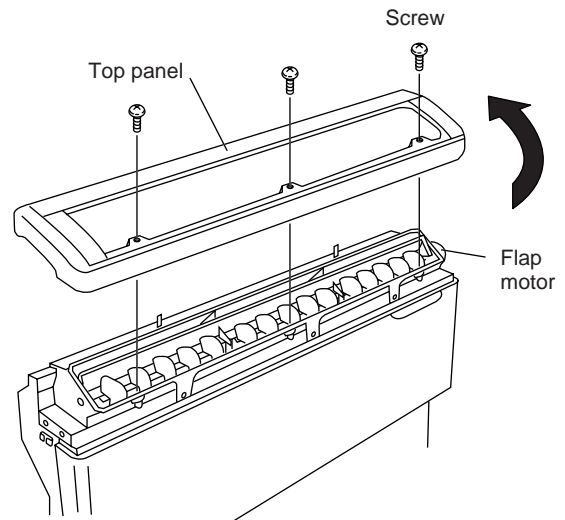


Fig.6

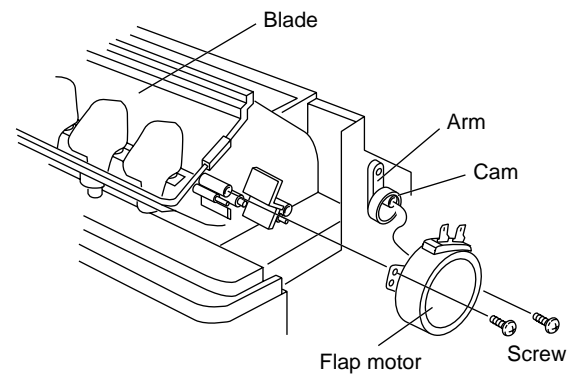


Fig.7

## 10-5. Removing Evaporator (=Indoor Heat Exchange Coil)

- (1) Remove the 7 screws used to mount the blades.  
(Fig. 8)
- (2) Lift the blades in the direction of the arrow.(Fig. 8)

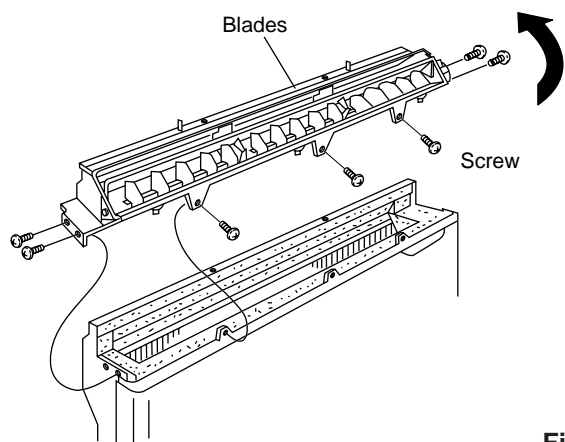


Fig.8



(3) Remove the 6 screws of the front panel and pull it toward you. (Fig. 9)

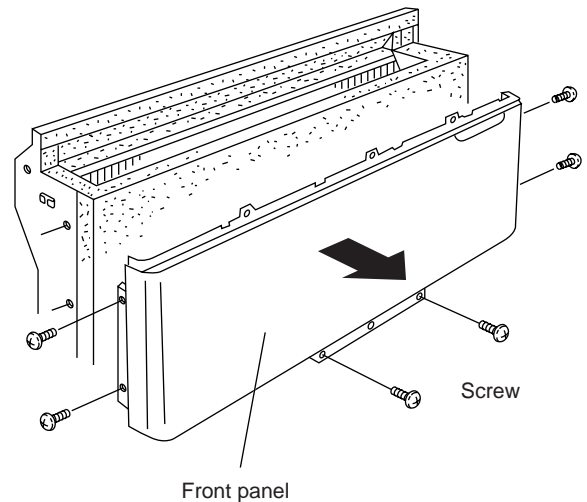


Fig.9

(4) Remove the 2 screws used to mount the evaporator. (Fig. 10)

(5) Remove the rubber cap to pull the thermistor out of the evaporator. (Fig. 10)

(6) Cut the plastic clamp securing the drain hose to the front fan casing. (Fig. 10)

(7) The evaporator is built into the drain pan. Pull out the drain pan together with the evaporator in the direction of the arrow. (Fig. 10)

**IMPORTANT**

The foamed polystyrene drain pan is fragile: DO NOT apply excessive force when removing it.

(8) The evaporator can be removed by sliding it out from the drain pan in the direction of the arrow. (Fig. 11)

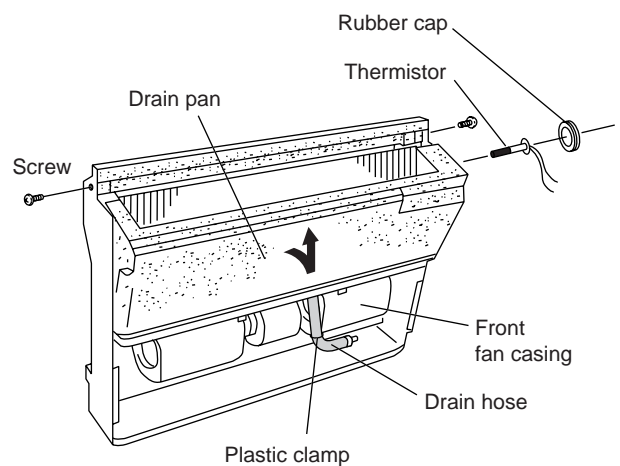


Fig.10

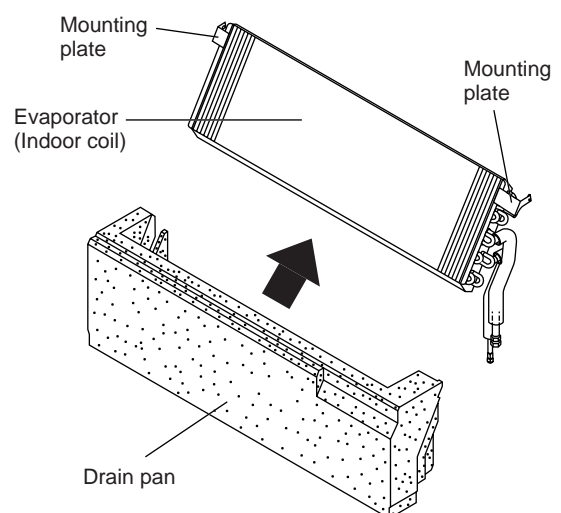


Fig.11

## 10-6. Removing Fan and Fan Motor

(1) Unlatch the 2 hooks on each side to take off the front fan casing. (Fig. 12)

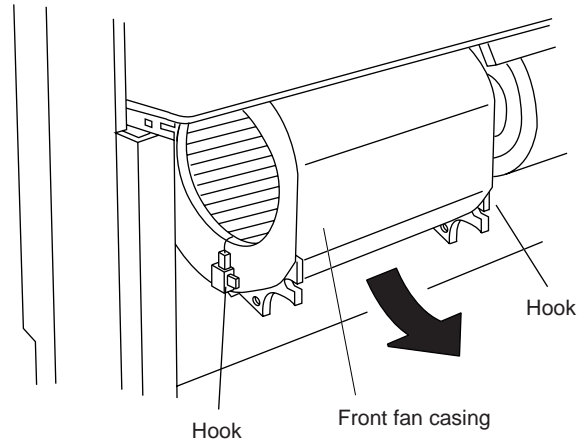


Fig.12

(2) Remove the 2 screws attaching the rear fan casing and then pull the fan casing out.

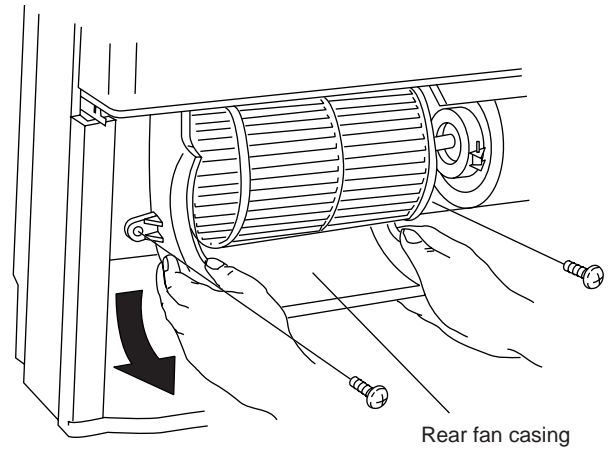


Fig.13

(3) Insert a hex wrench in the fan boss and turn it counterclockwise to loosen the centrifugal fan. The fan can be removed by sliding it to the left. (Fig. 14)

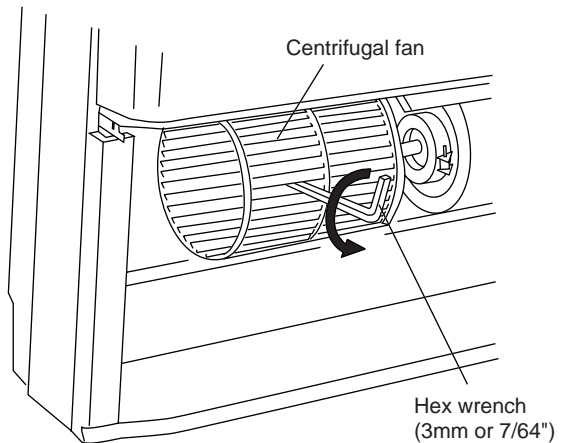


Fig.14

(4) Remove the 4 bolts to remove the fan motor from the frame. (Fig. 15)

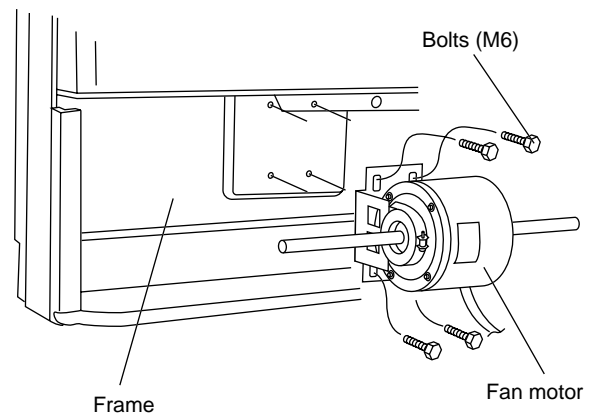


Fig.15

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**argo**

**FILIBERTI**  
S.P.A.

**21040 Oggiona con S. Stefano (VA) - Via Per Solbiate, 49 - Italy**

Direzione e Uffici: Via Varese, 90 - 21013 GALLARATE (VA)

Tel. 0331/755.111 - Telex. 331060 ARGO I - FAX 0331/776.240

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