

TECHNICAL DATA & SERVICE MANUAL

Outdoor Unit
AER518DC

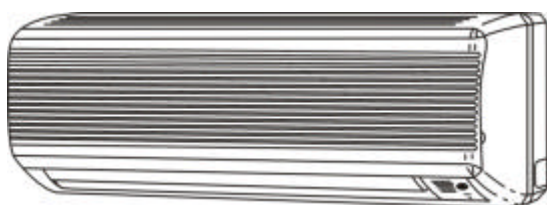
Indoor Unit
AWR509CL(x2)
AFR509CL(x2)

Euro-Line®

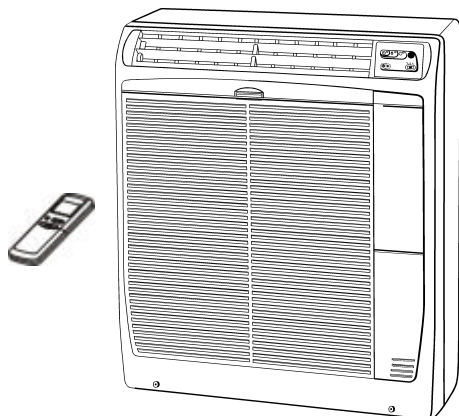
MULTI-SPLIT SYSTEM AIR CONDITIONER

Indoor Unit

AWR509CL(x2)

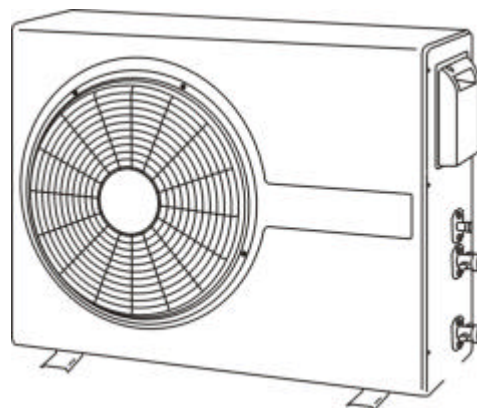


AFR509CL(x2)



Outdoor Unit

AER518DC



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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■ Unit Combination

Combine indoor and outdoor units only as listed below.

Outdoor Unit	Indoor Unit	Symbol of Indoor Unit	Refer to
AER518DC	AWR509CL AFR509CL	A	Fig.1
	AWR509CL AFR509CL	B	

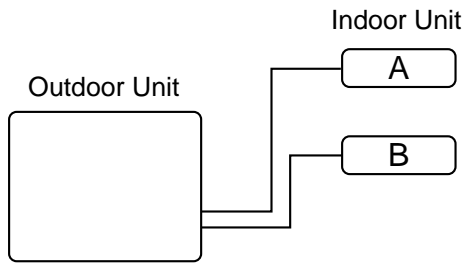


Fig.1

1. OPERATING RANGE

	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.

2. SPECIFICATIONS

2-1. Unit Specifications

Indoor Unit **AWR509CL**
 Outdoor Unit **AER518DC**

No. of indoor units.				1-unit	2-units			
Power Source				220 – 240 V ~ 50 Hz				
Performance	Capacity			Cooling				
				kW	2.85	5.30		
	Air circulation (High)			BTU/h	9,700	18,100		
				m ³ /h	470	470×2		
Moisture removal (High)			Liters/h	1.0	1.0×2			
Electrical Rating	Voltage rating			V		230		
	Available voltage range			V		198 to 264		
	Running amperes			A		4.6	9.5	
	Power input			W		1020	2050	
	Power factor			%		96	93	
	C.O.P.			W/W		3.0	2.7	
	Compressor locked rotor amperes			A		24	48	
Features	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		R407c / 2,000 (1,000×2)		
	Refrigerant control			Capillary tube				
	Operation sound			Indoor – Hi / Me / Lo		dB-A	38 / 33 / 31	
				Outdoor – Hi		dB-A	53	
	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.)	9.52 (3/8)			
Refrigerant tube kit / Accessories			Optional / Hanging wall bracket					
Dimensions & Weight	Unit dimensions			Indoor Unit		Outdoor Unit		
				Height		mm	270	630
				Width		mm	805	830
	Package dimensions			Depth		mm	177	305
				Height		mm	243	713
				Width		mm	855	994
	Weight			Depth		mm	332	413
				Net		kg	8.0	59.0
				Shipping		kg	10.0	64.0
Shipping volume			m ³		0.07	0.29		

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are:
 Indoor air temperature 27°C D.B. / 19°C W.B.
 Outdoor air temperature 35°C D.B. / 24°C W.B.

Indoor Unit **AFR509CL**
 Outdoor Unit **AER518DC**

No. of indoor units.		1-unit		2-units		
Power Source		220 – 240 V ~ 50 Hz				
Performance	Cooling					
	Capacity	kW	2.85	5.30		
		BTU/h	9,700	18,100		
	Air circulation (High)	m ³ /h	380	380 x 2		
Moisture removal (High)	Liters/h	1.0	1.0x2			
Electrical Rating	Voltage rating	V	230			
	Available voltage range	V	198 to 264			
	Running amperes	A	4.6	9.5		
	Power input	W	1020	2050		
	Power factor	%	96	93		
	C.O.P.	W/W	3.0	2.7		
	Compressor locked rotor amperes	A	24	48		
Features	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		Manual		
	Air filter		Washable, Anti-Mold			
	Compressor		Rotary (Hermetic)			
	Refrigerant / Amount charged at shipment		g	R407c / 2,000 (1,000x2)		
	Refrigerant control		Capillary tube			
	Operation sound	Indoor – Hi / Me / Lo	dB-A	37 / 32 / 31		
		Outdoor – Hi	dB-A	53		
	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.)	9.52 (3/8)			
Refrigerant tube kit / Accessories		Optional / Hanging wall bracket				
Dimensions & Weight	Unit dimensions		Indoor Unit		Outdoor Unit	
			Height	mm	700	630
			Width	mm	560	830
	Package dimensions		Depth	mm	200	305
			Height	mm	770	713
			Width	mm	620	994
	Weight		Depth	mm	265	413
			Net	kg	18	59.0
			Shipping	kg	20	64.0
	Shipping volume		m ³	0.07	0.29	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are:
 Indoor air temperature 27°C D.B. / 19°C W.B.
 Outdoor air temperature 35°C D.B. / 24°C W.B.

2-2. Major Component Specifications

Indoor Unit **AWR509CL**

Controller PCB	Part No.		POW-K8E(A), POW-K8E(B)		
	Controls		Microprocessor		
	Control circuit fuse		250 V 3.15 A		
Remote Control Unit			RCS-8PS3E		
Fan & Fan Motor	Type		Cross-flow		
	Q'ty ... Dia. and length		mm	1 ... ø95 / L617	
	Fan motor model ... Q'ty		KFV4Q-11H5P-S ... 1		
	No. of poles ... rpm (230 V, High)		4 ... 1,190		
	Nominal output		W	10	
	Coil resistance (Ambient temp. 20°C)		Ω	BRN - WHT : 561.8 VLT - WHT : 197.4 VLT - ORG : 63.4 YEL - ORG : 155.7 YEL - PNK : 115.9	
	Safety devices	Type	Internal fuse		
		Operating temp.	Open	°C	145 ± 2
	Run capacitor		Close	—	
				μF	0.8
			VAC	440	
Flap Motor	Type		Stepping motor		
	Model		MP24GA1		
	Rating		DC 12 V		
	Coil resistance (Ambient temp. 25°C)		Ω	WHT - BLU (respectively 4 wires) : 380 ± 7%	
Heat Exch. Coil	Coil		Aluminum plate fin / Copper tube		
	Rows		2		
	Fin pitch		mm	1.4	
	Face area		m ²	0.130	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Indoor Unit **AFR509CL**

Controller PCB		
Part No.		POW-K185GS5-N
Controls		Microprocessor
Control circuit fuse		250 V 3 A

Remote Control Unit		RCS-5PS3E
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Fan & Fan Motor		
Type		Cross-flow
Q'ty ... Dia. and length	mm	1 ... ø100 / L410
Fan motor model ... Q'ty		KR35406M01527
No. of poles ... rpm (230 V, High)		4 ... 1,140
Nominal output	W	27
Coil resistance (Ambient temp. 20°C)	Ω	GRY-WHT : 545 - 630 WHT-VLT : 92 - 105 VLT-YEL : 62 - 71 BRN-YEL : 78 - 90 — —
Safety devices	Type	Internal protector
	Operating temp.	150±10
	Open	°C
	Close	Automatic reclosing
Run capacitor	μF	0.6
	VAC	400

Heat Exch. Coil		
Coil		Aluminum plate fin / Copper tube
Rows		2
Fin pitch	mm	1.4
Face area	m ²	0.185

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Outdoor Unit **AER518DC**

Compressor	Type		Rotary (Hermetic)			
	Compressor model ... Q'ty		C-RN90H5B ... 2 / 80228345 ... 2			
	Nominal output		W	900		
	Compressor oil ... Amount		cc	DAPHNE-FV68S ... 470×2		
	Coil resistance (Ambient temp. 25°C)		Ω	C - R : 3.07 C - S : 6.69		
	Safety devices	Type	External protector (OLR 1, 3)		External protector (OLR 2, 4)	
		Overload relay ... Q'ty	MRA38066-3229 ... 2		CS-7C115 ... 2	
		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 18A		—	
Run capacitor ... Q'ty		μF	25 ... 2			
		VAC	450 ... 2			
Fan & Fan Motor	Type		Propeller			
	Q'ty ... Dia.		mm	1 ... ø400		
	Fan motor model ... Q'ty		SMEN 19TFB6047-S ... 1			
	No. of poles ... rpm (230 V)		6 ... 910			
	Nominal output		W	50		
	Coil resistance (Ambient temp. 20°C)		Ω	WHT - BRN : 83.4 WHT - PNK : 218.7		
	Safety devices	Type	Internal protector			
		Operating temp.	Open	°C	130 ± 5	
	Close		Automatic reclosing			
	Run capacitor		μF	2.0		
VAC			400			
Heat Exch. Coil	Coil		Aluminum plate fin / Copper tube			
	Rows		2			
	Fin pitch		mm	1.8		
	Face area		m ²	0.473		
External Finish		Acrylic baked-on enamel finish				

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2-3. Other Component Specifications

Indoor Unit **AWR509CL**

Transformer (TR)		ATR-J105	
Rating	Primary	AC 230V, 50/60Hz	
	Secondary	19V, 0.526A	
	Capacity	10VA	
Coil resistance	Ω (at 21°C)	Primary (WHT – WHT):	205 \pm 10%
		Secondary (BRN – BRN):	2.0 \pm 10%
Thermal cut-off temp.		150°C	

Thermistor (Coil sensor)		DTN-TKS131B	
Resistance	k Ω	0°C	15.0 \pm 2%

Thermistor (Room sensor)		DTN-TKS134B	
Resistance	k Ω	25°C	5.0 \pm 3%

Outdoor Unit **AER518DC**

Power Relay (RA, RB)		G7L-2A-TUB	
Coil rating		AC 200–240V, 50	
Coil resistance	Ω (at 23°C)	21 \pm 15%	
Contact rating		AC 240V, 14A	

Indoor Unit **AFR509CL**

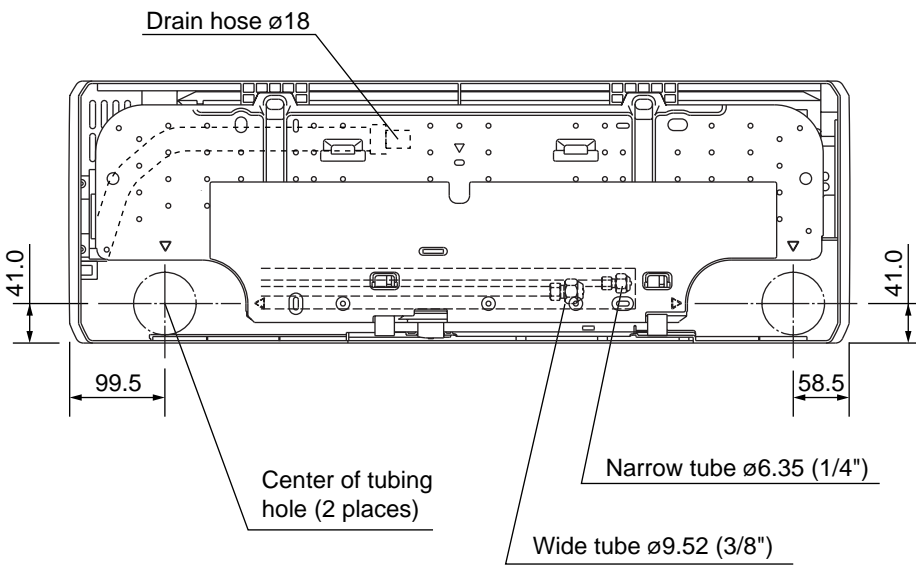
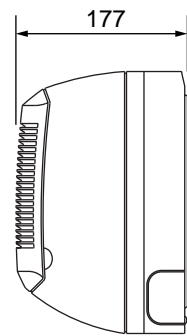
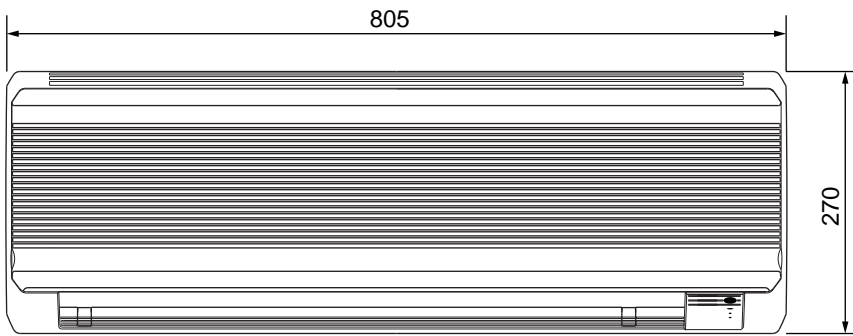
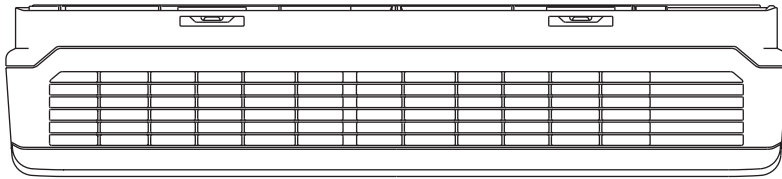
Thermistor (Room sensor TH2)		DHKTEC-35-S6N	
Resistance	k Ω	-20°C	10 \pm 5%
		-10°	7.9 \pm 5%
		-20°C	6.3 \pm 5%
		-10°C	5.0 \pm 5%

Thermistor (Coil sensor TH1)		DHPBC-41ES-14N	
Resistance	k Ω	-20°C	40.1 \pm 5%
		-10°C	24.4 \pm 5%
		0°C	15.3 \pm 5%
		-10°C	9.9 \pm 5%

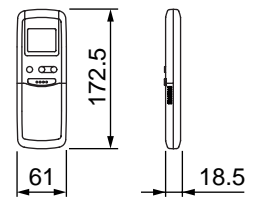
Transformer (TR)		ATR-H85	
Rating	Primary	AC 235V, 50Hz	
	Secondary	11V, 0.727A	
	Capacity	8VA	
Coil resistance	Ω (at 21°C)	Primary (WHT – WHT):	214 \pm 10%
		Secondary (BRN – BRN):	1.58 \pm 10%
Thermal cut-off temp.		145°C, 2A, 250V	

3. DIMENSIONAL DATA

Indoor Unit **AWR509CL**

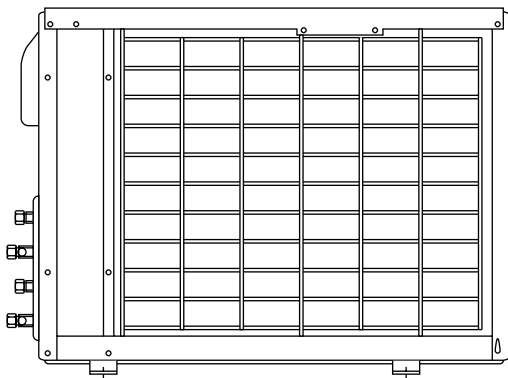
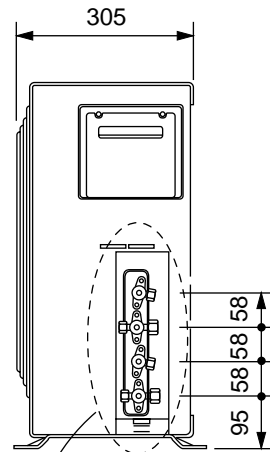
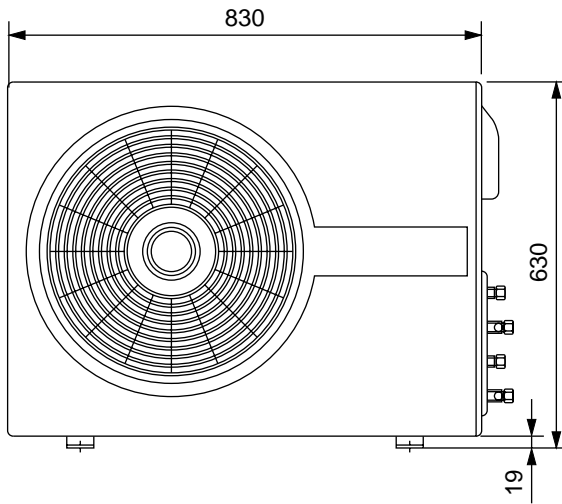
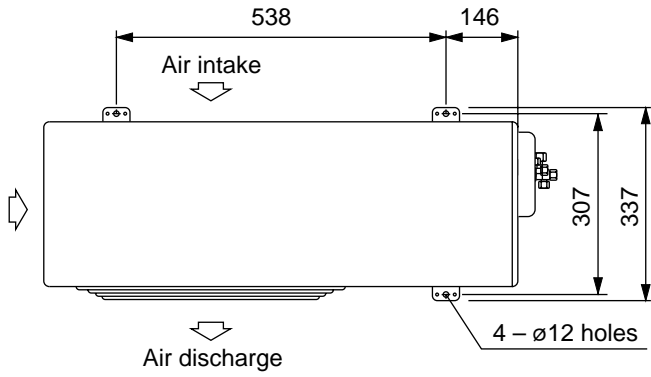


Remote control unit

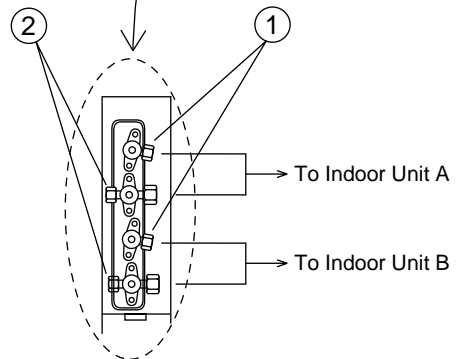


Unit : mm

Outdoor Unit **AER518DC**



Magnified illustration



- ① Narrow tube service valve
ø6.35(1/4")
- ② Wide tube service valve
ø9.52(3/8")

Unit : mm

4.COOLING CAPACITY

INDOOR UNIT: AWR509CL @ AFR509CL

230V 50 Hz

RATING CAPACITY		2.85 kW					
AIR FLOW RATE		470 m ³ /h @ 380 m ³ /h					
EVAPORATOR		CONDENSER					
ENT.TEMP. °C		OUTDOOR AMBIENT TEMP. °C					
W.B.	D.B.		25	30	35	40	43
15		TC	2.70	2.62	2.50	2.34	2.16
		CM	0.84	0.90	0.96	1.06	1.15
	21	SHC	1.85	1.82	1.75	1.68	1.59
	23	SHC	2.10	2.06	2.00	1.92	1.83
	25	SHC	2.34	2.29	2.23	2.16	2.07
	27	SHC	2.59	2.53	2.47	2.34	2.16
	29	SHC	2.70	2.62	2.50	2.34	2.16
	31	SHC	2.70	2.62	2.50	2.34	2.16
17		TC	2.92	2.81	2.68	2.52	2.32
		CM	0.86	0.92	0.99	1.09	1.18
	21	SHC	1.62	1.57	1.51	1.44	1.34
	23	SHC	1.86	1.81	1.75	1.67	1.59
	25	SHC	2.11	2.05	1.99	1.91	1.82
	27	SHC	2.35	2.29	2.22	2.15	2.06
	29	SHC	2.60	2.53	2.47	2.39	2.30
	31	SHC	2.84	2.76	2.68	2.52	2.32
19		TC	3.10	2.99	2.85	2.68	2.47
		CM	0.90	0.95	1.02	1.12	1.21
	21	SHC	1.36	1.31	1.25	1.18	1.09
	23	SHC	1.60	1.56	1.49	1.42	1.33
	25	SHC	1.83	1.79	1.73	1.66	1.57
	27	SHC	2.06	2.03	1.97	1.90	1.81
	29	SHC	2.29	2.27	2.21	2.14	2.04
	31	SHC	2.53	2.51	2.45	2.37	2.29
21		TC	3.28	3.17	3.02	2.84	2.61
		CM	0.92	0.98	1.05	1.15	1.25
	23	SHC	1.34	1.29	1.23	1.16	1.07
	25	SHC	1.57	1.53	1.47	1.40	1.31
	27	SHC	1.81	1.77	1.71	1.64	1.55
	29	SHC	2.04	2.01	1.95	1.88	1.79
23		TC	3.51	3.36	3.17	2.97	2.76
		CM	0.94	1.00	1.08	1.18	1.28
	25	SHC	1.32	1.26	1.19	1.12	1.04
	27	SHC	1.54	1.49	1.43	1.35	1.28
	29	SHC	1.77	1.73	1.67	1.59	1.52
	31	SHC	2.02	1.98	1.90	1.83	1.76

TC: TOTAL COOLING CAPACITY kW

SHC: SENSIBLE HEAT CAPACITY kW

CM: COMPRESSOR INPUT kW

RATING CONDITIONS

OUTDOOR AMBIENT TEMPERATURE

35°C D.B.

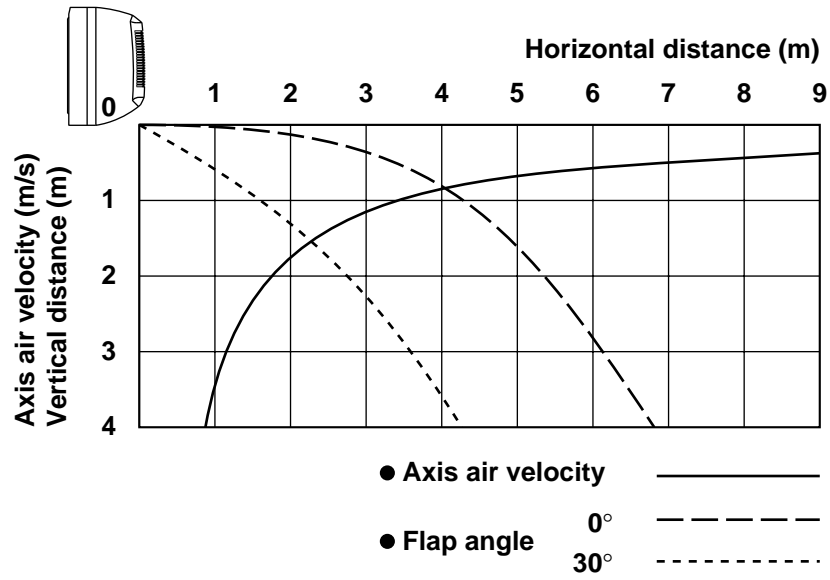
INDOOR UNIT ENTERING AIR TEMP.

27°C D.B./19°C W.B.

5. AIR THROW DISTANCE CHART

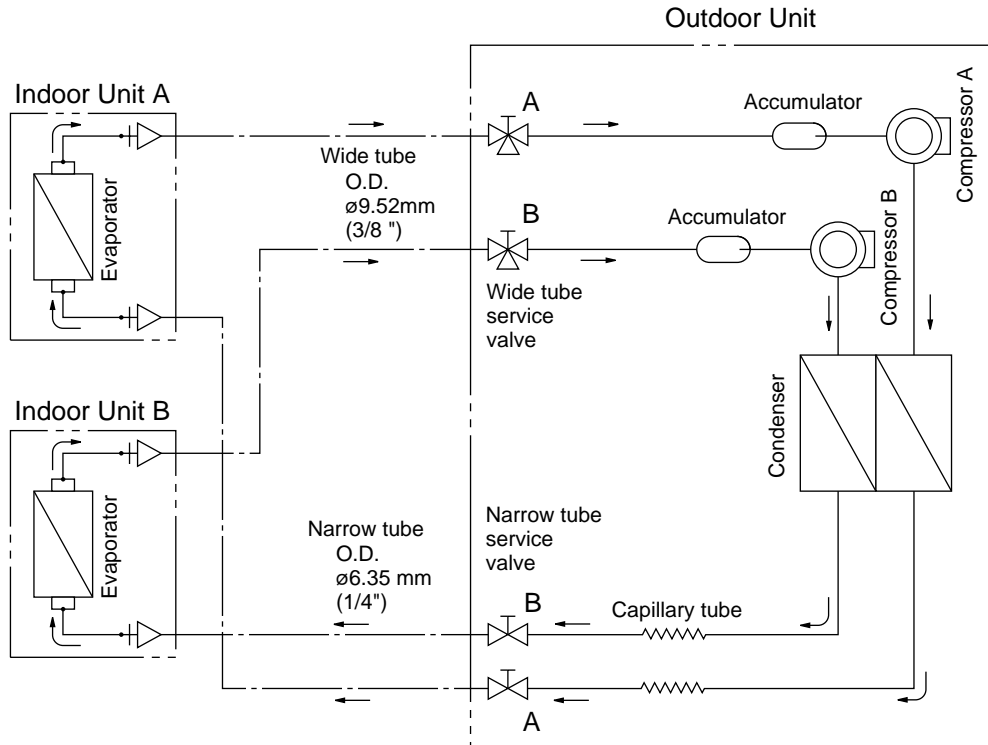
Indoor Unit AWR509CL

Room air temp. : 27°C
 Fan speed : High



6. REFRIGERANT FLOW DIAGRAM

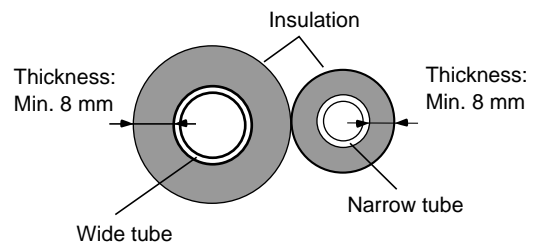
Indoor Unit **AWR509CL (x2) AFR509CL (x2)**
 Outdoor Unit **AER518DC**



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.

7. ELECTRICAL DATA

7-1. Electrical Characteristics

NOTE

The values in the table below indicate the sum of indoor and outdoor units which are in running condition.

Indoor Unit **AWR509CL AFR509CL**

Outdoor Unit **AER518DC**

230V Single phase 50 Hz

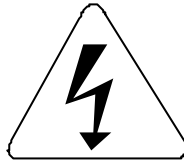
Number of indoor unit		1 - Unit (Either A or B)	2 - Units (Both A and B)
Rating Conditions	Running amp. A	4.6	9.5
	Power input kW	1.02	2.05
Full Load Conditions	Running amp. A	5.4	10.8
	Power input kW	1.15	2.34

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.

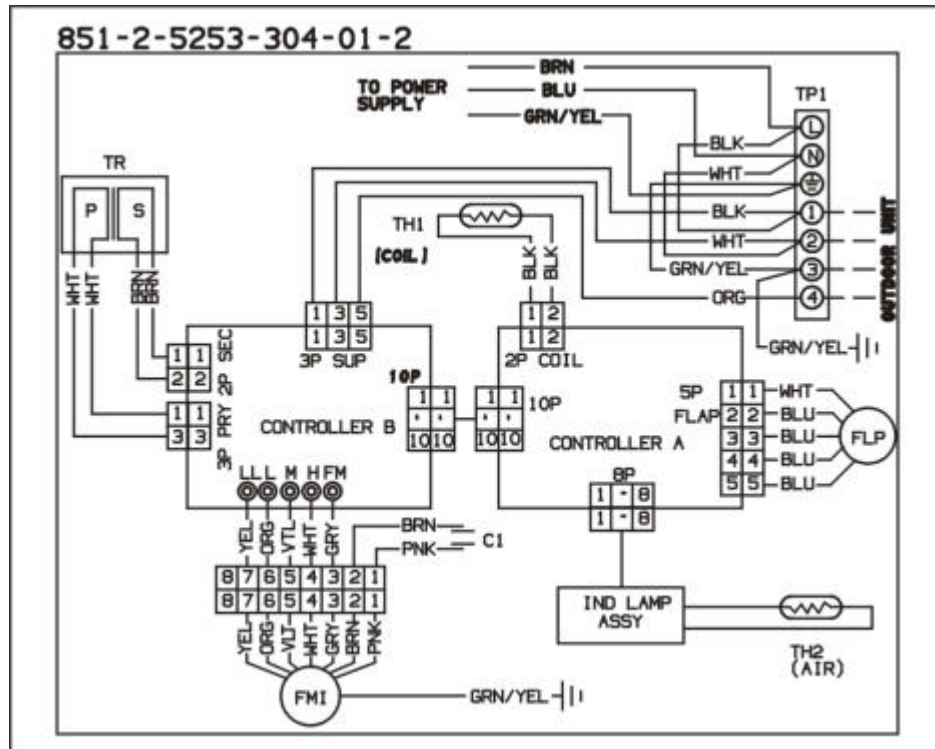
7-2 Electric Wiring Diagrams

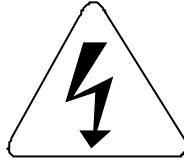
Indoor Unit **AWR509CL**



WARNING

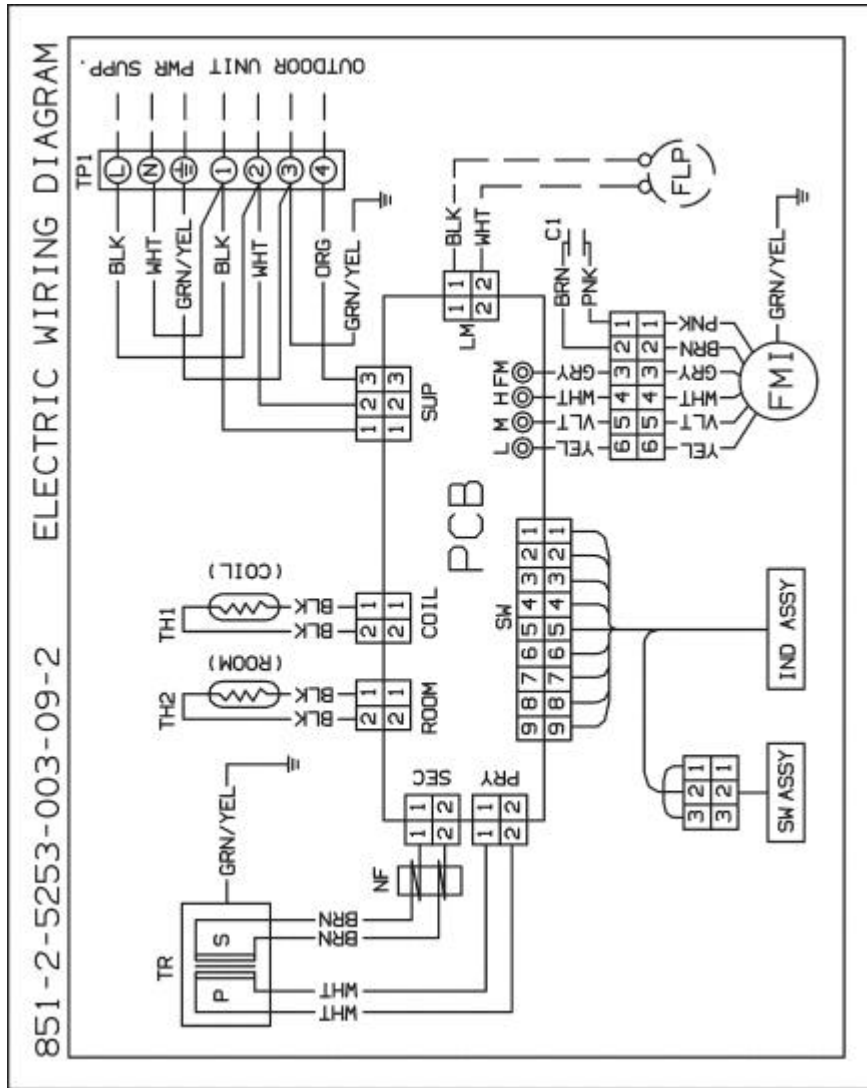
To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts

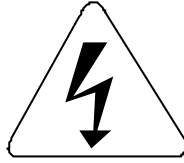




WARNING

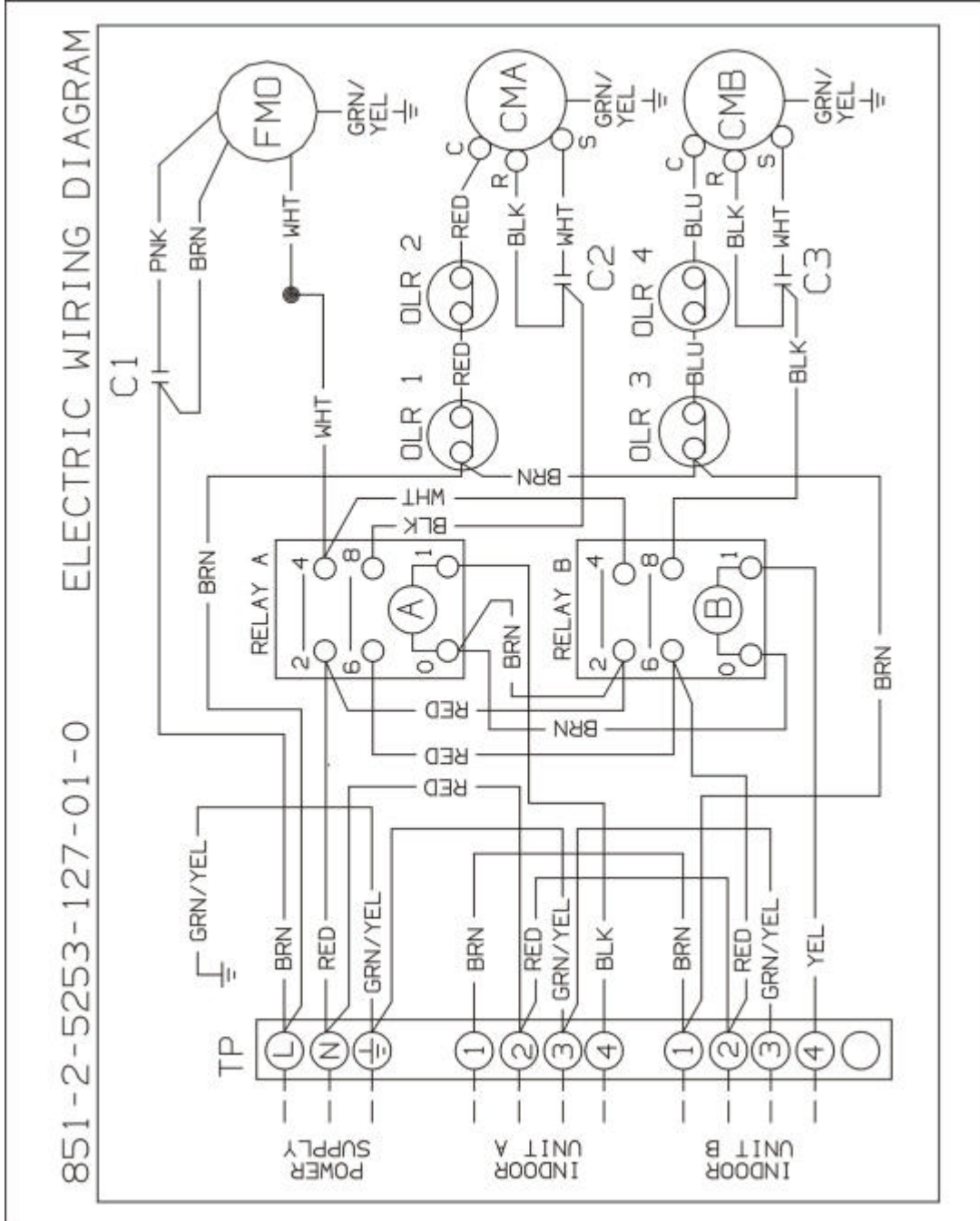
To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts





WARNING

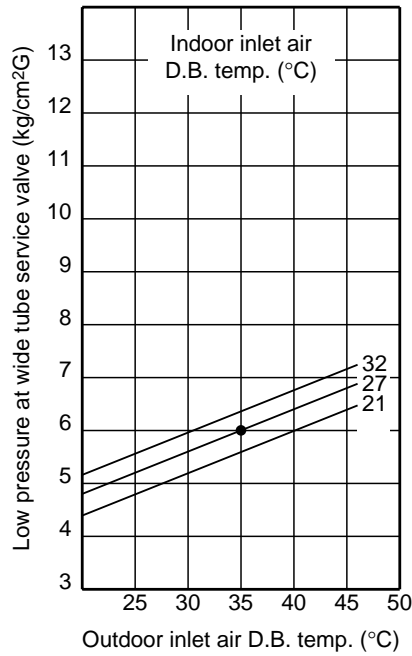
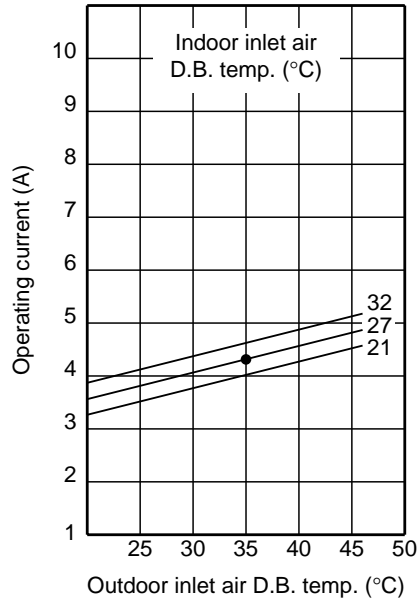
To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts



7-3. Performance Charts

Indoor Unit **AWR509CL (x1) AFR509CL (x1)**
 Outdoor Unit **AER518DC**

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.

8. INSTALLATION INSTRUCTIONS

8-1. Installation Site Selection

Maximum Allowable Tubing Length(L)and Elevation Difference(H).

The Multi-Split System outdoor unit should be installed as close to the indoor units as possible. Maximum allowable length of the refrigerant tubing and elevation difference between outdoor and indoor units are shown in Table 1.

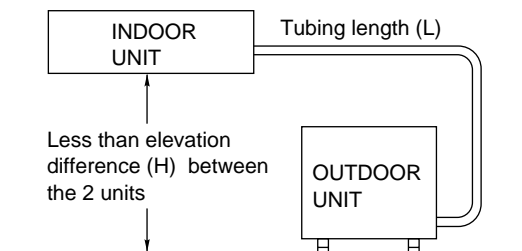


Fig. 1

Table 1

Max allowable tubing length at shipment.(m)	Limit tubing length (L). (m)	Limit of elevation difference (H). (m)	Required amount of additional refrigerant*(g/m)
7.5	15	7	15

* If total tubing length becomes 7.5 to 15 m (max.),charge additional refrigerant (R407c) by 15 g/m. No additional charge of compressor oil is necessary.

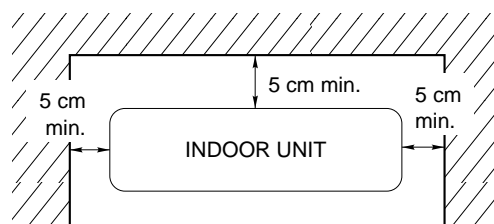
Indoor Unit



WARNING

To prevent abnormal heat generation and the possibility of fire, don't place obstacles, enclosures and grills in front of or surrounding the air conditioner in a way that may block air flow.

● Wall-Mounted Type



Front View

Fig.2a

AVOID:

- direct sunlight.
- nearby heat sources that may affect performance of the unit.
- areas where leakage of flammable gas may be expected.
- places where large amounts of oil mist exist.

DO:

- select an appropriate position from which every corner of the room can be uniformly air-conditioned. (High on a wall is best)
- select a location that will hold the weight of the unit.
- select a location where tubing and drain pipe have the shortest run to the outside.
- allow room for operation and maintenance as well as unrestricted air flow around the unit. (Fig. 2a)



CAUTION

For stable operation of the air conditioner, do not install wall-mounted type indoor units under 1.5m from floor level.

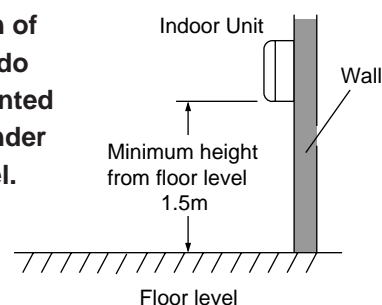


Fig. 2b

Outdoor Unit

AVOID:

- heat sources, exhaust fans, etc. (Fig. 3)
- damp, humid or uneven locations.

DO:

- choose a place as cool as possible.
- choose a place that is well ventilated.
- allow enough room around the unit for air intake/exhaust and possible maintenance.

(Figs. 4a and 4c)

- provide a solid base (concrete block, 10 × 40 cm beams or equal), a minimum of 10 cm above ground level to reduce humidity and protect the unit against possible water damage and decreased service life.

(Fig. 5a)

- use lug bolts or equal to bolt down unit, reducing vibration and noise.

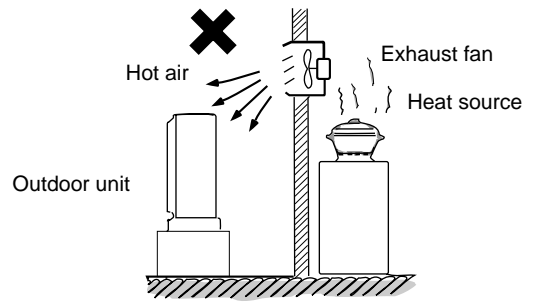
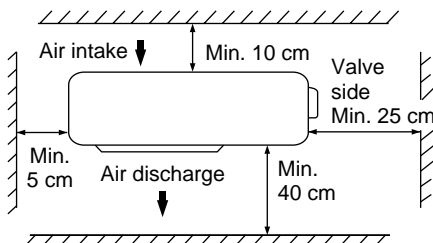


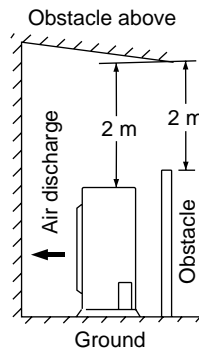
Fig. 3

Required space around the unit.



Top View

Fig. 4a



Side View

Fig. 4c

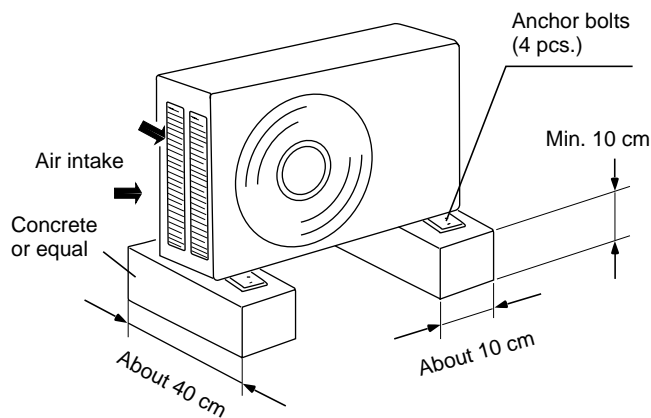


Fig. 5a

8-2. Remote Control Unit Installation Position

The remote control unit can be operated from either a non-fixed position or a wall-mounted position.

To ensure that the air conditioner operates correctly, do not install the remote control unit in the following places:

- In direct sunlight
- Behind a curtain or other place where it is covered
- More than 8 m away from the air conditioner
- In the path of the air conditioner's airstream
- Where it may become extremely hot or cold
- Where it may be subject to electrical or magnetic interference

Mounting on a Wall

a) Removable mounting

- 1) Momentarily hold the remote control unit at the desired mounting position.
- 2) Confirm that the air conditioner responds correctly when you press keys on the remote control from that position.
- 3) After confirming correct operation, use a screwdriver to screw the supplied special mounting screw into the wall. (Fig.6a)
- 4) Hang the remote control unit from the mounting screw.

b) Non-removable mounting

- 1) Momentarily hold the remote control unit at the desired mounting position.
- 2) Confirm that the air conditioner responds correctly when you press keys on the remote control from that position.
- 3) After confirming correct operation, use a screwdriver to screw the supplied special mounting screw into the wall. (Fig.6a)
- 4) Remove the remote control cover by sliding it downward.
- 5) Remove the batteries of the remote control unit.
- 6) Use a screwdriver to screw the remote control unit securing screw into the wall through the hole in the battery compartment. (Fig.6b)
- 7) Replace the batteries.
- 8) Again confirm that the remote control unit operates correctly.

Removable mounting

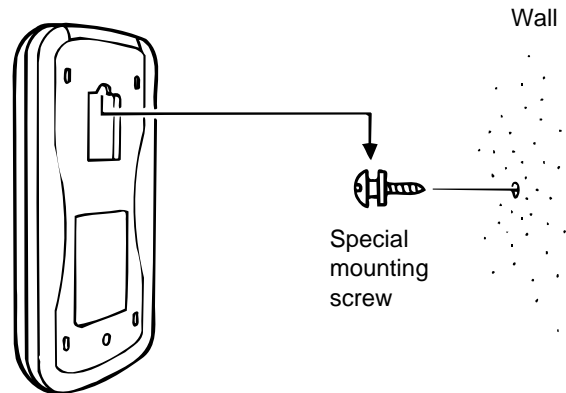


Fig.6a

Non-removable mounting

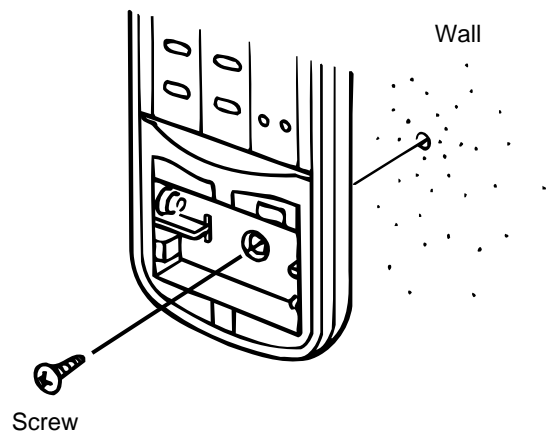


Fig.6b

8-3. Recommended Wire Length and Diameter

Regulations on wiring diameter differ from locality to locality. For field wiring requirements, please refer to your local electrical codes. Carefully observe these regulations when carrying out the installation. Table 2 lists recommended wire lengths and size for power supply systems.

NOTE

Refer to the WIRING SYSTEM DIAGRAM for the meaning of "A" and "B" in Table 2.

Table 2

Model	Cross Sectional Area (mm ²)	(A) Power Supply Wiring Length (m)	(B) Power Line Length (m)	Fuse or Circuit Capacity
		2.5 mm ²		2.5 mm ²
AER518DC		23	20	20A



WARNING

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



WARNING

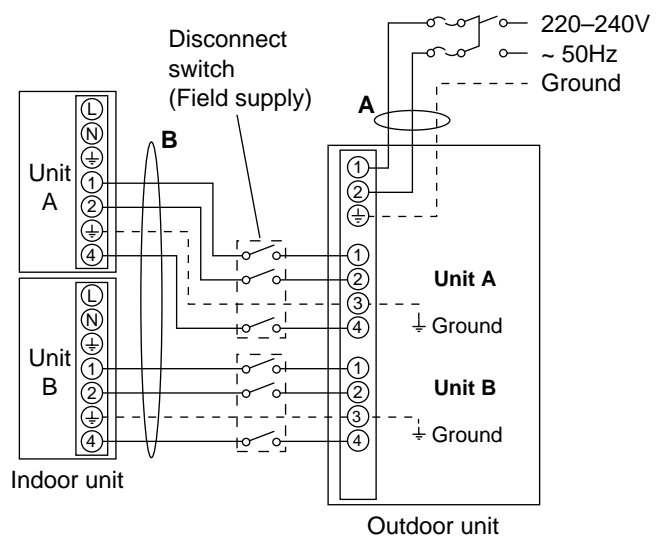
- To avoid the risk of electric shock, each air conditioner unit must be grounded.



CAUTION

- Be sure to connect the power supply line to the outdoor unit as shown in the wiring diagram. The indoor unit draws its power from the outdoor unit.

WIRING SYSTEM DIAGRAM



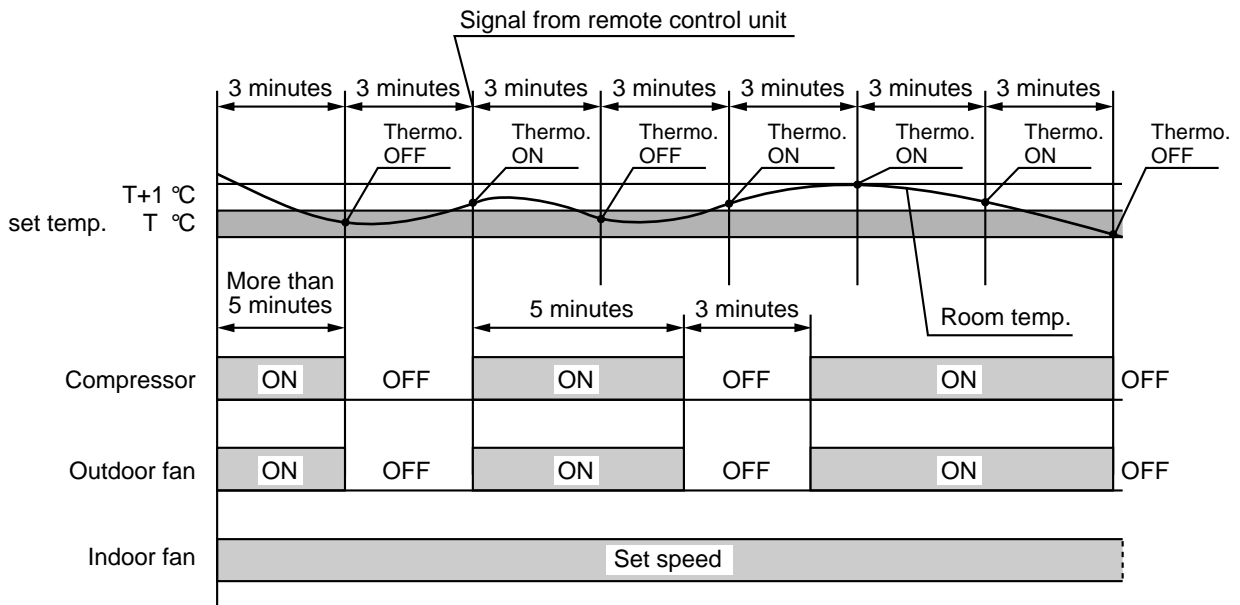
WARNING

Before starting installation of the multi-split system, disconnect the gray tripolar cable of 2 meter length joined at the indoor units' terminal base in positions L, N and Ground mark. Be sure to refer to the Wiring System Diagram on the outdoor unit for proper installation of the multi-split system. Incorrect wiring can cause system damage or personal injury.

9. FUNCTION

9-1. Room Temperature Control

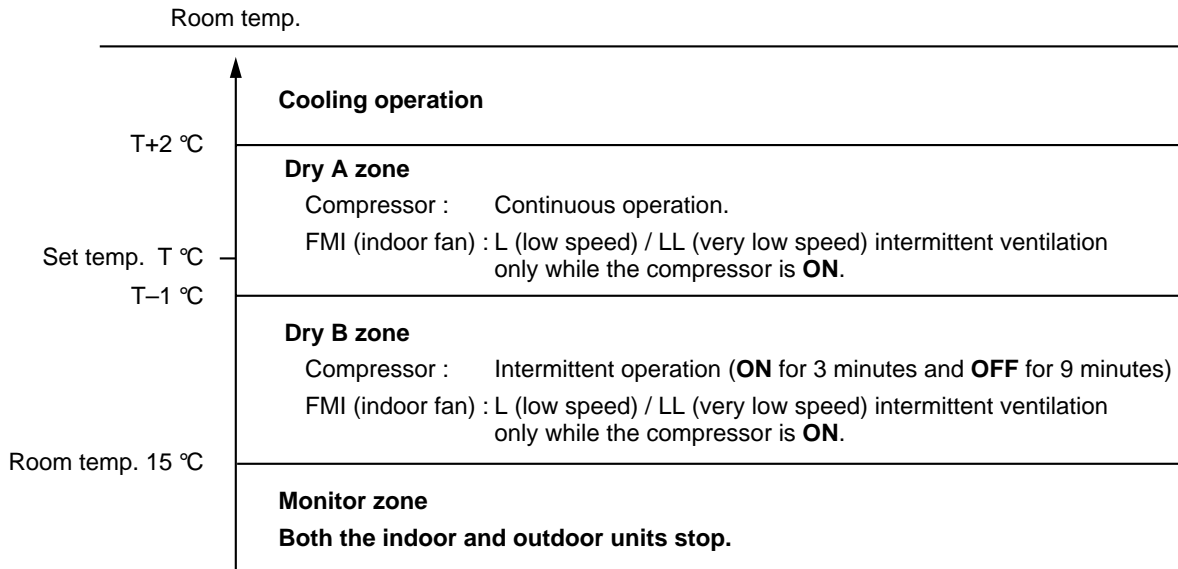
- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.
- The room temperature (and other information) is transmitted every 3 minutes by the remote control unit to the controller in the indoor unit.
- The control 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 $T + 1^{\circ}\text{C}$ ($T^{\circ}\text{C}$ is set temperature).
Compressor → ON
- Thermo. OFF : When the room temperature is equal to or below set temperature $T^{\circ}\text{C}$.
Compressor → OFF

9-2. Dry Operation (Dehumidification)

- Dry operation uses the ability of the cooling cycle to remove moisture from the air, but by running at low level to dehumidify without greatly reducing the room temperature. The air conditioner repeats the cycle of turning ON and OFF automatically as shown in the chart below according to the room temperature.

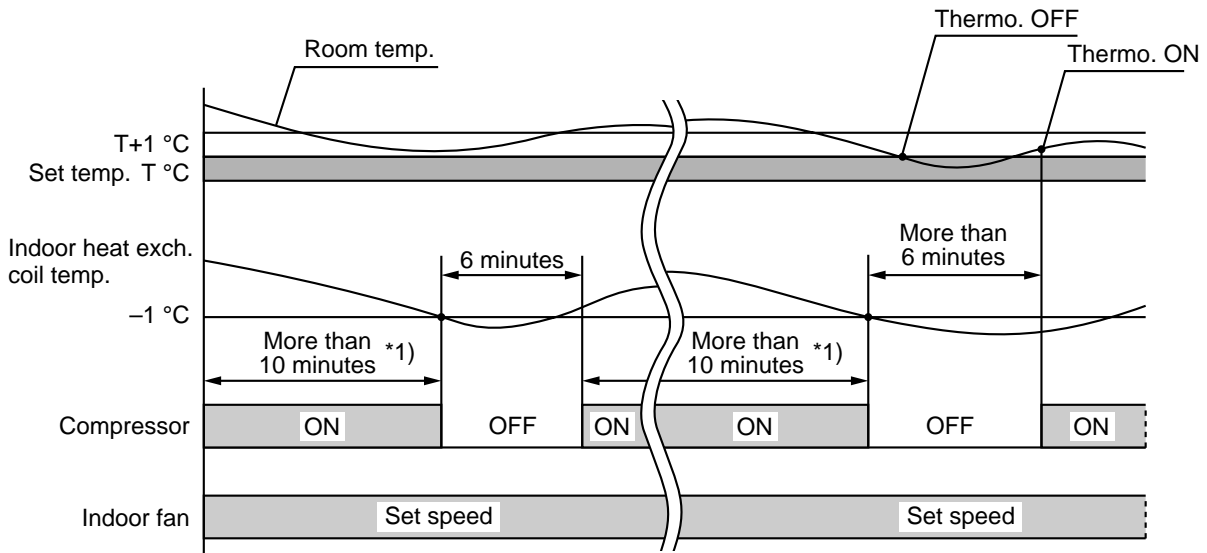


NOTE

- Intermittent ventilation occurs by switching the indoor fan speed between L ↔ LL.
- Dry operation does not occur when the room temperature is under 15°C, which is the monitor zone.
- When the compressor stops, the indoor fan stops as well.

9-3. Freeze Prevention

- This function prevents freezing of the indoor heat exchange coil.
- When the compressor has been running for 10 minutes^{*1)} or more and the temperature of the indoor heat exchange coil falls below -1°C , the control circuit stops the compressor for at least 6 minutes. The compressor does not start again until the temperature rises above 8°C or 6 minutes has elapsed.



NOTE

*1) Functionally, compressor running period, or time are of two types, 10 minutes and 6 minutes depending upon production date.

10. REFRIGERANT R407C : SPECIAL PRECAUTIONS WHEN SERVICING UNIT

10-1. Characteristics of new refrigerant R407C

10-1-1. What is new refrigerant R407C

R407C is a new refrigerant that contains three types of non-azeotropy-type mixed refrigerant which does not adversely affect the Earth's ozone layer. Its refrigeration capacity and energy efficiency are about the same level as the conventional refrigerant R22

10-1-2. Components (mixing proportions)

HFC32 (23%) / HFC125 (25%) / HFC134a (52%)

10-1-3. Characteristics

- Less toxic, more chemically stable refrigerant.
- Composition of refrigerant R407C changes whether it is in gaseous phase or liquid phase. Thus, when there is a refrigerant leak the basic performance of the air conditioner may be degraded because of a change in composition of the remaining refrigerant. **Therefore, do not add new refrigerant.** Instead, recover the remaining refrigerant with the refrigerant recovery unit. Then, after evacuation, totally recharge the specified amount of refrigerant with the new refrigerant at its normal mixed composition state (liquid phase).
- When refrigerant R407C is used, the composition will differ depending on whether it is in gaseous or liquid phase, and the basic performance of the air conditioner will be degraded if it is charged while the refrigerant is in gaseous state. **Thus, always charge the refrigerant while it is in the liquid phase.**



CAUTION

- Ether-type oil is used for the compressor oil for R407C-type units, which is different from the mineral oil used for R22. Thus more attention to moisture prevention and faster replacement work compared with conventional models are required.

10-2. Checklist before servicing

● Tubing precautions

Refrigerant R407C is more easily affected by dust or moisture compared with R22, thus be sure to temporarily cover the ends of the tubing with caps or tape prior to installation.

● No addition of compressor oil for R407C

No additional charge of compressor oil is permitted.

● No use of refrigerant other than R407C

Never use a refrigerant other than R407C.

● If refrigerant R407C is exposed to fire

Through welding, etc., toxic gas may be released when R407C refrigerant is exposed to fire. Therefore, be sure to provide ample ventilation during installation work.

● Caution in case of R407C leak

Check for possible leak points with the special leak detector for R407C. If a leak occurs inside the room, immediately provide thorough ventilation.

10-3. Tools specifically for R407C

- For servicing, use the following tools for R407C

Tool Distinction	Tool Name
Tools specifically for R407C	<ul style="list-style-type: none"> • Gauge manifold • Charging hose • Gas leak detector • Refrigerant cylinder • Charging cylinder • Refrigerant recovery unit • Vacuum pump with anti-reverse flow (*1) (Solenoid valve-installed type, which prevents oil from flowing back into the unit when the power is off, is recommended.) • Vacuum pump (*2) can be used if the following adapter is attached. • Vacuum pump adapter (reverse-flow prevention adapter) (*3). (Solenoid valve-installed adapter attached to a conventional vacuum pump.) • Electronic scale for charging refrigerant • Flare tool
Tools which can be commonly used for R22 and R407C	<ul style="list-style-type: none"> • Bender • Torque wrench • Cutter, Reamer • Welding machine, nitrogen gas cylinder



CAUTION

- The above tools specifically for R407C must not be used for R22. Doing so will cause malfunction of the unit.
- For the above vacuum pump (*1, *2) and vacuum pump adapter (*3) , those for R22-type units can be used for R407C-type. However, they must be used exclusively for R407C and never alternately with R22.

10-4. For tubing installation procedures

- When the tubes are connected, *always apply HAB oil on the flare portions to improve the sealing of tubing.*

The following is the **HAB oil** generally used:
Esso: ZERICE S32

NOTE

For details on tubing installation procedures, refer to the installation manuals attached to the indoor unit and outdoor unit.

10-5. In case of compressor malfunction



CAUTION

- Should the compressor malfunction, be sure to replace compressor as quickly as possible.
- Use only the tools indicated exclusively for R407C. → See "10-3. Tools specifically for R407C".

10-5-1. Procedure for replacing compressor

(1) Recovering refrigerant

- Any remaining refrigerant inside the unit should not be released to the atmosphere, but recovered using the refrigerant recovery unit for R407C.
- Do not reuse the recovered refrigerant, since will contain impurities.

(2) Replacing compressor

- Soon after removing pinched pipes of both discharge and suction tubes of the new compressor, replace it quickly.

(3) Checking for sealing

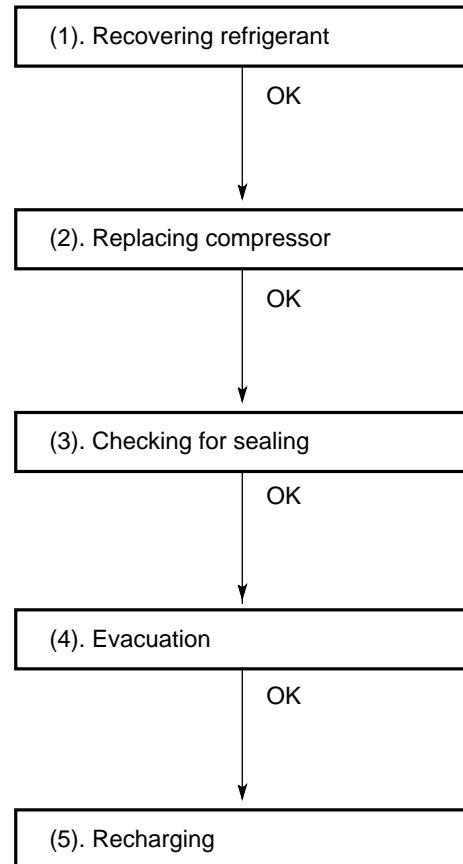
- Use nitrogen gas for the pressurized gas, and never use a refrigerant other than R407C. Also do not use oxygen or any flammable gas.

(4) Evacuation

- **Use a solenoid valve-installed vacuum pump** so that even if power is cut off in the middle of evacuation of air due to a power interruption, the valve will prevent the pump oil from flowing back.
- The equipment may be damaged if moisture remains in the tubing, thus carry out the evacuation thoroughly.
- When using a vacuum pump with exhaust air volume more than 25L/min. and ultimate vacuum pressure rate of 0.05Torr:

Standard time of evacuation

Length of tubing	Less than 10 m	More than 10 m
Time	More than 10 min.	More than 15 min.



(5) Recharging

- **Be sure to charge the specified amount of refrigerant in liquid state** using the service port of wide tube service valve. The proper amount is listed on the unit's nameplate.

When the entire amount cannot be charged all at once, charge gradually while operating the unit in Cooling Operation.



CAUTION

- **Never charge a large amount of liquid refrigerant at once to the unit. This may cause damage to the compressor.**

- When charged with a refrigerant cylinder, use the electronic scale for charging refrigerant. In this case, if the volume of refrigerant in the cylinder becomes less than 20% of the fully-charged amount, the composition of the refrigerant starts to change. Thus, **do not use the refrigerant if the amount in the refrigerant cylinder is less than 20%.**

Also, charge the minimum necessary amount to the cylinder before using it for charging the air conditioning unit.

Example:

In case of charging refrigerant to a unit requiring 0.76Kg using a capacity of 10Kg-cylinder, the minimum necessary amount for the cylinder is:

$$0.76 + 10 \times 0.20 = 2.76\text{Kg}$$

For the remaining refrigerant, refer to the instructions of the refrigerant manufacturer.

- If using a charging cylinder, transfer the specified amount of liquid refrigerant from the refrigerant cylinder to the charging cylinder.

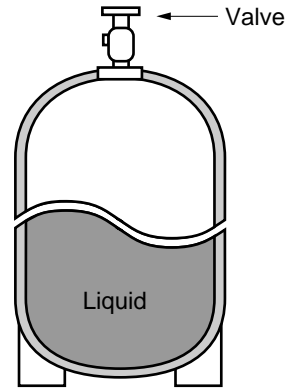
Prepare an evacuated charging cylinder beforehand.



CAUTION

- **To prevent the composition of R407C from changing, never bleed the refrigerant gas into the atmosphere while transferring the refrigerant. (Fig. 3)**

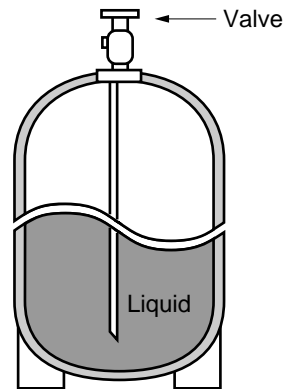
Do not use the refrigerant if the amount in the charging cylinder is less than 20%.



Single valve

Charge the liquid refrigerant with the cylinder in the up-side-down position.

Fig. 1



Single valve (with siphon tube)

Charge with the cylinder in the normal position.

Fig. 2

Configurations and characteristics of cylinders

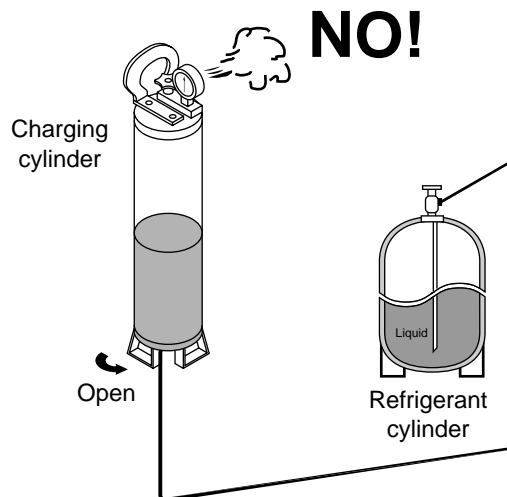


Fig.3

10-6. In case refrigerant is leaking



CAUTION

- Never attempt to charge additional refrigerant when refrigerant has been leaking from the unit. Follow the procedure described below to locate points of leaks and carry out repairs, then recharge the refrigerant.

(1) Detecting Leaks

- Use the detector for R407C to locate refrigerant leak points.

(2) Recovering refrigerant

- Never release the gas to the atmosphere, recover residual refrigerant using the refrigerant recovery unit for R407C, instead.
- Do not reuse the recovered refrigerant because its composition will have been altered.

(3) Welding leaking points

- Confirm again that no residual refrigerant exists in the unit before starting welding.
- Weld securely using flux and wax for R407C.
- Prevent oxide film from forming inside the tubes utilizing substitution with nitrogen (N₂) in the refrigerant circuit of the unit. Leave ends of tubes open during welding.

(4) Checking for sealing

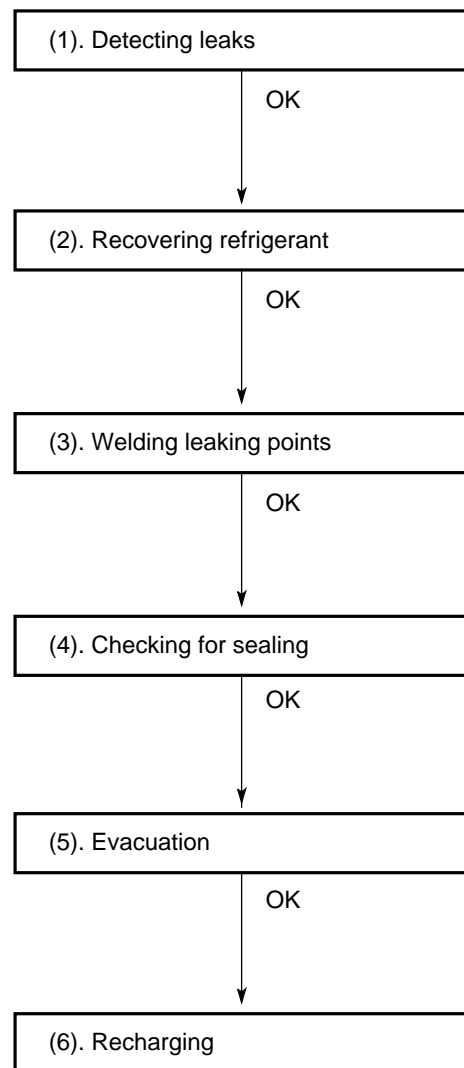
- Use nitrogen gas for the pressurized gas, and never use a refrigerant other than R407C. Also do not use oxygen or any flammable gas.

(5) Evacuation

- **Use a solenoid valve-installed vacuum pump** so that even if power is cut off in the middle of evacuation of air due to a power interruption, the valve will prevent the pump oil from flowing back.
- The equipment may be damaged if moisture remains in the tubing, thus carry out the evacuation thoroughly.
- When using a vacuum pump with exhaust air volume more than 25L/min. and ultimate vacuum pressure rate of 0.05Torr:

Standard time of evacuation

Length of tubing	Less than 10 m	More than 10 m
Time	More than 10 min.	More than 15 min.



(6) Recharging

- **Be sure to charge the specified amount of refrigerant in liquid state** using the service port of wide tube service valve. The proper amount is listed on the unit's nameplate.

When the entire amount cannot be charged all at once, charge gradually while operating the unit in Cooling Operation.



CAUTION

- **Never charge a large amount of liquid refrigerant at once to the unit. This may cause damage to the compressor.**

- When charged with a refrigerant cylinder, use the electronic scale for charging refrigerant. In this case, if the volume of refrigerant in the cylinder becomes less than 20% of the fully-charged amount, the composition of the refrigerant starts to change. Thus, **do not use the refrigerant if the amount in the refrigerant cylinder is less than 20%.**

Also, charge the minimum necessary amount to the cylinder before using it for charging the air conditioning unit.

Example:

In case of charging refrigerant to a unit requiring 0.76Kg using a capacity of 10Kg-cylinder, the minimum necessary amount for the cylinder is:

$$0.76 + 10 \times 0.20 = 2.76\text{Kg}$$

For the remaining refrigerant, refer to the instructions of the refrigerant manufacturer.

- If using a charging cylinder, transfer the specified amount of liquid refrigerant from the refrigerant cylinder to the charging cylinder.

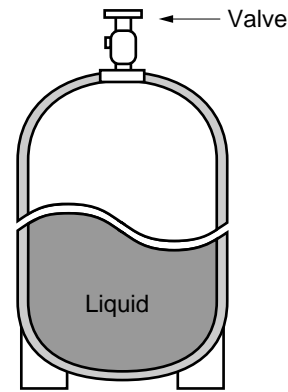
Prepare an evacuated charging cylinder beforehand.



CAUTION

- **To prevent the composition of R407C from changing, never bleed the refrigerant gas into the atmosphere while transferring the refrigerant. (Fig. 6)**

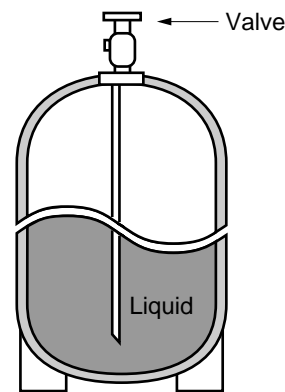
Do not use the refrigerant if the amount in the charging cylinder is less than 20%.



Single valve

Charge the liquid refrigerant with the cylinder in the up-side-down position.

Fig. 4



Single valve (with siphon tube)

Charge with the cylinder in the normal position.

Fig. 5

Configurations and characteristics of cylinders

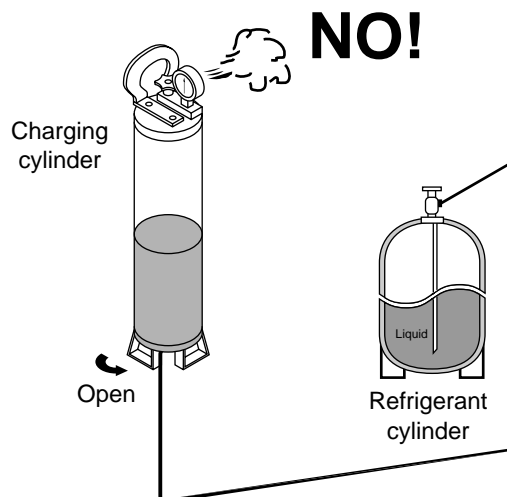


Fig. 6

10-7. Charging additional refrigerant

10-7-1. When tubes are extended

- Observe the proper amount of refrigerant as stated in this service manual or the installation manual that came with the indoor unit. **Charge additional refrigerant in liquid state.**



CAUTION

- Never charge additional refrigerant if refrigerant is leaking from the unit. Follow instructions given in "10-6. In case refrigerant is leaking" and completely carry out repairs. Only then should you recharge the refrigerant.

10-8. Retro-fitting existing systems

10-8-1 Use of existing units

- **Never use new refrigerant R407C for existing units which use R22.** This will cause the air conditioner to operate improperly and may result in a hazardous condition.

10-8-2 Use of existing tubing

- If replacing an older unit that used refrigerant R22 with a R407C unit, **do not use its existing tubing.** Instead, completely new tubing must be used.

11. TROUBLESHOOTING

11-1. 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.

11-1-1. Check power supply wiring.

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

11-1-2. Check inter-unit wiring.

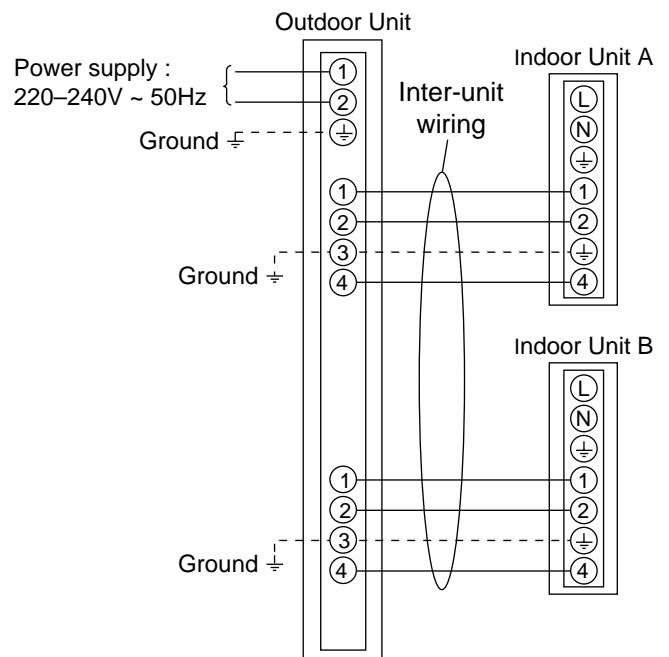
- Check that inter-unit wiring is correctly connected to the indoor unit from the outdoor unit.

11-1-3. Check power supply.

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

11-1-4. 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.



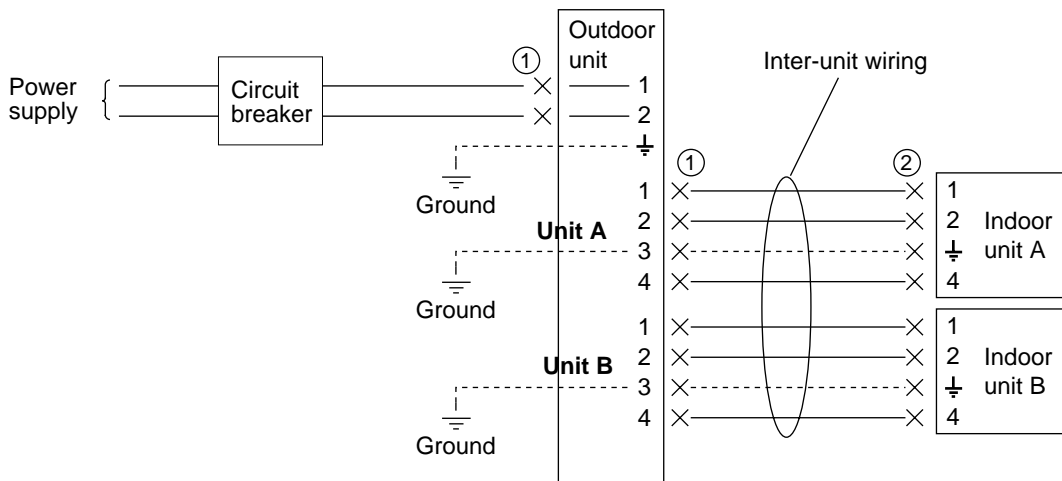
11-2. Air conditioner does not operate.

11-2-1. Circuit breaker trips (or fuse blows).

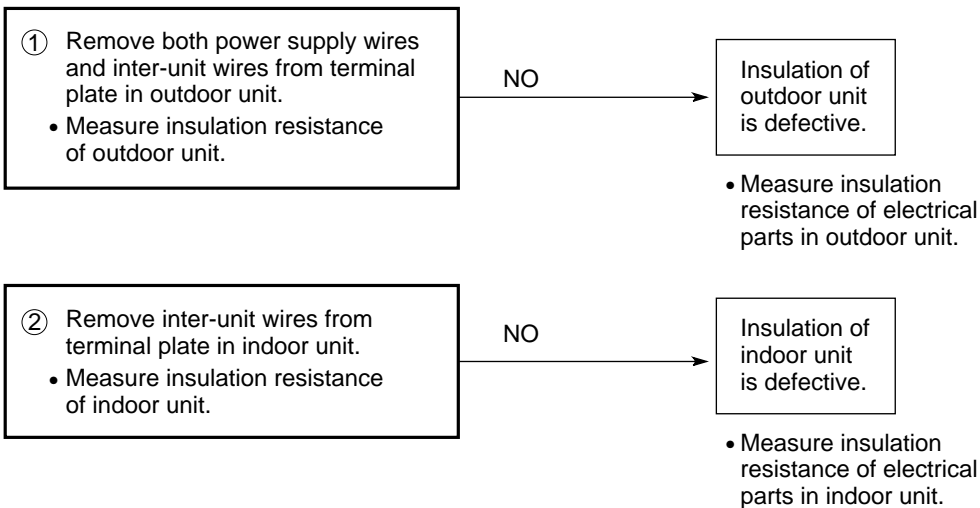
A. When the circuit breaker is set to ON, it is tripped soon. (Resetting is not possible.)

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

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

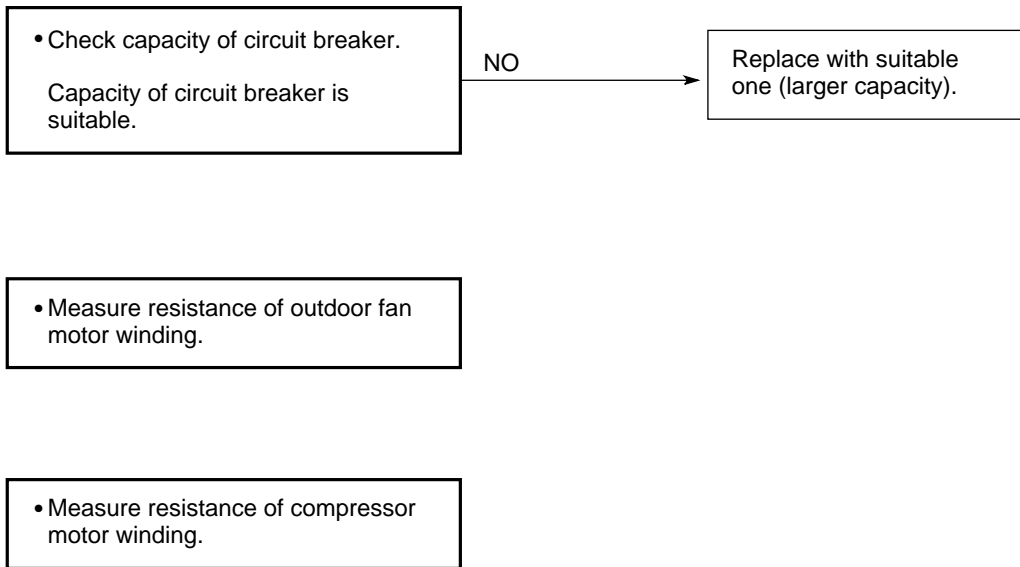


* Set circuit breaker to OFF.



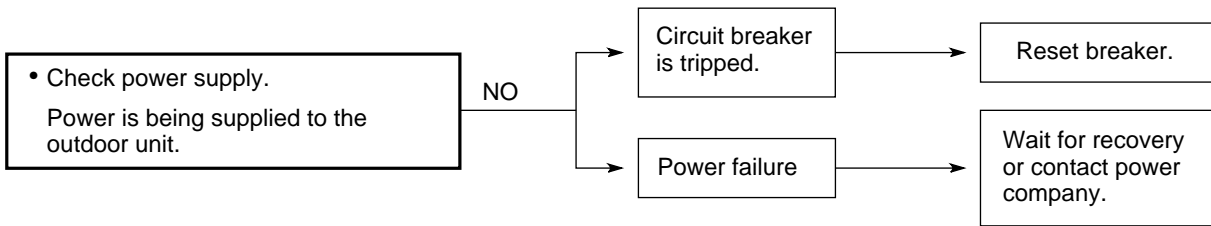
B.Circuit breaker trips in several minutes after turning the air conditioner on.

- There is a possibility of short circuit.

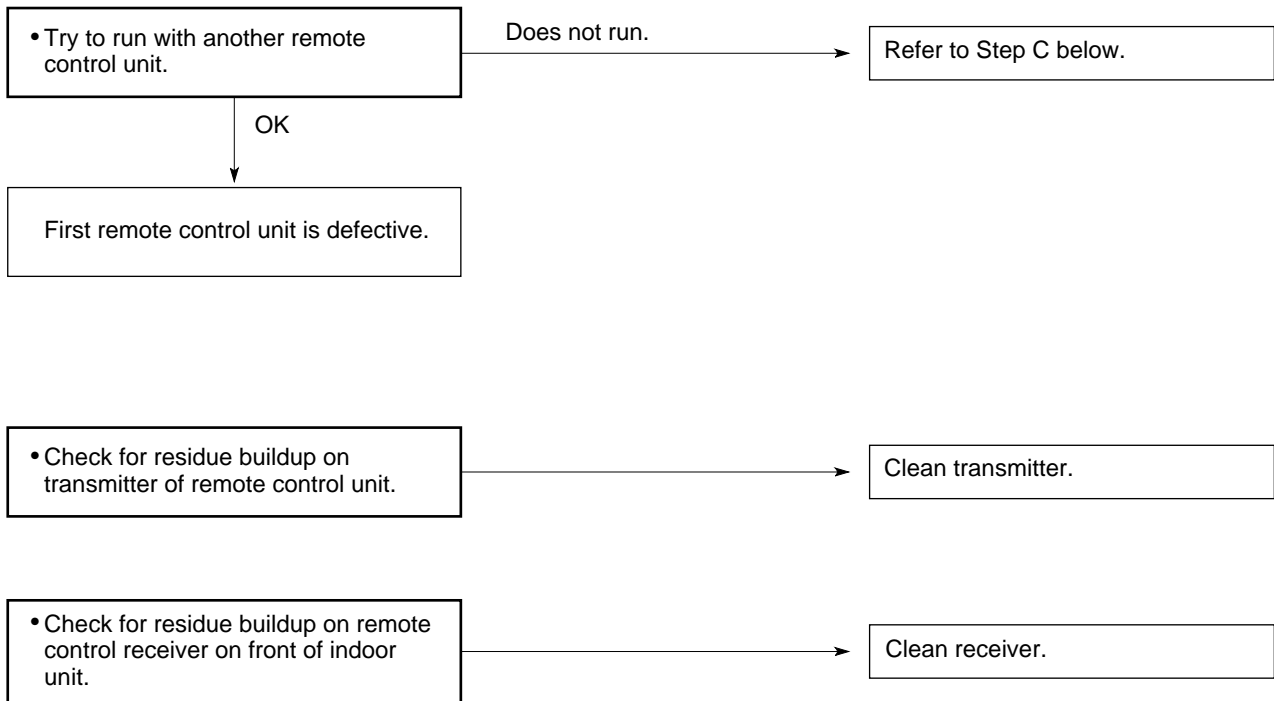


11-2-2. Neither indoor nor outdoor unit runs.

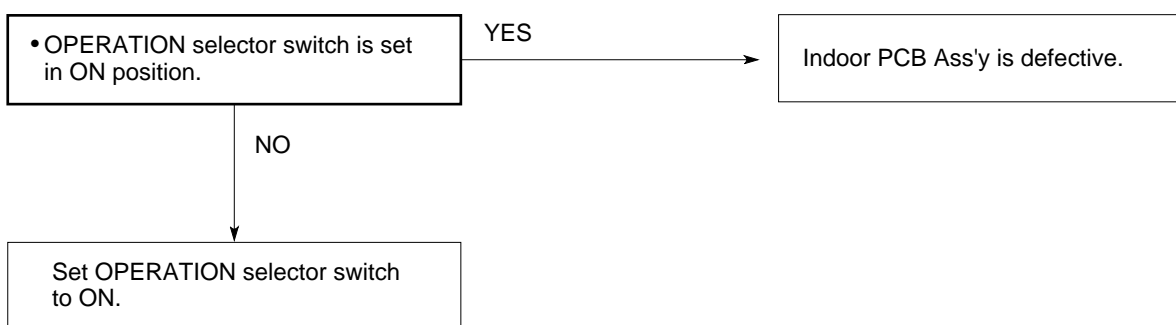
A. Power is not supplied.



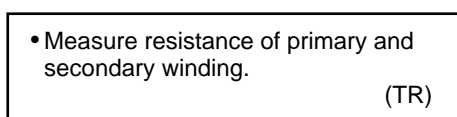
B. Check remote control unit.



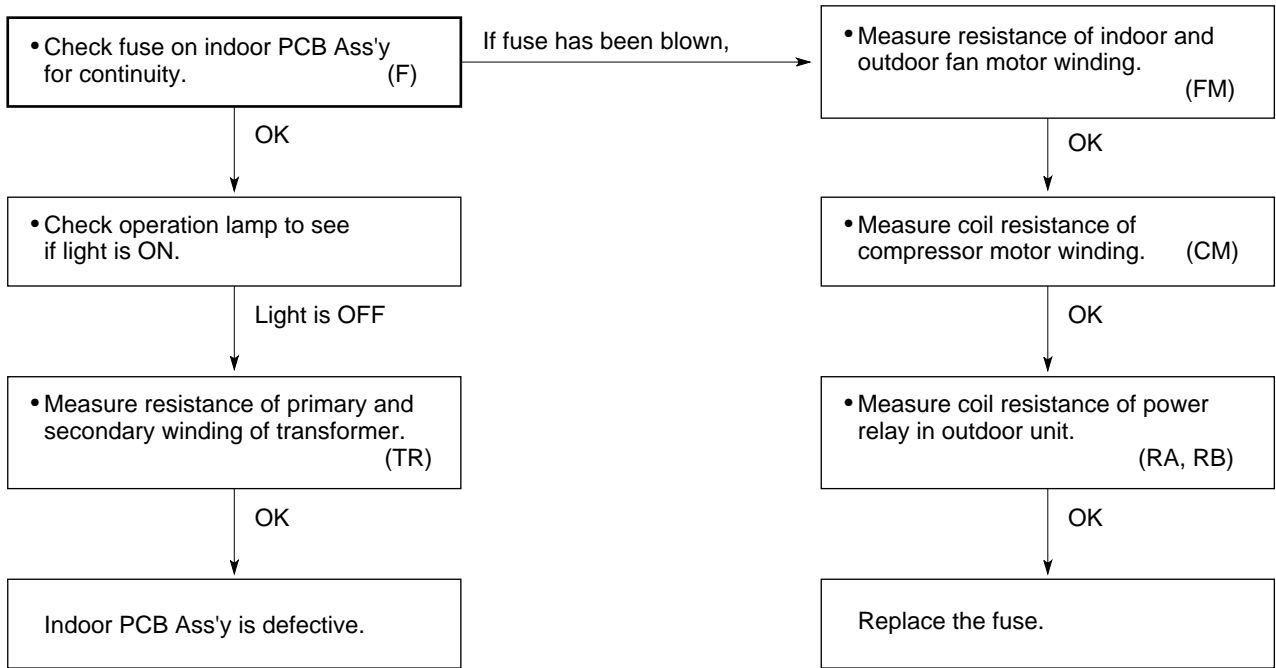
C. Check "OPERATION selector" switch in the indoor unit.



D. Check transformer in indoor unit.



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

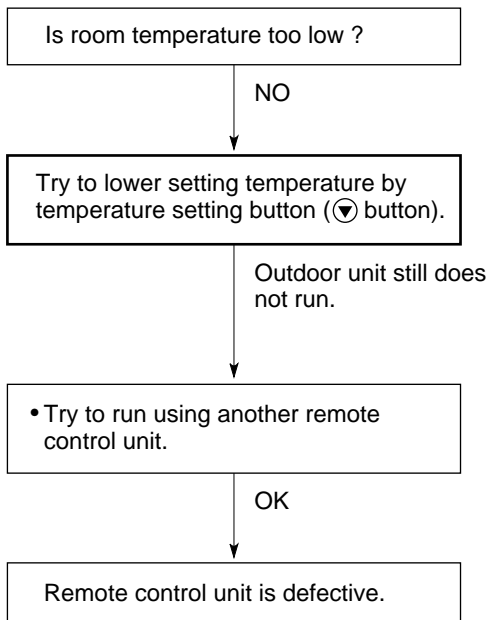


F. Check TIMER on the remote control unit.

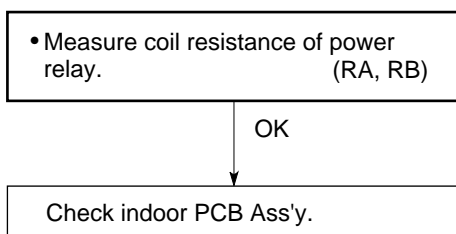


11-2-3. Only outdoor unit does not run.

A. Check setting temperature.

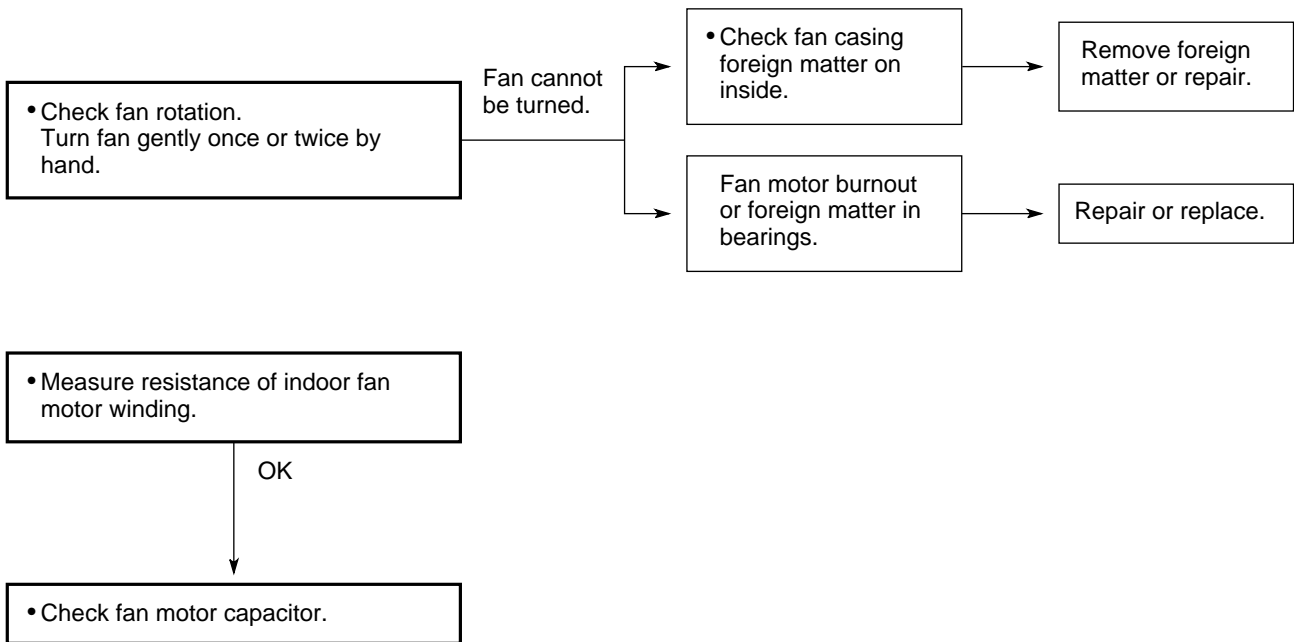


B. Check power relay in outdoor unit.

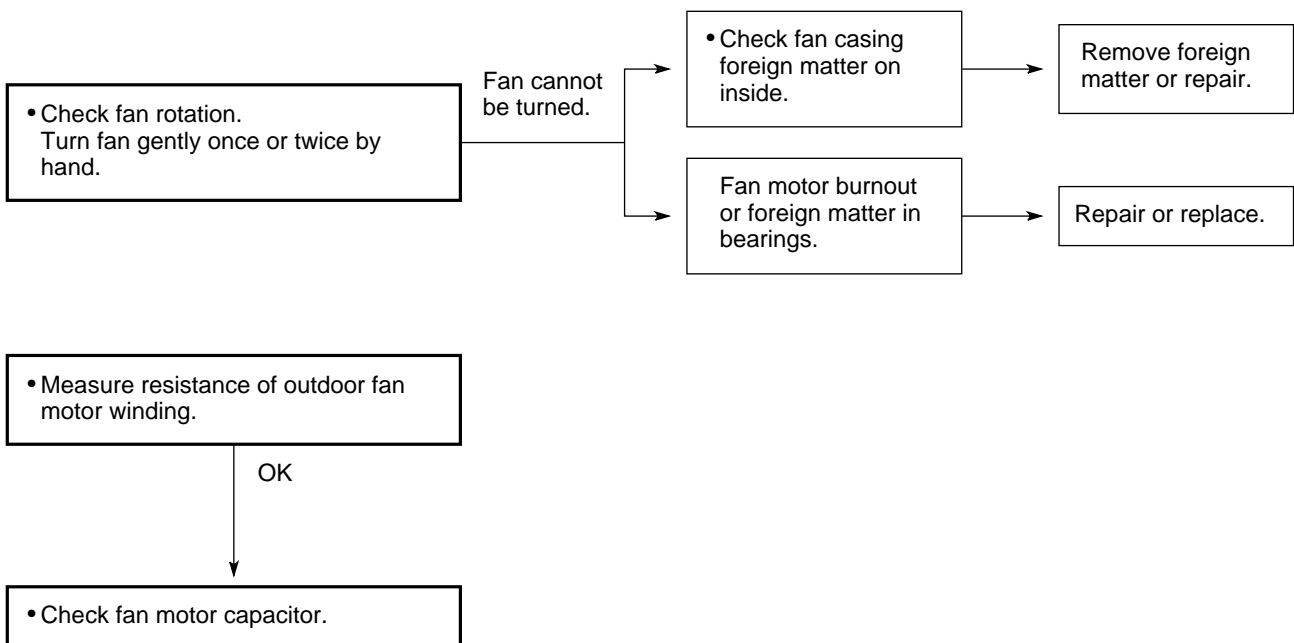


11-3. Some part of air conditioner does not operate.

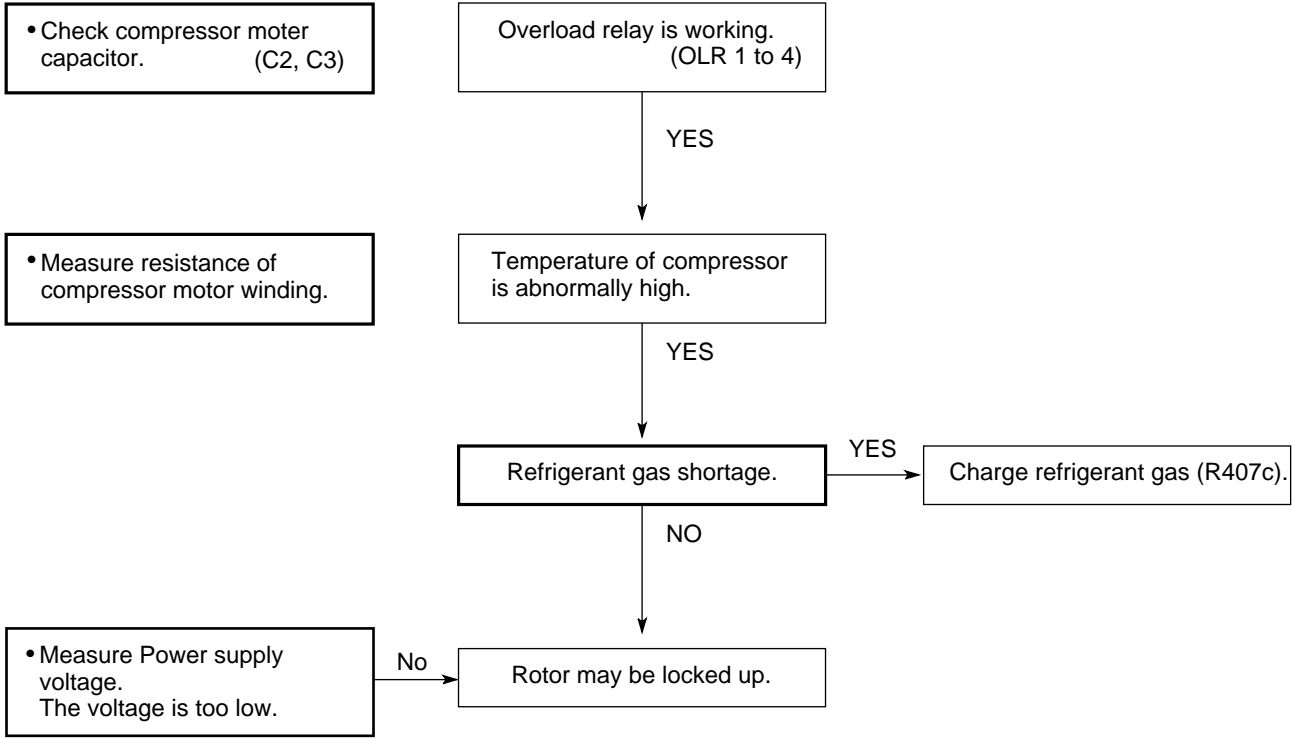
11-3-1. Only indoor fan does not run.



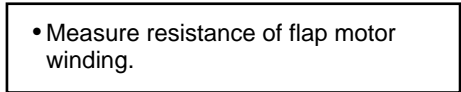
11-3-2. Only outdoor fan does not run.



11-3-3. Only compressor does not run.

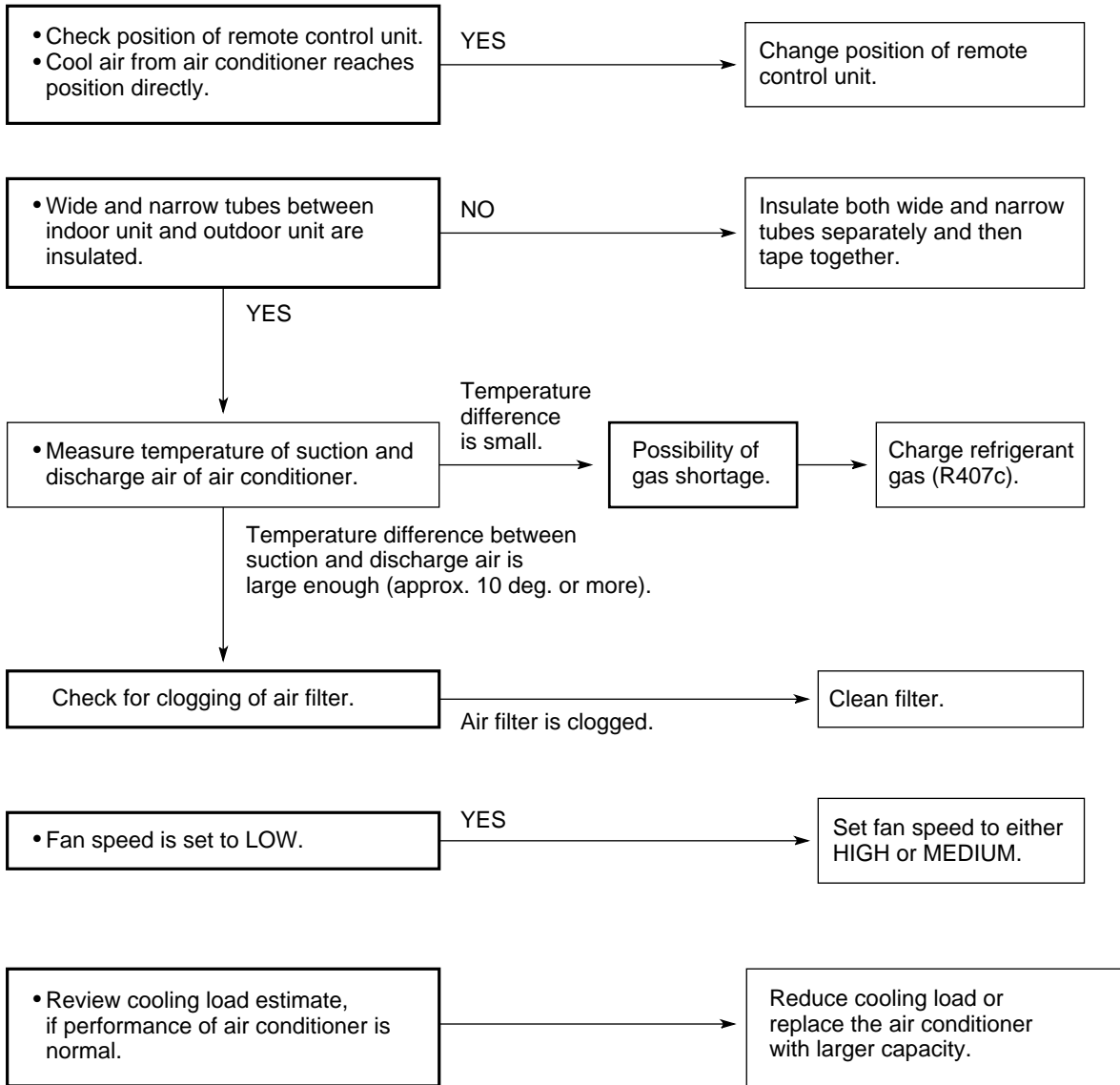


11-3-4. Only flap motor does not run.

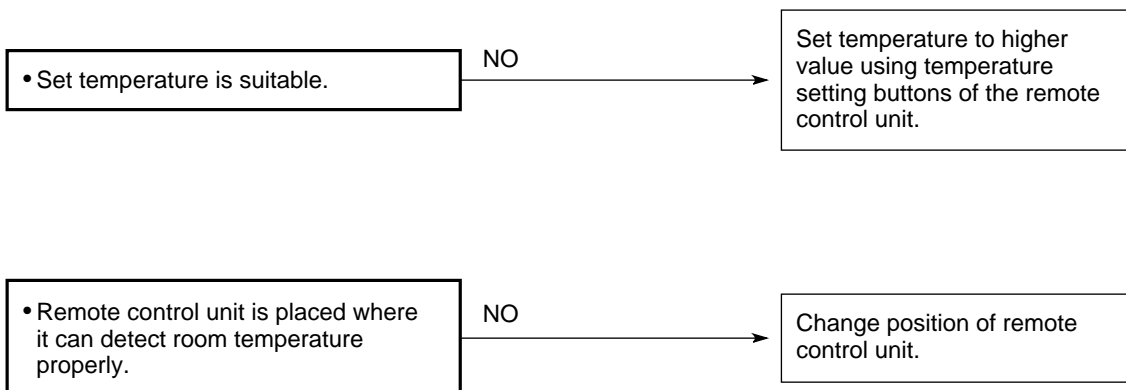


11-4. Air conditioner operates, but abnormalities are observed.

11-4-1. Poor cooling.

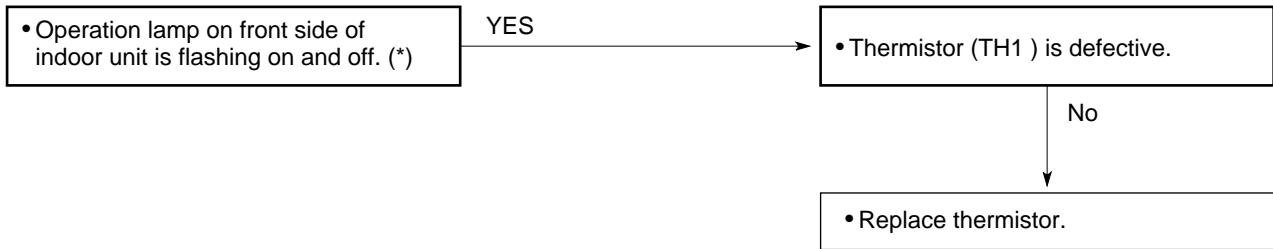


11-4-2. Excessive cooling.



11-5. If a sensor is defective.

11-5-1. Indoor coil temp. thermistor (TH1) is defective.



NOTE Alarm Signal (*)

Operation lamp on the front side of the indoor unit will flash on and off when the indoor coil thermistor is defective. At the same time the outdoor unit will stop. Indoor unit will operate only for ventilation.

11-5-2. 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

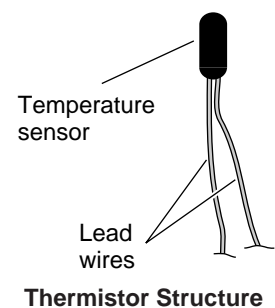
When thermistor is short, the air conditioner will be in the following conditions as the controller tries to detect extremely high room temperature.

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)

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

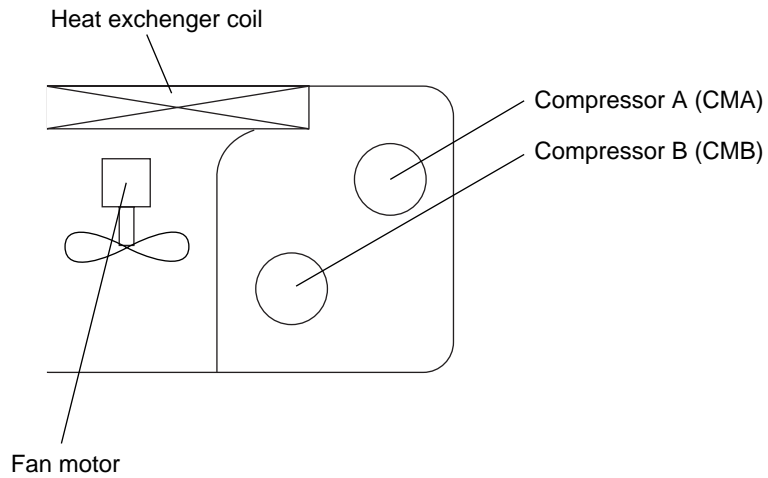
Short... The protective cover of a lead wire has been damaged, and the exposed wire is touching another metal part, or both lead wires have become exposed and are touching each other. Alternatively, the circuit inside the temperature sensor is closed.



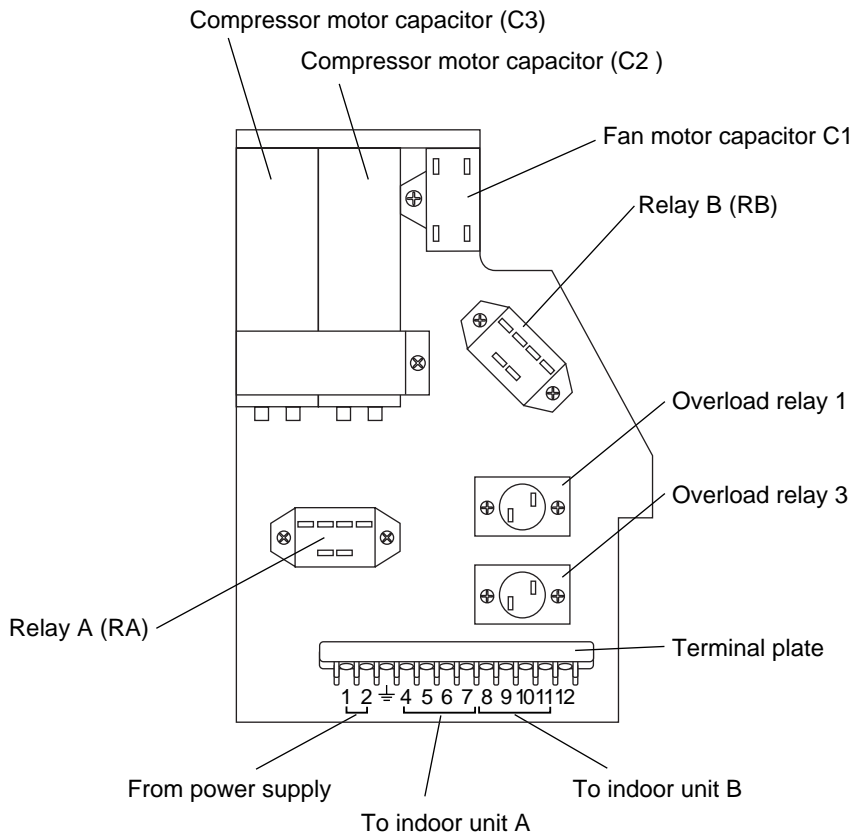
12. ARRANGEMENT OF ELECTRICAL COMPONENTS

Outdoor Unit AER518DC

● Parts Layout in Unit



● Electric Parts



13. CHECKING ELECTRICAL COMPONENTS

13-1. Measurement of Insulation Resistance

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

13-1-1. Power Supply Wires

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

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

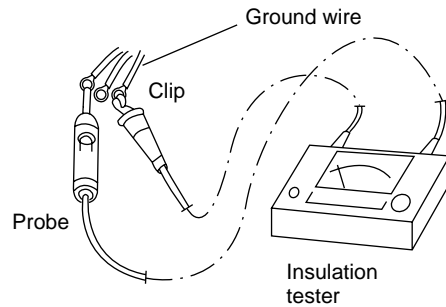


Fig. 1

13-1-2. 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 except where the ground line is connected on the terminal plate. (Fig. 2)

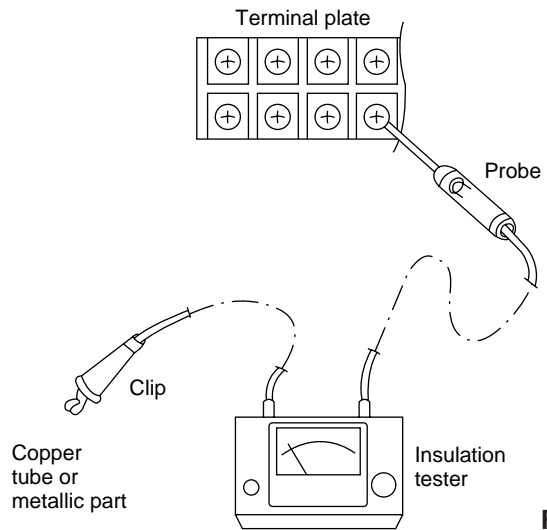


Fig. 2

13-1-3. Outdoor Unit

Clamp a metallic part of the unit with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on each terminal screw where power supply lines are connected on the terminal plate. (Fig. 2)

13-1-4. 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)

Refer to Electric Wiring Diagram.

NOTE

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

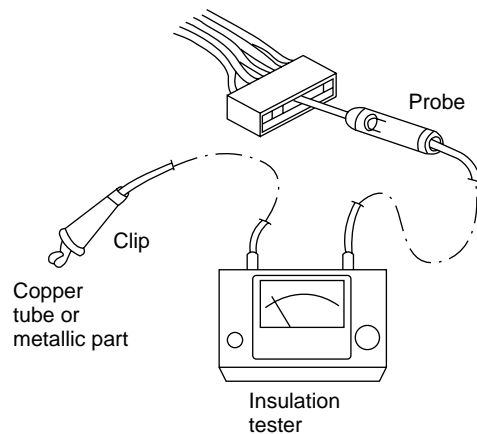


Fig. 3

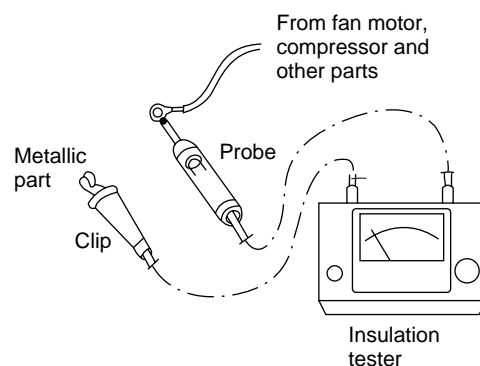


Fig. 4

13-2. 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.
- Check for continuity using a multimeter as shown in Fig. 6.

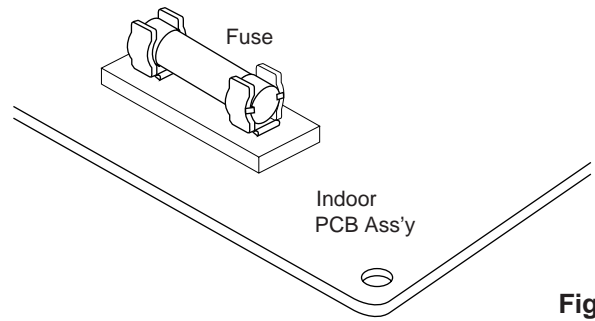


Fig. 5

13-3. 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.

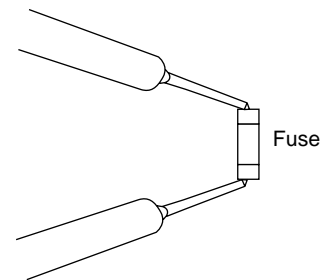


Fig. 6

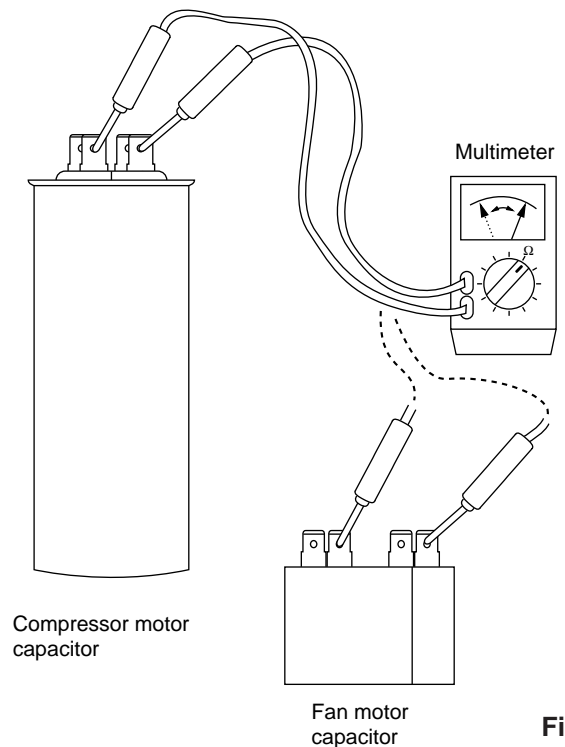


Fig. 7

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