TECHNICAL & SERVICE MANUAL

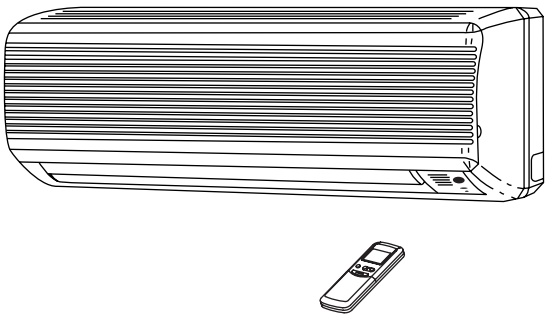
Outdoor Unit
AER524DC

Indoor Unit
AWR512CL
FCR512CL

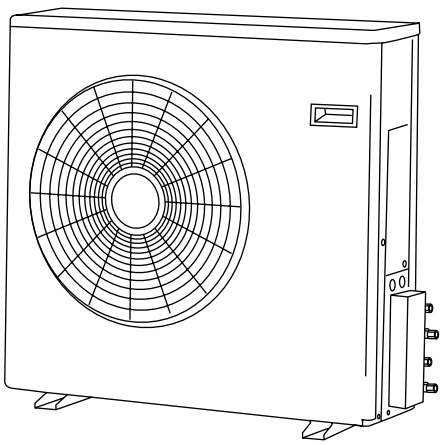
Euro-Line®

MULTI-SPLIT SYSTEM AIR CONDITIONER

AWR512CL

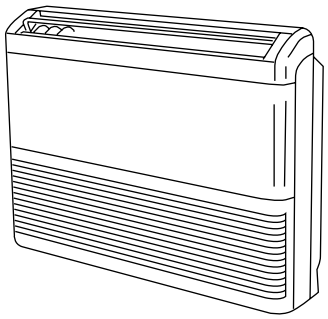


Outdoor Unit

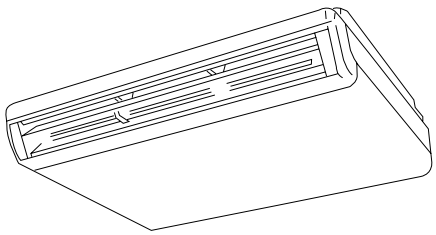


AER524DC

FCR512CL
Floor-Mounted



Ceiling-Mounted



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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.

Table of Contents

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 **AWR512CL X 2**
Outdoor Unit **AER524DC**

Power Source			220–240V ~ 50Hz	
Voltage rating			230 V	
Performance			Cooling	
Max Capacity			kW	6.70
		BTU/h		22900
Air circulation (High)		m^3/h		490 x 2
Moisture removal (High)		Liters/h		1.2 x 2
Electrical Rating			Cooling	
Available voltage range		V		198 ~ 264
Running amperes		A		12.5
Power input		W		2650
Power factor		%		93
C.O.P.		W/W		2.7
Compressor locked rotor amperes		A		66
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 /Auto (Hi,Lo)
Airflow direction (Indoor)		Horizontal		Manual
		Vertical		Auto
Air filter				Washable, Anti-Mold
Compressor				Rotary (Hermetic)
Refrigerant / Amount charged at shipment		g		R407c / 1030 x 2
Refrigerant control				Capillary tube
Operation sound	Indoor : Hi / Me / Lo	dB-A		39 / 35 / 33
	Outdoor : Hi	dB-A		53
Refrigerant tubing connections				Flare type
Max. allowable tubing length at shipment		m		7.5
Refrigerant	Narrow tube	mm (in.)		6.35(1/4)
tube diameter	Wide tube	mm (in.)		12.7(1/2)
Accessories				Air Clean Filter

Dimensions & Weight			Indoor Unit	Outdoor Unit
Unit dimensions	Height	mm	270	835
	Width	mm	805	850
	Depth	mm	177	305
Package dimensions	Height	mm	243	913
	Width	mm	855	1,000
	Depth	mm	332	400
Weight	Net	kg	8.0	67.5
	Shipping	kg	10.0	76.5
Shipping volume		m^3	0.07	0.365

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks:

Rating conditions are:

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

Indoor Unit **FCR512CL x 2**
Outdoor Unit **AER524DC**

Power Source	220–240V ~ 50Hz

Voltage rating	230 V

Performance			Cooling
Max Capacity		kW	6.70
		BTU/h	22900
Air circulation (High)		m^3/h	700 x 2
Moisture removal (High)		Liters/h	1.30 x 2

Electrical Rating		Cooling
Available voltage range	V	198 ~ 264
Running amperes	A	12.5
Power input	W	2650
Power factor	%	93
C.O.P.	W/W	2.7
Compressor locked rotor amperes	A	66

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 / Auto(Hi Lo)
Airflow direction (Indoor)		Horizontal	Manual
		Vertical	Auto
Air filter			Washable, Anti-Mold
Compressor			Rotary (Hermetic)
Refrigerant / Amount charged at shipment		g	R407c / 1030 x 2
Refrigerant control			Capillary tube
Operation sound	Indoor : Hi / Me / Lo	dB-A	39 / 35 / 33
	Outdoor : Hi	dB-A	53
Refrigerant tubing connections			Flare type
Max. allowable tubing length at shipment		m	7.5
Refrigerant	Narrow tube	mm (in.)	6.35(1/4)
tube diameter	Wide tube	mm (in.)	12.7(1/2)
Refrigerant tube kit / Air Clean Filter			Optional / Optional

Dimensions & Weight			Indoor Unit	Outdoor Unit
Unit dimensions	Height	mm	680	835
	Width	mm	900	850
	Depth	mm	190	305
Package dimensions	Height	mm	813	913
	Width	mm	1,011	1,000
	Depth	mm	296	400
Weight	Net	kg	23.5	67.5
	Shipping	kg	30.0	76.5
Shipping volume		m^3	0.24	0.365

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

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

2-2. Major Component Specifications

Outdoor Unit **AER524DC**

Compressor	Type				Rotary (Hermetic)	
	Compressor model…Q'ty / Code number				C-RN110H5B … 2 / 802356-45B	
	Nominal output			W	1,100	
	Compressor oil ... Amount			cc	FV68S ... 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 … Q'ty			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 21 A	—
	Run capacitor			μF	25.0 ... 2	
	··· Q'ty			VAC	450 ... 2	
Fan & Fan Motor	Type				Propeller	
	Q'ty ... Dia.			mm	1 ... ø460	
	Fan motor model ... Q'ty				19TFB6064 ... 1	
	No. of poles ... rpm (230 V)				6 ... 850-370	
	Nominal output			W	50	
	Coil resistance (Ambient temp. 20°C)				WHT – BRN : 99.5 WHT – YEL : 25.2 YEL – PNK : 63.2	
	Safety devices	Type			Internal protector	
		Operating temp.	Open	°C	130 ± 5	
			Close		Automatic reclosing	
	Run capacitor			μF	5.0	
				VAC	400	
Heat Exch. Coil	Coil				Aluminum plate fin / Copper tube	
	Rows				2	
	Fin pitch			mm	1.8	
	Face area			m^2	0.574	
External Finish					Acrylic baked-on enamel finish	

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Indoor Unit **AWR512CL**

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 ... 1,230
Nominal output			W	10
Coil resistance (Ambient temp. 20℃)			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	℃	145±2
		Close		—
Run capacitor			μF	1.0
			VAC	440
Flap Motor				
Type				Stepping motor
Model				MP24GA1
Rating				DC 12 V
Coil resistance (Ambient temp. 25℃)			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

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Indoor Unit **FCR512CL**

Controller PCB				
	Part No.			POW-K185GS-N
	Controls			Microprocessor
	Control circuit fuse			250 V 3 A
Remote Control Unit				RCS-5PS3E
Fan & Fan Motor				
	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. Open	°C	145±5
		Close		Automatic reclosing
	Run capacitor		µF	1.5
			VAC	440
Flap Motor				
	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%
Heat Exch. Coil				
	Coil			Aluminum plate fin / Copper tube
	Rows			2
	Fin pitch		mm	1.8
	Face area		m^2	0.192

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2-3. Other Component Specifications

Power Relay (RA, RB)		**G7L-2A-TUB**
Coil rating		AC 220/230/240V, single phase 50 Hz
Coil resistance	Ω (at 23°C)	21 ± 15%
Contact rating		AC 220V, 25A

Thermostat (Fan Speed Control 23S)		**YTB-S383**
Switching temp.	°C	high → LOW 28.5°C ± 1
		low → HIGH 31°C ± 1

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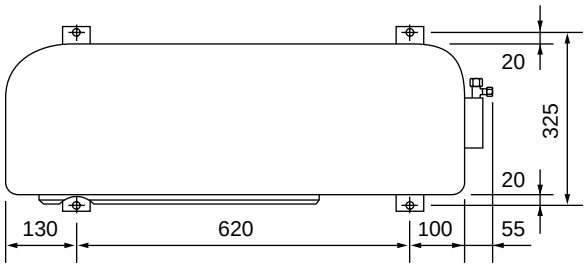
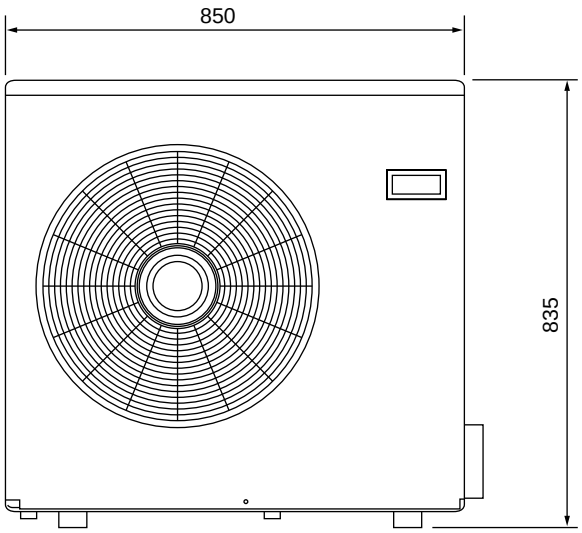
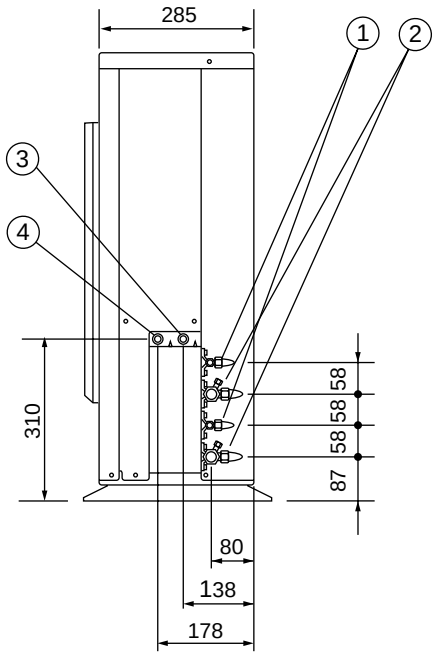
3. DIMENSIONAL DATA

Outdoor Unit **AER524DC**



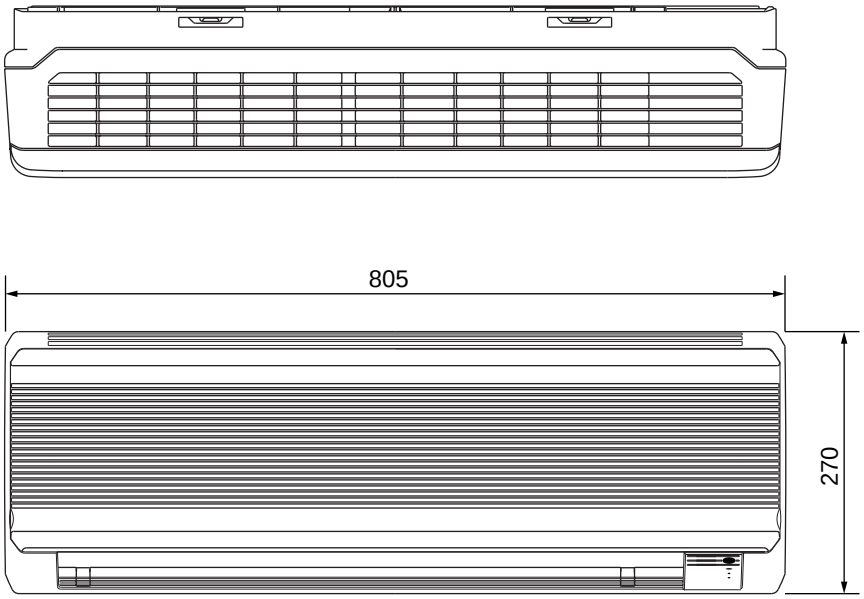


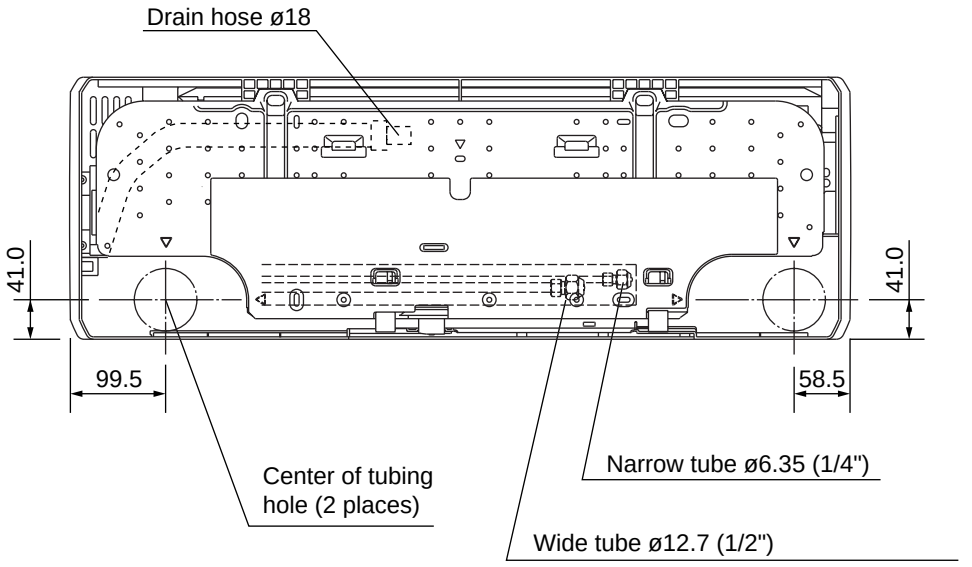
① Narrow tube service valve ø6.35 (1/4")
② Wide tube service valve ø12.7 (1/2")
③ Power supply wires connection
④ Inter-unit wires connection



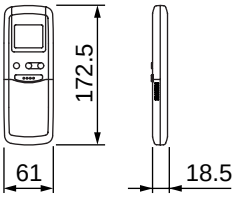
Unit : mm

Indoor Unit **AWR512CL**



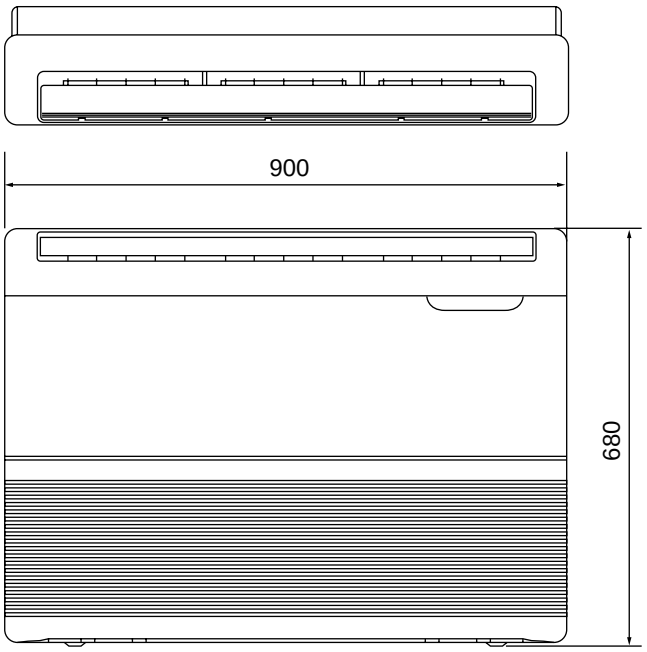


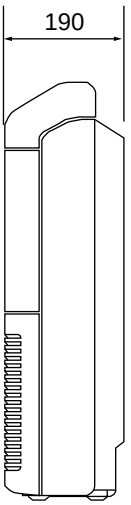
Remote control unit

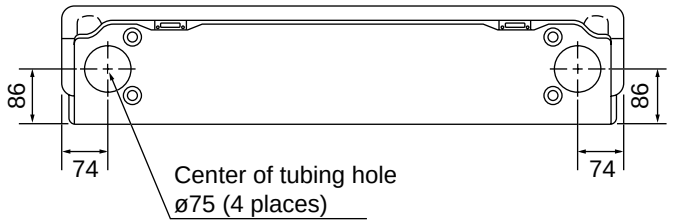


Unit : mm

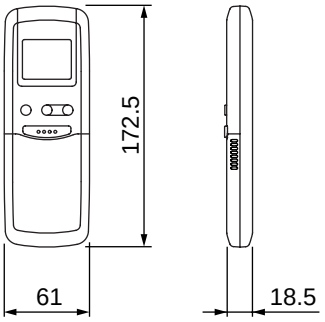
Indoor Unit **FCR512CL**

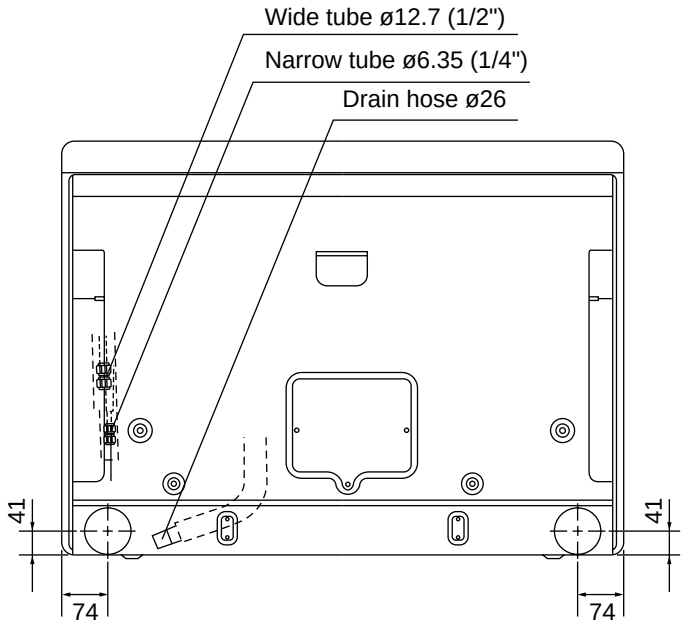






Remote control unit



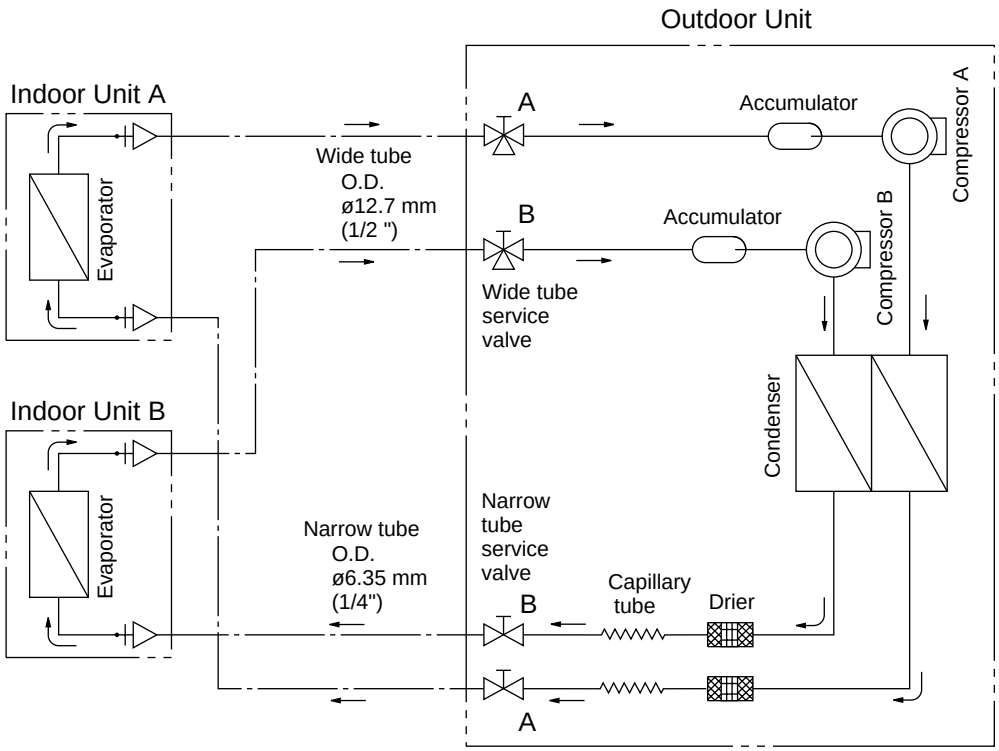


Unit : mm

4. REFRIGERANT FLOW DIAGRAM

Applicable Indoor Unit : AWR512CL (x2) FCR512CL (x2)

Outdoor Unit : AER524DC



5. ELECTRICAL DATA

5-1. Electrical Characteristics

Outdoor Unit **AER524DC**

NOTE

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

230 V Single phase 50Hz

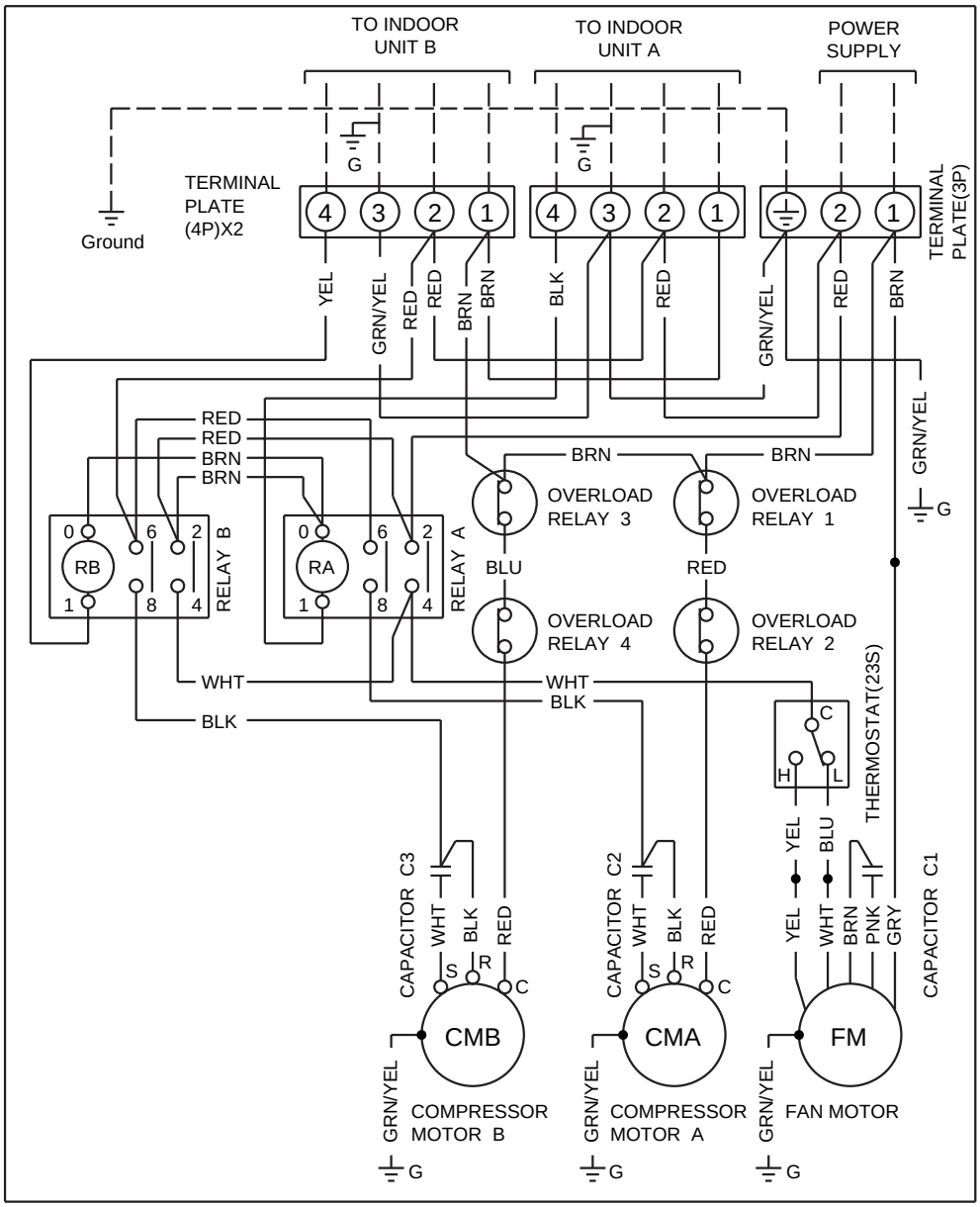
Number of Indoor Unit			1-Unit	2-Units
Rating Conditions	Running Amps.	A	6.20	12.50
	Power Input	kW	1.32	2.65
Full Load Conditions	Running Amps.	A	7.2	14.5
	Power Input	kW	1.55	3.15

Rating Conditions : Indoor Air Temperature 27℃ D.B. / 19℃ W.B.
Outdoor Air Temperature 35℃ D.B. / 24℃ W.B.

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

5-2. Electric Wiring Diagram

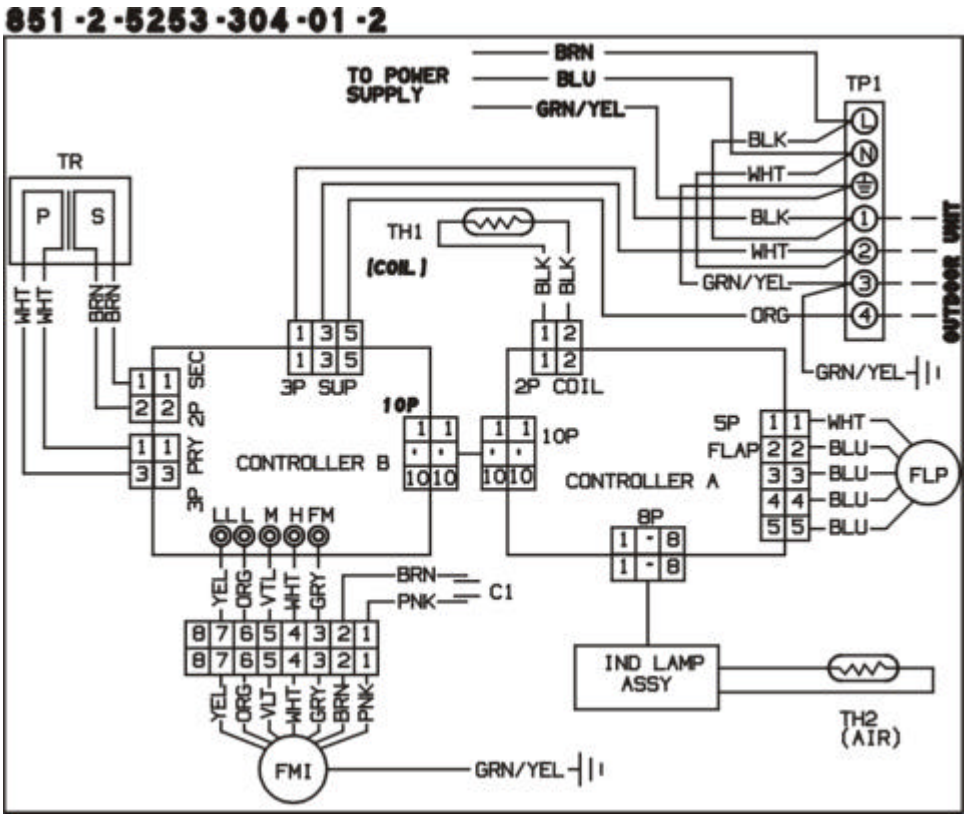
Outdoor Unit **AER524DC**



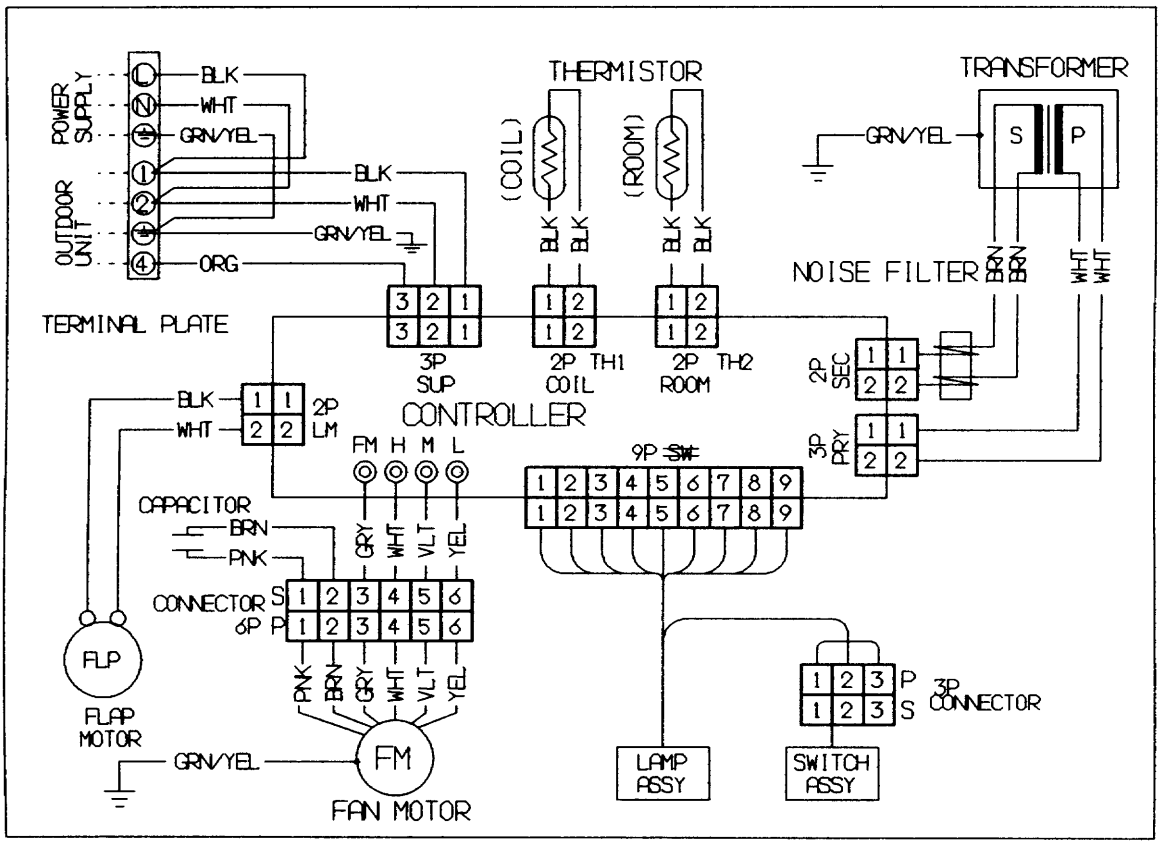
Indoor Unit **AWR512CL**

WARNING

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



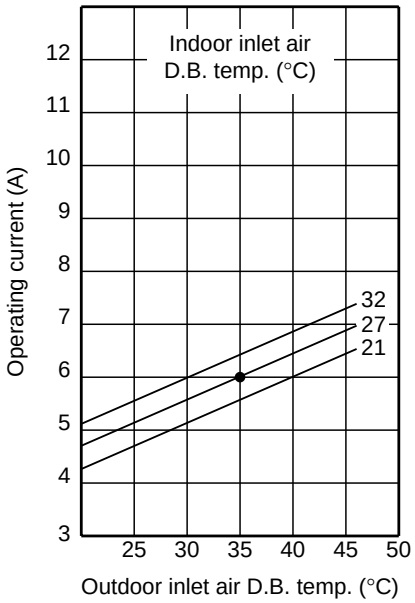
FCR512CL

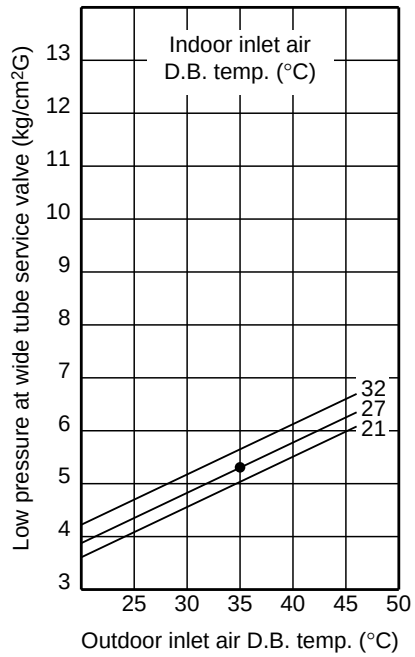


5-3. Performance Charts

Indoor Unit **AWR512CL (x1) FCR512 (x1)**
Outdoor Unit **AER524DC**

■ 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.

6. INSTALLATION INSTRUCTIONS

6-1. Installation Site Selection

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

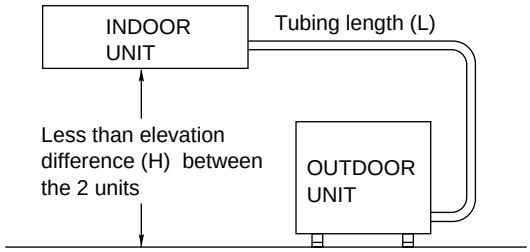


Fig.1

IMPORTANT

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 Fig.1 and Table 1.

Table.1

Max allowable tubing length at shipment.(m)	Limit of tubing length(L). (m)	Limit of elevation difference(H). (m)	Required amount of additional refrigerant*(g/m).
7.5	20	7	25

* If total tubing length becomes 7.5 to 20 m (max.), charge additional refrigerant (R407c) by 25 g/m.

No additional charge of compressor oil is necessary.

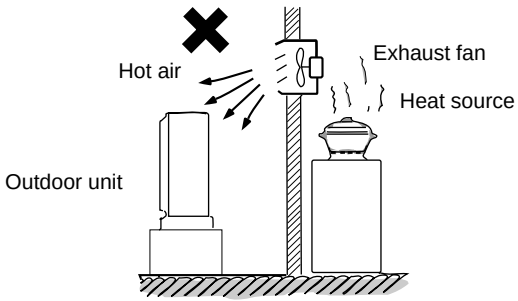


Fig.2

6-2. Place and Space for Installation

Avoid:

- heat source, exhaust fans, etc. (Fig. 2)
- direct sunlight
- 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. (Fig. 3)
- provide a solid base (concrete block, 10 x 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. 4)
- use lug (anchor) bolts or equal to bolt down the unit, reducing vibration and noise. (Fig. 4)

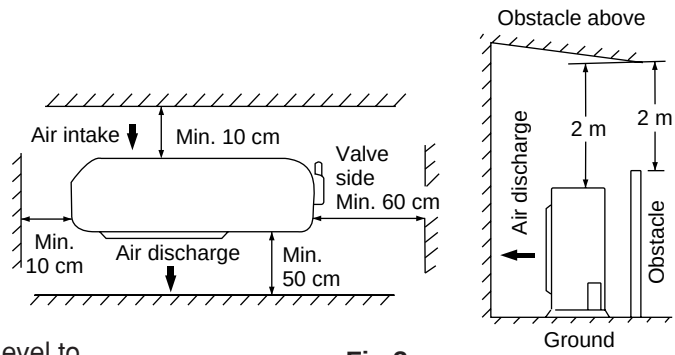


Fig.3

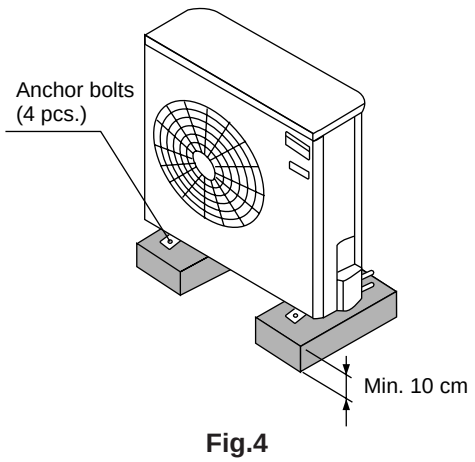


Fig.4

6-3. Wiring instructions

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.

General precautions on Wiring

- Check the rated voltage on the unit's name plate before wiring according to the wiring diagram.
- Provide a power outlet to be used exclusively for each unit, with a power supply disconnect and a circuit breaker for overcurrent protection provided in the exclusive line.
- To prevent possible hazards due to insulation failure, the unit must be grounded.
- Each wire must be connected firmly.
- No wire should be allowed to touch refrigerant tubing, the compressor or any moving parts of fan motors.

Regulations on wire diameters differ according to national and local requirements. For field wiring regulations, please refer to the LOCAL ELECTRICAL CODES before starting, and carefully follow the regulations as you do the installation.

WARNING

- **Do not supply power to the system until all wiring and refrigerant tubing connections are completed and checked.**
- **Wiring should only be done by an experienced, qualified electrician.**

Table 2 lists recommended wire lengths and diameters for power supply systems. Refer to the Wiring System Diagram above for the meaning of "A" and "B" in Table 2.

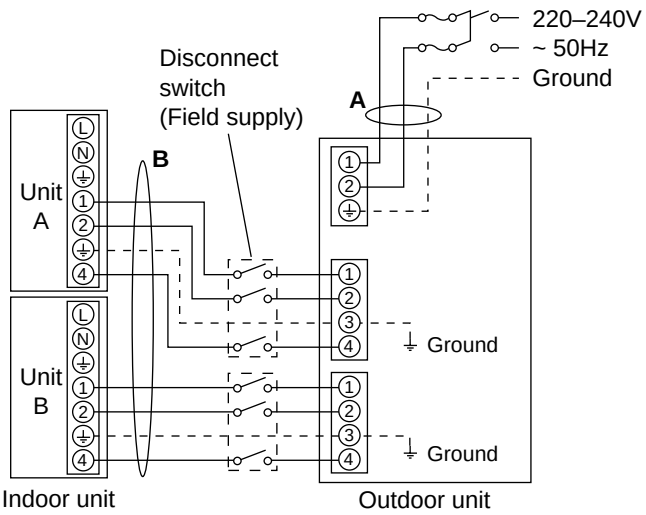
Table.2

Cross-Sectional Area	(A)Power Supply Wiring Length (m)	(B)Power Line Length(m)
	$2.5mm^2$	$2.5mm^2$
220-240 V	13	20

WARNING

This appliance must be grounded.

Wiring System Diagram



7. REFRIGERANT R407C : SPECIAL PRECAUTIONS WHEN SERVICING UNIT

7-1. Characteristics of new refrigerant R407C

7-1-1. 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

7-1-2. Components (mixing proportions)

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

7-1-3. 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.***

- **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.**

7-2. 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.

7-3. Tools specifically for R407C

● For servicing, use the following tools for R407C

Tool Distinction	Tool Name
Tools specifically for R407C	• 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	• 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.**

7-4. 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.

7-5. 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 "7-3. 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**

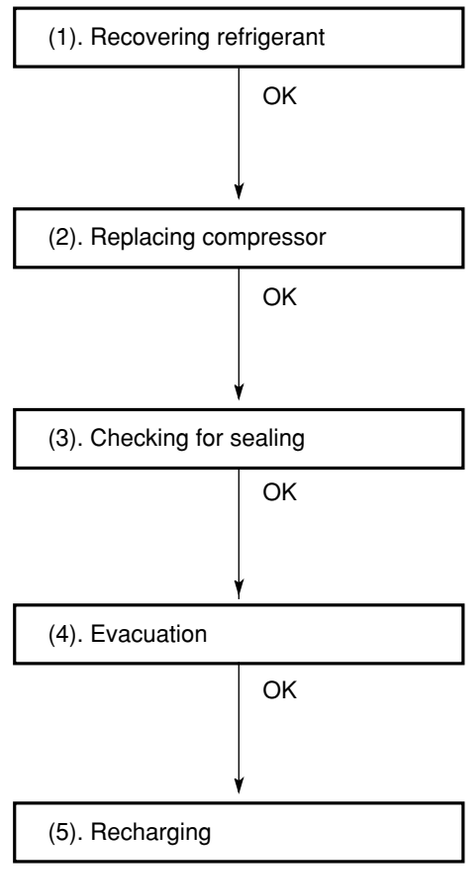
- Soon after removing pinched pipes of both discharge and suction tubes of the new compressor, replace it quickly.

(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 x 0.20 = 2.76Kg

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

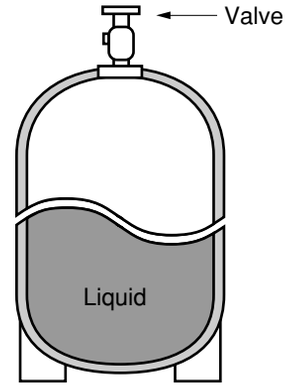
• If using a charging cylinder, transfer the specified amount of liquid refrigerant from the refrigerant cylinder to the charging cylinder.

Prepare an evacuated charging cylinder beforehand.

CAUTION

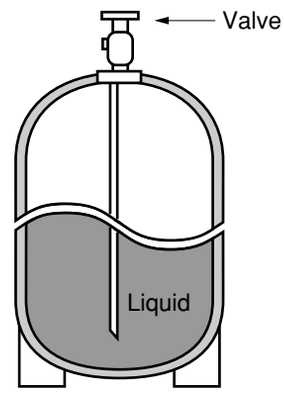
● **To prevent the composition of R407C from changing, never bleed the refrigerant gas into the atmosphere while transferring the refrigerant. (Fig. 3)**

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

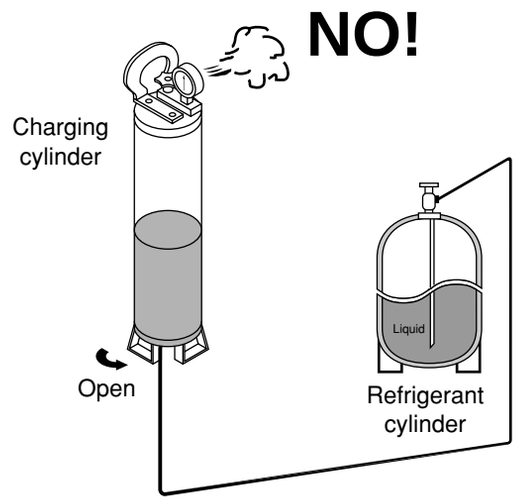


Fig.3

7-6. 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**

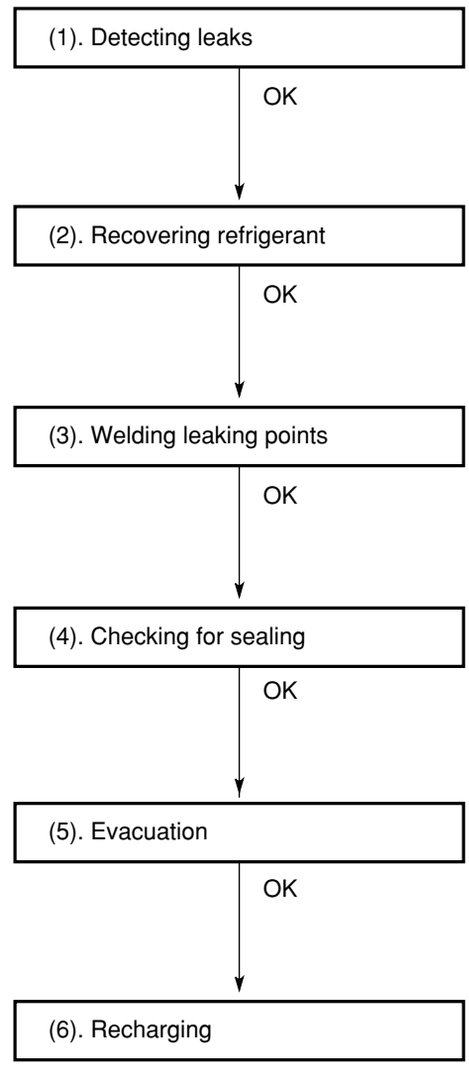
- Confirm again that no residual refrigerant exists in the unit before starting welding.
- Weld securely using flux and wax for R407C.
- Prevent oxide film from forming inside the tubes utilizing substitution with nitrogen (N2) in the refrigerant circuit of the unit. Leave ends of tubes open during welding.

(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 x 0.20 = 2.76Kg

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

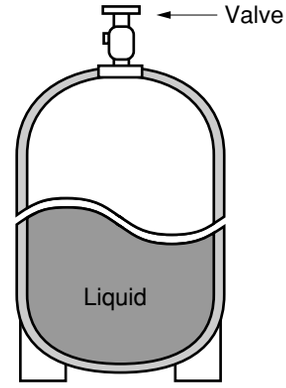
• If using a charging cylinder, transfer the specified amount of liquid refrigerant from the refrigerant cylinder to the charging cylinder.

Prepare an evacuated charging cylinder beforehand.

CAUTION

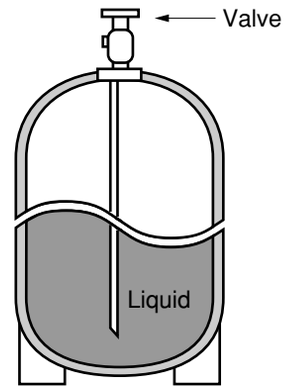
● **To prevent the composition of R407C from changing, never bleed the refrigerant gas into the atmosphere while transferring the refrigerant. (Fig. 6)**

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

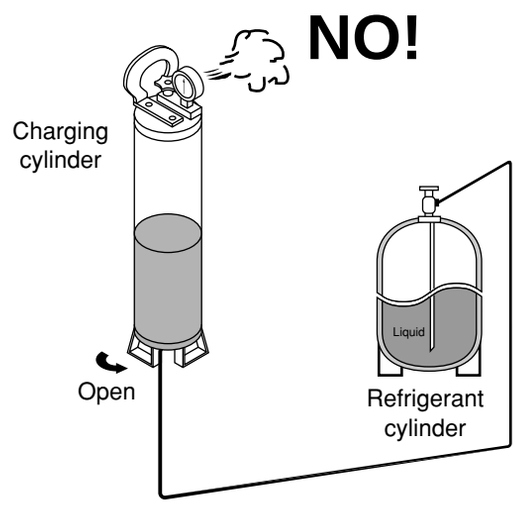


Fig. 6

7-7. Charging additional refrigerant

7-7-1.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.***

● **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.**

7-8. Retro-fitting existing systems

7-8-1 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.

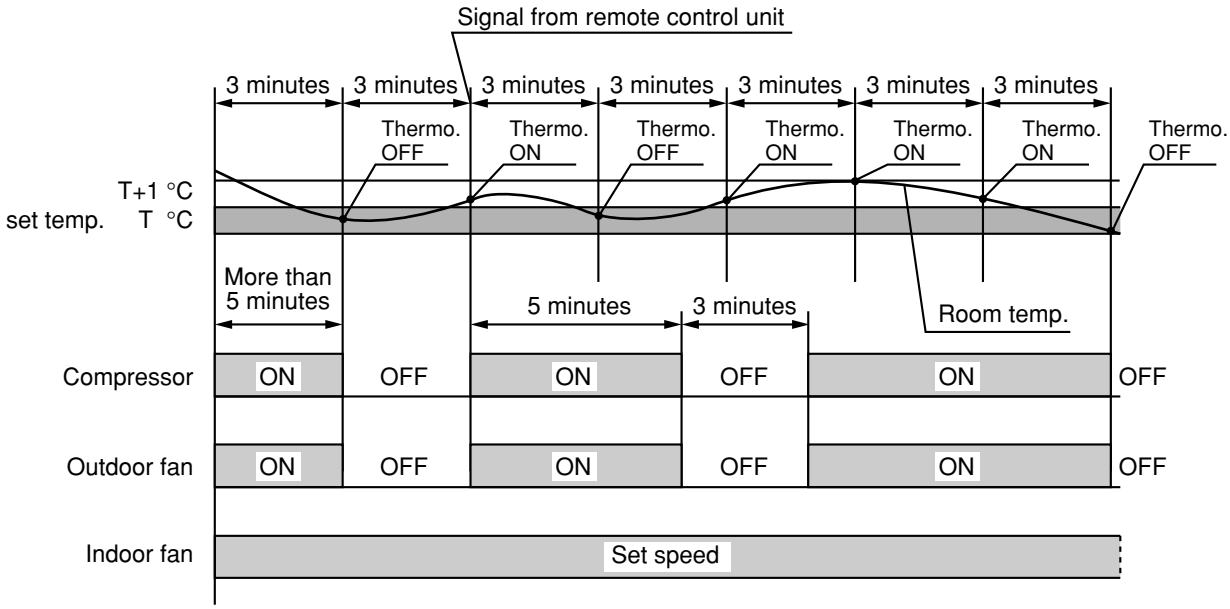
7-8-2 Use of existing tubing

• 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.

8. FUNCTION

8-1. Room Temperature Control

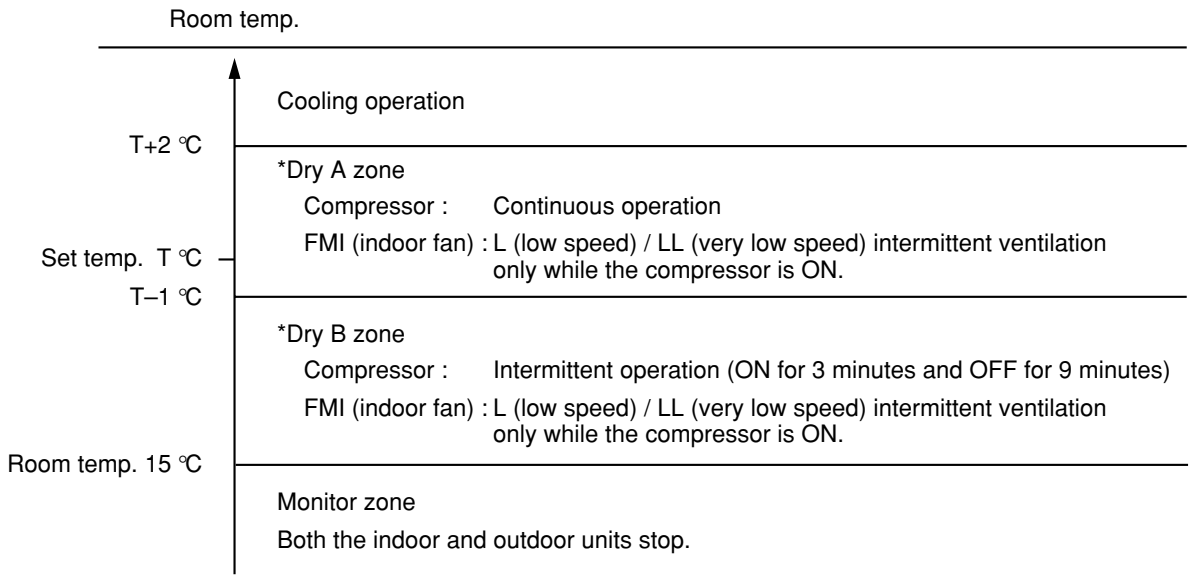
- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.
- The room temperature (and other information) is transmitted every 3 minutes by the remote control unit to the controller in the indoor unit.



- 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

8-2. 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.

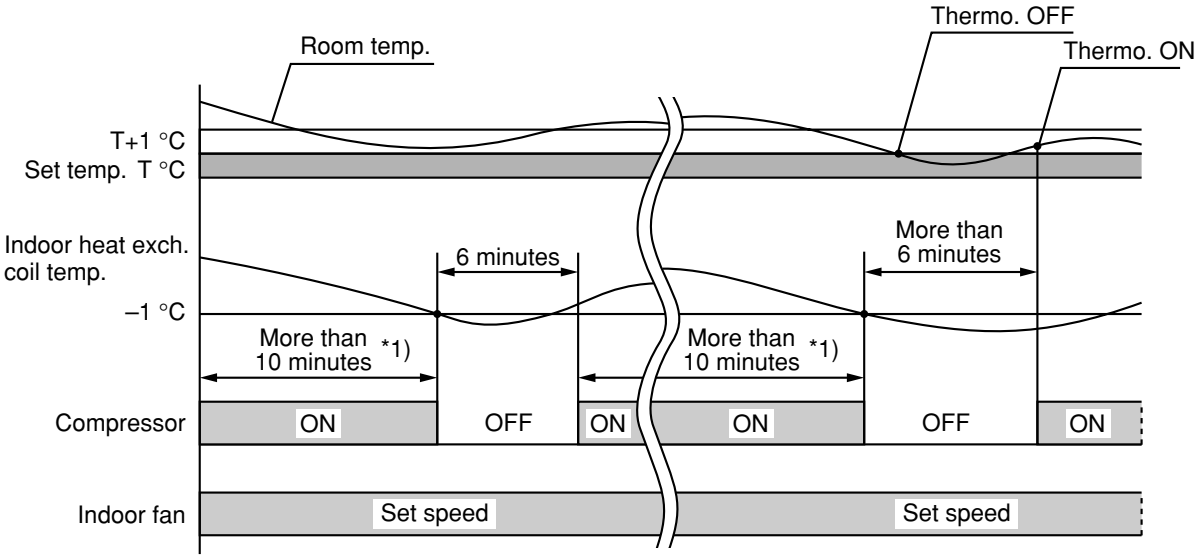


NOTE

- 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.

8-3. 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.

9. TROUBLESHOOTING

9-1. Check before and after troubleshooting

WARNING

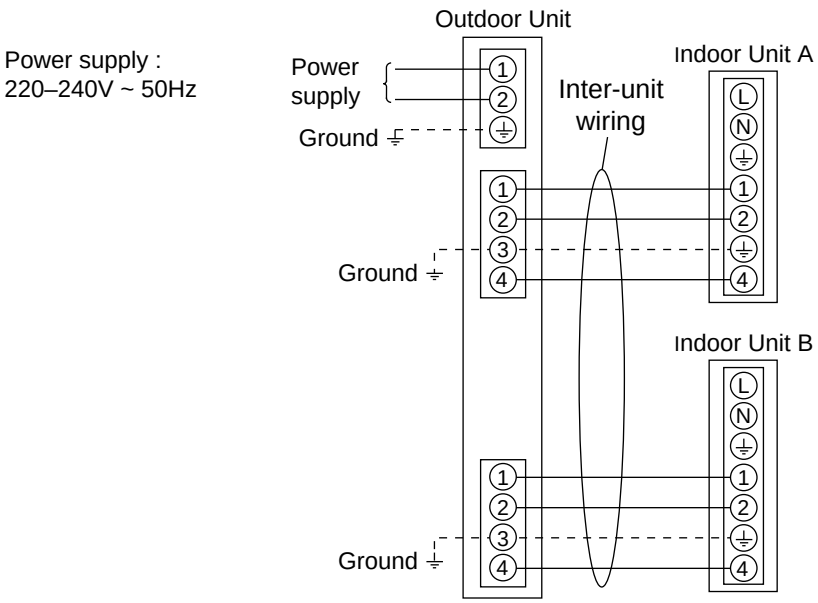
Hazardous voltage can cause ELECTRIC SHOCK or DEATH. Disconnect power or turn off circuit breaker before you start checking or servicing.

9-1-1. Check power supply wiring.

- Check that power supply wires are correctly connected to terminals No. 1 and No. 2 on the 3p terminal plate in the outdoor unit.

9-1-2. Check inter-unit wiring.

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



9-1-3. Check power supply.

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

9-1-4. Check lead wires and connectors.

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

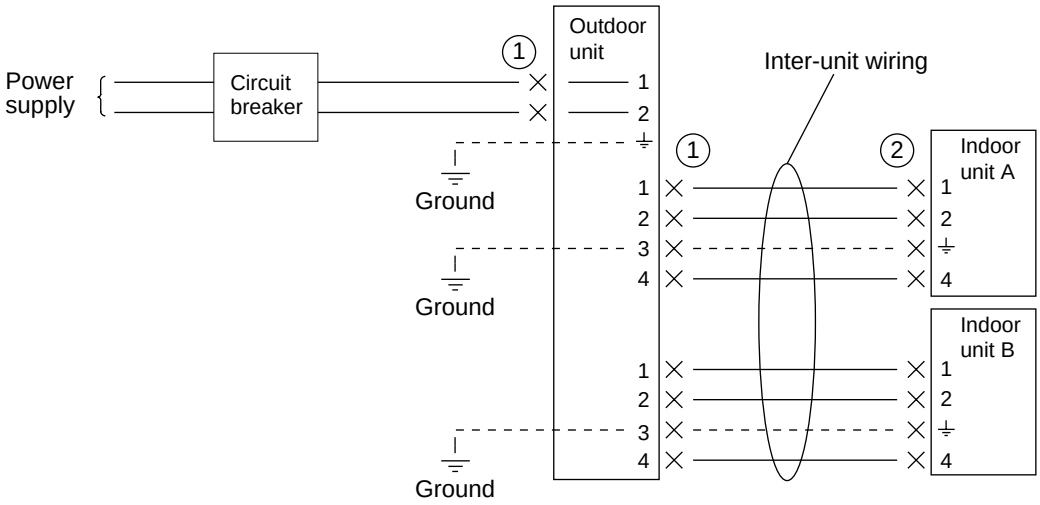
9-2. Air conditioner does not operate.

9-2-1. 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 2MΩ or less, insulation is defective (“NO”).



*Set circuit breaker to OFF.

① Remove both power supply wires and inter-unit wires from terminal plate in outdoor unit.
- Measure insulation resistance of outdoor unit.

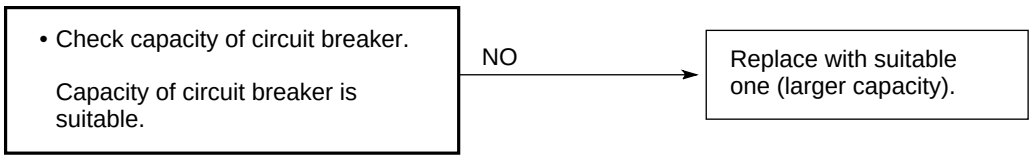
NO → Insulation of outdoor unit is defective.
- Measure insulation resistance of electrical parts in outdoor unit.

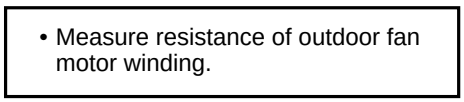
② Remove inter-unit wires from terminal plate in indoor unit.
- Measure insulation resistance of indoor unit.

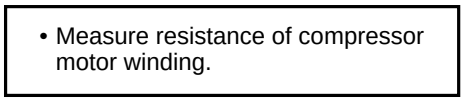
NO → Insulation of indoor unit is defective.
- Measure insulation resistance of electrical parts in indoor unit.

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

● There is a possibility of short circuit.

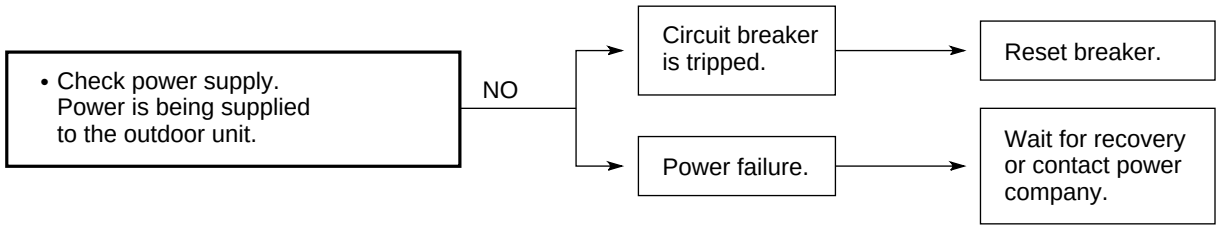






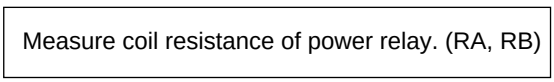
9-2-2. Neither indoor nor outdoor unit runs.

Power is not supplied.



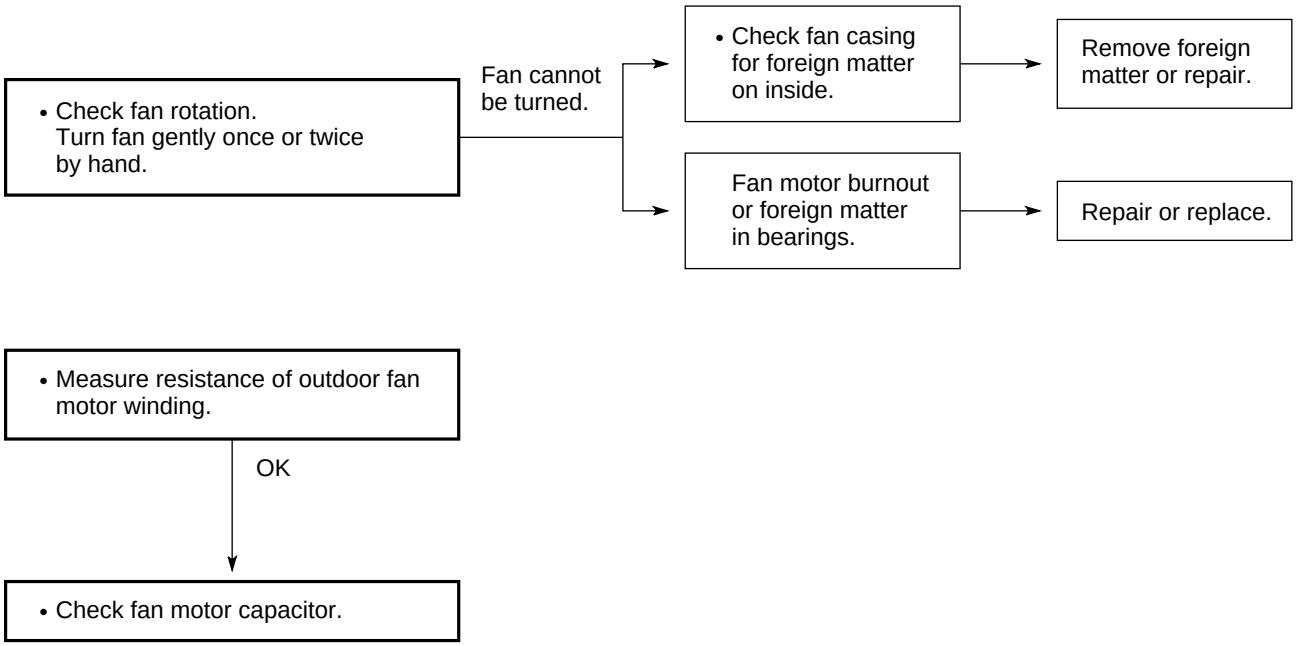
9-2-3. Only outdoor unit does not run.

Check power relay in outdoor unit.

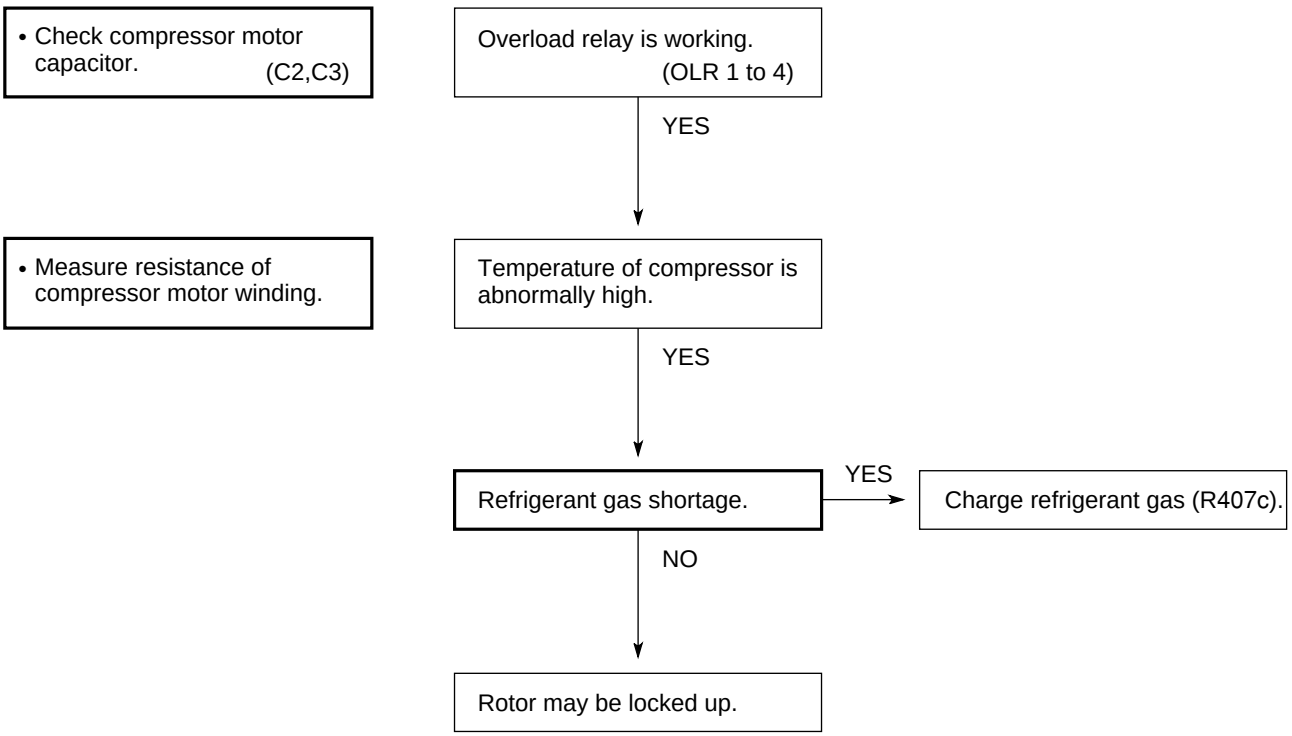


9-3. Some part of air conditioner does not operate.

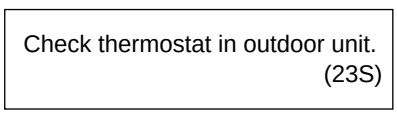
9-3-1. Only outdoor fan does not run.



9-3-2. Only compressor does not run.

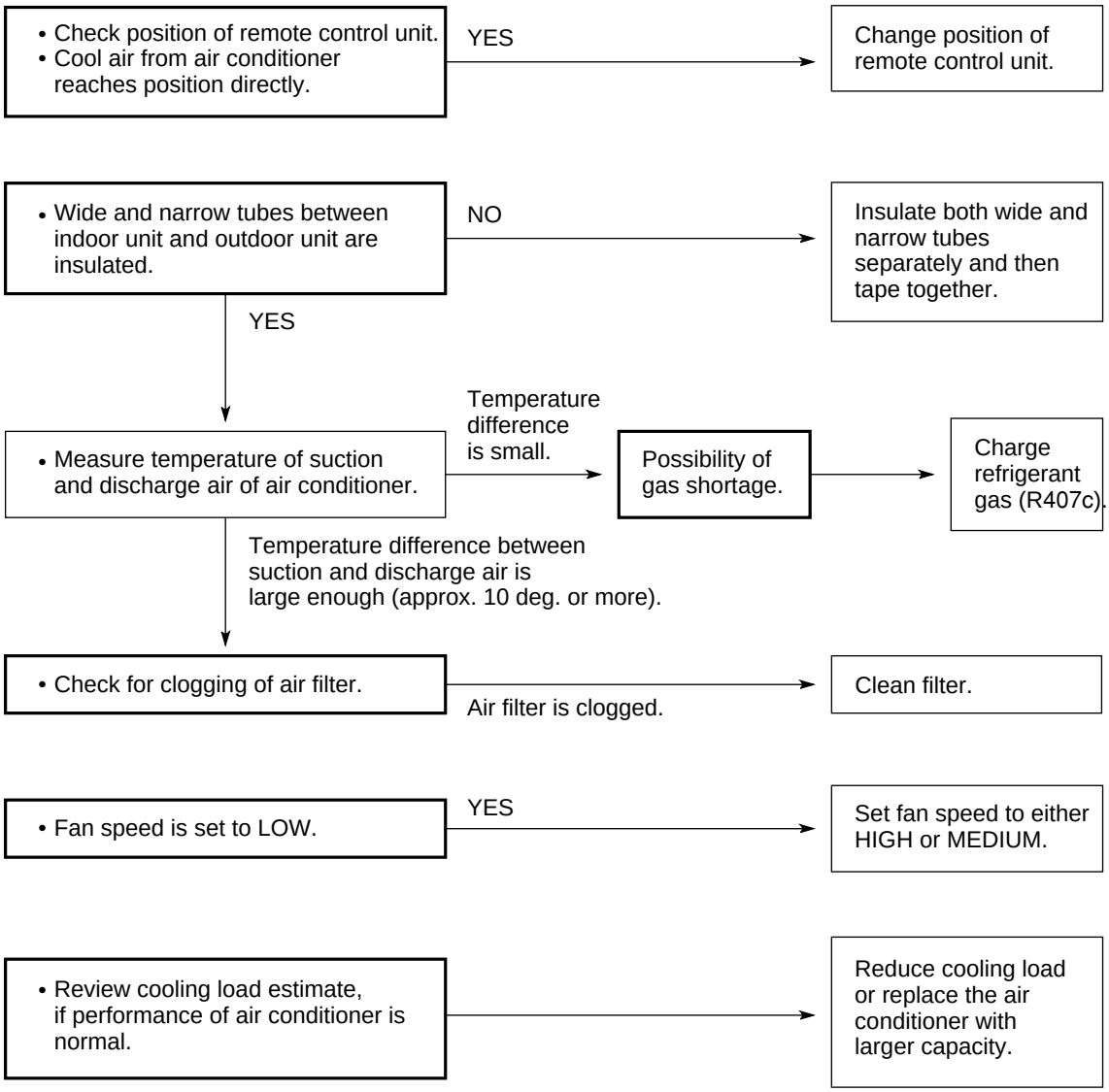


9-3-3. Function of outdoor fan speed control does not work properly.

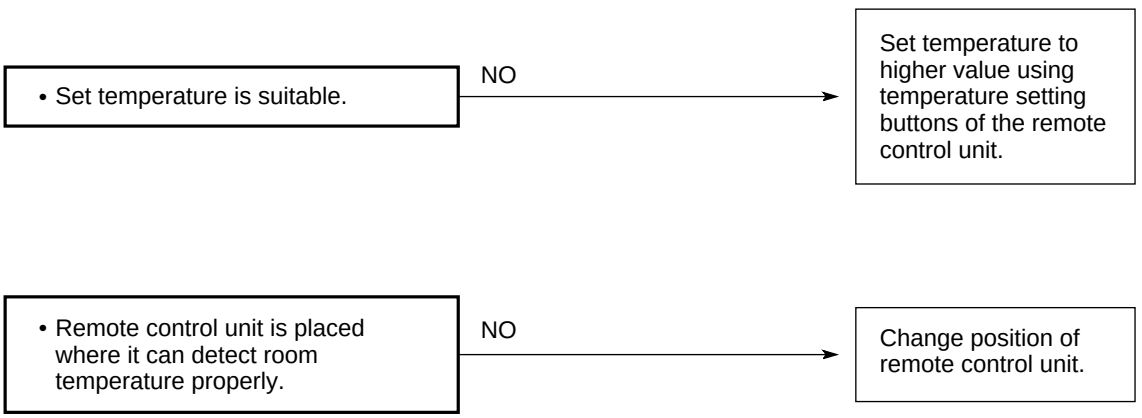


9-4. Air conditioner operates, but abnormalities are observed.

9-4-1. Poor cooling



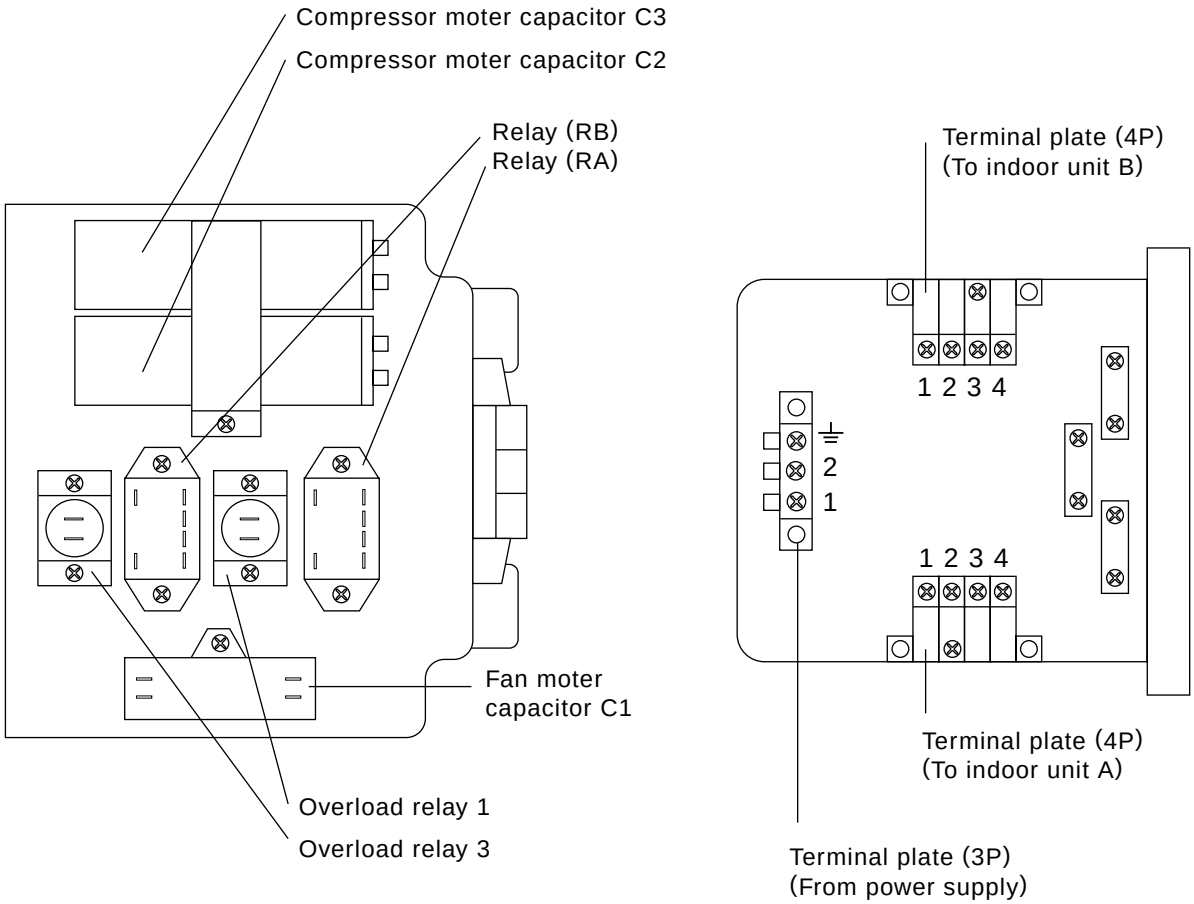
9-4-2. Excessive cooling



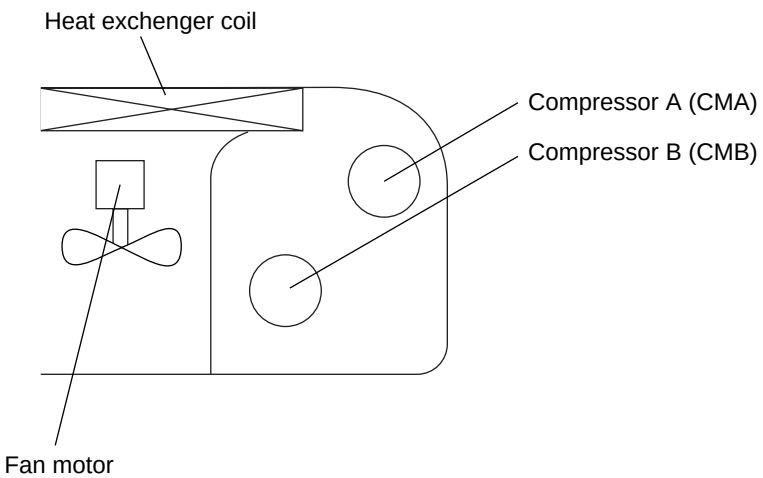
10. ARRANGEMENT OF ELECTRICAL COMPONENT

Outdoor Unit **AER524DC**

● **Electric Parts**



● **Parts Layout in Unit**



11. CHECKING ELECTRICAL COMPONENTS

11-1 Measurement of Insulation Resistance

- The insulation is in good condition if the resistance exceeds 2MΩ.

11-1-1. 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)

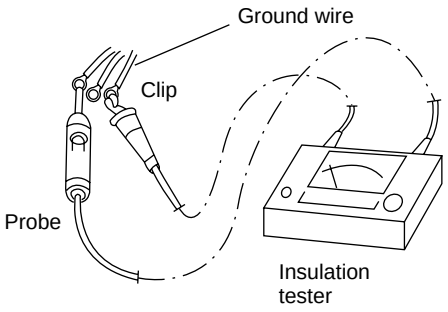


Fig.1

11-1-2. 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)

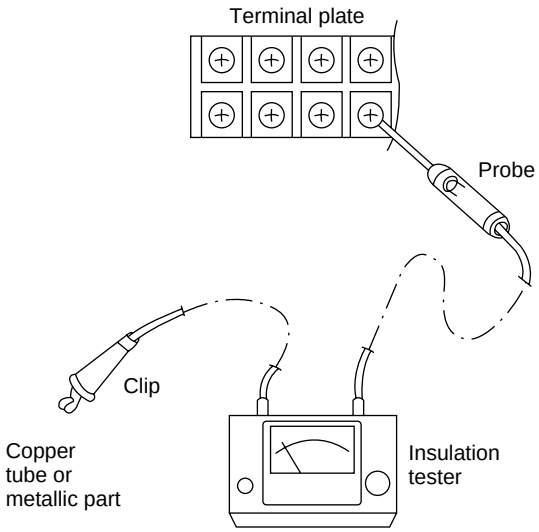


Fig.2

11-1-3. 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.

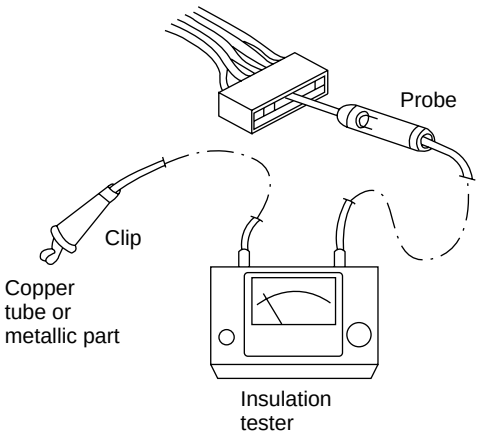


Fig.3

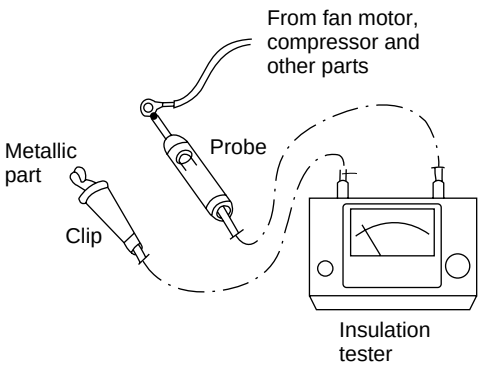


Fig.4

11-2. Checking Motor Capacitor

Remove the lead wires from the capacitor terminals, and then place a probe on the capacitor terminals as shown in Fig. 5. 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.

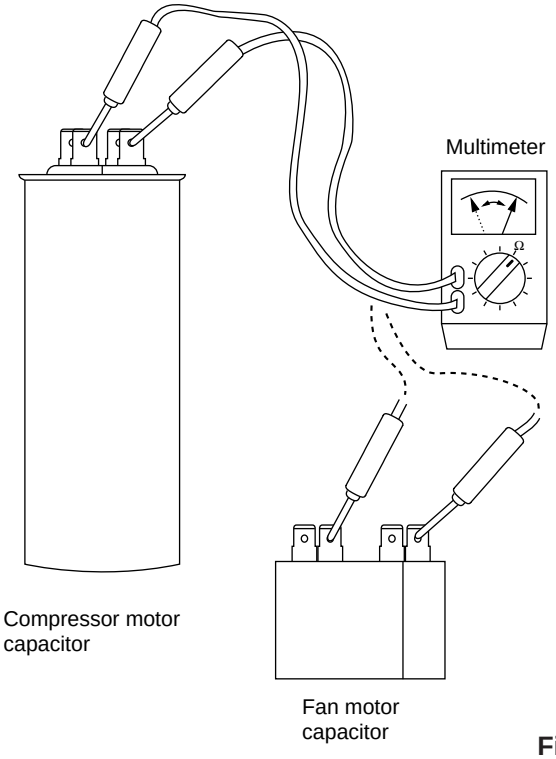


Fig.5

12. 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

12-1. 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.

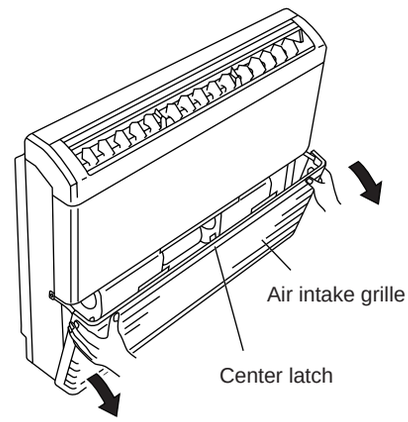


Fig.1

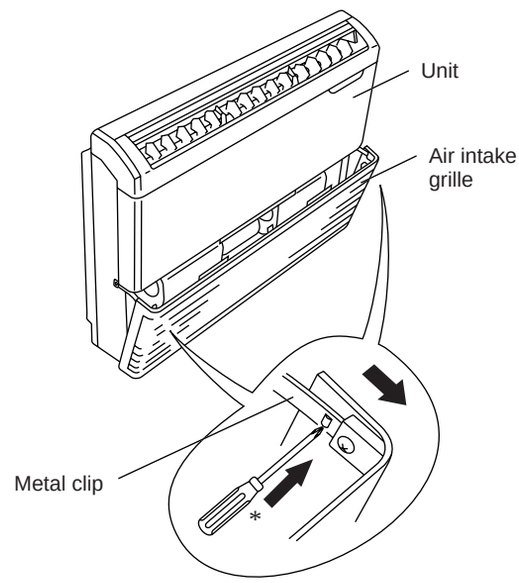


Fig.2

12-2. 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.

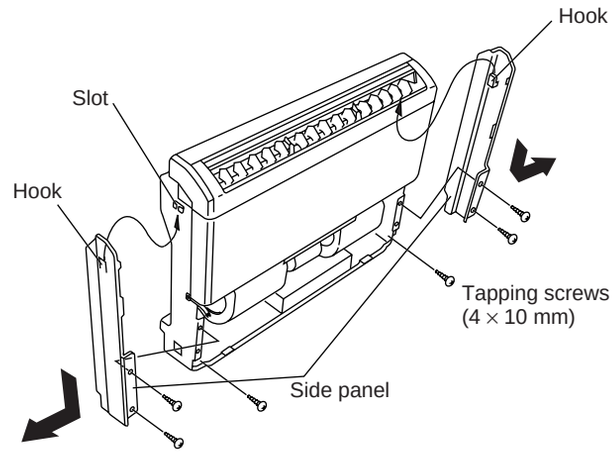


Fig.3

12-3. 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)

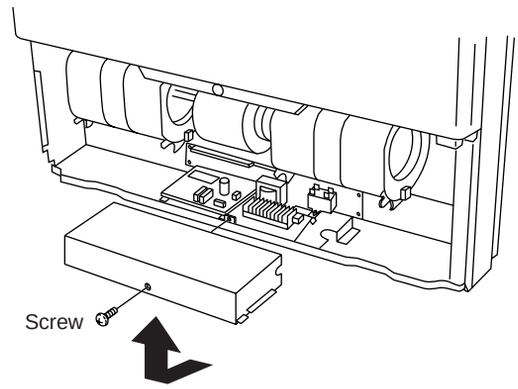


Fig.4

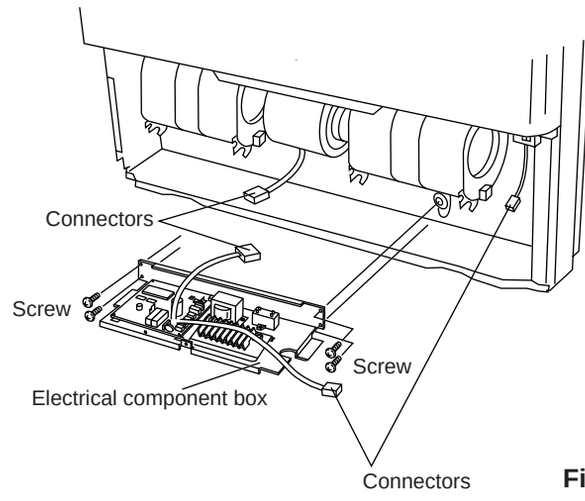


Fig.5

12-4. 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)

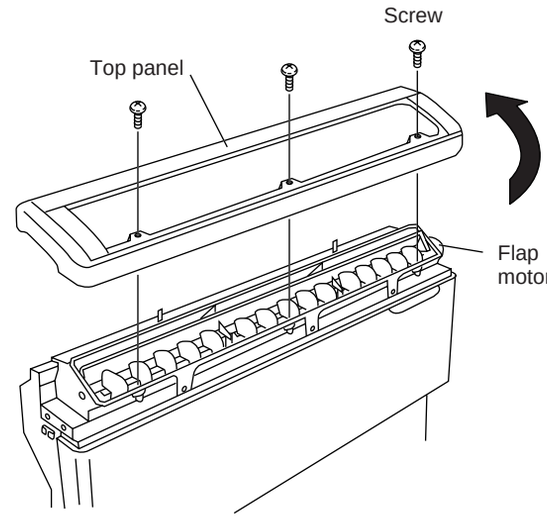


Fig.6

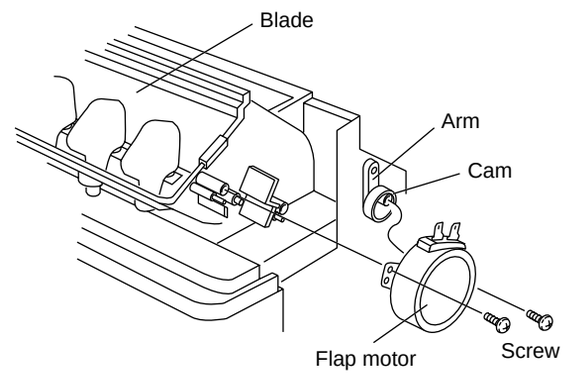


Fig.7

12-5. 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)

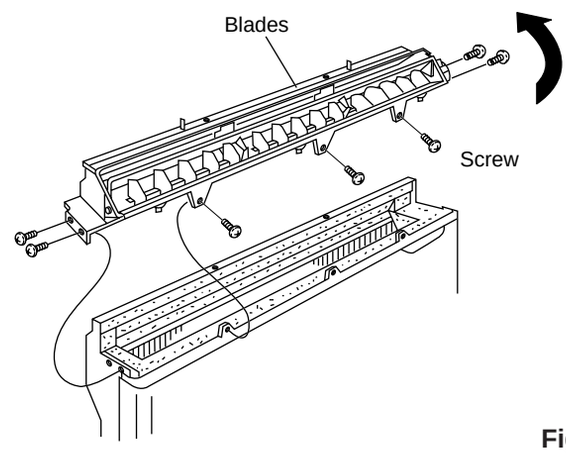


Fig.8

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

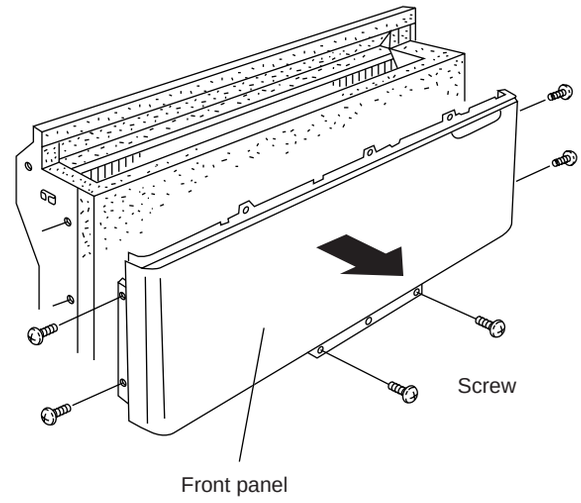


Fig.9

(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)

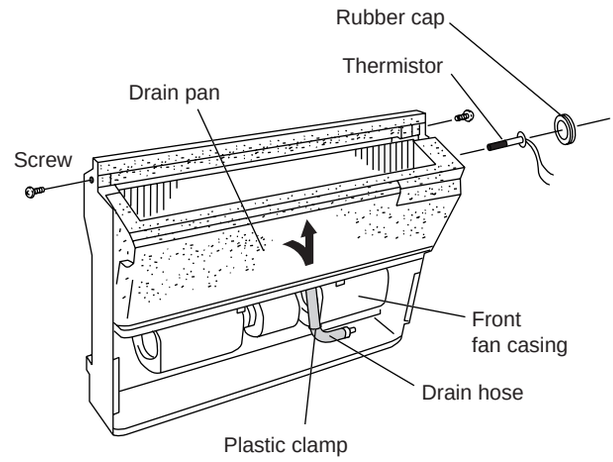


Fig.10

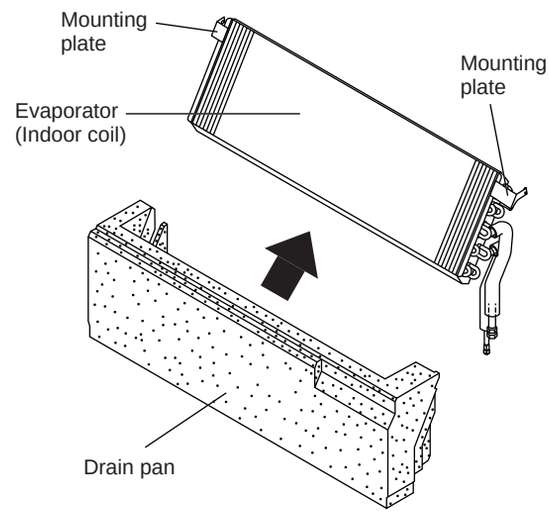


Fig.11

12-6. Removing Fan and Fan Motor

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

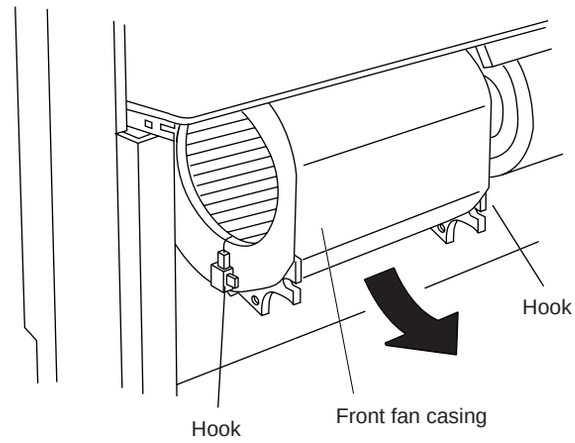


Fig.12

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

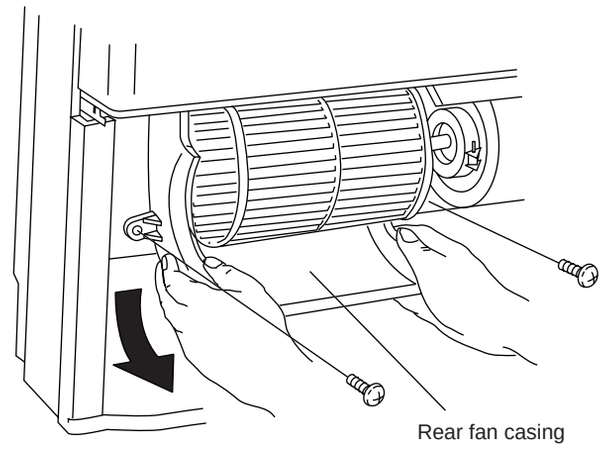


Fig.13

(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)

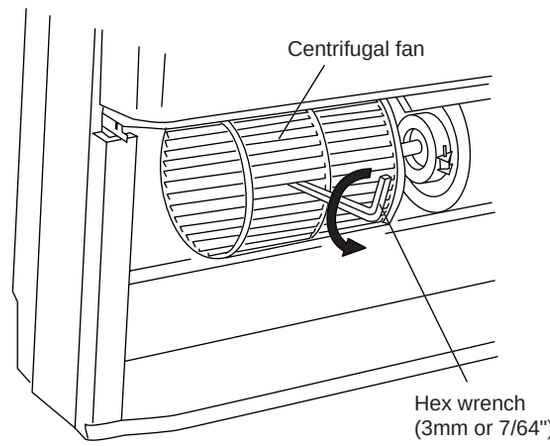


Fig.14

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

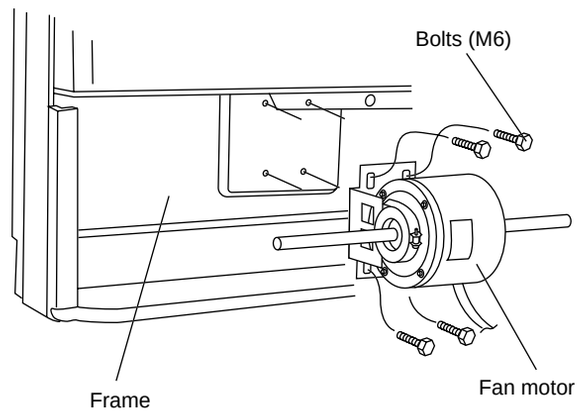


Fig.15

argoclima S.p.A.
Via Varese, 90 - 21013 Gallarate - Va - Italy
Tel. +39 0331 755111 - Fax +39 0331 776240
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