# TECHNICAL DATA & SERVICE MANUAL

**Indoor Unit**
**AWR518CL**
**FCR518CL**

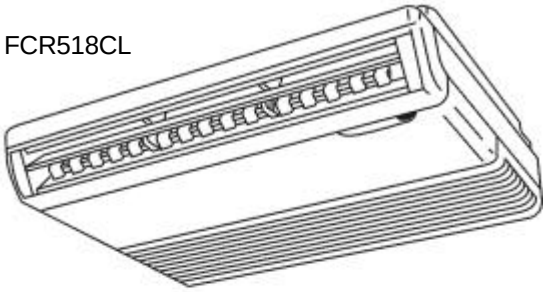
**Outdoor Unit**
**AER518SC**

Euro-Line®

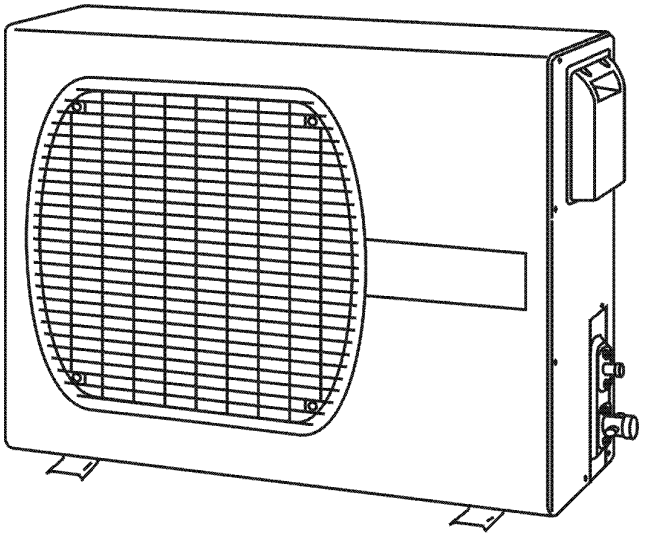
## SPLIT SYSTEM AIR CONDITIONER

● **Ceiling-Mounted**

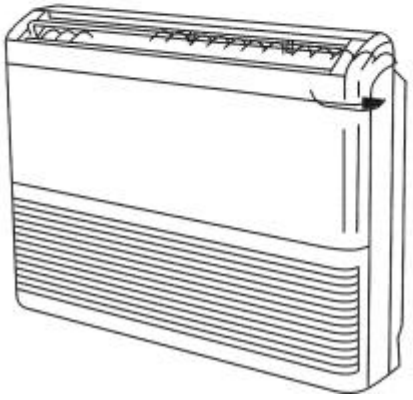
FCR518CL



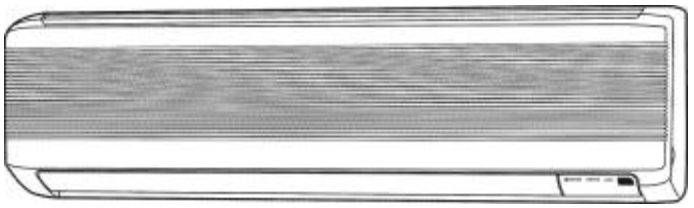
AER518SC



● **Floor-Mounted**



AWR518CL



# 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 units 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 **AWR518CL**
Outdoor Unit **AER518SC**

| | | | | | |
|---|---|---|---|---|---|
| Power Source | | | | 230 V Single phase 50Hz | |
| Voltage rating | | | V | 230 | |
| Performance | | | | Cooling | |
| | Capacity | | kW | 4.80 | |
| | | | BTU/h | 16400 | |
| | Air circulation (High) | | $m^3/h$ | 760 | |
| | Moisture removal (High) | | Liters/h | 2.2 | |
| Electrical Rating | Available voltage range | | V | 198 to 264 | |
| | Running amperes | | A | 9.1 | |
| | Power input | | W | 1950 | |
| | Power factor | | % | 93 | |
| | C.O.P. | | W/W | 2.50 | |
| | Compressor locked rotor amperes | | A | 43 | |
| 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 | |
| | Compressor | | | Rotary (Hermetic) | |
| | Refrigerant / Amount charged at shipment | | g | R407c / 1840 | |
| | Refrigerant control | | | Capillary tube | |
| | Noise Power Level | Indoor – Hi / Me / Lo | dB-A | 55 / 51/ 49 | |
| | | Outdoor – Hi | dB-A | 62 | |
| | Refrigerant tubing connections | | | Flare type | |
| | Max. allowable tubing length at shipment | | m | 7.5 | |
| | Refrigerant tube diameter | Narrow tube | mm (in.) | 6.35 (1/4) | |
| | | Wide tube | mm (in.) | 12.7 (1/2) | |
| | Refrigerant tube kit / Accessories | | | Optional / Hanging wall bracket | |
| Dimensions & Weight | | | | Indoor Unit | Outdoor Unit |
| | Unit dimensions | Height | mm | 285 | 630 |
| | | Width | mm | 995 | 830 |
| | | Depth | mm | 206 | 305 |
| | Package dimensions | Height | mm | 276 | 713 |
| | | Width | mm | 1,070 | 994 |
| | | Depth | mm | 363 | 413 |
| | Weight | Net | kg | 12.0 | 52.0 |
| | | Shipping | kg | 15.0 | 57.0 |
| | Shipping volume | | $m^3$ | 0.11 | 0.29 |

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

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

Indoor Unit **FCR518CL**
Outdoor Unit **AER518SC**

| | | | | | |
|---|---|---|---|---|---|
| Power Source | | | | 230 V Single phase 50Hz | |
| Voltage rating | | | V | 230 | |
| Performance | | | | Cooling | |
| | Capacity | | kW | 4.80 | |
| | | | BTU/h | 16400 | |
| | Air circulation (High) | | $m^3/h$ | 800 | |
| | Moisture removal (High) | | Liters/h | 2.3 | |
| Electrical Rating | Available voltage range | | V | 198 to 264 | |
| | Running amperes | | A | 9.1 | |
| | Power input | | W | 1950 | |
| | Power factor | | % | 93 | |
| | C.O.P. | | W/W | 2.5 | |
| | Compressor locked rotor amperes | | A | 43 | |
| 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 | |
| | Compressor | | | Rotary (Hermetic) | |
| | Refrigerant / Amount charged at shipment | | g | R407c / 1840 | |
| | Refrigerant control | | | Capillary tube | |
| | Noise Power Level | Indoor – Hi / Me / Lo | dB-A | 58 / 55 / 52 | |
| | | Outdoor – Hi | dB-A | 62 | |
| | Refrigerant tubing connections | | | Flare type | |
| | Max. allowable tubing length at shipment | | m | 7.5 | |
| | Refrigerant tube diameter | Narrow tube | mm (in.) | 6.35 (1/4) | |
| | | Wide tube | mm (in.) | 12.7 (1/2) | |
| | Refrigerant tube kit / Accessories | | | Optional / Hanging wall bracket | |
| Dimensions & Weight | | | | Indoor Unit | Outdoor Unit |
| | Unit dimensions | Height | mm | 680 | 630 |
| | | Width | mm | 900 | 830 |
| | | Depth | mm | 190 | 305 |
| | Package dimensions | Height | mm | 813 | 713 |
| | | Width | mm | 1011 | 994 |
| | | Depth | mm | 296 | 413 |
| | Weight | Net | kg | 23.5 | 52.0 |
| | | Shipping | kg | 30.0 | 57.0 |
| | Shipping volume | | $m^3$ | 0.24 | 0.29 |

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

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

## 2-2. Major Component Specifications

### 2-2-1. Indoor Unit

Indoor Unit **AWR518CL**

| | | | | | |
|---|---|---|---|---|---|
| Controller PCB | Part No. | | | | POW–K188E |
| | 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 ... ø88 / L746 |
| | Fan motor model ... Q´ty | | | | UF2– 31A5PA–S ... 1 |
| | No. of poles ... rpm (High) | | | | 2 ... 1,305 |
| | Nominal output | | | W | 30 |
| | Coil resistance (Ambient temp. 20°C) | | | Ω | WHT – BRN : 130.4<br>WHT – PNK : 169.8<br>– : –<br>– : –<br>– : – |
| | Safety devices | Type | | | Thermal protector |
| | | Operating temp. | Open | °C | 130 ± 8 |
| | | | Close | | Automatic reclosing |
| | Run capacitor | | | µF | 2.0 |
| | | | | VAC | 440 |
| Flap Motor | Type | | | | Stepping motor |
| | Model | | | | MP24GA2 |
| | Rating | | | | DC 12 V |
| | Coil resistance (Ambient temp. 20°C) | | | Ω | Each terminals (1–2, 1–3, 1–4, 1–5) 400 : ± 7% |
| Heat Exch. Coil | Coil | | | | Aluminum plate fin / Copper tube |
| | Rows | | | | 2 |
| | Fin pitch | | | mm | 1.3 |
| | Face area | | | m2 | 0.250 |

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Indoor Unit **FCR518CL**

| | | | | | |
|---|---|---|---|---|---|
| Controller PCB | Part No. | | | | POW–K185GS–N |
| | Controls | | | | Microprocessor |
| | Control circuit fuse | | | | 250 V – 3 A |
| Remote Control Unit | | | | | RCS – 5PN3E |
| Fan & Fan Motor | Type | | | | Centrifugal |
| | Number ... Dia. and length | | | mm | 2 ... ø 130 / L 180 |
| | Fan motor model ... Number | | | | K48410–M01417 ... 1 |
| | No. of poles ... rpm (230 V, High) | | | | 4 ... 1,140 |
| | Nominal output | | | W | 27 |
| | Coil resistance (Ambient temp. 20°C) | | | Ω | GRY – WHT : 215 ± 7%<br>WHT – VLT : 87 ± 7%<br>VLT – YEL : 87 ± 7%<br>WHT – PNK : 273 ± 7% |
| | Safety devices | Type | | | Internal thermal fuse |
| | | Operating temp. | Open | °C | 145 ± 5 |
| | | | Close | | Automatic reclosing |
| | Run capacitor | | | μF | 2.0 |
| | | | | 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 |

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Outdoor Unit **AER518SC**

| | | | | | | |
|---|---|---|---|---|---|---|
| Controller PCB | | | | | | — |
| Compressor | Type | | | | | Rotary (Hermetic) |
| | Compressor model | | | | | C–2RN150H5W 80805045 |
| | Nominal output | | | | W | 1500 |
| | Compressor oil ... Amount | | | | cc | DAPHNE FV68S ... 750 |
| | Coil resistance (Ambient temp. 25°C) | | | | Ω | C – R : 1.42<br>C – S : 4.12 |
| | Safety devices | Type | | | | Internal protector |
| | | Overload relay | | | | — |
| | | Operating temp. | Open | | °C | Automatic opening |
| | | | Close | | °C | Automatic reclosing |
| | | Operating amp.(Ambient temp. 25°C) | | | | — |
| | Run capacitor | | | | µF | 40.0 |
| | | | | | VAC | 450 |
| | Crank case heater | | | | | |
| Fan & Fan Motor | Type | | | | | Propeller |
| | Number ... Dia. | | | | mm | 1 ... ø 400 |
| | Fan motor model ... Number | | | | | Smen 19TFB6055 ... 1 |
| | No. of poles ... rpm (230 V, High) | | | | | 6 ... 910 |
| | Nominal output | | | | W | 43 |
| | Coil resistance (Ambient temp. 20°C) | | | | Ω | WHT – BRN : 77.7 ± 7%<br>WHT – YEL : 366.0 ± 7%<br>WHT – PNK : 211.0 ± 7% |
| | Safety devices | Type | | | | Thermal protector |
| | | Operating temp. | Open | | °C | 130 ± 5 |
| | | | Close | | | Automatic reclosing |
| | Run capacitor | | | | µF | 5.2 |
| | | | | | VAC | 440 |
| Heat Exch. Coil | Coil | | | | | Aluminum plate fin / Copper tube |
| | Rows | | | | | 2 |
| | Fin pitch | | | | mm | 1.8 |
| | Face area | | | | $m^2$ | 0.508 |
| External Finish | | | | | | Acrylic baked-on enamel finish |

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

## 2-3. Other Component Specifications

Indoor Unit **AWR518CL**

| **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 ± 10% |
| | | Secondary (BRN – BRN): 2.0 ± 10% |
| Thermal cut-off temp. | | 150°C |

| **Thermistor (Coil sensor)** | | **DTN-TKS131B** |
|---|---|---|
| Resistance | kΩ | 0°C 15.0 ± 2% |

| **Thermistor (Room sensor)** | | **DTN-TKS142B** |
|---|---|---|
| Resistance | kΩ | 25°C 5.0 ± 3% |

Indoor Unit **FCR518CL**

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

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

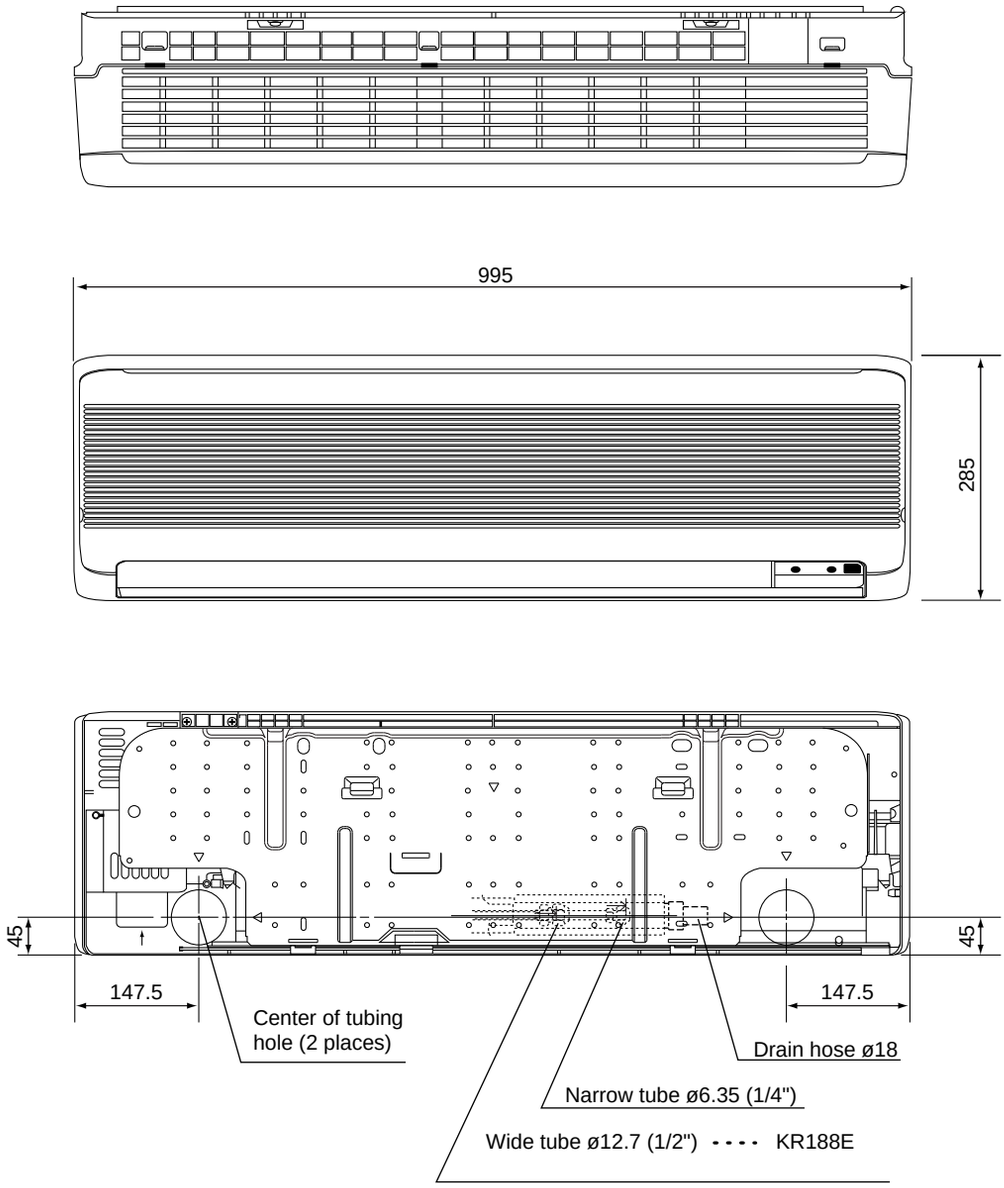
| **Transformer (TR)** | | **ATR-H85** |
|---|---|---|
| Rating | Primary | AC 230V, 50/60Hz |
| | Secondary | 11V, 0.727A |
| | Capacity | 8VA |
| Coil resistance | Ω (at 21°C) | Primary (WHT – WHT): 214 ± 10% |
| | | Secondary (BRN – BRN): 1.58 ± 10% |
| Thermal cut-off temp. | | 145°C, 2A, 250V |

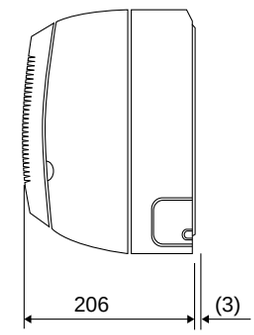
| **Power Relay** | | **G7L-2A-TUB** |
|---|---|---|
| Coil rating | | AC 200−240V, 50/60Hz |
| Coil resistance | kΩ (at 23°C) | ( 21 ± 15% ) |
| Contact rating | | AC 220V, 25A |

| **Thermostat (Fan Speed Control 23S)** | | **MQT5S-27YZJ** |
|---|---|---|
| Switching temp. | °C | high → LOW 23.5°C $^{+0}_{-2.5}$ |
| | | low → HIGH 27.0°C $^{+0}_{-3}$ |
| Contact rating | | AC 220V, 3A |

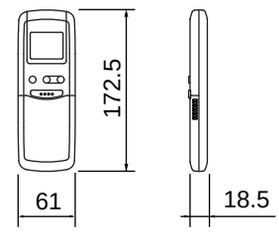
# 3. DIMENSIONAL DATA

Indoor Unit **AWR518CL**



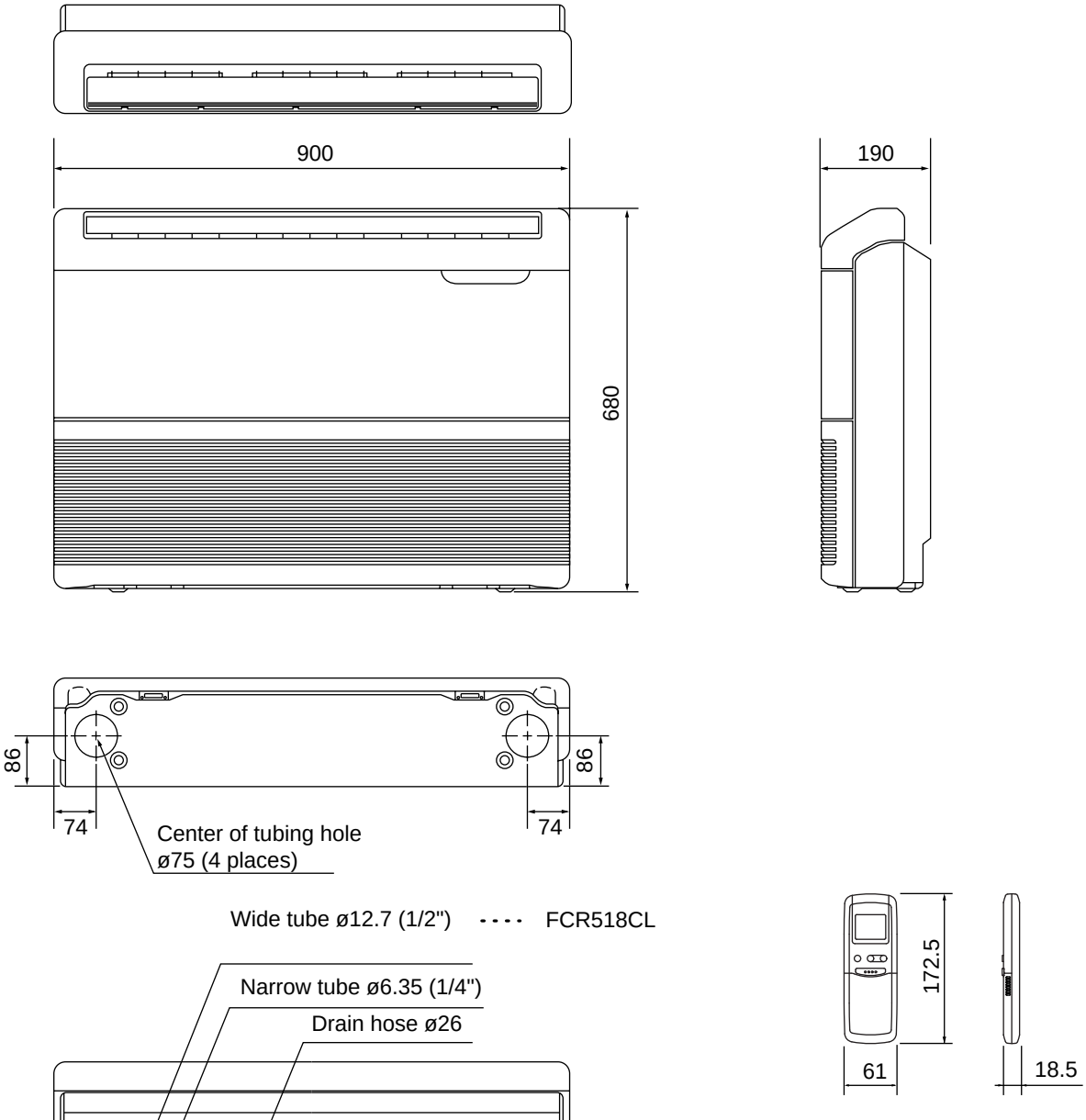




Remote control unit



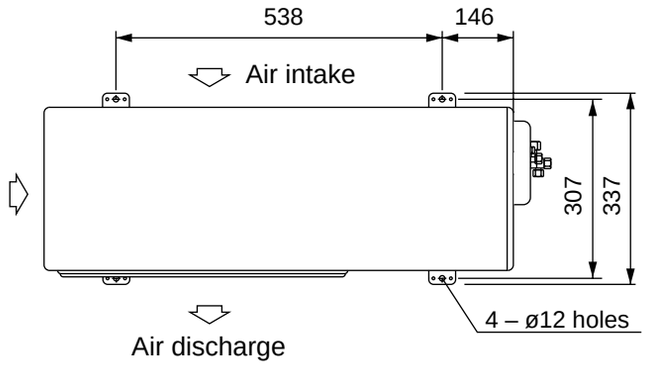

Unit : mm

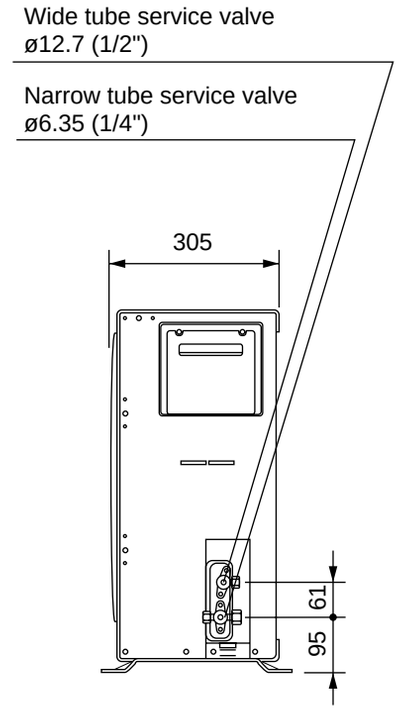
Indoor Unit **FCR518CL**

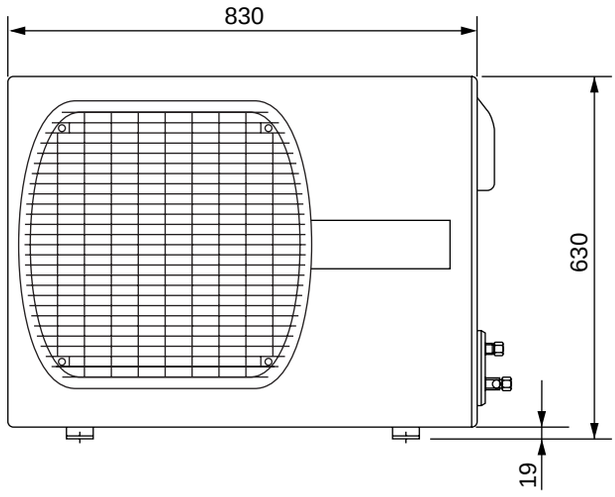



**Dimensions : mm**

Outdoor Unit **AER518SC**



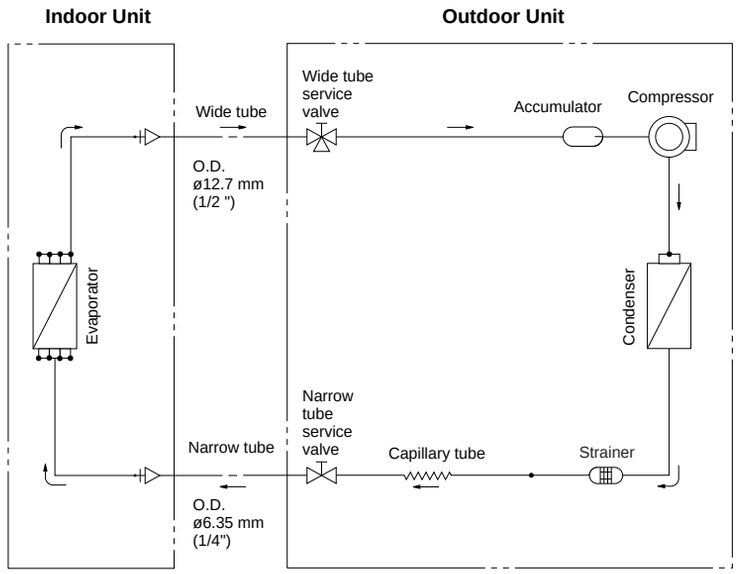




Unit : mm

# 4. REFRIGERANT FLOW DIAGRAM

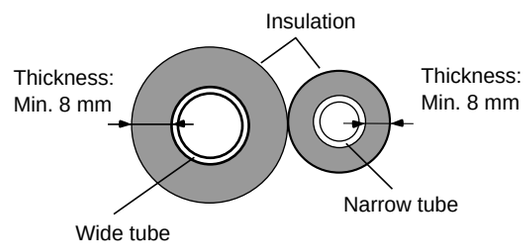
Indoor Unit **AWR518CL** Outdoor Unit **AER518SC**
**FCR518CL**




## Insulation of Refrigerant Tubing

**IMPORTANT**

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




**CAUTION**

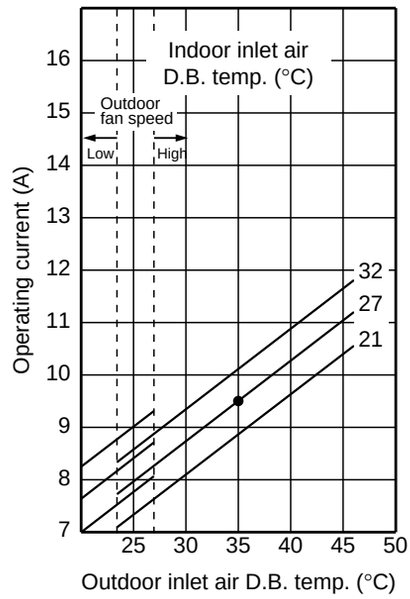
**After a tube has been insulated, never try to bend it into a narrow curve because it can cause the tube to break or crack.**

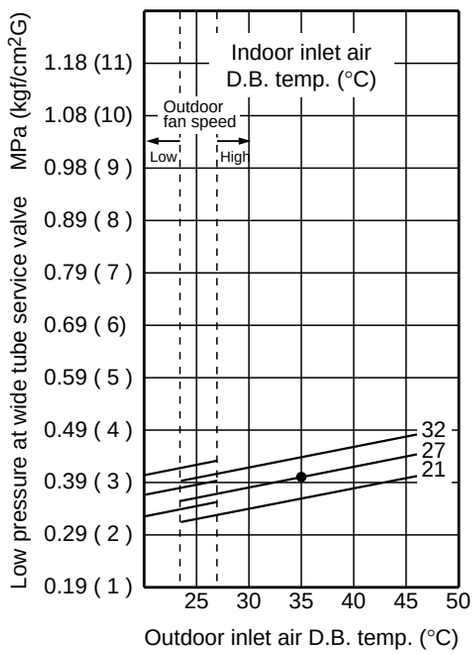
# 5. PERFORMANCE DATA

## 5-1. Performance charts

Indoor Unit **AWR518CL**
Outdoor Unit **AER518SC**

■ Cooling Characteristics




**NOTE**

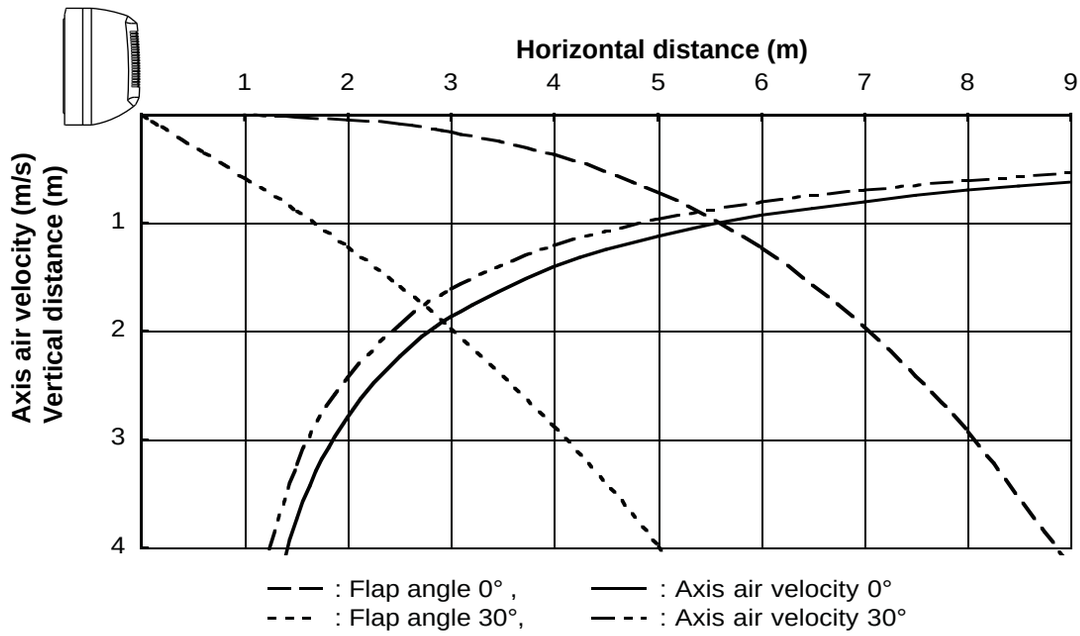
● ..... Points of Rating condition
Black dots in above charts indicate the following rating conditions.

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

## 5-2. Air Throw Distance Chart

Indoor Unit **AWR518CL**

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

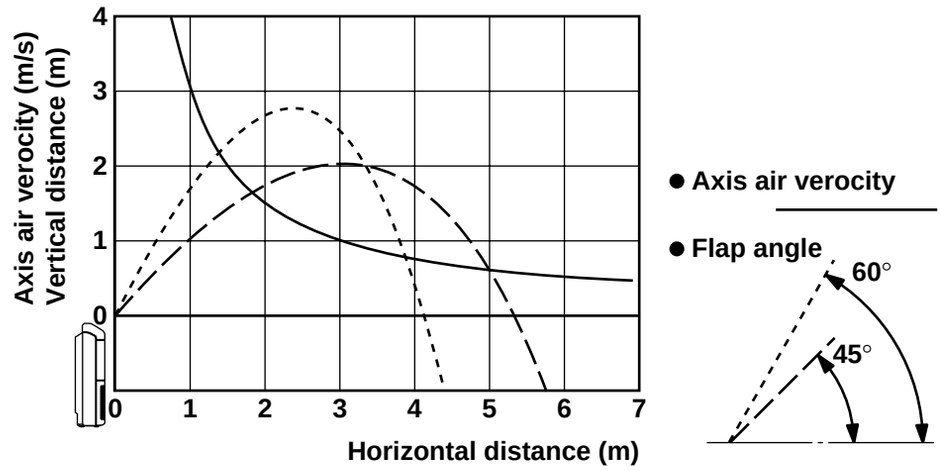


## AIR FLOW CHART

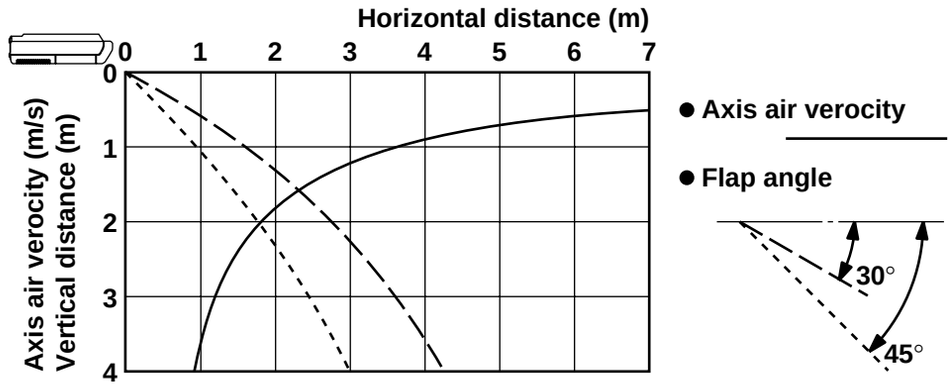
Indoor Unit **FCR518CL**

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

### ■ Floor mounted




### ■ Ceiling mounted



## 5-3. Cooling Capacity

Indoor Unit **AWR518CL**

Outdoor Unit **AER518SC**

| RATING CAPACITY 4.8 kW<br>AIR FLOW RATE 760 m³/h | | | | | | | |
|---|---|---|---|---|---|---|---|
| EVAPORATOR | | CONDENSER | | | | | |
| ENT.TEMP. °C | | OUTDOOR AMBIENT TEMP. °C | | | | | |
| W.B. | D.B. | | 25 | 30 | 35 | 40 | 43 |
| 15 | | TC | 4.55 | 4.41 | 4.21 | 3.94 | 3.64 |
| | | CM | 1.61 | 1.71 | 1.84 | 2.02 | 2.20 |
| | 21 | SHC | 3.12 | 3.06 | 2.95 | 2.83 | 2.68 |
| | 23 | SHC | 3.54 | 3.46 | 3.36 | 3.23 | 3.09 |
| | 25 | SHC | 3.94 | 3.86 | 3.76 | 3.63 | 3.49 |
| | 27 | SHC | 4.35 | 4.27 | 4.16 | 3.94 | 3.64 |
| | 29 | SHC | 4.55 | 4.41 | 4.21 | 3.94 | 3.64 |
| | 31 | SHC | 4.55 | 4.41 | 4.21 | 3.94 | 3.64 |
| 17 | | TC | 4.93 | 4.74 | 4.51 | 4.24 | 3.90 |
| | | CM | 1.64 | 1.76 | 1.89 | 2.08 | 2.26 |
| | 21 | SHC | 2.73 | 2.65 | 2.55 | 2.42 | 2.26 |
| | 23 | SHC | 3.14 | 3.05 | 2.94 | 2.82 | 2.67 |
| | 25 | SHC | 3.55 | 3.45 | 3.35 | 3.22 | 3.07 |
| | 27 | SHC | 3.96 | 3.85 | 3.75 | 3.62 | 3.47 |
| | 29 | SHC | 4.38 | 4.26 | 4.15 | 4.03 | 3.87 |
| | 31 | SHC | 4.79 | 4.65 | 4.51 | 4.24 | 3.90 |
| 19 | | TC | 5.22 | 5.04 | 4.80 | 4.51 | 4.15 |
| | | CM | 1.72 | 1.82 | 1.95 | 2.14 | 2.32 |
| | 21 | SHC | 2.29 | 2.21 | 2.11 | 1.98 | 1.84 |
| | 23 | SHC | 2.69 | 2.62 | 2.51 | 2.39 | 2.24 |
| | 25 | SHC | 3.08 | 3.02 | 2.91 | 2.80 | 2.64 |
| | 27 | SHC | 3.47 | 3.42 | 3.32 | 3.19 | 3.05 |
| | 29 | SHC | 3.86 | 3.82 | 3.71 | 3.60 | 3.44 |
| | 31 | SHC | 4.27 | 4.23 | 4.12 | 4.00 | 3.85 |
| 21 | | TC | 5.53 | 5.34 | 5.09 | 4.78 | 4.40 |
| | | CM | 1.76 | 1.87 | 2.01 | 2.20 | 2.39 |
| | 23 | SHC | 2.26 | 2.18 | 2.08 | 1.95 | 1.81 |
| | 25 | SHC | 2.64 | 2.58 | 2.48 | 2.36 | 2.21 |
| | 27 | SHC | 3.04 | 2.98 | 2.88 | 2.77 | 2.61 |
| | 29 | SHC | 3.43 | 3.38 | 3.29 | 3.16 | 3.02 |
| | 31 | SHC | 3.83 | 3.79 | 3.68 | 3.57 | 3.42 |
| 23 | | TC | 5.91 | 5.66 | 5.34 | 5.00 | 4.65 |
| | | CM | 1.80 | 1.91 | 2.06 | 2.25 | 2.45 |
| | 25 | SHC | 2.21 | 2.12 | 2.00 | 1.88 | 1.75 |
| | 27 | SHC | 2.59 | 2.51 | 2.40 | 2.27 | 2.15 |
| | 29 | SHC | 2.98 | 2.92 | 2.81 | 2.68 | 2.56 |
| | 31 | SHC | 3.41 | 3.33 | 3.20 | 3.08 | 2.96 |

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.

Indoor Unit **FCR518CL**

Outdoor Unit **AER518SC**

| RATING CAPACITY 4.8 kW<br>AIR FLOW RATE 760 m³/h | | | | | | | |
|---|---|---|---|---|---|---|---|
| EVAPORATOR | | CONDENSER | | | | | |
| ENT.TEMP. °C | | OUTDOOR AMBIENT TEMP. °C | | | | | |
| W.B. | D.B. | | 25 | 30 | 35 | 40 | 43 |
| 15 | | TC | 4.55 | 4.41 | 4.21 | 3.94 | 3.64 |
| | | CM | 1.61 | 1.71 | 1.84 | 2.02 | 2.20 |
| | 21 | SHC | 3.12 | 3.06 | 2.95 | 2.83 | 2.68 |
| | 23 | SHC | 3.54 | 3.46 | 3.36 | 3.23 | 3.09 |
| | 25 | SHC | 3.94 | 3.86 | 3.76 | 3.63 | 3.49 |
| | 27 | SHC | 4.35 | 4.27 | 4.16 | 3.94 | 3.64 |
| | 29 | SHC | 4.55 | 4.41 | 4.21 | 3.94 | 3.64 |
| | 31 | SHC | 4.55 | 4.41 | 4.21 | 3.94 | 3.64 |
| 17 | | TC | 4.93 | 4.74 | 4.51 | 4.24 | 3.90 |
| | | CM | 1.64 | 1.76 | 1.89 | 2.08 | 2.26 |
| | 21 | SHC | 2.73 | 2.65 | 2.55 | 2.42 | 2.26 |
| | 23 | SHC | 3.14 | 3.05 | 2.94 | 2.82 | 2.67 |
| | 25 | SHC | 3.55 | 3.45 | 3.35 | 3.22 | 3.07 |
| | 27 | SHC | 3.96 | 3.85 | 3.75 | 3.62 | 3.47 |
| | 29 | SHC | 4.38 | 4.26 | 4.15 | 4.03 | 3.87 |
| | 31 | SHC | 4.79 | 4.65 | 4.51 | 4.24 | 3.90 |
| 19 | | TC | 5.22 | 5.04 | 4.80 | 4.51 | 4.15 |
| | | CM | 1.72 | 1.82 | 1.95 | 2.14 | 2.32 |
| | 21 | SHC | 2.29 | 2.21 | 2.11 | 1.98 | 1.84 |
| | 23 | SHC | 2.69 | 2.62 | 2.51 | 2.39 | 2.24 |
| | 25 | SHC | 3.08 | 3.02 | 2.91 | 2.80 | 2.64 |
| | 27 | SHC | 3.47 | 3.42 | 3.32 | 3.19 | 3.05 |
| | 29 | SHC | 3.86 | 3.82 | 3.71 | 3.60 | 3.44 |
| | 31 | SHC | 4.27 | 4.23 | 4.12 | 4.00 | 3.85 |
| 21 | | TC | 5.53 | 5.34 | 5.09 | 4.78 | 4.40 |
| | | CM | 1.76 | 1.87 | 2.01 | 2.20 | 2.39 |
| | 23 | SHC | 2.26 | 2.18 | 2.08 | 1.95 | 1.81 |
| | 25 | SHC | 2.64 | 2.58 | 2.48 | 2.36 | 2.21 |
| | 27 | SHC | 3.04 | 2.98 | 2.88 | 2.77 | 2.61 |
| | 29 | SHC | 3.43 | 3.38 | 3.29 | 3.16 | 3.02 |
| | 31 | SHC | 3.83 | 3.79 | 3.68 | 3.57 | 3.42 |
| 23 | | TC | 5.91 | 5.66 | 5.34 | 5.00 | 4.65 |
| | | CM | 1.80 | 1.91 | 2.06 | 2.25 | 2.45 |
| | 25 | SHC | 2.21 | 2.12 | 2.00 | 1.88 | 1.75 |
| | 27 | SHC | 2.59 | 2.51 | 2.40 | 2.27 | 2.15 |
| | 29 | SHC | 2.98 | 2.92 | 2.81 | 2.68 | 2.56 |
| | 31 | SHC | 3.41 | 3.33 | 3.20 | 3.08 | 2.96 |

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.

# 6. ELECTRICAL DATA

## 6-1. Electrical Characteristics

Indoor Unit **AWR518CL**
Outdoor Unit **AER518SC**

| | | | Indoor Unit | Outdoor Unit | | Complete Unit |
|---|---|---|---|---|---|---|
| | | | Fan Motor | Fan Motor | Compressor | |
| Performance at | | | 230V Single phase 50Hz | | | |
| Rating Conditions | Running Amps. | A | 0.37 | 0.50 | 8.23 | 9.1 |
| | Power Input | kW | 0.070 | 0.093 | 1.78 | 1.95 |
| Full Load Conditions | Running Amps. | A | 0.37 | 0.50 | 9.63 | 10.5 |
| | Power Input | kW | 0.070 | 0.093 | 2.13 | 2.30 |

Rating Conditions : Indoor Air Temperature 27℃ D.B. / 19℃ W.B.
Outdoor Air Temperature 35℃ D.B.
Full Load Conditions : Indoor Air Temperature 32℃ D.B. / 23℃ W.B.
Outdoor Air Temperature 46° C D.B.

Indoor Unit **FCR518CL**
Outdoor Unit **AER518SC**

| | | | Indoor Unit | Outdoor Unit | | Complete Unit |
|---|---|---|---|---|---|---|
| | | | Fan Motor | Fan Motor | Compressor | |
| Performance at | | | 230V Single phase 50Hz | | | |
| Rating Conditions | Running Amps. | A | 0.33 | 0.50 | 8.27 | 9.1 |
| | Power Input | kW | 0.070 | 0.093 | 1.78 | 1.95 |
| Full Load Conditions | Running Amps. | A | 0.33 | 0.50 | 9.67 | 10.5 |
| | Power Input | kW | 0.070 | 0.093 | 2.13 | 2.30 |

Rating Conditions : Indoor Air Temperature 27℃ D.B. / 19℃ W.B.
Outdoor Air Temperature 35℃ D.B.
Full Load Conditions : Indoor Air Temperature 32℃ D.B. / 23℃ W.B.
Outdoor Air Temperature 46℃ D.B.

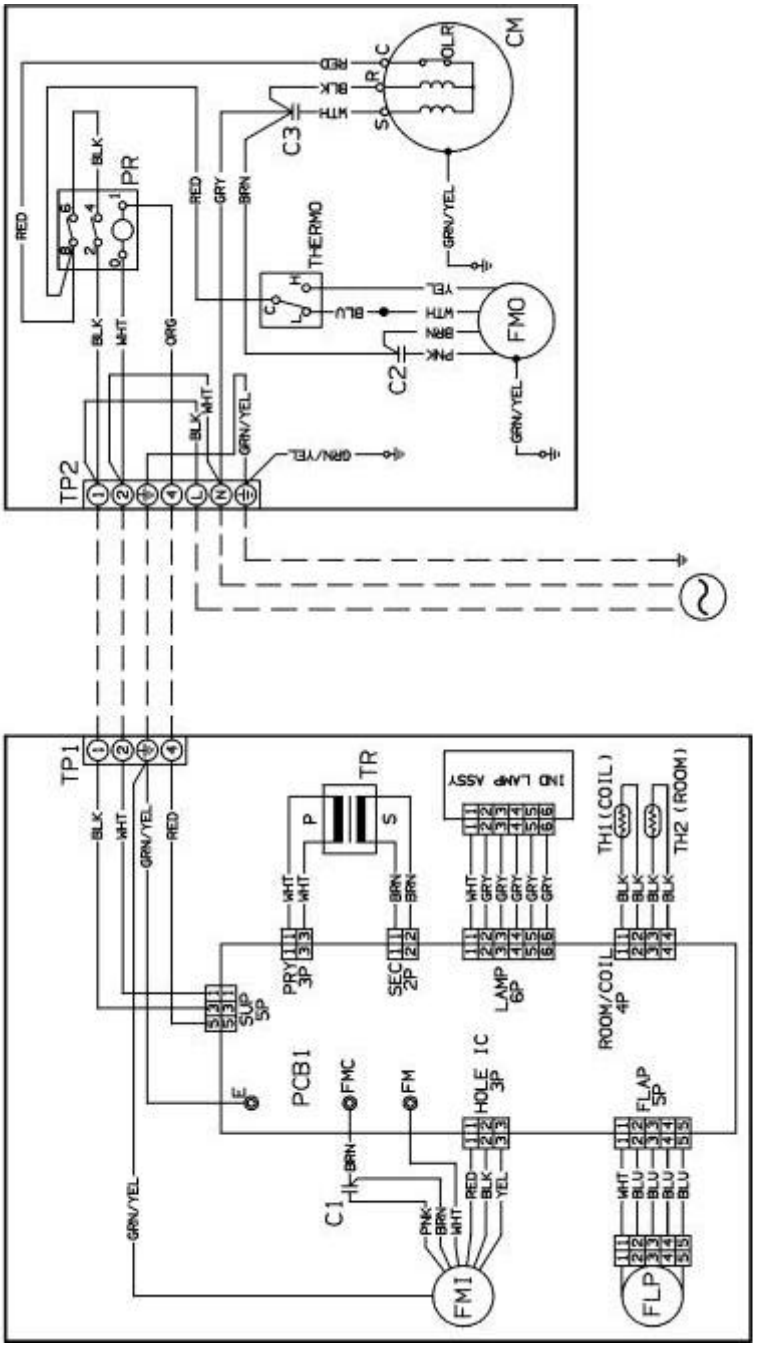
## 6-2 Electric Wiring Diagrams

Indoor Unit **AER518CL**

Outdoor Unit **AER518SC**

**WARNING**

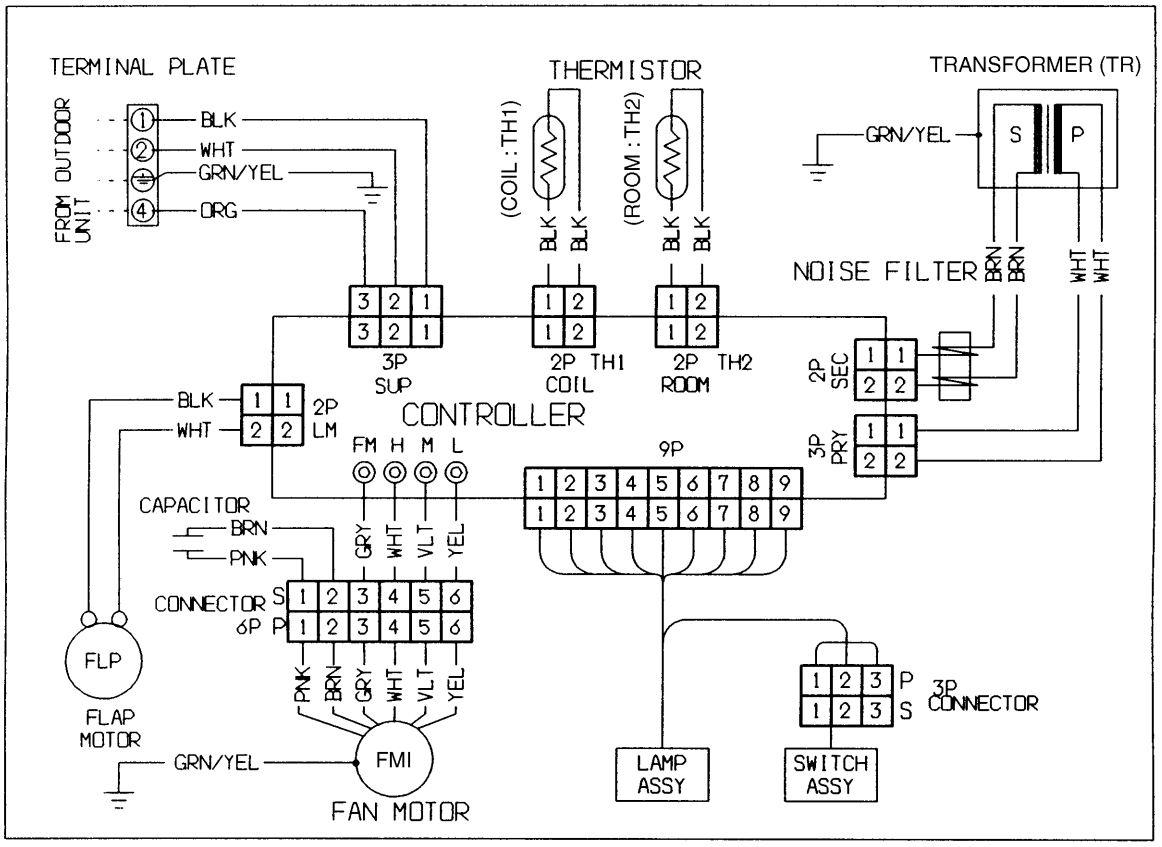
***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing and/or cleaning any electrical parts***



Indoor Unit **FCR518CL**

**WARNING**

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



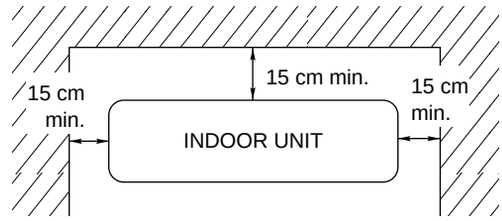
# 7. INSTALLATION INSTRUCTIONS

## 7-1. Installation Site Selection

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.**




**Front View**

**Fig.1**

**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. 1)
- install the unit within the maximum elevation difference (H) above or below the outdoor unit and within a total tubing length (L) from the outdoor unit as detailed Table 1 and Fig. 2a.

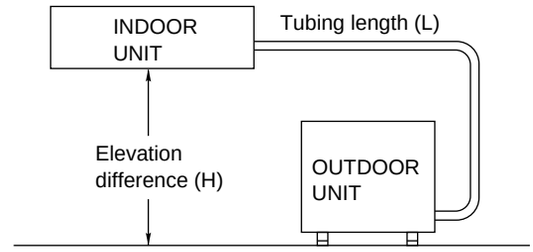



**Fig. 2a**

**CAUTION**

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

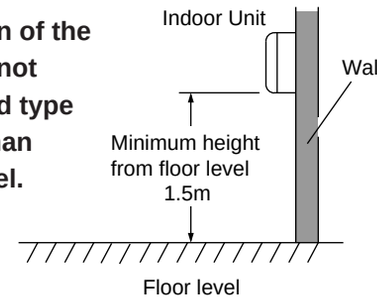



**Fig. 2b**

**Table 1**

| Model | 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)* |
|---|---|---|---|---|
| AER518SC | 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.

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 to 4b
- 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.

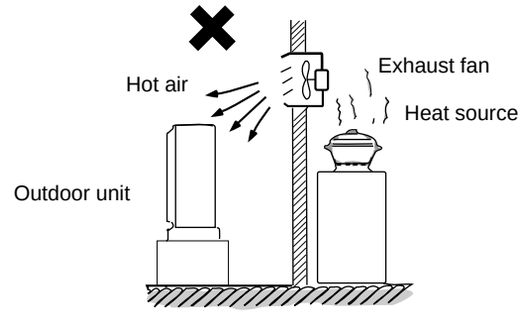
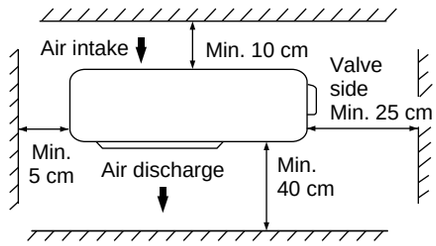



**Fig. 3**

**Required space around the unit.**

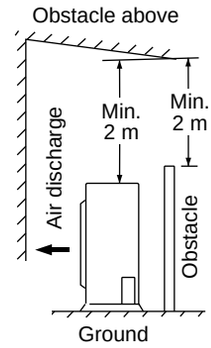
AER518SC mod.




**Top View**

**Fig. 4a**

AER518SC mod.




**Side View**

**Fig. 4c**

AER518SC mod.

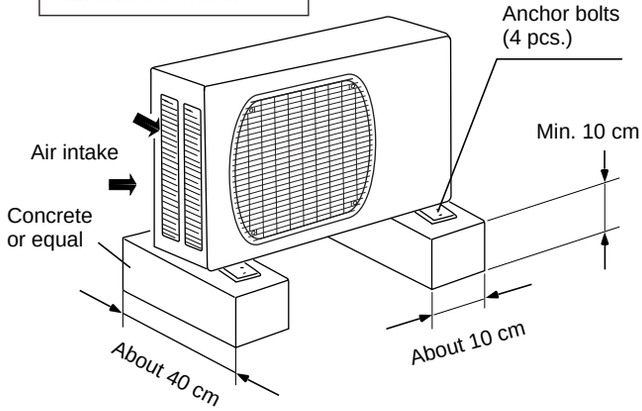



**Fig. 5a**

## 7-2. 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**

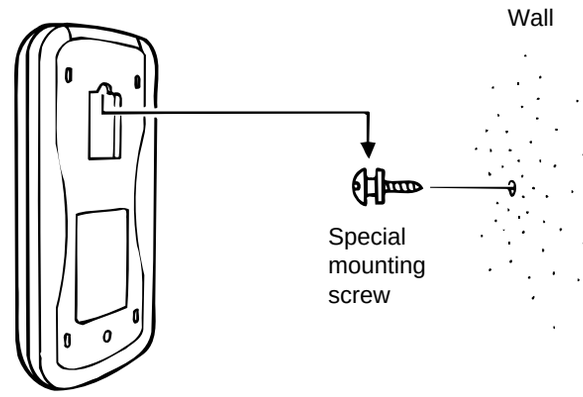



**Fig.6a**

**Non-removable mounting**

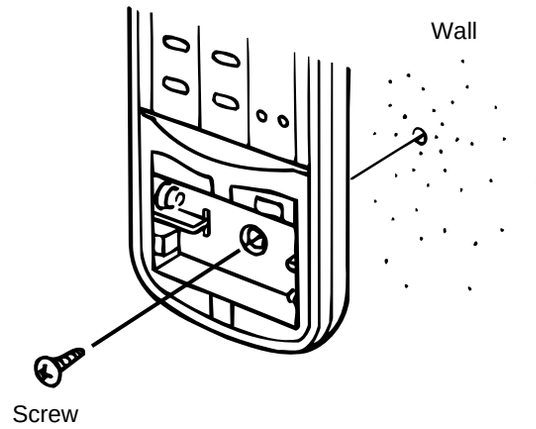



**Fig.6b**

## 7-3. Recommended Wire Length and Size

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 cross section area for power supply systems.

**NOTE**

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

**Table 2**

| Cross-Sectional Area ($mm^2$) / Model | (A) Power Supply Wiring Length (m) | (B) Power Line | Fuse or Circuit Breaker Capacity |
|---|---|---|---|
| | 2.5 $mm^2$ | 2.5 $mm^2$ | |
| AER518SC | 22 | 20 | 20 A |

**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.**

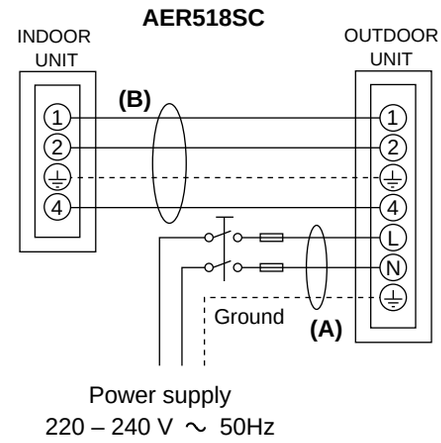
**WARNING**

**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.**

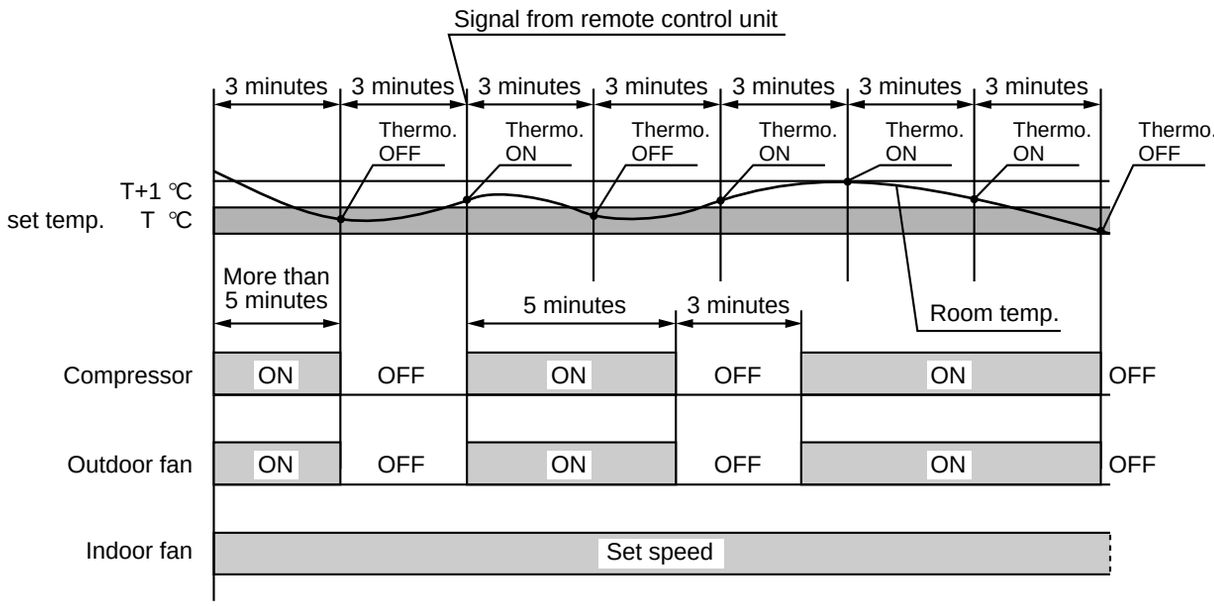
**WIRING SYSTEM DIAGRAM**



# 8. FUNCTION

## 8-1. Room Temperature Control

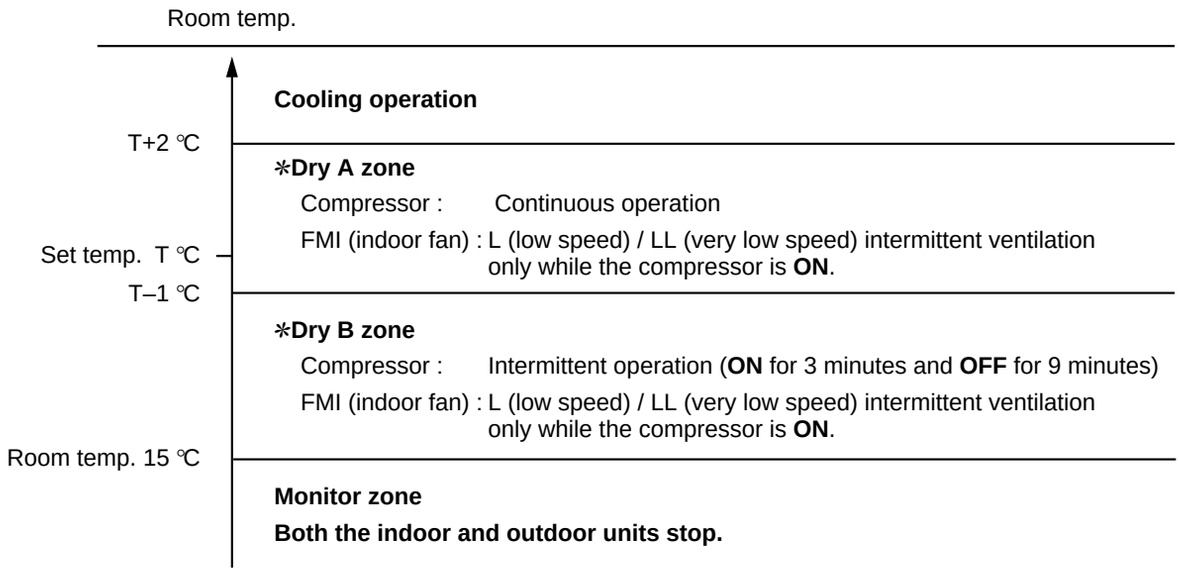
- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.
- The room temperature (and other information) is transmitted every 3 minutes by the remote control unit to the controller in the indoor unit.




- 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.

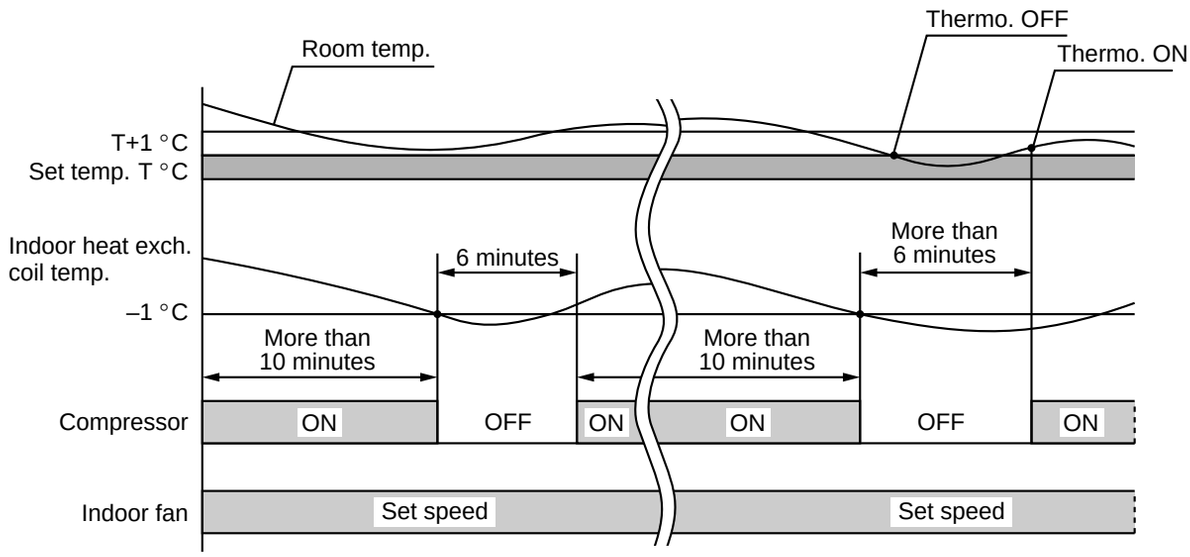



**NOTE**

- 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.

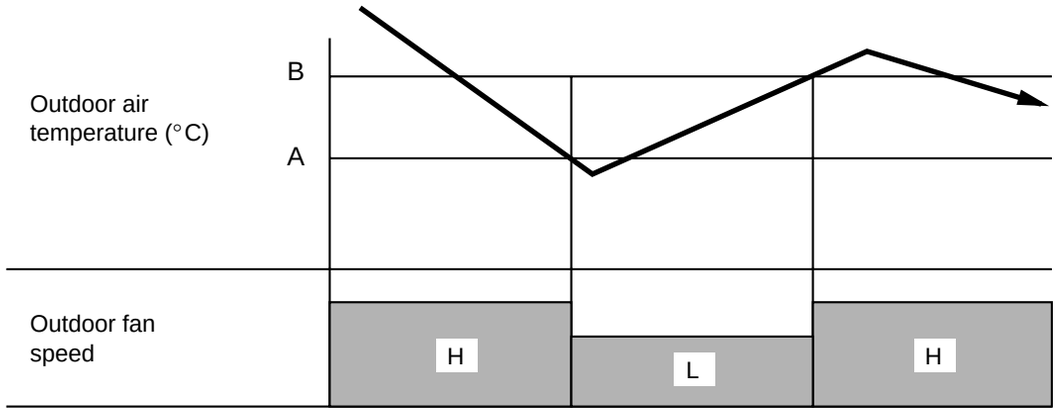
## 8-3. Freeze Prevention

- This function prevents freezing of the indoor heat exchange coil.
- When the compressor has been running for 10 minutes 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.



## 8-4. Outdoor Fan Speed Control

- To optimize performance of the air conditioner, the outdoor fan speed is switched automatically according to the outdoor temperature.
- If the outdoor air temperature falls below **A**°C, the fan speed switches to LOW.
- If the outdoor air temperature rises above **B**°C, the fan speed switches to HIGH.




**NOTE** The operating temperature shown as **A** and **B** in the chart differ by models.

| Models | A | B |
|---|---|---|
| AER518SC | 23.5°C | 27.0°C |
| | | |

# 9. REFRIGERANT R407C : SPECIAL PRECAUTIONS WHEN SERVICING UNIT

## 9-1. Characteristics of new refrigerant R407C

### 9-1-1. 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**

### 9-1-2. Components (mixing proportions)

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

### 9-1-3. 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.**

## 9-2. 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.

## 9-3. Tools specifically for R407C

### ● For servicing, use the following tools for R407C

| Tool Distinction | Tool Name |
|---|---|
| Tools specifically for R407C | • Gauge manifold<br>• Charging hose<br>• Gas leak detector<br>• Refrigerant cylinder<br>• Charging cylinder<br>• Refrigerant recovery unit<br>• Vacuum pump with anti-reverse flow **(✻1)**<br>(Solenoid valve-installed type, which prevents oil from flowing back into the unit when the power is off, is recommended.)<br>• Vacuum pump **(✻2)** ..... can be used if the following adapter is attached.<br>• Vacuum pump adapter (reverse-flow prevention adapter) **(✻3)**.<br>(Solenoid valve-installed adapter attached to a conventional vacuum pump.)<br>• Electronic scale for charging refrigerant<br>• Flare tool |
| Tools which can be commonly used for R22 and R407C | • Bender<br>• Torque wrench<br>• Cutter, Reamer<br>• 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.**

## 9-4. 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.

## 9-5. 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 "9-3. Tools specifically for R407C".**

### 9-5-1.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**

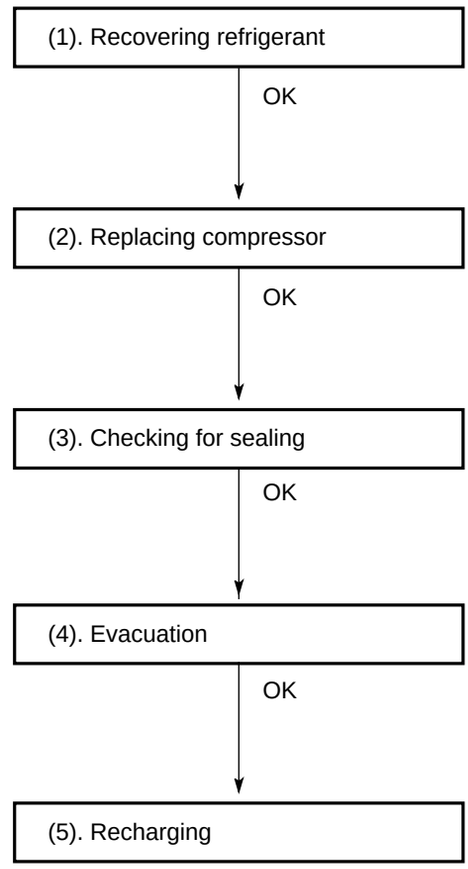
- Soon after removing pinched pipes of both discharge and suction tubes of the new compressor, replace it quickly.

(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.***

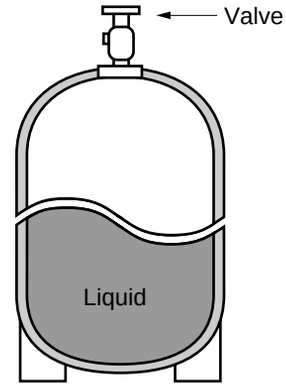
- If using a charging cylinder, transfer the specified amount of liquid refrigerant from the refrigerant cylinder to the charging cylinder.

  Prepare an evacuated charging cylinder beforehand.

**CAUTION**

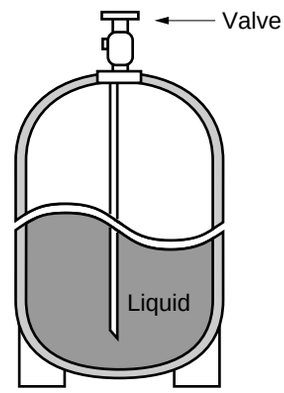
- **To prevent the composition of R407C from changing, never bleed the refrigerant gas into the atmosphere while transferring the refrigerant. (Fig. 3)**

***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**

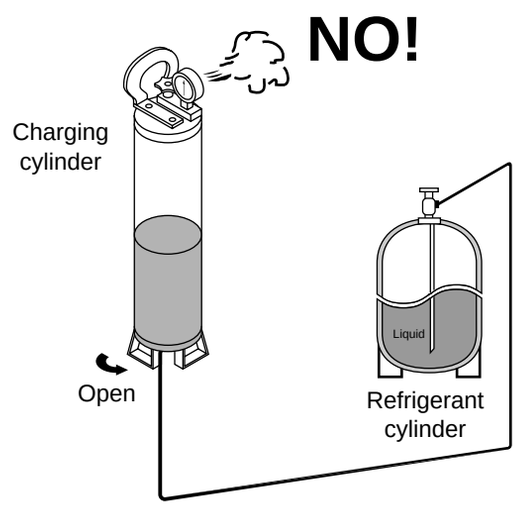



**Fig.3**

## 9-6. 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**

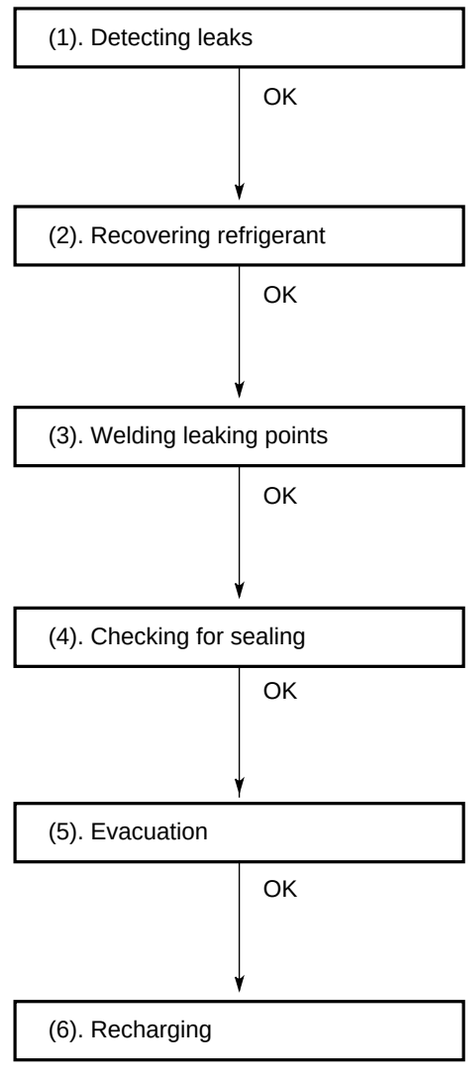
- Confirm again that no residual refrigerant exists in the unit before starting welding.
- Weld securely using flux and wax for R407C.
- Prevent oxide film from forming inside the tubes utilizing substitution with nitrogen (N2) in the refrigerant circuit of the unit. Leave ends of tubes open during welding.

(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.

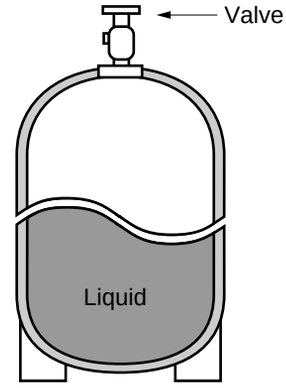
- If using a charging cylinder, transfer the specified amount of liquid refrigerant from the refrigerant cylinder to the charging cylinder.

  Prepare an evacuated charging cylinder beforehand.

**CAUTION**

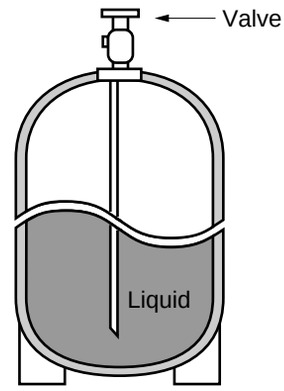
- **To prevent the composition of R407C from changing, never bleed the refrigerant gas into the atmosphere while transferring the refrigerant. (Fig. 6)**

***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**

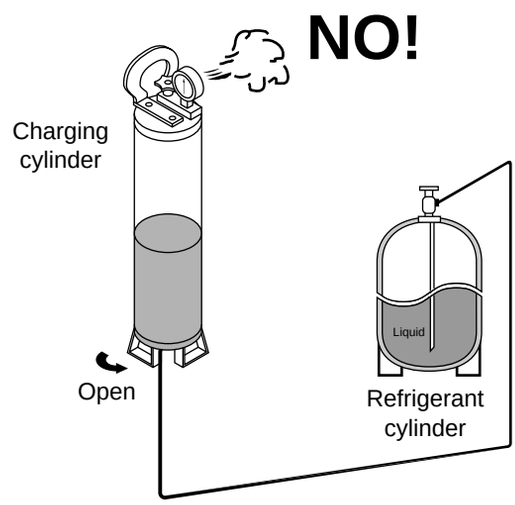



**Fig. 6**

## 9-7. Charging additional refrigerant

### 9-7-1.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 "9-6. In case refrigerant is leaking" and completely carry out repairs. Only then should you recharge the refrigerant.**

## 9-8. Retro-fitting existing systems

### 9-8-1 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.

### 9-8-2 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.

# 10. TROUBLESHOOTING

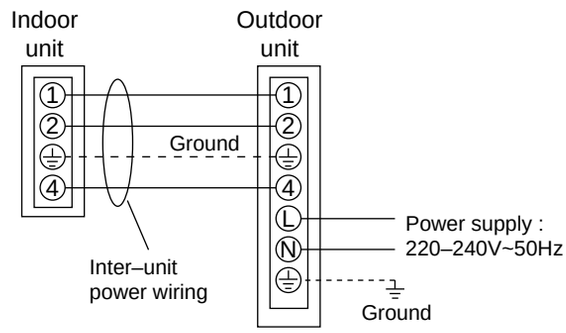
## 10-1. Check before and after troubleshooting

**WARNING**

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

### 10-1-1. Check power supply wiring.

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




### 10-1-2. Check inter-unit wiring.

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

### 10-1-3. Check power supply.

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

### 10-1-4. 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.

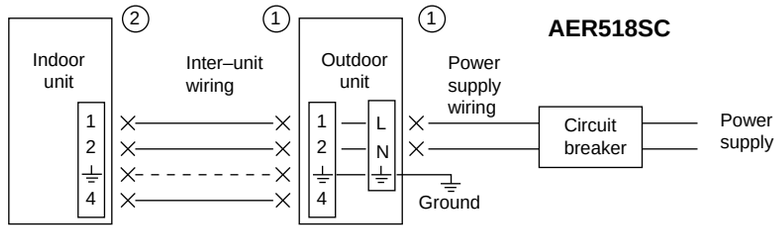
# 10-2. Air conditioner does not operate.

## 10-2-1. 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”).




**WARNING**

* **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.

- Check capacity of circuit breaker.

  Capacity of circuit breaker is suitable.

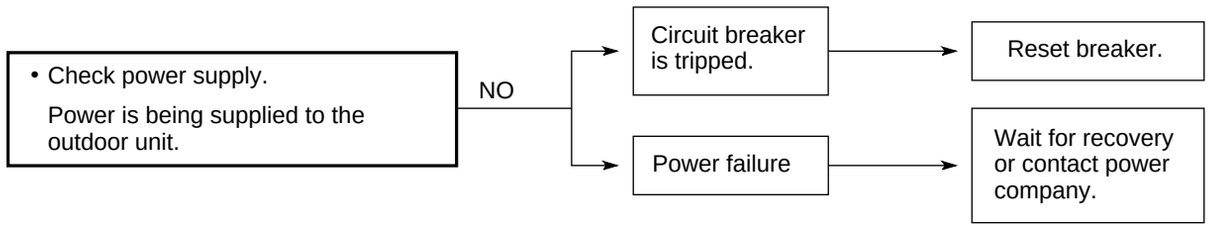
NO → Replace with suitable one (larger capacity).

- Measure resistance of outdoor fan motor winding.

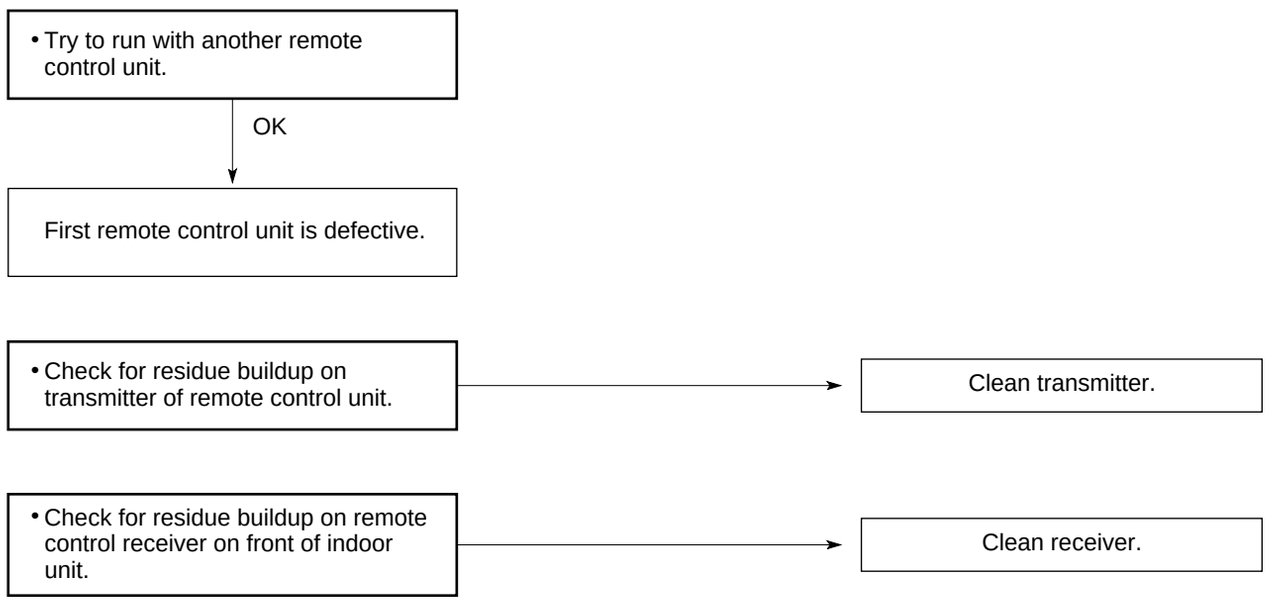
- Measure resistance of compressor motor winding.

## 10-2-2. Neither indoor nor outdoor unit runs.

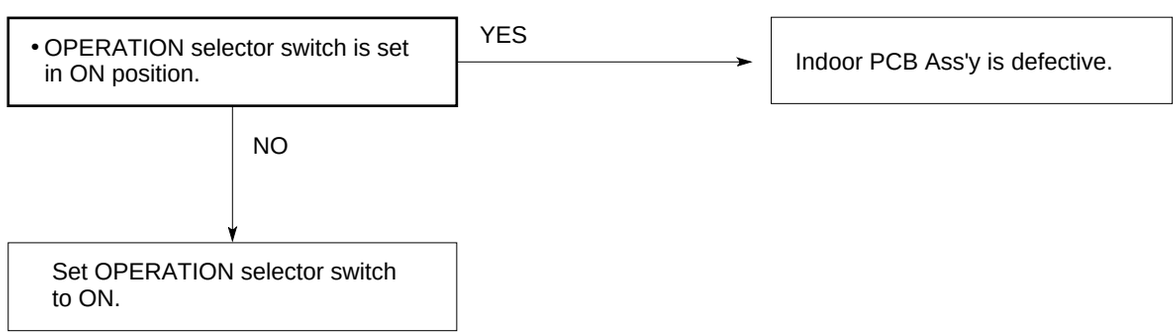
### A. Power is not supplied.



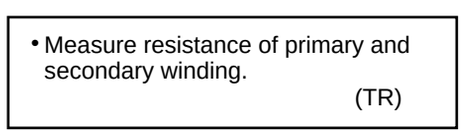

### B. Check remote control unit.



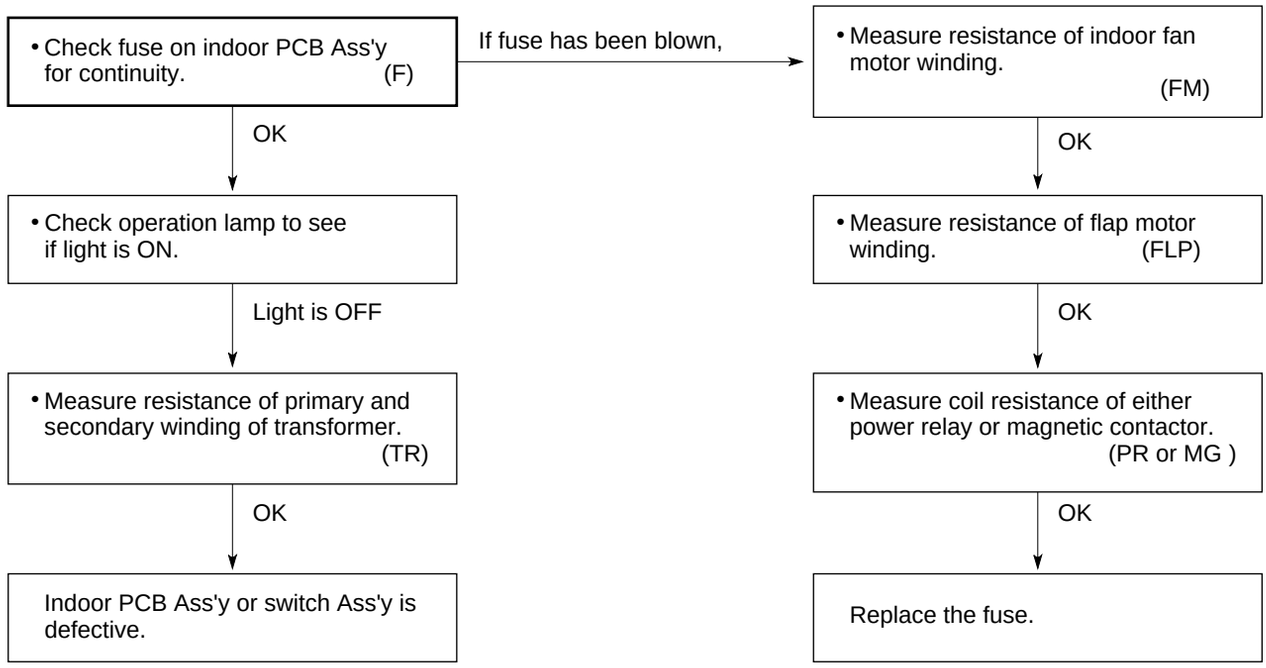

### C. Check "OPERATION selector" switch in the indoor unit.




### D. Check transformer in indoor unit.



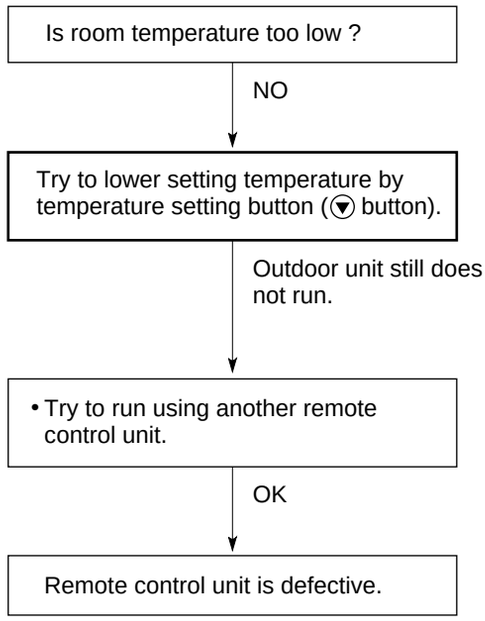
### E. Check fuse on the indoor PCB Ass'y.



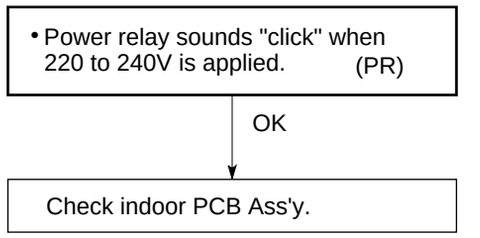

### F. Check TIMER on the remote control unit.

## 10-2-3. Only outdoor unit does not run.

### A. Check setting temperature.

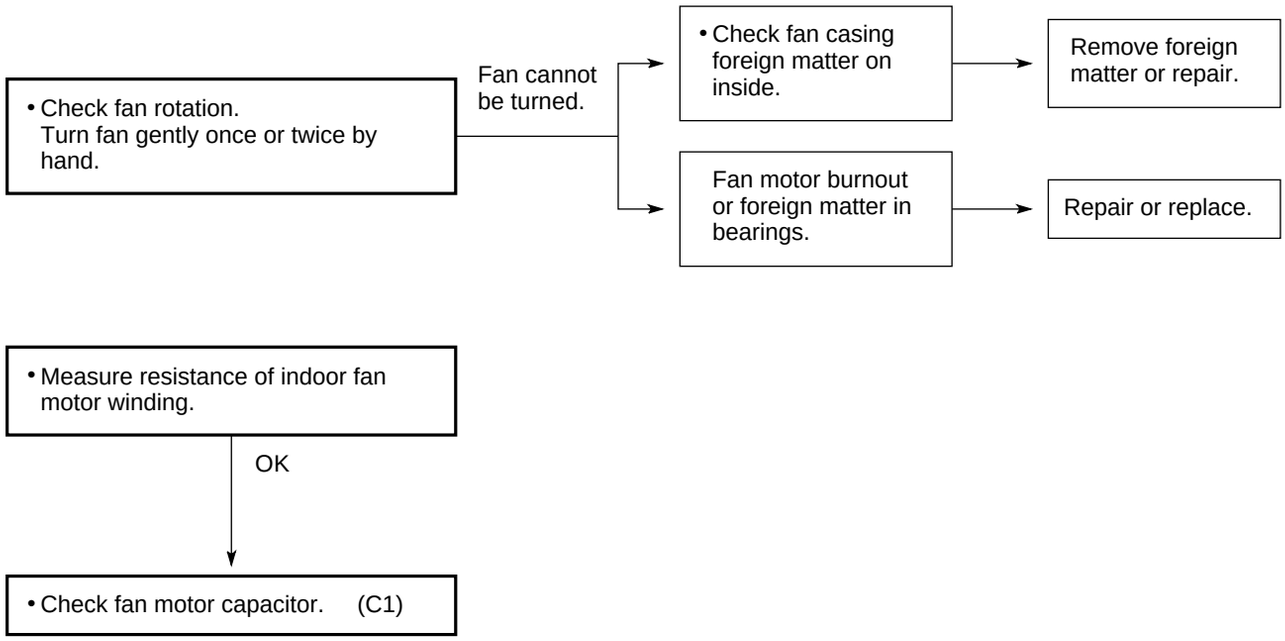



### B. Check power relay in outdoor unit.

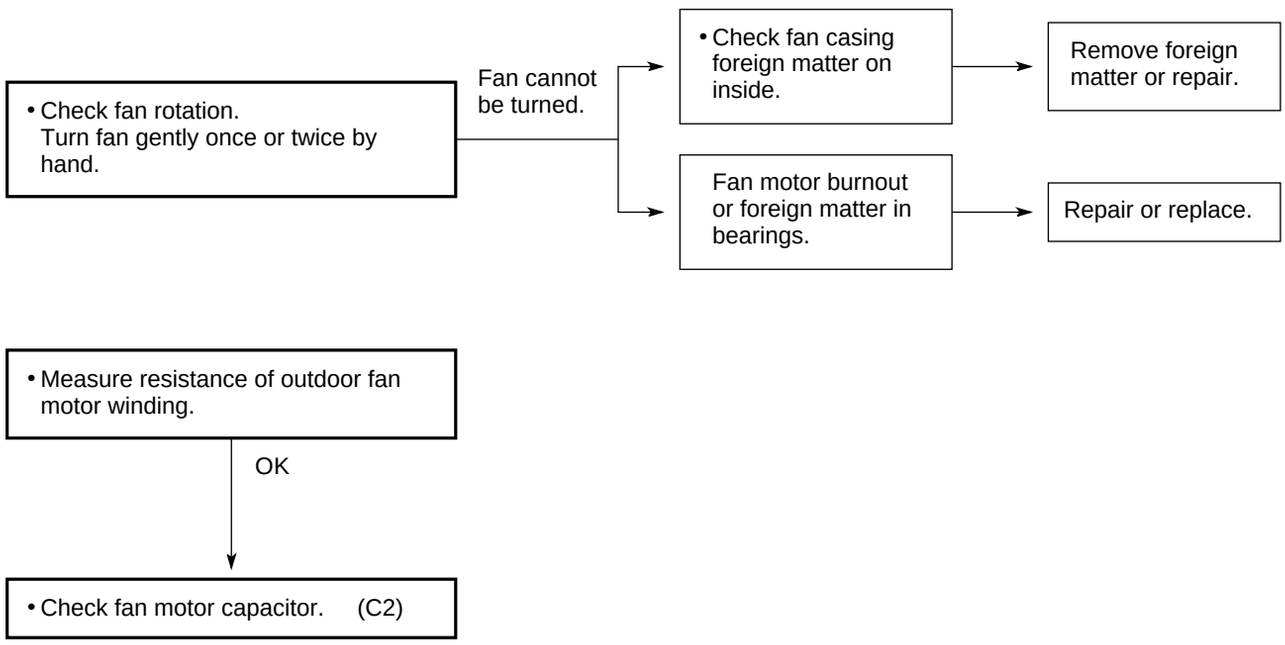


## 10-3. Some part of air conditioner does not operate.

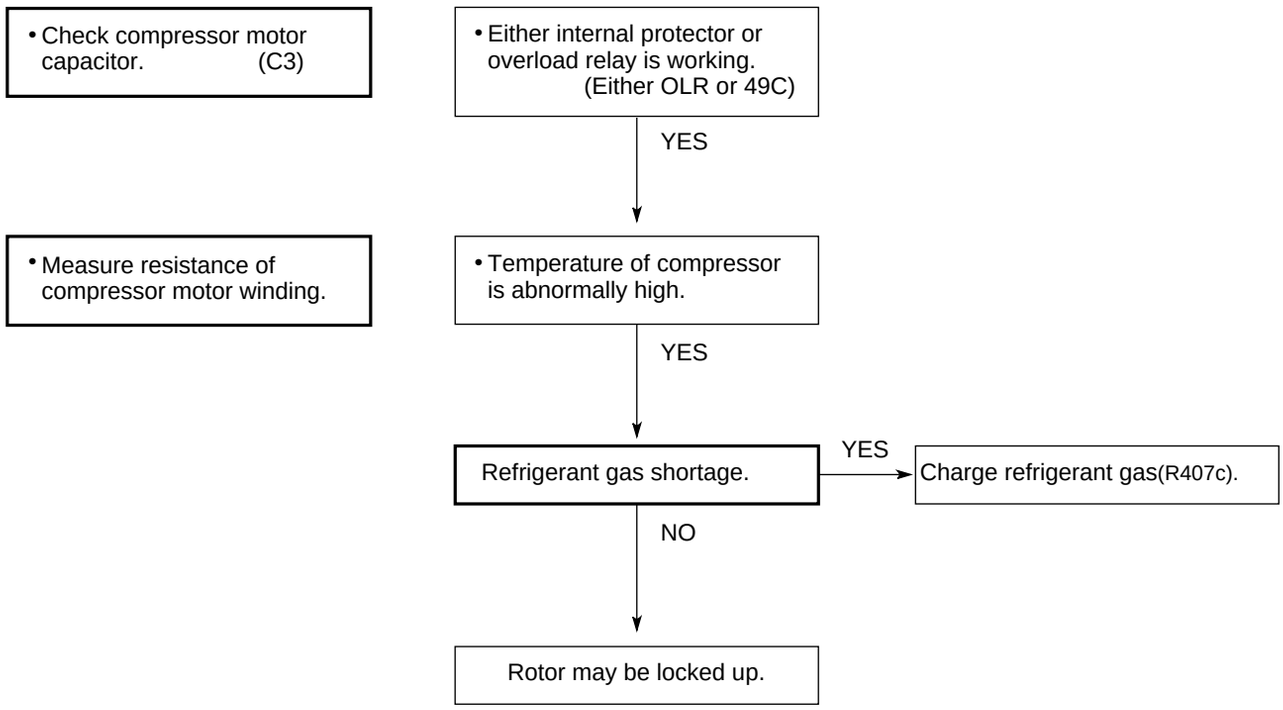
### 10-3-1. Only indoor fan does not run.



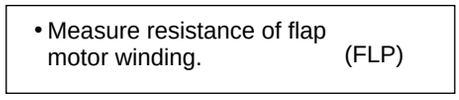

### 10-3-2. Only outdoor fan does not run.



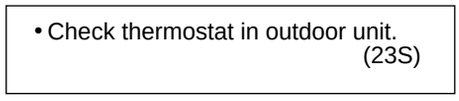
## 10-3-3. Only compressor does not run.




## 10-3-4. Only flap motor does not run.



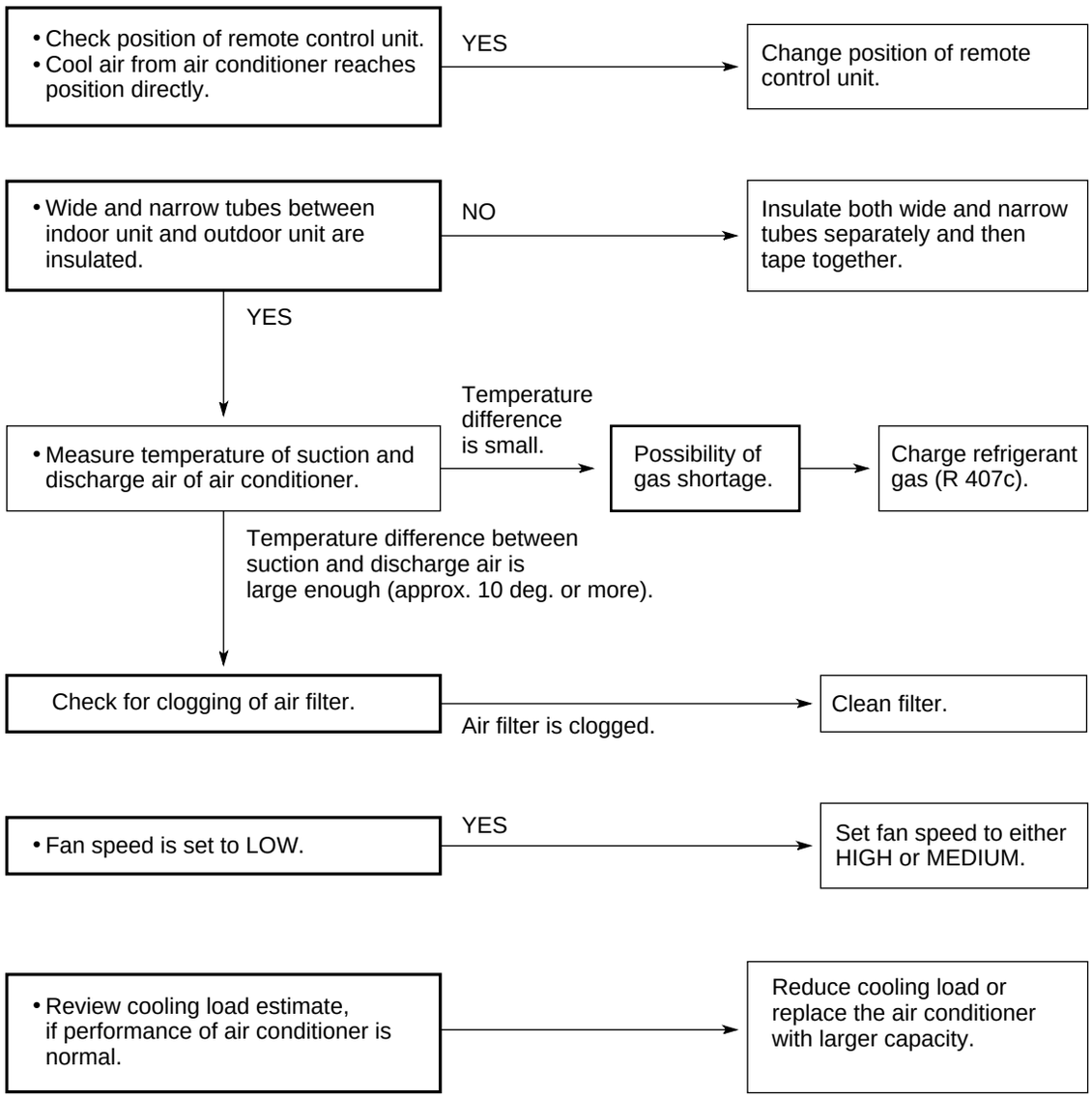

## 10-3-5. Function of outdoor fan speed control does not work properly.



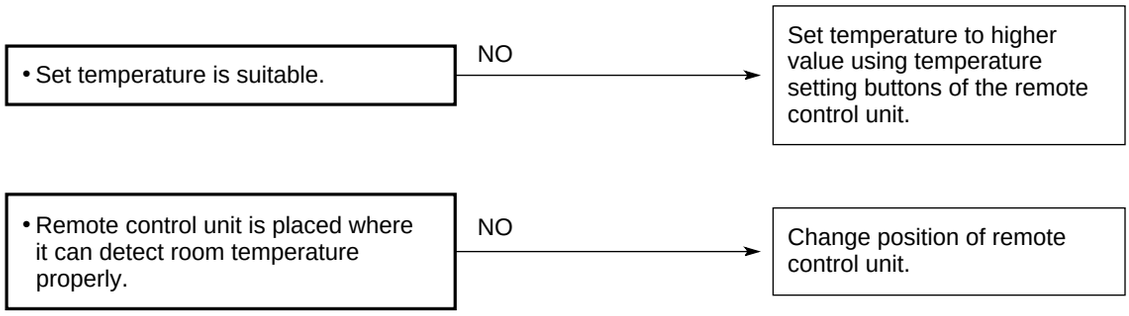

Refer to "8-4. Outdoor Fan Speed Control".

## 10-4. Air conditioner operates, but abnormalities are observed.

### 10-4-1. Poor cooling.




### 10-4-2. Excessive cooling.



## 10-5. If a sensor is defective.

### 10-5-1. Indoor coil temp. thermistor (TH1) is defective.

**A. Open**

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

In Cooling mode: Function of freeze prevention continues to work. That is, the controller turns both compressor and outdoor fan motor periodically ON and OFF for several minutes. (Refer to "8-3. Freeze Prevention")

**B. Short**

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

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

### 10-5-2. Room temp. thermistor (TH2) is defective.

**A. Open**

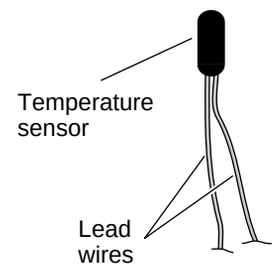
When thermistor opens, the air conditioner will be in the following conditions as the controller tries to detect extremely low room temperature.

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.




**Thermistor Structure**

**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.

# 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)

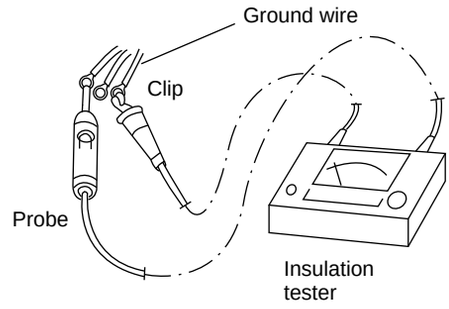



**Fig. 1**

### 11-1-2. 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 on the terminal plate. (Fig. 2)
Note that the ground line terminal should be skipped for the check.

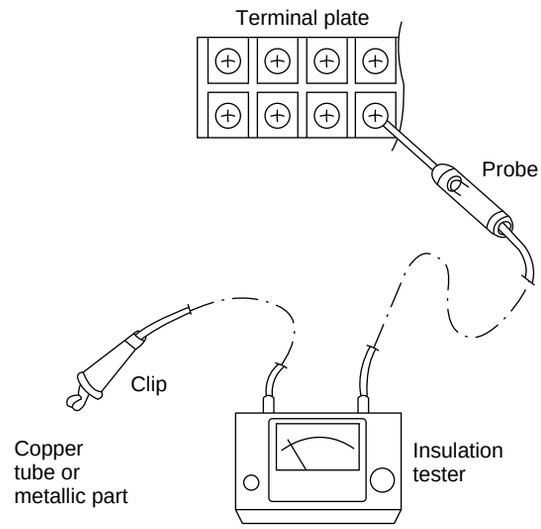



**Fig. 2**

### 11-1-3. Outdoor Unit

Clamp an aluminum plate fin or copper tube with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on each terminal screw where power supply lines are connected on the terminal plate. (Fig. 2)

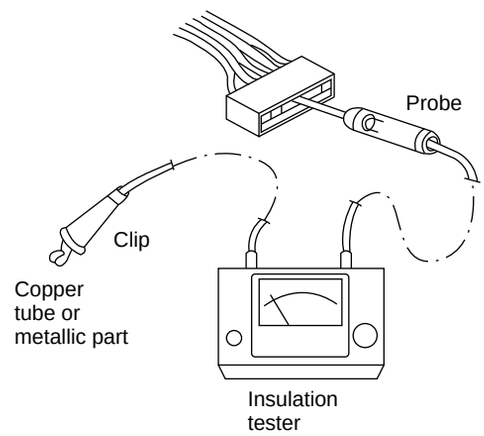



**Fig. 3**

### 11-1-4. Measurement of Insulation Resistance for Electrical Parts

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

**NOTE**

Refer to Electric Wiring Diagram.

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

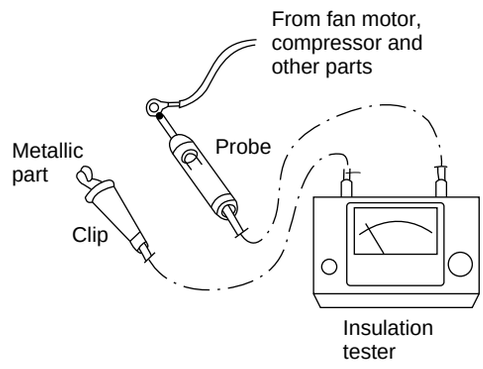



**Fig. 4**

## 11-2. Checking Continuity of Fuse on PCB Ass'y

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

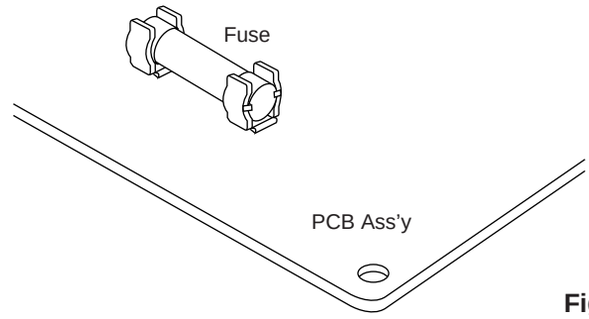



**Fig. 5**

## 11-3. 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.

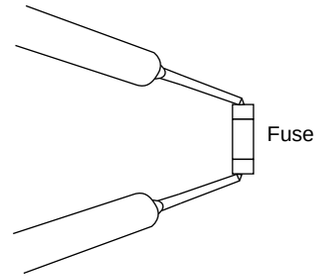



**Fig. 6**

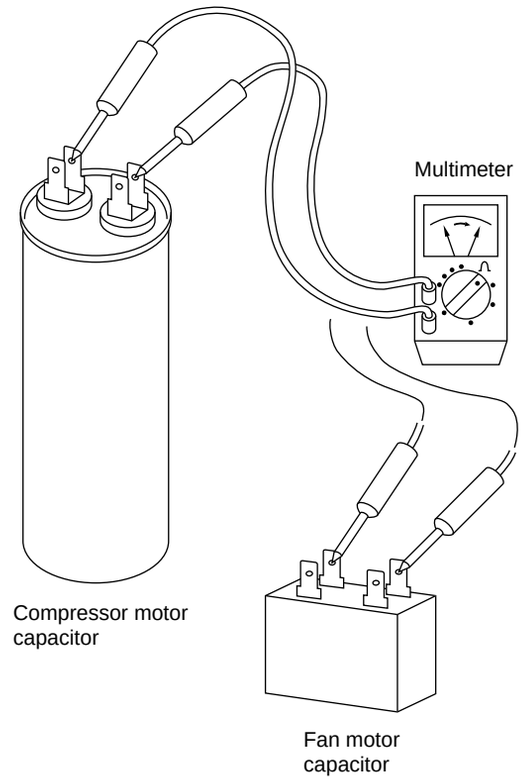



**Fig. 7**

# 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.

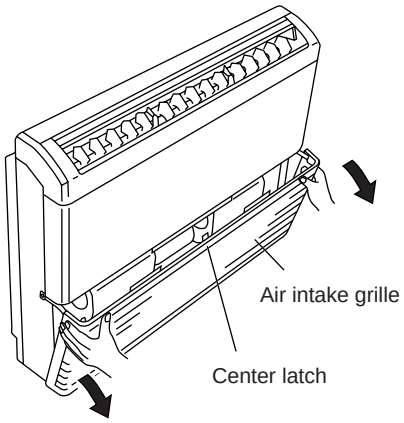



**Fig.1**

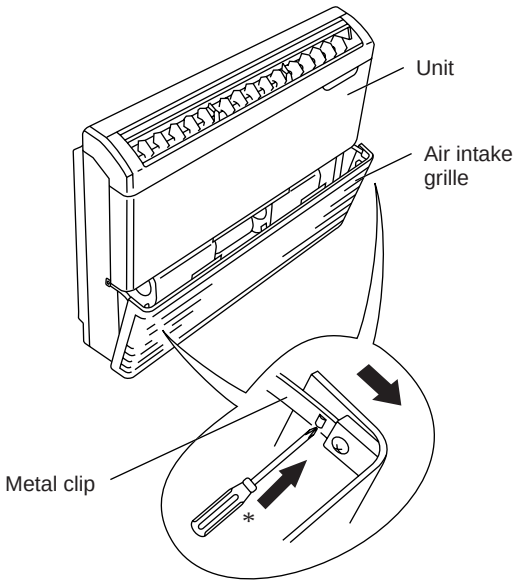



**Fig.2**

## 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.

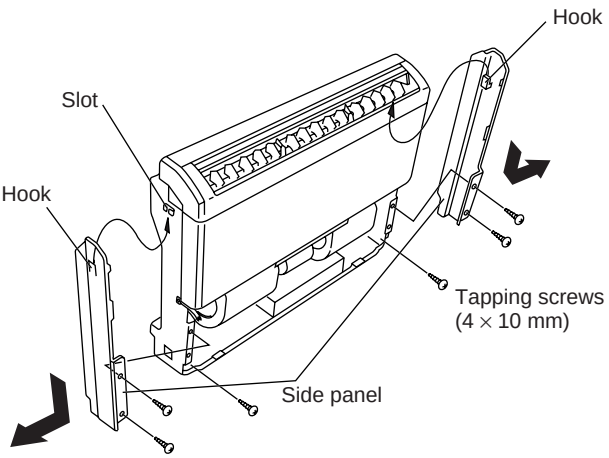



**Fig.3**

## 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)

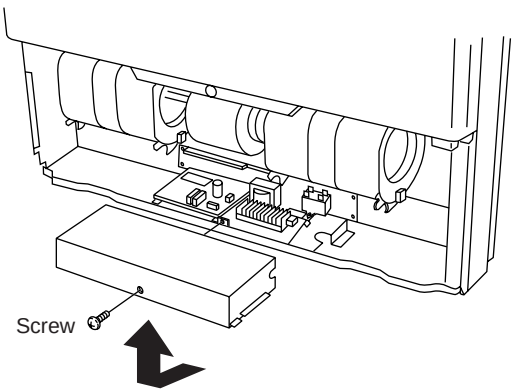



**Fig.4**

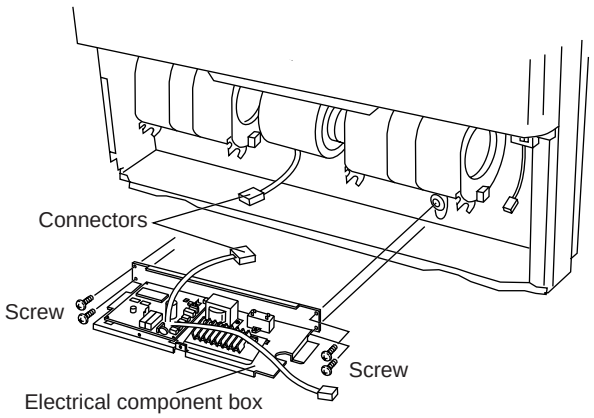



**Fig.5**

## 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)

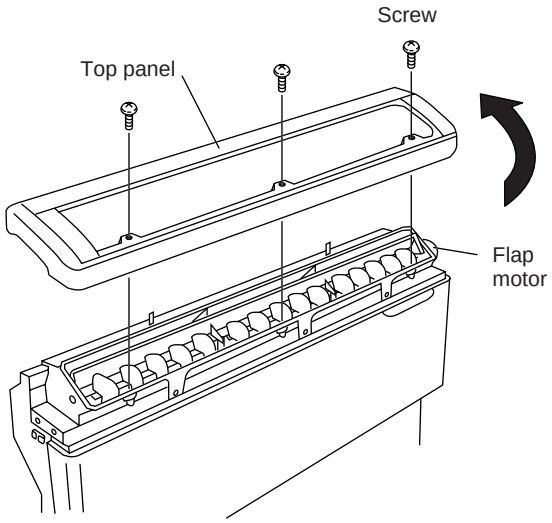



**Fig.6**

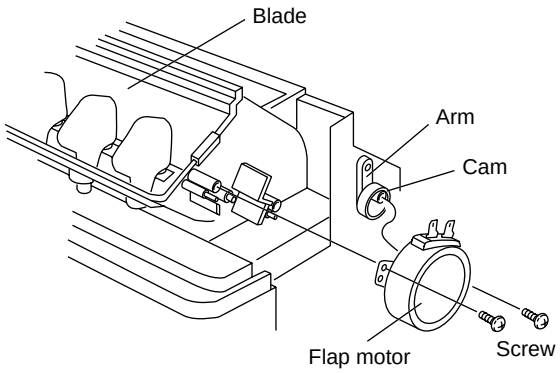



**Fig.7**

## 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)

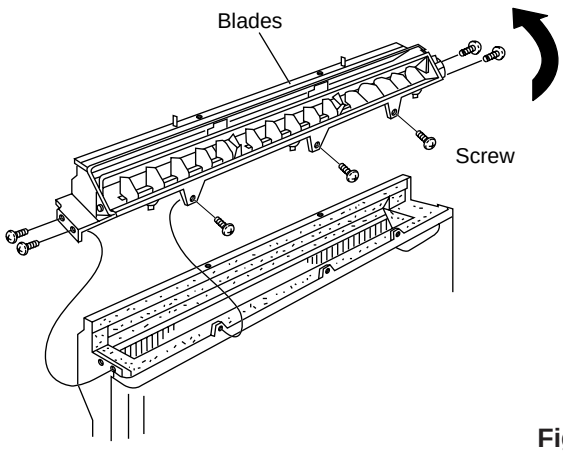



**Fig.8**

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

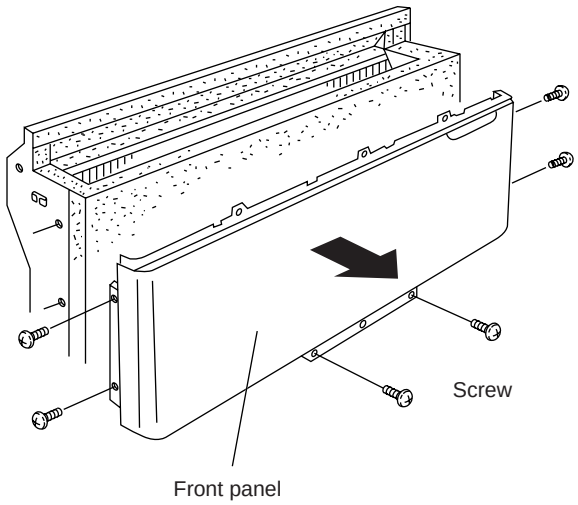



**Fig.9**

(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)

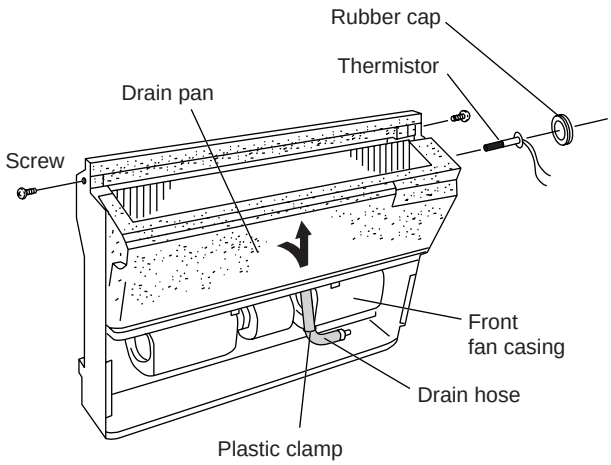



**Fig.10**

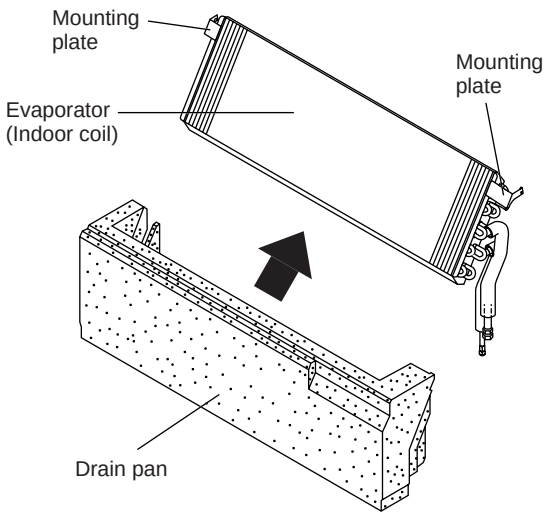



**Fig.11**

## 12-6. Removing Fan and Fan Motor

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

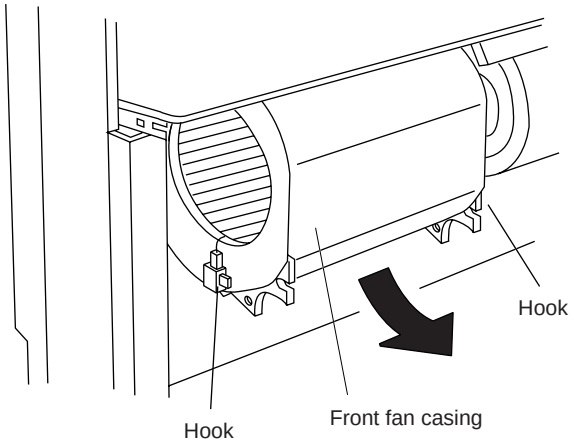



**Fig.12**

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

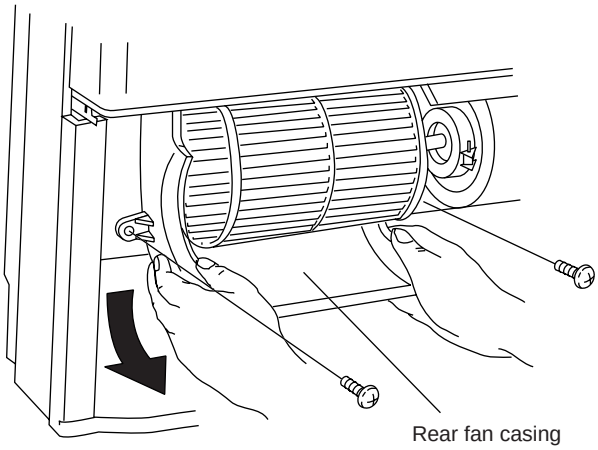



**Fig.13**

(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)

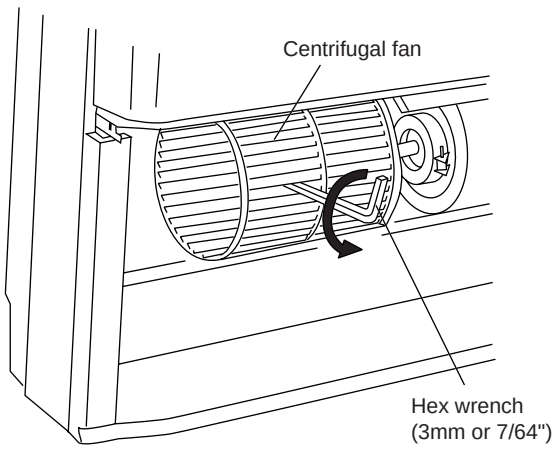



**Fig.14**

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

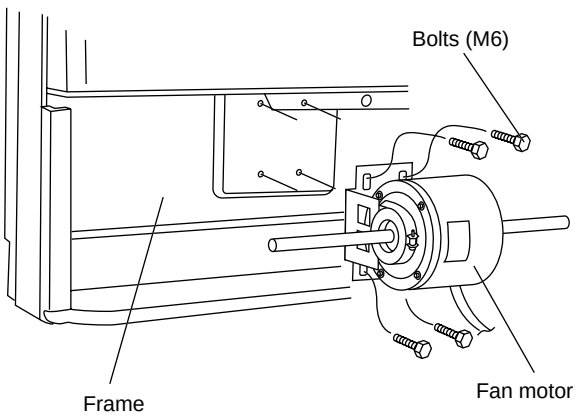



**Fig.15**

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