

# Inverter air conditioner

# Service Manual

## Models

**ACV12WA2-I/ACV12WA2-O**

**ACV18WA2-I/ACV18WA2-O**

**ACV24WA2-I/ACV24WA2-O**

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## 1. Important Notice

This service manual is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair the appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

The information, specifications and parameter are subject to change due to technical modification or improvement without any prior notice. The accurate specifications are presented on the nameplate label.

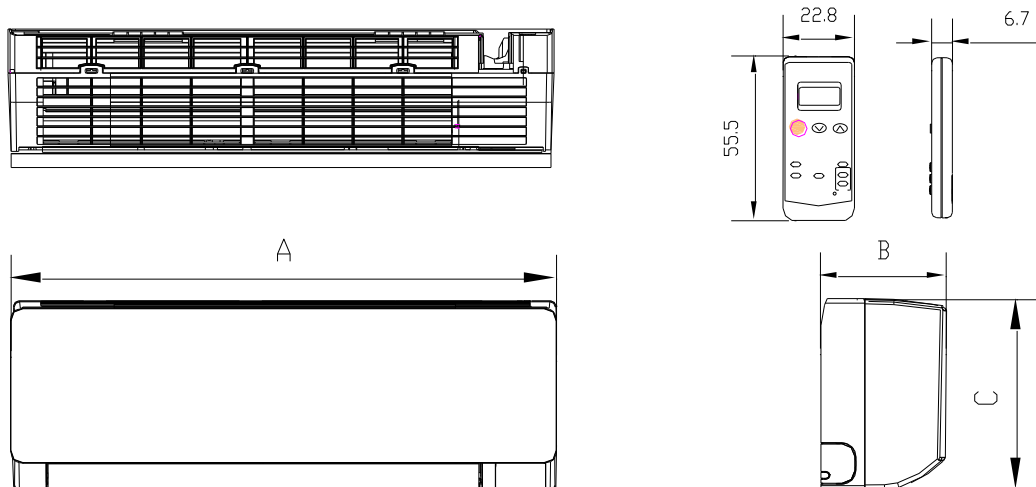
### How to order spare parts

To have your order filled promptly and correctly, please furnish the following information:

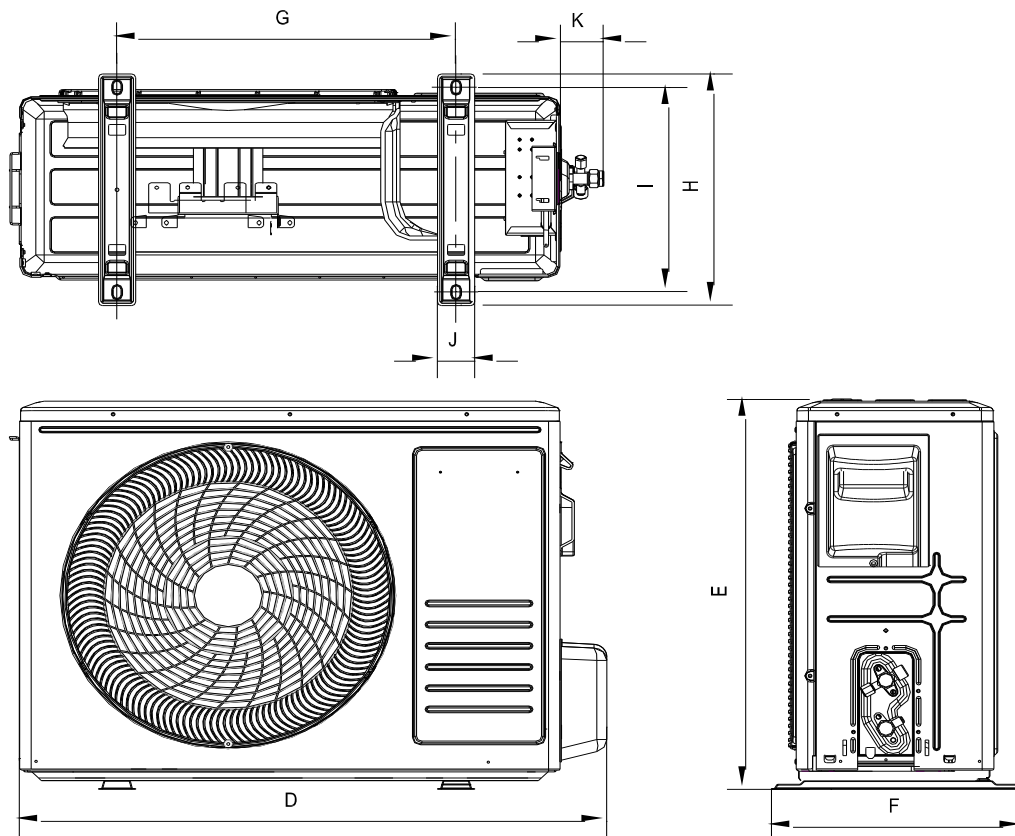
1. Model No. with Indoor or Outdoor
2. No. in the Explosion View
3. Part Name
4. The quantity you ordered

## 2. Product Dimensions

### Indoor Unit:



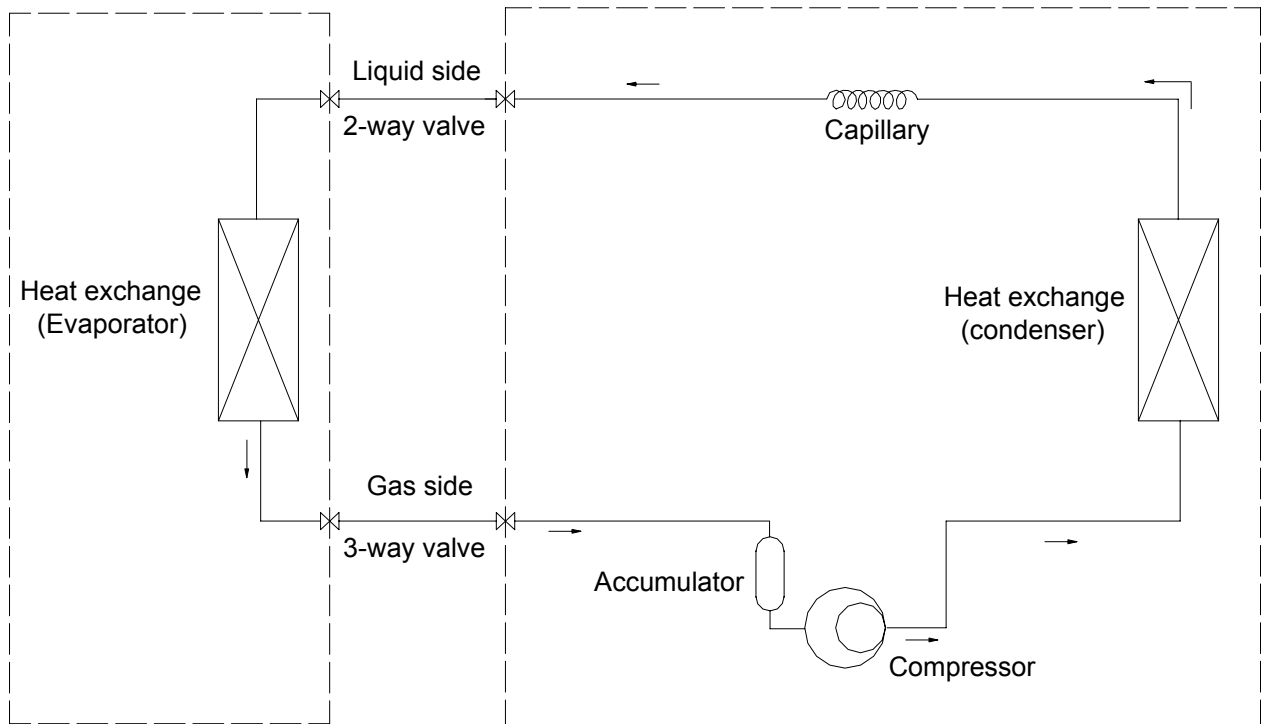
### Outdoor Unit:



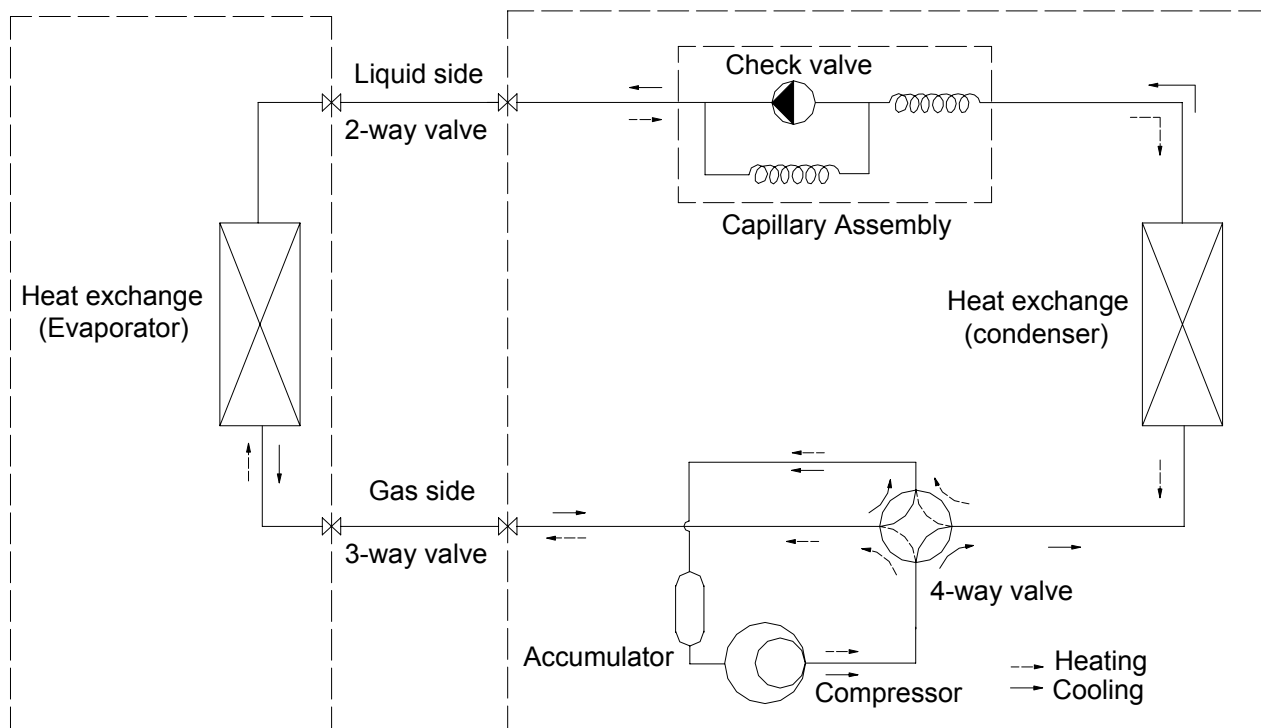
| Model                 | Indoor unit |     |     | Outdoor unit |     |     |     |       |       |      |    |
|-----------------------|-------------|-----|-----|--------------|-----|-----|-----|-------|-------|------|----|
|                       | A           | B   | C   | D            | E   | F   | G   | H     | I     | J    | K  |
| ACV12WA2-I/ACV12WA2-O | 811         | 292 | 203 | 831          | 553 | 300 | 508 | 302   | 277.8 | 48   | 55 |
| ACV18WA2-I/ACV18WA2-O | 1010        | 315 | 220 | 863          | 602 | 349 | 516 | 349   | 314   | 54   | 63 |
| ACV24WA2-I/ACV24WA2-O | 1186        | 340 | 258 | 927          | 699 | 380 | 586 | 374.9 | 347.5 | 58.6 | 63 |

### 3. Refrigeration cycle diagram

#### Cooling only

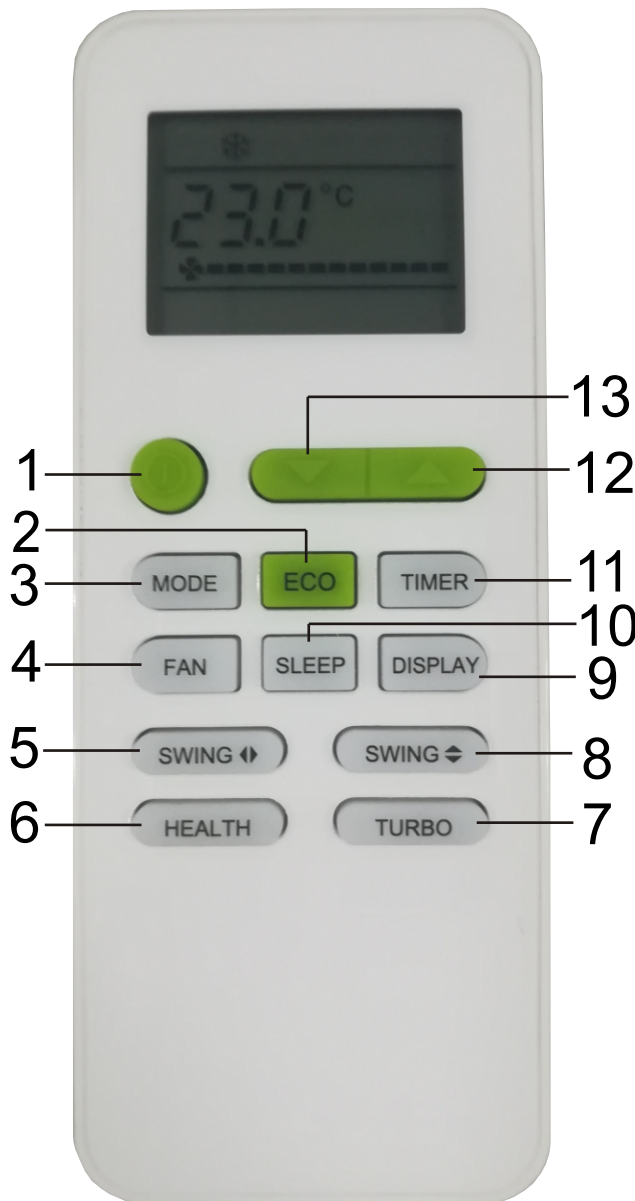


#### Heat pump



## 4. Operation Details

### Remote controller



- 1 ON/OFF button**  
To switch the conditioner on and off.
- 2 ECO button**  
In cooling mode, press this button, the temperature will increase 2°C on the base of setting temperature. In heating mode, press this button, the temperature will decrease 2°C on the base of setting temperature.
- 3 MODE button**  
To select the mode of operation.
- 4 FAN SPEED button**  
To select the fan speed of auto/low/mid/high.
- 5 SWING button**  
To activate or deactivate of the movement of the "DEFLECTORS".
- 6 HEALTH button**  
To switch - on /off HEALTHY function. It is a button which controls the ionizer or plasma generator only for inverter type.
- 7 TURBO button**  
In cooling mode, press this button, the unit will give the maximum cooling temperature with 16°C. In heating mode, press this button, the unit will give the maximum heating temperature with 31°C.
- 8 SWING button**  
To activate or deactivate of the movement of the "DEFLECTORS".
- 9 DISPLAY button**  
To switch on/off the LED display (if present)
- 10 SLEEP button**  
To activate the function "SLEEP".
- 11 TIMER button**  
To set automatic switching-on/off.
- 12 TEMP UP button**  
Increase the temperature or time by 1 unit.
- 13 TEMP DOWN button**  
Decrease the temperature or time by 1 unit.

**Note:** Each mode and relevant function will be further specified in following pages.

#### Remote Control

The remote controller is not presetting as Cooling Only Air Conditioner or Heat Pump by manufacturer.

Each time after the remote controller replace batteries or is energized, the arrowhead will flashes on the front of "Heat" or "Cool" on LCD of the remote controller.

User can preset the remote controller type depending on the air conditioner type you have purchased as follows:

Press any button when the arrowhead flashes on the front of "Cool", Cooling Only is set.

Press any button when the arrowhead flashes on the front of "Heat", Heat Pump is set.

If you don't press any button within 10 seconds, the remote controller is preset as Heat Pump automatically.

#### Note :

If the air conditioner you purchased is a Cooling Only one, but you preset the remote controller as Heat Pump, it doesn't bring any matter. But if the air conditioner you purchased is a Heat Pump one, and you preset the remote controller as Cooling Only, then you CAN NOT preset the Heating operation with the remote controller.

## Electronic Controller

### 1. Safety Protection

#### (1) Time Delay for Safety protection

- 3 minutes delay for compressor ---The compressor is ceased for 3minutes before restarting to balance the pressure in the refrigeration cycle in order to protect the compressor.
- 2 minutes delay for 4-way valve---The 4-way valve will be ceased for 2 minutes late after compressor to prevent the refrigerant-gas abnormal noise when the HEATING operation is OFF or switch to the other operation mode.

#### (2) Discharge temperature protection

There is a temperature sensor on top of compressor, when temperature on top of compressor exceeded the limit, system control will shut down the compressor and the display board will show the error code.

#### (3) Lower voltage protection

When AC voltage  $\leq 158V$  and keep it for 10 seconds, unit will be shut down for protection.

#### (4) Over voltage protection

When AC voltage  $\geq 260V$ , unit will be shut down and recover while  $AC \leq 255V$ .

#### (5) Over current protection

When the current of outdoor unit is overload, controller shut down the unit immediately and show error code.

#### (6) Compressor abnormality protection

When compressor start on or in the process of running, if there is no feedback to controller or load of compressor is abnormality, the air conditioner will shut down, and show error code.

#### (7) IPM module protection

IPM module has high temperature & over current protection itself, if there is signal feedback to IPM, the outdoor unit will shut down, LED on outdoor PCB will show the error code.

### 2. "Feel" Mode Operation

- (1) When the "Feel" mode is selected, the operation mode and initial temperature set are determined by the initial room temperature at start-up of the operation except to turn off the air conditioner and operates it again.
- (2) If the mode is change to "Feel" from other mode, the "Feel" mode doesn't operate until compressor stop for more than 3 minutes.

| Mode                                           | Initial Room Temperature | Initial Set Temperature |
|------------------------------------------------|--------------------------|-------------------------|
| COOLING                                        | RT=26°C                  | 23°C                    |
| DRY                                            | 26°C>RT≥20°C             | RT-2°C                  |
| HEATING for Heat Pump/<br>FAN for Cooling Only | RT<20°C                  | -                       |

- In the "Feel" mode, when the controller receives the up or down signal of temperature, the set temperature can adjust by 1°C upper or lower. The biggest you can adjust by 2°C upper or lower.

### 3. "COOLING" Mode Operation

#### (1) Compressor frequency control

According to difference room temperature and set temperature ( $\delta t = RT - ST$ ), running frequency of compressor is controlled by electronic controller. When room temperature is much higher than set temperature, the compressor will start at a high frequency, and as room temperature goes down, the compressor running frequency will go down. When room temperature is lower than set temperature,

the compressor will run at very low frequency. In general, unit will change its running frequency according to  $\delta t$  to make room temperature closing to set temperature.

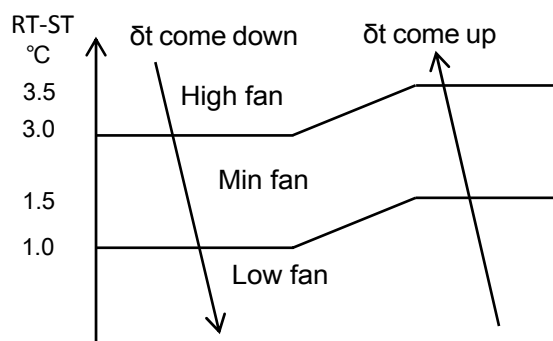
(2) Outdoor temperature affects running frequency of the compressor

Outdoor temperature affect compressor's running frequency. Difference inlet temperature of outdoor unit is adapted by difference compressor running frequency. While outdoor temperature is about 30°C, the compressor will run in high frequency.

If unit run in "cooling" mode and outdoor temperature is less than -2°C, the controller will shut down compressor and show error code, while the ambient temperature is over 1°C, the compressor will run automatically.

(3) Auto fan control in cooling mode

In cooling mode (include cooling in "feel" mode), fan speed is determined by  $\delta t$ , as the following diagram:



#### 4. "DRY" Mode Operation

(1) The system for DRY operation used the same refrigerant circle as the cooling one.

(2) When the system operates in DRY mode, at first it operates in cooling mode, the set temperature (ST) is "RT-2°C". After that, the system will operate in cooling mode with lowest fan speed for 30 minutes and then change to middle speed for 30seconds as a cycle. During the course of this operation, you can't use remote controller to adjust the fan speed but you can control the vane direction.

(3) In the dry mode, when  $RT \leq 12^\circ\text{C}$ , the compressor will stop and operates again at  $RT \geq 14^\circ\text{C}$ .

#### 5. "HEATING" Mode Operation (available for Heat Pump only)

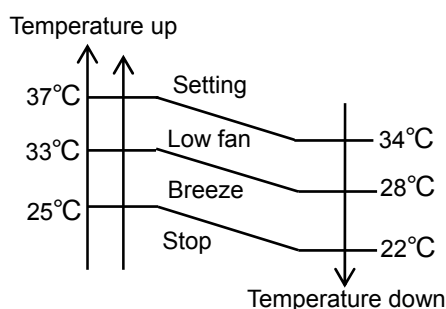
(1) Frequency control

Same as the frequency control in cooling mode, the running frequency of compressor is controlled by controller. Unit change its running frequency according to  $\delta t$  to make the room temperature closing to the set temperature.

(2) Indoor fan motor control

1) Cold Air Prevention Control

- The function is intended to prevent cold air from being discharged when heating mode selected or while in defrosting.
- The indoor fan speed will be controlled as following.

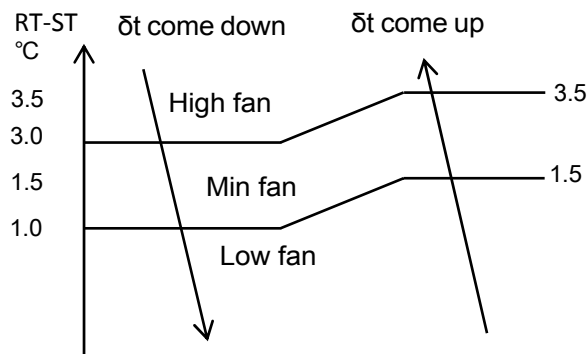


- In heating operation, if air conditioner turn off, the indoor fan motor will run most for 30

seconds since the stop of compressor.

## 2) Auto fan control (heating)

In heating mode (include in "I feel" mode), fan speed is determined by  $\delta t$  as the following:



## (3) 4-way valve control

In heating mode, 4-way valve will power on ahead of compressor for 5 seconds, and cut off for 2 minutes later than compressor. 4-way valve will not power off unless the machine to be switched off, mode changed or on the process of defrosting.

## (4) Defrosting

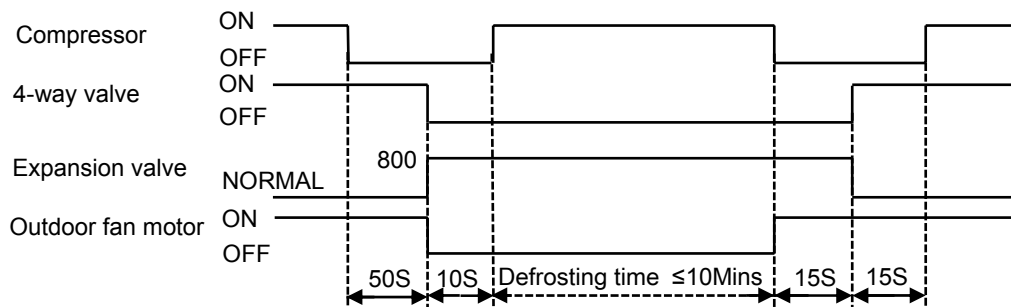
Defrosting is controlled by the microprocessor.

When one of the following conditions is satisfied, unit comes into defrosting:

- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C while the unit runs for more than 40 minutes, and OPT is keeping under -6°C for more than 3 minutes.
- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C meanwhile the unit runs for more than 80 minutes, and OPT is keeping under -4°C for more than 3 minutes.
- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C while the unit runs for more than 120 minutes, and OPT is keeping below -2°C for more than 3 minutes.

Before the air con comes into defrosting, compressor running frequency drop down to a lower frequency firstly, then the compressor shuts down.

In defrosting, the max. frequency of compressor is F9 (a little less than the highest frequency). In this period all protection function are available.



In defrosting, LED showing by winking.

No matter what AC come into or out of defrosting, indoor fan motor speed is the same as Cold Air Prevention Control.

While one of the following conditions is satisfied, unit comes out of defrosting and shifts to heating mode:

- Outdoor coil Temperature (OPT)  $\geq 15^\circ\text{C}$ .
- The time of defrosting keeps for more than 10 minutes.

## (5) Indoor exchanger overheat protection

When Indoor exchanger Temperature (IPT) is higher than 55°C, unit comes into indoor exchanger

overheat protection. The compressor drops its frequency toward to F1 level until  $IPT \leq 52^{\circ}\text{C}$

If  $IPT \leq 52^{\circ}\text{C}$  and keep for 5 minutes, control system doesn't limit running frequency.

If  $IPT > 62^{\circ}\text{C}$ , control system shut down compressor, and recover while IPT drop less than  $50^{\circ}\text{C}$ .

## 6. "SLEEP" mode

When the SLEEP button is pressed, the AC operates as following:

- The indoor fan speed is set at low speed, the power lamp and the sleep lamp is on, the display of temperature will close after 5 minutes.
- When selecting COOLING/DRY operation with SLEEP mode, the set temperature will be raised by  $1^{\circ}\text{C}$  1 hour later and by  $2^{\circ}\text{C}$  2 hour later.
- When selecting HEATING operation with SLEEP mode, the set temperature will be dropped by  $1^{\circ}\text{C}$  1 hour later and  $2^{\circ}\text{C}$  2 hours later.
- After the System operates in SLEEP mode for 8 hours, it will stop automatically.

## 7. EMERGENCY Operation

When the EMERGENCY Operation switch is pressed one time, COOLING mode is selected and if the EMERGENCY Operation switch press again within 3s, HEATING mode selected, while press once again, the unit will switch off.

When the remote controller missing, failed or the batteries run down, press the EMERGENCY Operation switch on front of the indoor unit for function test.

NOTE: Do not press the EMERGENCY Operation switch during normal operation.

## 8. AUTO-RESTART Function (Option)

While air conditioner is operating in one mode, all of its operation data, such as working mode, preset temperature etc. would be memorized into IC by main PCB. If power supply cut off due to reasons and recover again, the AUTO-RESTART function will set synchronously and the air conditioner would work at the same mode as before.

### Auto-restart Pre-setting (optional):

If Auto-restart function is needed, follow the steps below to activate this function:

- 1) Pulling the air-con's plug out of socket.
- 2) Pressing and holding the Emergency button (ON/OFF) on the indoor, then insert the plug into the socket again.
- 3) Keep pressing the Emergency button for more than 10 seconds until three short beeps heard, the Auto-restart function been activated.

## 9. Protection and Failure Display

- When protection display is available, controller will show error code, digital LED shows error code and setting temperature by turns.
- If there is more than one failure, it will show error codes according to the error list sequence.
- To insure the signal communication of indoor and outdoor unit, any failure code relates to outdoor unit will remain display for 2 minutes maximum after it's recovered.
- Among all the failure codes, sensor failure can be recovery automatically once it comes normal.

## ● Error list

| Failure Type                                   | LED Code                | Digital LED Code |
|------------------------------------------------|-------------------------|------------------|
| Indoor and outdoor communication failure       | RUN、TIMER –both winking | E0               |
| Outdoor communication failure                  | RUN、TIMER –both winking | EC               |
| Indoor room temperature sensor (IRT)           | RUN-1 time/8s           | E1               |
| Indoor coil temperature sensor (IPT)           | RUN-2 times /8s         | E2               |
| Outdoor coil temperature sensor (OPT)          | RUN-3 times /8s         | E3               |
| System abnormality                             | RUN-4 times /8s         | E4               |
| Model configuration wrong                      | RUN-5 times /8s         | E5               |
| Indoor fan motor fault                         | RUN-6 times /8s         | E6               |
| Outdoor temperature sensor                     | RUN-7 times /8s         | E7               |
| Exhaust temp. sensor                           | RUN-8 times /8s         | E8               |
| IPM drive and module fault                     | RUN-9 times /8s         | E9               |
| Outdoor fan motor fault (DC motor)             | RUN-10 times /8s        | EF               |
| Current sensor fault                           | RUN—11 times /8s        | EA               |
| Indoor unit EEPROM fault                       | RUN-12 times /8s        | EE               |
| Temp. switch fault ( on top of the compressor) | RUN-13 times /8s        | EP               |
| Voltage sensor fault                           | RUN-14 times /8s        | EU               |

## ● Protection display code list:

| Protection Type                                         | Function Indicator (flash)         | Digital LED Code |
|---------------------------------------------------------|------------------------------------|------------------|
| Overvoltage /lower voltage protection                   | RUN: Blink; TIMER: 1 blink /8 sec  | P1               |
| Overcurrent protection                                  | RUN: Blink; TIMER: 2 blink /8 sec  | P2               |
| Exhaust over temperature protection                     | RUN: Blink; TIMER: 4 blink /8 sec  | P4               |
| Too cool protection in cooling mode                     | RUN: Bright; TIMER: 5 blink /8 sec | P5               |
| Overheat protection in cooling mode                     | RUN: Bright; TIMER: 6 blink /8 sec | P6               |
| Overheat protection in heating mode                     | RUN: Bright; TIMER: 7 blink /8 sec | P7               |
| Outdoor over temperature / lower temperature protection | RUN: Bright; TIMER: 8 blink /8 sec | P8               |
| Drive protection (software control )                    | RUN: Blink; TIMER: 9 blink /8 sec  | P9               |
| Module protection (hardware control)                    | RUN: Blink; TIMER: 10 blink /8 sec | P0               |

## ● Outdoor failure display

There is a LED on outdoor power board, it blinks 1s ON and 1s OFF while compressor standby and it always light (ON) while compressor running; If there is failure happened on ODU, The indicator (LED) alerts the fault in a cycle as such that it is bright for 0.5 seconds, dark for 0.5 seconds, blinks “n” times and then dark for 3 seconds. For details as table below:

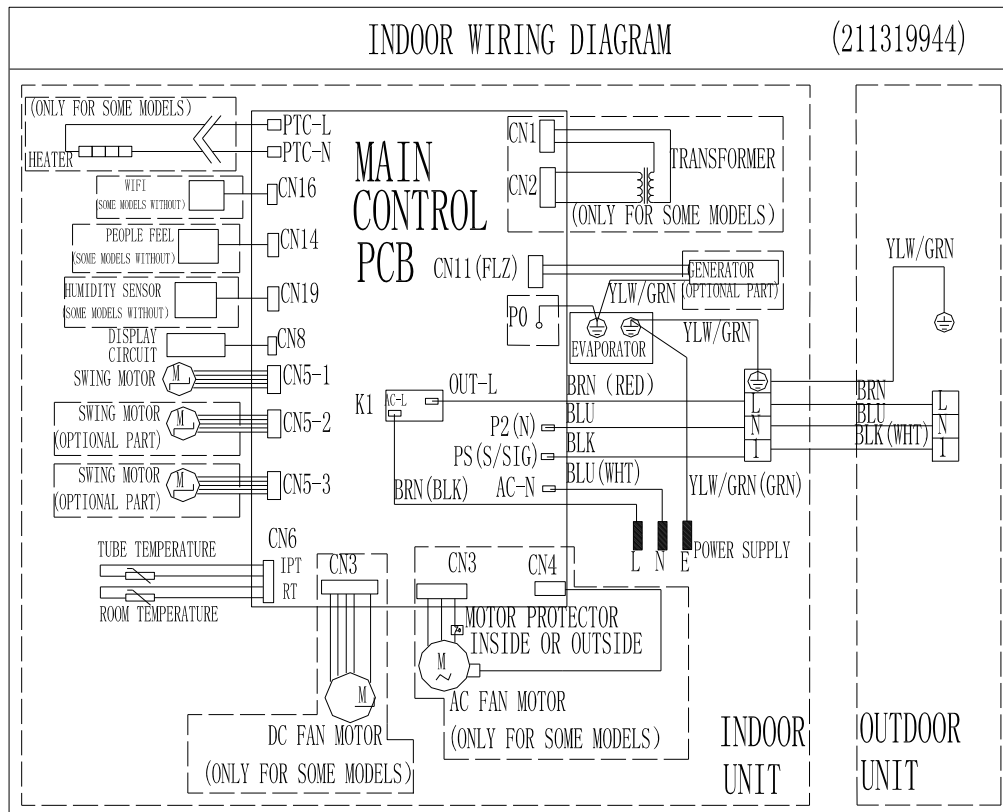
Display on outdoor power source board:

| blink time (n) | Failure                                                                         |
|----------------|---------------------------------------------------------------------------------|
| 1              | IPM protection                                                                  |
| 2              | Over voltage /lower voltage                                                     |
| 3              | Overcurrent                                                                     |
| 4              | Exhaust over temperature protection                                             |
| 5              | Outdoor coil over temperature protection                                        |
| 6              | Drive fault and protection (V1, VP1)                                            |
| 7              | Communication fault with indoor unit                                            |
| 8              | Compressor overheat fault (compressor top switch)                               |
| 9              | Short-circuit / open-circuit fault of outdoor temperature sensor                |
| 10             | Short circuit / open-circuit fault of outdoor heat exchanger temperature sensor |
| 11             | Short-circuit / open-circuit fault of exhaust temperature sensor                |
| 12             | Voltage sensor fault                                                            |
| 13             | Current sensor fault                                                            |
| 14             | IPM fault                                                                       |
| 15             | Communication fault between power source board and IPM                          |
| 16             | No feedback from DC fan motor(outdoor unit)                                     |
| 17             | Defrost state                                                                   |

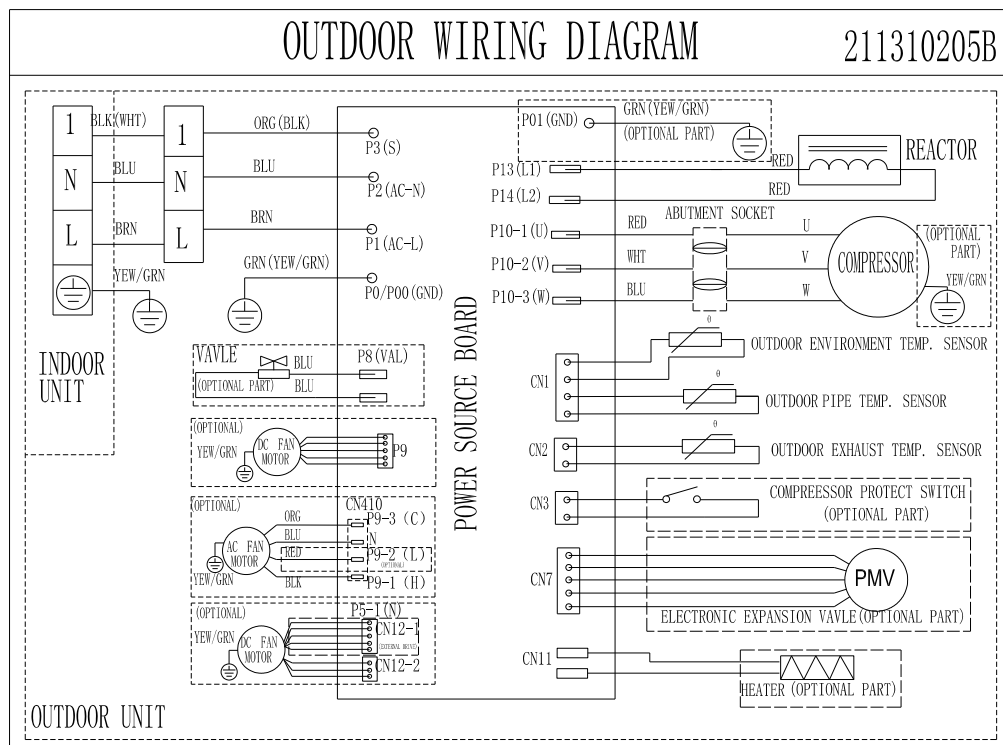
## 5. Wiring diagram

Mode: ACV12WA2-I/ACV12WA2-O, ACV18WA2-I/ACV18WA2-O

### INDOOR UNIT:

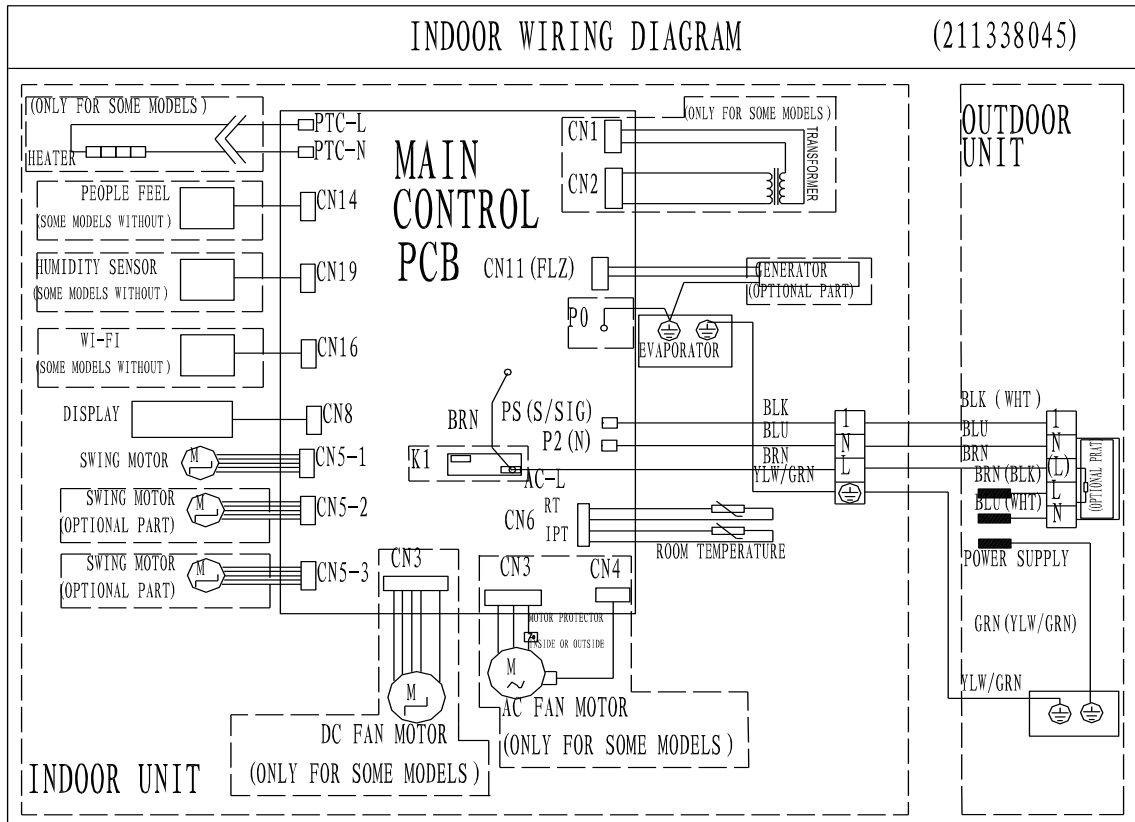


### OUTDOOR UNIT

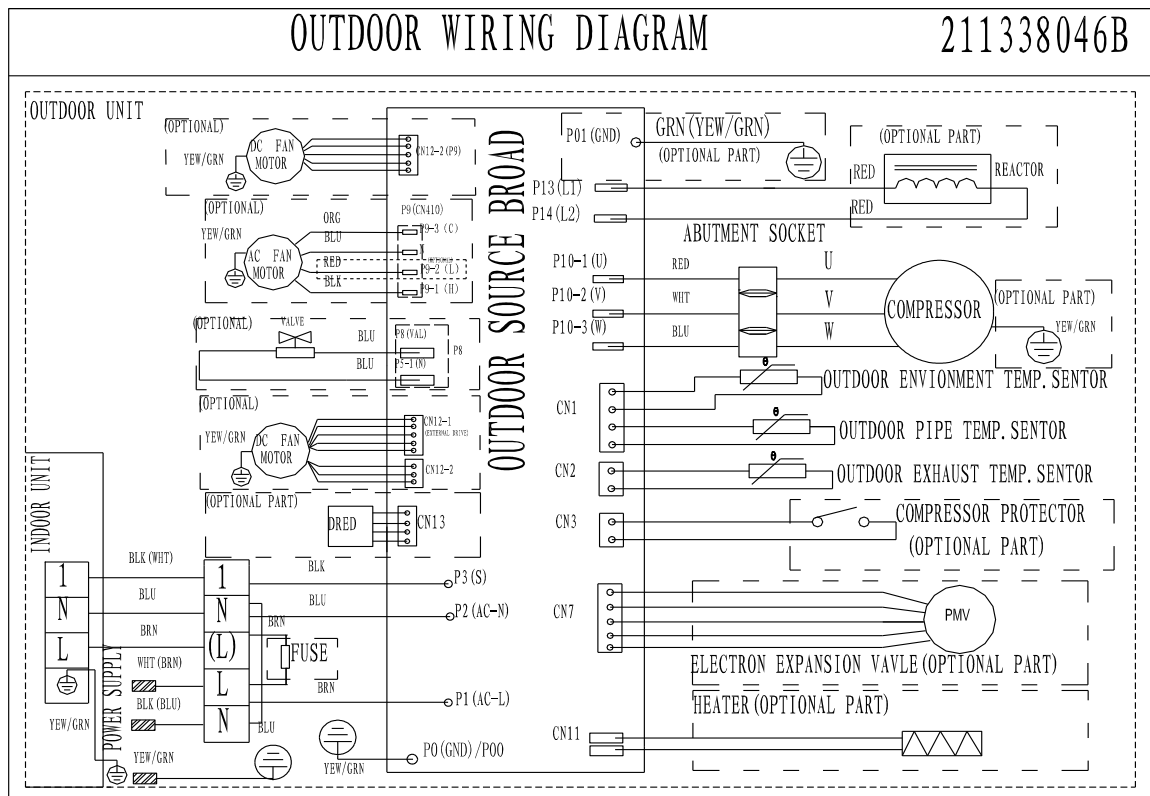


MODEL: ACV24WA2-I/ACV24WA2-O

# INDOOR UNIT

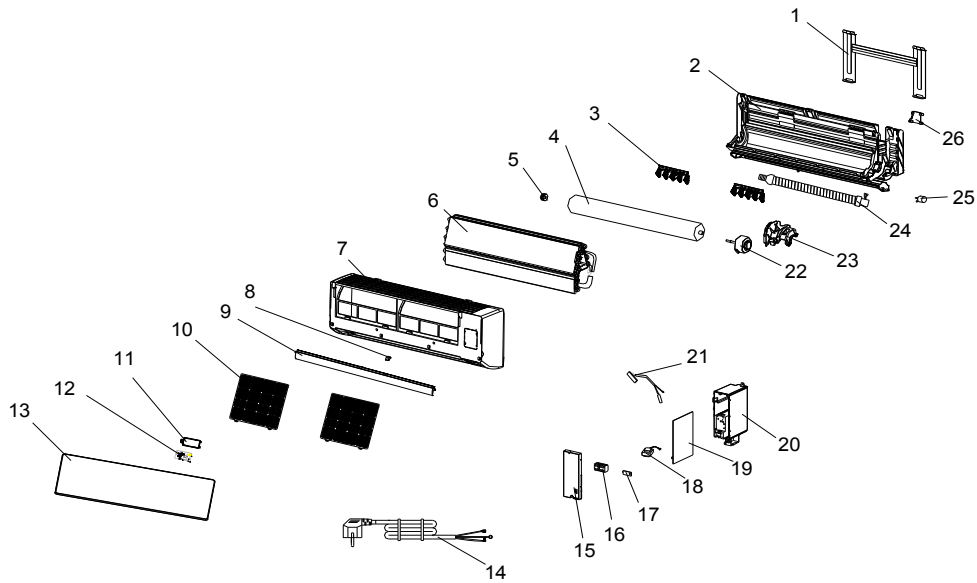


# OUTDOOR UNIT

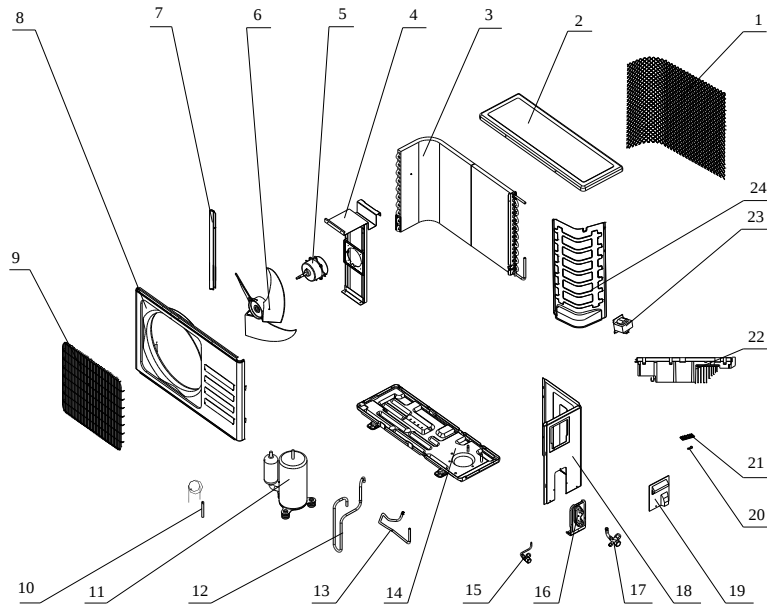


## 6. Explosion view and parts

### Indoor Unit-ACV12WA2-I

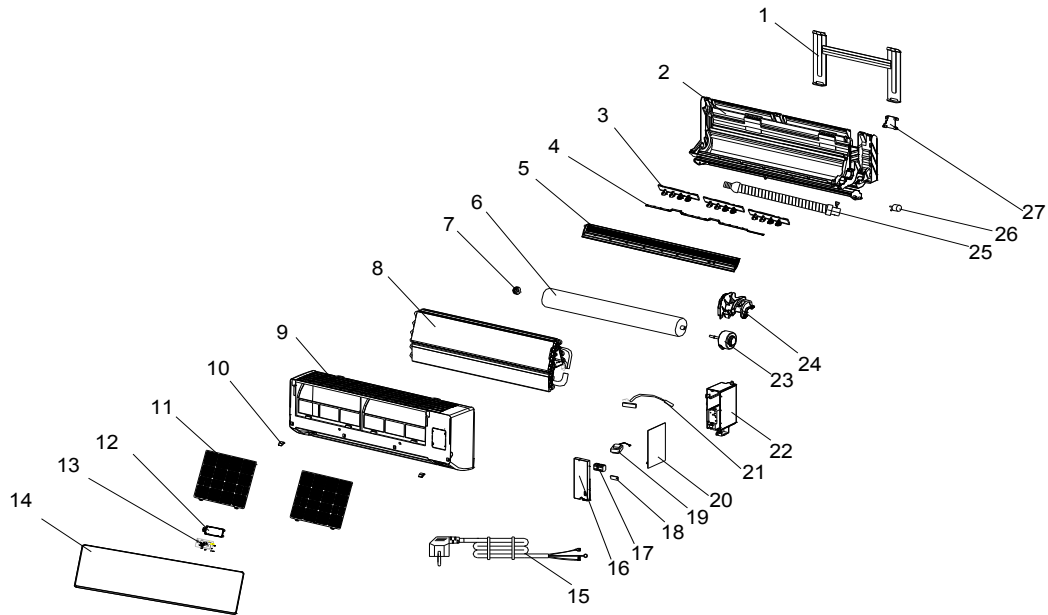


| No. | Part No. | Part Name                   | Q'ty | Remark                      |
|-----|----------|-----------------------------|------|-----------------------------|
| 1   |          | Installation Plate          | 1    |                             |
| 2   |          | Base                        | 1    |                             |
| 3   |          | Vertical Vane Assembly      | 2    |                             |
| 4   |          | Cross Fan                   | 1    |                             |
| 5   |          | Bearing Mount               | 1    |                             |
| 6   |          | Evaporator                  | 1    |                             |
| 7   |          | Face Frame                  | 1    |                             |
| 8   |          | Screw Cover                 | 1    |                             |
| 9   |          | Vane                        | 1    |                             |
| 10  |          | Air Filter                  | 2    |                             |
| 11  |          | Display PCB Box             | 1    |                             |
| 12  |          | Display PCB                 | 1    |                             |
| 13  |          | Front Panel                 | 1    |                             |
|     |          | Glass Panel                 | 1    |                             |
| 14  |          | Power Supply Cord           | 1    |                             |
| 15  |          | Electrical Box Cover        | 1    |                             |
| 16  |          | Terminal                    | 1    |                             |
| 17  |          | Cable Clamp                 | 1    |                             |
| 18  |          | Transformer                 | 1    |                             |
| 19  |          | Main PCB                    | 1    |                             |
| 20  |          | Electrical Box              | 1    |                             |
| 21  |          | Indoor Sensor Assembly      | 1    |                             |
| 22  |          | Indoor Motor                | 1    |                             |
| 23  |          | Indoor Motor Cover          | 1    |                             |
| 24  |          | Drainage Hose               | 1    |                             |
| 25  |          | Vane Motor                  | 1    |                             |
| 26  |          | In And Out Pipe Fixer       | 1    |                             |
| 27  |          | Remote Controller           | 1    | Not shown in Explosion view |
| 28  |          | Remote Controller Supporter | 1    |                             |
| 29  |          | Indoor Carton               | 1    |                             |
| 30  |          | Left Foaming                | 1    |                             |
| 31  |          | Right Foaming               | 1    |                             |

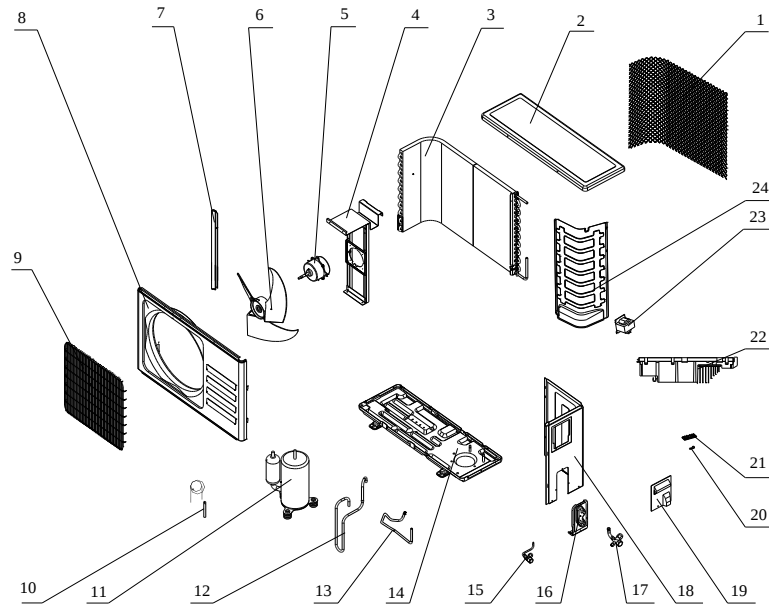
**Outdoor Unit- ACV12WA2-O**

| No. | Part No. | Part Name                                  | Q'ty | Remark                      |
|-----|----------|--------------------------------------------|------|-----------------------------|
| 1   |          | Grille                                     | 1    |                             |
| 2   |          | Top cover                                  | 1    |                             |
| 3   |          | Condenser                                  | 1    |                             |
| 4   |          | Outdoor motor supporter                    | 1    |                             |
| 5   |          | Outdoor motor                              | 1    |                             |
| 6   |          | Propeller fan                              | 1    |                             |
| 7   |          | Left grille supporter                      | 1    |                             |
| 8   |          | Front plate                                | 1    |                             |
| 9   |          | Fan guard                                  | 1    |                             |
| 10  |          | Capillary assembly                         | 1    |                             |
| 11  |          | Compressor and accessories                 | 1    |                             |
| 12  |          | Discharge Pipe                             | 1    |                             |
| 13  |          | Suction Pipe                               | 1    |                             |
| 14  |          | Base                                       | 1    |                             |
| 15  |          | Two-way valve                              | 1    |                             |
| 16  |          | Valve supporter                            | 1    |                             |
| 17  |          | Three-way valve                            | 1    |                             |
| 18  |          | Right plate                                | 1    |                             |
| 19  |          | Electrical Box Cover                       | 1    |                             |
| 20  |          | Cable clamp                                | 1    |                             |
| 21  |          | Terminal                                   | 1    |                             |
| 22  |          | Outdoor PCB Assembly                       | 1    |                             |
| 23  |          | Inductor                                   | 1    |                             |
| 24  |          | Partition plate                            | 1    |                             |
| 25  |          | Pipe Temp. sensor and outdoor Temp. sensor | 1    | Not shown in explosion view |
| 26  |          | Discharge Temp. sensor                     | 1    |                             |
| 27  |          | Base carton                                | 1    |                             |
| 28  |          | Cabinet carton                             | 1    |                             |
| 29  |          | Base foaming                               | 1    |                             |
| 30  |          | Cover foaming                              | 1    |                             |

## Indoor Unit- ACV18WA2-I

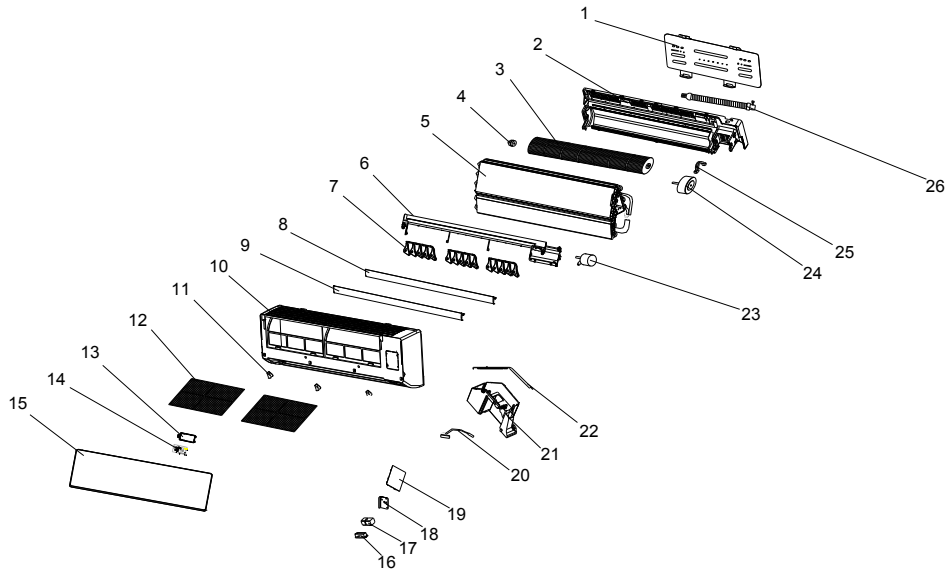


| No. | Part No. | Part Name               | Q'ty | Remark                      |
|-----|----------|-------------------------|------|-----------------------------|
| 1   |          | Installation Plate      | 1    |                             |
| 2   |          | Base                    | 1    |                             |
| 3   |          | Vertical Vane Assembly  | 3    |                             |
| 4   |          | Vertical Vane Connector | 1    |                             |
| 5   |          | Vane                    | 1    |                             |
| 6   |          | Cross Fan               | 1    |                             |
| 7   |          | Bearing Mount           | 1    |                             |
| 8   |          | Evaporator              | 1    |                             |
| 9   |          | Face Frame              | 1    |                             |
| 10  |          | Screw Cover             | 2    |                             |
| 11  |          | Air Filter              | 1    |                             |
| 12  |          | Display PCB Box         | 1    |                             |
| 13  |          | Display PCB             | 1    |                             |
| 14  |          | Front Panel             | 1    |                             |
| 15  |          | Power Supply Cord       | 1    |                             |
| 16  |          | Electrical Box Cover    | 1    |                             |
| 17  |          | Terminal                | 1    |                             |
| 18  |          | Cable Clamp             | 1    |                             |
| 19  |          | Transformer             | 1    |                             |
| 20  |          | Main PCB                | 1    |                             |
| 21  |          | Electrical Box          | 1    |                             |
| 22  |          | Indoor Sensor Assembly  | 1    |                             |
| 23  |          | Indoor Motor            | 1    |                             |
| 24  |          | Indoor Motor Cover      | 1    |                             |
| 25  |          | Drainage Hose           | 1    |                             |
| 26  |          | Vane Motor              | 1    |                             |
| 27  |          | In And Out Pipe Fixer   | 1    | Not shown in Explosion view |
| 28  |          | Remote Controller       | 1    |                             |
| 29  |          | Indoor Carton           | 1    |                             |
| 30  |          | Left Foaming            | 1    |                             |
| 31  |          | Right Foaming           | 1    |                             |

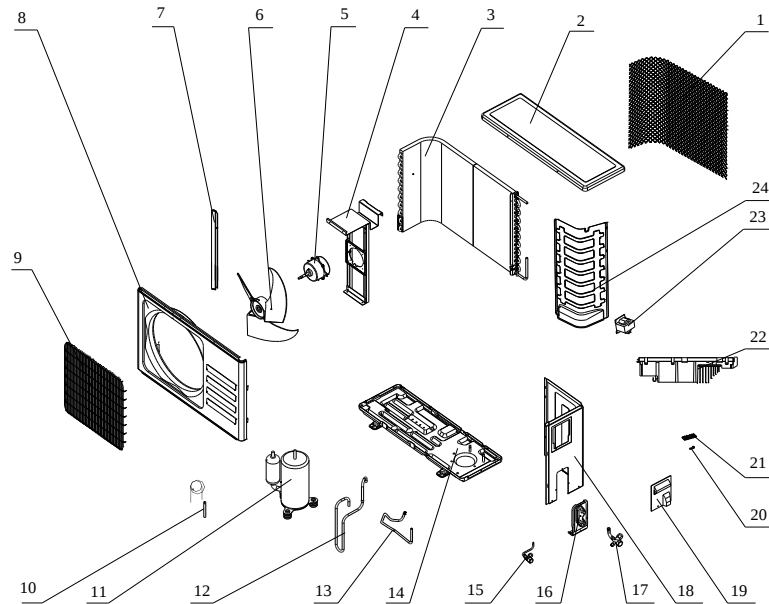
**Outdoor Unit- ACV18WA2-O**

| No. | Part No. | Part Name                                  | Q'ty | Remark                      |
|-----|----------|--------------------------------------------|------|-----------------------------|
| 1   |          | Grille                                     | 1    |                             |
| 2   |          | Top cover                                  | 1    |                             |
| 3   |          | Condenser                                  | 1    |                             |
| 4   |          | Outdoor motor supporter                    | 1    |                             |
| 5   |          | Outdoor motor                              | 1    |                             |
| 6   |          | Propeller fan                              | 1    |                             |
| 7   |          | Left grille supporter                      | 1    |                             |
| 8   |          | Front plate                                | 1    |                             |
| 9   |          | Fan guard                                  | 1    |                             |
| 10  |          | Capillary assembly                         | 1    |                             |
| 11  |          | Compressor and accessories                 | 1    |                             |
| 12  |          | Discharge Pipe                             | 1    |                             |
| 13  |          | Suction Pipe                               | 1    |                             |
| 14  |          | Base                                       | 1    |                             |
| 15  |          | Two-way valve                              | 1    |                             |
| 16  |          | Valve supporter                            | 1    |                             |
| 17  |          | Three-way valve                            | 1    |                             |
| 18  |          | Right plate                                | 1    |                             |
| 19  |          | Electrical Box Cover                       | 1    |                             |
| 20  |          | Cable clamp                                | 1    |                             |
|     |          | Cable clamp                                | 1    |                             |
| 21  |          | Terminal                                   | 1    |                             |
| 22  |          | Outdoor PCB Assembly                       | 1    |                             |
| 23  |          | Inductor                                   | 1    |                             |
| 23  |          | Partition plate                            | 1    |                             |
| 24  |          | Pipe Temp. sensor and outdoor Temp. sensor | 1    | Not shown in explosion view |
| 25  |          | Discharge Temp. sensor                     | 1    |                             |
| 26  |          | Base carton                                | 1    |                             |
| 27  |          | Cabinet carton                             | 1    |                             |
| 28  |          | Base foaming                               | 1    |                             |
| 29  |          | Cover foaming                              | 1    |                             |

## Indoor Unit- ACV24WA2-I



| No. | Part No. | Part Name                   | Q'ty | Remark                      |
|-----|----------|-----------------------------|------|-----------------------------|
| 1   |          | Installation Plate          | 1    |                             |
| 2   |          | Base                        | 1    |                             |
| 3   |          | Cross Fan                   | 1    |                             |
| 4   |          | Bearing Mount               | 1    |                             |
| 5   |          | Evaporator                  | 1    |                             |
| 6   |          | Water Drainage Assembly     | 1    |                             |
| 7   |          | Vertical Vane Assembly      | 3    |                             |
| 8   |          | Up Vane                     | 1    |                             |
| 9   |          | Down Vane                   | 1    |                             |
| 10  |          | Face Frame                  | 1    |                             |
| 11  |          | Screw Cover                 | 3    |                             |
| 12  |          | Air Filter                  | 2    |                             |
| 13  |          | Display PCB Box             | 1    |                             |
| 14  |          | Display PCB                 | 1    |                             |
| 15  |          | Front Panel                 | 1    |                             |
| 16  |          | Cable Clamp                 | 1    |                             |
| 17  |          | Terminal                    | 1    |                             |
| 18  |          | Terminal fixing board       | 1    |                             |
| 19  |          | Main PCB                    | 1    |                             |
| 20  |          | Indoor Sensor Assembly      | 1    |                             |
| 21  |          | Electrical Box              | 1    |                             |
| 22  |          | Electrical Box Cover        | 1    |                             |
| 23  |          | Vane Motor                  | 1    |                             |
| 24  |          | Indoor Motor                | 1    |                             |
| 25  |          | Indoor Motor Cover          | 1    |                             |
| 26  |          | Drainage Hose               | 1    |                             |
| 27  |          | Remote Controller           | 1    | Not shown in Explosion view |
| 28  |          | Remote Controller Supporter | 1    |                             |
| 29  |          | Indoor Carton               | 1    |                             |
| 30  |          | Left Foaming                | 1    |                             |
| 31  |          | Right Foaming               | 1    |                             |

**Outdoor Unit- ACV24WA2-O**

| No. | Part No. | Part Name                                  | Q'ty | Remark                      |
|-----|----------|--------------------------------------------|------|-----------------------------|
| 1   |          | Grille                                     | 1    |                             |
| 2   |          | Top cover                                  | 1    |                             |
| 3   |          | Condenser                                  | 1    |                             |
| 4   |          | Outdoor motor supporter                    | 1    |                             |
| 5   |          | Outdoor motor                              | 1    |                             |
| 6   |          | Propeller fan                              | 1    |                             |
| 7   |          | Left grille supporter                      | 1    |                             |
| 8   |          | Front plate                                | 1    |                             |
| 9   |          | Fan guard                                  | 1    |                             |
| 10  |          | Capillary assembly                         | 1    |                             |
| 11  |          | Compressor and accessories                 | 1    |                             |
| 12  |          | Discharge Pipe                             | 1    |                             |
| 13  |          | Suction Pipe                               | 1    |                             |
| 14  |          | Base                                       | 1    |                             |
| 15  |          | Two-way valve                              | 1    |                             |
| 16  |          | Valve supporter                            | 1    |                             |
| 17  |          | Three-way valve                            | 1    |                             |
| 18  |          | Right plate                                | 1    |                             |
| 19  |          | Electrical Box Cover                       | 1    |                             |
| 20  |          | Cable clamp                                | 1    |                             |
|     |          | Cable clamp                                | 1    |                             |
| 21  |          | Terminal                                   | 1    |                             |
| 22  |          | Outdoor PCB Assembly                       | 1    |                             |
| 23  |          | Inductor                                   | 1    |                             |
| 23  |          | Partition plate                            | 1    |                             |
| 24  |          | Pipe Temp. sensor and outdoor Temp. sensor | 1    | Not shown in explosion view |
| 25  |          | Discharge Temp. sensor                     | 1    |                             |
| 26  |          | Base carton                                | 1    |                             |
| 27  |          | Cabinet carton                             | 1    |                             |
| 28  |          | Base foaming                               | 1    |                             |
| 29  |          | Cover foaming                              | 1    |                             |

## 7. Precaution

### 7.1 SAFETY RULES AND RECOMMENDATIONS FOR THE INSTALLATION

- Read this guide before installing and using the appliance.
- During the installation of the indoor and outdoor units the access to the working area should be forbidden to children.  
Unforeseeable accidents could happen.
- Make sure that the base of the outdoor unit is firmly fixed.
- Check that air cannot enter the refrigerant system and check for refrigerant leaks when moving the air conditioner.
- Check that air cannot enter the refrigerant system and check for refrigerant leaks when moving the air conditioner.
- The ratings of the fuse installed in the built in-control unit are T 5A / 250V.
- The user must protect the indoor unit with a fuse of suitable capacity for the maximum input current or with another overload protection device.
- Ensure that the mains voltage corresponds to that stamped on the rating plate. Keep the switch or power plug clean. Insert the power plug correctly and firmly into the socket, thereby avoiding the risk of electric shock or fire due to insufficient contact.
- Check that the socket is suitable for the plug, otherwise have the socket changed.
- The appliance must be fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under over voltage category III conditions, and these means must be incorporated in the fixed wiring in accordance with the wiring rules.
- The air conditioner must be installed by professional or qualified persons. Do not install the appliance at a distance of less than 50 cm from inflammable substances (alcohol, etc.) Or from pressurized containers (e.g. spray cans).
- If the appliance is used in areas without the possibility of ventilation, precautions must be taken to prevent any leaks of refrigerant gas from remaining in the environment and creating a danger of fire.
- The packaging materials are recyclable and should be disposed of in the separate waste bins. Take the air conditioner at the end of its useful life to a special waste collection center for disposal.
- Only use the air conditioner as instructed in this booklet. These instructions are not intended to cover every possible condition and situation. As with any electrical household appliance, common sense and caution are therefore always recommended for installation, operation and maintenance.
- The appliance must be installed in accordance with applicable national regulations.
- Before accessing the terminals, all the power circuits must be disconnected from the power supply.
- The appliance shall be installed in accordance with national wiring regulations.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or

instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

## **7.2 SAFETY RULES AND RECOMMENDATIONS FOR THE USER**

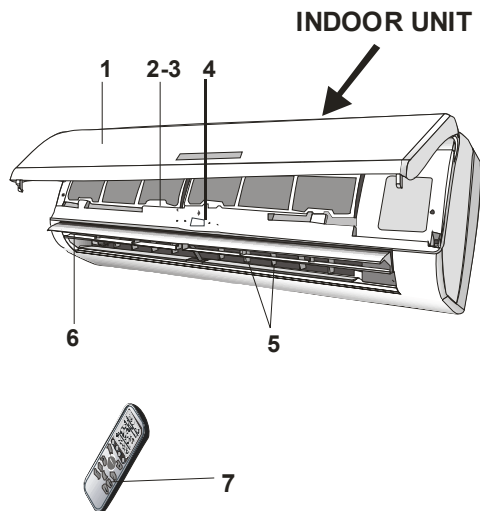
- Do not try to install the conditioner alone; always contact specialized technical personnel. Cleaning and maintenance must be carried out by specialized technical personnel. In any case disconnect the appliance from the mains electricity supply before carrying out any cleaning or maintenance.
- Ensure that the mains voltage corresponds to that stamped on the rating plate. Keep the switch or power plug clean. Insert the power plug correctly and firmly into the socket, thereby avoiding the risk of electric shock or fire due to insufficient contact.
- Do not pull out the plug to switch off the appliance when it is in operation, since this could create a spark and cause a fire, etc.
- This appliance has been made for air conditioning domestic environments and must not be used for any other purpose, such as for drying clothes, cooling food, etc.
- The packaging materials are recyclable and should be disposed of in the separate waste bins. Take the air conditioner at the end of its useful life to a special waste collection center for disposal.
- Always use the appliance with the air filter mounted. The use of the conditioner without air filter could cause an excessive accumulation of dust or waste on the inner parts of the device with possible subsequent failures.
- The user is responsible for having the appliance installed by a qualified technician, who must check that it is earthed in accordance with current legislation and insert a thermomagnetic circuit breaker.
- The batteries in remote controller must be recycled or disposed of properly. Disposal of Scrap Batteries  
--- Please discard the batteries as sorted municipal waste at the accessible collection point.
- Never remain directly exposed to the flow of cold air for a long time. The direct and prolonged exposition to cold air could be dangerous for your health. Particular care should be taken in the rooms where there are children, old or sick people.
- If the appliance gives off smoke or there is a smell of burning, immediately cut off the power supply and contact the Service Centre.
- The prolonged use of the device in such conditions could cause fire or electrocution.
- Have repairs carried out only by an authoritative Service Centre of the manufacturer. Incorrect repair could expose the user to the risk of electric shock, etc.
- Unhook the automatic switch if you foresee not to use the device for a long time.  
The airflow direction must be properly adjusted.
- The flaps must be directed downwards in the heating mode and upwards in the cooling mode.
- Only use the air conditioner as instructed in this booklet. These instructions are not intended to cover every possible condition and situation. As with any electrical household appliance, common sense and caution are therefore always recommended for installation, operation and maintenance.

- Ensure that the appliance is disconnected from the power supply when it will remain inoperative for a long period and before carrying out any cleaning or maintenance.
- Selecting the most suitable temperature can prevent damage to the appliance.

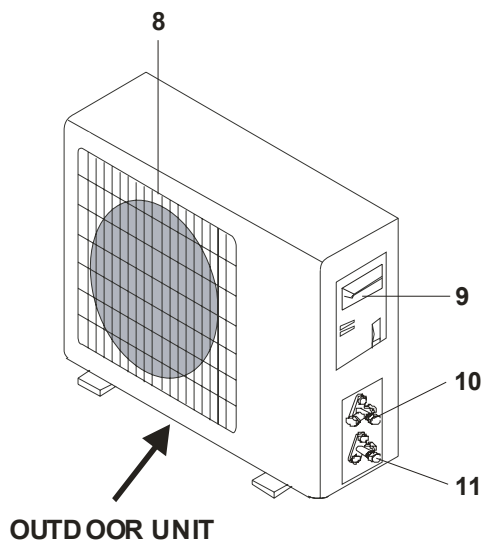
### **7.3 SAFETY RULES AND PROHIBITIONS**

- Do not bend, tug or compress the power cord since this could damage it. Electrical shocks or fire are probably due to a damaged power cord. Specialized technical personnel only must replace a damaged power cord.
- Do not use extensions or gang modules.
- Do not touch the appliance when barefoot or parts of the body are wet or damp.
- Do not obstruct the air inlet or outlet of the indoor or the outdoor unit. The obstruction of these openings causes a reduction in the operative efficiency of the conditioner with possible consequent failures or damages.
- In no way alter the characteristics of the appliance.
- Do not install the appliance in environments where the air could contain gas, oil or sulphur or near sources of heat.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Do not climb onto or place any heavy or hot objects on top of the appliance.
- Do not leave windows or doors open for long when the air conditioner is operating.
- Do not direct the airflow onto plants or animals.
- A long direct exposition to the flow of cold air of the conditioner could have negative effects on plants and animals.
- Do not put the conditioner in contact with water. The electrical insulation could be damaged and thus causing electrocution.
- Do not climb onto or place any objects on the outdoor unit
- Never insert a stick or similar object into the appliance. It could cause injury.
- Children should be supervised to ensure that they do not play with the appliance. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

## 8.Names of parts



| Indoor unit |                        |
|-------------|------------------------|
| No.         | Name                   |
| 1           | Front panel            |
| 2           | Air filter             |
| 3           | Special filter(option) |
| 4           | Display PCB            |
| 5           | Vertical vane          |
| 6           | Horizontal vane        |
| 7           | Remote controller      |



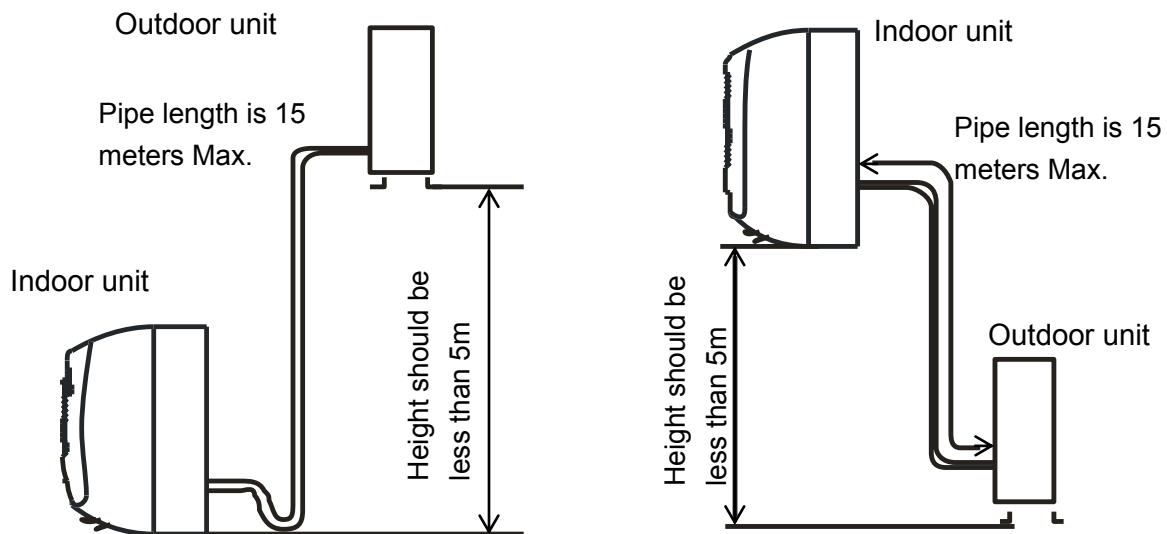
| Outdoor unit |                      |
|--------------|----------------------|
| No.          | Name                 |
| 8            | Air outlet grille    |
| 9            | Electronic box cover |
| 10           | 2-way valve          |
| 11           | 3-way valve          |

## 9. Installation manual

### 9.1 Installation Details

#### Connecting pipe length

| Model                 | Pipe size(Inch) |     |
|-----------------------|-----------------|-----|
|                       | Liquid          | Gas |
| ACV12WA2-I/ACV12WA2-O | 1/4             | 3/8 |
| ACV18WA2-I/ACV18WA2-O | 1/4             | 1/2 |
| ACV24WA2-I/ACV24WA2-O | 1/4             | 5/8 |



| Mode                  | Standard length: m | Refrigerant piping Max. length: m<br>A | Additional refrigerant B<br>Calculation: $\times g = Bg/m(A-5m)$ |
|-----------------------|--------------------|----------------------------------------|------------------------------------------------------------------|
| ACV12WA2-I/ACV12WA2-O | 5.0                | 25                                     | 20g/m                                                            |
| ACV18WA2-I/ACV18WA2-O | 5.0                | 25                                     | 30g/m                                                            |
| ACV24WA2-I/ACV24WA2-O | 5.0                | 25                                     | 30g/m                                                            |

#### Connecting cables

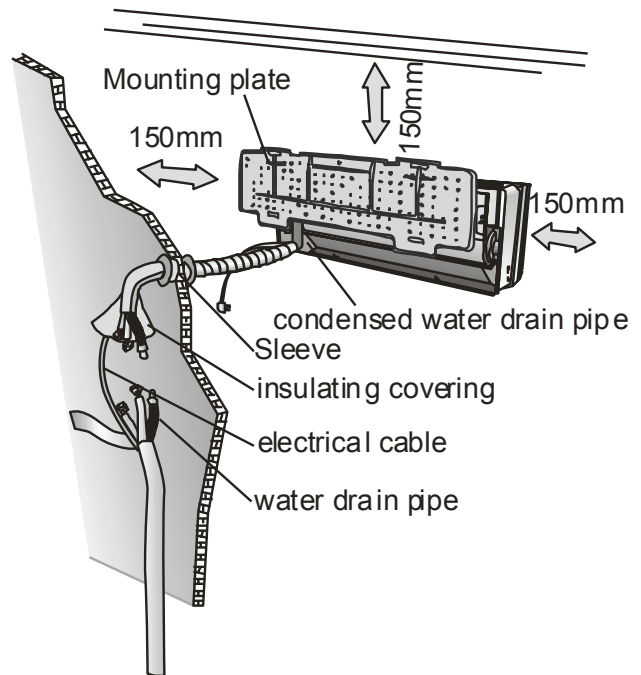
The power cord should be selected according to the following specifications sheet.

| Appliance Amps | Wire Size                   |
|----------------|-----------------------------|
| 5              | AWG21/0.75 mm <sup>2</sup>  |
| 10             | AWG18/1.0 mm <sup>2</sup>   |
| 13             | AWG15 /1. 5 mm <sup>2</sup> |
| 18             | AWG14/1.6 mm <sup>2</sup>   |
| 25             | AWG12/2.0 mm <sup>2</sup>   |
| 30             | AWG10/2.5 mm <sup>2</sup>   |

## 9.2 Installation for the first time

### Indoor unit

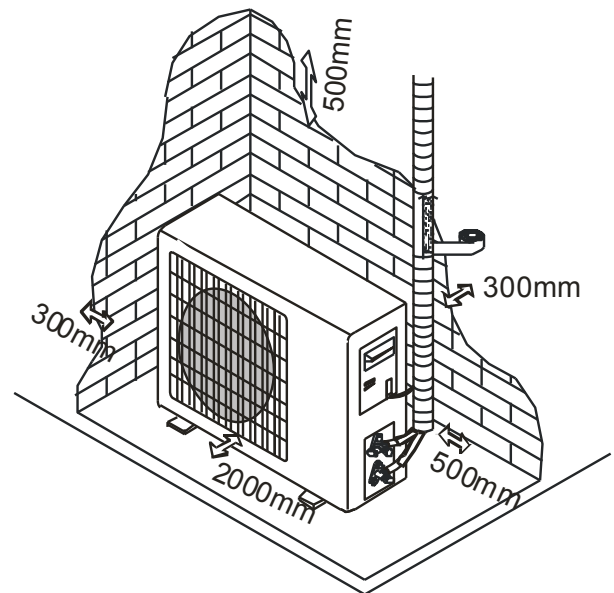
- Install the indoor unit level on a strong wall that is not subject to vibrations
- The inlet and outlet ports should not be obstructed: the air should be able to blow all over the room.
- Do not install the unit near a source of heat, steam, or flammable gas.
- Install the unit near an electric socket or private circuit.
- Do not install the unit where it will be exposed to direct sunlight.
- Install the unit where connection between indoor and outdoor unit is as easy as possible.
- Install the unit where it is easy to drain the condensed water.
- Check the machine operation regularly and leave the necessary spaces as shown in the picture.
- Install the indoor unit where the filter can be easily accessible.



Minimum space to be left (mm) showing in the picture.

### OUTDOOR UNIT

- Do not install the outdoor unit near sources of heat, steam or flammable gas.
- Do not install the unit in too windy or dusty places.
- Do not install the unit where people often pass. Select a place where the air discharge and operating sound level will not disturb the neighbours.
- Avoid installing the unit where it will be exposed to direct sunlight (other wise use a protection, if necessary, that should not interfere with the air flow).
- Leave the spaces as shown in the picture for
- The air to circulate freely.
- Install the outdoor unit in a safe and solid place.
- If the outdoor unit is subject to vibration, place rubber gaskets onto the feet of the unit.
- Install the indoor unit in the room to be air conditioning, avoiding to installation in corridors or communal areas.



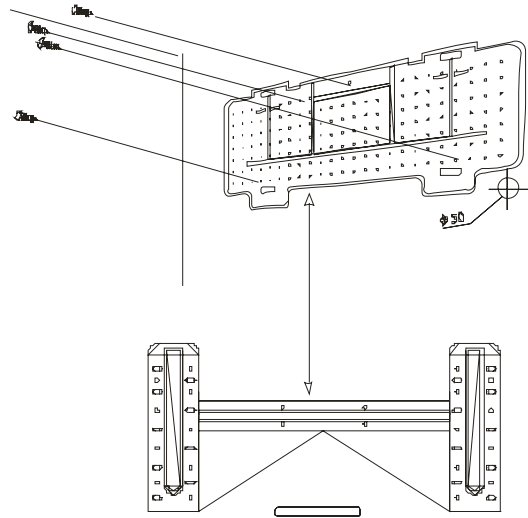
- Install the indoor unit at a height of at least 2.5m from the ground.

To install, proceed as follows:

### 9.2.1 Installation of the mounting plate.

- 1) By using a level, put the mounting plate in a perfect square position vertically and horizontally.
- 2) Drill 32mm deep holes in the wall to fix the plate.
- 3) Insert the plastic anchors into the hole.
- 4) Fix the mounting plate by using the provided tapping screws.
- 5) Check that the mounting plate is correctly fixed.

**Note: The shape of the mounting plate may be different from the one above, but installation method is similar.**

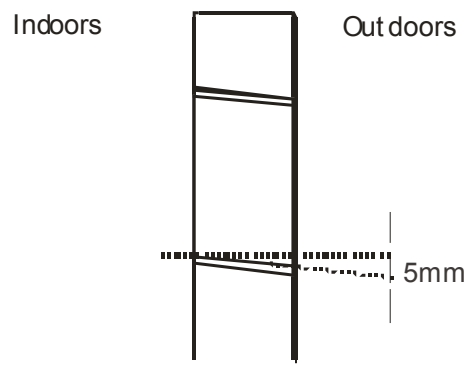


### 9.2.2 Drilling a hole in the wall for the piping

- 1) Decide where to drill the hole in the wall for the piping (if necessary) according to the position of the mounting plate
- 2) Install a flexible flange through the hole in the wall to keep the latter intact and clean.

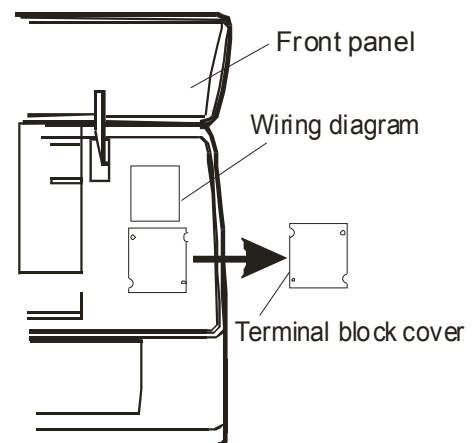
The hole must slope downwards towards the exterior.

Note: Keep the drain pipe down towards the direction of the wall hole, otherwise leakage may occur.



### 9.2.3 Electrical connections---Indoor unit

- 1).Lift the front panel.
- 2).Take off the cover as indicated in the picture (by removing a screw or by breaking the hooks).
- 3).For the electrical connections, see the circuit diagram on the right part of the unit under the front panel.
- 4).Connect the cable wires to the screw terminals by following the numbering. Use wire size suitable to the electric power input (see name plate on the unit) and according to all current national safety code requirements.
- 5).The cable connecting the outdoor and indoor units must be suitable for outdoor use.
- 6).The plug must be accessible also after the appliance has been installed so that it can be pulled out if necessary.

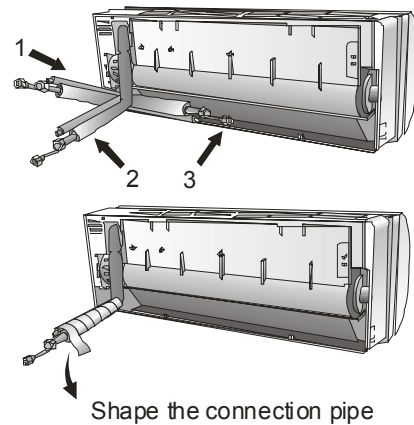


- 7).An efficient earth connection must be ensured.
- 8).If the power cable is damaged, it must be replaced by an authorized Service Centre.

#### 9.2.4 Refrigerant piping connection

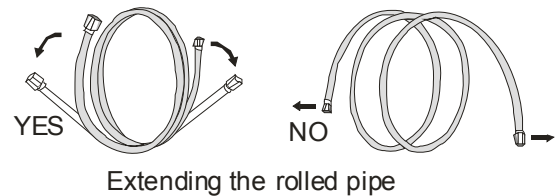
The piping can be run in the 3 directions indicated by numbers in the picture. When the piping is run in direction 1 or 3, cut a notch along the groove on the side of the indoor unit with a cutter.

Run the piping in the direction of the wall hole and bind the copper pipes, the drain pipe and the power cables together with the tape with the drain pipe at the bottom, so that water can flow freely.



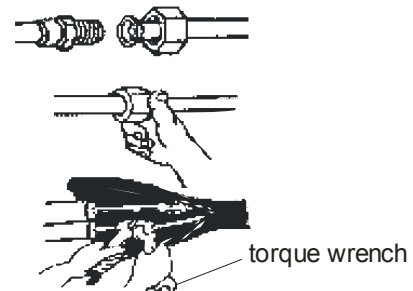
#### 9.2.5 Connecting the pipes.

- Do not remove the cap from the pipe until connecting it, to avoid dampness or dirt from entering.
- If the pipe is bent or pulled too often, it will become stiff. Do not bend the pipe more than three times at one point.
- When extending the rolled pipe, straighten the pipe by unwinding it gently as shown in the picture.



#### 9.2.6 Connections to the indoor unit

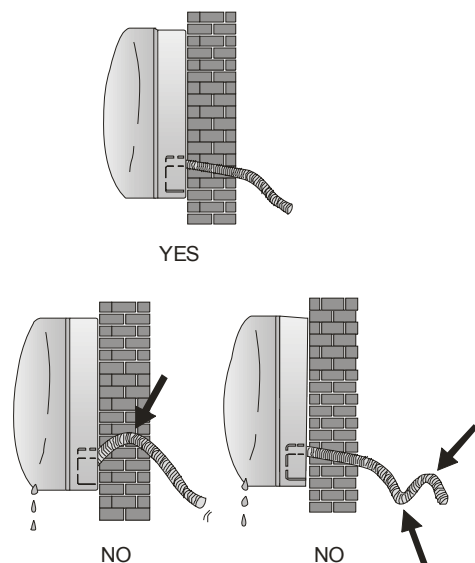
- 1).Remove the indoor unit pipe cap (check that there is no debris inside).
- 2).Insert the flare nut and create a flange at the extreme end of the connection pipe.
- 3).Tighten the connections by using two wrenches working in opposite directions.



#### 9.2.7 Indoor unit condensed water drainage

The indoor unit condensed water drainage is fundamental for the success of the installation.

- 1).Place the drain hose below the piping, taking care not to create siphons.
- 2).The drain hose must slant downwards to aid drainage.
- 3).Do not bend the drain hose or leave it protruding or twisted and do not put the end of it in water. If an extension is connected to the drain hose, ensure that it is lagged when it passes into the indoor unit.

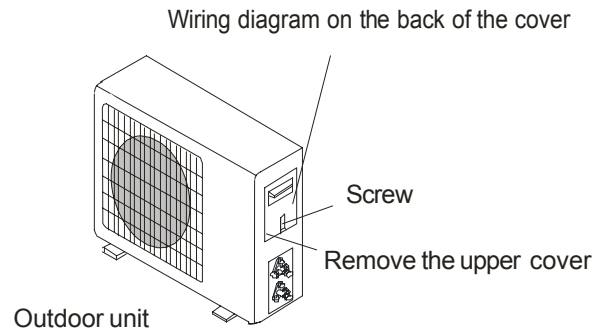


4). If the piping is installed to the right, the pipes, power cable and drain hose must be lagged and secured onto the rear of the unit with a pipe connection.

- Insert the pipe connection into the relative slot.
- Press to join the pipe connection to the base.

### 9.2.8 Electronic connections

1. Take the cover away.
2. Connect the cable wires to the terminal board using the same numbering as in the indoor unit.
3. For the electrical connections, see the wiring diagram on the back of the cover
4. Fasten the cables with a cable-clamp.
5. An efficient earth connection must be ensured.
6. Replace the covers.



### 9.2.9 Connecting the pipe

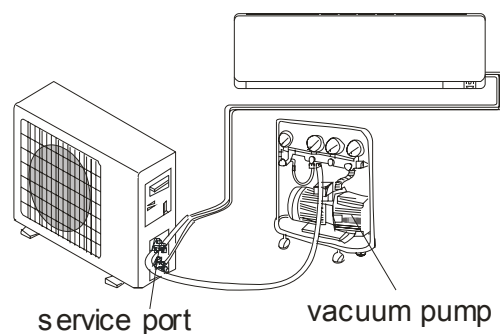
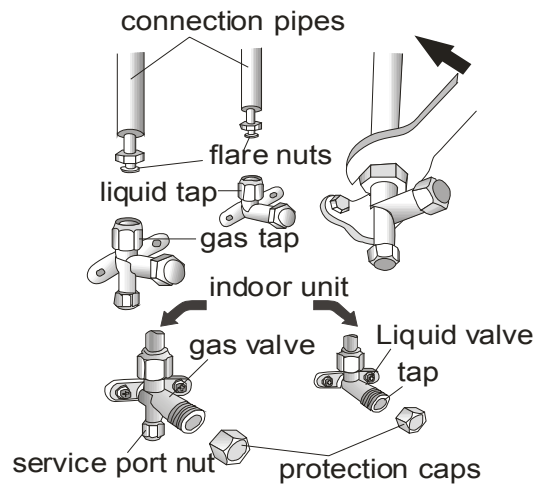
Screw the flare nuts to the outdoor unit coupling with the same tightening procedures described for the indoor unit.

Note: If the tightening torque is not sufficient, there will probably be some leakage. With excessive tightening torque there will also be some leakage, as the flange could be damaged.

### 9.2.10 Bleeding

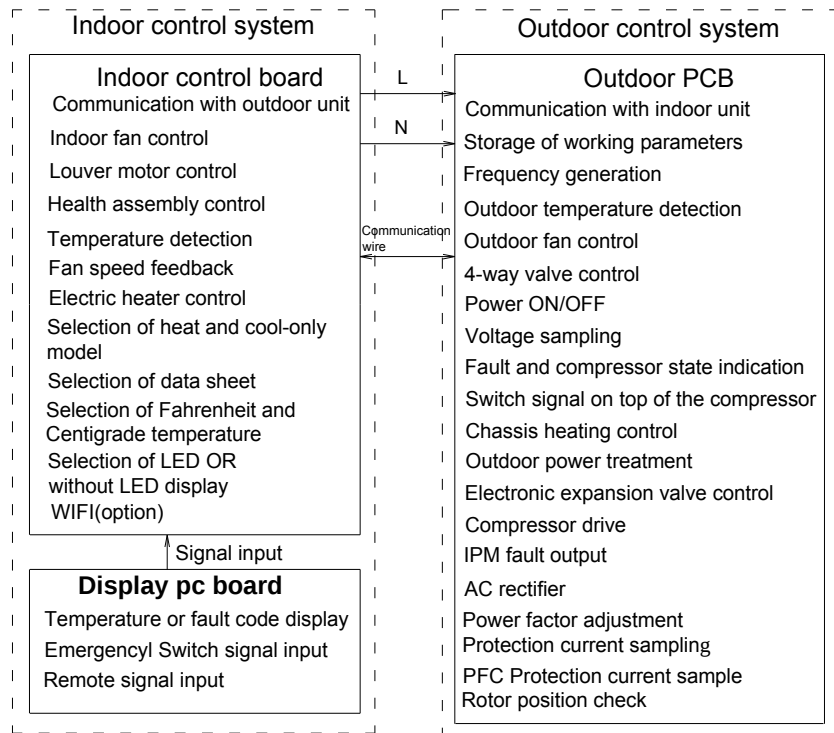
Air and humidity left inside the refrigerant circuit can cause compressor malfunction. After having connected the indoor and outdoor units, bleed the air and humidity from the refrigerant circuit by using a vacuum pump.

The air and humidity left inside the refrigerant circulation can cause compressor malfunction. After having connected the indoor and outdoor units, bleed the air and humidity from the refrigerant circulation using a vacuum pump.



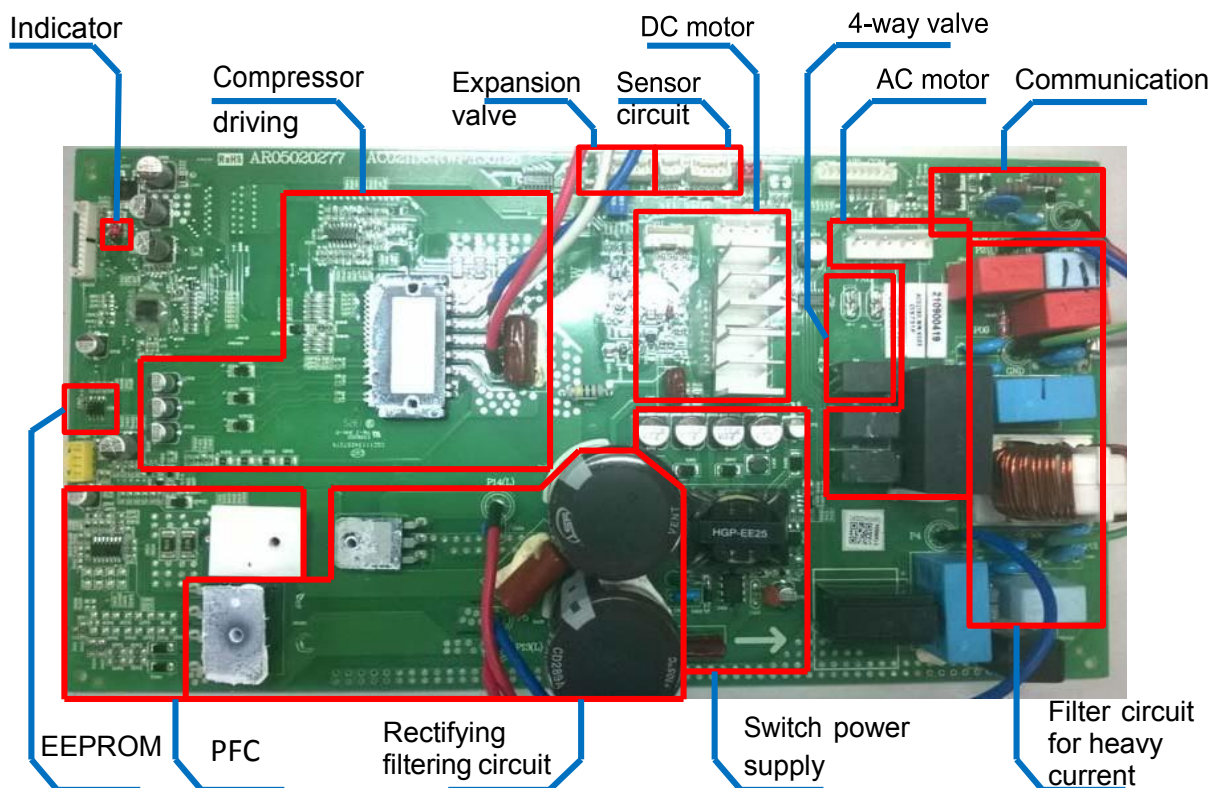
## 10. Trouble shooting

### 10.1 Outdoor control diagram

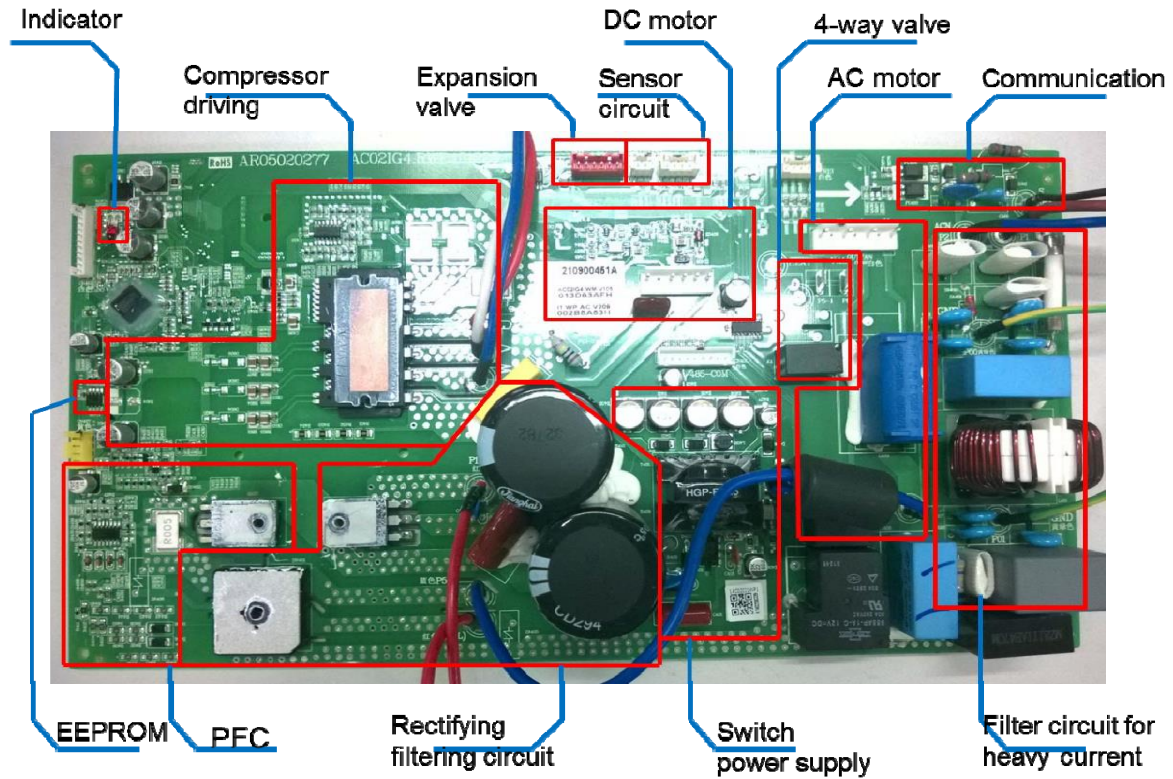


### 10.2 The structure of ODU PCB

ACV12WA2-I/ACV12WA2-O

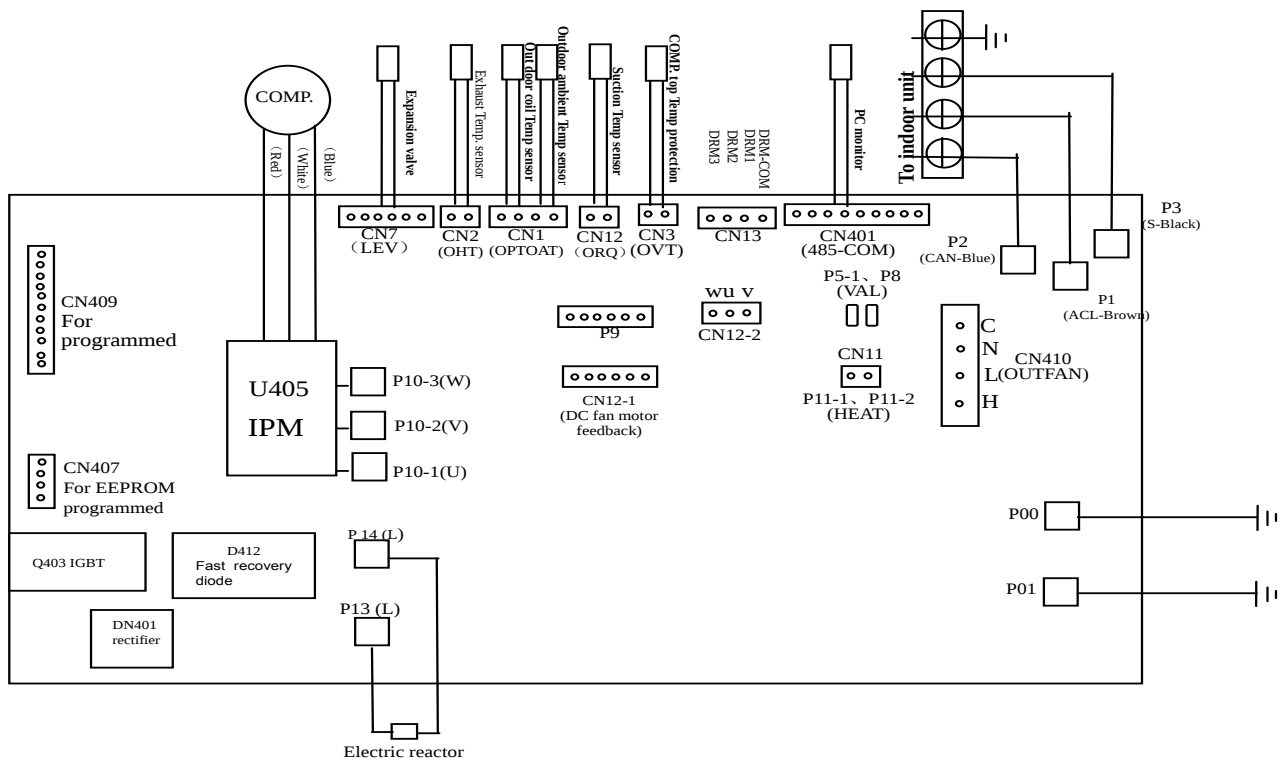


ACV18WA2-I/ACV18WA2-O,ACV24WA2-I/ACV24WA2-O

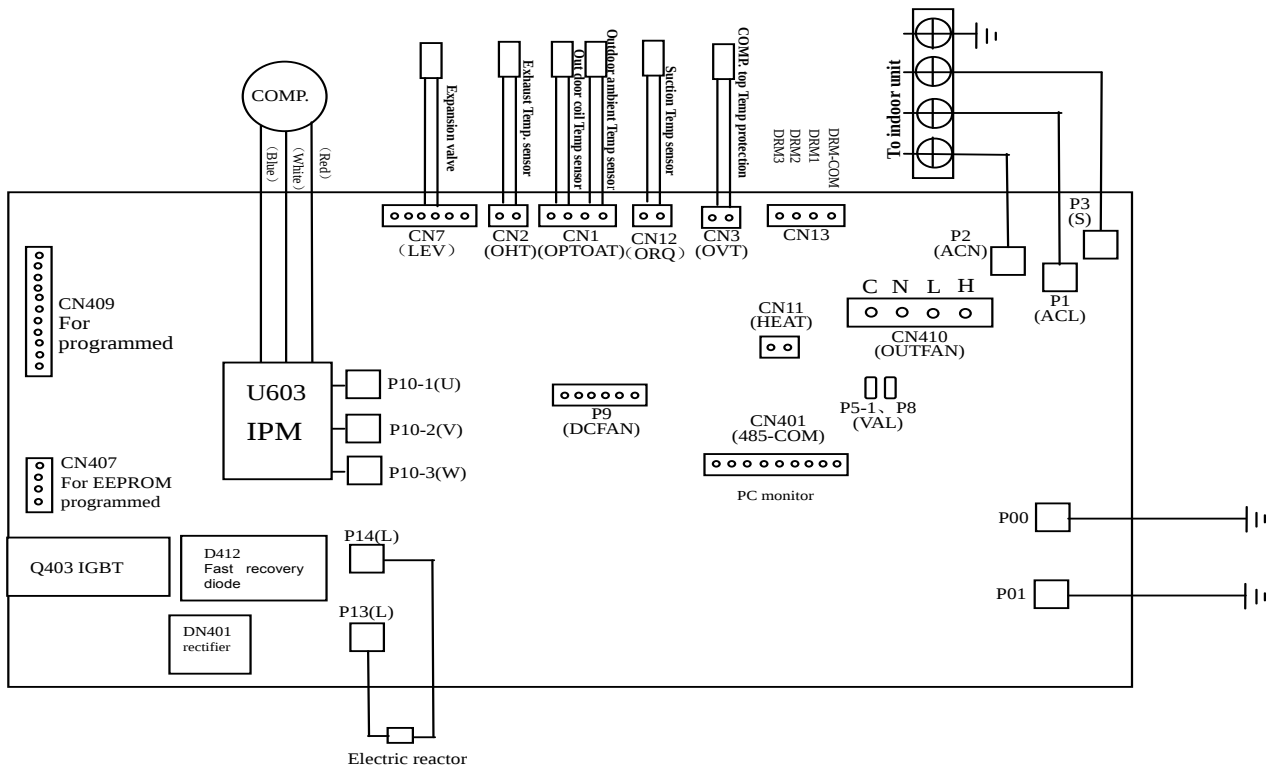


10.3 Connection of ODU PCB

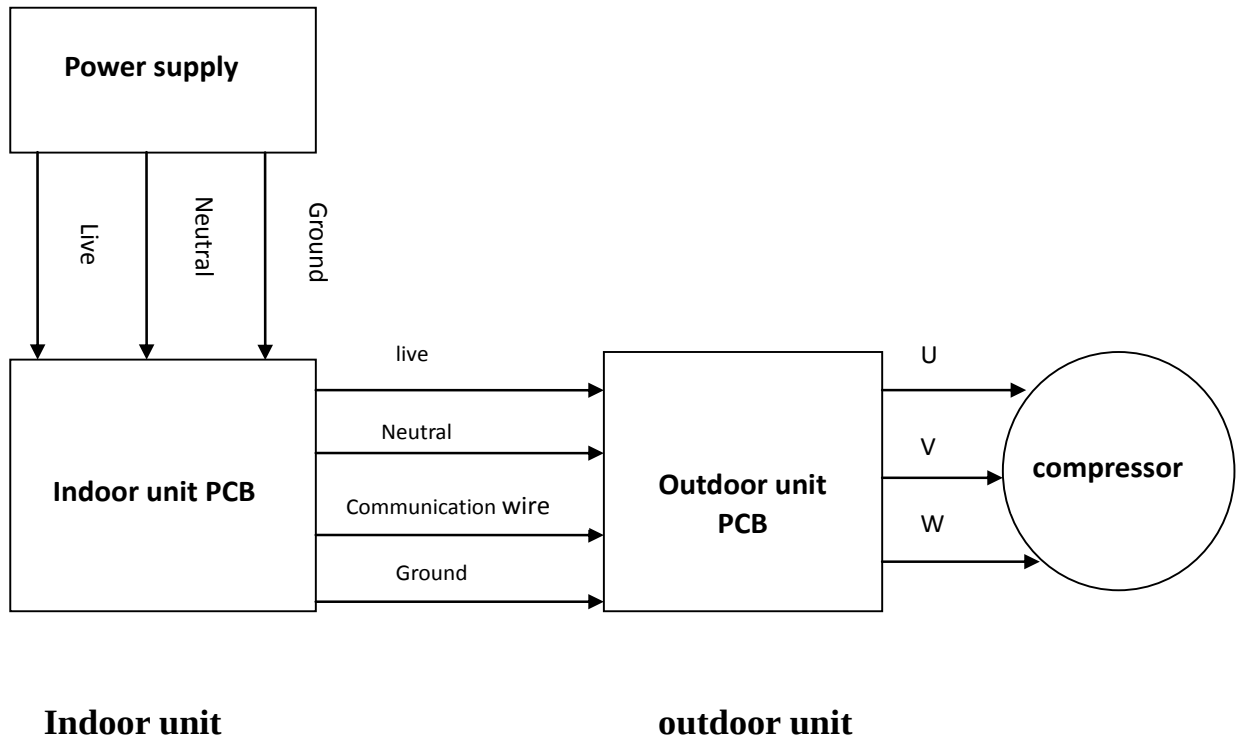
ACV12WA2-I/ACV12WA2-O



ACV18WA2-I/ACV18WA2-O,ACV24WA2-I/ACV24WA2-O



#### 10.4 Current flow

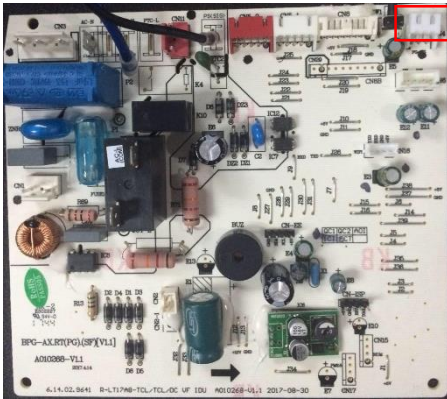


## 10.5 Examples of repairing

### 10.5.1 Display E1 or E2

#### Reasons:

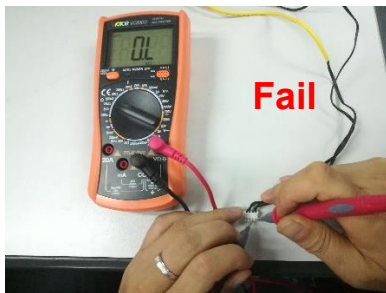
- 1) The sensor connection terminal loose or not plugged in.



**Solution:** Check the connector of sensor and slot (CN6), if loose or not plugged in, please connect again.

- 2) Room temperature sensor (IRT) and Indoor pipe (coil) temperature sensor (IPT) damage (short or broken).

**Solution:** check the resistance of the sensor R (25°C) =5 kΩ, if short or broken please replace it.



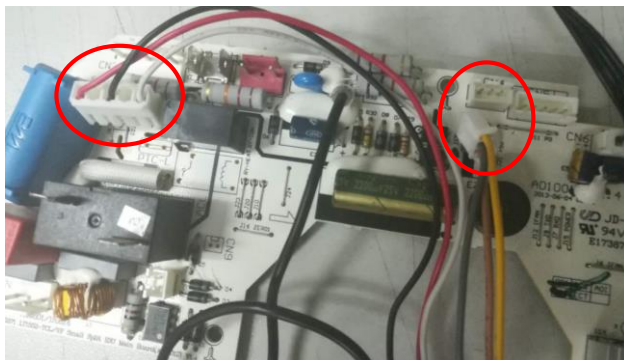
- 3) The PCB fail.

**Solution:** Replace the indoor main PCB.

### 10.5.2 Display E6

#### Reasons:

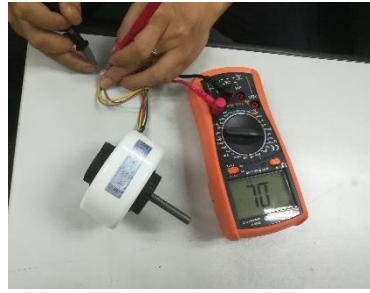
- 1) The indoor motor connection terminal loose or not plugged in.



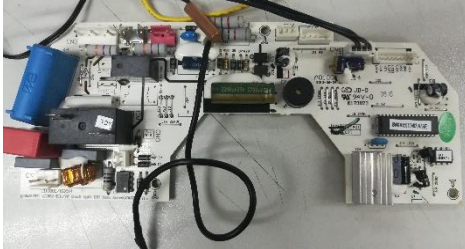
**Solution:** Check the connector of indoor motor and slot (CN3) and (CN4), if loose or not plugged in, please connect again.

- 2) The indoor motor damage.

**Solution:** Check and replace the motor.



3) The indoor main PCB damage.



**Solution:** Replace the indoor main PCB.

### 10.5.3 Display E3, E7

**Reasons:**

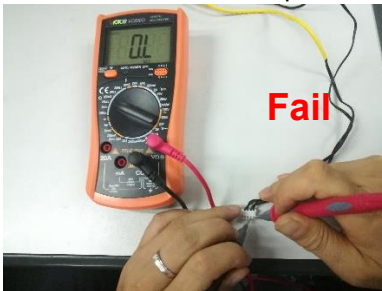
- 1) Outdoor pipe temp sensor, outdoor temp sensor & exhaust temp sensor connection terminal loose or not plugged in.



**Solution:** Check the connector of sensor and slot, if loose or not plugged in, please connect again.

- 2) Outdoor pipe temp sensor, outdoor temp sensor & exhaust temp sensor damage (short or broken).

**Solution:** Check and replace the sensor.



3) Outdoor PCB damage.

**Solution:** Check and replace the outdoor PCB.

### 10.5.4 Display E8

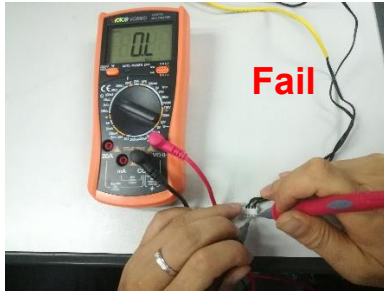
**Reasons:**

- 1) Outdoor discharge pipe temp sensor connection terminal loose or not plugged in.



**Solution:** Check the connector of sensor and slot, if loose or not plugged in, please connect again.

2) Outdoor pipe temp sensor damage.



Solution: Check and replace the sensor.

3) Outdoor PCB damage.

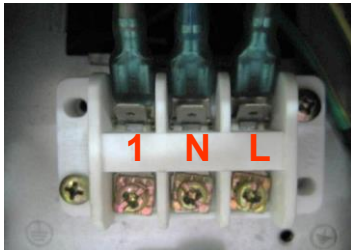
Solution: Check and replace the outdoor PCB.

### 10.5.5 Display E0, E5

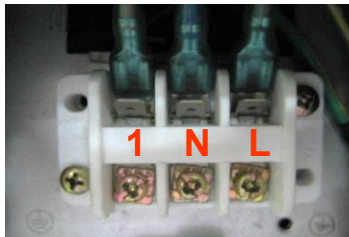
**Reason:** Indoor / outdoor communication damage.

**Solution:**

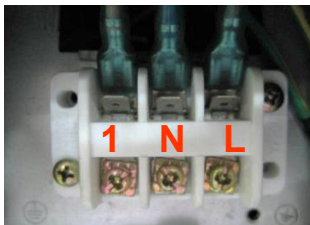
- 1) Check if the indoor and outdoor connections are correct. The terminal L and N which connect to indoor unit shall correspond to each other on indoor and outdoor units. Measure the voltage on outdoor terminal L and N (before display of E0 fault). If the voltage is "0", please replace indoor main PCB.



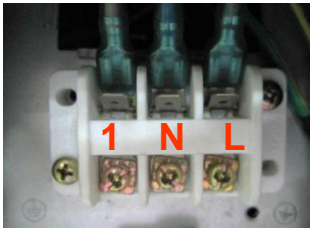
- 2) If the 1 & N which connect to indoor unit voltage is normal, measure the voltage between the outdoor terminal 1 and N. If the voltage change occurs between 0~24V (change pulse voltage), please replace outdoor PCB.



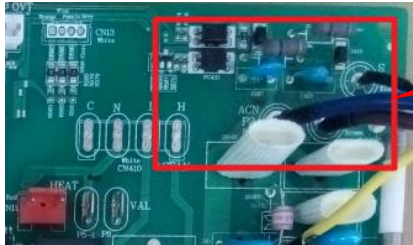
- 3) If the 1 & N which connect to indoor unit voltage is normal, measure the voltage between the outdoor terminal 1 and N. If the voltage change occurs between 0~12V (change pulse voltage), but there is no 24V, please replace the indoor PCB.



- 4) If the 1 & N voltage is normal, measure the voltage between the outdoor terminal 1 and N. If the voltage has no change, firstly replace the indoor main PCB. If the fault remains unsolved, replace the outdoor PCB.



5) Communication fault if resistance or optical coupler broken, replace outdoor PCB.



Communication circuit

6) Is there any burnt on PCB? If no, test the rectifier, FRD, IGBT etc. any component broken, replace PCB.

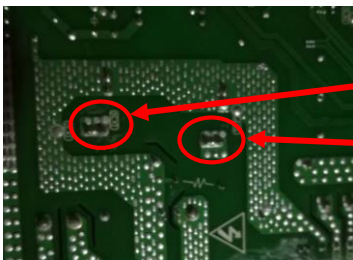


Any of 2 pins should be no short circuit

Any of 2 pins should be no short circuit

Any of 2 pins should be no short circuit

7) Test the DC voltage between DC+ and DC-. If the voltage is less than 50V approximately, please replace outdoor PCB.



DC-

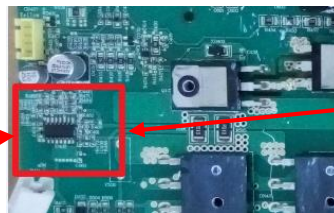
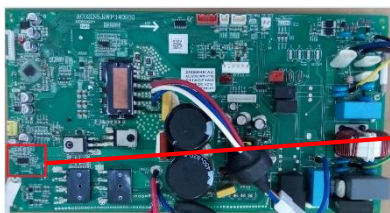
DC+

#### 10.5.6 Display EA

**Reason: Current sensor fault.**

**Solution:**

- 1) Check for refrigerant leakage, to find the leakage point and recharge the refrigerant.
- 2) Current sampling circuit broken on the outdoor PCB and replace outdoor PCB.



Current sampling circuit

#### 10.5.7 Display E9 (first display P0 or P9)

**Reason: Outdoor PCB drive circuit damage.**

**Solution:**

Re-energize and check the protection code on display. Firstly display P0.

- 1) If this code is displayed when the compressor is started for several seconds or even not started, check the compressor connection for correctness, if no insert wrong, replace outdoor PCB.



Compressor connection

- 2) Check if the outdoor module is tightly installed onto the radiating fins and if the silicone is applied evenly, fix the screws again if loose.



Heat radiation problem easily happened while the screw is not fixed tightly.

- 3) Check the system pressure, recharge refrigerant if the pressure is low, and discharge some refrigerant if the pressure is too high.
  - 4) Check the outdoor ventilation and if there is any obstruction that affects the normal radiating of the air conditioner, and installation again.
  - 5) If the above inspections are normal, but the fault remains unsolved, please replace the outdoor PCB.
- Re-energize and check the protection code on display. Firstly display P9.
- a) Check the U,V, W connection, if is correctness or loose please connect again.



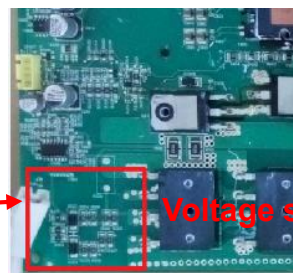
U, V, W connection

- b) If this code is displayed when the compressor is started for several seconds or even not started, check the compressor connection for correctness, if no insert wrong, replace outdoor PCB.

**10.5.8 Display EU.**

Reason: Voltage sensor damage.

Solution: Please replace outdoor PCB.

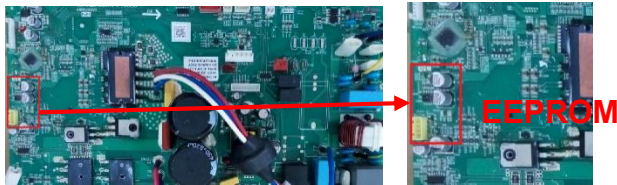


Voltage sensor

**10.5.9 Display EE**

Reason: EEPROM fault.

**Solution:** Shut down power supply and reenergize it, if the fault remains there, check the EEPROM installation, if no problem, please replace outdoor PCB.



### 10.5.10 Display CL

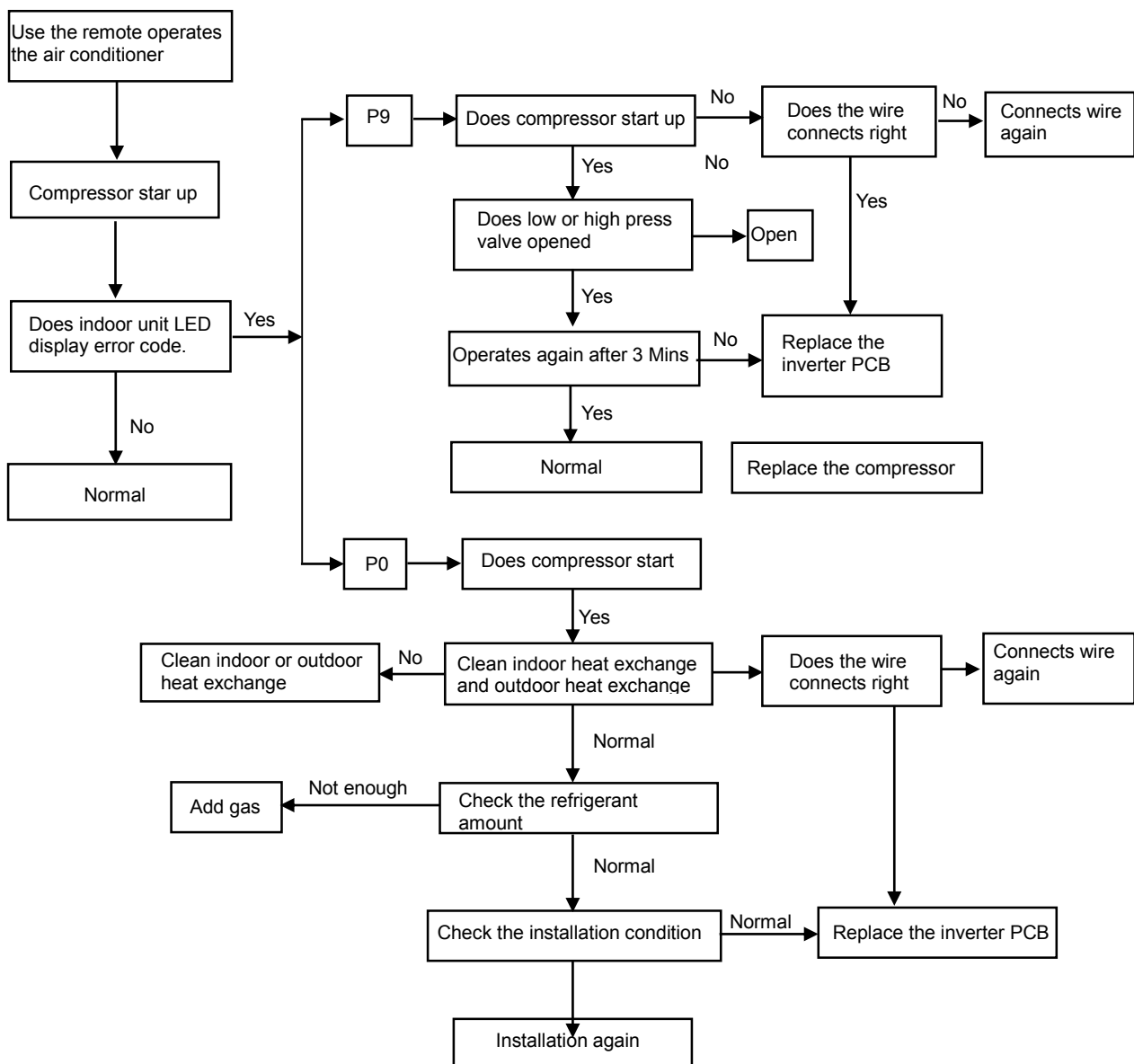
Cause: Air filter dirty, the unit operation Cumulative time 500 hours, the controller will confirmation the filter dirty and display CL.

Solution: Clean the air filter then cut off the power and supply again.

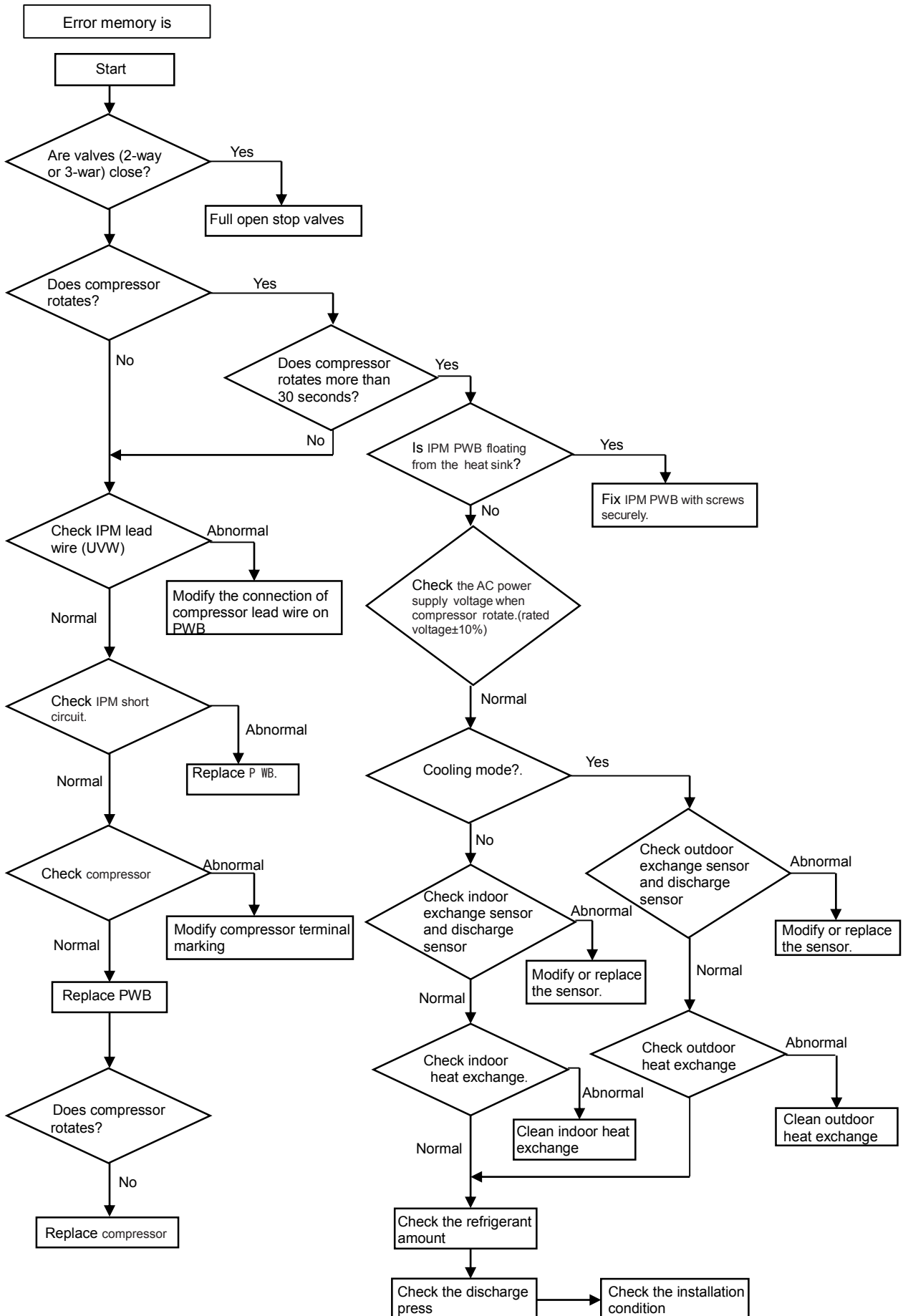
## 10.6 MALFUNCTION (PARTS) CHECK METHOD

### 10.6.1 Procedure for determining defective outdoor unit IPM/compressor

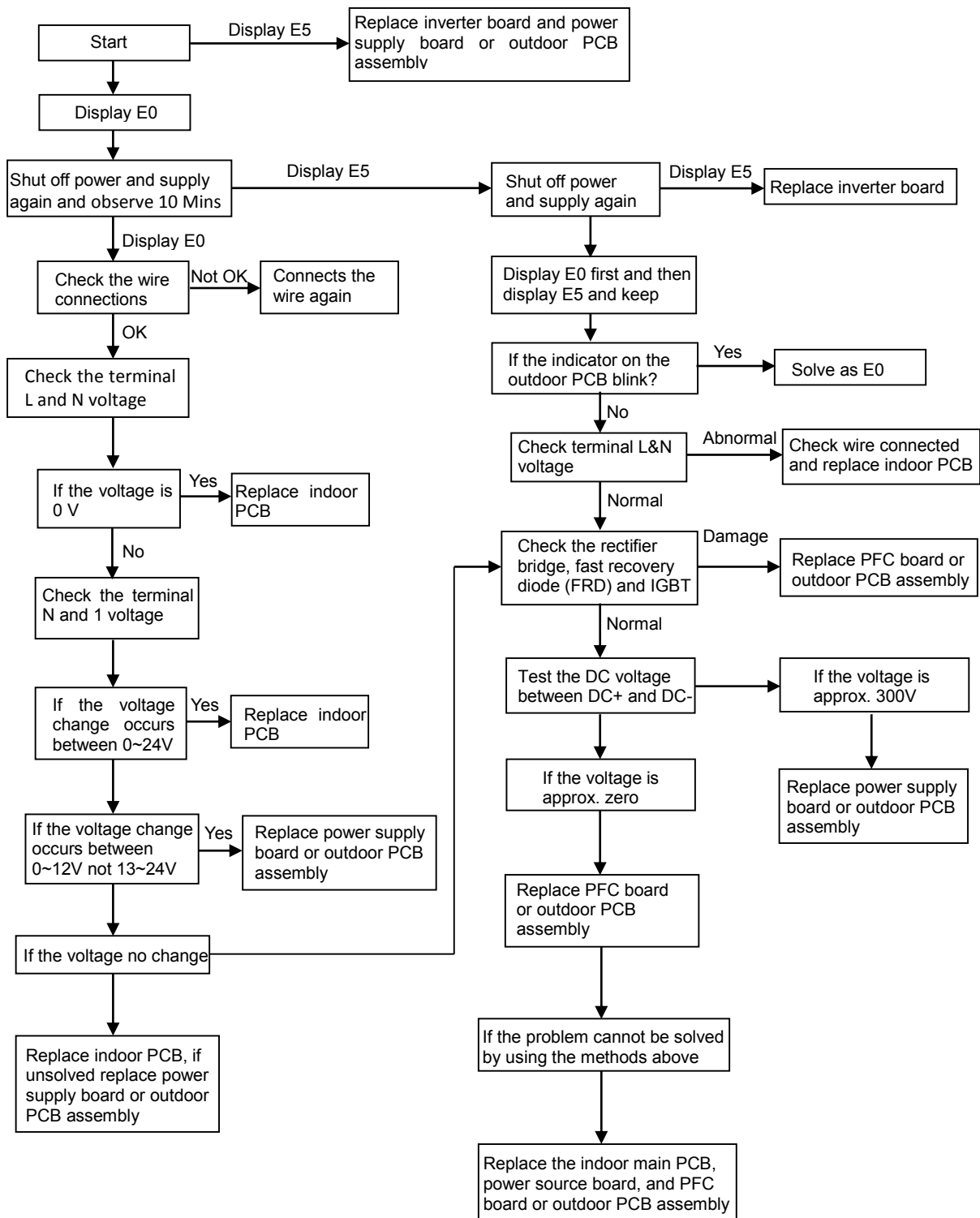
The following flow chart shows a procedure for locating the cause of a malfunction when the compressor does not start up and a DC overcurrent indication error occurs.



### 10.6.2 DC Over Current Error



## 10.6.3 E0,E5 Error

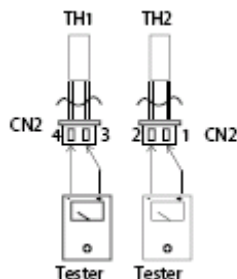


## 10.7 THERMISTOR TEMPERATURE CHARACTERISTICS

### 1. Indoor unit and outdoor exchange temperature and outside air temperature sensor temperature characteristics

| TEMP.<br>(°C) | Resistance<br>(k Ohm) | Voltage of<br>resistance | TEMP.<br>(°C) | Resistance<br>(k Ohm) | Voltage of<br>resistance | TEMP.<br>(°C) | Resistance<br>(k Ohm) | Voltage of<br>resistance |
|---------------|-----------------------|--------------------------|---------------|-----------------------|--------------------------|---------------|-----------------------|--------------------------|
| -30           | 63.513                | 4.628                    | 15            | 7.447                 | 2.968                    | 60            | 1.464                 | 1.115                    |
| -29           | 60.135                | 4.609                    | 16            | 7.148                 | 2.918                    | 61            | 1.418                 | 1.088                    |
| -28           | 56.956                | 4.589                    | 17            | 6.863                 | 2.868                    | 62            | 1.374                 | 1.061                    |
| -27           | 53.963                | 4.568                    | 18            | 6.591                 | 2.819                    | 63            | 1.331                 | 1.035                    |
| -26           | 51.144                | 4.547                    | 19            | 6.332                 | 2.769                    | 64            | 1.290                 | 1.009                    |
| -25           | 48.488                | 4.524                    | 20            | 6.084                 | 2.720                    | 65            | 1.250                 | 0.984                    |
| -24           | 45.985                | 4.501                    | 21            | 5.847                 | 2.671                    | 66            | 1.212                 | 0.960                    |
| -23           | 43.627                | 4.477                    | 22            | 5.621                 | 2.621                    | 67            | 1.175                 | 0.936                    |
| -22           | 41.403                | 4.452                    | 23            | 5.404                 | 2.572                    | 68            | 1.139                 | 0.913                    |
| -21           | 39.305                | 4.426                    | 24            | 5.198                 | 2.524                    | 69            | 1.105                 | 0.890                    |
| -20           | 37.326                | 4.399                    | 25            | 5.000                 | 2.475                    | 70            | 1.072                 | 0.868                    |
| -19           | 35.458                | 4.371                    | 26            | 4.811                 | 2.427                    | 71            | 1.040                 | 0.847                    |
| -18           | 33.695                | 4.343                    | 27            | 4.630                 | 2.379                    | 72            | 1.009                 | 0.825                    |
| -17           | 32.030                | 4.313                    | 28            | 4.457                 | 2.332                    | 73            | 0.979                 | 0.805                    |
| -16           | 30.458                | 4.283                    | 29            | 4.292                 | 2.285                    | 74            | 0.950                 | 0.785                    |
| -15           | 28.972                | 4.252                    | 30            | 4.133                 | 2.238                    | 75            | 0.922                 | 0.765                    |
| -14           | 27.567                | 4.219                    | 31            | 3.981                 | 2.192                    | 76            | 0.895                 | 0.746                    |
| -13           | 26.239                | 4.186                    | 32            | 3.836                 | 2.146                    | 77            | 0.869                 | 0.728                    |
| -12           | 24.984                | 4.152                    | 33            | 3.697                 | 2.101                    | 78            | 0.843                 | 0.710                    |
| -11           | 23.795                | 4.117                    | 34            | 3.563                 | 2.057                    | 79            | 0.819                 | 0.692                    |
| -10           | 22.671                | 4.082                    | 35            | 3.435                 | 2.012                    | 80            | 0.795                 | 0.675                    |
| -9            | 21.606                | 4.045                    | 36            | 3.313                 | 1.969                    | 81            | 0.773                 | 0.658                    |
| -8            | 20.598                | 4.008                    | 37            | 3.195                 | 1.926                    | 82            | 0.751                 | 0.641                    |
| -7            | 19.644                | 3.969                    | 38            | 3.082                 | 1.883                    | 83            | 0.729                 | 0.625                    |
| -6            | 18.732                | 3.930                    | 39            | 2.974                 | 1.842                    | 84            | 0.709                 | 0.610                    |
| -5            | 17.881                | 3.890                    | 40            | 2.870                 | 1.800                    | 85            | 0.689                 | 0.595                    |
| -4            | 17.068                | 3.850                    | 41            | 2.770                 | 1.760                    | 86            | 0.669                 | 0.580                    |
| -3            | 16.297                | 3.808                    | 42            | 2.674                 | 1.720                    | 87            | 0.651                 | 0.566                    |
| -2            | 15.565                | 3.766                    | 43            | 2.583                 | 1.681                    | 88            | 0.633                 | 0.552                    |
| -1            | 14.871                | 3.723                    | 44            | 2.494                 | 1.642                    | 89            | 0.615                 | 0.538                    |
| 0             | 14.212                | 3.680                    | 45            | 2.410                 | 1.604                    | 90            | 0.598                 | 0.525                    |
| 1             | 13.586                | 3.635                    | 46            | 2.328                 | 1.567                    | 91            | 0.582                 | 0.512                    |
| 2             | 12.991                | 3.590                    | 47            | 2.250                 | 1.530                    | 92            | 0.566                 | 0.499                    |
| 3             | 12.426                | 3.545                    | 48            | 2.174                 | 1.495                    | 93            | 0.550                 | 0.487                    |
| 4             | 11.889                | 3.499                    | 49            | 2.102                 | 1.459                    | 94            | 0.535                 | 0.475                    |
| 5             | 11.378                | 3.452                    | 50            | 2.032                 | 1.425                    | 95            | 0.521                 | 0.463                    |
| 6             | 10.893                | 3.406                    | 51            | 1.965                 | 1.391                    | 96            | 0.507                 | 0.452                    |
| 7             | 10.431                | 3.358                    | 52            | 1.901                 | 1.357                    | 97            | 0.493                 | 0.441                    |
| 8             | 9.991                 | 3.310                    | 53            | 1.839                 | 1.325                    | 98            | 0.480                 | 0.430                    |
| 9             | 9.573                 | 3.262                    | 54            | 1.779                 | 1.293                    | 99            | 0.467                 | 0.419                    |
| 10            | 9.174                 | 3.214                    | 55            | 1.721                 | 1.262                    | 100           | 0.455                 | 0.409                    |
| 11            | 8.795                 | 3.165                    | 56            | 1.666                 | 1.231                    |               |                       |                          |
| 12            | 8.433                 | 3.116                    | 57            | 1.613                 | 1.201                    |               |                       |                          |
| 13            | 8.089                 | 3.067                    | 58            | 1.561                 | 1.172                    |               |                       |                          |
| 14            | 7.760                 | 3.017                    | 59            | 1.512                 | 1.143                    |               |                       |                          |

Resistance at 25℃: 5 kΩ.



TH1: indoor room temperature sensor and outside air temperature sensor

TH2: indoor exchange temperature sensor and outside exchange temperature sensor

Before measuring resistance, disconnect connectors as shown above.

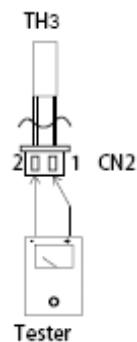
## 2. Outdoor unit sensor temperature characteristics

| TEMP.<br>(℃) | R min<br>(k Ohm) | R(t)<br>(k Ohm) | R max<br>(k Ohm) | TEMP.<br>(℃) | R min<br>(k Ohm) | R(t)<br>(k Ohm) | R max<br>(k Ohm) | TEMP.<br>(℃) | R min<br>(k Ohm) | R(t)<br>(k Ohm) | R max<br>(k Ohm) |
|--------------|------------------|-----------------|------------------|--------------|------------------|-----------------|------------------|--------------|------------------|-----------------|------------------|
| -30          | 283.3            | 322.9           | 367.7            | 24           | 19.36            | 20.89           | 22.52            | 78           | 2.563            | 2.654           | 2.745            |
| -29          | 267.4            | 304.4           | 346.3            | 25           | 18.55            | 20              | 21.54            | 79           | 2.481            | 2.567           | 2.654            |
| -28          | 252.5            | 287.1           | 307.4            | 26           | 17.77            | 19.14           | 20.6             | 80           | 2.402            | 2.484           | 2.567            |
| -27          | 238.5            | 270.9           | 307.4            | 27           | 17.03            | 18.32           | 19.7             | 81           | 2.327            | 2.404           | 2.483            |
| -26          | 225.4            | 255.7           | 289.8            | 28           | 16.32            | 17.55           | 18.85            | 82           | 2.254            | 2.327           | 2.401            |
| -25          | 213.1            | 241.4           | 273.3            | 29           | 15.65            | 16.81           | 18.04            | 83           | 2.183            | 2.253           | 2.323            |
| -24          | 201.5            | 228             | 257.9            | 30           | 15               | 16.1            | 17.27            | 84           | 2.115            | 2.182           | 2.248            |
| -23          | 190.6            | 215.5           | 243.4            | 31           | 14.39            | 15.43           | 16.54            | 85           | 2.05             | 2.113           | 2.176            |
| -22          | 180.3            | 203.6           | 229.8            | 32           | 13.81            | 14.79           | 15.34            | 86           | 1.985            | 2.047           | 2.109            |
| -21          | 170.7            | 192.5           | 217              | 33           | 13.25            | 14.18           | 15.17            | 87           | 1.922            | 1.983           | 2.045            |
| -20          | 161.6            | 182.1           | 205              | 34           | 12.72            | 13.6            | 14.54            | 88           | 1.861            | 1.922           | 1.983            |
| -19          | 153.1            | 172.3           | 193.7            | 35           | 12.21            | 13.05           | 13.93            | 89           | 1.802            | 1.862           | 1.923            |
| -18          | 145              | 163.1           | 183.2            | 36           | 11.72            | 12.52           | 13.36            | 90           | 1.746            | 1.805           | 1.865            |
| -17          | 137.5            | 154.4           | 173.2            | 37           | 11.26            | 12.01           | 12.81            | 91           | 1.692            | 1.75            | 1.809            |
| -16          | 130.3            | 146.2           | 163.9            | 38           | 10.82            | 11.53           | 12.29            | 92           | 1.639            | 1.697           | 1.755            |
| -15          | 123.6            | 138.5           | 155.1            | 39           | 10.29            | 11.07           | 11.78            | 93           | 1.589            | 1.646           | 1.703            |
| -14          | 117.3            | 131.3           | 146.8            | 40           | 9.986            | 10.63           | 11.31            | 94           | 1.54             | 1.596           | 1.653            |
| -13          | 111.3            | 124.4           | 139              | 41           | 9.6              | 10.21           | 10.85            | 95           | 1.493            | 1.549           | 1.604            |
| -12          | 105.6            | 118             | 131.7            | 42           | 9.231            | 9.813           | 10.42            | 96           | 1.448            | 1.502           | 1.558            |
| -11          | 100.3            | 111.9           | 124.7            | 43           | 8.878            | 9.43            | 10               | 97           | 1.404            | 1.458           | 1.512            |
| -10          | 95.24            | 106.2           | 118.2            | 44           | 8.54             | 9.064           | 9.612            | 98           | 1.362            | 1.415           | 1.469            |
| -9           | 90.49            | 100.8           | 112.1            | 45           | 8.217            | 8.714           | 9.233            | 99           | 1.321            | 1.373           | 1.426            |
| -8           | 85.99            | 95.68           | 106.3            | 46           | 7.908            | 8.38            | 8.872            | 100          | 1.284            | 1.335           | 1.387            |
| -7           | 81.75            | 90.86           | 100.8            | 47           | 7.612            | 8.06            | 8.526            | 101          | 1.245            | 1.296           | 1.348            |
| -6           | 77.74            | 86.31           | 95.74            | 48           | 7.328            | 7.754           | 8.196            | 102          | 1.209            | 1.258           | 1.309            |
| -5           | 73.94            | 82.01           | 90.88            | 49           | 7.057            | 7.461           | 7.88             | 103          | 1.173            | 1.222           | 1.272            |
| -4           | 70.35            | 77.95           | 86.29            | 50           | 6.797            | 7.18            | 7.578            | 104          | 1.139            | 1.187           | 1.236            |
| -3           | 66.96            | 74.11           | 81.96            | 51           | 6.548            | 6.912           | 7.289            | 105          | 1.105            | 1.153           | 1.202            |

|    |       |       |       |    |       |       |       |     |        |        |        |
|----|-------|-------|-------|----|-------|-------|-------|-----|--------|--------|--------|
| -2 | 63.74 | 70.48 | 77.87 | 52 | 6.309 | 6.655 | 7.013 | 106 | 1.073  | 1.12   | 1.168  |
| -1 | 60.69 | 67.05 | 74    | 53 | 6.08  | 6.409 | 6.748 | 107 | 1.042  | 1.089  | 1.136  |
| 0  | 57.81 | 63.8  | 70.34 | 54 | 5.861 | 6.173 | 6.495 | 108 | 1.013  | 1.058  | 1.104  |
| 1  | 55.08 | 60.72 | 66.88 | 55 | 5.651 | 5.947 | 6.253 | 109 | 0.9833 | 1.028  | 1.074  |
| 2  | 52.49 | 57.81 | 63.61 | 56 | 5.449 | 5.73  | 6.02  | 110 | 0.9553 | 0.9997 | 1.045  |
| 3  | 50.03 | 55.05 | 60.52 | 57 | 5.255 | 5.522 | 5.798 | 111 | 0.9283 | 0.9719 | 1.016  |
| 4  | 47.71 | 52.44 | 57.59 | 58 | 5.07  | 5.323 | 5.585 | 112 | 0.9021 | 0.9451 | 0.9892 |
| 5  | 45.5  | 49.97 | 54.82 | 59 | 4.891 | 5.132 | 5.381 | 113 | 0.8765 | 0.9191 | 0.9626 |
| 6  | 43.41 | 47.62 | 52.2  | 60 | 4.72  | 4.949 | 5.101 | 114 | 0.8524 | 0.894  | 0.9367 |
| 7  | 41.42 | 45.4  | 49.71 | 61 | 4.556 | 4.774 | 4.997 | 115 | 0.8087 | 0.8595 | 0.9117 |
| 8  | 39.53 | 43.2  | 42.33 | 62 | 4.398 | 4.605 | 4.817 | 116 | 0.8059 | 0.8461 | 0.8875 |
| 9  | 37.74 | 41.29 | 45.12 | 63 | 4.247 | 4.448 | 4.644 | 117 | 0.7837 | 0.8233 | 0.8641 |
| 10 | 36.04 | 39.39 | 43.01 | 64 | 4.101 | 4.288 | 4.479 | 118 | 0.7623 | 0.8012 | 0.8413 |
| 11 | 34.42 | 37.59 | 41    | 65 | 3.961 | 4.139 | 4.32  | 119 | 0.7415 | 0.7798 | 0.8193 |
| 12 | 32.89 | 35.87 | 39.1  | 66 | 3.827 | 3.995 | 4.167 | 120 |        |        |        |
| 13 | 31.43 | 34.25 | 37.29 | 67 | 3.698 | 3.858 | 4.021 | 121 | 0.702  | 0.7386 | 0.7773 |
| 14 | 30.04 | 32.71 | 35.58 | 68 |       |       |       | 122 | 0.6631 | 0.7195 | 0.7572 |
| 15 | 29.72 | 31.24 | 33.95 | 69 |       |       |       | 123 | 0.6649 | 0.7007 | 0.7378 |
| 16 |       |       |       | 70 | 3.339 | 3.476 | 3.616 | 124 | 0.6472 | 0.6824 | 0.7189 |
| 17 |       |       |       | 71 | 3.229 | 3.359 | 3.491 | 125 | 0.6301 | 0.6647 | 0.7006 |
| 18 | 25.13 | 27.26 | 29.55 | 72 | 3.122 | 3.246 | 3.372 | 126 | 0.6135 | 0.6476 | 0.6829 |
| 19 | 24.05 | 26.07 | 28.23 | 73 | 3.02  | 3.138 | 3.257 | 127 | 0.5974 | 0.6309 | 0.6657 |
| 20 | 23.02 | 24.93 | 26.97 | 74 | 2.921 | 3.033 | 3.146 | 128 | 0.5818 | 0.6148 | 0.649  |
| 21 | 22.04 | 23.84 | 25.77 | 75 | 2.827 | 2.933 | 3.04  | 129 | 0.5667 | 0.5991 | 0.6328 |
| 22 | 21.1  | 22.81 | 24.63 | 76 | 2.735 | 2.836 | 2.938 | 130 | 0.5521 | 0.5839 | 0.6171 |
| 23 | 20.21 | 21.83 | 23.55 | 77 | 2.647 | 2.743 | 2.84  |     |        |        |        |
|    |       |       |       |    |       |       |       |     |        |        |        |
|    |       |       |       |    |       |       |       |     |        |        |        |
|    |       |       |       |    |       |       |       |     |        |        |        |

**R—Resistance**

**Resistance at 25°C : 20 kΩ**



**TH3: Outdoor unit discharge pipe sensor**

**Before measuring resistance, disconnect connectors as shown above.**