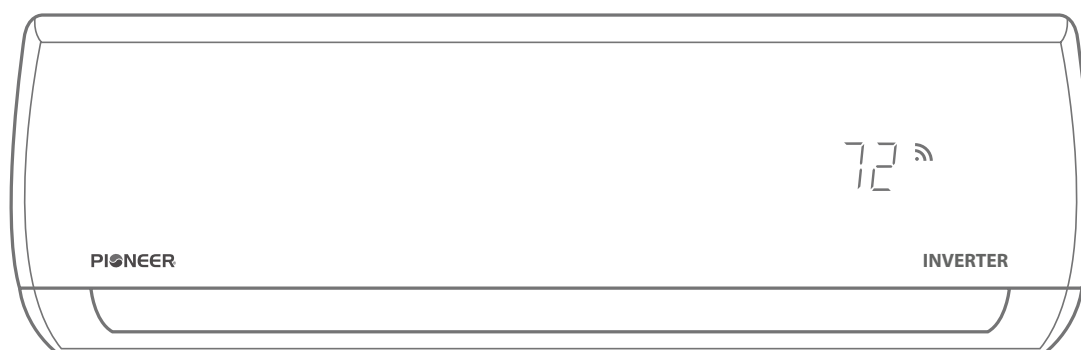




## QUANTUM INVERTER SERIES (WYS-20, WYS-22, Single-Zone)

### SERVICE & TROUBLESHOOTING MANUAL (FOR USE BY QUALIFIED PERSONNEL ONLY)



#### Model Numbers Encompassed:

##### **20 SEER Series (WYS-20, Quantum Inverter+):**

WYS009AMFI20RL (comprised of YN009AMFI20RPD + WS009AMFI20HLD)  
WYS009GMFI20RL (comprised of YN009GMFI20RPD + WS009GMFI20HLD)  
WYS012AMFI20RL (comprised of YN012AMFI20RPD + WS012AMFI20HLD)  
WYS012GMFI20RL (comprised of YN012GMFI20RPD + WS012GMFI20HLD)  
WYS018GMFI20RL (comprised of YN018GMFI20RPD + WS018GMFI20HLD)  
WYS024GMFI20RL (comprised of YN024GMFI20RPD + WS024GMFI20HLD)  
WYS030GMFI20RL (comprised of YN030GMFI20RPD + WS030GMFI20HLD)  
WYS036GMFI20RL (comprised of YN036GMFI20RPD + WS030GMFI26HLD)

##### **22 SEER Series (WYS-22, Quantum Inverter++):**

WYS009AMFI22RL (comprised of YN009AMFI22RPE + WS009AMFI22HLE)  
WYS009GMFI22RL (comprised of YN009GMFI22RPE + WS009GMFI22HLE)  
WYS012AMFI22RL (comprised of YN012AMFI22RPE + WS012AMFI22HLE)  
WYS012GMFI22RL (comprised of YN012GMFI22RPE + WS012GMFI22HLE)  
WYS018GMFI22RL (comprised of YN018GMFI22RPE + WS018GMFI22HLE)  
WYS024GMFI22RL (comprised of YN024GMFI22RPE + WS024GMFI22HLE)



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Caution: Risk of fire  
(Required for R32/R290  
units only)

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# Safety Precautions

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## 1. Precautions

To prevent personal injury, or property or unit damage, adhere to all precautionary measures and instructions outlined in this manual. Before servicing a unit, refer to this service manual and its relevant sections.

Failure to adhere to all precautionary measures listed in this section may result in personal injury, damage to the unit or to property, or in extreme cases, death.

 **WARNING** indicates a potentially hazardous situation which if not avoided could result in serious personal injury, or death.

 **CAUTION** indicates a potentially hazardous situation which if not avoided could result in minor or moderate personal injury, or unit damage.

### 1.1 In case of Accidents or Emergency

#### WARNING

- If a gas leak is suspected, immediately turn off the gas and ventilate the area if a gas leak is suspected before turning the unit on.
- If strange sounds or smoke is detected from the unit, turn the breaker off and disconnect the power supply cable.
- If the unit comes into contact with liquid, contact an authorized service center.
- If liquid from the batteries makes contact with skin or clothing, immediately rinse or wash the area well with clean water.
- Do not insert hands or other objects into the air inlet or outlet while the unit is plugged in.
- Do not operate the unit with wet hands.
- Do not use a remote controller that has previously been exposed to battery damage or battery leakage.

#### CAUTION

- Clean and ventilate the unit at regular intervals when operating it near a stove or near similar devices.
- Do not use the unit during severe weather conditions. If possible, remove the product from the window before such occurrences.

### 1.2 Pre-Installation and Installation

#### WARNING

- Use this unit only on a dedicated circuit.
- Damage to the installation area could cause the unit to fall, potentially resulting in personal injury, property damage, or product failure.
- Only qualified personnel should disassemble, install, remove, or repair the unit.
- Only a qualified electrician should perform electrical work. For more information, contact your dealer, seller, or an authorized service center.

#### CAUTION

- While unpacking be careful of sharp edges around the unit as well as the edges of the fins on the condenser and evaporator.

### 1.3 Operation and Maintenance

#### WARNING

- Do not use defective or under-rated circuit breakers.
- Ensure the unit is properly grounded and that a dedicated circuit and breaker are installed.
- Do not modify or extend the power cable. Ensure the power cable is secure and not damaged during operation.
- Do not unplug the power supply plug during operation.
- Do not store or use flammable materials near the unit.
- Do not open the inlet grill of the unit during operation.
- Do not touch the electrostatic filter if the unit is equipped with one.
- Do not block the inlet or outlet of air flow to the unit.
- Do not use harsh detergents, solvents, or similar items to clean the unit. Use a soft cloth for cleaning.
- Do not touch the metal parts of the unit when removing the air filter as they are very sharp.
- Do not step on or place anything on the unit or outdoor units.
- Do not drink water drained from the unit
- Avoid direct skin contact with water drained from the unit.
- Use a firm stool or step ladder according to manufacturer procedures when cleaning or maintaining the unit.

#### CAUTION

- Do not install or operate the unit for an extended period of time in areas of high humidity or in an environment directly exposing it to sea wind or salt spray.
- Do not install the unit on a defective or damaged installation stand, or in an unsecure location.
- Ensure the unit is installed at a level position
- Do not install the unit where noise or air discharge created by the outdoor unit will negatively impact the environment or nearby residences.
- Do not expose skin directly to the air discharged by the unit for prolonged periods of time.
- Ensure the unit operates in areas water or other liquids.
- Ensure the drain hose is installed correctly to ensure proper water drainage.
- When lifting or transporting the unit, it is recommended that two or more people are used for this task.
- When the unit is not to be used for an extended time, disconnect the power supply or turn off the breaker.

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## 2. Information Disclosures (For flammable materials)

### 2.1 Checks to the area

- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized.
- For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

### 2.2 Work procedure

- Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

### 2.3 Work procedure

- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out.
- Work in confined spaces shall be avoided.
- The area around the work space shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

### 2.4 Checking for presence of refrigerant

- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. no sparking, adequately sealed or intrinsically safe.

### 2.5 Presence of fire extinguisher

- If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
- Have a dry powder or CO<sub>2</sub> fire extinguisher adjacent to the charging area.

### 2.6 No ignition sources

- No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion.
- All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space.

- Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks.
- NO SMOKING signs shall be displayed.

### 2.7 Ventilated area

- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

### 2.8 Checks to the refrigeration equipment

- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:
  - the charge size is in accordance with the room size within which the refrigerant containing parts are installed;
  - the ventilation machinery and outlets are operating adequately and are not obstructed;
  - if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant; marking to the equipment continues to be visible and legible.
  - markings and signs that are illegible shall be corrected;
  - refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

### 2.9 Checks to electrical devices

- Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised. Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that there no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

## 2.10 Repairs to sealed components

- During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
- Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
  - Ensure that apparatus is mounted securely.
  - Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE: The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

## 2.11 Repair to intrinsically safe components

- Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.
- Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

## 2.12 Cabling

- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check

shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

## 2.13 Detection of flammable refrigerants

- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

## 2.14 Leak detection methods

- The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
  - If a leak is suspected, all naked flames shall be removed or extinguished.
  - If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

## 2.15 Removal and evacuation

- When breaking into the refrigerant circuit to make repairs or for any other purpose, conventional procedures shall be used. However, it is important that best practice is followed since flammability is a consideration.
- The following procedure shall be adhered to:
  - remove refrigerant;
  - purge the circuit with inert gas;
  - evacuate;
  - purge again with inert gas;
  - open the circuit by cutting or brazing.

- The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be flushed with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task. Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.
- Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

## 2.16 Charging procedures

- In addition to conventional charging procedures, the following requirements shall be followed:
  - Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
  - Cylinders shall be kept upright.
  - Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
  - Label the system when charging is complete (if not already).
  - Extreme care shall be taken not to overfill the refrigeration system.
  - Prior to recharging the system it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

## 2.17 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken.

In case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

- Become familiar with the equipment and its operation.
- Isolate system electrically.

- Before attempting the procedure ensure that:
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - all personal protective equipment is available and being used correctly;
  - the recovery process is supervised at all times by a competent person;
  - recovery equipment and cylinders conform to the appropriate standards.
- Pump down refrigerant system, if possible.
- If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- Make sure that cylinder is situated on the scales before recovery takes place.
- Start the recovery machine and operate in accordance with manufacturer's instructions.
- Do not overfill cylinders. (No more than 80 % volume liquid charge).
- Do not exceed the maximum working pressure of the cylinder, even temporarily.
- When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

## 2.18 Labelling

- Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant.
- The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

## 2.19 Recovery

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct numbers of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.

- 
- Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
  - The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order.
  - Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
  - The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
  - If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

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# Specifications

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## 1. Model Reference

Refer to the following table to determine the specific indoor and outdoor unit model.

| Outdoor Unit Model | Indoor Unit Model | Capacity (Btu/h) | Power Supply               |
|--------------------|-------------------|------------------|----------------------------|
| YN009GMFI22RPE     | WS009GMFI22RPE    | 9,000            | 208/230V~, 60Hz,<br>1Phase |
| YN009GMFI20RPD     | WS009GMFI20RPD    |                  |                            |
| YN012GMFI22RPE     | WS012GMFI22RPE    | 12,000           |                            |
| YN012GMFI20RPD     | WS012GMFI20RPD    |                  |                            |
| YN018GMFI22RPE     | WS018GMFI22RPE    | 18,000           |                            |
| YN018GMFI20RPD     | WS018GMFI20RPD    |                  |                            |
| YN024GMFI22RPE     | WS024GMFI22RPE    | 24,000           |                            |
| YN024GMFI20RPD     | WS024GMFI20RPD    |                  |                            |
| YN030GMFI20RPD     | WS030GMFI20RPD    | 30,000           |                            |
| YN036GMFI20RPD     | WS036GMFI20RPD    | 36,000           |                            |
| YN009AMFI22RPE     | WS009AMFI22RPE    | 9,000            | 115V~, 60Hz,<br>1Phase     |
| YN009AMFI20RPD     | WS009AMFI20RPD    |                  |                            |
| YN012AMFI22RPE     | WS012AMFI22RPE    | 12,000           |                            |
| YN012AMFI20RPD     | WS012AMFI20RPD    |                  |                            |

\*Systems ending in 22RPE or 22HLE are from the **WYS-22** Inverter++ Quantum Series line.

\*Systems ending in 20RPD or 20HLD are from the **WYS-20** Inverter+ Quantum Series line.

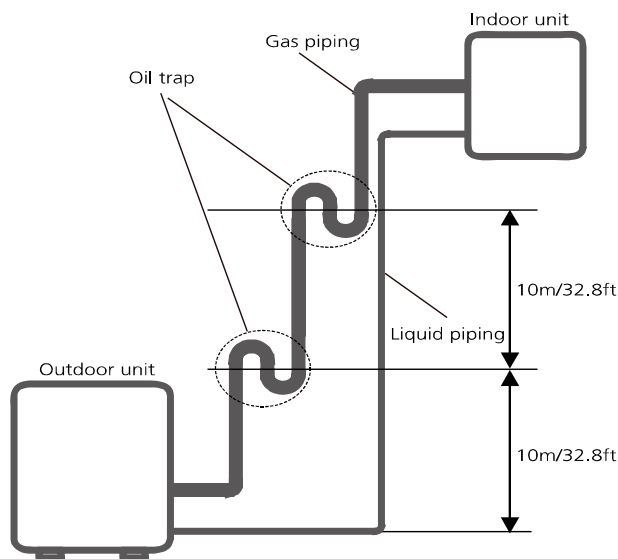
## 2. Pipe Length, Adjustment Charge, and Drop Height

The length and elevation of connection pipe are shown in the table below. If the pipe length exceeds or falls below\* the standard pipe length range, refrigerant should be adjusted to ensure nominal cooling/heating capacity.

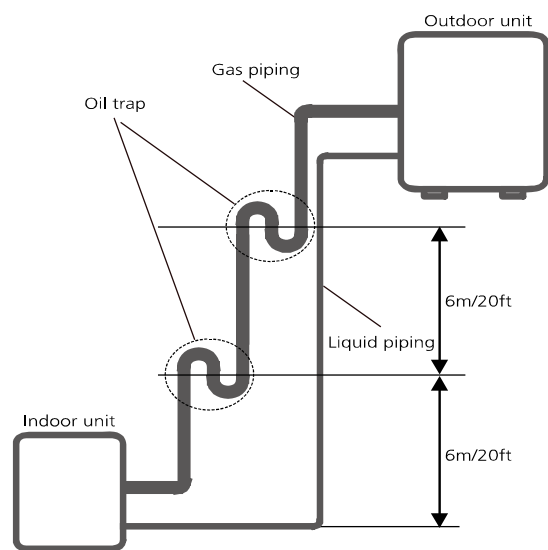
| Capacity(Btu/h) | Standard Length              | Max Pipe Length | Max Elevation | Adjustment Refrigerant |
|-----------------|------------------------------|-----------------|---------------|------------------------|
| 9k~12k          | ≥ 3m (10ft)<br>≤ 7.5m (25ft) | 25m (82ft)      | 10m (32.8ft)  | 15g/m (0.16oz/ft)      |
| 18k             |                              | 30m (98.4ft)    | 20m (65.6ft)  |                        |
| 24k/30k         |                              | 50m (164ft)     | 25m (82ft)    | 30g/m (0.32oz/ft)      |
| 36k             |                              | 65m (213.3ft)   | 30m (98.4ft)  |                        |

\*Do not use a lineset shorter than 1.5m (5ft).

If oil flows back into the outdoor unit's compressor, this might cause liquid compression or deterioration of oil return. Oil traps in the rising gas pipe can prevent this.



1. Indoor unit is installed higher than outdoor unit



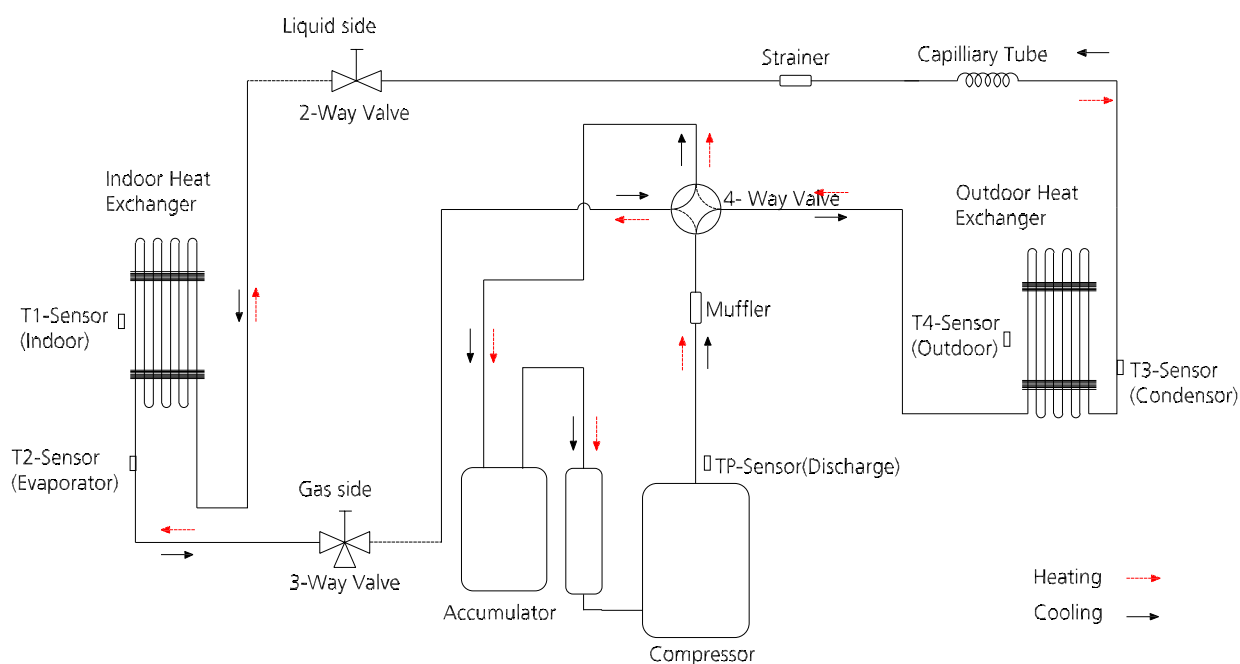
2. Outdoor unit is installed higher than indoor unit

If indoor unit is installed higher than outdoor unit, oil trap should be set every 10m(32.8ft) of vertical distance.

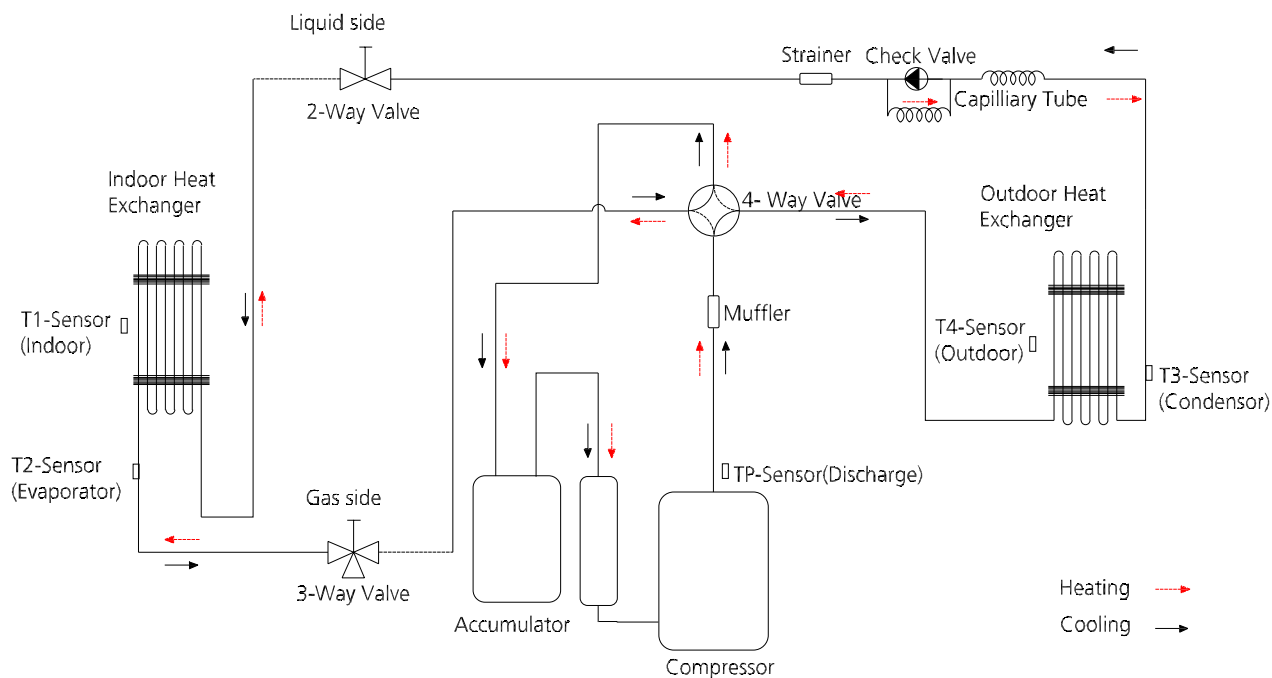
If the outdoor unit is installed higher than the indoor unit, proper oil should return to the compressor along with the suction of refrigerant to keep lubrication of compressor. If the suction flow velocity drops below 7.62m/s(1500fpm (ft per minute)), oil won't return to the compressor. An oil trap should be installed every 6m(20ft) of vertical distance.

### 3. Refrigerant Cycle Diagrams

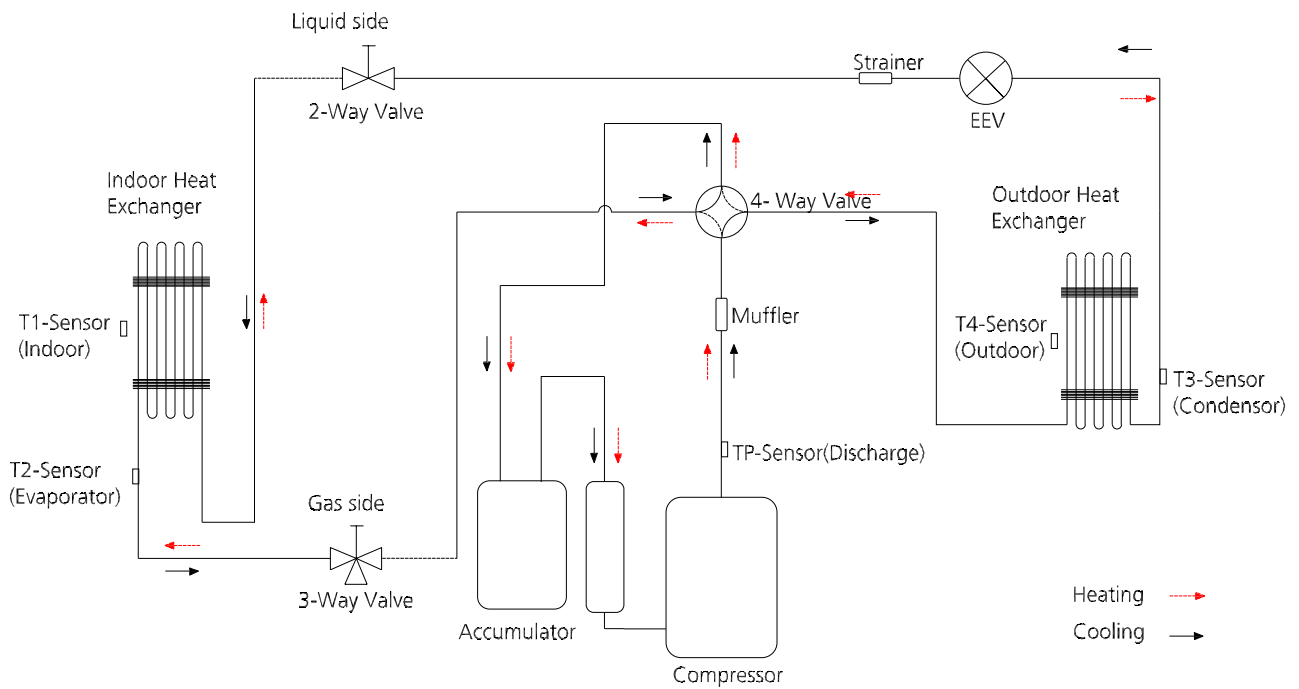
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YN018GMFI20RPD

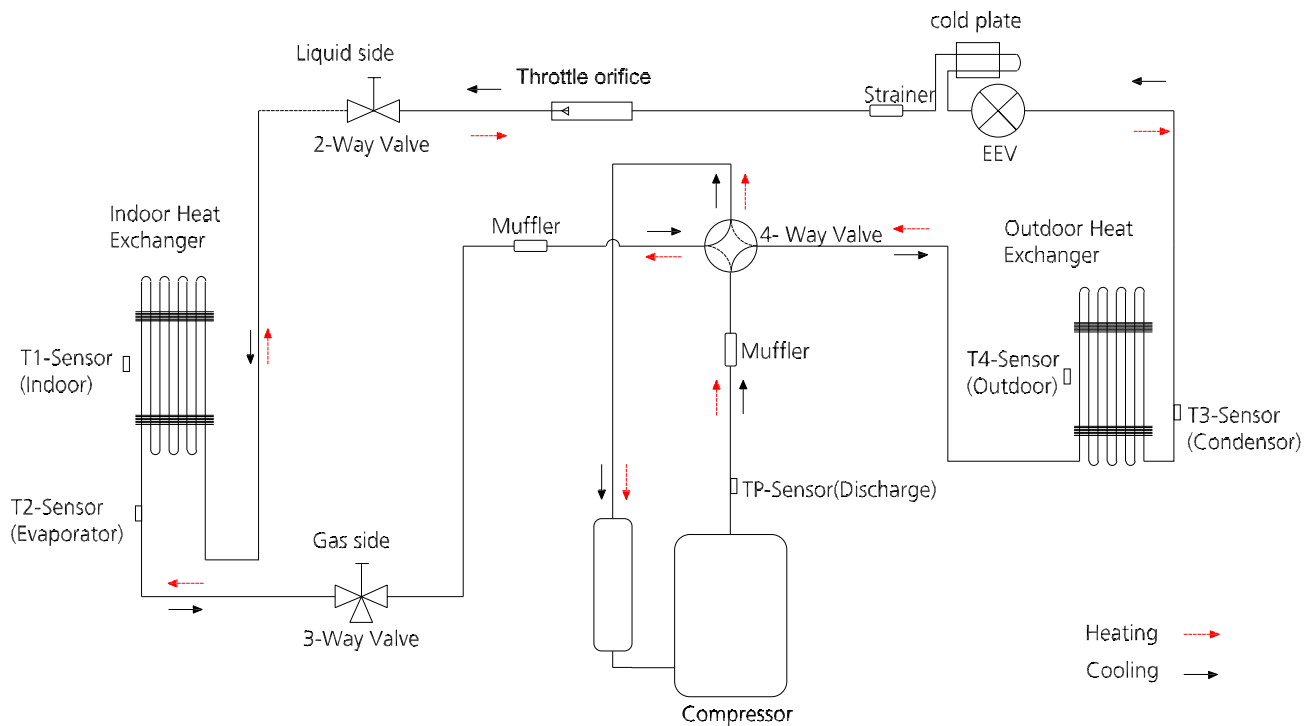


YN009AMFI22RPE, YN012AMFI22RPE, YN009GMFI22RPE, YN012GMFI22RPE

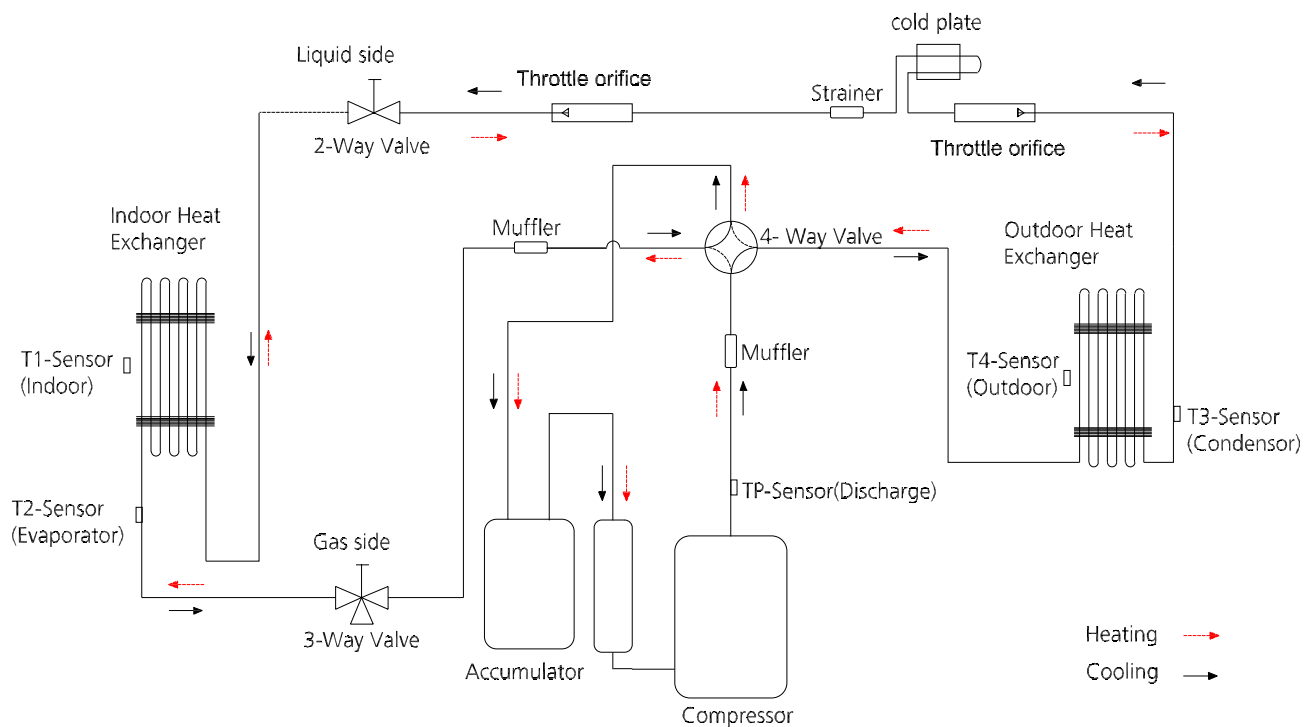


Only for YN012AMFI22RPE, there is an Accumulator.

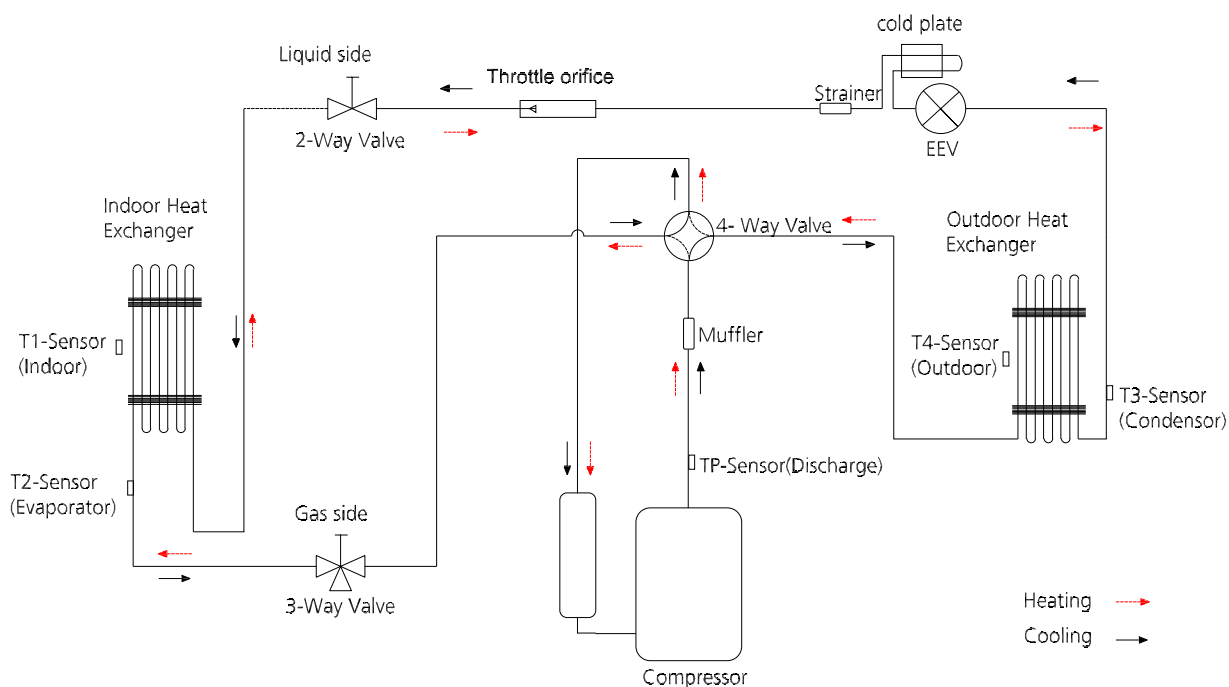
YN018GMFI22RPE



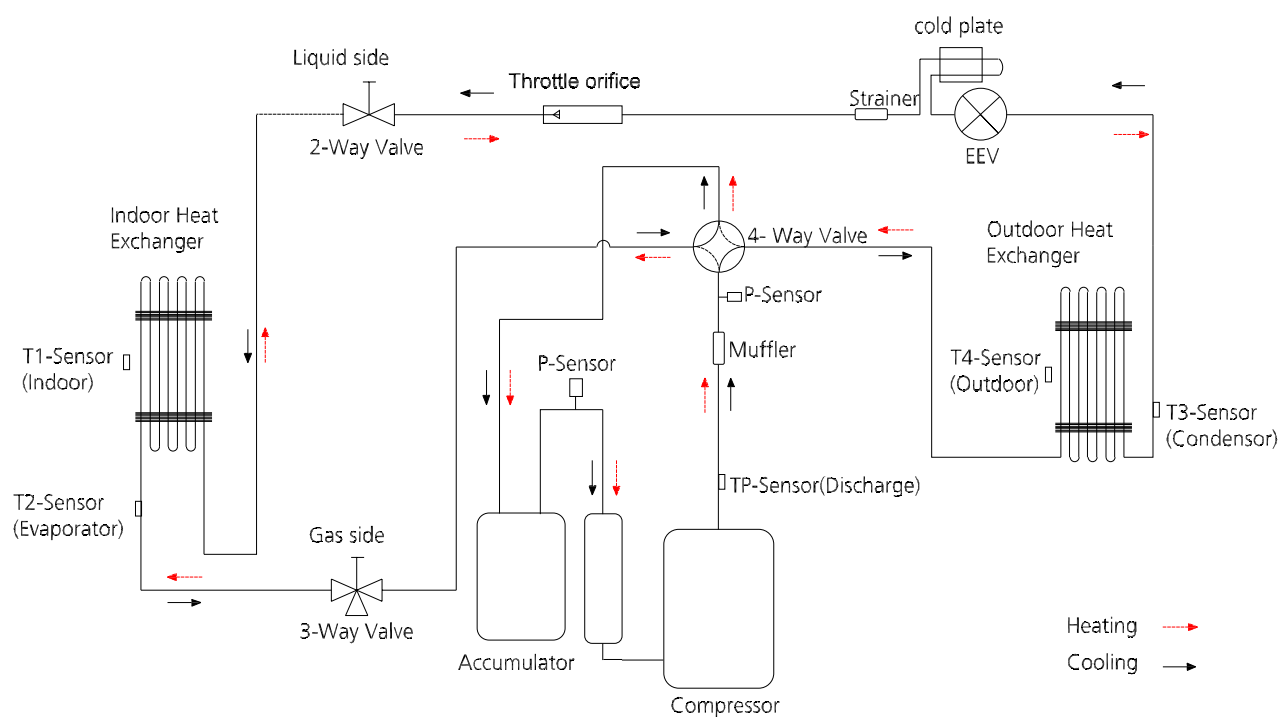
## YN024GMFI20RPD



## YN024GMFI22RPE, YN030GMFI20RPD



YN036GMFI20RPD



## 4. Electrical Wiring Diagrams

Indoor and Outdoor Unit Wiring Diagram

| Outdoor Unit   |                    | Indoor Unit    |                    |
|----------------|--------------------|----------------|--------------------|
| ODU Model      | ODU Wiring Diagram | IDU Model      | IDU Wiring Diagram |
| YN009AMFI22RPE | 22000035851        | WS009AMFI22HLE | 22000019694        |
| YN012AMFI22RPE |                    | WS012AMFI22HLE |                    |
| YN009AMFI20RPD |                    | WS009AMFI20HLD |                    |
| YN012AMFI20RPD |                    | WS012AMFI20HLD |                    |
| YN009GMFI22RPE | 22000035853        | WS009GMFI22HLE |                    |
| YN012GMFI22RPE |                    | WS012GMFI22HLE |                    |
| YN009GMFI20RPD |                    | WS009GMFI20HLD |                    |
| YN012GMFI20RPD |                    | WS012GMFI20HLD |                    |
| YN018GMFI20RPD |                    | WS018GMFI20HLD |                    |
| YN018GMFI22RPE | 22000035849        | WS018GMFI22HLE |                    |
| YN024GMFI22RPE |                    | WS024GMFI22HLE |                    |
| YN024GMFI20RPD |                    | WS024GMFI20HLD |                    |
| YN030GMFI20RPD | 22000036331        | WS030GMFI20HLD |                    |
| YN036GMFI20RPD |                    | WS036GMFI20HLD |                    |

Outdoor Unit PCB (Printed Circuit Board) Diagram

| Outdoor Unit   |                           |                               |
|----------------|---------------------------|-------------------------------|
| ODU Model      | ODU Printed Circuit Board | ODU IPM Printed Circuit Board |
| YN009AMFI22RPE | 22000047115               | /                             |
| YN012AMFI22RPE |                           |                               |
| YN009AMFI20RPD |                           |                               |
| YN012AMFI20RPD |                           |                               |
| YN009GMFI22RPE | 22000048121               | /                             |
| YN012GMFI22RPE |                           |                               |
| YN009GMFI20RPD |                           |                               |
| YN012GMFI20RPD |                           |                               |
| YN018GMFI20RPD | 22000046453               |                               |
| YN018GMFI22RPE | 22000048064               | /                             |
| YN024GMFI22RPE |                           |                               |
| YN024GMFI20RPD |                           |                               |
| YN030GMFI20RPD | 22000047742               |                               |
| YN036GMFI20RPD |                           |                               |

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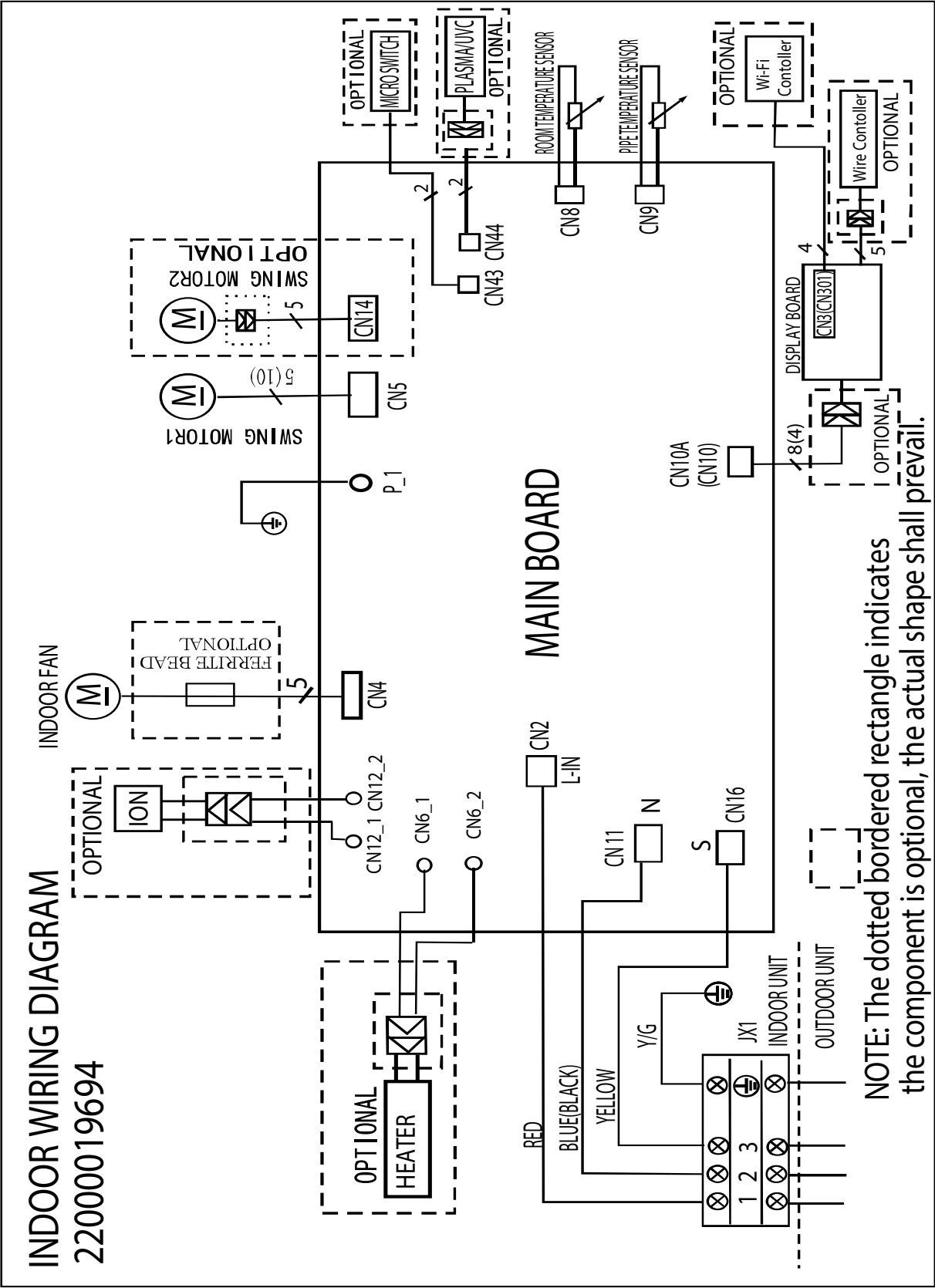
#### Indoor Unit Abbreviations

| Abbreviation | Definition                                |
|--------------|-------------------------------------------|
| Y/G          | Yellow-Green Conductor                    |
| ION          | Positive and Negative Ion Generator       |
| CAP          | Capacitor                                 |
| PLASMA       | Electronic Dust Collector                 |
| L            | LINE                                      |
| N            | NEUTRAL                                   |
| T1           | Indoor Room Temperature                   |
| T2           | Coil Temperature of Indoor Heat Exchanger |

#### Outdoor Unit Abbreviations

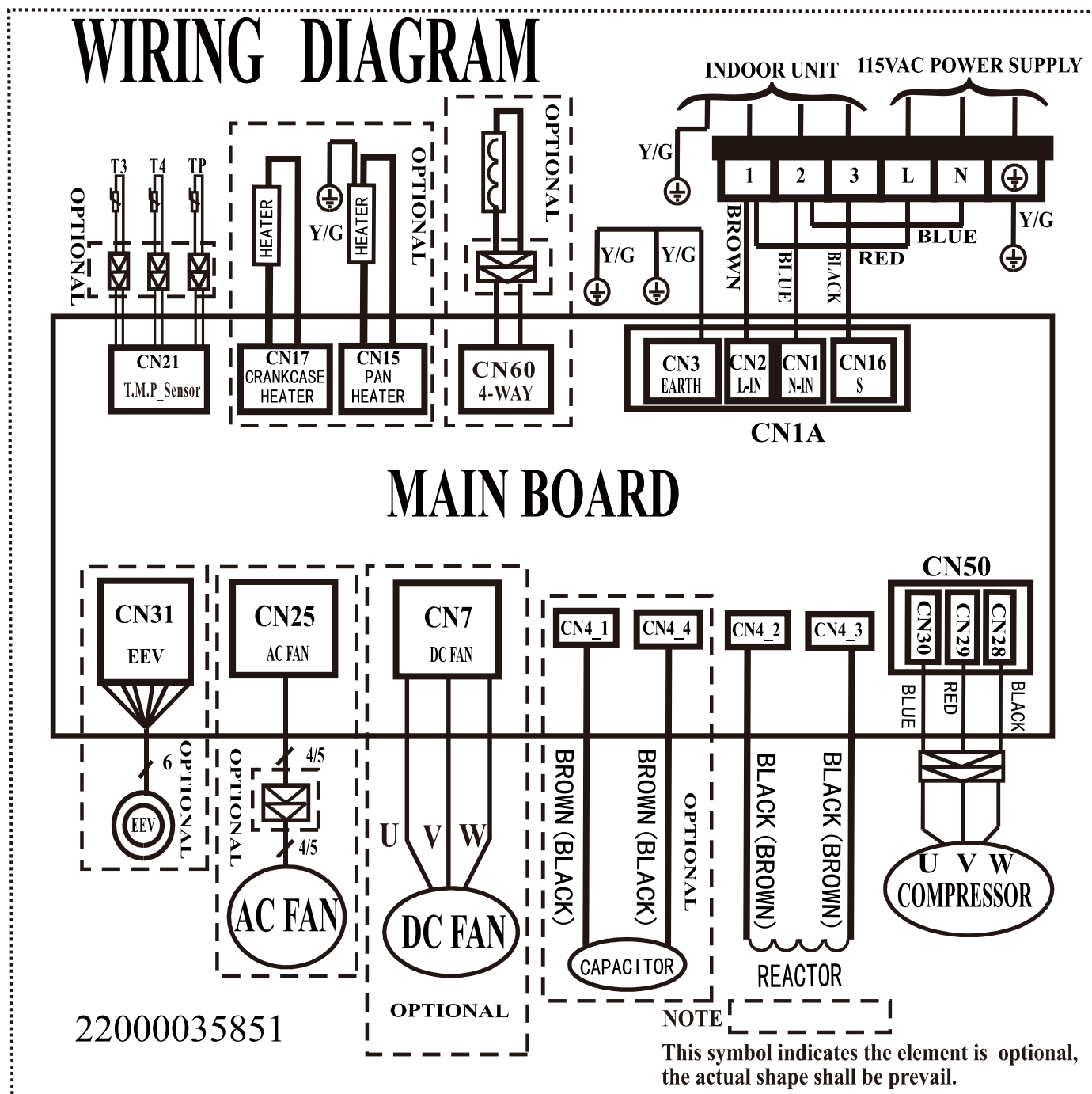
| Abbreviation | Definition                       |
|--------------|----------------------------------|
| 4-WAY        | Gas Valve Assembly/4-WAY VALVE   |
| AC-FAN       | Alternating Current FAN          |
| DC-FAN       | Direct Current FAN               |
| CT1          | AC Current Detector              |
| COMP         | Compressor                       |
| T3           | Coil Temperature of Condenser    |
| T4           | Outdoor Ambient Temperature      |
| TH           | Compressor Suction Temperature   |
| TP           | Compressor Discharge Temperature |
| EEV          | Electronic Expansion Valve       |
| L-PRO        | Low Pressure Switch              |
| H-PRO        | High Pressure Switch             |

ALL INDOOR UNIT MODELS



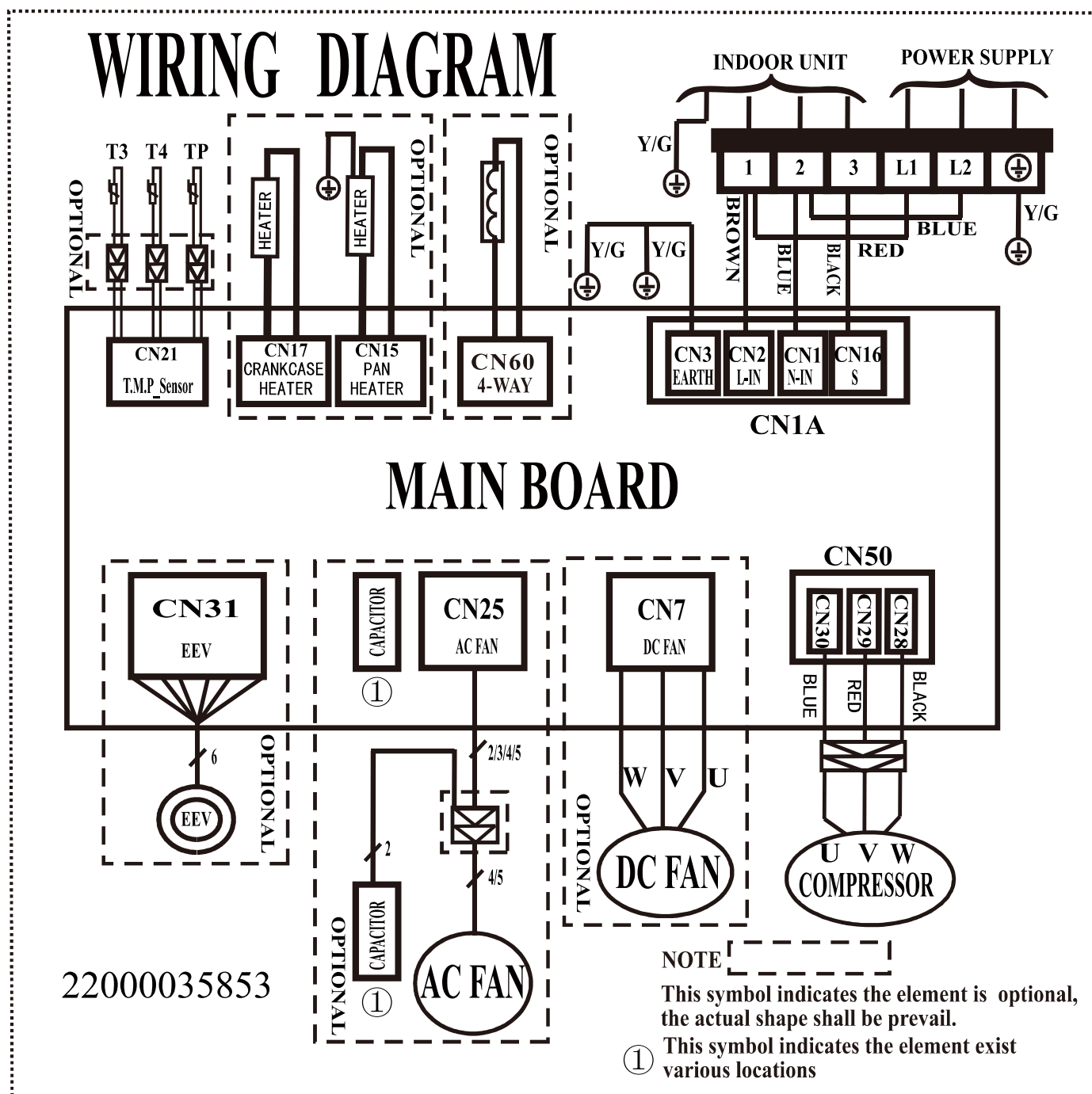
## Outdoor Unit Wiring Diagram: 22000035851

YN009AMFI22RPE, YN012AMFI22RPE, YN009AMFI20RPD, YN012AMFI20RPD



## Outdoor Unit Wiring Diagram: 22000035853

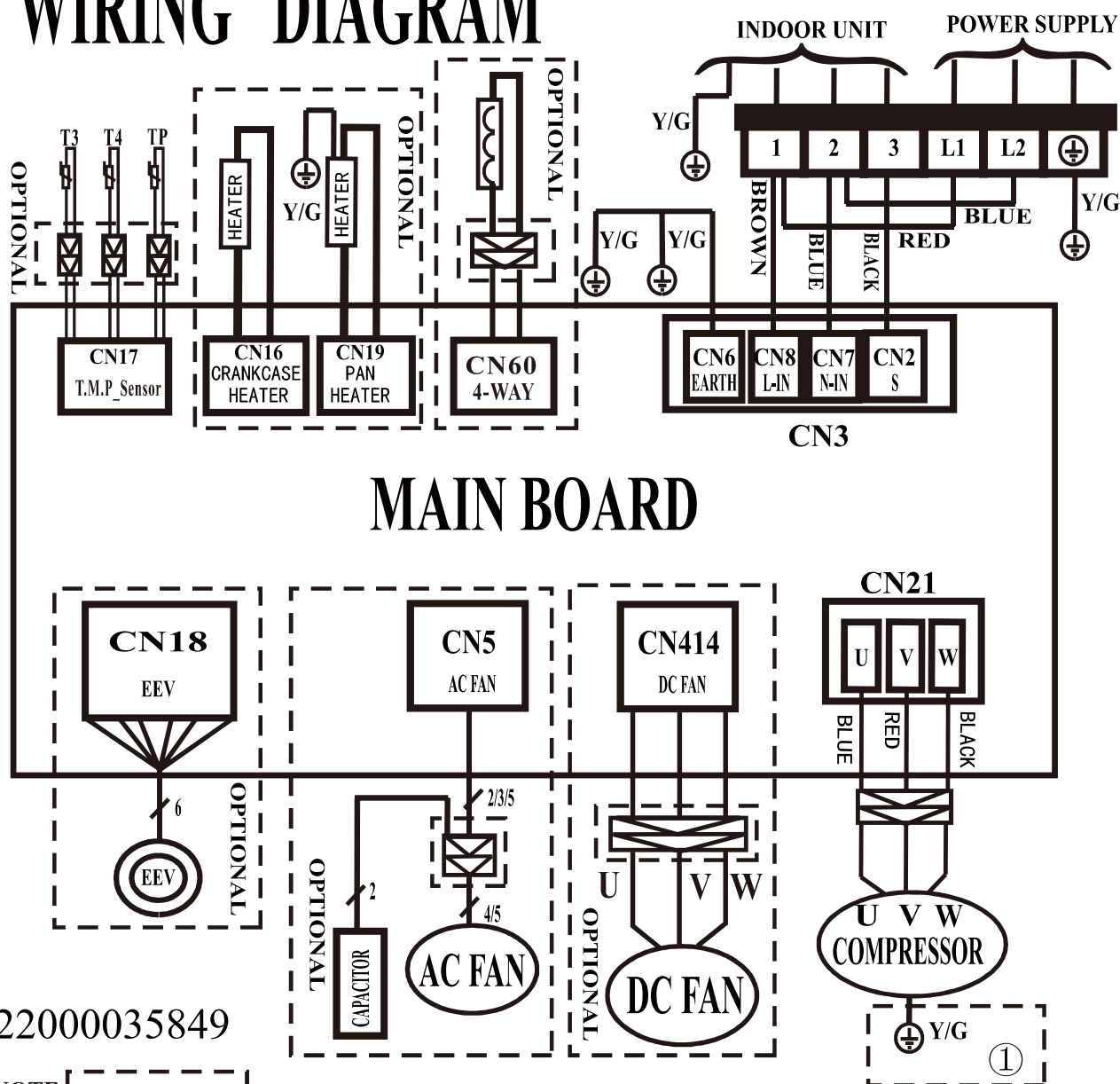
YN009GMFI22RPE, YN012GMFI22RPE, YN009GMFI20RPD, YN012GMFI20RPD



## Outdoor Unit Wiring Diagram: 22000035849

YN018GMFI22RPE, YN024GMFI22RPE, YN024GMFI20RPD

# WIRING DIAGRAM



22000035849

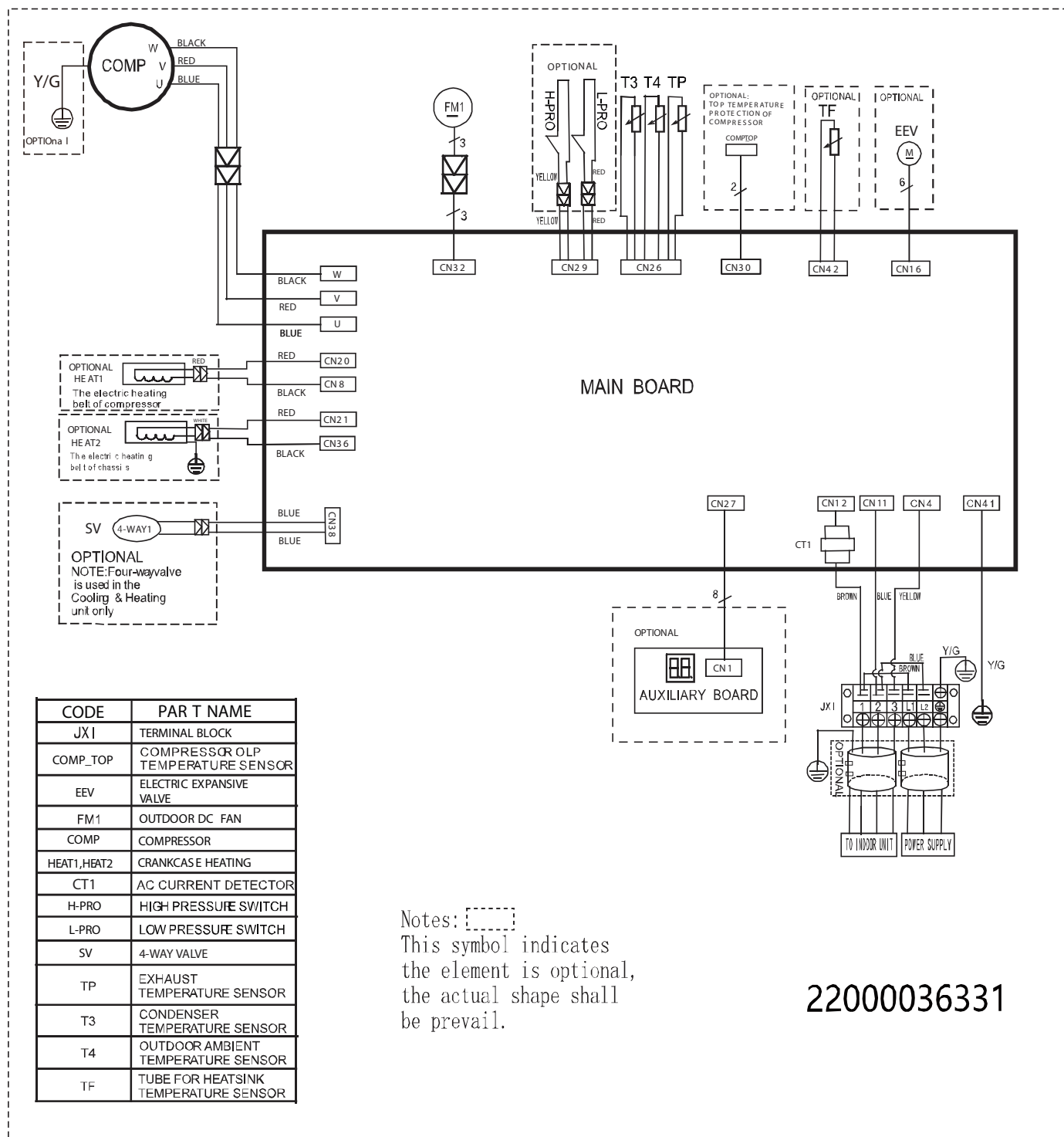
### NOTE

This symbol indicates the element is optional, the actual shape shall be prevail.

① The D box contains the ground wire of the compressor, and the other boxes do not.

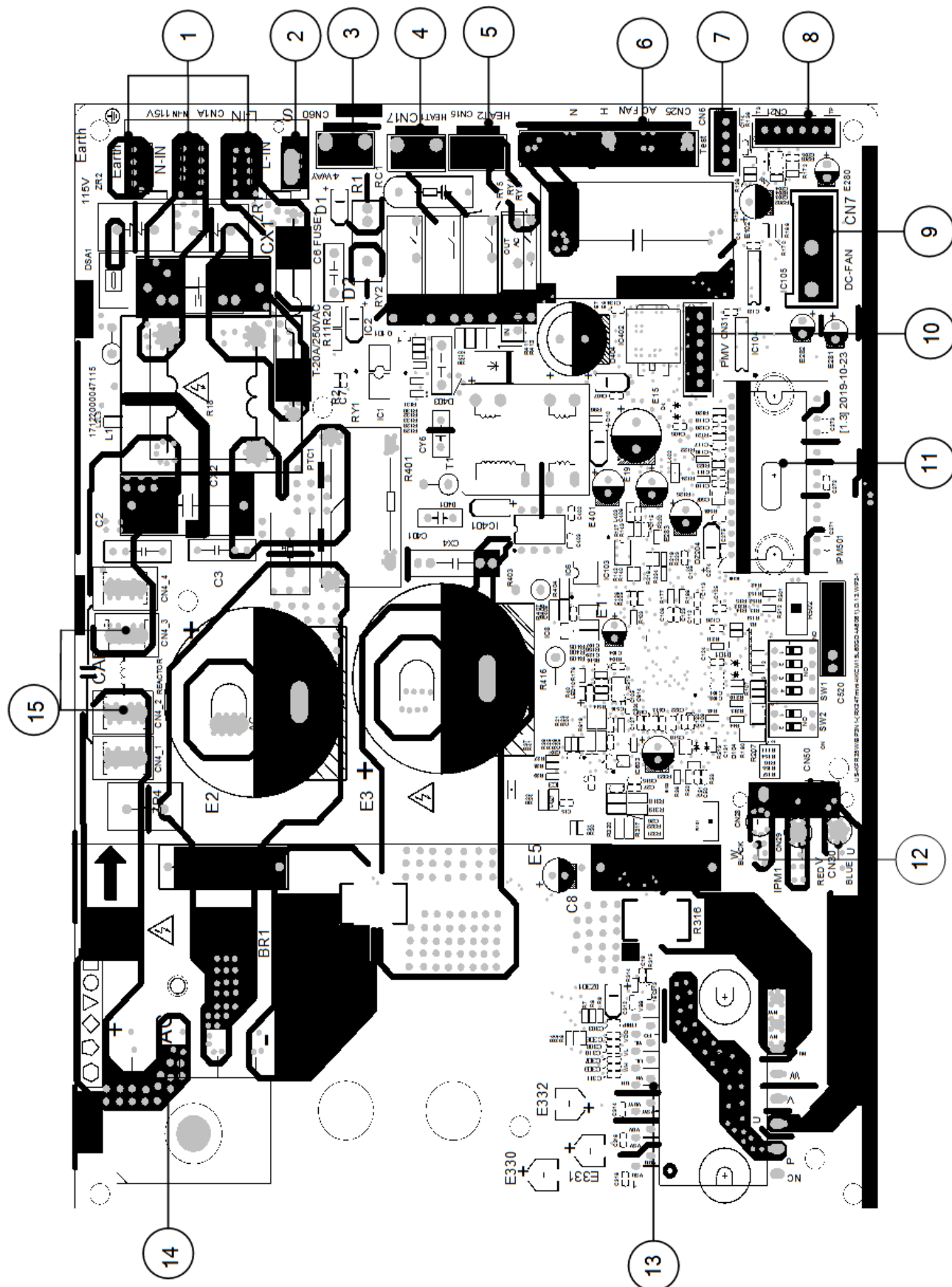
## Outdoor Unit Wiring Diagram: 22000036331

YN030GMFI20RPD, YN036GMFI20RPD



## Outdoor Unit Wiring Diagram: 22000047115

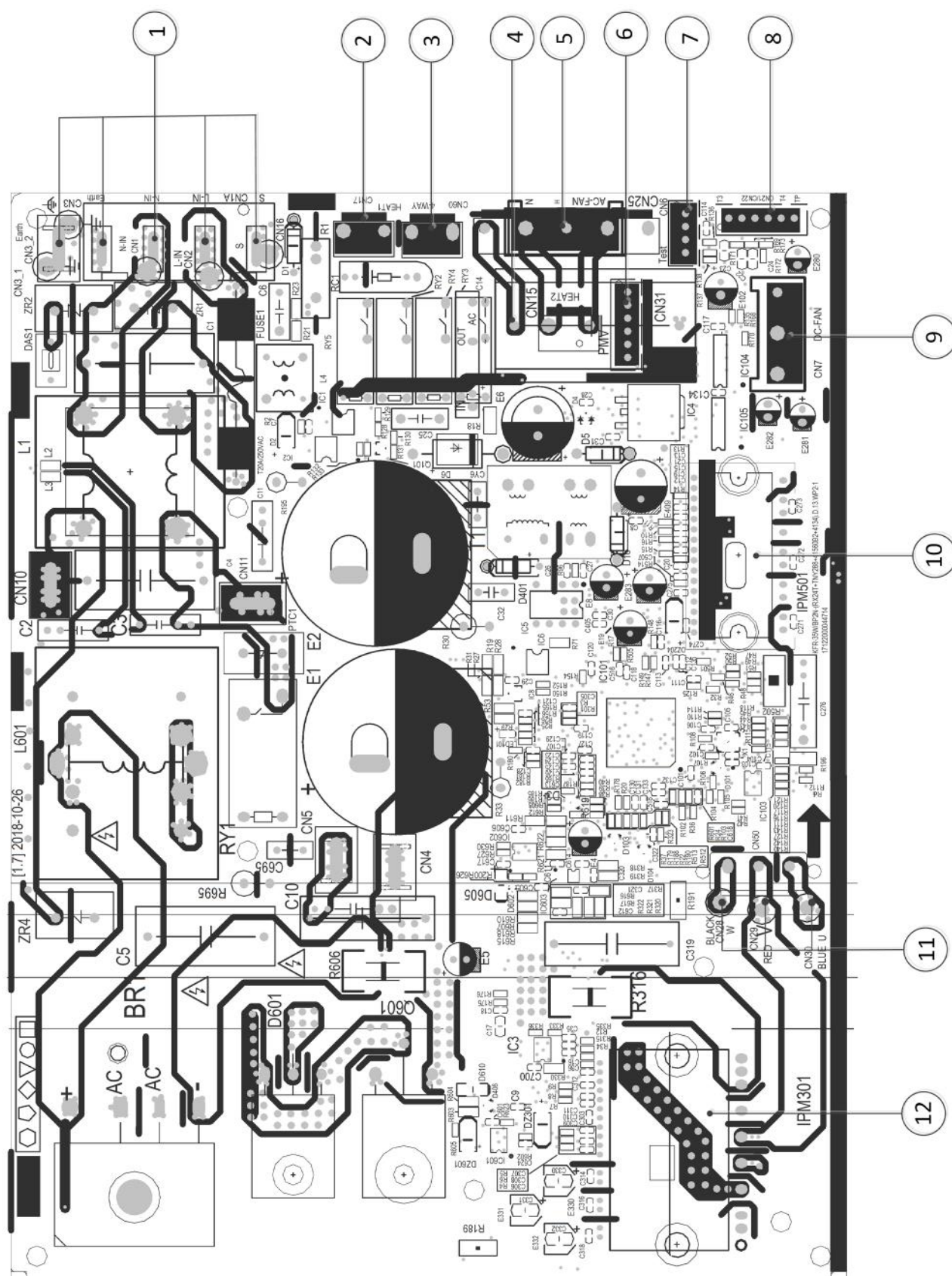
YN009AMFI22RPE, YN012AMFI22RPE, YN009AMFI20RPD, YN012AMFI20RPD



| No. | Name         | CN#     | Meaning                                                                           |
|-----|--------------|---------|-----------------------------------------------------------------------------------|
| 1   | Power Supply | CN3     | Earth: connect to Ground                                                          |
|     |              | CN1     | N_in: connect to N-line (100-130V AC input)                                       |
|     |              | CN2     | L_in: connect to L-line (100-130V AC input)                                       |
| 2   | S            | CN16    | S: connect to indoor unit communication                                           |
| 3   | 4-WAY        | CN60    | connect to 4 way valve, 100-130V AC when is ON.                                   |
| 4   | HEAT1        | CN17    | connect to compressor heater, 100-130V AC when is ON                              |
| 5   | HEAT2        | CN15    | connect to chassis heater, 100-130V AC when is ON                                 |
| 6   | AC-FAN       | CN25    | connect to AC fan                                                                 |
| 7   | TESTPORT     | CN6     | used for testing                                                                  |
| 8   | TP T4 T3     | CN21    | connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP |
| 9   | DC-FAN       | CN7     | connect to DC fan                                                                 |
| 10  | PMV          | CN31    | connect to Electric Expansion Valve                                               |
| 11  | FAN_IPM      | IPM 501 | IPM for DC fan                                                                    |
| 12  | W            | CN28    | connect to compressor                                                             |
|     | V            | CN29    | 0V AC (standby)                                                                   |
|     | U            | CN30    | 10-230V AC (running)                                                              |
| 13  | COMP_IPM     | IPM 1   | IPM for compressor                                                                |
| 14  | BR1          | BR1     | Bridge                                                                            |
| 15  | CN4          | CN4_2   | connect to reactor                                                                |
|     |              | CN4_3   |                                                                                   |

**Note: This section is for reference only. Please take practicality as standard.**

**YN009GMFI22RPE, YN012GMFI22RPE, YN009GMFI20RPD, YN012GMFI20RPD, YN018GMFI20RPD**



| No. | Name     | CN#       | Meaning                                                                           |
|-----|----------|-----------|-----------------------------------------------------------------------------------|
| 1   | CN1A     | CN3       | Earth: connect to Ground                                                          |
|     |          | CN1       | N_in: connect to N-line (208-230V AC input)                                       |
|     |          | CN2       | L_in: connect to L-line (208-230V AC input)                                       |
|     |          | CN16      | S: connect to indoor unit communication                                           |
| 2   | HEAT1    | CN17      | connect to compressor heater, 208-230V AC when is ON                              |
| 3   | 4-WAY    | CN60      | connect to 4 way valve, 208-230V AC when is ON.                                   |
| 4   | HEAT2    | CN15      | connect to chassis heater, 208-230V AC when is ON                                 |
| 5   | AC-FAN   | CN25      | connect to AC fan                                                                 |
| 6   | PMV      | CN31      | connect to Electric Expansion Valve                                               |
| 7   | TESTPORT | CN6       | used for testing                                                                  |
| 8   | TP T4 T3 | CN21/CN22 | connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP |
| 9   | DC-FAN   | CN7       | connect to DC fan                                                                 |
| 10  | FAN_IPM  | IPM 501   | IPM for DC fan                                                                    |
| 11  | W        | CN28      | connect to compressor                                                             |
|     | V        | CN29      | 0V AC (standby)                                                                   |
|     | U        | CN30      | 10-200V AC (running)                                                              |
| 12  | COMP_IPM | IPM 301   | IPM for compressor                                                                |

**Note: This section is for reference only. Please take practicality as standard.**

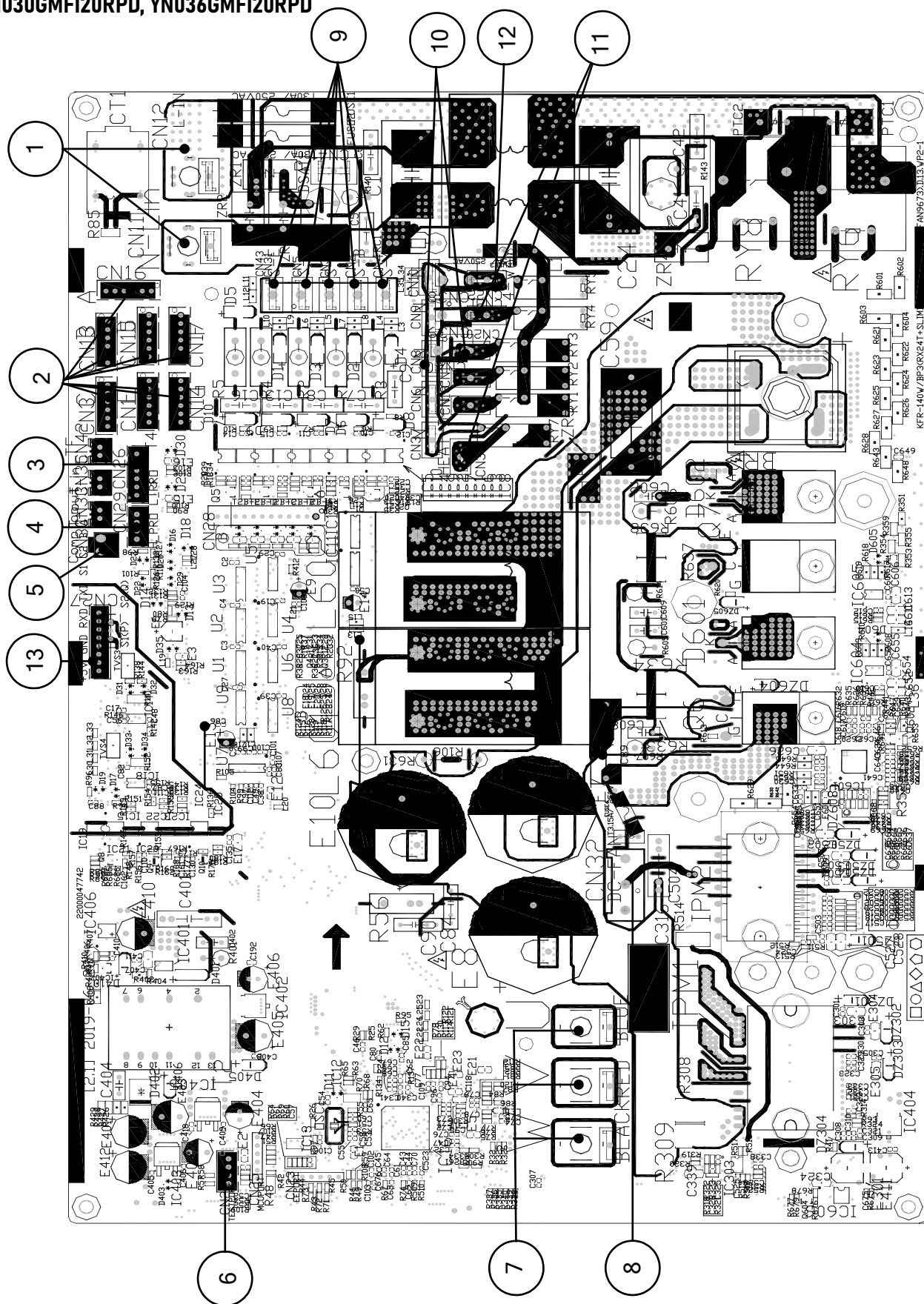
**YN018GMFI22RPE, YN024GMFI22RPE, YN024GMFI20RPD**



| No. | Name         | CN#    | Meaning                                                                           |
|-----|--------------|--------|-----------------------------------------------------------------------------------|
| 1   | Power Supply | CN6    | Earth: connect to Ground                                                          |
|     |              | CN7    | N_in: connect to N-line (208-230V AC input)                                       |
|     |              | CN8    | L_in: connect to L-line (208-230V AC input)                                       |
| 2   | S            | CN2    | S: connect to indoor unit communication                                           |
| 3   | 4-WAY        | CN60   | connect to 4 way valve, 208-230V AC when is ON.                                   |
| 4   | AC-FAN       | CN5    | connect to AC fan                                                                 |
| 5   | HEAT2        | CN19   | connect to chassis heater, 208-230V AC when is ON                                 |
| 6   | TP T4 T3     | CN17   | connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP |
| 7   | PMV          | CN18   | connect to Electric Expansion Valve                                               |
| 8   | HEAT1        | CN16   | connect to compressor heater, 208-230V AC when is ON                              |
| 9   | DC-FAN       | CN414  | connect to DC fan                                                                 |
| 10  | TESTPORT     | CN23   | used for testing                                                                  |
| 11  | FAN_IPM      | IPM501 | IPM for DC fan                                                                    |
| 12  | COMP_IPM     | IPM1   | IPM for compressor                                                                |
| 13  | U            | CN27   | connect to compressor                                                             |
|     | V            | CN28   | 0V AC (standby)                                                                   |
|     | W            | CN29   | 200-300V AC (running)                                                             |
| 14  | EE_PORT      | CN505  | EEPROM programmer port                                                            |

**Note: This section is for reference only. Please take practicality as standard.**

**YN030GMFI20RPD, YN036GMFI20RPD**



| No. | Name             | CN#  | Meaning                                                                                             |
|-----|------------------|------|-----------------------------------------------------------------------------------------------------|
| 1   | Power Supply     | CN11 | N_in: connect to N-line (208-230V AC input)                                                         |
|     |                  | CN12 | L_in: connect to L-line (208-230V AC input)                                                         |
| 2   | EEV-A            | CN16 | connect to electric expansion valve                                                                 |
|     | EEV-B            | CN13 |                                                                                                     |
|     | EEV-C            | CN3  |                                                                                                     |
|     | EEV-D            | CN15 |                                                                                                     |
|     | EEV-E            | CN1  |                                                                                                     |
|     | EEV-F            | CN17 |                                                                                                     |
|     | EEV-G            | CN14 |                                                                                                     |
| 3   | T3 T4 TP         | CN26 | connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP                   |
| 4   | H-PRO, L-RPO     | CN29 | connect to high and low pressure switch (pin1-pin2 & pin3-pin4: 5VDC pulse wave)                    |
| 5   | OLP TEMP. SENSOR | CN30 | connect to compressor top temp. sensor (5VDC Pulse wave)                                            |
| 6   | TESTPORT         | CN24 | used for testing                                                                                    |
| 7   | COMPRESSOR       | U    | connect to compressor                                                                               |
|     |                  | V    | 0V AC (standby)                                                                                     |
|     |                  | W    | 10-200V AC (running)                                                                                |
| 8   | DC-FAN           | CN32 | connect to DC fan                                                                                   |
| 9   | S-E              | CN31 | S: connect to indoor unit communication (pin1-pin2: 24VDC Pulse wave; pin2-pin3: 208-230V AC input) |
|     | S-D              | CN5  |                                                                                                     |
|     | S-C (mono)       | CN34 |                                                                                                     |
|     | S-B              | CN2  |                                                                                                     |
|     | S-A              | CN4  |                                                                                                     |

| No. | Name   | CN#  | Meaning                                         |
|-----|--------|------|-------------------------------------------------|
| 10  | HEAT_D | CN8  | connect to the heater, 208-230V AC when is ON   |
|     |        | CN20 |                                                 |
| 11  | HEAT_Y | CN21 |                                                 |
|     |        | CN36 |                                                 |
| 12  | 4-WAY  | CN38 | connect to 4 way valve, 208-230V AC when is ON. |
| 13  | /      | CN27 | connect to key board CN1                        |

**Note: This section is for reference only. Please take practicality as standard.**

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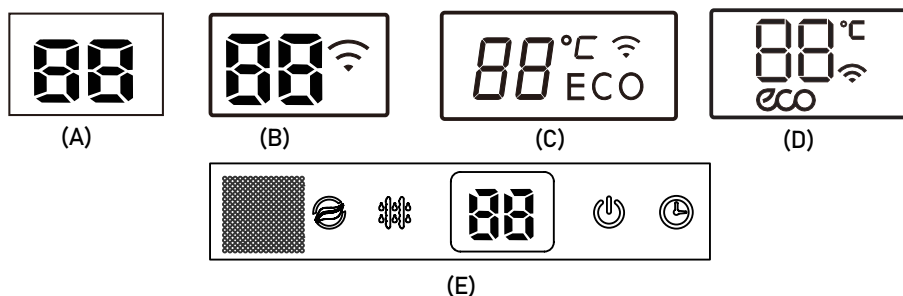
# Product Features

## Contents

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## 1. Display Function

Unit display functions



| Display |                   | Function                                                                                                                                                                         |
|---------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                   | Fresh(available on select units only)                                                                                                                                            |
|         |                   | Defrost                                                                                                                                                                          |
|         |                   | When the unit is on                                                                                                                                                              |
|         |                   | When TIMER is on                                                                                                                                                                 |
| ECO     |                   | ECO function (available on select units only)                                                                                                                                    |
| °C      |                   | Lights up in different color according to the operation mode(some units) :<br>Under COOL and DRY mode, it displays as cool color.<br>Under HEAT mode, it displays as warm color. |
|         |                   | When Wireless Control feature is activated(some units)                                                                                                                           |
|         | Temperature value | Temperature                                                                                                                                                                      |
|         | ON (3s)           | Activation of Timer ON, Fresh, Swing, Turbo, or Silent                                                                                                                           |
|         | OF (3s)           | Cancellation of Timer OFF, Fresh, Swing, Turbo, or Silent                                                                                                                        |
|         | dF                | Defrost                                                                                                                                                                          |
|         | cF                | Warming in heating mode                                                                                                                                                          |
|         | SC                | Self-clean (available on select units only)                                                                                                                                      |
|         | FP                | Heating in room temperature under 8°C/46°F                                                                                                                                       |

---

## 2. Safety Features

### Compressor three-minute delay at restart

Compressor functions are delayed for up to one minute upon the first startup of the unit, and are delayed for up to three minutes upon subsequent unit restarts.

### Zero crossing detection error protection(Except for DC fan units)

If AC can not detect zero crossing signal for 4 minutes or the zero crossing signal time interval is not correct, the unit will stop and the LED will display the failure. The correct zero crossing signal time interval should be between 6-13ms.

### Automatic shutoff based on discharge temperature

If the compressor discharge temperature exceeds a certain level for a period of time, the compressor ceases operation.

### Automatic shutoff based on fan speed

If the indoor fan speed registers below 300RPM for an extended period of time, the unit ceases operation and the corresponding error code is displayed on the indoor unit.

### Inverter module protection

The inverter module has an automatic shutoff mechanism based on the unit's current, voltage, and temperature. If automatic shutoff is initiated, the corresponding error code is displayed on the indoor unit and the unit ceases operation.

### Indoor fan delayed operation

- When the unit starts, the louver is automatically activated and the indoor fan will operate after a period of 7 seconds.
- If the unit is in heating mode, the indoor fan is regulated by the anti-cold wind function.

### Sensor redundancy and automatic shutoff

- If one temperature sensor malfunctions, the air conditioner continues operation and displays the corresponding error code, allowing for emergency use.
- When more than one temperature sensor is malfunctioning, the air conditioner ceases operation.

### Refrigerant leakage detection

This function is active only when cooling mode is selected. It will detect if the compressor is being damaged by refrigerant leakage or by compressor overload. This is measured using the coil temperature of evaporator T2 when the compressor is in operation.

### 3. Basic Functions

#### 3.1 Table

| Functions |                | Cooling Mode & Heating mode               |           | Heating Mode               |                      | Auto Mode                      |
|-----------|----------------|-------------------------------------------|-----------|----------------------------|----------------------|--------------------------------|
|           |                | Outdoor Fan Control                       |           | Defrosting Mode            |                      |                                |
| Cases     |                | Case 1:<br>Compressor<br>Frequency and T4 | Case 2:T4 | Case 1:T3 and<br>T4,15 min | Case 2:<br>T3,10 min | A=2°C(3.6°F)<br>B=-2°C(-3.6°F) |
| Models    | YN009AMFI20RPD | ✓                                         |           | ✓                          |                      | ✓                              |
|           | YN012AMFI20RPD | ✓                                         |           | ✓                          |                      |                                |
|           | YN009AMFI22RPE | ✓                                         |           | ✓                          |                      |                                |
|           | YN012AMFI22RPE | ✓                                         |           | ✓                          |                      |                                |
|           | YN009GMFI22RPE | ✓                                         |           | ✓                          |                      |                                |
|           | YN009GMFI20RPD | ✓                                         |           | ✓                          |                      |                                |
|           | YN012GMFI20RPD | ✓                                         |           | ✓                          |                      |                                |
|           | YN012GMFI22RPE | ✓                                         |           | ✓                          |                      |                                |
|           | YN018GMFI20RPD | ✓                                         |           | ✓                          |                      | ✓                              |
|           | YN018GMFI22RPE | ✓                                         |           | ✓                          |                      |                                |
|           | YN024GMFI20RPD | ✓                                         |           | ✓                          |                      |                                |
|           | YN024GMFI22RPE | ✓                                         |           | ✓                          |                      |                                |
|           | YN030GMFI20RPD | ✓                                         |           | ✓                          |                      | ✓                              |
|           | YN036GMFI20RPD | ✓                                         |           | ✓                          |                      | ✓                              |

**Note:** The detailed description of case 1 or case 2 is explained in the following sections (from 3.4 to 3.6).

## 3.2 Abbreviation

Unit element abbreviations

| Abbreviation | Element                          |
|--------------|----------------------------------|
| T1           | Indoor room temperature          |
| T2           | Coil temperature of evaporator   |
| T3           | Coil temperature of condenser    |
| T4           | Outdoor ambient temperature      |
| Ts           | Set temperature                  |
| Td           | Control target temperature       |
| TP           | Compressor discharge temperature |

In this manual, such as TCE1, TCE2...etc., they are configurable parameters of EEPROM.

## 3.3 Fan Mode

When fan mode is activated:

- The outdoor fan and compressor are stopped.
- Temperature control is disabled and no temperature setting is displayed.
- The indoor fan speed can be set to high, medium, low, or auto.
- The louver operations are identical to those in cooling mode.
- Auto fan: In fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 24°C(75.2°F).

## 3.4 Cooling Mode

### 3.4.1 Compressor Control

Cooling temperature compensation( $\Delta T5$ ) is a configurable parameter of EEPROM. Its value ranges from -2°C to 2°C. The default value is 0.

- When  $T1-Ts < \Delta T5-2^{\circ}\text{C}$  (3.6 °F), the compressor ceases operation.
- When  $T1-Ts > \Delta T5+3^{\circ}\text{C}$  (5.4 °F), the compressor continues operation.
- When the AC is operating in mute mode, the compressor operates at a low frequency.
- When the current exceeds the preset value, the current protection function activates and the compressor ceases operation.

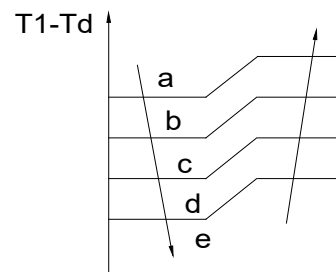
### 3.4.2 Indoor Fan Control

- In cooling mode, the indoor fan operates continuously. The fan speed can be set to high, medium, low, or auto.

- If the compressor ceases operation when the configured temperature is reached, the indoor fan motor operates at the minimum or configured speed.
- The indoor fan is controlled as below:

| Setting fan speed | $T1-Td$ °C(°F) | Actual fan speed |
|-------------------|----------------|------------------|
| H                 | A              | $H+(H+=H+G)$     |
|                   | B              | $H(=H)$          |
|                   | C              | $H-(H-=H-G)$     |
| M                 | D ...          | $M+(M+=M+Z)$     |
|                   | E              | $M(M=M)$         |
|                   | F              | $M-(M-=M-Z)$     |
| L                 | G              | $L+(L+=L+D)$     |
|                   | H              | $L(L=L)$         |
|                   | I              | $L-(L-=L-D)$     |

- The auto fan acts using the following logic:



### 3.4.3 Outdoor Fan Control

Case 1:

- The outdoor unit will be run at different fan speed according to T4 and compressor frequency.
- For different outdoor units, the fan speeds are different.

Case 2:

- The outdoor unit will be run at different fan speed according to T4.
- For different outdoor units, the fan speeds are different.

### 3.4.4 Condenser Temperature Protection

When condenser temperature is more than setting value, the compressor ceases operation.

### 3.4.5 Evaporator Temperature Protection

When evaporator temperature drops below a configured value, the compressor and outdoor fan cease operation.

## 3.5 Heating Mode(Heat pump units)

### 3.5.1 Compressor Control

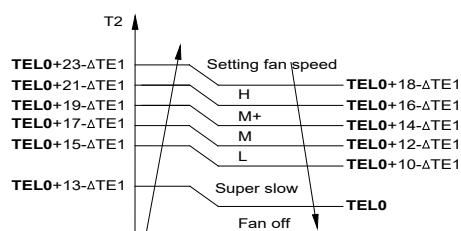
Heating temperature compensation( $\Delta T3$ ) is a configurable

parameter of EEPROM. Its value ranges from -6°C to 6°C.

- When  $T1-Ts > -\Delta T3$ , the compressor ceases operation.
- When  $T1-Ts < -\Delta T3-1.5^\circ\text{C}$  (2.7 °F), the compressor continues operation.
- When the AC is operating in mute mode, the compressor operates at a low frequency.
- When the current exceeds the preset value, the current protection function activates and the compressor ceases operation.

### 3.5.2 Indoor Fan Control:

- When the compressor is on, the indoor fan speed can be set to high, medium, low, or auto. And the anti-cold wind function has the priority.
- Anti-cold air function
  - The indoor fan is controlled by the indoor temperature  $T1$  and indoor unit coil temperature  $T2$ .

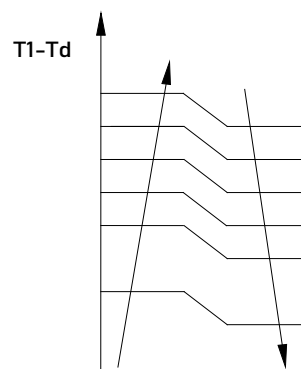


|                                                                    |                                                 |
|--------------------------------------------------------------------|-------------------------------------------------|
| $T1 \geq 19^\circ\text{C}$ (66.2 °F)                               | $\Delta TE1=0$                                  |
| $15^\circ\text{C}$ (59°F) $\leq T1 \leq 18^\circ\text{C}$ (64.4°F) | $\Delta TE1=19^\circ\text{C}-T1$<br>(34.2°F-T1) |
| $T1 < 15^\circ\text{C}$ (59°F)                                     | $\Delta TE1=4^\circ\text{C}$ (7.2 °F)           |

- When the indoor temperature  $T1$  reaches the setting temperature, the compressor continues operation, the indoor fan motor runs at the minimum speed or setting speed. (The anti-cold air function is valid).
- The indoor fan is controlled as below:

| Setting fan speed | $T1-Td$ °C(°F) | Actual fan speed |
|-------------------|----------------|------------------|
| H                 | $H-(H-H-G)$    | H                |
|                   | $H-(H-H-G)$    | H                |
|                   | $H-(H-H-G)$    | H                |
| M                 | $M-(M-M-Z)$    | M                |
|                   | $M-(M-M-Z)$    | M                |
|                   | $M-(M-M-Z)$    | M                |
| L                 | $L-(L-L-D)$    | L                |
|                   | $L-(L-L-D)$    | L                |
|                   | $L-(L-L-D)$    | L                |

- Auto fan action in heating mode:



### 3.5.3 Outdoor Fan Control:

Case 1:

- The outdoor unit will be run at different fan speed according to  $T4$  and compressor frequency.
- For different outdoor units, the fan speeds are different.

Case 2:

- The outdoor unit will be run at different fan speed according to  $T4$ .
- For different outdoor units, the fan speeds are different.

### 3.5.4 Defrosting mode

Case 1:

- The unit enters defrosting mode according to the temperature value of  $T3$  and  $T4$  as well as the compressor running time.
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will cease operation, the defrost light of the indoor unit will turn on, and the "df" symbol is displayed.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - $T3$  rises above TCDE1.
  - $T3$  maintained above TCDE2 for 80 seconds.
  - Unit runs for 15 minutes consecutively in defrosting mode.

Case 2:

- The unit enters defrosting mode according to the temperature value of  $T3$  as well as the compressor running time.
- In defrosting mode, the compressor continues to run, the indoor and outdoor motor will cease operation, the defrost light of the indoor unit will turn on, and the "df" symbol is displayed.

- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
  - T3 rises above TCDE1.
  - T3 maintained above TCDE2 for 80 seconds.
  - Unit runs for 10 minutes consecutively in defrosting mode.

### 3.5.5 Evaporator Temperature Protection

When the evaporator temperature exceeds a preset protection value, the compressor ceases operation.

## 3.6 Auto-mode

- This mode can be selected with the remote controller and the setting temperature can be changed between 17°C~30°C (62 °F~86 °F).
- In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of ΔT (ΔT =T1-TS).

| ΔT        | Running mode |
|-----------|--------------|
| ΔT>A      | Cooling      |
| B°C ≤ΔT≤A | Fan-only     |
| ΔT< B     | Heating*     |

Heating\*: In auto mode, cooling only models run the fan

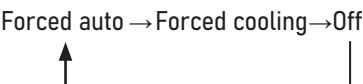
- Indoor fan will run at auto fan speed.
- The louver operates same as in relevant mode.
- If the machine switches mode between heating and cooling, the compressor will keep stopping for certain time and then choose mode according to ΔT.

## 3.7 Drying mode

- Indoor fan speed is fixed at breeze and can't be changed. The louver angle is the same as in cooling mode.
- All protections are active and the same as that in cooling mode.

## 3.8 Forced operation function

Press the AUTO/COOL button, the AC will run as below sequence:



- Forced cooling mode:

The compressor and outdoor fan continue to run and the indoor fan runs at breeze speed. After running for 30 minutes, the AC will switch to auto mode with a preset temperature of 24°C (76°F).

- Forced auto mode:

Forced auto mode operates the same as normal auto mode with a preset temperature of 24°C (76°F).

- The unit exits forced operation when it receives the following signals:
  - Switch on
  - Switch off
  - Timer on
  - Timer off
  - Changes in:
    - mode
    - fan speed
    - sleep mode
    - Follow me
- Forced defrosting mode:
  - Press AUTO/COOL button continuously for 5s under forced cooling mode to enter this mode.
  - Indoor fan will stop, defrosting lamp will light on.
  - Quit this mode and turn off the unit when:
    - quit normal defrosting
    - turn off by RC
    - press AUTO/COOL button continuously for 5s again

## 3.9 Sleep function

- The sleep function is available in cooling, heating, or auto mode.
- The operational process for sleep mode is as follows:
  - When cooling, the temperature rises 1°C (2°F) (to no higher than 30°C (86 °F)) every hour. After 2 hours, the temperature stops rising and the indoor fan is fixed at low speed.
  - When heating, the temperature decreases 1°C(2 °F) (to not lower than 17°C(62.6°F)) every hour. After 2 hours, the temperature stops decreasing and the indoor fan is fixed at low speed. Anti-cold wind function takes priority.
- The operating time for sleep mode is 8 hours, after which, the unit exits this mode and does not switch off.

## 3.10 Auto-Restart function

- The indoor unit has an auto-restart module that allows the unit to restart automatically. The module automatically stores the current settings (not including the swing setting) and, in the case of a sudden power

---

failure, will restore those setting automatically within 3 minutes after power returns.

- If the unit was in forced cooling mode, it will run in this mode for 30 minutes and turn to auto mode with temperature set to 24°C (76°F).
- If there is a power failure while the unit is running, the compressor starts 3 minutes after the unit restarts. If the unit was already off before the power failure, the compressor starts 1 minute after the unit restarts.

### 3.11 Refrigerant Leakage Detection

With this new technology, the display area will show “EC” when the outdoor unit detects refrigerant leakage.

## 4. Optional Functions

### 4.1 46°F / 8°C Heating

In heating mode, the temperature can be set to as low as 46°F (8°C), preventing the indoor area and pipes from freezing if unoccupied during severe cold weather.

### 4.2 Self clean

- If you press “Self Clean” when the unit is in cooling or drying mode:
  - For cooling models, the indoor unit will run in low fan mode for a certain time, then ceases operation.
  - For heat pump models, the indoor unit will run in fan-only mode, then low heat, and finally in fan-only mode.
- Self Clean keeps the indoor unit dry and prevents mold growth.
- When matched with multi outdoor unit, this function is unavailable.

### 4.3 Follow me

- If you press “Follow Me” on the remote, the indoor unit will beep. This indicates the follow me function is active.
- Once active, the remote control will send a signal every 3 minutes, with no beeps. The unit automatically sets the temperature according to the measurements from the remote control.
- The unit will only change modes if the information from the remote control makes it necessary, not from the unit’s temperature setting.
- If the unit does not receive a signal for 7 minutes or you press “Follow Me,” the function turns off. The unit regulates temperature based on its own sensor and settings.

### 4.4 Silence

- Press “Silence” on the remote control to enable the SILENCE function. While this function is active, the compressor frequency is maintained at a lower level than F3. The indoor unit will run at faint breeze, which reduces noise to the lowest possible level.
- When matched with multi outdoor unit, this function is unavailable.

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# Maintenance

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## 1. First Time Installation Check

Air and moisture trapped in the refrigerant system affects the performance of the air conditioner by:

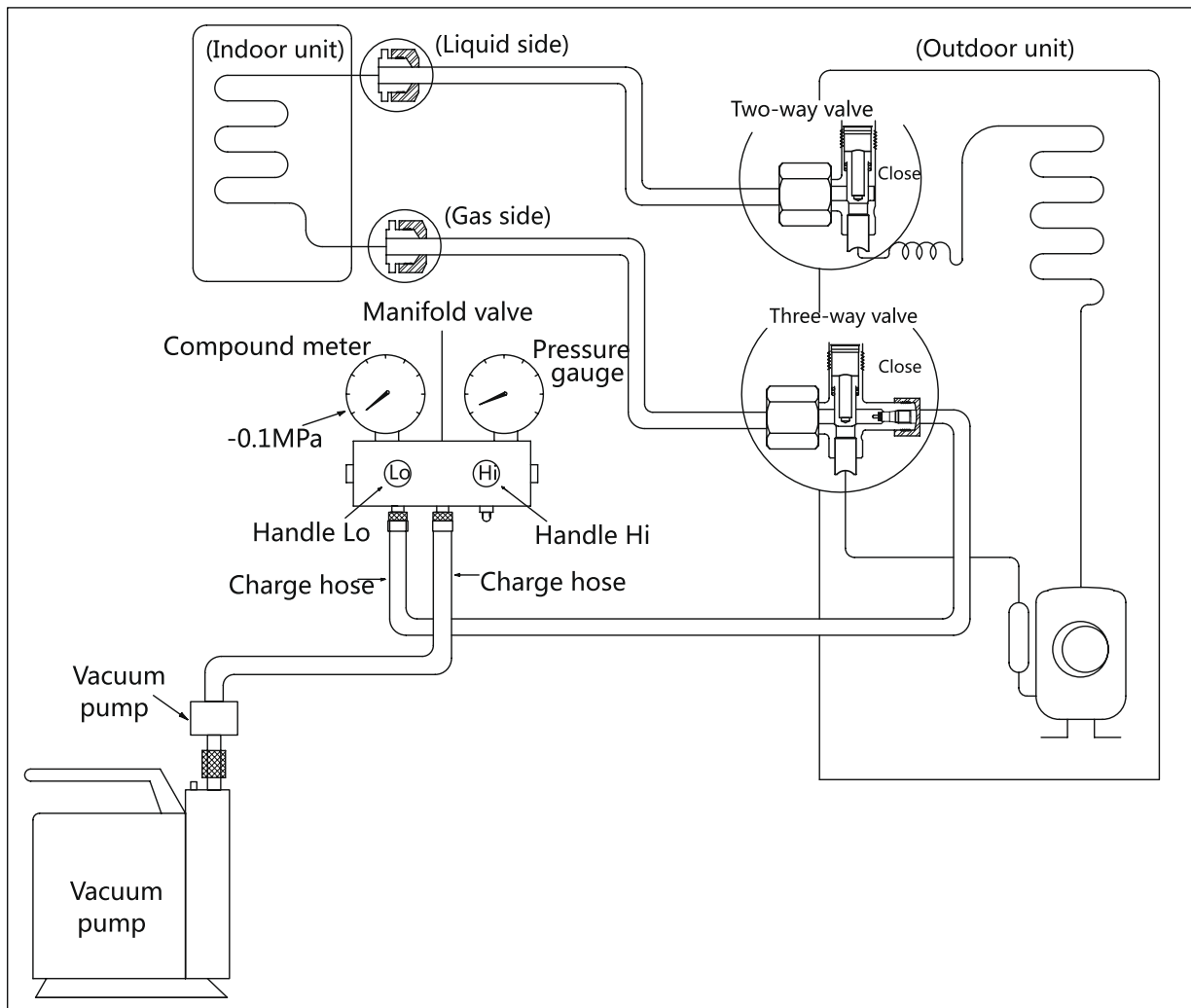
- Increasing pressure in the system.
- Increasing the operating current.
- Decreasing the cooling or heating efficiency.
- Congesting the capillary tubing due to ice build-up in the refrigerant circuit.
- Corroding the refrigerant system.

To prevent air and moisture from affecting the air conditioner's performance, the indoor unit, as well as the pipes between the indoor and outdoor unit, must be leak tested and evacuated.

### Leak test (soap water method)

Use a soft brush to apply soapy water or a neutral liquid detergent onto the indoor unit connections and outdoor unit connections. If there is gas leakage, bubbles will form on the connection.

### Air Purging with Vacuum Pump:



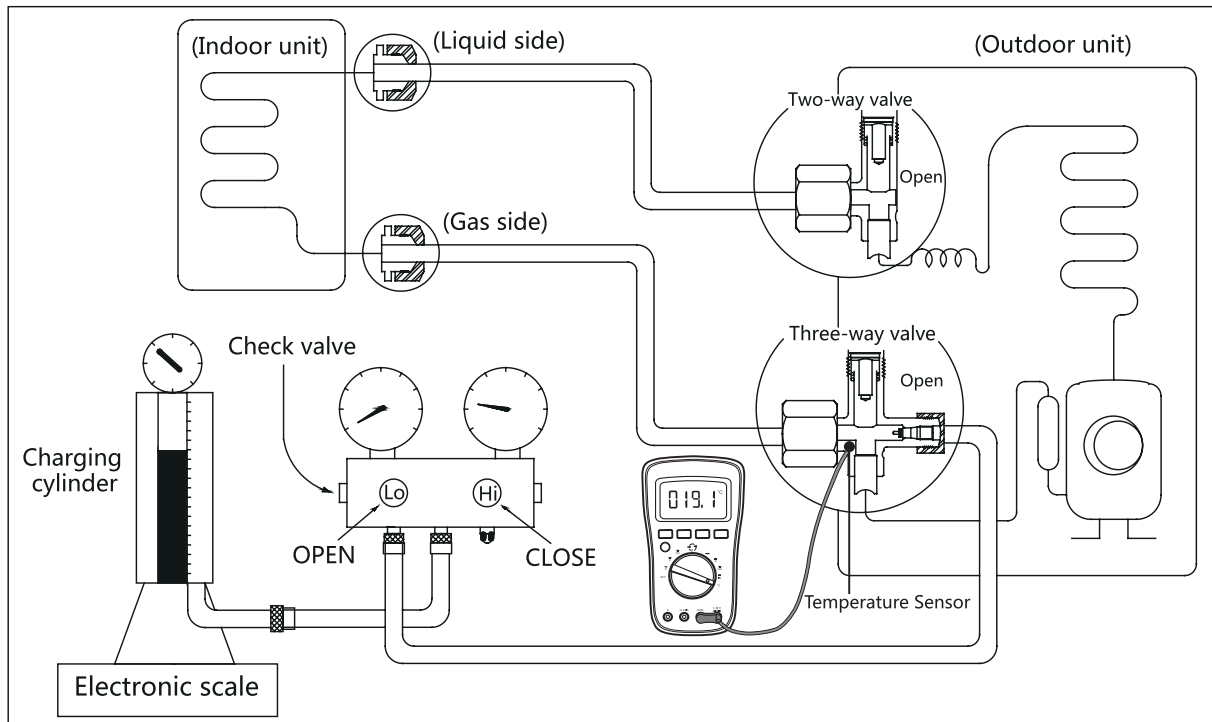
(Continued on Next Page)

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**Procedure:**

1. Tighten the flare nuts of the indoor and outdoor units, and confirm that both the 2- and 3-way valves are closed.
2. Connect the charge hose with the push pin of Handle Lo to the gas service port of the 3-way valve.
3. Connect another charge hose to the vacuum pump.
4. Fully open the Handle Lo manifold valve.
5. Using the vacuum pump, evacuate the system for 30 minutes.
  - a. Check whether the compound meter indicates -0.1 MPa (14.5 Psi).
    - If the meter does not indicate -0.1 MPa (14.5 Psi) after 30 minutes, continue evacuating for an additional 20 minutes.
    - If the pressure does not achieve -0.1 MPa (14.5 Psi) after 50 minutes, check for leakage.
  - b. If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then cease vacuum pump operations.
6. Loosen the flare nut of the 3-way valve for 6 or 7 seconds, and then tighten the flare nut again.
  - a. Confirm the pressure display in the pressure indicator is slightly higher than the atmospheric pressure.
  - b. Remove the charge hose from the 3-way valve.
7. Fully open the 2- and 3-way valves and tighten the cap of the 2- and 3-way valves.

## 2. Refrigerant Recharging



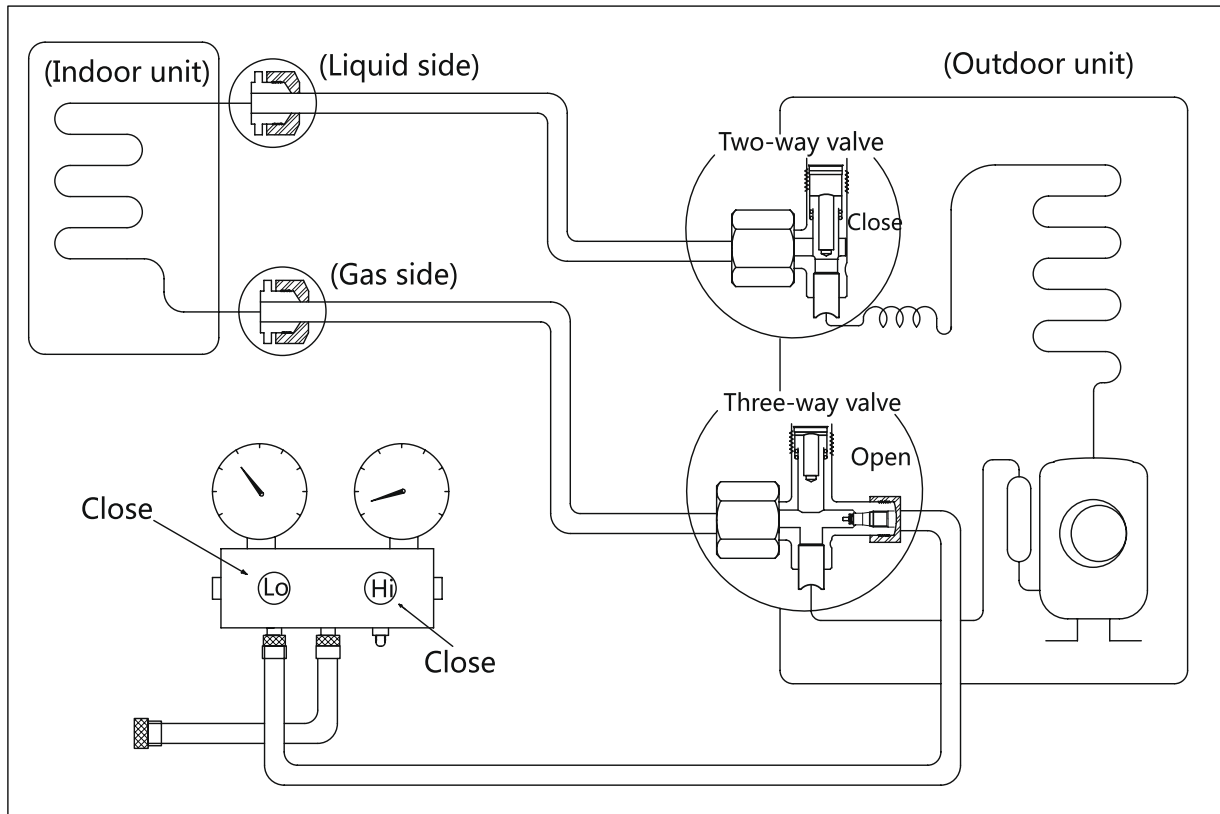
### Procedure:

1. Close both 2- and 3-way valves.
2. Slightly connect the Handle Lo charge hose to the 3-way service port.
3. Connect the charge hose to the valve at the bottom of the cylinder.
4. If the refrigerant is R410A/R32, invert the cylinder to ensure a complete liquid charge.
5. Open the valve at the bottom of the cylinder for 5 seconds to purge the air in the charge hose, then fully tighten the charge hose with push pin Handle Lo to the service port of 3-way valve..
6. Place the charging cylinder onto an electronic scale and record the starting weight.
7. Fully open the Handle Lo manifold valve, 2- and 3-way valves.
8. Operate the air conditioner in cooling mode to charge the system with liquid refrigerant.
9. When the electronic scale displays the correct weight (refer to the gauge and the pressure of the low side to confirm, the value of pressure refers to chapter Appendix), turn off the air conditioner, then disconnect the charge hose from the 3-way service port immediately.
10. Mount the caps of service port and 2- and 3-way valves.
11. Use a torque wrench to tighten the caps to a torque of 18 N.m. (13.28 ft-lb).
12. Check for gas leakage.

### 3. Re-Installation

#### 3.1 Indoor Unit

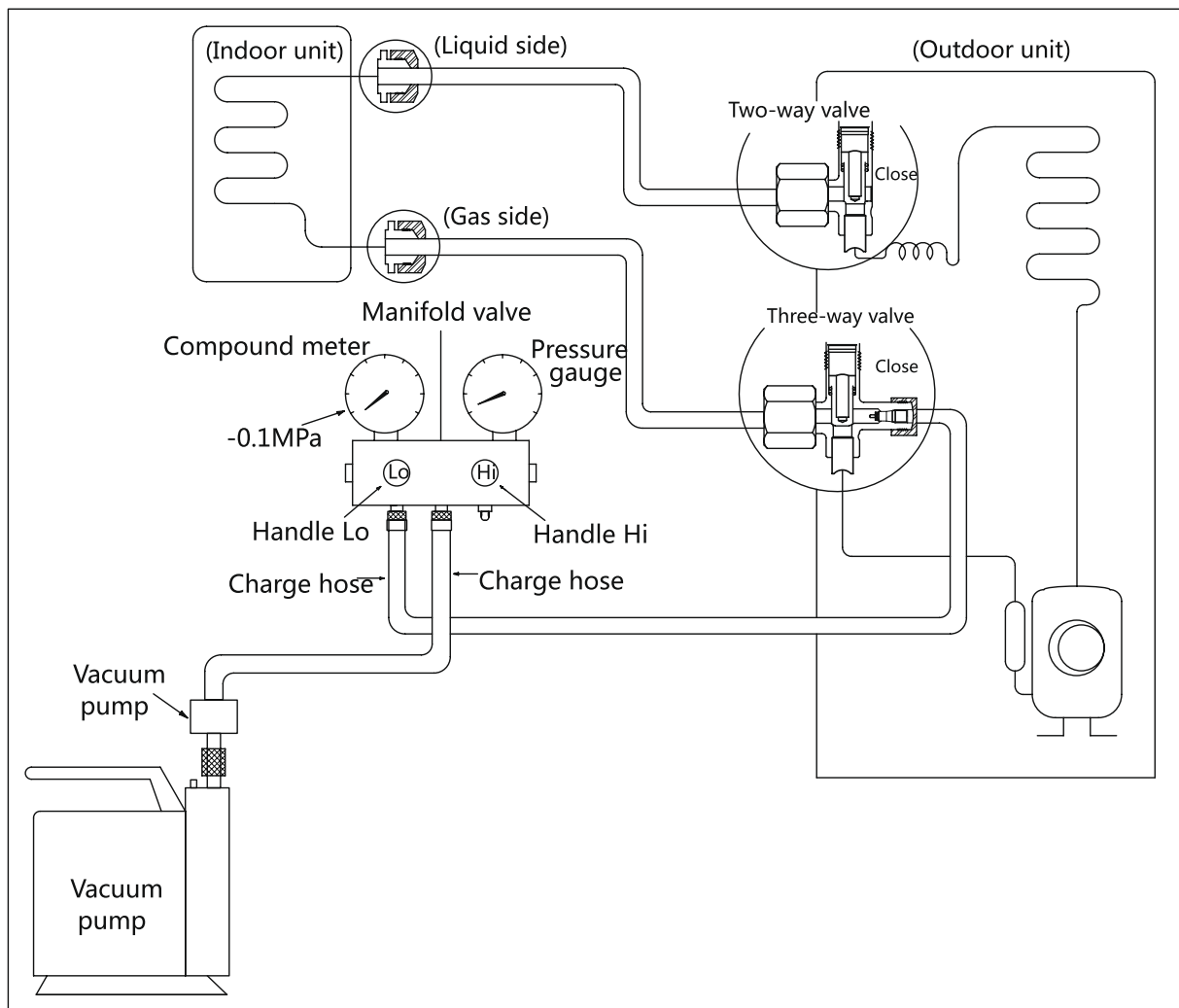
Capturing the refrigerant into the outdoor unit:



#### Procedure:

1. Confirm that the 2- and 3-way valves are opened.
2. Connect the charge hose with the push pin of Handle Lo to the 3-way valve's gas service port.
3. Open the Handle Lo manifold valve to purge air from the charge hose for 5 seconds and then close it quickly.
4. Close the 2-way valve.
5. Operate the air conditioner in cooling mode. Cease operations when the gauge reaches 0.1 MPa (14.5 Psi).
6. Close the 3-way valve so that the gauge rests between 0.3 MPa (43.5 Psi) and 0.5 MPa (72.5 Psi).
7. Disconnect the charge set and mount the caps of service port and 2- and 3-way valves.
8. Use a torque wrench to tighten the caps to a torque of 18 N.m. (13.28 ft-lb).
9. Check for gas leakage.

### Air Purging with Vacuum Pump:

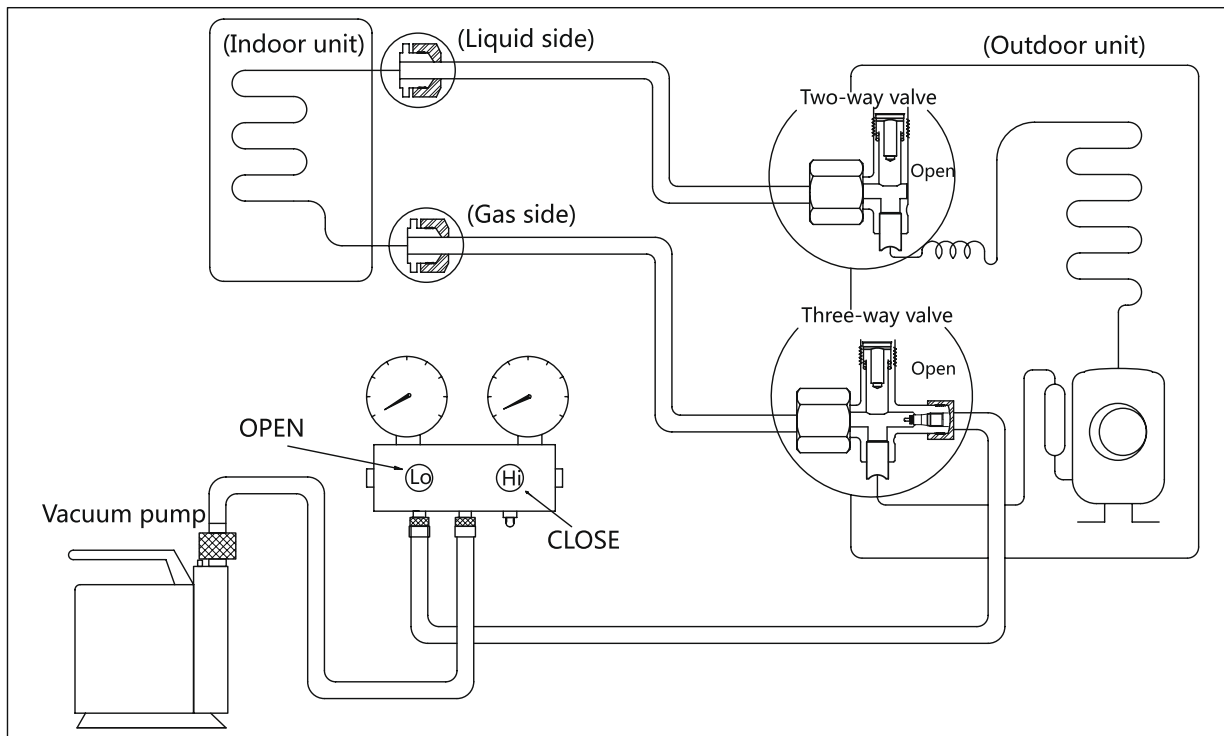


### Procedure:

1. Tighten the flare nuts of the indoor and outdoor units, and confirm that both the 2- and 3-way valves are closed.
2. Connect the charge hose with the push pin of Handle Lo to the gas service port of the 3-way valve.
3. Connect another charge hose to the vacuum pump.
4. Fully open the Handle Lo manifold valve.
5. Using the vacuum pump, evacuate the system for 30 minutes.
  - a. Check whether the compound meter indicates -0.1 MPa (14.5 Psi).
    - If the meter does not indicate -0.1 MPa (14.5 Psi) after 30 minutes, continue evacuating for an additional 20 minutes.
    - If the pressure does not achieve -0.1 MPa (14.5 Psi) after 50 minutes, check for leakage.
  - b. If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then cease vacuum pump operations.
6. Loosen the flare nut of the 3-way valve for 6 or 7 seconds and then tighten the flare nut again.
  - a. Confirm the pressure display in the pressure indicator is slightly higher than the atmospheric pressure.
  - b. Remove the charge hose from the 3-way valve.
7. Fully open the 2- and 3-way valves and tighten the cap of the 2- and 3-way valves.

## 3.2 Outdoor Unit

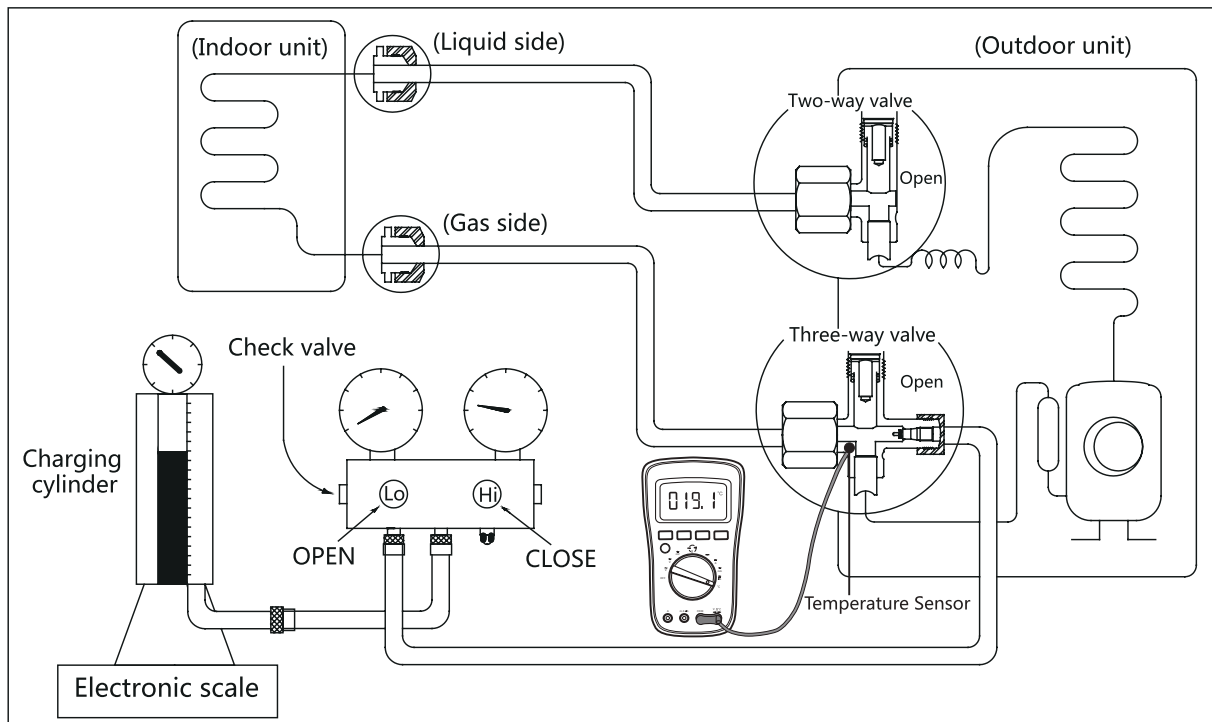
### Evacuation for the Whole System:



#### Procedure:

1. Confirm that the 2- and 3-way valves are opened.
2. Connect the vacuum pump to the 3-way valve's service port.
3. Evacuate the system for approximately one hour. Confirm that the compound meter indicates  $-0.1$  MPa (14.5Psi).
4. Close the valve (Low side) on the charge set and turn off the vacuum pump.
5. Wait for 5 minutes then check whether the gauge needle moves after turning off the vacuum pump. If the gauge needle moves backward, check whether there is gas leakage.
6. Disconnect the charge hose from the vacuum pump.
7. Mount the caps of service port and 2- and 3-way valves.
8. Use a torque wrench to tighten the caps to a torque of 18 N.m. (13.28 ft-lb).

## Refrigerant Charging:



### Procedure:

1. Close both 2- and 3-way valves.
2. Slightly connect the Handle Lo charge hose to the 3-way service port.
3. Connect the charge hose to the valve at the bottom of the cylinder.
4. If the refrigerant is R410A/R32, invert the cylinder to ensure a complete liquid charge.
5. Open the valve at the bottom of the cylinder for 5 seconds to purge the air in the charge hose, then fully tighten the charge hose with push pin Handle Lo to the service port of 3-way valve..
6. Place the charging cylinder onto an electronic scale and record the starting weight.
7. Fully open the Handle Lo manifold valve, 2- and 3-way valves.
8. Operate the air conditioner in cooling mode to charge the system with liquid refrigerant.
9. When the electronic scale displays the correct weight (refer to the gauge and the pressure of the low side to confirm, the value of pressure refers to chapter Appendix), turn off the air conditioner, then disconnect the charge hose from the 3-way service port immediately..
10. Mount the caps of service port and 2- and 3-way valves.
11. Use a torque wrench to tighten the caps to a torque of 18 N.m. (13.28 ft-lb).
12. Check for gas leakage.

### Note:

1. Mechanical connectors used indoors shall comply with local regulations.
2. When mechanical connectors are reused indoors, sealing parts shall be renewed.
3. When flared joints are reused indoors, the flare part shall be re-fabricated.

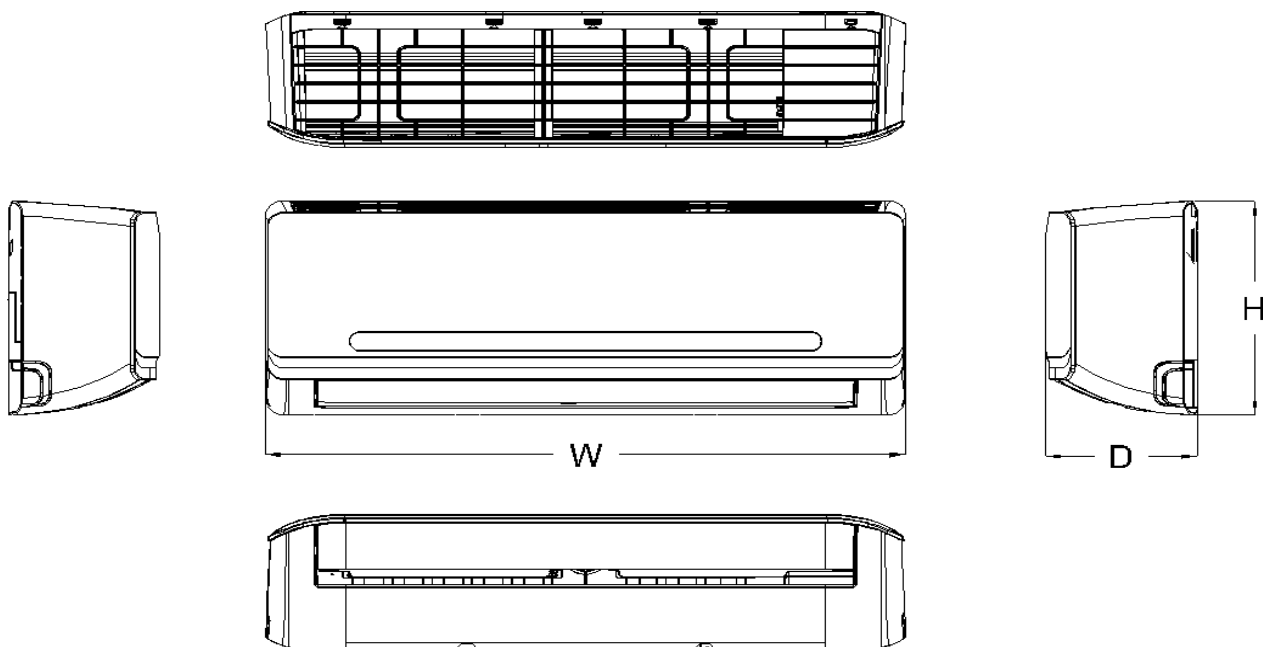
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# Indoor Units Disassembly

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| 3.6 | Drain Hose.....                       | 34 |

## 1. Dimensions



| Capacity | Size Class | W (in.) | D (in.) | H (in.) |
|----------|------------|---------|---------|---------|
| 9K       | A          | 28"-3/8 | 7"-3/8  | 11"-3/8 |
| 9K~12K   | B          | 31"-5/8 | 7"-1/2  | 11"-3/4 |
| 18K      | C          | 38"     | 8"-1/2  | 12"-1/2 |
| 18K~24K  | D          | 42"-1/2 | 8"-7/8  | 13"-1/4 |
| 30K~36K  | E          | 49"-5/8 | 11"-1/8 | 14"-1/4 |

### Size Class A:

WS009AMFI20HLD / WS009GMFI20HLD

### Size Class B:

WS009GMFI22HLE / WS012GMFI22HLE / WS009AMFI22HLE / WS012AMFI22HLE / WS012AMFI20HLD / WS012GMFI20HLD

### Size Class C:

WS018GMFI20HLD

### Size Class D:

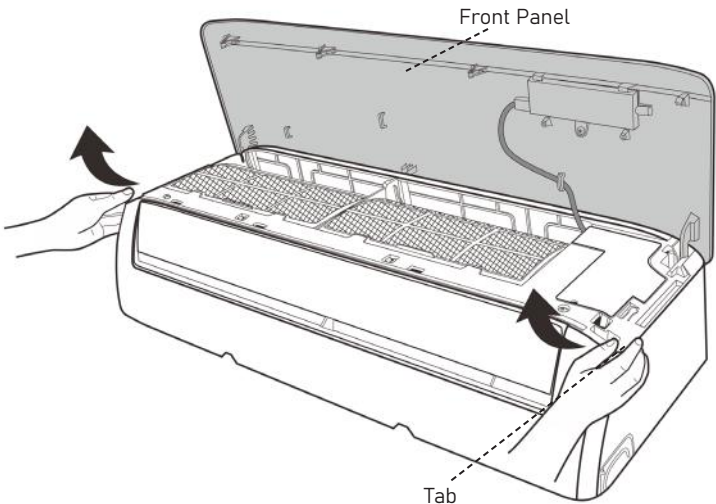
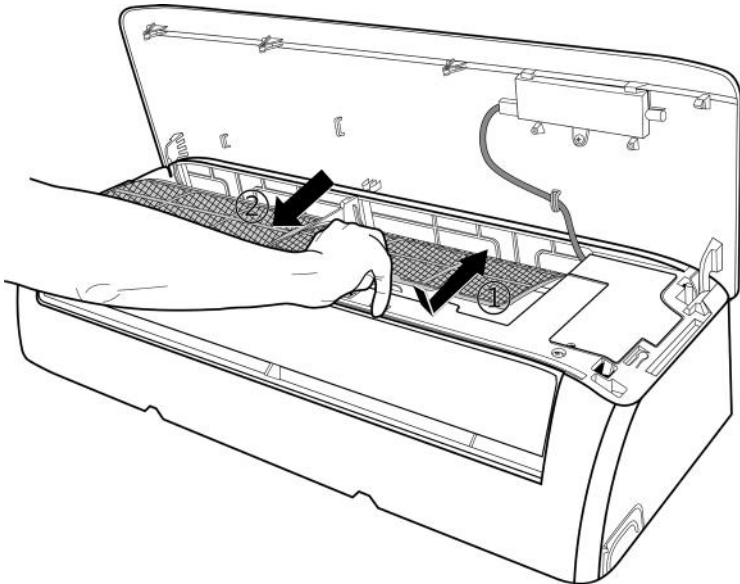
WS018GMFI22HLE, WS024GMFI22HLE, WS024GMFI20HLD

### Size Class E:

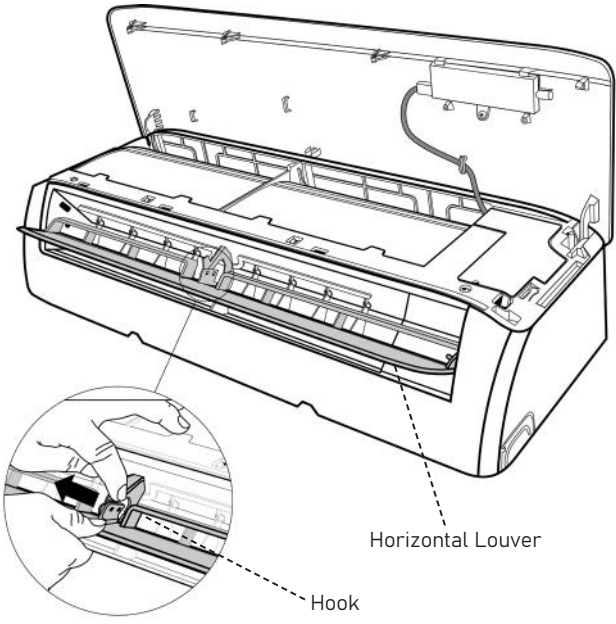
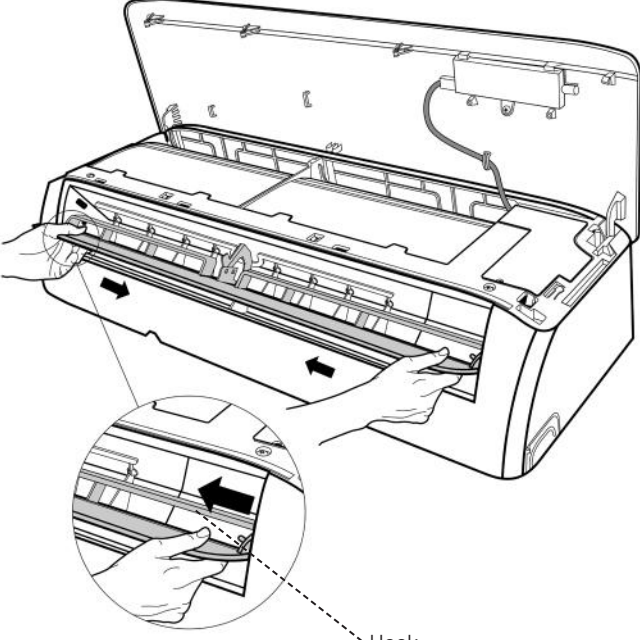
WS030GMFI20HLD, WS036GMFI20HLD

## 2. Indoor Unit Disassembly (9,000 ~ 24,000 BTU)

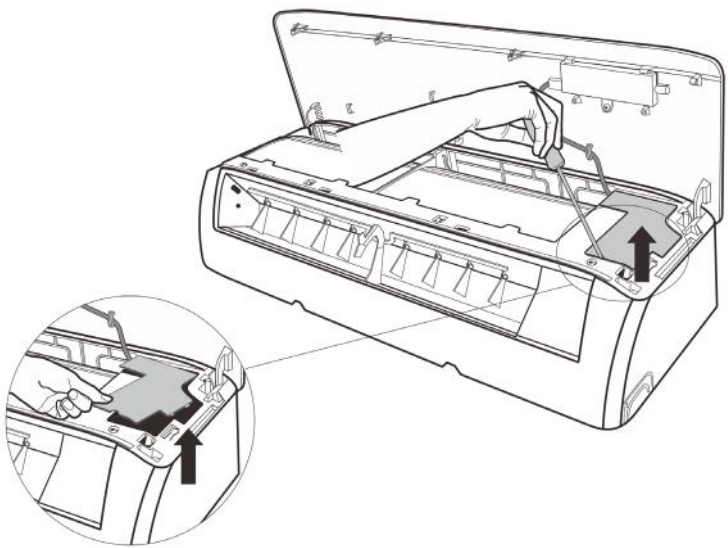
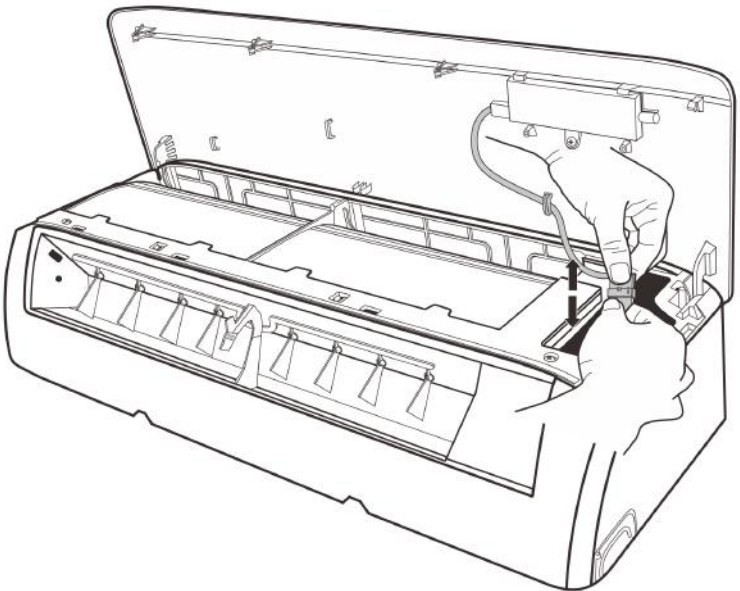
### 2.1. Front Panel Disassembly

| Procedure                                                                                                     | Illustration                                                                                         |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <p>1) Hold the front panel by the tabs on the both sides and lift it (see Fig. 1).</p>                        |  <p>Figure 1</p>   |
| <p>2) Push up the bottom of an air filter (step 1), and then pull it out downwards (step 2) (see Fig. 2).</p> |  <p>Figure 2</p> |

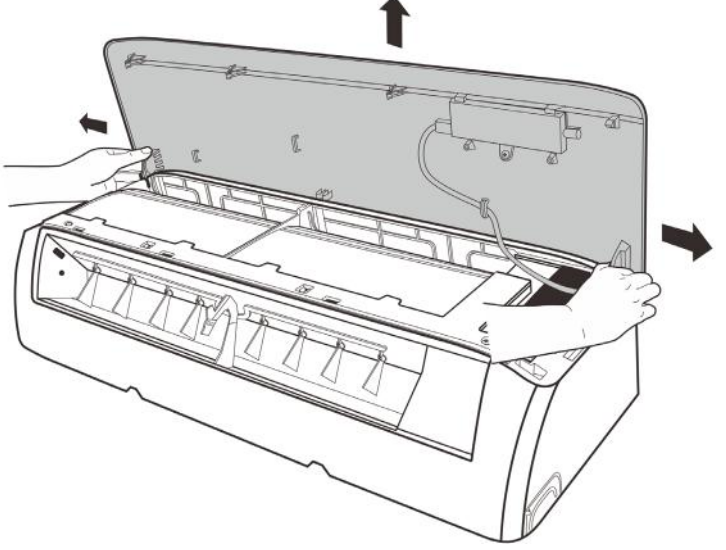
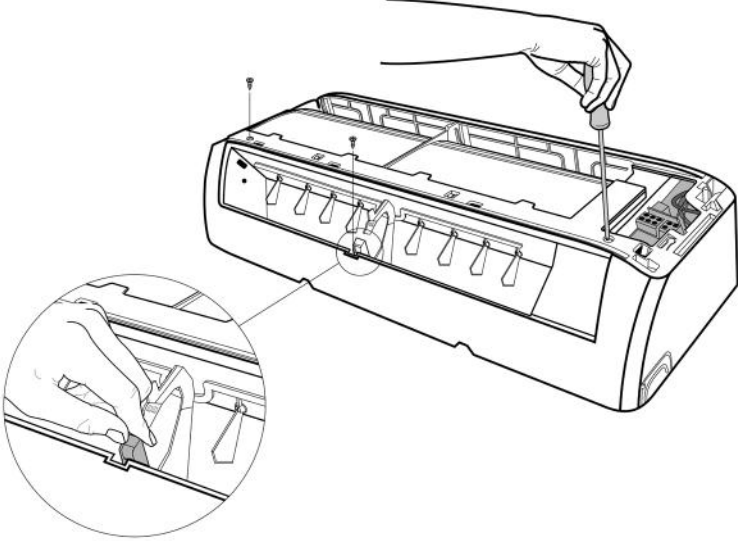
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                         | Illustration                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>3) Open the horizontal louver and push the hook towards left to open it (see Figure 3).</p>                                    |  <p>Horizontal Louver</p> <p>Hook</p> <p><b>Figure 3</b></p> |
| <p>4) Bend the horizontal louver lightly by both hands to loosen the hooks, then remove the horizontal louver (see Figure 4).</p> |  <p>Hook</p> <p><b>Figure 4</b></p>                        |

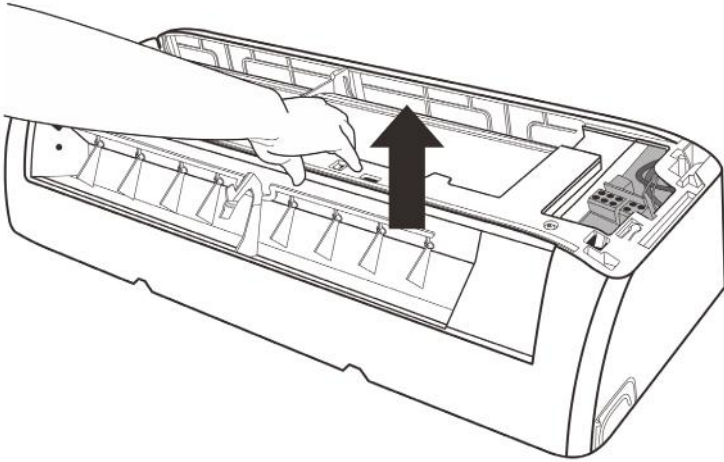
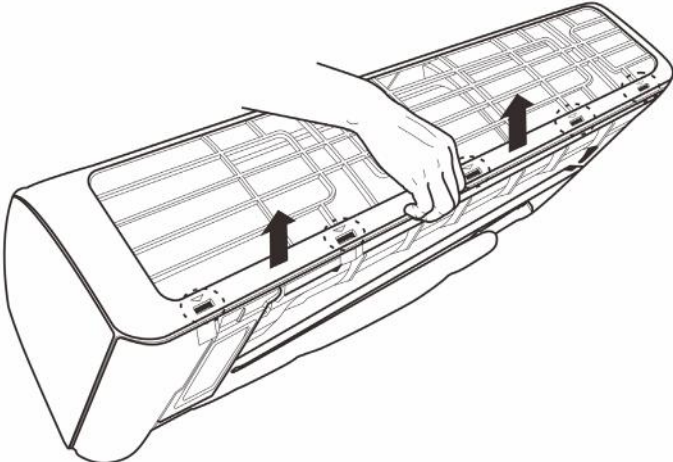
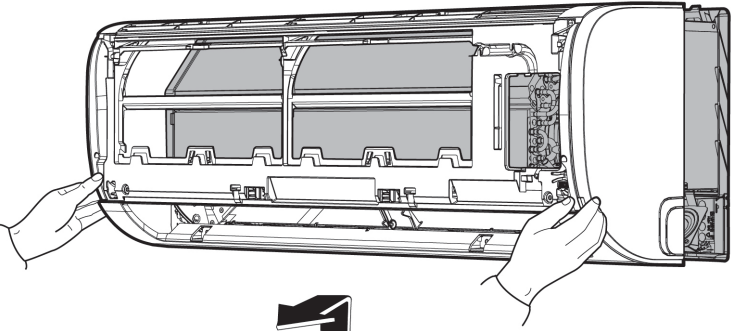
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                      | Illustration                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>5) Pry the electrical cover by a screw driver, and rotate it towards left, then remove it (see Fig. 5).</p> |  <p>The diagram illustrates the process of removing the electrical cover. A screwdriver is shown prying the cover from the right side. An arrow indicates the cover is to be rotated towards the left. An inset circular view provides a closer look at the cover being lifted, with an arrow pointing upwards to show its removal direction.</p> <p style="text-align: center;"><b>Figure 5</b></p> |
| <p>6) Disconnect the connector for display board (see Fig. 6).</p>                                             |  <p>The diagram shows a hand disconnecting a cable connector from a socket on the right side of the unit's interior. The cover is open, and the internal components are visible.</p> <p style="text-align: center;"><b>Figure 6</b></p>                                                                                                                                                            |

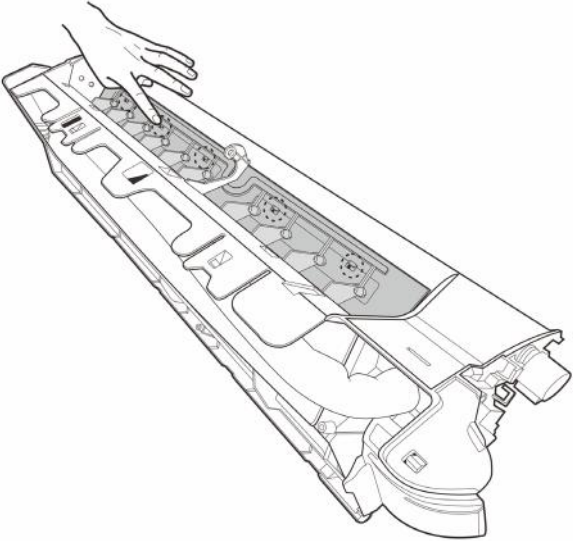
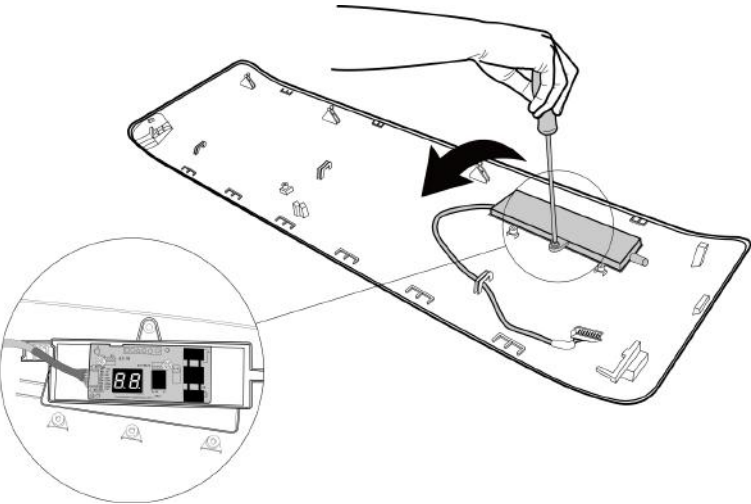
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                      | Illustration                                                                                         |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <p>7) Slid the front panel side to side to release each axis (see Fig. 7).</p> |  <p>Figure 7</p>   |
| <p>8) Open the screw cap and then remove the 3 screws (see Fig. 8).</p>        |  <p>Figure 8</p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                                    | Illustration                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <p>9) Release the hooks with hands (see Fig. 9).</p>                                                                                         |  <p>Figure 9</p>    |
| <p>10) Release the 5 hooks in the back (see Fig. 10).</p>                                                                                    |  <p>Figure 10</p>  |
| <p>11) Pull out the panel frame while pushing the hook through a clearance between the panel frame and the heat exchanger (see Fig. 11).</p> |  <p>Figure 11</p> |

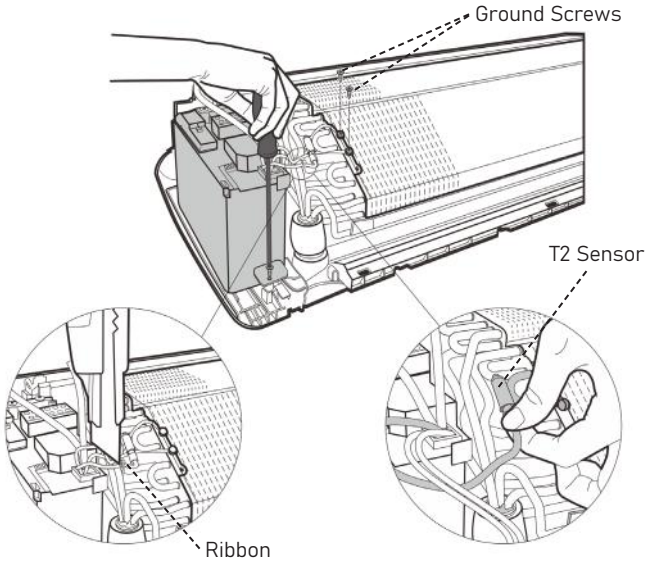
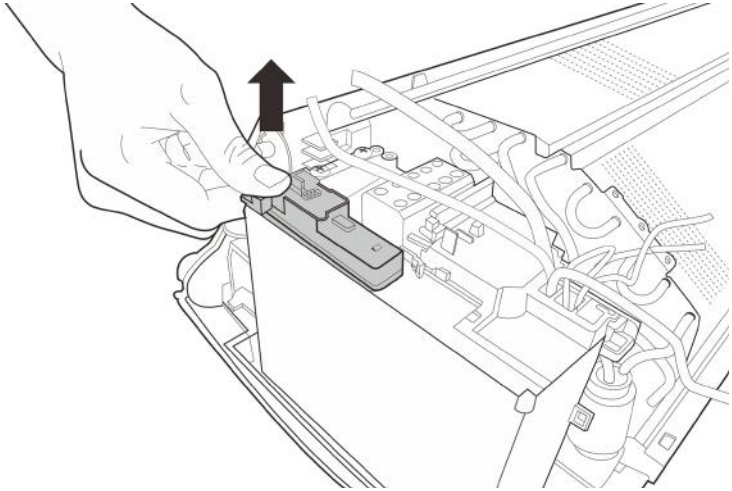
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                                                                    | Illustration                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>12)</b> Release the 5 hooks of the vertical blades, then pull the vertical blades rightward and remove it (see Fig. 12).</p>                                           |  <p style="text-align: center;"><b>Figure 12</b></p>   |
| <p><b>13)</b> Remove 1 screw of the display board. (see Fig. 13).</p> <p><b>14)</b> Rotate the display board in the direction shown in the right picture. (see Fig. 13).</p> |  <p style="text-align: center;"><b>Figure 13</b></p> |

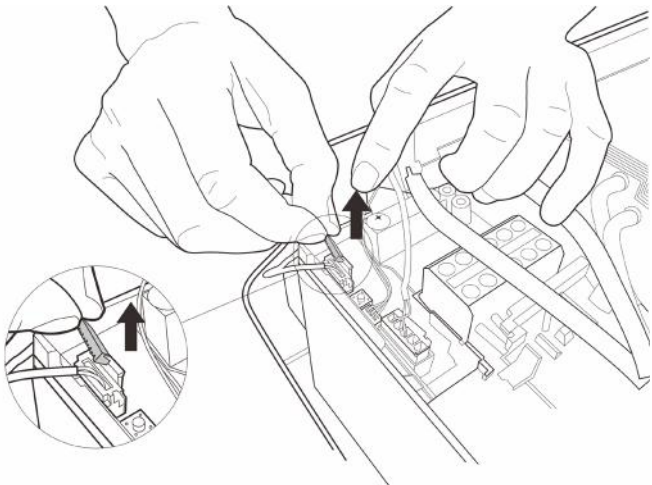
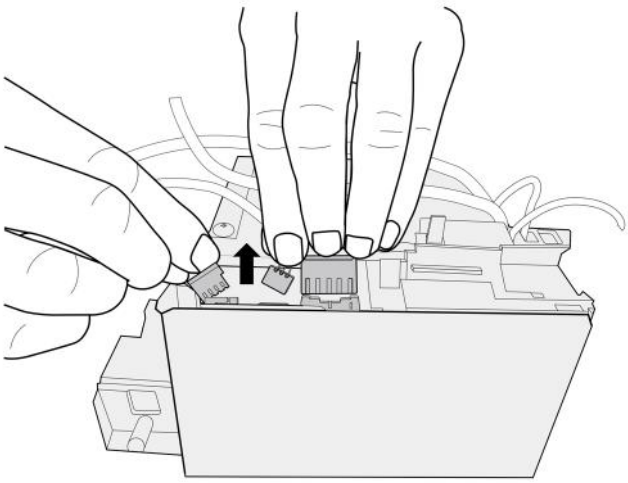
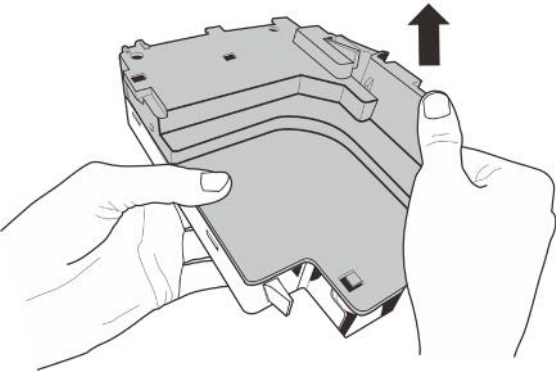
**Note:** This section is for reference only. Actual unit appearance may vary.

## 2.2. Electrical Parts Disassembly (Antistatic gloves must be worn.)

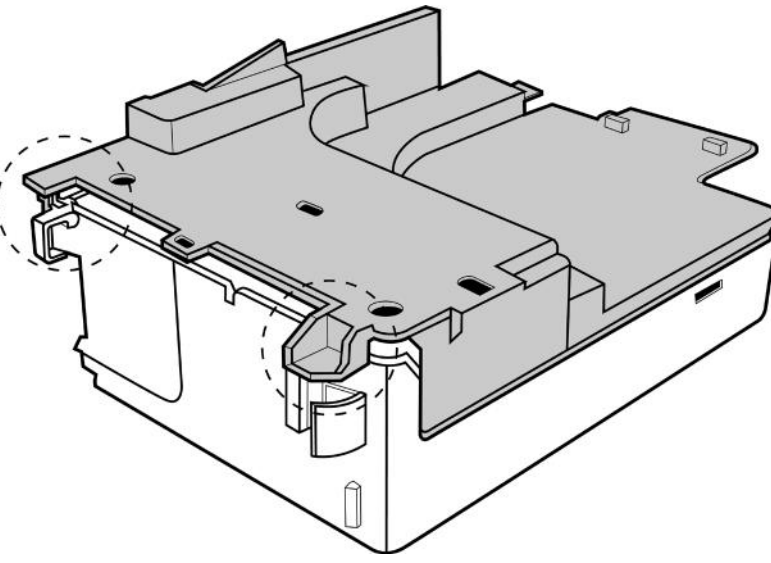
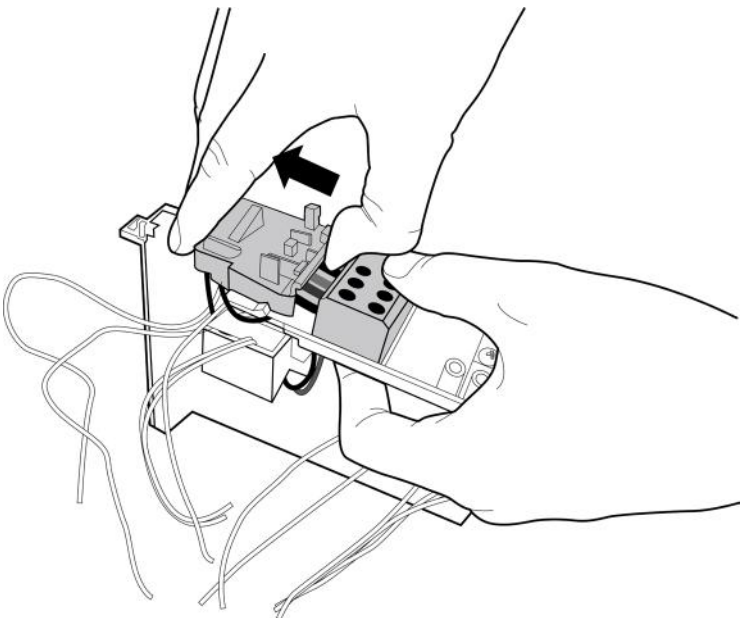
**Note:** Remove the front panel (refer to 2.1. Front Panel Disassembly) prior to disassembling electrical parts.

| Procedure                                                                                                                                                                                                                                                                       | Illustration                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"><li>1) Cut the ribbon with a cutter, then pull out the coil temperature sensor (T2) (see Fig. 14).</li><li>2) Remove one fastening screw of the electronic control box and two screws used for the ground connection (see Fig. 14).</li></ol> |  <p><b>Figure 14</b></p>  |
| <ol style="list-style-type: none"><li>3) An upward force is maintained until the cover of electronic control box is removed (see Fig. 15).</li></ol>                                                                                                                            |  <p><b>Figure 15</b></p> |

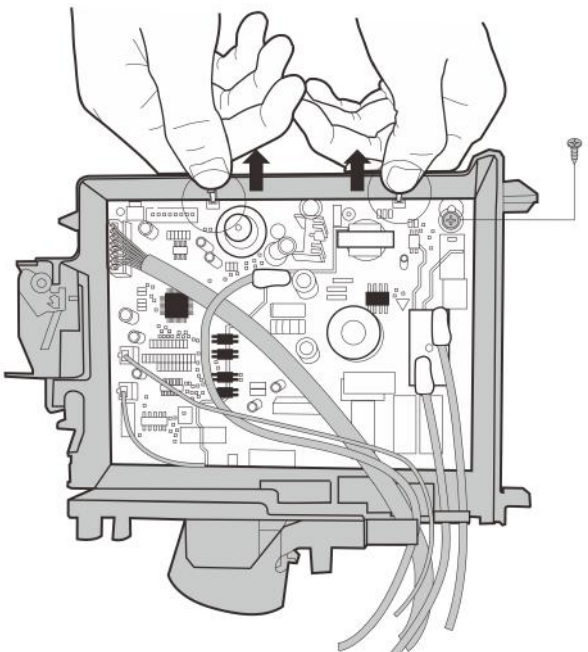
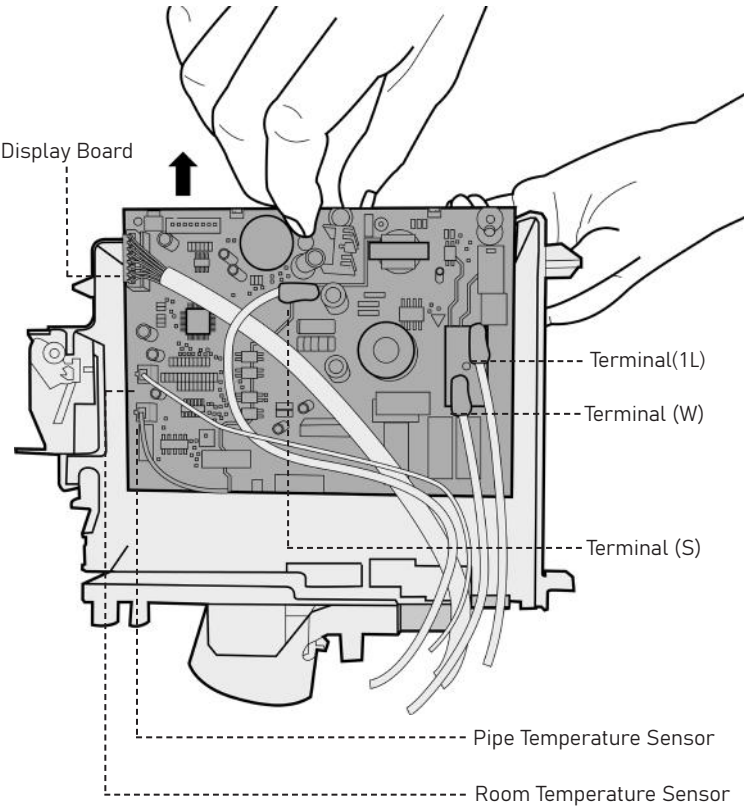
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                         | Illustration                                                                                                 |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <p>4) Remove the fixed devices of the connectors (see Fig. 16).</p>                               |  <p><b>Figure 16</b></p>   |
| <p>5) Disconnect the connectors of fan motor, the step motor and the T2 sensor (see Fig. 17).</p> |  <p><b>Figure 17</b></p>  |
| <p>6) Open the left side plate of electronic control box (see Fig. 18).</p>                       |  <p><b>Figure 18</b></p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                     | Illustration                                                                                                                             |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p>7) Open the two clips on the front of the electric box (see Fig. 19).</p>  |  <p style="text-align: center;"><b>Figure 19</b></p>   |
| <p>8) Open the upper cover plate of electronic control box (see Fig. 20).</p> |  <p style="text-align: center;"><b>Figure 20</b></p> |

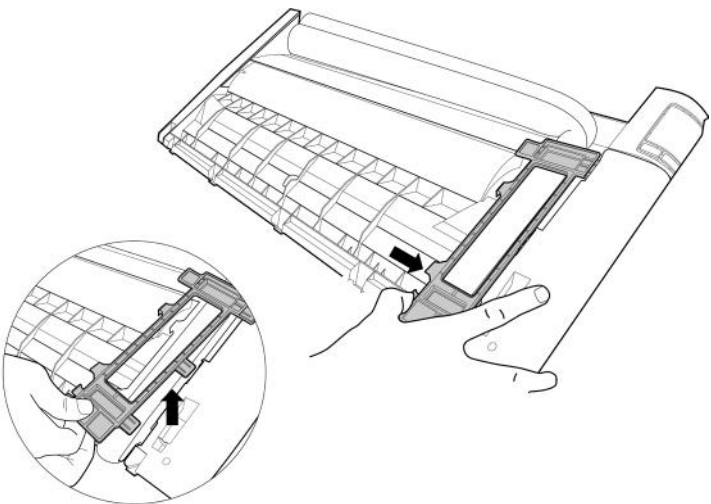
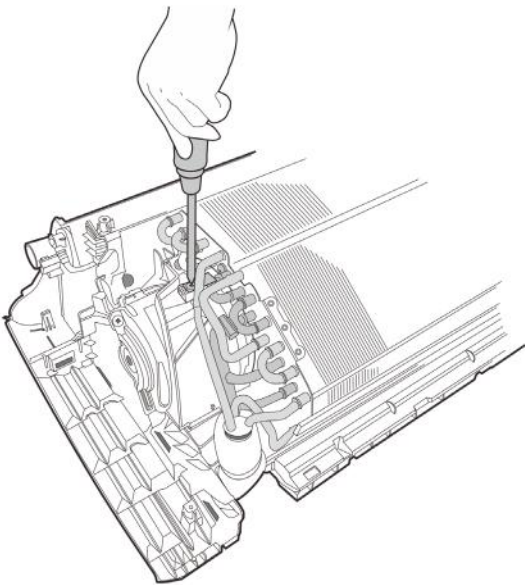
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                              | Illustration                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p>9) Remove 1 screw and open the 2 clips along the direction indicated in right image (see Fig. 21).</p>              |  <p style="text-align: center;"><b>Figure 21</b></p>   |
| <p>10) Pull out the electrical main board along the direction indicated in right image to remove it (see Fig. 22).</p> |  <p style="text-align: center;"><b>Figure 22</b></p> |

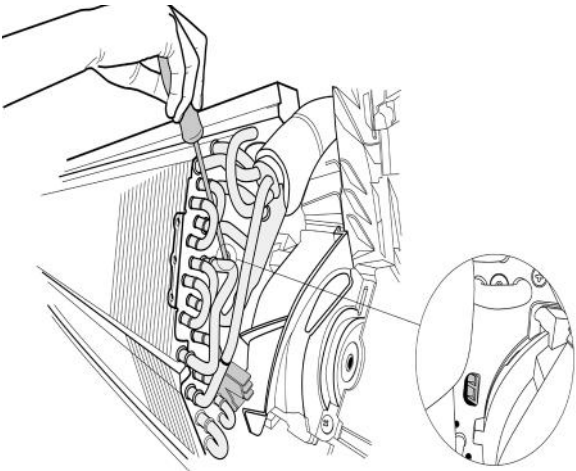
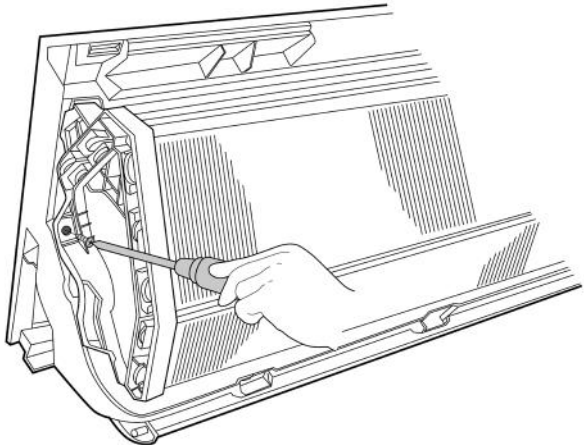
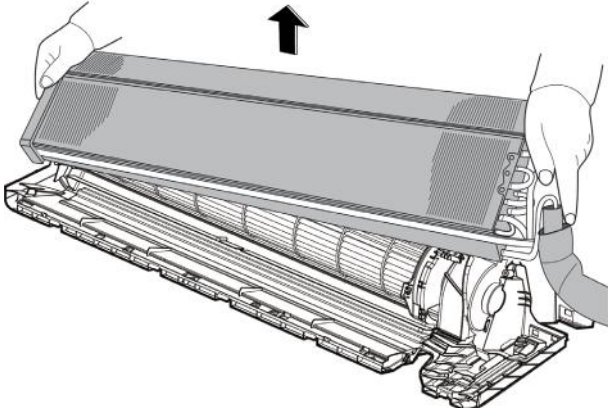
**Note:** This section is for reference only. Actual unit appearance may vary.

## 2.3. Evaporator Disassembly

**Note:** Remove the front panel and electrical parts (refer to 2.1. Front Panel Disassembly and 2.2. Electrical Parts Disassembly) before disassembling the evaporator.

| Procedure                                                                         | Illustration                                                                         |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1) Disassemble the pipe holder located at the rear of the unit (see Fig. 23).     |    |
| 2) Remove the 1 screw on the evaporator located at the fixed plate (see Fig. 24). |  |

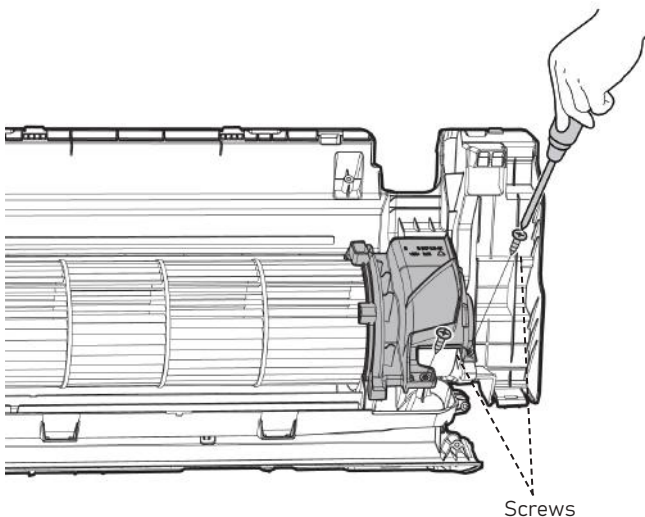
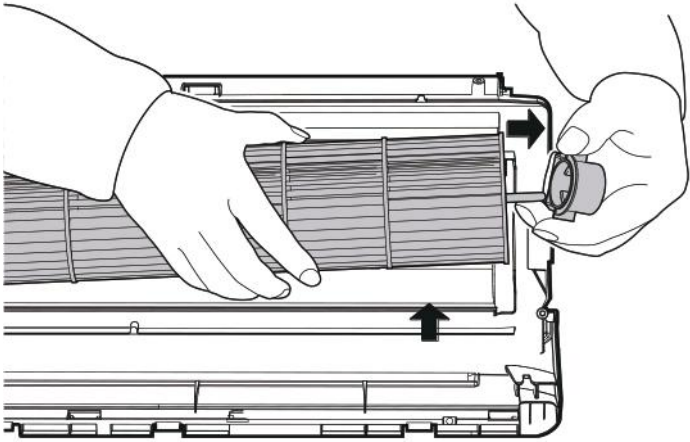
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                  | Illustration                                                                                                                             |
|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p>3) Release the hook on the evaporator (see Fig. 25).</p>                                |  <p style="text-align: center;"><b>Figure 25</b></p>   |
| <p>4) Remove the one screw on the evaporator located at the fixed plate (see Fig. 26).</p> |  <p style="text-align: center;"><b>Figure 26</b></p>  |
| <p>5) Pull out the evaporator (see Fig. 27).</p>                                           |  <p style="text-align: center;"><b>Figure 27</b></p> |

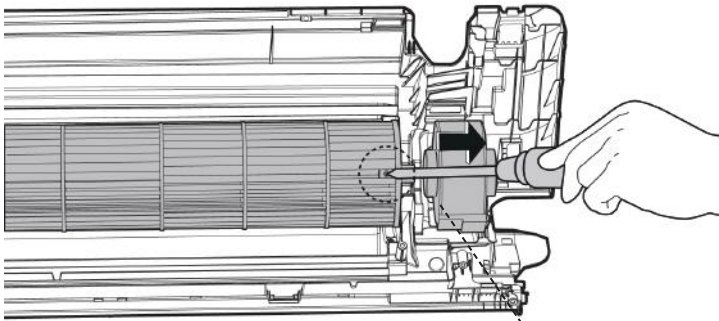
**Note:** This section is for reference only. Actual unit appearance may vary.

## 2.4. Fan Motor and Fan Disassembly

**Note:** Remove the front panel, electrical parts and evaporator (refer to 2.1. Front Panel Disassembly, 2.2. Electrical Parts Disassembly, and 2.3. Evaporator Disassembly) prior to disassembling fan motor and fan.

| Procedure                                                                     | Illustration                                                                                                                      |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1) Remove the two screws and remove the cover of the fan motor (see Fig. 28). |  <p style="text-align: center;">Figure 28</p>  |
| 2) Remove the bearing sleeve (see Fig. 29).                                   |  <p style="text-align: center;">Figure 29</p> |

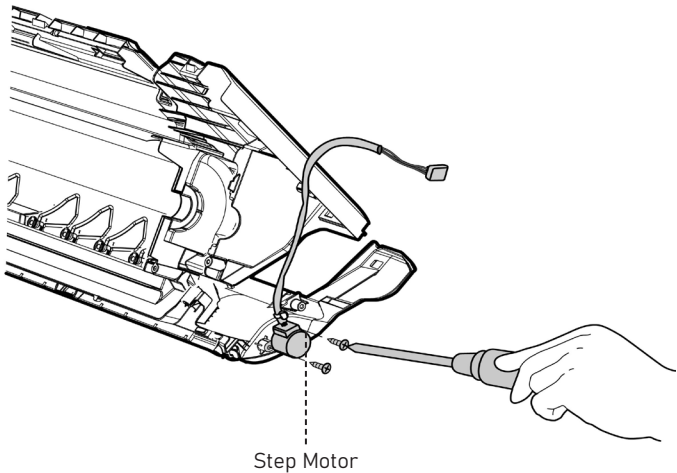
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                          | Illustration                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <p><b>3)</b> Remove the fastening screw (see Fig. 30).</p> <p><b>4)</b> Pull out the fan motor and fan assembly from the side.</p> |  <p><b>Figure 30</b></p> <p>Fastening Screw</p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

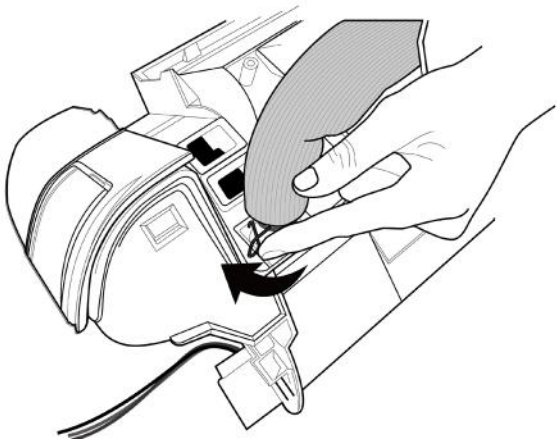
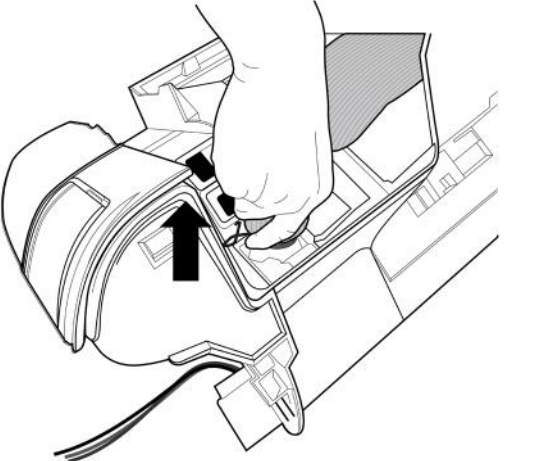
## 2.5. Step Motor Disassembly

**Note:** Remove the front panel and electrical parts (refer to 2.1. Front Panel Disassembly, 2.2. Electrical Parts Disassembly) before disassembling step motor.

| Procedure                                                                  | Illustration                                                                                                                 |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <p>1) Remove the two screws, then remove the step motor (see Fig. 31).</p> |  <p>Step Motor</p> <p><b>Figure 31</b></p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

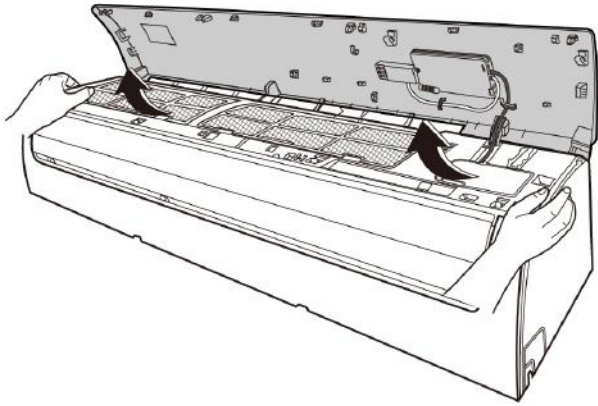
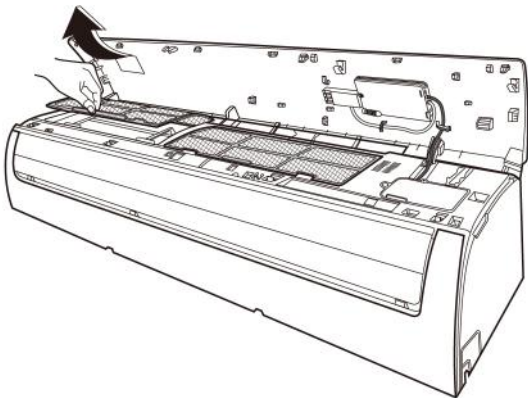
## 2.6. Drain Hose Removal

| Procedure                                                                                | Illustration                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1) Rotate the fixed wire clockwise as depicted in right-hand image (see Fig. 32).</p> |  <p>Figure 32</p>  <p>Figure 33</p> |
| <p>2) Pull up the drain hose to remove it (see Fig. 33).</p>                             |                                                                                                                                                                                                           |

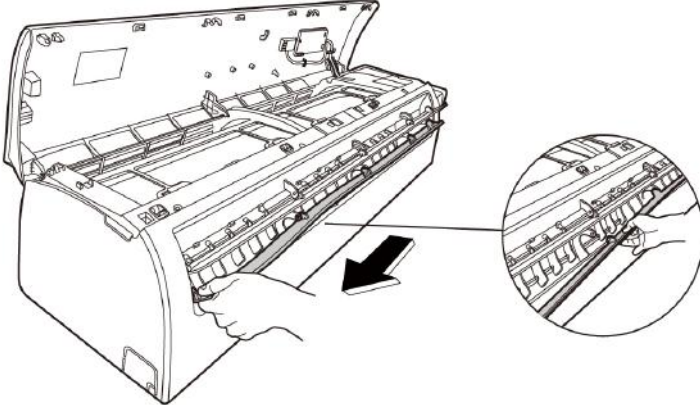
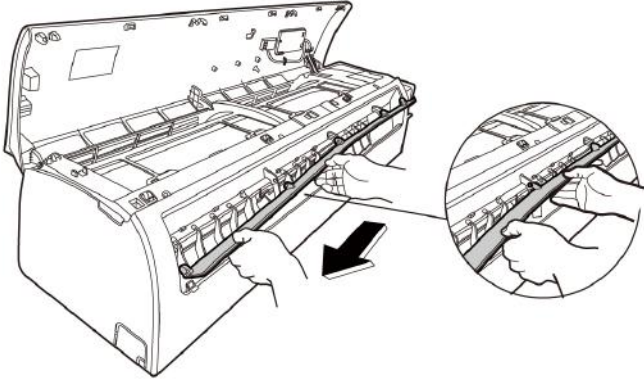
**Note:** This section is for reference only. Actual unit appearance may vary.

### 3. Indoor Unit Disassembly (30,000 ~ 36,000 BTU)

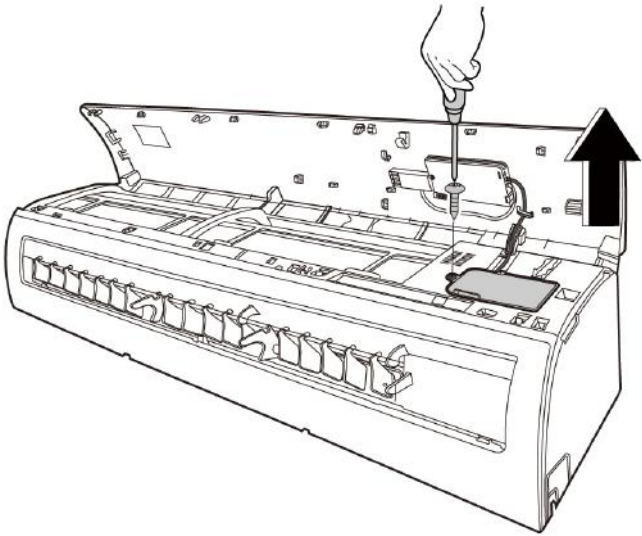
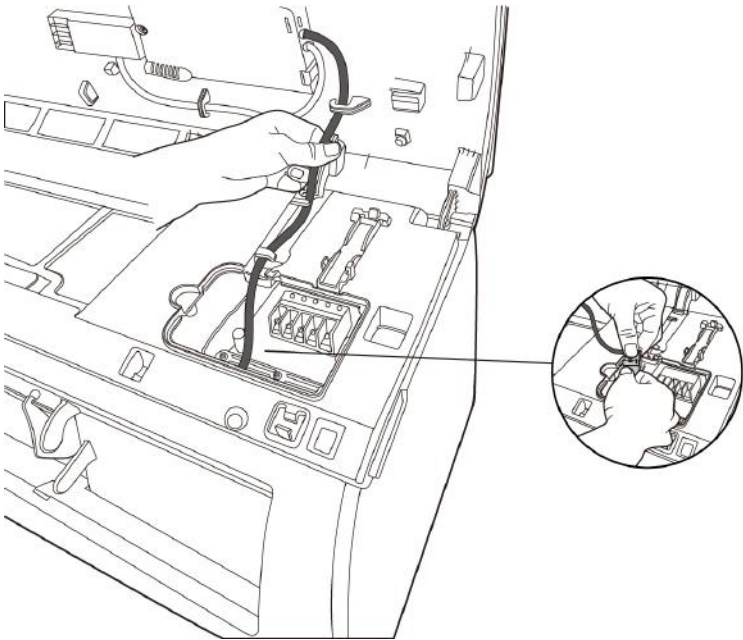
#### 3.1. Front Panel

| Procedure                                                                                              | Illustration                                                                         |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1) Hold the front panel by the tabs on the both sides and lift it (see Fig. 1).                        |    |
| 2) Push up the bottom of an air filter (step 1), and then pull it out downwards (step 2) (see Fig. 2). |  |

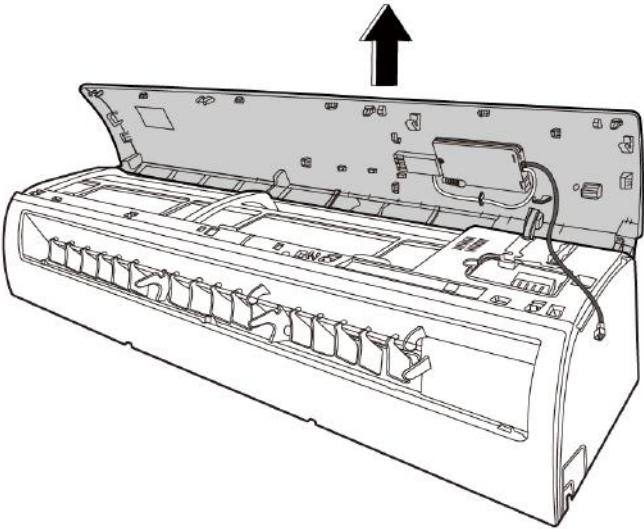
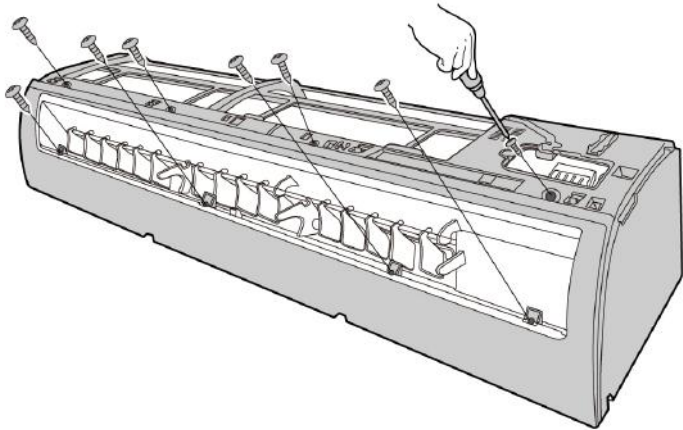
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                                                                                                                                                  | Illustration                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <p>3) Open the horizontal louver(below) and bend the louver lightly to loosen the leftmost hook, then push the hook towards right to loosen the second hook (see Fig. 3).</p> <p>4) Remove the horizontal louver(below) towards the left (see Fig. 3).</p> |  <p style="text-align: center;"><b>Figure 3</b></p>   |
| <p>5) Remove the horizontal louver(above) with the same way (see Fig. 4).</p>                                                                                                                                                                              |  <p style="text-align: center;"><b>Figure 4</b></p> |

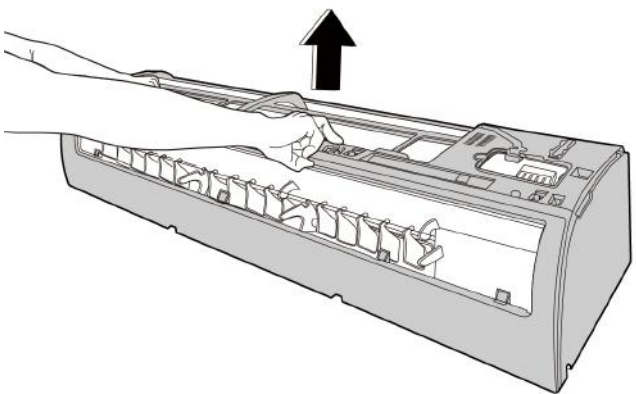
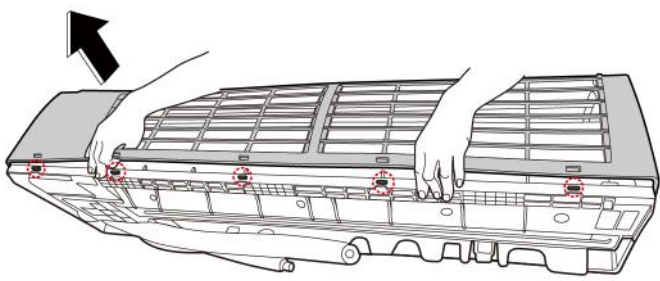
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                         | Illustration                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <p>6) Pry the electrical cover using a screw driver, and rotate it towards left, then remove it (see Fig. 5).</p> |  <p data-bbox="922 927 1024 958"><b>Figure 5</b></p>     |
| <p>7) Pull out the connector wire, and then disconnect the connector for display board (see Fig. 6).</p>          |  <p data-bbox="922 1877 1024 1908"><b>Figure 6</b></p> |

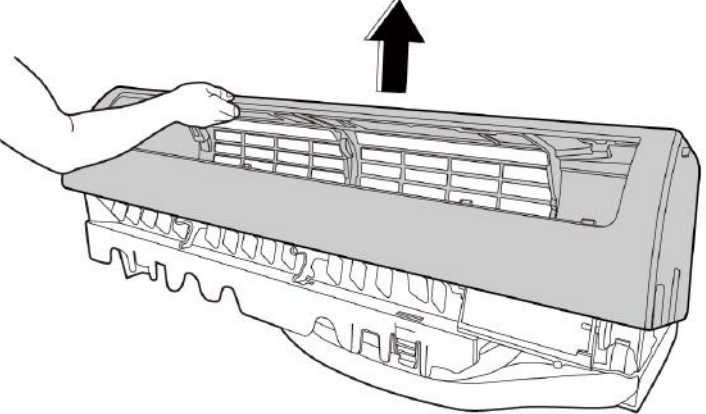
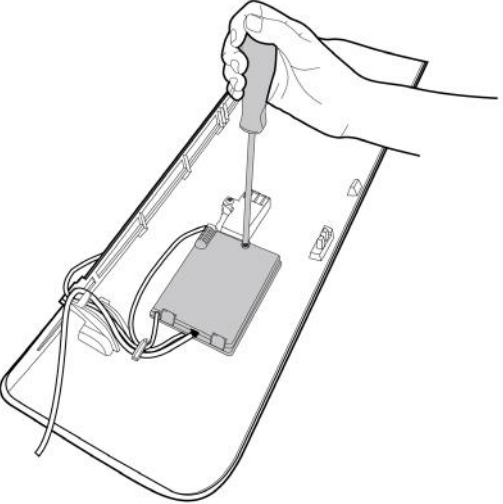
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                                    | Illustration                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <p>8) Slid the front panel side to side to release each axis (see Fig. 7).</p>                                                               |  <p style="text-align: center;"><b>Figure 7</b></p>   |
| <p>9) Open the screw caps and then remove the 4 screws (see Fig. 8).</p> <p>10) Remove the 4 screws fixing the panel frame (see Fig. 8).</p> |  <p style="text-align: center;"><b>Figure 8</b></p> |

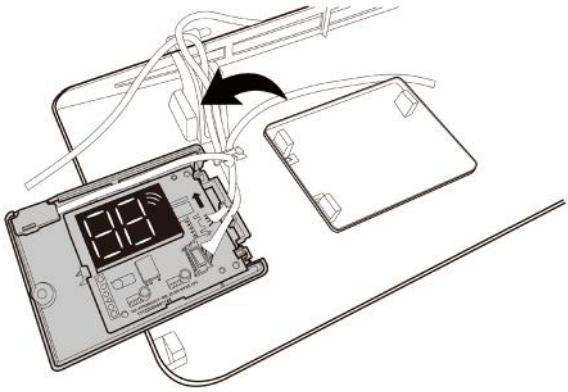
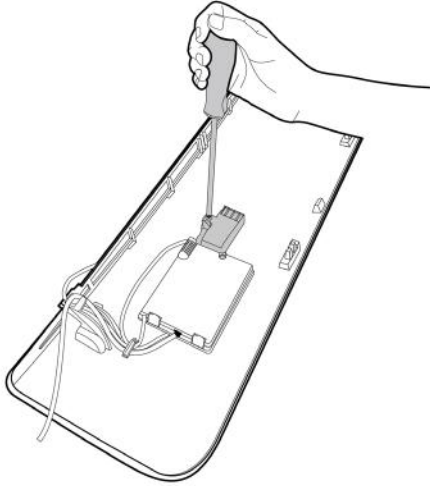
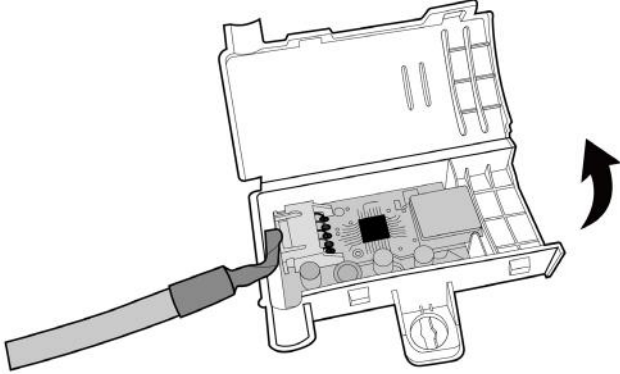
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                        | Illustration                                                                                                                             |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>11)</b> Release the hooks with hands (see Fig. 9).</p>     |  <p style="text-align: center;"><b>Figure 9</b></p>    |
| <p><b>12)</b> Release the 5 hooks in the back (see Fig. 10).</p> |  <p style="text-align: center;"><b>Figure 10</b></p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                                           | Illustration                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>13)</b> Pull out the panel frame while pushing the hook through a clearance between the panel frame and the heat exchanger (see Fig. 11).</p> |  <p style="text-align: center;"><b>Figure 11</b></p>   |
| <p><b>14)</b> Remove 1 screw of the display board. (see Fig. 12).</p>                                                                               |  <p style="text-align: center;"><b>Figure 12</b></p> |

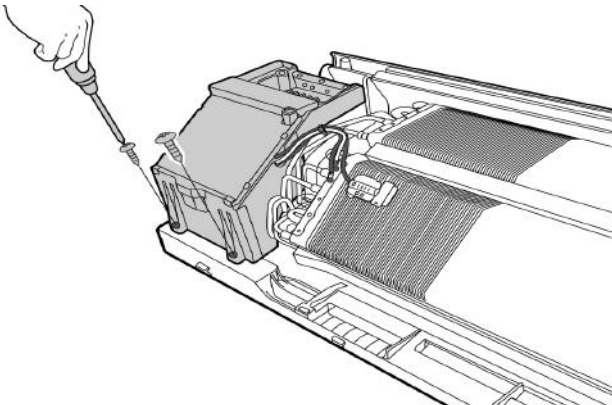
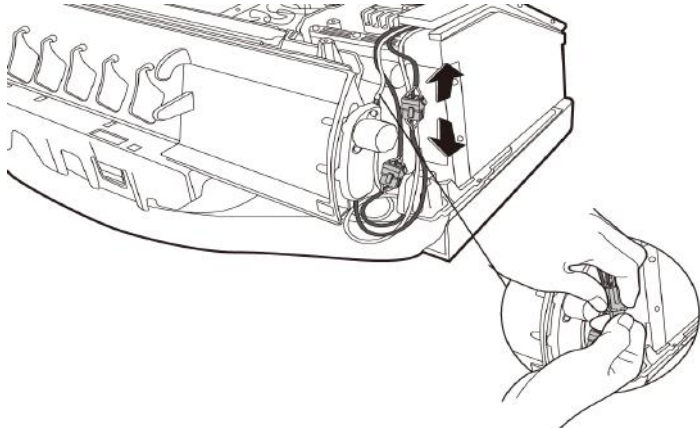
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                             | Illustration                                                                                                                             |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>15)</b> Rotate the display board in the direction shown in the right picture (see Fig. 13).</p> |  <p style="text-align: center;"><b>Figure 13</b></p>   |
| <p><b>16)</b> Remove 1 screw of the wifi module (see Fig. 14).</p>                                    |  <p style="text-align: center;"><b>Figure 14</b></p>  |
| <p><b>17)</b> Rotate the wifi module in the direction shown in the right picture (see Fig. 15).</p>   |  <p style="text-align: center;"><b>Figure 15</b></p> |

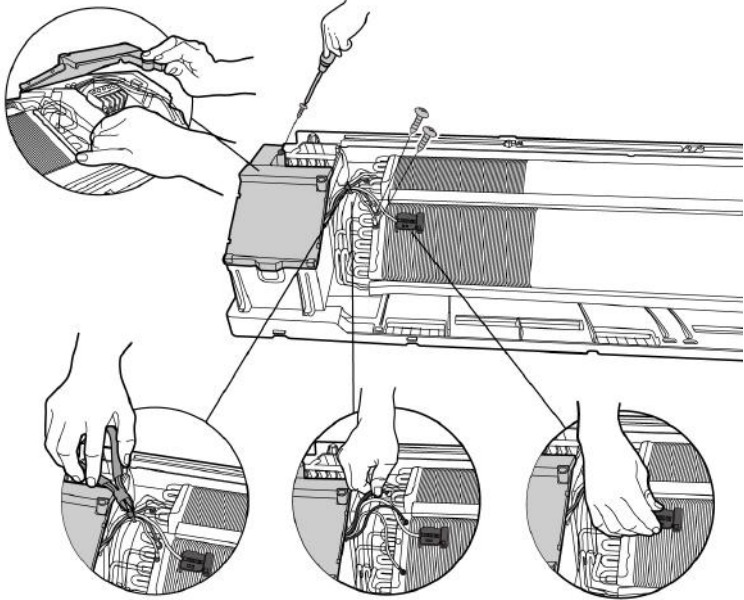
**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.2. Electrical Parts Disassembly (Antistatic gloves must be worn.)

**Note:** Remove the front panel (refer to 3.1. Front Panel Disassembly) prior to disassembling electrical parts.

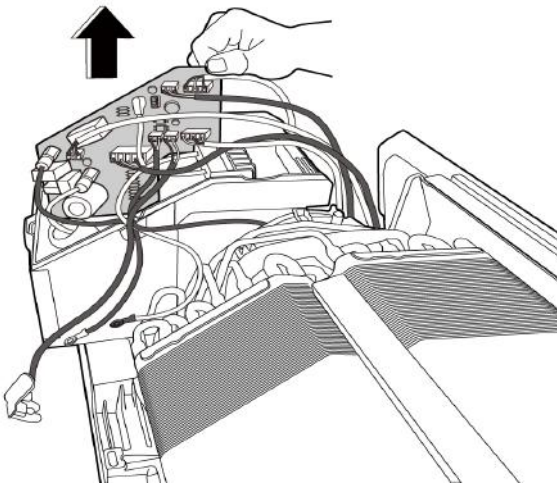
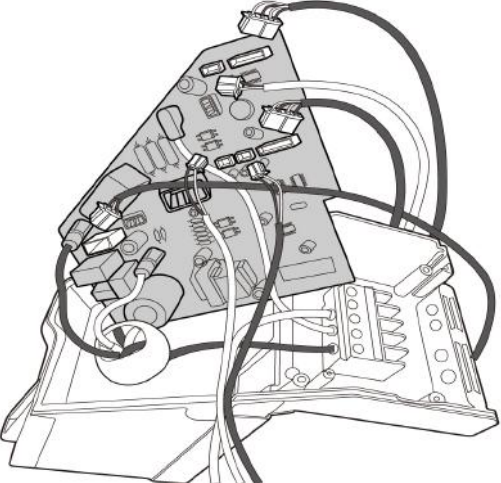
| Procedure                                                                                                                                                                                                                                                 | Illustration                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>1) Remove 2 fastening screws of the electrical control box subassembly (see Fig. 16).</p>                                                                                                                                                              |    |
| <p>2) Disconnect the connectors (see Fig. 17).</p> <p>(If you want to repair the electrical control box components, perform the steps 1 &amp; 2. If you want to repair the main control board assembly, perform steps 3 to 7 in the following pages.)</p> |  |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                                                                                                                                                                                                                    | Illustration                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <p><b>3)</b> Cut the ribbon with a cutter, then pull out the coil temperature sensor (T2) (see Fig. 18).</p> <p><b>4)</b> Remove one fastening screw of the electronic control box and two screws used for the ground connection (see Fig. 18).</p> <p><b>5)</b> Remove fixed clamp of temperature sensor (see Fig. 18).</p> |  |

**Figure 18**

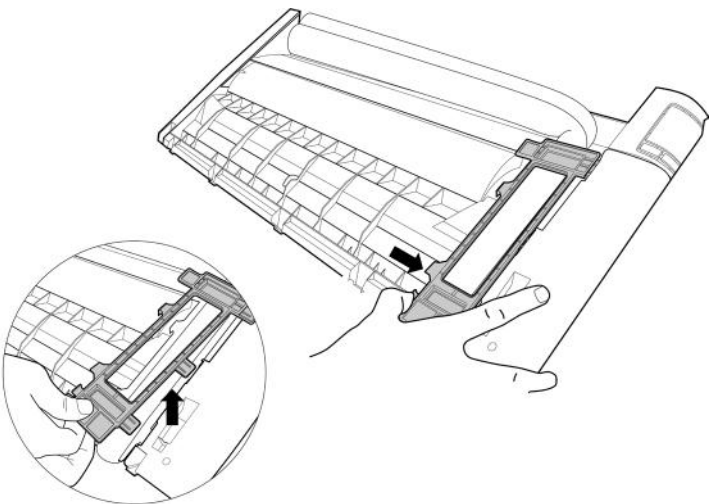
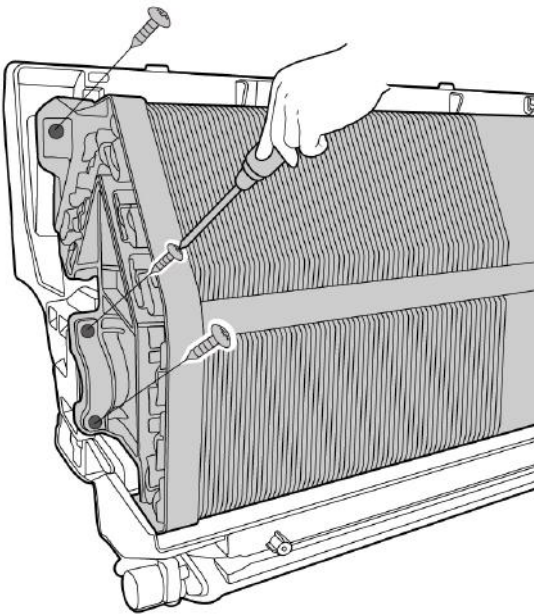
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                | Illustration                                                                                                                               |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <p>6) Pull out the electrical main board along the direction indicated in right image (see Fig. 19).</p> |  <p data-bbox="922 869 1034 902"><b>Figure 19</b></p>    |
| <p>7) Disconnect the connectors and remove main control board (see Fig. 20).</p>                         |  <p data-bbox="922 1462 1034 1496"><b>Figure 20</b></p> |

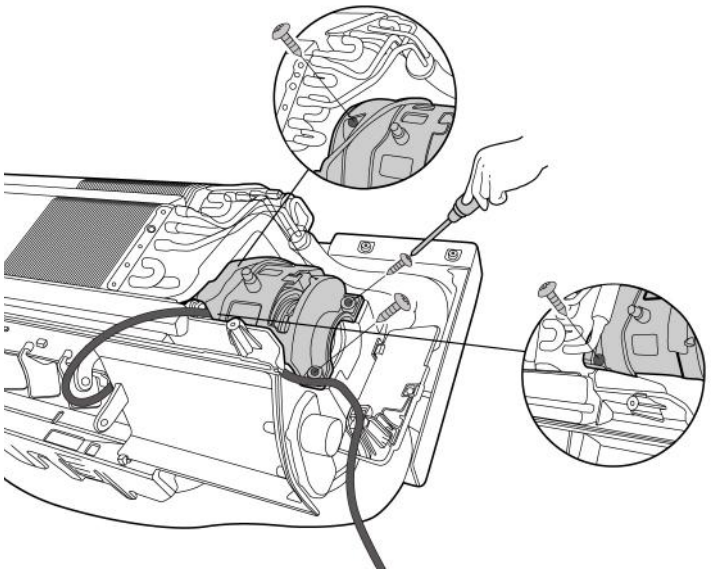
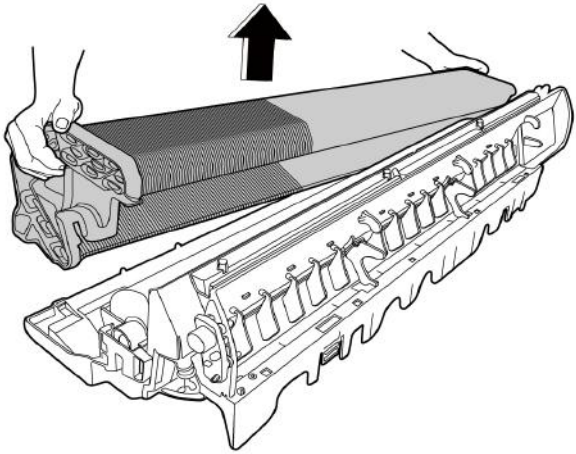
**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.3. Evaporator Disassembly

**Note:** Remove the front panel and electrical parts (refer to 3.1. Front Panel Disassembly and 3.2. Electrical Parts Disassembly) before disassembling the evaporator.

| Procedure                                                                                 | Illustration                                                                         |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>1) Disassemble the pipe holder located at the rear of the unit (see Fig. 21).</p>      |    |
| <p>2) Remove the 3 screws on the evaporator located at the fixed plate (see Fig. 22).</p> |  |

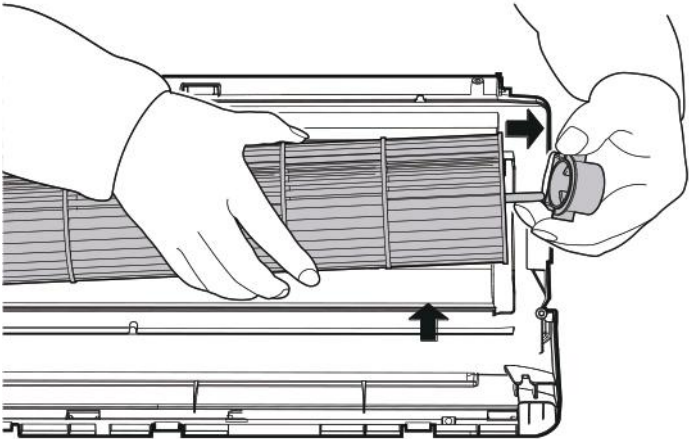
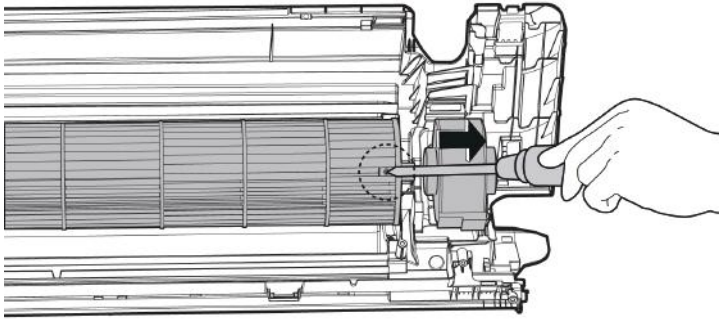
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                           | Illustration                                                                                                                                                                                              |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>3) Remove the 4 screws of the fan motor cover (see Fig. 23).</p> |  <p>Figure 23</p>  <p>Figure 24</p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.4. Fan Motor and Fan Disassembly

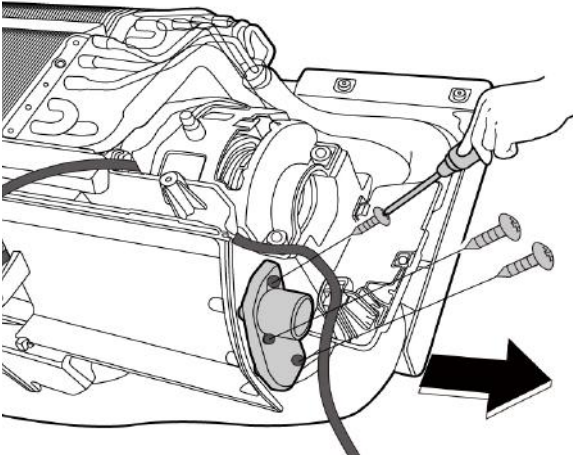
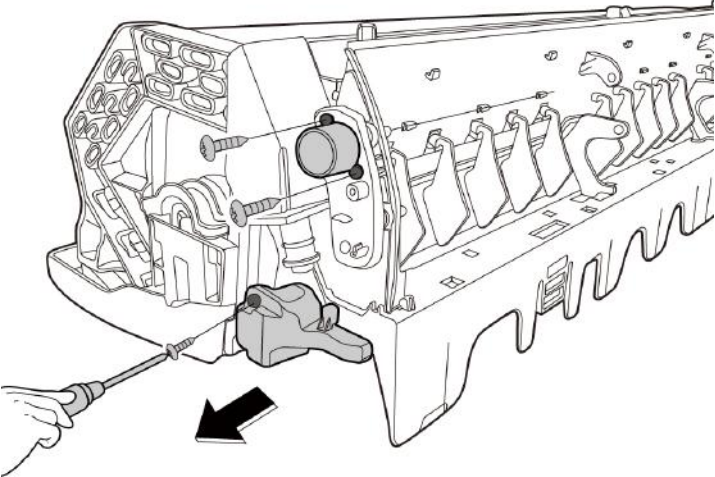
**Note:** Remove the front panel, electrical parts and evaporator (refer to 3.1. Front Panel Disassembly, 3.2. Electrical Parts Disassembly, and 3.3. Evaporator Disassembly) prior to disassembling fan motor and fan.

| Procedure                                                 | Illustration                                                                         |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1) Remove the bearing sleeve (see Fig. 25).               |   |
| 2) Remove the fastening screw (see Fig. 26).              |  |
| 3) Pull out the fan motor and fan assembly from the side. |                                                                                      |

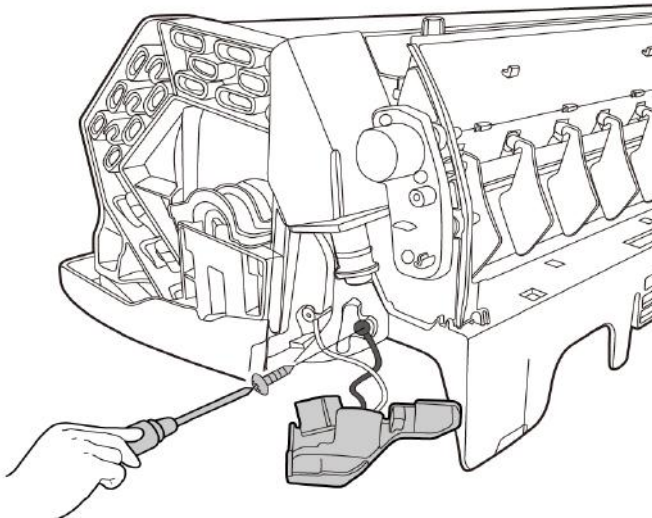
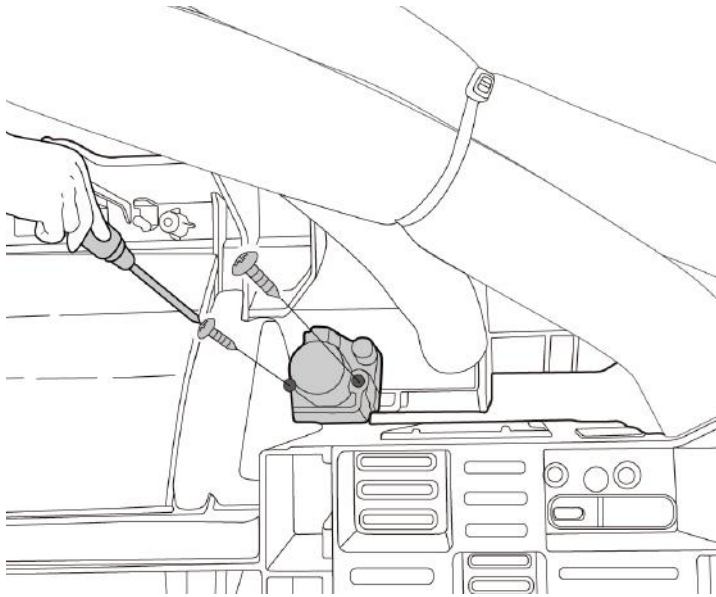
**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.5. Step Motor Disassembly

**Note:** Remove the front panel and electrical parts (refer to 3.1. Front Panel Disassembly, 3.2. Electrical Parts Disassembly) before disassembling step motor.

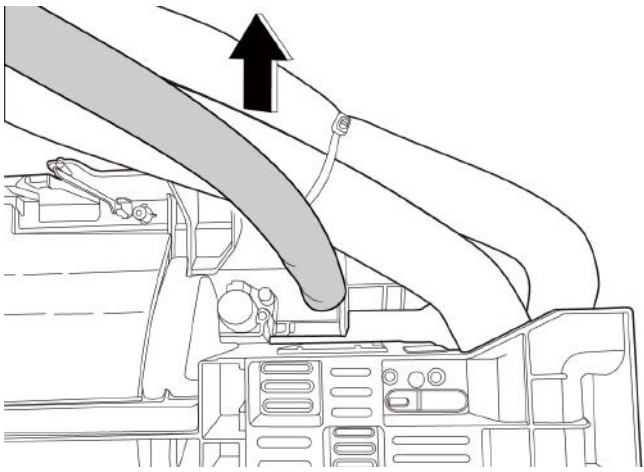
| Procedure                                                                                                                                                                                     | Illustration                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>1) Remove the 3 screws, then remove the horizontal swing motor(above)(see Fig. 27).</p>                                                                                                    |    |
| <p>2) Remove the 2 screws, then remove the horizontal swing motor(below)(see Fig. 28).</p> <p>(For some units)</p> <p>3) Remove 1 screw, then remove the ionizer generator (see Fig. 28).</p> |  |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                                   | Illustration                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <p>(for some units)</p> <p><b>4)</b> Remove 1 screw, then remove the Positive and negative ion generator (see Fig. 29).</p> |  <p><b>Figure 29</b></p>   |
| <p>(for some units)</p> <p><b>5)</b> Remove 2 screws, then remove the vertical swing motor (see Fig. 30).</p>               |  <p><b>Figure 30</b></p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.6. Drain Hose Removal

| Procedure                                                    | Illustration                                                                                        |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <p>1) Pull up the drain hose to remove it (see Fig. 31).</p> |  <p>Figure 31</p> |

Note: This section is for reference only. Actual unit appearance may vary.

---

# Outdoor Units Disassembly

## Contents

|     |                                        |    |
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## 1. Outdoor Unit Table

### 1.1 Outdoor Unit Panel Type and PCB Matching Table

Refer to the following table to determine the reference plate and PCB configuration for each outdoor unit model.

| Outdoor Unit Model | Panel Plate Type | PCB Configuration | Power Supply               |
|--------------------|------------------|-------------------|----------------------------|
| YN009GMFI22RPE     | PT-1             | EW-1              | 208/230V~, 60Hz,<br>1Phase |
| YN009GMFI20RPD     |                  |                   |                            |
| YN012GMFI22RPE     |                  |                   |                            |
| YN012GMFI20RPD     |                  |                   |                            |
| YN018GMFI22RPE     | PT-3             | EW-3              |                            |
| YN018GMFI20RPD     | PT-2             | EW-1              |                            |
| YN024GMFI22RPE     | PT-4             | EW-3              |                            |
| YN024GMFI20RPD     | PT-3             |                   |                            |
| YN030GMFI20RPD     | PT-4             | EW-4              |                            |
| YN036GMFI20RPD     |                  |                   |                            |
| YN009AMFI22RPE     | PT-1             | EW-2              | 115V~, 60Hz,<br>1Phase     |
| YN009AMFI20RPD     |                  |                   |                            |
| YN012AMFI22RPE     |                  |                   |                            |
| YN012AMFI20RPD     |                  |                   |                            |

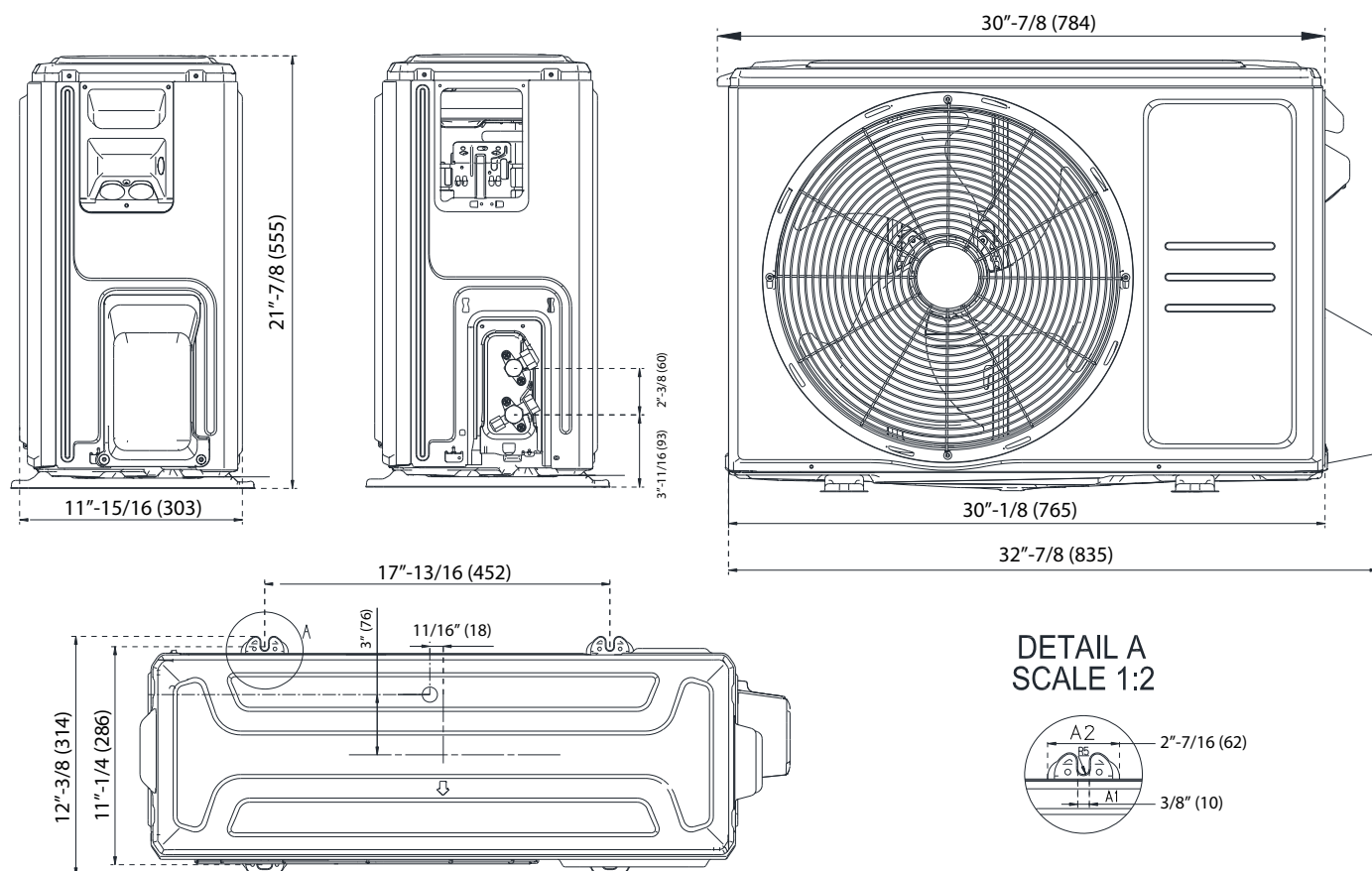
## 2. Outdoor Unit Dimensions

### 2.1 Outdoor Unit Dimensions of Panel Plate PT-1

#### Scope of Models Covered:

YN009GMFI22RPE / YN009GMFI20RPD / YN012GMFI22RPE / YN012GMFI20RPD

YN009AMFI22RPE / YN009AMFI20RPD / YN012AMFI22RPE / YN012AMFI20RPD

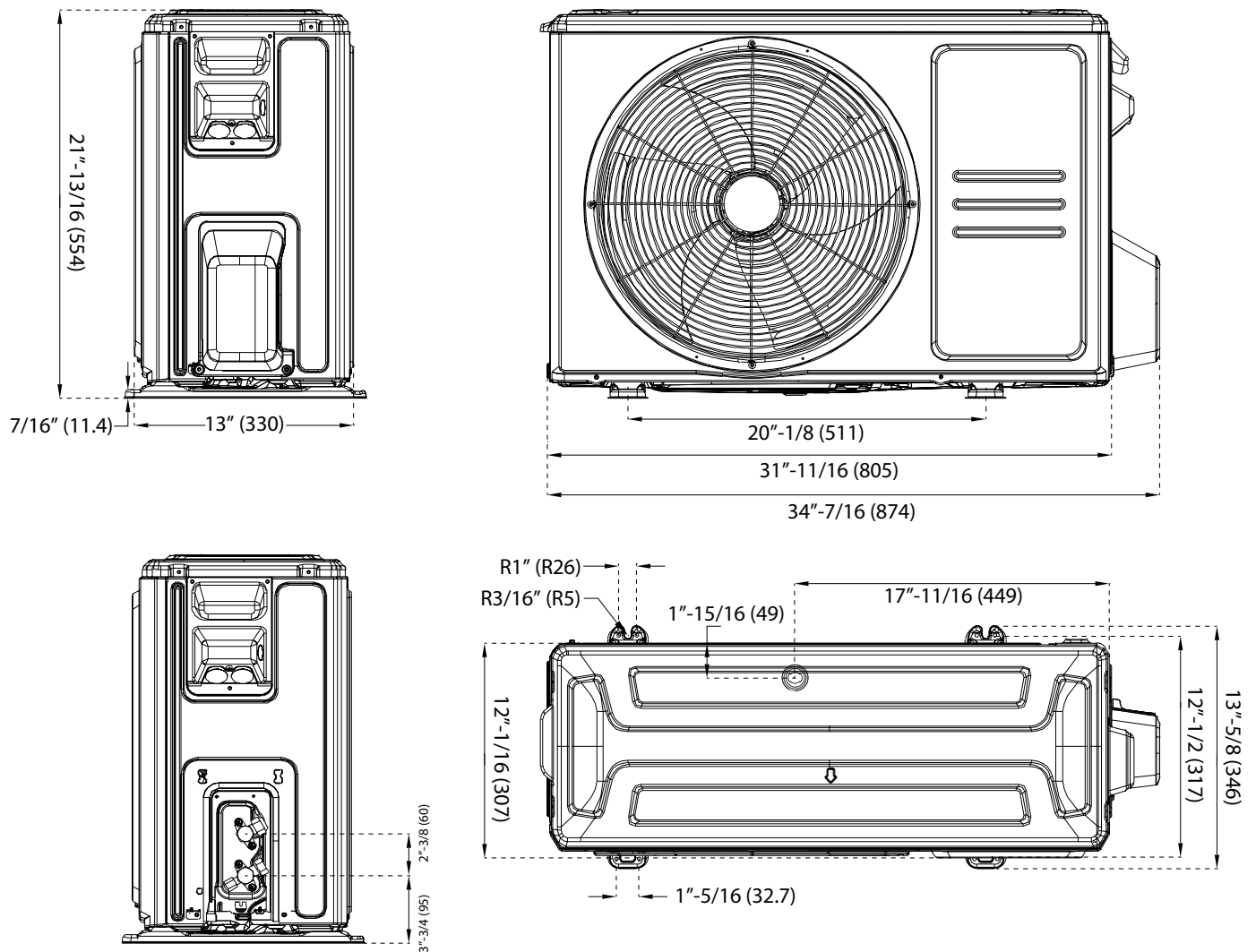


All dimensions are in Inches (mm)

## 2.2 Outdoor Unit Dimensions of Panel Plate PT-2

### Scope of Models Covered:

YN018GMFI20RPD

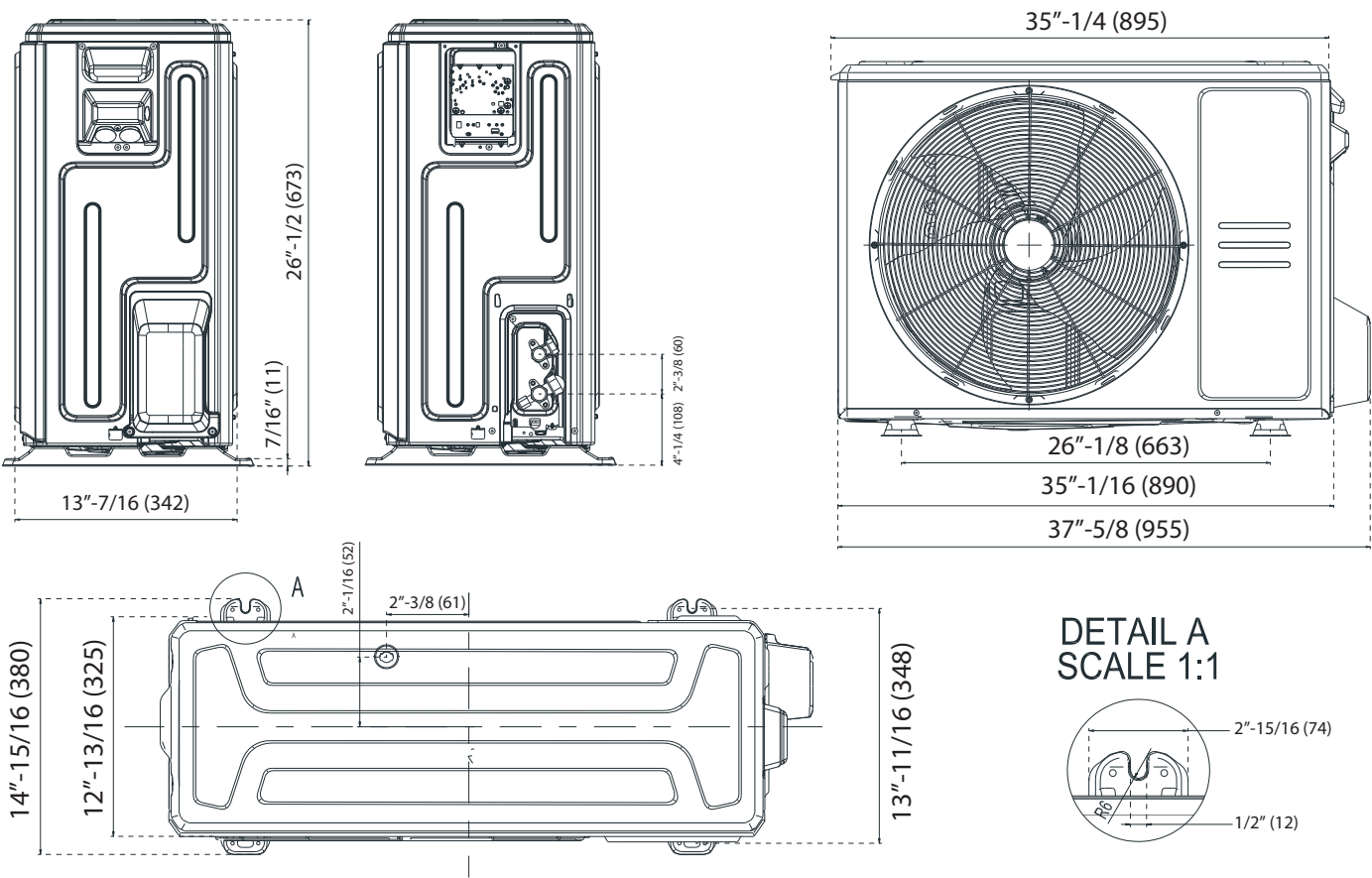


All dimensions are in Inches (mm)

2.3 Outdoor Unit Dimensions of Panel Plate PT-3

Scope of Models Covered:

YN018GMFI22RPE / YN024GMFI20RPD

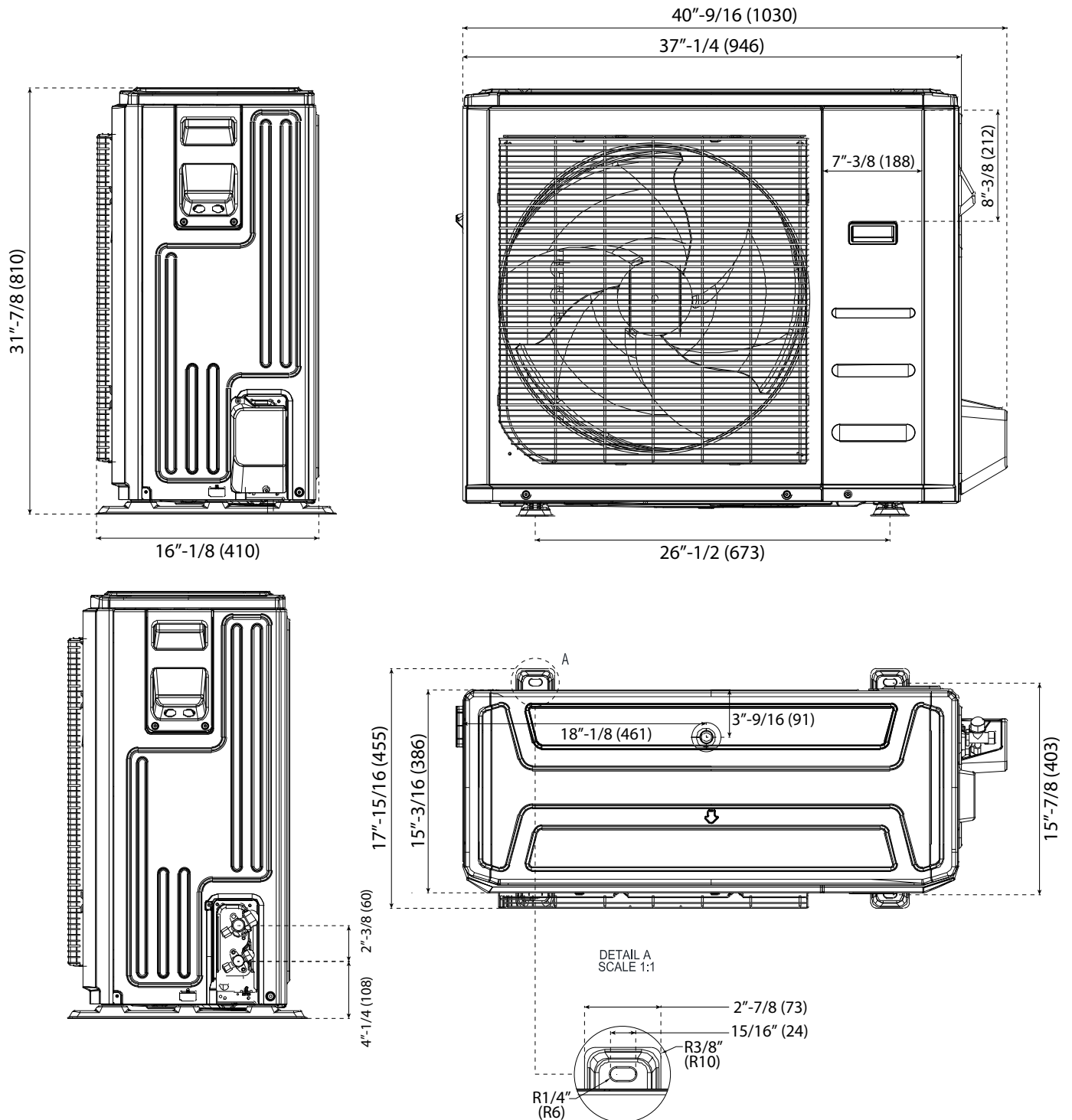


All dimensions are in Inches (mm)

## 2.4 Outdoor Unit Dimensions of Panel Plate PT-4

### Scope of Models Covered:

YN024GMFI22RPE / YN030GMFI20RPD / YN036GMFI20RPD



All dimensions are in Inches (mm)

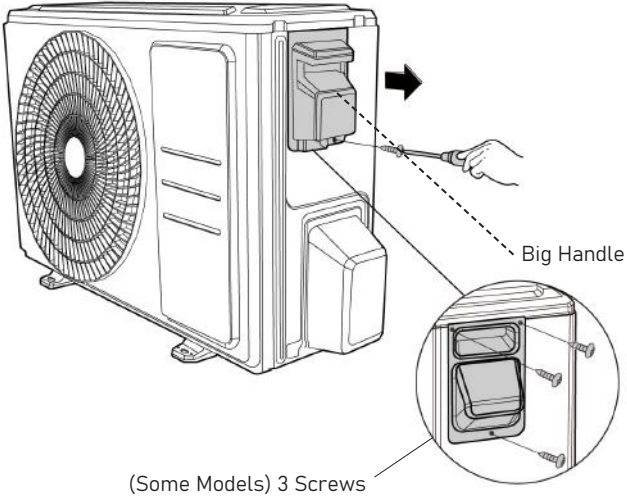
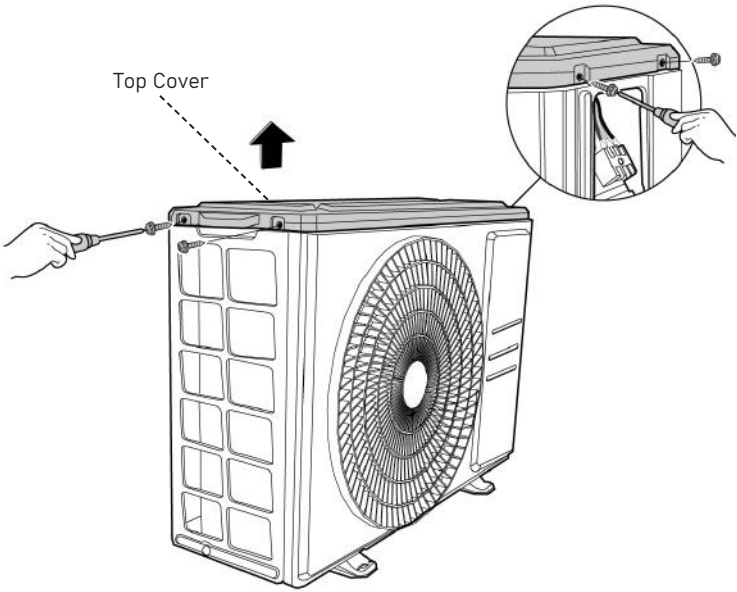
### 3. Outdoor Unit Disassembly

#### 3.1. Panel Plate Disassembly

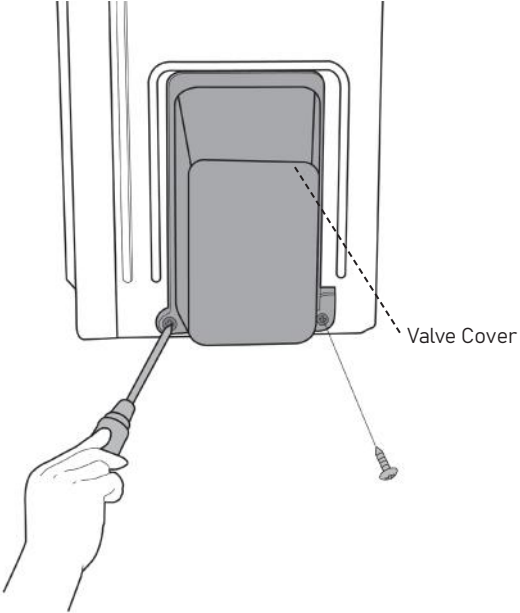
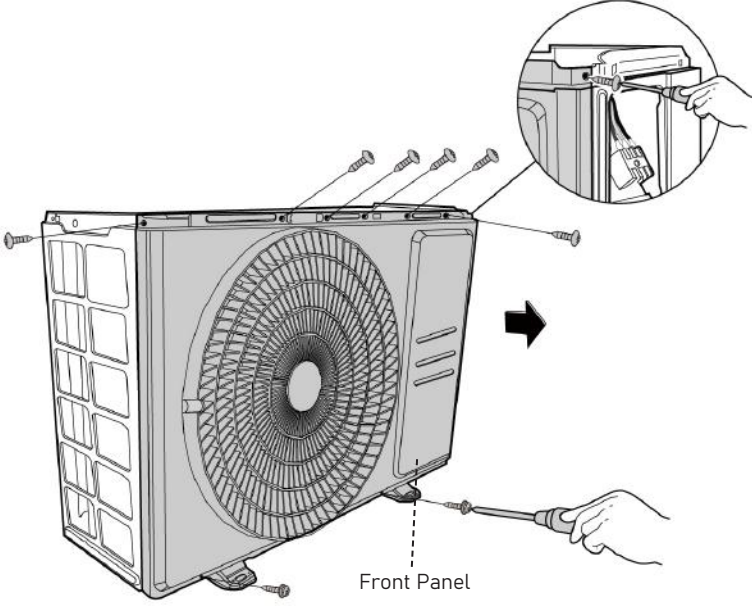
##### 3.1.1. Panel Plate Disassembly (PT-1, PT-2)

**Scope of Models Covered:**

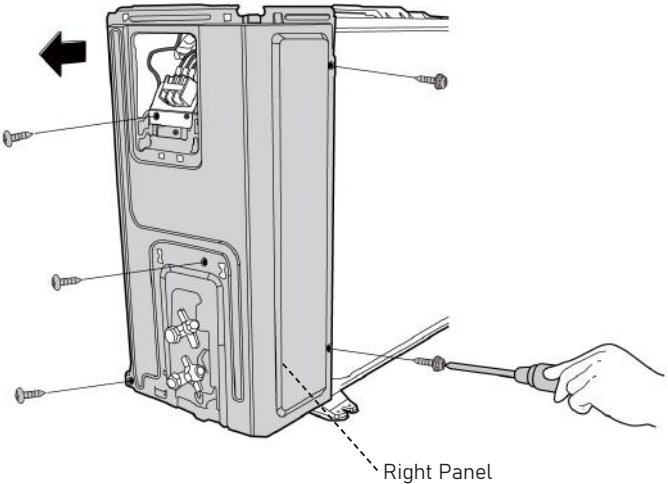
YN009GMFI22RPE / YN009GMFI20RPD / YN012GMFI22RPE / YN012GMFI20RPD / YN018GMFI20RPD  
YN009AMFI22RPE / YN009AMFI20RPD / YN012AMFI22RPE / YN012AMFI20RPD

| Procedure                                                                                                                                                            | Illustration                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <p>1) Turn off the air conditioner and the power breaker.</p> <p>2) Remove the screw of the big handle and then remove the big handle (1-3 screws) (see Fig. 1).</p> |  <p>Figure 1</p>  |
| <p>3) Remove the screws of the top cover and then remove the top cover (4 screws). One of the screws is located underneath the big handle (see Fig. 2).</p>          |  <p>Figure 2</p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                               | Illustration                                                                                                                            |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <p>4) Remove the screws of the valve cover and then remove the valve cover (2 screws) (see Fig. 3).</p> |  <p style="text-align: center;"><b>Figure 3</b></p>   |
| <p>5) Remove the screws of the front panel and then remove the front panel (9 screws) (see Fig. 4).</p> |  <p style="text-align: center;"><b>Figure 4</b></p> |

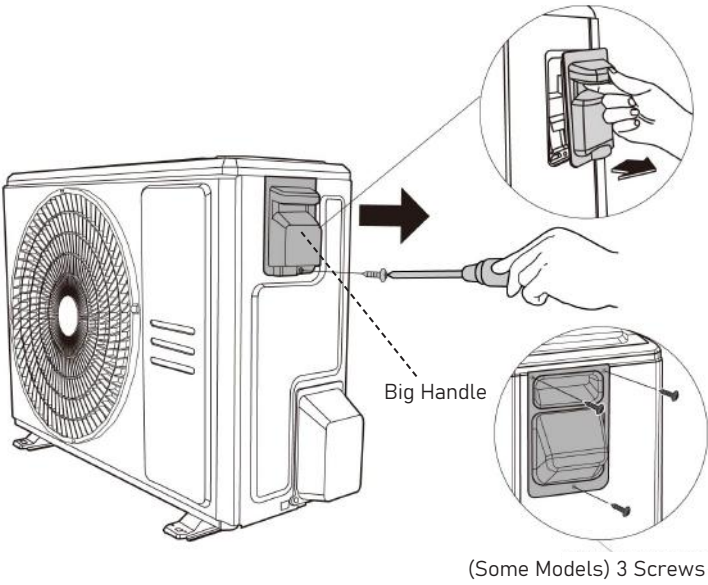
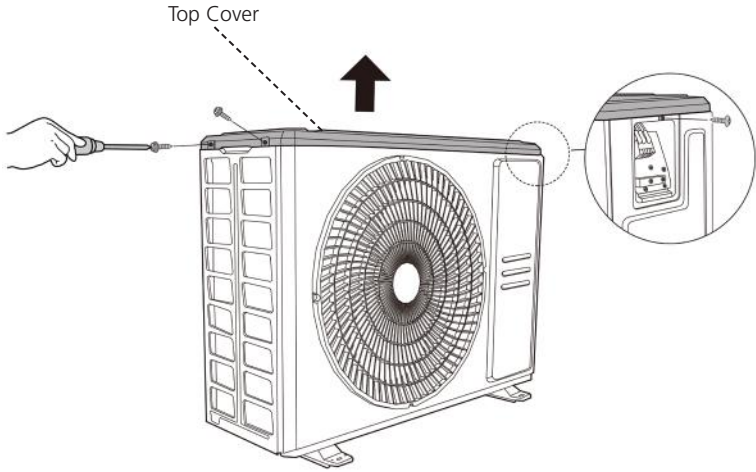
**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                               | Illustration                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>6) Remove the screws of the right panel and then remove the right panel (5 screws) (see Fig. 5).</p> |  <p>The diagram shows a side view of an outdoor unit. A hand is using a screwdriver to remove a screw from the right panel. A dashed line points to the right panel, and a black arrow points left, indicating its removal direction.</p> <p>Right Panel</p> <p><b>Figure 5</b></p> |

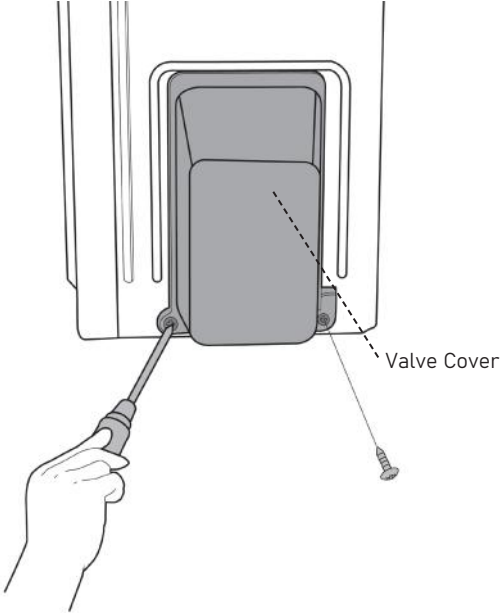
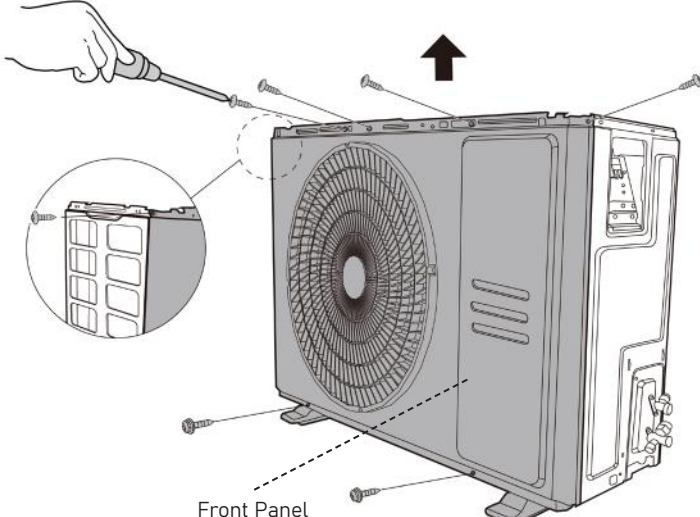
**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.1.2. Panel Plate Disassembly (PT-3)

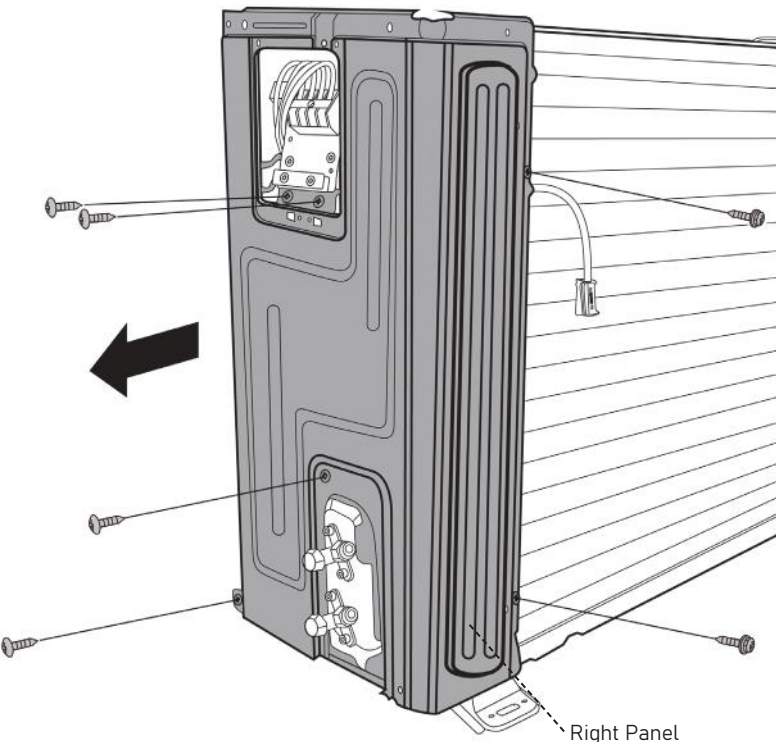
**Scope of Models Covered:**  
YN018GMFI22RPE / YN024GMFI20RPD

| Procedure                                                                                                                                                            | Illustration                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1) Turn off the air conditioner and the power breaker.</p> <p>2) Remove the screw of the big handle and then remove the big handle (1-3 screws) (see Fig. 1).</p> |  <p>Big Handle</p> <p>(Some Models) 3 Screws</p> <p><b>Figure 1</b></p> |
| <p>3) Remove the screws of the top cover and then remove the top cover (3 screws). One of the screws is located underneath the big handle (see Fig. 2).</p>          |  <p>Top Cover</p> <p><b>Figure 2</b></p>                               |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                               | Illustration                                                                                                                   |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <p>4) Remove the screws of the valve cover and then remove the valve cover (2 screws) (see Fig. 3).</p> |  <p>Valve Cover</p> <p><b>Figure 3</b></p>   |
| <p>5) Remove the screws of the front panel and then remove the front panel (9 screws) (see Fig. 4).</p> |  <p>Front Panel</p> <p><b>Figure 4</b></p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                               | Illustration                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>6) Remove the screws of the right panel and then remove the right panel (6 screws) (see Fig. 5).</p> |  <p>The illustration shows a side view of an outdoor unit. A large black arrow points to the left, indicating the removal of the right panel. Six screws are shown being removed from the right panel. The panel is labeled 'Right Panel'.</p> |

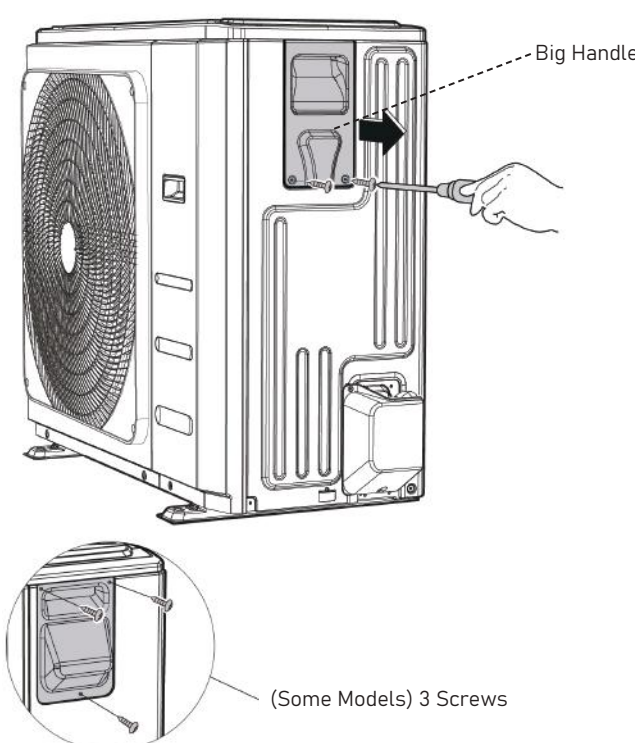
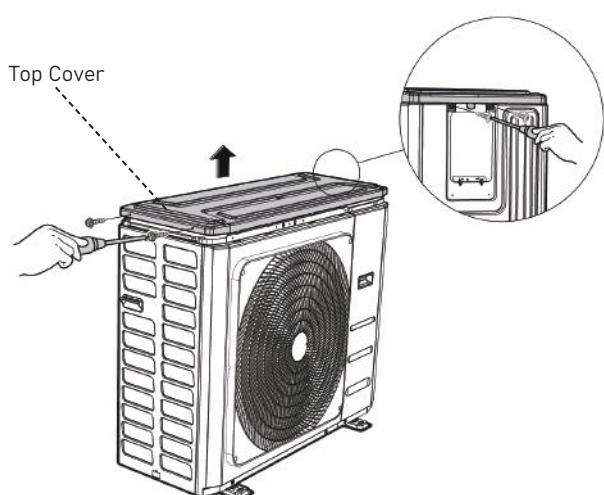
**Figure 5**

**Note:** This section is for reference only. Actual unit appearance may vary.

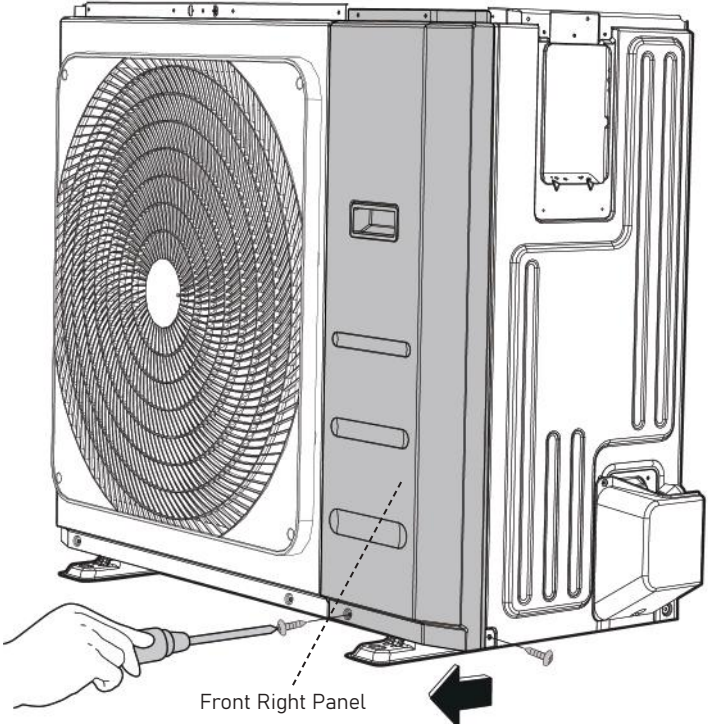
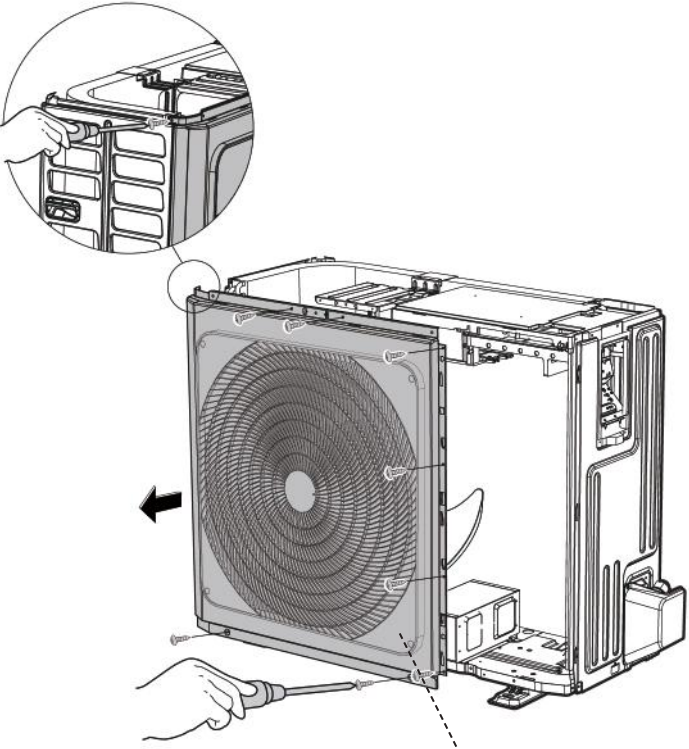
### 3.1.3. Panel Plate Disassembly (PT-4)

#### Scope of Models Covered:

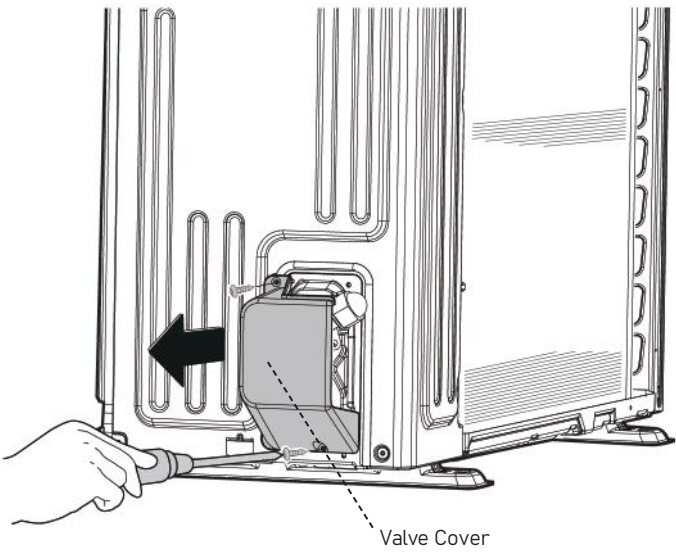
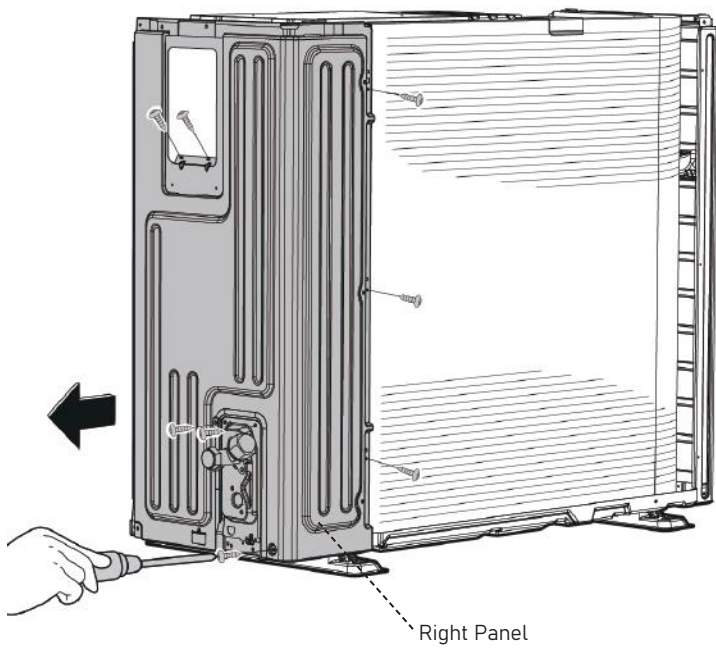
YN024GMFI22RPE / YN030GMFI20RPD / YN036GMFI20RPD

| Procedure                                                                                                                                                                                                       | Illustration                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"><li>1) Turn off the air conditioner and the power breaker.</li><li>2) Remove the screws of the big handle and then remove the big handle (2-3 screws) (see Fig. 1).</li></ol> |  <p>Big Handle</p> <p>(Some Models) 3 Screws</p> <p><b>Figure 1</b></p> |
| <ol style="list-style-type: none"><li>3) Remove the screws of the top cover and then remove the top cover (4 screws). Two of the screws are found underneath the big handle (see Fig. 2).</li></ol>             |  <p>Top Cover</p> <p><b>Figure 2</b></p>                               |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                                           | Illustration                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <p>4) Remove the screws of the front right panel and then remove the front right panel (2 screws) (see Fig. 3).</p> |  <p>Front Right Panel</p> <p><b>Figure 3</b></p> |
| <p>5) Remove the screws of the front panel and then remove the front panel (9 screws) (see Fig. 4).</p>             |  <p>Front Panel</p> <p><b>Figure 4</b></p>      |

**Note:** This section is for reference only. Actual unit appearance may vary.

| Procedure                                                                                               | Illustration                                                                                                                            |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <p>6) Remove the screws of the valve cover and then remove the valve cover (2 screws) (see Fig. 5).</p> |  <p style="text-align: center;"><b>Figure 5</b></p>   |
| <p>7) Remove the screws of the right panel and then remove the right panel (8 screws) (see Fig. 6).</p> |  <p style="text-align: center;"><b>Figure 6</b></p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

## 3.2 Electrical Components Disassembly

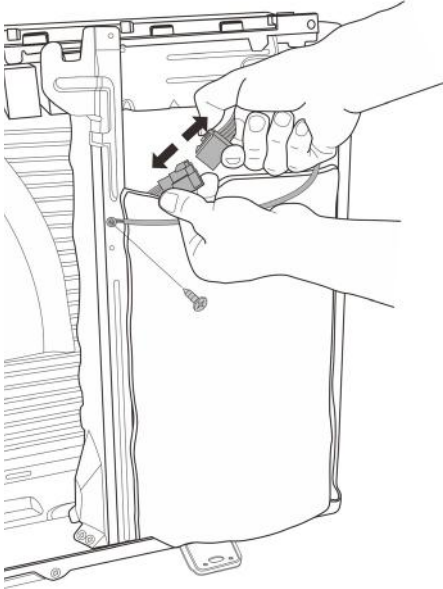
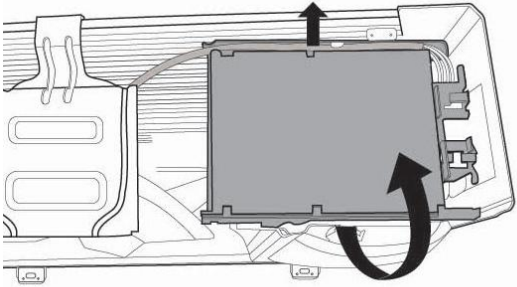
**⚠ WARNING:** Antistatic gloves must be worn when you disassemble the electronic box.

**Note:** Remove the air outlet grille (refer to 3.1 Panel Plate Disassembly) prior to disassembling electrical parts.

### 3.2.1. Electronic Control Box Subassembly Removal (EW-1, EW-2)

**Scope of Models Covered:**

YN009GMFI22RPE / YN009GMFI20RPD / YN012GMFI22RPE / YN012GMFI20RPD / YN018GMFI20RPD  
YN009AMFI22RPE / YN009AMFI20RPD / YN012AMFI22RPE / YN012AMFI20RPD

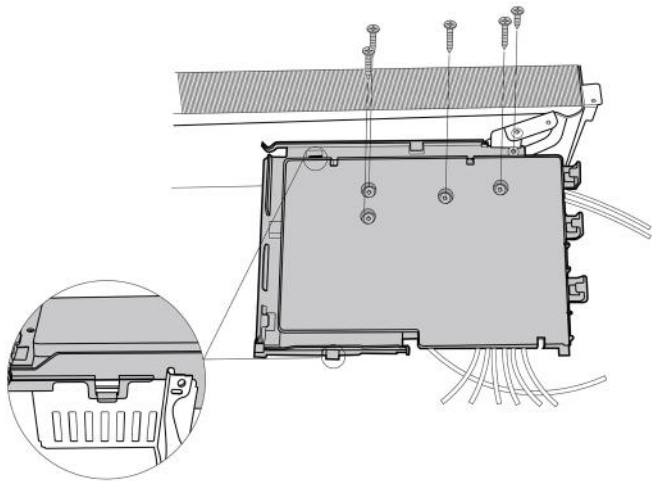
| Procedure                                                                                                                               | Illustration                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>1) Disconnect the connector for compressor and release the ground wire (1 screw, for some models ) See Fig. 1).</p>                  |   |
| <p>2) Remove the electronic control box subassembly (see Fig. 2).</p> <p><b>Note:</b> Electric control box cover cannot be removed.</p> |  |

**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.2.2. Electronic Control Box Subassembly Removal (EW-3)

#### Scope of Models Covered:

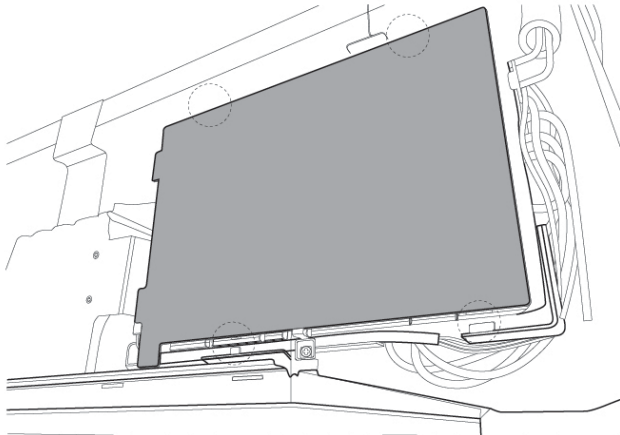
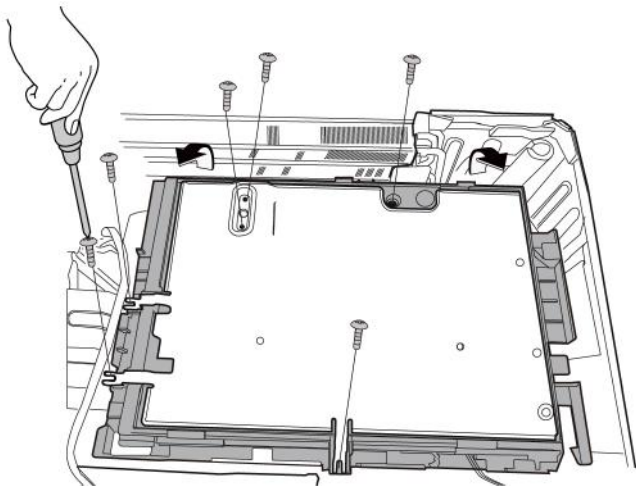
YN018GMFI22RPE / YN024GMFI20RPD / YN024GMFI22RPE

| Procedure                                                                                                                                                                                | Illustration                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <p>1) Remove the 5 screws, and release two hooks, then remove the electronic control box subassembly. see Fig. 1).</p> <p><b>Note:</b> Electric control box cover cannot be removed.</p> |  <p style="text-align: center;"><b>Figure 1</b></p> |

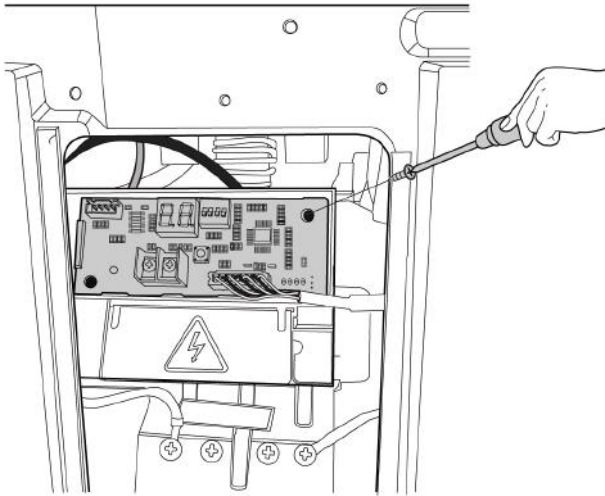
**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.2.3. Electronic Control Box Subassembly Removal (EW-4)

**Scope of Models Covered:**  
YN030GMFI20RPD / YN036GMFI20RPD

| Procedure                                                                                                                                                                                        | Illustration                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>1) Release the hooks, and then open the cover (4 hooks total)(see Fig. 1).</p>                                                                                                                |    |
| <p>2) Remove 6 screws on the electronic control board and then remove the electronic control box subassembly (see Fig. 2).</p> <p><b>Note:</b> Electric control box cover cannot be removed.</p> |  |

**Note:** This section is for reference only. Actual unit appearance may vary.

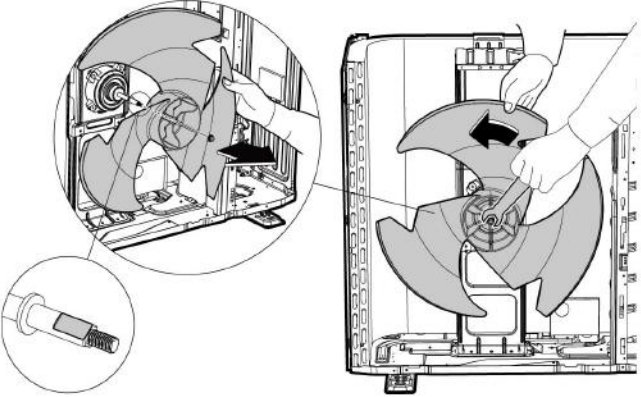
| Procedure                                                                                                                     | Illustration                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <p>3) Pull out the connector, remove one screw and then remove the key board subassembly on terminal board. (see Fig. 3).</p> |  <p style="text-align: center;"><b>Figure 3</b></p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.3 Fan Assembly Disassembly

#### 3.3.1. Fan Blade Removal

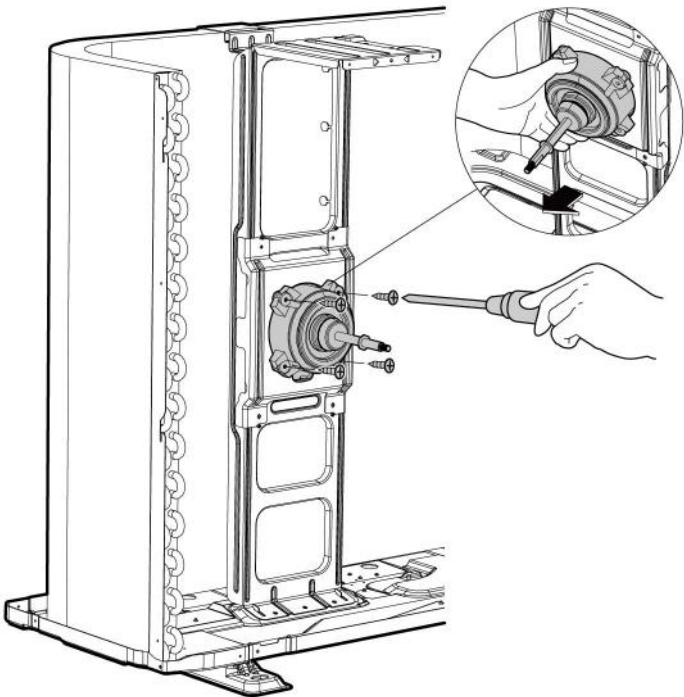
**Note:** Remove the air outlet grille (refer to 3.1 Panel Plate Disassembly) prior to disassembling fan parts.

| Procedure                                                                                                                                        | Illustration                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"><li>1) Remove the nut securing the fan with a spanner (see Fig. 1).</li><li>2) Remove the fan blade.</li></ol> |  <p data-bbox="890 1059 991 1093">Figure 1</p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.3.2. Fan Motor Removal

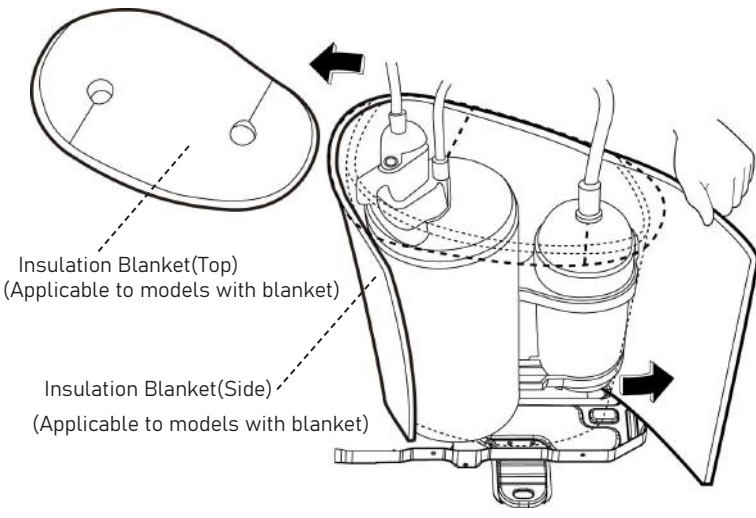
**Note:** Remove the panel plate and the connection of fan motor on PCB (refer to 3.1 Panel Plate Disassembly and 3.2 Electrical Components Disassembly) prior to disassembling fan motor.

| Procedure                                                                                                       | Illustration                                                                                        |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <p>3) Remove the fastening screws of the fan motor (4 screws) (see Fig. 1).</p> <p>4) Remove the fan motor.</p> |  <p>Figure 1</p> |

**Note:** This section is for reference only. Actual unit appearance may vary.

3.4 Insulation Blanket Removal

**Note:** Remove the panel plate (refer to 3.1 Panel Plate Disassembly) before removing the insulation blanket.

| Procedure                                                     | Illustration                                                                                                                                                                                                                                             |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Remove the insulation blanket (side and top) (see Fig. 1). |  <p>Insulation Blanket(Top)<br/>(Applicable to models with blanket)</p> <p>Insulation Blanket(Side)<br/>(Applicable to models with blanket)</p> <p><b>Figure 1</b></p> |

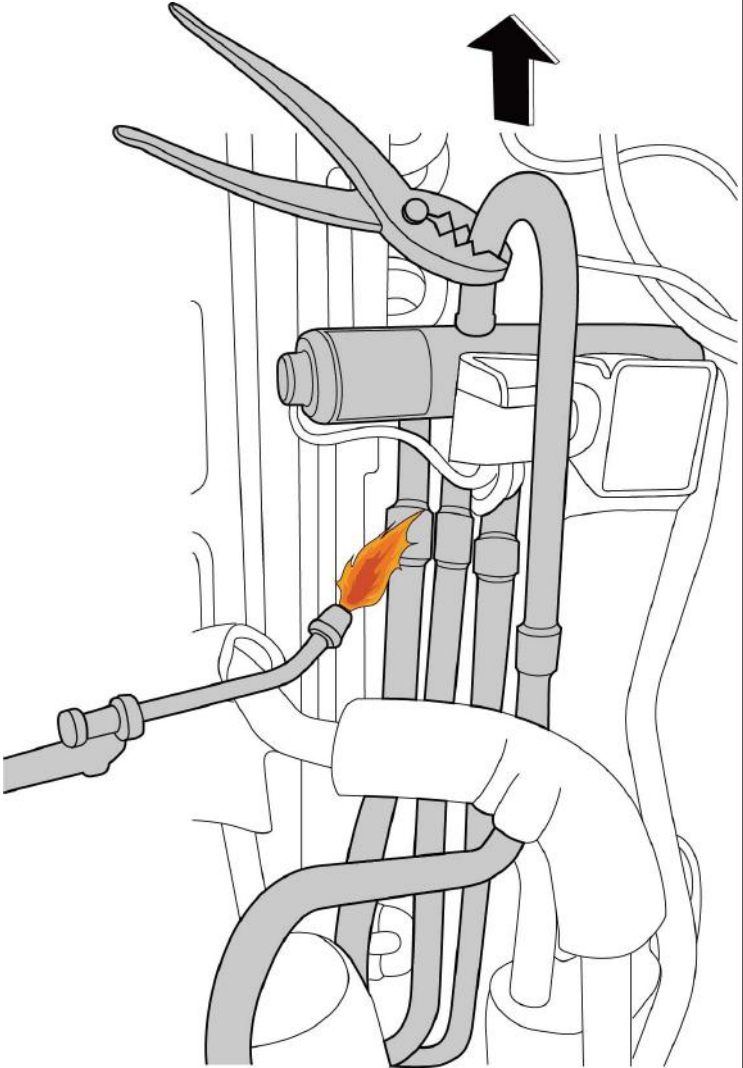
**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.5 Four-Way Valve Removal

**⚠ WARNING:** Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. (The operation below should be performed by professionals.)

(For R32/R290 systems, evacuate the system with the vacuum pump, flush the system with nitrogen, and repeat those two steps prior to heating up the brazed parts.)

**Note:** Remove the panel plate, connection of four-way valve on PCB (refer to 3.1 Panel Plate Disassembly and 3.2 Electrical Components Disassembly), and insulation blanket, prior to disassembling the four-way valve.

| Procedure                                                                                                                                                                                                | Illustration                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"><li>1) Heat up the brazed parts and then detach the four-way valve and the pipe (see Fig. 1).</li><li>2) Remove the four-way valve assembly by using pliers.</li></ol> |  <p>Figure 1</p> |

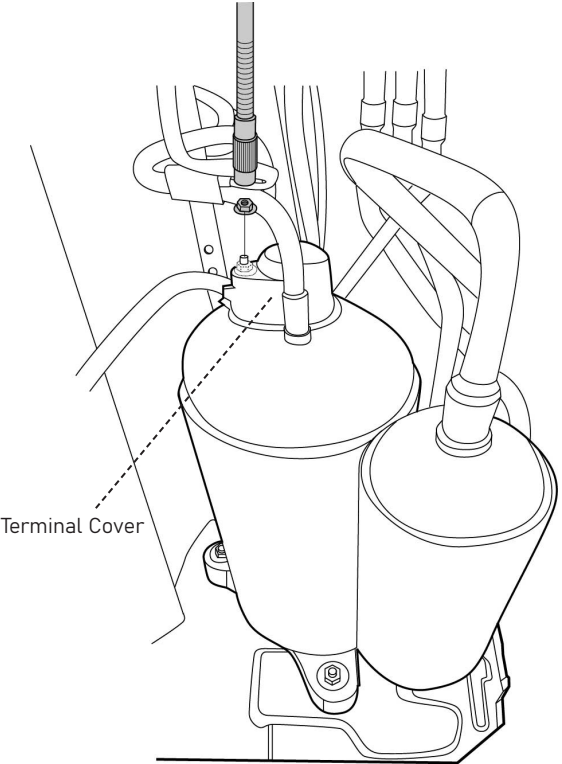
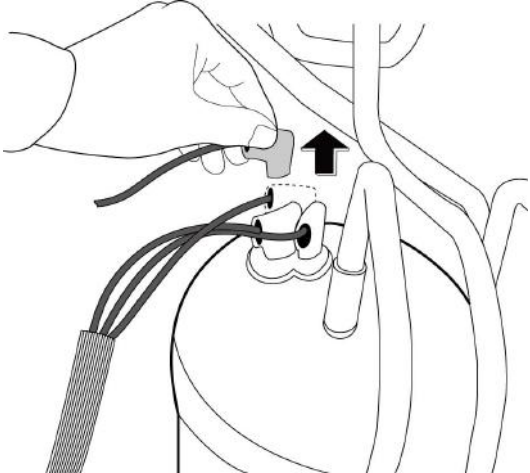
**Note:** This section is for reference only. Actual unit appearance may vary.

### 3.6 Compressor Removal

**⚠ WARNING:** Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. (The operation below should be performed by professionals.)

(For R32/R290 systems, evacuate the system with the vacuum pump, flush the system with nitrogen, and repeat those two steps prior to heating up the brazed parts.)

**Note:** Remove the panel plate, connection of four-way valve on PCB (refer to 3.1 Panel Plate Disassembly and 3.2 Electrical Components Disassembly), and insulation blanket, prior to disassembling the compressor.

| Procedure                                                                               | Illustration                                                                                         |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 1) Remove the flange nut of terminal cover, and remove the terminal cover (see Fig. 1). |  <p>Figure 1</p>  |
| 2) Disconnect the connectors (see Fig. 2).                                              |  <p>Figure 2</p> |

**Note:** This section is for reference only. Actual unit appearance may vary.



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# Troubleshooting

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# Troubleshooting

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## 1. Safety Caution

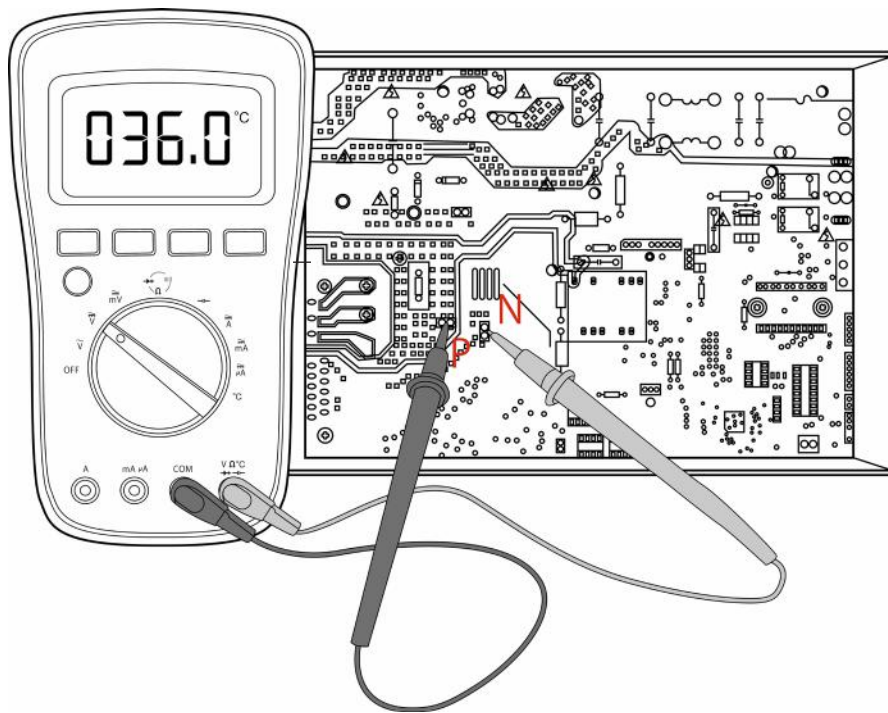
### WARNING

Be sure to turn off all power supplies or disconnect all wires to avoid electric shock. While checking indoor/outdoor PCB, please equip oneself with antistatic gloves or wrist strap to avoid damage to the board.

### WARNING

Electricity remains in capacitors even when the power supply is off. Ensure the capacitors are fully discharged before troubleshooting.

Test the voltage between P and N on back of the main PCB with multimeter. If the voltage is lower than 36V, the capacitors are fully discharged.



**Note:** This picture is for reference only. Actual appearance may vary.

For models that cannot be measured, wait 5 minutes after the power supply is off to ensure that the capacitors are fully discharged.

## 2. General Troubleshooting

### 2.1 Error Display (Indoor Unit)

When the indoor unit encounters a recognized error, the operation lamp will flash in a corresponding series, the timer lamp may turn on or begin flashing, and an error code will be displayed. These error codes are described in the following tables:

| Operation Lamp | Timer Lamp | Display        | Error Information                                                                                                    | Solution |
|----------------|------------|----------------|----------------------------------------------------------------------------------------------------------------------|----------|
| 1 time         | OFF        | <i>E0</i>      | Indoor unit EEPROM parameter error                                                                                   | TS19     |
| 2 times        | OFF        | <i>E1</i>      | Indoor / outdoor unit communication error                                                                            | TS20     |
| 3 times        | OFF        | <i>E2</i>      | Zero-crossing signal detection error(for some models)                                                                | TS22     |
| 4 times        | OFF        | <i>E3</i>      | The indoor fan speed is operating outside of the normal range                                                        | TS23     |
| 5 times        | OFF        | <i>E4</i>      | Indoor room temperature sensor T1 is in open circuit or has short circuited                                          | TS26     |
| 6 times        | OFF        | <i>E5</i>      | Evaporator coil temperature sensor T2 is in open circuit or has short circuited                                      | TS26     |
| 9 times        | OFF        | <i>E7/EH0b</i> | Indoor PCB/Display board communication error(for some models)                                                        | TS27     |
| 7 times        | OFF        | <i>EC</i>      | Refrigerant leak detected                                                                                            | TS28     |
| 1 times        | ON         | <i>F0</i>      | Current overload protection                                                                                          | TS29     |
| 2 times        | ON         | <i>F1</i>      | Outdoor room temperature sensor T4 is in open circuit or has circuited                                               | TS26     |
| 3 times        | ON         | <i>F2</i>      | Condenser coil temperature sensor T3 is in open circuit or has short circuited                                       | TS26     |
| 4 times        | ON         | <i>F3</i>      | Compressor discharge temperature sensor TP is in open circuit or has short circuited                                 | TS26     |
| 7 times        | ON         | <i>F6</i>      | Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited(for free-match indoor units) | TS26     |
| 5 times        | ON         | <i>F4</i>      | Outdoor unit EEPROM parameter error                                                                                  | TS19     |
| 6 times        | ON         | <i>F5</i>      | The outdoor fan speed is operating outside of the normal range (for some models)                                     | TS23     |
| 1 times        | FLASH      | <i>P0</i>      | IPM malfunction or IGBT over-strong current protection                                                               | TS30     |
| 2 times        | FLASH      | <i>P1</i>      | Over voltage or over low voltage protection                                                                          | TS31     |
| 3 times        | FLASH      | <i>P2</i>      | High temperature protection of IPM module or High pressure protection                                                | TS32     |
| 5 times        | FLASH      | <i>P4</i>      | Inverter compressor drive error                                                                                      | TS34     |
| 7 times        | FLASH      | <i>P6</i>      | High pressure protection or low pressure protection (for some models)                                                | TS35     |
| 6 times        | FLASH      | <i>P5/--</i>   | Indoor units mode conflict(match with multi outdoor unit)                                                            | --       |

#### For other errors:

The display board may show a garbled code or a code undefined by the service manual, such as an "88" with the Wi-Fi symbol lighting up. Ensure that this code is not a temperature reading.

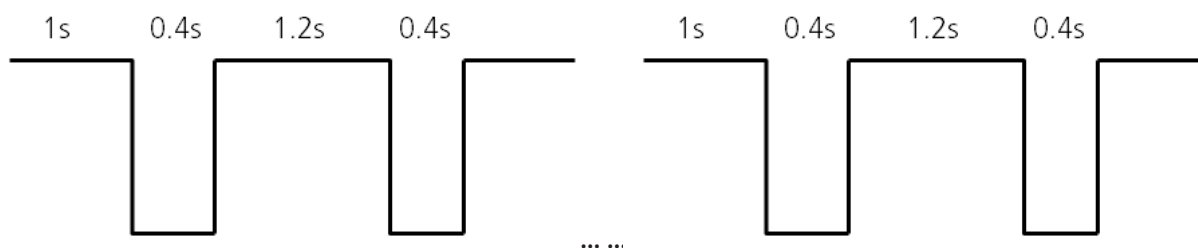
#### Troubleshooting:

Test the unit using the remote control. If the unit does not respond to the remote and the wiring is correct, the indoor PCB requires replacement. If the unit responds, the display board requires replacement.

**For some models**

| Operation Lamp | Timer Lamp | LED Display                   | Error Information                                                                                                    | Solution |
|----------------|------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------|----------|
| 1 time         | OFF        | <i>EH 00/</i><br><i>EH 0A</i> | Indoor unit EEPROM parameter error                                                                                   | TS19     |
| 2 times        | OFF        | <i>EL 01</i>                  | Indoor / outdoor unit communication error                                                                            | TS20     |
| 3 times        | OFF        | <i>EL 02</i>                  | Zero-crossing signal detection error(for some models)                                                                | TS22     |
| 4 times        | OFF        | <i>EL 03</i>                  | The indoor fan speed is operating outside of the normal range                                                        | TS23     |
| 5 times        | OFF        | <i>EC 51</i>                  | Outdoor unit EEPROM parameter error(for some models)                                                                 | TS19     |
| 5 times        | OFF        | <i>EC 52</i>                  | Condenser coil temperature sensor T3 is in open circuit or has short circuited                                       | TS26     |
| 5 times        | OFF        | <i>EC 53</i>                  | Outdoor room temperature sensor T4 is in open circuit or has short circuited                                         | TS26     |
| 5 times        | OFF        | <i>EC 54</i>                  | Compressor discharge temperature sensor TP is in open circuit or has short circuited                                 | TS26     |
| 5 times        | OFF        | <i>EC 56</i>                  | Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited(for free-match indoor units) | TS26     |
| 6 times        | OFF        | <i>EH 60</i>                  | Indoor room temperature sensor T1 is in open circuit or has short circuited                                          | TS26     |
| 6 times        | OFF        | <i>EH 61</i>                  | Evaporator coil temperature sensor T2 is in open circuit or has short circuited                                      | TS26     |
| 12 times       | OFF        | <i>EC 07</i>                  | The outdoor fan speed is operating outside of the normal range (for some models)                                     | TS23     |
| 9 times        | OFF        | <i>EH 0b</i>                  | Indoor PCB / Display board communication error (for some models)                                                     | TS27     |
| 8 times        | OFF        | <i>EL 0C</i>                  | Refrigerant leak detected                                                                                            | TS28     |
| 7 times        | FLASH      | <i>PC 00</i>                  | IPM malfunction or IGBT over-strong current protection                                                               | TS30     |
| 2 times        | FLASH      | <i>PC 01</i>                  | Over voltage or over low voltage protection                                                                          | TS31     |
| 3 times        | FLASH      | <i>PC 02</i>                  | High temperature protection of IPM module or High pressure protection                                                | TS32     |
| 5 times        | FLASH      | <i>PC 04</i>                  | Inverter compressor drive error                                                                                      | TS34     |
| 1 time         | FLASH      | <i>PC 08</i>                  | Current overload protection(for some models)                                                                         | TS29     |
| 7 times        | FLASH      | <i>PC 03</i>                  | High pressure protection or low pressure protection (for some models)                                                | TS35     |
| 1 times        | ON         | --                            | Indoor units mode conflict (match with multi outdoor unit)                                                           | --       |

### LED Flash Frequency:



## 2.2 Error Display (For Some Outdoor Units)

There are 2 LED lights (RED color and GREEN color) welded in outdoor main board. After power on, LED show different actions when encounter different problems.

| No. | Problem                                                                  | LED(GREEN) | LED(RED) | Solution |
|-----|--------------------------------------------------------------------------|------------|----------|----------|
| 1   | Standby normally                                                         | ON         | OFF      | -        |
| 2   | Operate normally                                                         | OFF        | ON       | -        |
| 3   | Compressor driven chip EEPROM parameter error                            | ON         | FLASH    | TS19     |
| 4   | IPM malfunction or IGBT over-current protection                          | FLASH      | OFF      | TS30     |
| 5   | Over voltage or too low voltage protection                               | ON         | ON       | TS31     |
| 6   | Inverter compressor drive error                                          | OFF        | FLASH    | TS34     |
| 7   | Inverter compressor drive error                                          | FLASH      | LIGHT    | TS34     |
| 8   | Communication error between outdoor main chip and compressor driven chip | FLASH      | FLASH    | TS19     |

### 3. Complaint Record Form

| Complaint Record Form                                           |                                                                                                                                  |                                                                  |                                                                                                                                                            |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Request No.:                                                    |                                                                                                                                  | Date:                                                            |                                                                                                                                                            |
| Installation Date:                                              |                                                                                                                                  | Service Date:                                                    |                                                                                                                                                            |
| Customer Information                                            |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Name                                                            |                                                                                                                                  | Telephone No.                                                    |                                                                                                                                                            |
| Home Address                                                    |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Email                                                           |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Product Information                                             |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Indoor Unit Model                                               |                                                                                                                                  | Outdoor Unit Model                                               |                                                                                                                                                            |
| Serial No. of indoor unit                                       |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Serial No. of outdoor unit                                      |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Working Mode                                                    | <input type="checkbox"/> Cooling <input type="checkbox"/> Heating <input type="checkbox"/> Fan only <input type="checkbox"/> Dry |                                                                  |                                                                                                                                                            |
| Setting temperature                                             | _____°C / °F                                                                                                                     | Fan speed                                                        | <input type="checkbox"/> Turbo <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low<br><input type="checkbox"/> Auto |
| Temperature of air inlet                                        | _____°C / °F                                                                                                                     | Temperature of air outlet                                        | _____°C / °F                                                                                                                                               |
| Installation / Condition Information                            |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Indoor temperature                                              | _____°C / °F                                                                                                                     | Indoor humidity                                                  | _____ %RH                                                                                                                                                  |
| Outdoor temperature                                             | _____°C / °F                                                                                                                     | Outdoor humidity                                                 | _____ %RH                                                                                                                                                  |
| Length of Connecting pipe                                       |                                                                                                                                  | Pipe diameter                                                    | Gas pipe:      Liquid pipe:                                                                                                                                |
| Length of Wiring                                                |                                                                                                                                  | Wire diameter                                                    |                                                                                                                                                            |
| System Running Pressure                                         | _____MPa   or   _____Bar   or   _____PSI                                                                                         |                                                                  |                                                                                                                                                            |
| Room size (L*W*H)                                               |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Photo of Installation of Indoor unit<br>(Photo #1) - Image Link |                                                                                                                                  | Photo of Installation of Outdoor unit<br>(Photo #2) - Image Link |                                                                                                                                                            |
| Failure Description                                             |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Error Code of Indoor unit                                       |                                                                                                                                  | Code of Outdoor PCB                                              |                                                                                                                                                            |
| Unit does not start                                             |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Remote control does not work                                    |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Indoor display shows nothing                                    |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| No cooling or heating at all                                    |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Less cooling or heating                                         |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Unit starts but stops shortly                                   |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| High noise                                                      |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| High vibration                                                  |                                                                                                                                  |                                                                  |                                                                                                                                                            |
| Other failure description                                       |                                                                                                                                  |                                                                  |                                                                                                                                                            |

| Parameter Checking information by Remote controller            |                                    |               |                       |
|----------------------------------------------------------------|------------------------------------|---------------|-----------------------|
| Displaying code                                                | Displaying code meaning            | Display value | Display value meaning |
| T1                                                             | Room temperature                   |               |                       |
| T2                                                             | Indoor coil temperature            |               |                       |
| T3                                                             | Outdoor coil temperature           |               |                       |
| T4                                                             | Ambient temperature                |               |                       |
| Tb                                                             | Outlet temperature of indoor coil  |               |                       |
| TP                                                             | Discharge temperature              |               |                       |
| TH                                                             | Suction temperature                |               |                       |
| FT                                                             | Targeted Frequency                 |               |                       |
| Fr                                                             | Actual Frequency                   |               |                       |
| IF                                                             | Indoor fan speed                   |               |                       |
| OF                                                             | Outdoor fan speed                  |               |                       |
| LA                                                             | EXV opening steps                  |               |                       |
| CT                                                             | Compressor continuous running time |               |                       |
| ST                                                             | Causes of compressor stop.         |               |                       |
| A0, A1, b0, b1, b2, b3, b4, b5, b6, dL, Ac, Uo, Td, dA, dS, dT | Reserved                           |               |                       |

| Approval from Manufacturer                 |  |
|--------------------------------------------|--|
| <input type="checkbox"/> Approved          |  |
| <input type="checkbox"/> More Proof needed |  |
| <input type="checkbox"/> Rejected          |  |

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## 4. Information Inquiry

- To enter information inquiry status, complete the following procedure within ten seconds:
  1. Press LED(or DO NOT DISTURB) 3 times.
  2. Press SWING(or AIR DIRECTION) 3 times.
- Finish 1 and 2 within 10 seconds, you will hear beeps for two seconds, which means the unit goes into parameter checking mode.
- Use the LED(or DO NOT DISTURB) and SWING(or AIR DIRECTION) buttons to cycle through information displayed.
- Pressing LED(or DO NOT DISTURB) will display the next code in the sequence. Pressing SWING(or AIR DIRECTION) will show the previous.
- The following table (p. 10) shows information codes. The screen will display this code for two seconds, then the information for 25 seconds.

| Displayed code | Explanation                        | Displayed value                                                                                                             | Meaning                                                                                                                                       | Additional Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>T1</i>      | Room temperature                   | -1F,-1E,-1d,-1c,-1b,-1A<br>-19—99<br>A0,A1,...A9<br>b0,b1,...b9<br>c0,c1,...c9<br>d0,d1,...d9<br>E0,E1,...E9<br>F0,F1,...F9 | -25,-24,-23,-22,-21,-20<br>-19—99<br>100,101,...109<br>110,111,...119<br>120,121,...129<br>130,131,...139<br>140,141,...149<br>150,151,...159 | <ol style="list-style-type: none"> <li>1. All displayed temperatures use actual values.</li> <li>2. All temperatures are displayed in °C regardless of remote used.</li> <li>3. T1, T2, T3, T4, and T2B display ranges from -25 to 70 °C. TP display ranges from -20 to 130 °C.</li> <li>4. The frequency display ranges from 0 to 159HZ.</li> <li>5. If the actual values exceed or fall short of the defined range, the values closest to the maximum and minimum values will be displayed.</li> </ol> |
| <i>T2</i>      | Indoor coil temperature            |                                                                                                                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>T3</i>      | Outdoor coil temperature           |                                                                                                                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>T4</i>      | Ambient temperature                |                                                                                                                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>TB</i>      | Outlet temperature of indoor coil  |                                                                                                                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>TP</i>      | Discharge temperature              |                                                                                                                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>TH</i>      | Suction temperature                |                                                                                                                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>FT</i>      | Targeted frequency                 |                                                                                                                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>FR</i>      | Actual frequency                   |                                                                                                                             |                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>IF</i>      | Indoor fan speed                   | 0<br>1,2,3,4                                                                                                                | OFF<br>Low speed, Medium speed, High speed, Turbo.                                                                                            | N/A<br>Used for some large capacity motors.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>OF</i>      | Outdoor fan speed                  | 14-FF                                                                                                                       | Actual fan speed is equal to the display value converted to decimal value and multiplied by 10. This is measured in RPM.                      | Used for some small capacity motors.<br>The display value is 14-FF (hexadecimal). The corresponding fan speed ranges from 200 to 2550RPM.                                                                                                                                                                                                                                                                                                                                                                |
| <i>LR</i>      | EXV opening angle                  | 0-FF                                                                                                                        | Actual EXV opening value is equal to the display value converted to decimal value and then multiplied by 2.                                   | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>CT</i>      | Compressor continuous running time | 0-FF                                                                                                                        | 0-255 minutes                                                                                                                                 | If the actual value exceeds or falls short of the defined range, the value closest to the maximum and minimum will be displayed.                                                                                                                                                                                                                                                                                                                                                                         |
| <i>ST</i>      | Causes of compressor stop          | 0-99                                                                                                                        | For a detailed explanation, contact technical support.                                                                                        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Displayed code | Explanation | Displayed value              | Meaning | Additional Notes |
|----------------|-------------|------------------------------|---------|------------------|
| <i>R0</i>      | Reserved    | 0-FF<br>2-28<br>5-20<br>5-25 | -       | -                |
| <i>R1</i>      |             |                              |         |                  |
| <i>b0</i>      |             |                              |         |                  |
| <i>b1</i>      |             |                              |         |                  |
| <i>b2</i>      |             |                              |         |                  |
| <i>b3</i>      |             |                              |         |                  |
| <i>b4</i>      |             |                              |         |                  |
| <i>b5</i>      |             |                              |         |                  |
| <i>b6</i>      |             |                              |         |                  |
| <i>dL</i>      |             |                              |         |                  |
| <i>Rc</i>      |             |                              |         |                  |
| <i>Uo</i>      |             |                              |         |                  |
| <i>Td</i>      |             |                              |         |                  |
| <i>dR</i>      |             |                              |         |                  |
| <i>dS</i>      |             |                              |         |                  |
| <i>dT</i>      |             |                              |         |                  |

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## 5. Error Diagnosis and Troubleshooting Without Error Code



### WARNING

**Be sure to turn off unit before any maintenance to prevent damage or injury.**

### 5.1 Remote maintenance

**SUGGESTION:** When troubles occur, please check the following points with customers prior to field maintenance.

| No. | Problem                                                 | Solution    |
|-----|---------------------------------------------------------|-------------|
| 1   | Unit will not start                                     | TS14 - TS15 |
| 2   | The power switch is on but fans will not start          | TS14 - TS15 |
| 3   | The temperature on the display board cannot be set      | TS14 - TS15 |
| 4   | Unit is on but the wind is not cold(hot)                | TS14 - TS15 |
| 5   | Unit runs, but shortly stops                            | TS14 - TS15 |
| 6   | The unit starts up and stops frequently                 | TS14 - TS15 |
| 7   | Unit runs continuously but insufficient cooling/heating | TS14 - TS15 |
| 8   | Cool can not change to heat                             | TS14 - TS15 |
| 9   | Unit is noisy                                           | TS14 - TS15 |

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## 5.2 Field maintenance

| No. | Problem                                                 | Solution    |
|-----|---------------------------------------------------------|-------------|
| 1   | Unit will not start                                     | TS16 - TS17 |
| 2   | Compressor will not start but fans run                  | TS16 - TS17 |
| 3   | Compressor and condenser (outdoor) fan will not start   | TS16 - TS17 |
| 4   | Evaporator (indoor) fan will not start                  | TS16 - TS17 |
| 5   | Condenser (Outdoor) fan will not start                  | TS16 - TS17 |
| 6   | Unit runs, but shortly stops                            | TS16 - TS17 |
| 7   | Compressor short-cycles due to overload                 | TS16 - TS17 |
| 8   | High discharge pressure                                 | TS16 - TS17 |
| 9   | Low discharge pressure                                  | TS16 - TS17 |
| 10  | High suction pressure                                   | TS16 - TS17 |
| 11  | Low suction pressure                                    | TS16 - TS17 |
| 12  | Unit runs continuously but insufficient cooling/heating | TS16 - TS17 |
| 13  | Too cool                                                | TS16 - TS17 |
| 14  | Compressor is noisy                                     | TS16 - TS17 |
| 15  | Horizontal louver can not revolve                       | TS16 - TS17 |

| 1.Remote Maintenance                               |                                           | Electrical Circuit                                                        |   |   |   | Refrigerant Circuit |   |   |   |   |   |   |   |  |   |
|----------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------|---|---|---|---------------------|---|---|---|---|---|---|---|--|---|
| Possible causes of trouble                         |                                           | Power failure                                                             |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | The main power tripped                                                    |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | Loose connections                                                         |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | Faulty transformer                                                        |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | The voltage too high or too low                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | The remote control is powered off                                         |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | The remote control is broken                                              |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | Dirty air filter                                                          |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | Dirty condenser fins                                                      |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | The setting temperature is higher/lower than the room's (cooling/heating) |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | The ambient temperature is too high/low when the mode is cooling/heating  |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | Fan mode                                                                  |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | Silence feature is activated (optional function)                          |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    |                                           | Frosting and defrosting frequently                                        |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    | Unit will not start                       | ☆                                                                         | ☆ |   |   |                     |   |   |   |   |   |   |   |  |   |
| The power switch is on but fans will not start     |                                           |                                                                           | ☆ | ☆ | ☆ |                     |   |   |   |   |   |   |   |  |   |
| The temperature on the display board cannot be set |                                           |                                                                           |   |   |   | ☆                   | ☆ |   |   |   |   |   |   |  |   |
| Unit is on but the wind is not cold(hot)           |                                           |                                                                           |   |   |   |                     |   |   |   | ☆ | ☆ |   |   |  |   |
| Unit runs, but shortly stops                       |                                           |                                                                           |   |   | ☆ |                     |   |   |   | ☆ | ☆ |   |   |  |   |
| The unit starts up and stops frequently            |                                           |                                                                           |   |   | ☆ |                     |   |   |   |   | ☆ |   |   |  | ☆ |
| Unit runs continuously but insufficient cooling    |                                           |                                                                           |   |   |   |                     |   | ☆ | ☆ | ☆ | ☆ |   | ☆ |  |   |
| Cool can not change to heat                        |                                           |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
| Unit is noisy                                      |                                           |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
| Test method / remedy                               | Test voltage                              |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    | Close the power switch                    |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    | Inspect connections - tighten             |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    | Change the transformer                    |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    | Test voltage                              |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    | Replace the remote controller's batteries |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    | Replace the remote controller             |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  |   |
|                                                    | Clean or replace                          |                                                                           |   |   |   |                     |   |   | ☆ |   |   |   |   |  |   |
|                                                    | Clean                                     |                                                                           |   |   |   |                     |   |   | ☆ |   |   |   |   |  |   |
|                                                    | Adjust the setting temperature            |                                                                           |   |   |   |                     |   |   |   |   | ☆ |   |   |  |   |
|                                                    | Turn on the AC later                      |                                                                           |   |   |   |                     |   |   |   |   | ☆ |   |   |  |   |
|                                                    | Adjust to cool mode                       |                                                                           |   |   |   |                     |   |   |   |   |   | ☆ |   |  |   |
|                                                    | Turn off the silence feature              |                                                                           |   |   |   |                     |   |   |   |   |   |   | ☆ |  |   |
|                                                    | Turn on the AC later                      |                                                                           |   |   |   |                     |   |   |   |   |   |   |   |  | ☆ |

| 1.Remote Maintenance                               | Others               |                                        |                                 |                                                   |                                                                                   |                                 |
|----------------------------------------------------|----------------------|----------------------------------------|---------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------|
| Possible causes of trouble                         | Heavy load condition | Loosen hold down bolts and / or screws | Bad airproof                    | The air inlet or outlet of either unit is blocked | Interference from cell phone towers and remote boosters                           | Shipping plates remain attached |
| Unit will not start                                |                      |                                        |                                 |                                                   |                                                                                   |                                 |
| The power switch is on but fans will not start     |                      |                                        |                                 |                                                   | ☆                                                                                 |                                 |
| The temperature on the display board cannot be set |                      |                                        |                                 |                                                   |                                                                                   |                                 |
| Unit is on but the wind is not cold(hot)           |                      |                                        |                                 |                                                   |                                                                                   |                                 |
| Unit runs, but shortly stops                       |                      |                                        |                                 |                                                   |                                                                                   |                                 |
| The unit starts up and stops frequently            |                      |                                        |                                 | ☆                                                 |                                                                                   |                                 |
| Unit runs continuously but insufficient cooling    | ☆                    |                                        | ☆                               | ☆                                                 |                                                                                   |                                 |
| Cool cannot change to heat                         |                      |                                        |                                 |                                                   |                                                                                   |                                 |
| Unit is noisy                                      |                      | ☆                                      |                                 |                                                   |                                                                                   | ☆                               |
| Test method / remedy                               | Check heat load      | Tighten bolts or screws                | Close all the windows and doors | Remove the obstacles                              | Reconnect the power or press ON/OFF button on remote control to restart operation | Remove them                     |

| 2.Field Maintenance        | Refrigerant Circuit                                   |                         |                        |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            |                                                     | Others                                   |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|----------------------------|-------------------------------------------------------|-------------------------|------------------------|-------------------------|-----------------------|------------------------------------------|---------------------------|--------------------------------------|------------------------------------------------|---------------------------------|------------------------------------|-----------------------------------------|-----------------------------------------|------------------------|----------------------------|-----------------------------------------------------|------------------------------------------|----------------------------------|----------------------|----------------------------------------|---------------------------------|--------------------------|-------------------------------------------------------|-----------------------------------------------------------------------|
| Possible causes of trouble | Compressor stuck                                      | Shortage of refrigerant | Restricted liquid line | Dirty air filter        | Dirty evaporator coil | Insufficient air through evaporator coil | Overcharge of refrigerant | Dirty or partially blocked condenser | Air or incompressible gas in refrigerant cycle | Short cycling of condensing air | High temperature condensing medium | Insufficient condensing medium          | Broken compressor internal parts        | Inefficient compressor | Expansion valve obstructed | Expansion valve or capillary tube closed completely | Leaking power element on expansion valve | Poor installation of feeler bulb | Heavy load condition | Loosen hold down bolts and / or screws | Shipping plates remain attached | Poor choices of capacity | Contact of piping with other piping or external plate |                                                                       |
|                            | Unit will not start                                   |                         |                        |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Compressor will not start but fans run                | ☆                       |                        |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Compressor and condenser (outdoor) fan will not start |                         |                        |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Evaporator (indoor) fan will not start                |                         |                        |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Condenser (Outdoor) fan will not start                |                         |                        |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Unit runs, but shortly stops                          |                         | ☆                      | ☆                       |                       |                                          |                           | ☆                                    | ☆                                              |                                 |                                    |                                         |                                         |                        |                            |                                                     | ☆                                        | ☆                                |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Compressor short-cycles due to overload               |                         | ☆                      |                         |                       |                                          |                           | ☆                                    | ☆                                              |                                 |                                    |                                         |                                         |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | High discharge pressure                               |                         |                        |                         |                       |                                          |                           | ☆                                    | ☆                                              | ☆                               | ☆                                  | ☆                                       | ☆                                       |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Low discharge pressure                                |                         | ☆                      |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        | ☆                          |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | High suction pressure                                 |                         |                        |                         |                       |                                          |                           | ☆                                    |                                                |                                 |                                    |                                         |                                         |                        | ☆                          |                                                     |                                          |                                  | ☆                    | ☆                                      |                                 |                          |                                                       |                                                                       |
|                            | Low suction pressure                                  |                         | ☆                      | ☆                       | ☆                     | ☆                                        | ☆                         |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            | ☆                                                   | ☆                                        | ☆                                |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Unit runs continuously but insufficient cooling       |                         | ☆                      | ☆                       | ☆                     | ☆                                        | ☆                         |                                      | ☆                                              | ☆                               | ☆                                  |                                         |                                         |                        | ☆                          |                                                     |                                          |                                  |                      | ☆                                      |                                 |                          | ☆                                                     |                                                                       |
|                            | Too cool                                              |                         |                        |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Compressor is noisy                                   |                         |                        |                         |                       |                                          |                           | ☆                                    |                                                |                                 |                                    |                                         |                                         | ☆                      |                            |                                                     |                                          |                                  |                      |                                        | ☆                               | ☆                        |                                                       | ☆                                                                     |
|                            | Horizontal louver can not revolve                     |                         |                        |                         |                       |                                          |                           |                                      |                                                |                                 |                                    |                                         |                                         |                        |                            |                                                     |                                          |                                  |                      |                                        |                                 |                          |                                                       |                                                                       |
|                            | Test method / remedy                                  | Replace the compressor  | Leak test              | Replace restricted part | Clean or replace      | Clean coil                               | Check fan                 | Change charged refrigerant volume    | Clean condenser or remove obstacle             | Purge, evacuate and recharge    | Remove obstruction to air flow     | Remove obstruction in air or water flow | Remove obstruction in air or water flow | Replace compressor     | Test compressor efficiency | Replace valve                                       | Replace valve                            | Replace valve                    | Fix feeler bulb      | Check heat load                        | Tighten bolts or screws         | Remove them              | Choose AC of lager capacity or add the number of AC   | Rectify piping so as not to contact each other or with external plate |

| 2.Field Maintenance        | Electrical Circuit   |                        |                          |                               |                           |                                             |                                                 |                                                                    |                                   |                                          |                                    |                                    |                       |                                |                                  |                                  |
|----------------------------|----------------------|------------------------|--------------------------|-------------------------------|---------------------------|---------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------|-----------------------------------|------------------------------------------|------------------------------------|------------------------------------|-----------------------|--------------------------------|----------------------------------|----------------------------------|
| Possible causes of trouble | Power failure        | Blown fuse or varistor | Loose connections        | Shorted or broken wires       | Safety device opens       | Faulty thermostat / room temperature sensor | Wrong setting place of temperature sensor       | Faulty transformer                                                 | Shorted or open capacitor         | Faulty magnetic contactor for compressor | Faulty magnetic contactor for fan  | Low voltage                        | Faulty stepping motor | Shorted or grounded compressor | Shorted or grounded fan motor    |                                  |
|                            | ☆                    | ☆                      | ☆                        | ☆                             | ☆                         |                                             |                                                 | ☆                                                                  |                                   |                                          |                                    |                                    |                       |                                |                                  |                                  |
|                            |                      |                        |                          | ☆                             |                           | ☆                                           |                                                 |                                                                    | ☆                                 | ☆                                        |                                    |                                    |                       | ☆                              |                                  |                                  |
|                            |                      |                        |                          | ☆                             |                           | ☆                                           |                                                 |                                                                    |                                   | ☆                                        |                                    |                                    |                       |                                |                                  |                                  |
|                            |                      |                        |                          | ☆                             |                           | ☆                                           |                                                 |                                                                    | ☆                                 |                                          | ☆                                  |                                    |                       |                                | ☆                                |                                  |
|                            |                      |                        |                          | ☆                             |                           | ☆                                           |                                                 |                                                                    | ☆                                 |                                          | ☆                                  |                                    |                       |                                | ☆                                |                                  |
|                            |                      |                        |                          |                               |                           |                                             |                                                 |                                                                    |                                   | ☆                                        |                                    | ☆                                  |                       |                                |                                  |                                  |
|                            |                      |                        |                          |                               |                           |                                             |                                                 |                                                                    |                                   | ☆                                        |                                    | ☆                                  |                       |                                |                                  |                                  |
|                            |                      |                        |                          |                               |                           |                                             |                                                 |                                                                    |                                   |                                          |                                    |                                    |                       |                                |                                  |                                  |
|                            |                      |                        |                          |                               |                           |                                             |                                                 |                                                                    |                                   |                                          |                                    |                                    |                       |                                |                                  |                                  |
|                            |                      |                        |                          |                               |                           |                                             |                                                 |                                                                    |                                   |                                          |                                    |                                    |                       |                                |                                  |                                  |
|                            |                      |                        |                          |                               |                           |                                             | ☆                                               | ☆                                                                  |                                   |                                          |                                    |                                    |                       |                                |                                  |                                  |
|                            |                      |                        |                          |                               |                           |                                             |                                                 |                                                                    |                                   |                                          |                                    |                                    |                       |                                |                                  |                                  |
|                            |                      |                        |                          | ☆                             | ☆                         |                                             |                                                 |                                                                    |                                   |                                          |                                    |                                    |                       | ☆                              |                                  |                                  |
|                            | Test method / remedy | Test voltage           | Inspect fuse type & size | Inspect connections - tighten | Test circuits with tester | Test continuity of safety device            | Test continuity of thermostat / sensor & wiring | Place the temperature sensor at the center of the air inlet grille | Check control circuit with tester | Check capacitor with tester              | Test continuity of coil & contacts | Test continuity of coil & contacts | Test voltage          | Replace the stepping motor     | Check resistance with multimeter | Check resistance with multimeter |

## 6. Quick Maintenance by Error Code

If you do not have the time or tools to test which specific parts are faulty, you can directly change the required parts according to the error code.

You can find the parts to replace by error code in the following table.

| Part requiring replacement | Error Code      |       |       |       |       |       |       |       |       |
|----------------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|
|                            | E0              | E1    | E2    | E3    | E4    | E5    | E7/E6 | EC    | FD    |
|                            | EH 00/<br>EH 0A | EL 01 | EH 02 | EH 03 | EH 60 | EH 61 | EH 0b | EL 0C | PC 0B |
| Indoor PCB                 | ✓               | ✓     | ✓     | ✓     | ✓     | ✓     | ✓     | ✓     | x     |
| Outdoor PCB                | x               | ✓     | x     | x     | x     | x     | x     | x     | ✓     |
| Display board              | x               | x     | x     | x     | x     | x     | ✓     | x     | x     |
| Indoor fan motor           | x               | x     | x     | ✓     | x     | x     | x     | x     | x     |
| T1 sensor                  | x               | x     | x     | x     | ✓     | x     | x     | x     | x     |
| T2 Sensor                  | x               | x     | x     | x     | x     | ✓     | x     | ✓     | x     |
| Reactor                    | x               | ✓     | x     | x     | x     | x     | x     | x     | x     |
| Compressor                 | x               | x     | x     | x     | x     | x     | x     | x     | ✓     |
| Additional refrigerant     | x               | x     | x     | x     | x     | x     | x     | ✓     | x     |

| Part requiring replacement | F1    | F2    | F3    | F6    | F4    | F5    | P0    | P1    | P2    | P6    | P4    |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                            | EC 53 | EC 52 | EC 54 | EC 56 | EC 51 | EC 07 | PC 00 | PC 01 | PC 02 | PC 03 | PC 04 |
| Indoor PCB                 | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |
| Outdoor PCB                | ✓     | ✓     | ✓     | ✓     | ✓     | ✓     | ✓     | ✓     | ✓     | ✓     | ✓     |
| Indoor fan motor           | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |
| Outdoor fan motor          | x     | x     | x     | x     | x     | ✓     | ✓     | x     | ✓     | x     | ✓     |
| T3 Sensor                  | x     | ✓     | x     | x     | x     | x     | x     | x     | x     | x     | x     |
| T4 Sensor                  | ✓     | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |
| TP Sensor                  | x     | x     | ✓     | x     | x     | x     | x     | x     | x     | x     | x     |
| T2B Sensor                 | x     | x     | x     | ✓     | x     | x     | x     | x     | x     | x     | x     |
| Reactor                    | x     | x     | x     | x     | x     | x     | x     | ✓     | x     | x     | x     |
| Compressor                 | x     | x     | x     | x     | x     | x     | ✓     | x     | x     | x     | ✓     |
| IPM module board           | x     | x     | x     | x     | x     | x     | ✓     | ✓     | ✓     | x     | ✓     |
| High pressure protector    | x     | x     | x     | x     | x     | x     | x     | x     | ✓     | x     | x     |
| Low pressure protector     | x     | x     | x     | x     | x     | x     | x     | x     | x     | ✓     | x     |
| Additional refrigerant     | x     | x     | x     | x     | x     | x     | x     | x     | x     | ✓     | x     |

**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

## 7. Troubleshooting by Error Code

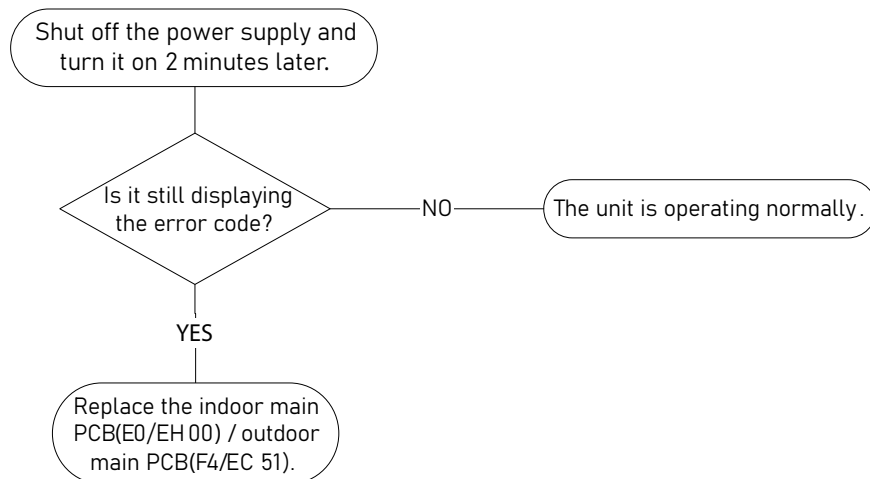
### 7.1 E0/EH 00/EH 0A / F4/EC 51 (EEPROM parameter error diagnosis and solution)

Description: Indoor or outdoor PCB main chip does not receive feedback from EEPROM chip.

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB

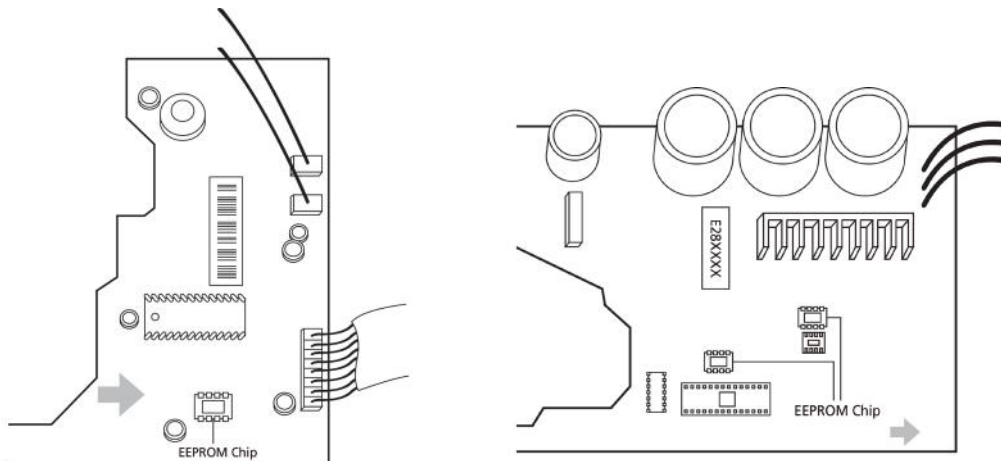
Troubleshooting and repair:



#### Remarks:

EEPROM: A read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

The location of the EEPROM chip on the indoor and outdoor PCB is shown in the following two images:



**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole. This pictures are only for reference, actual appearance may vary.

Troubleshooting and repair of compressor driven chip EEPROM parameter error and communication error between outdoor main chip and compressor driven chip are same as F4/EC 51.

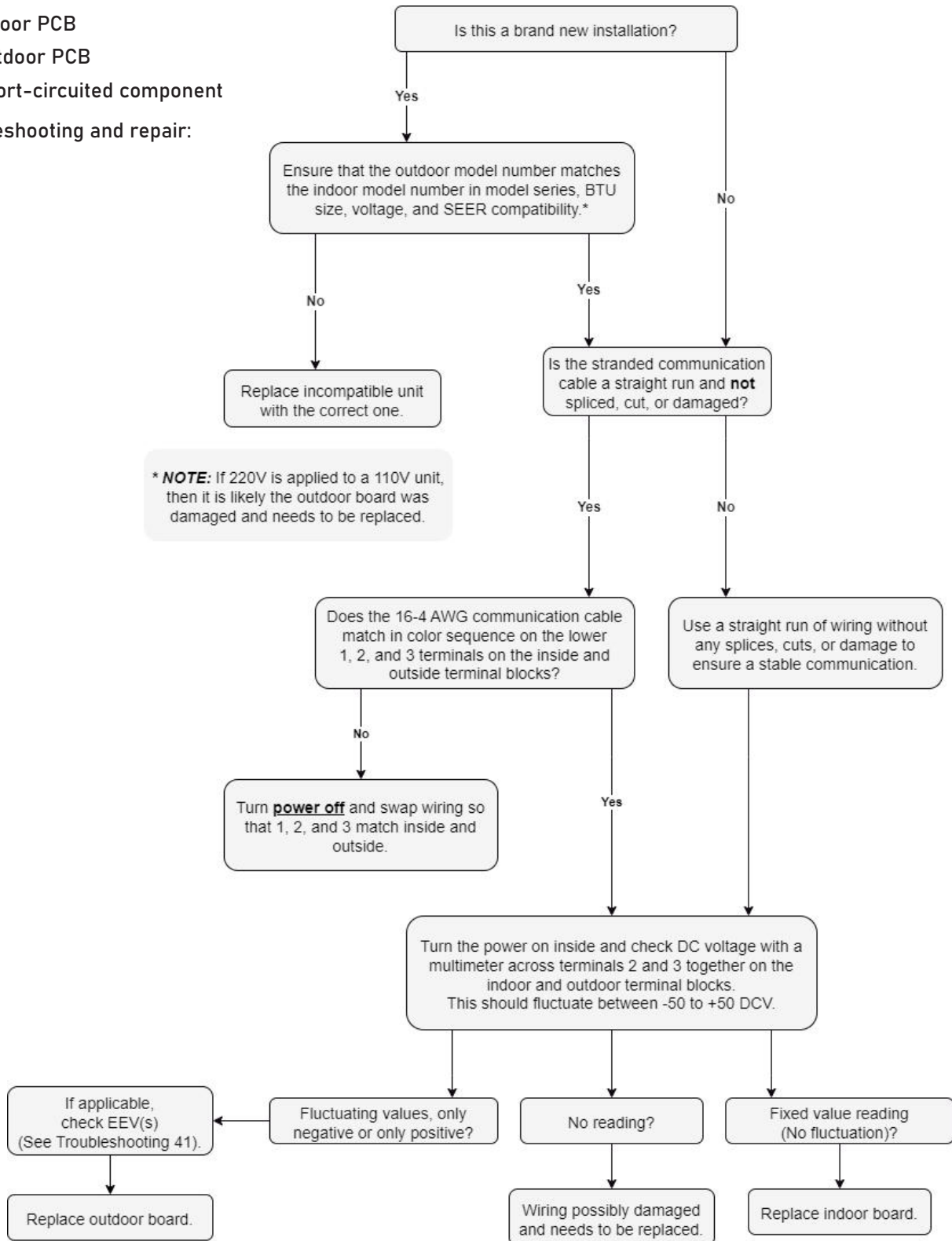
## 7.2 E1/EL 01 (Indoor and outdoor unit communication error diagnosis and solution)

Description: Indoor unit cannot communicate with outdoor unit.

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB
- Short-circuited component

Troubleshooting and repair:

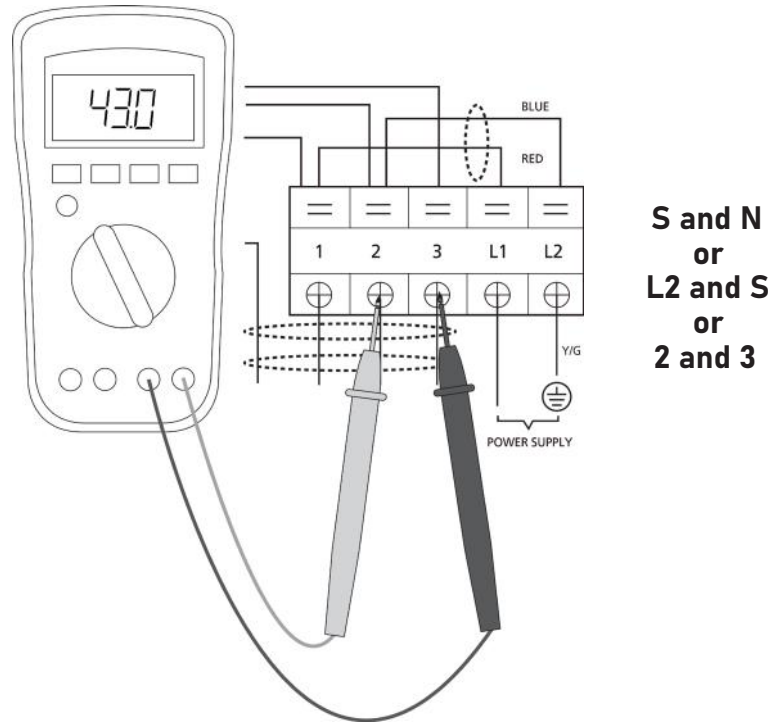


**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

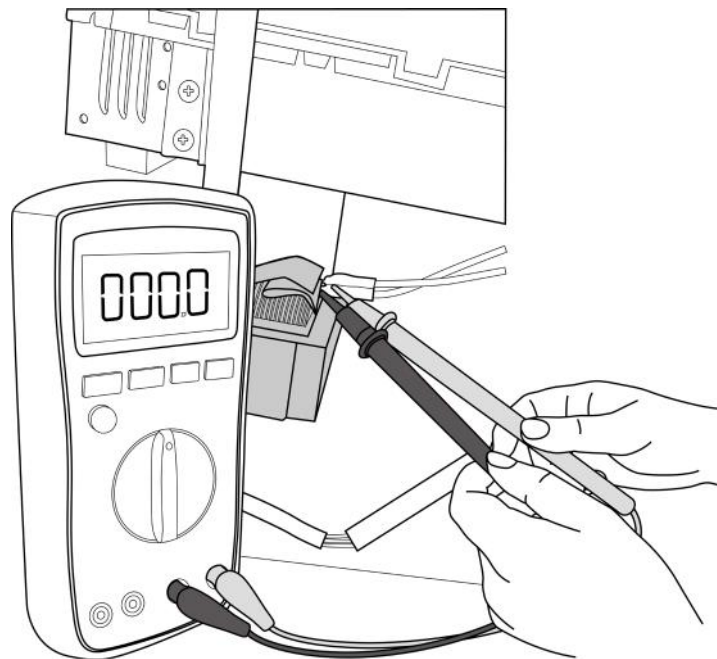
---

**Remarks:**

- Use a multimeter to test the DC voltage between #2 port(or S/L2 port) and #3 port(or N/S port) of outdoor unit. The red pin of multimeter connects with 2 port(or S or L2 port), while the black pin is for 3 port(or N or S port).
- When the AC is normal running, the voltage is moving alternately between positive values and negative values.
- If the outdoor unit has faulted, the voltage will fluctuate at positive values.
- If the indoor unit has faulted, the voltage will remain at a certain value.



- Use a multimeter to test the resistance of the reactor which does not connect with capacitor.
- The normal value should be around zero ohm. Otherwise, the reactor is malfunctioning.



**Note:** The picture and the value are only for reference, actual condition and specific value may vary.

---

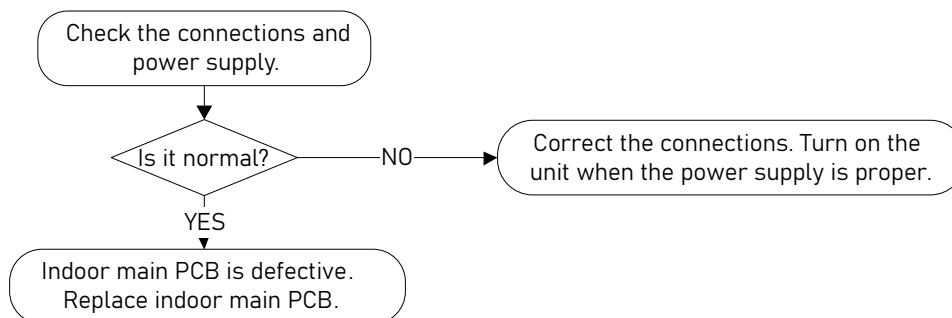
### 7.3 E2/EH 02 (Zero crossing detection error diagnosis and solution)

Description: When PCB does not receive zero crossing signal feedback for 4 minutes or the zero crossing signal time interval is abnormal.

Recommended parts to prepare:

- Connection wires
- PCB

Troubleshooting and repair:



**Note:** E2/EH 02 zero crossing detection error is only valid for the unit with AC fan motors, for other models, this error is invalid.

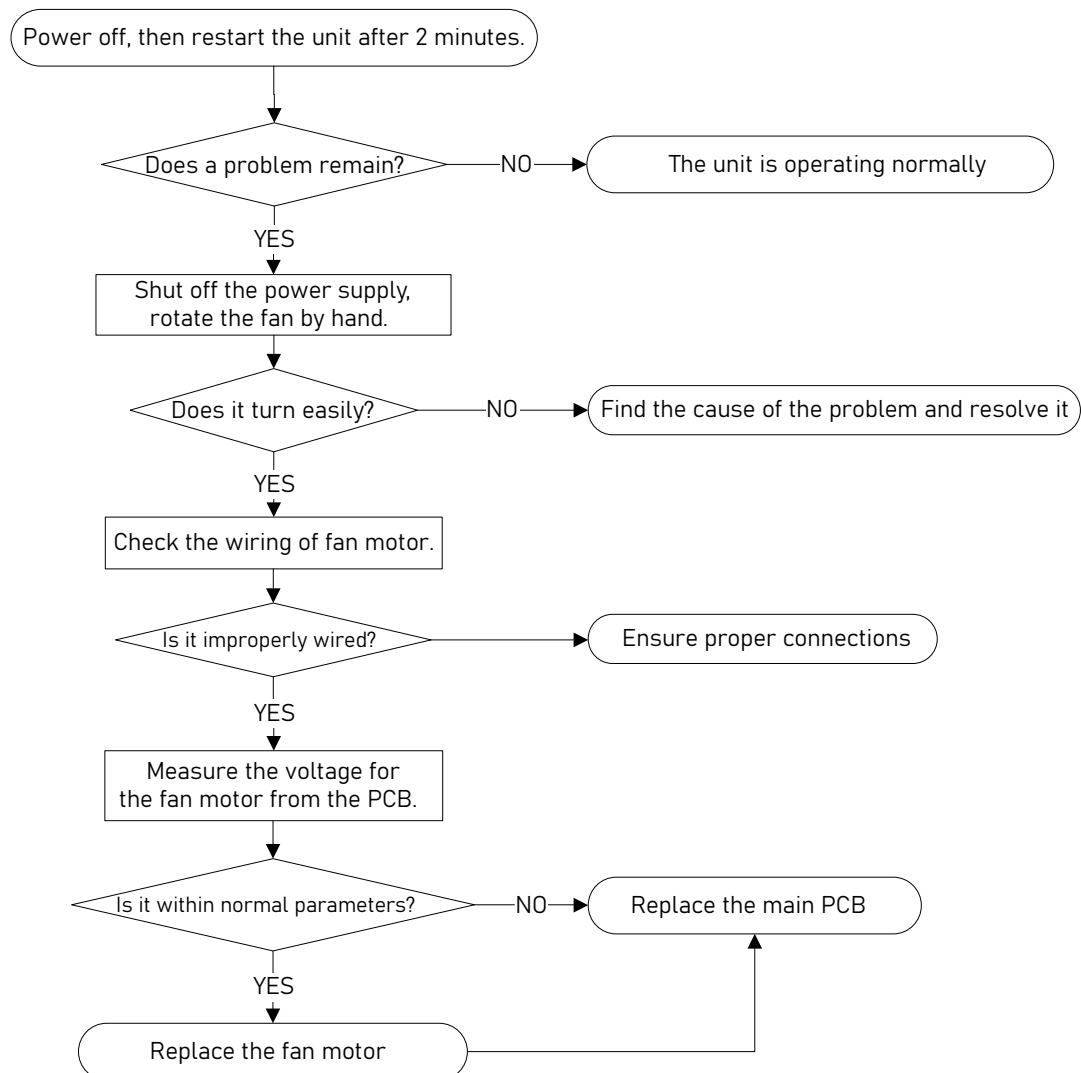
## 7.4 E3/EH 03 / F5/EC 07 (Fan speed is operating outside of normal range diagnosis and solution)

Description: When indoor / outdoor fan speed keeps too low or too high for a certain time, the LED displays the failure code and the AC turns off.

Recommended parts to prepare:

- Connection wires
- Fan assembly
- Fan motor
- PCB

Troubleshooting and repair:



**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

## Index:

### 1. Indoor or Outdoor DC Fan Motor(control chip is in fan motor)

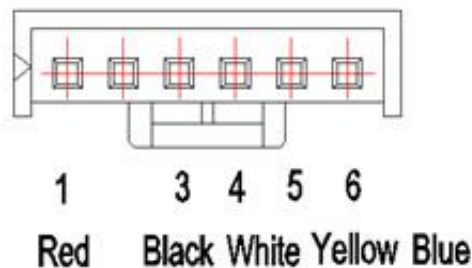
Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not within the range showing in table below, the PCB has faulted and needs to be replaced.

- DC motor voltage input and output (voltage: 220-240V~):

| No. | Color  | Signal | Voltage   |
|-----|--------|--------|-----------|
| 1   | Red    | Vs/Vm  | 280V~380V |
| 2   | ---    | ---    | ---       |
| 3   | Black  | GND    | 0V        |
| 4   | White  | Vcc    | 14~17.5V  |
| 5   | Yellow | Vsp    | 0~5.6V    |
| 6   | Blue   | FG     | 14~17.5V  |

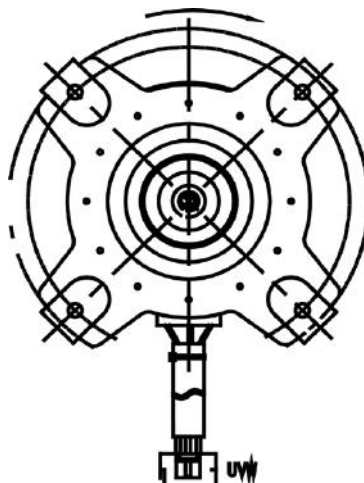
- DC motor voltage input and output (voltage: 115V~):

| No. | Color  | Signal | Voltage   |
|-----|--------|--------|-----------|
| 1   | Red    | Vs/Vm  | 140V~190V |
| 2   | ---    | ---    | ---       |
| 3   | Black  | GND    | 0V        |
| 4   | White  | Vcc    | 14~17.5V  |
| 5   | Yellow | Vsp    | 0~5.6V    |
| 6   | Blue   | FG     | 14~17.5V  |



### 2. Outdoor DC Fan Motor (control chip is in outdoor PCB)

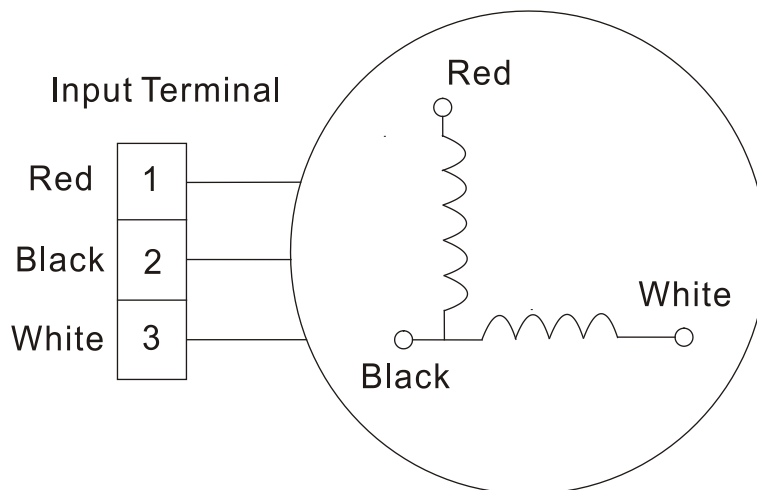
Release the UVW connector. Measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other, the fan motor has faulted and needs to be replaced. Otherwise, the PCB has faulted and need to be replaced.



---

### 3. Indoor DC Fan Motor

Power on and set the unit running in fan mode at high fan speed. After running for 15 seconds, measure the voltage of pin1 and pin2. If the value of the voltage is less than 100V(208~240V power supply) or 50V (115V power supply), the PCB faulted and needs to be replaced.



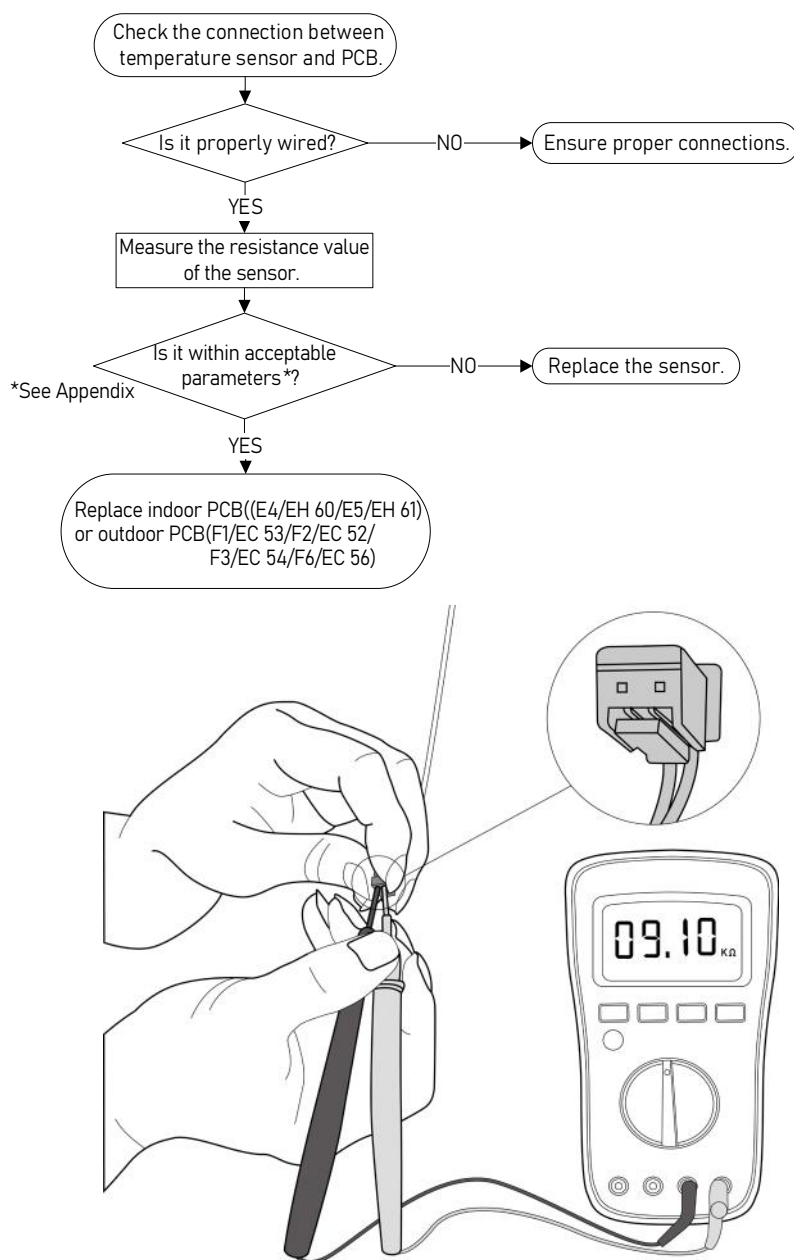
## 7.5 E4/EH 60/E5/EH 61/F1/EC 53/F2/EC 52/F3/EC 54/F6/EC56 (Open circuit or short circuit of temperature sensor diagnosis and solution)

Description: If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED displays the failure code.

Recommended parts to prepare:

- Connection wires
- Sensors
- PCB

Troubleshooting and repair:



**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole. This picture and the value are only for reference, actual appearance and value may vary. For certain models, outdoor unit uses combination sensor (T3, T4 and TP are the same of sensor).

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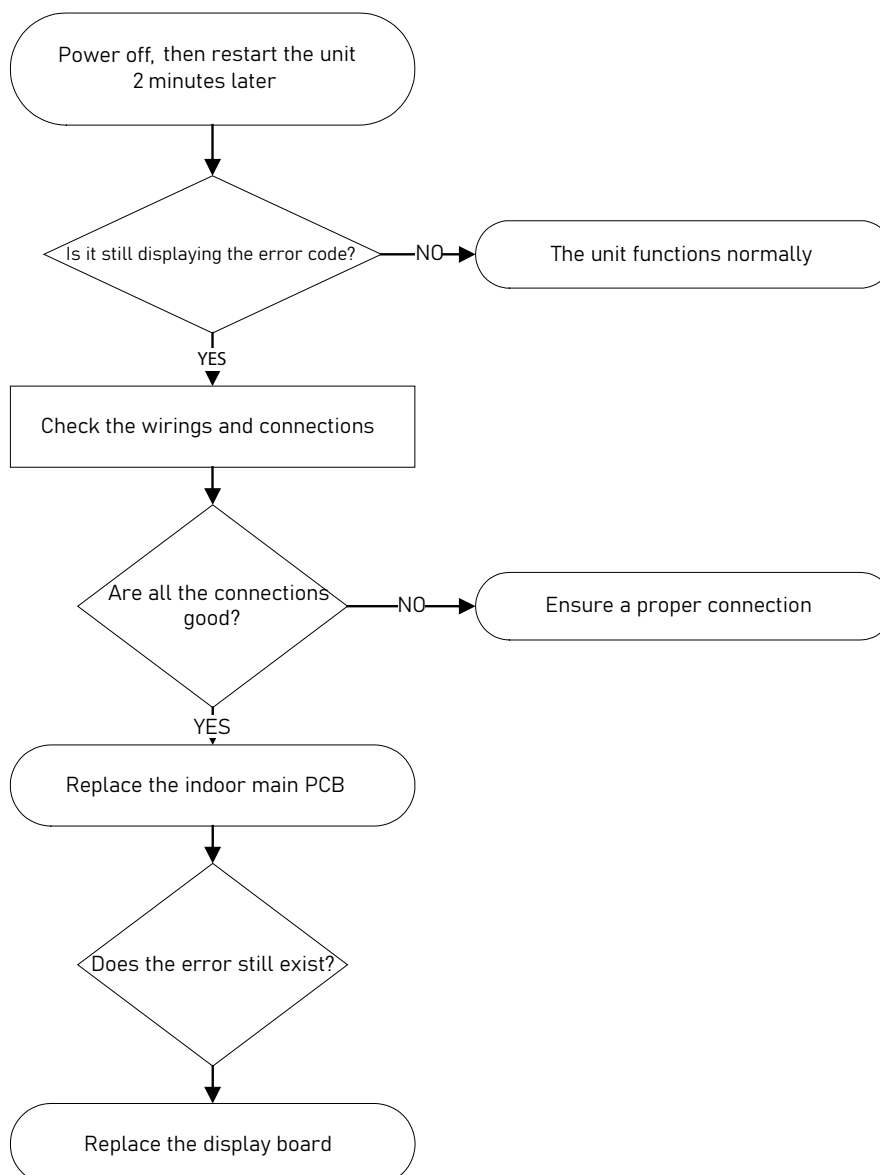
## 7.6 E7/EH 0b (Indoor PCB / Display board communication error diagnosis and solution)

Description: Indoor PCB does not receive feedback from the display board.

Recommended parts to prepare:

- Communication wire
- Indoor PCB
- Display board

Troubleshooting and repair :



## 7.7 EC/EL 0C (Refrigerant Leakage Detection diagnosis and solution)

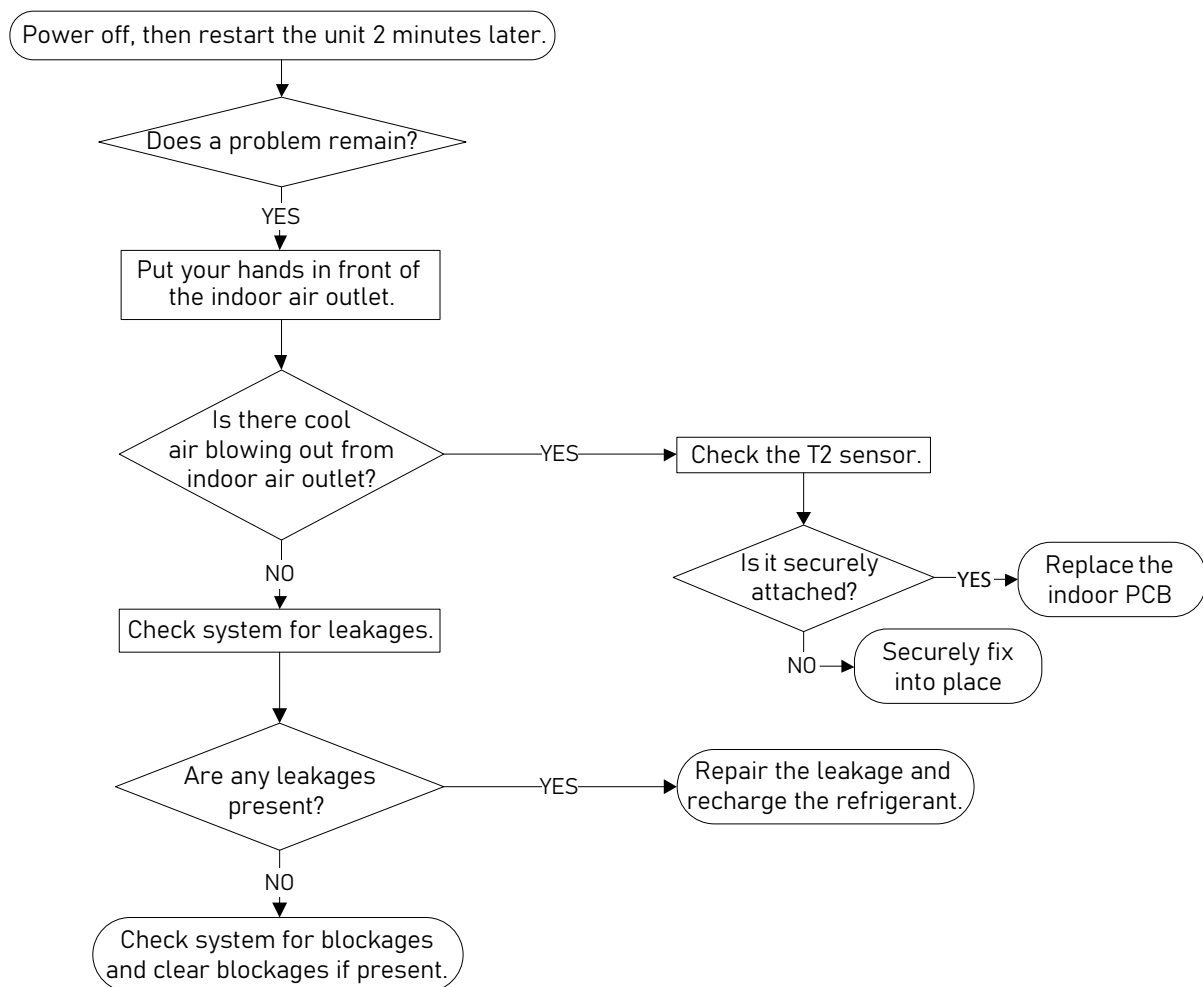
Description: Define the evaporator coil temperature T2 of the compressor just starts running as Tcool.

In the first 5 minutes after the compressor starts up, if  $T2 < T_{cool} - 1^{\circ}\text{C} (1.8^{\circ}\text{F})$  does not keep continuous 4 seconds and compressor running frequency higher than 50Hz does not keep for 3 minutes, and this situation happens 3 times, the LED displays the failure code and the AC turns off.

Recommended parts to prepare:

- T2 sensor
- Indoor PCB
- Additional refrigerant

Troubleshooting and repair :



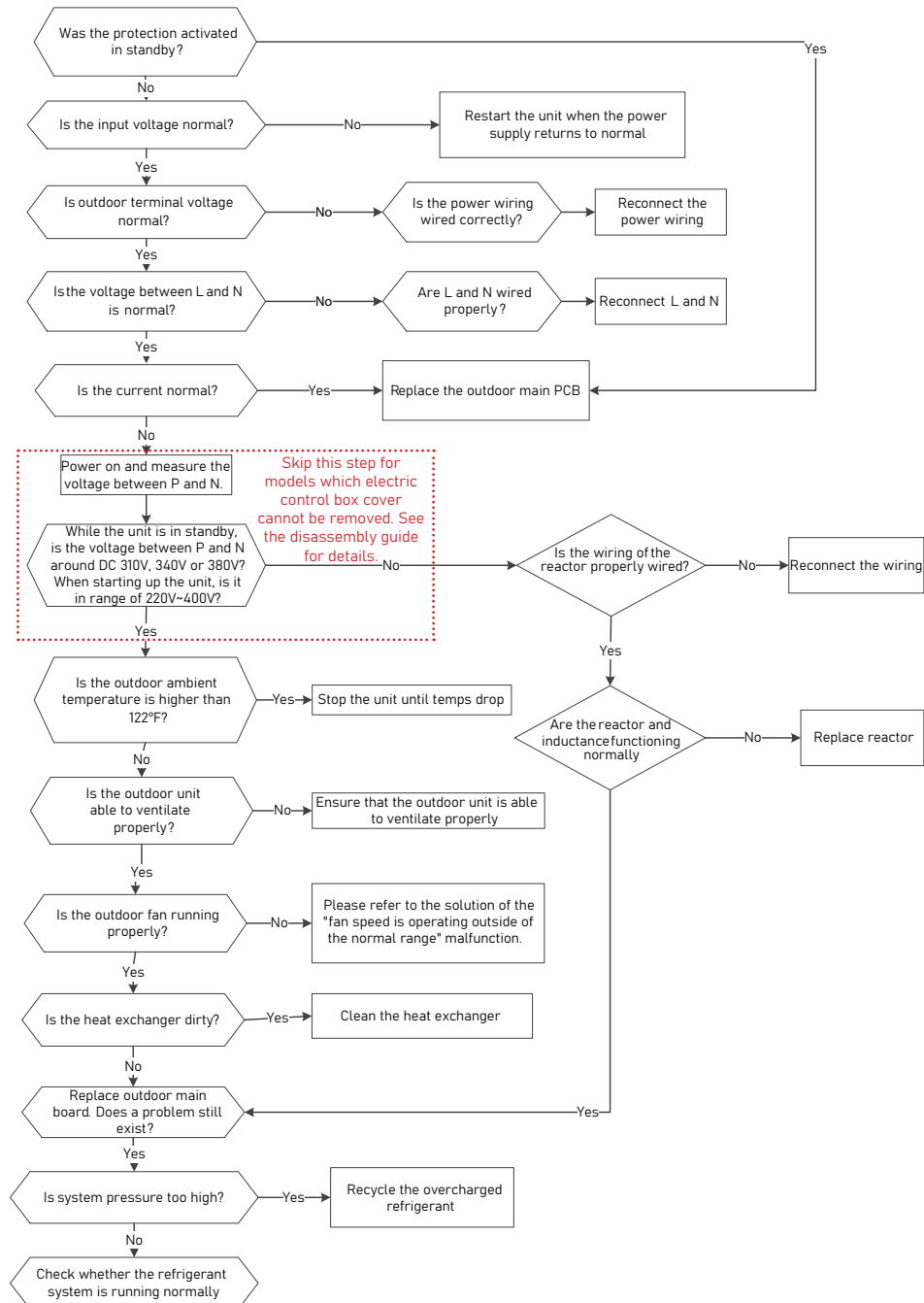
## 7.8 F0/PC 08 (Current overload protection diagnosis and solution)

Description: An abnormal current rise is detected by checking the specified current detection circuit.

Recommended parts to prepare:

- Connection wires
- Reactor
- Outdoor fan
- Outdoor PCB

Troubleshooting and repair :



**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

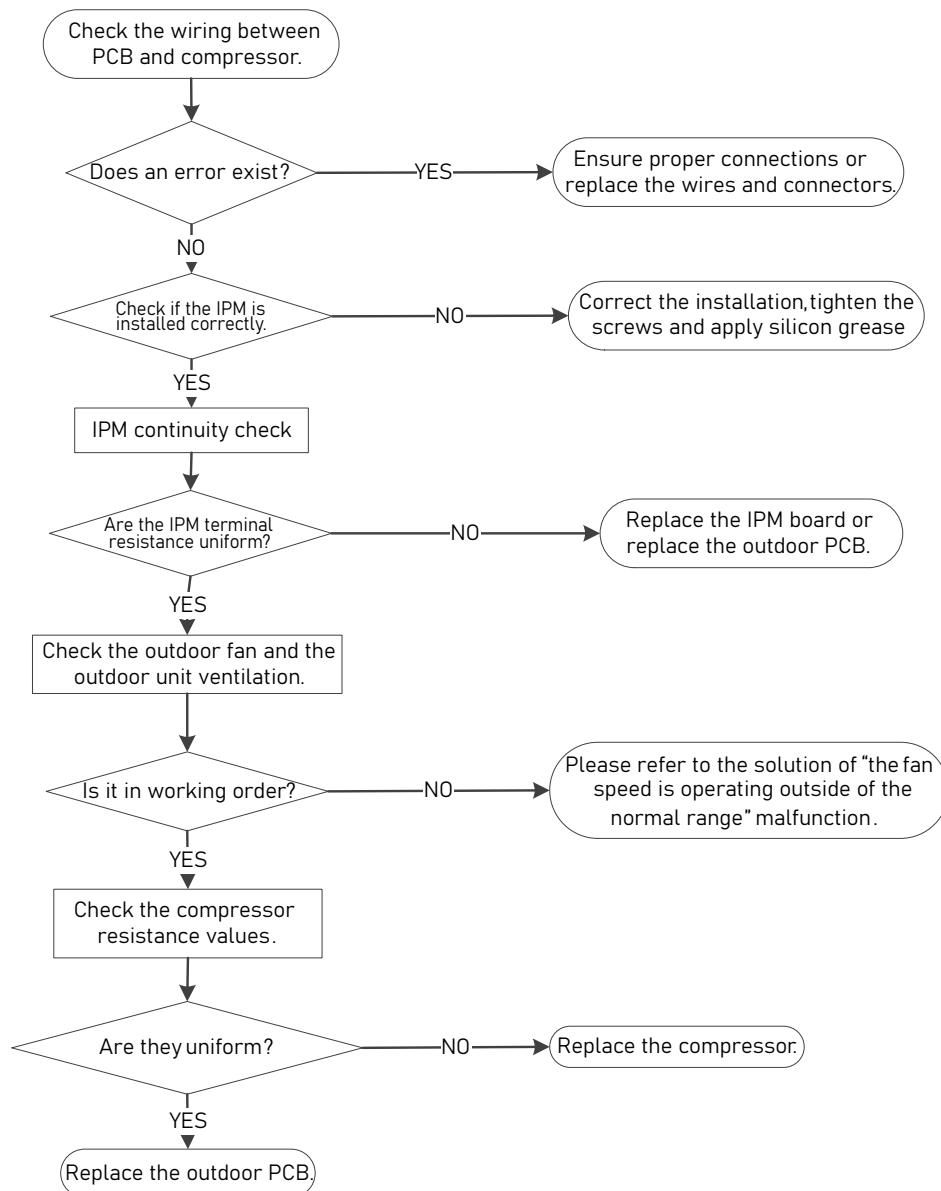
## 7.9 P0/PC 00(IPM malfunction or IGBT over-strong current protection diagnosis and solution)

Description: When the voltage signal the IPM sends to the compressor drive chip is abnormal, the LED displays the failure code and the AC turns off.

Recommended parts to prepare:

- Connection wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

Troubleshooting and repair:



**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

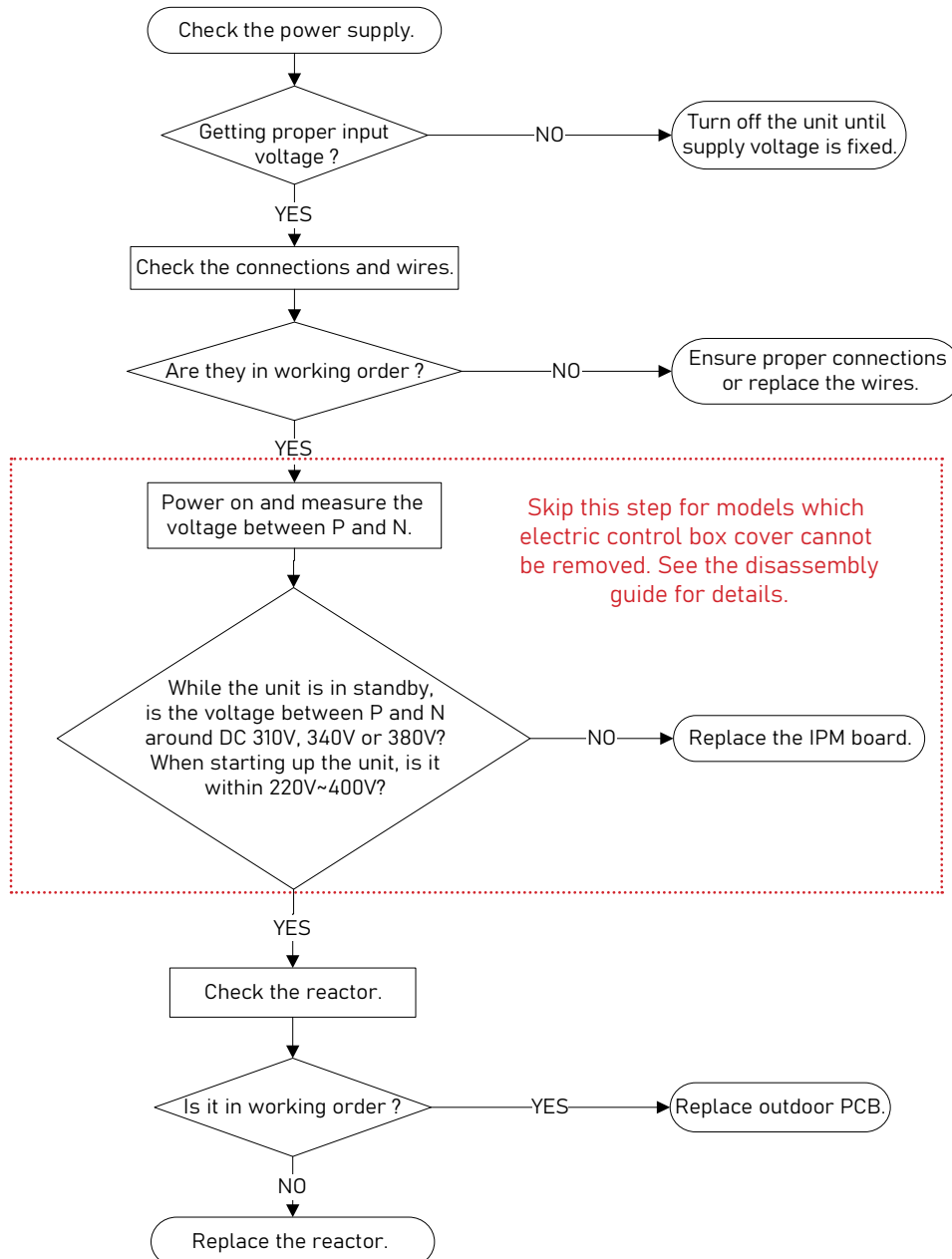
## 7.10 P1/PC 01(Over voltage or too low voltage protection diagnosis and solution)

Description: Abnormal increases or decreases in voltage are detected by the specified voltage detection circuit.

Recommended parts to prepare:

- Power supply wires
- IPM module board
- PCB
- Reactor

Troubleshooting and repair:



**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

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## 7.11 P2/PC 02(High temperature protection of IPM module or High pressure protection diagnosis and solution)

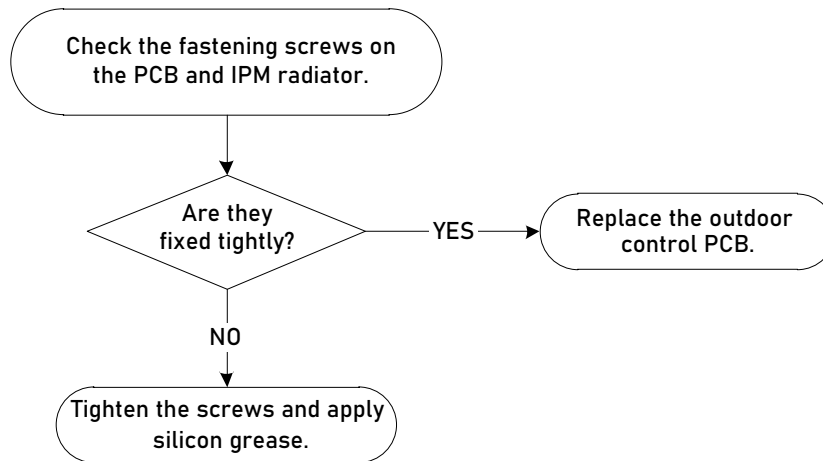
Description: If the temperature of IPM module is higher than a certain value, the LED displays the failure code.

For some models with high pressure switch, outdoor pressure switch cut off the system because high pressure is higher than 638 PSI, and then the LED displays the failure code.

Recommended parts to prepare:

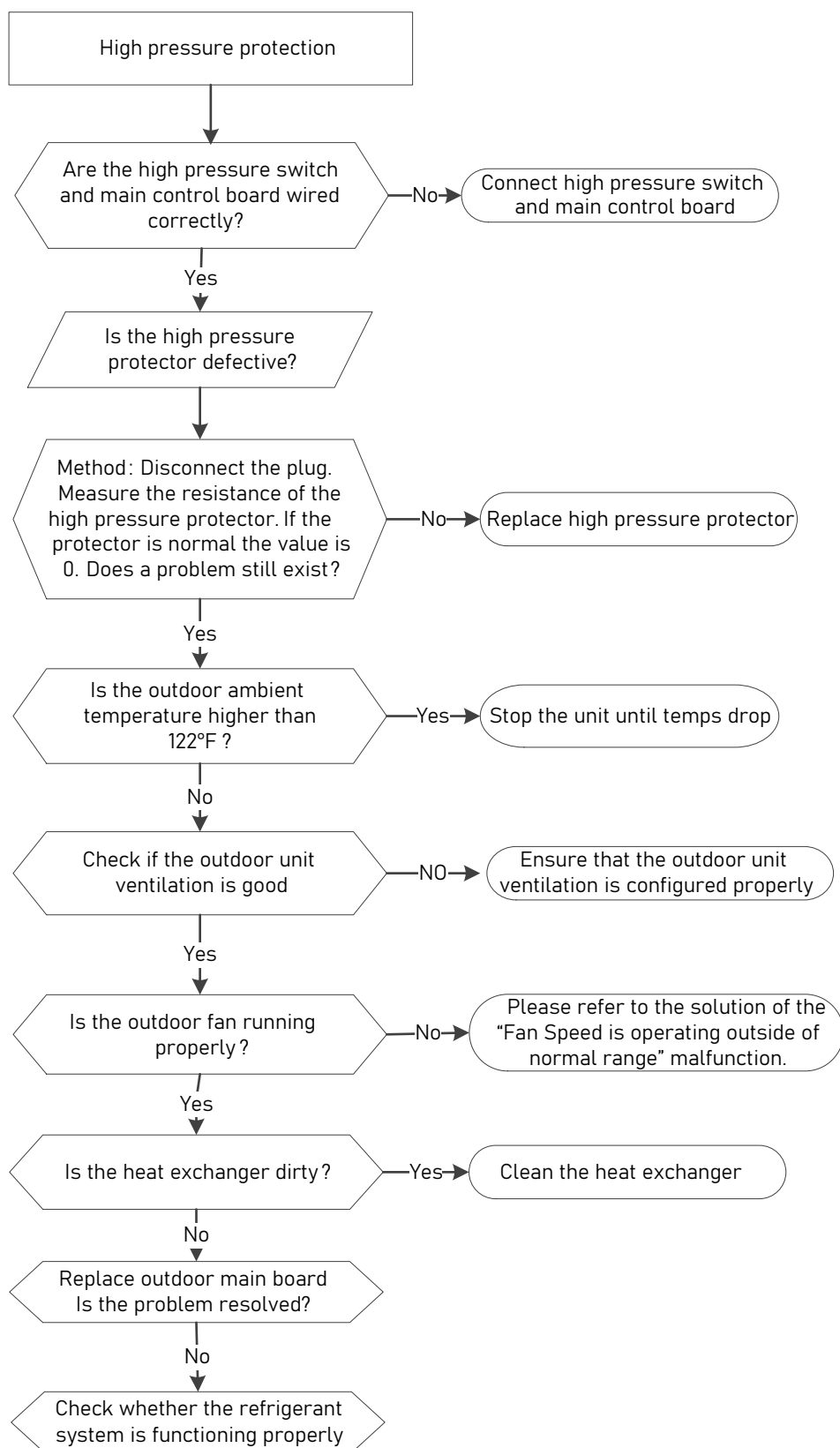
- Connection wires
- Outdoor PCB
- IPM module board
- High pressure protector
- System blockages

Troubleshooting and repair:



(continued on next page)

**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.



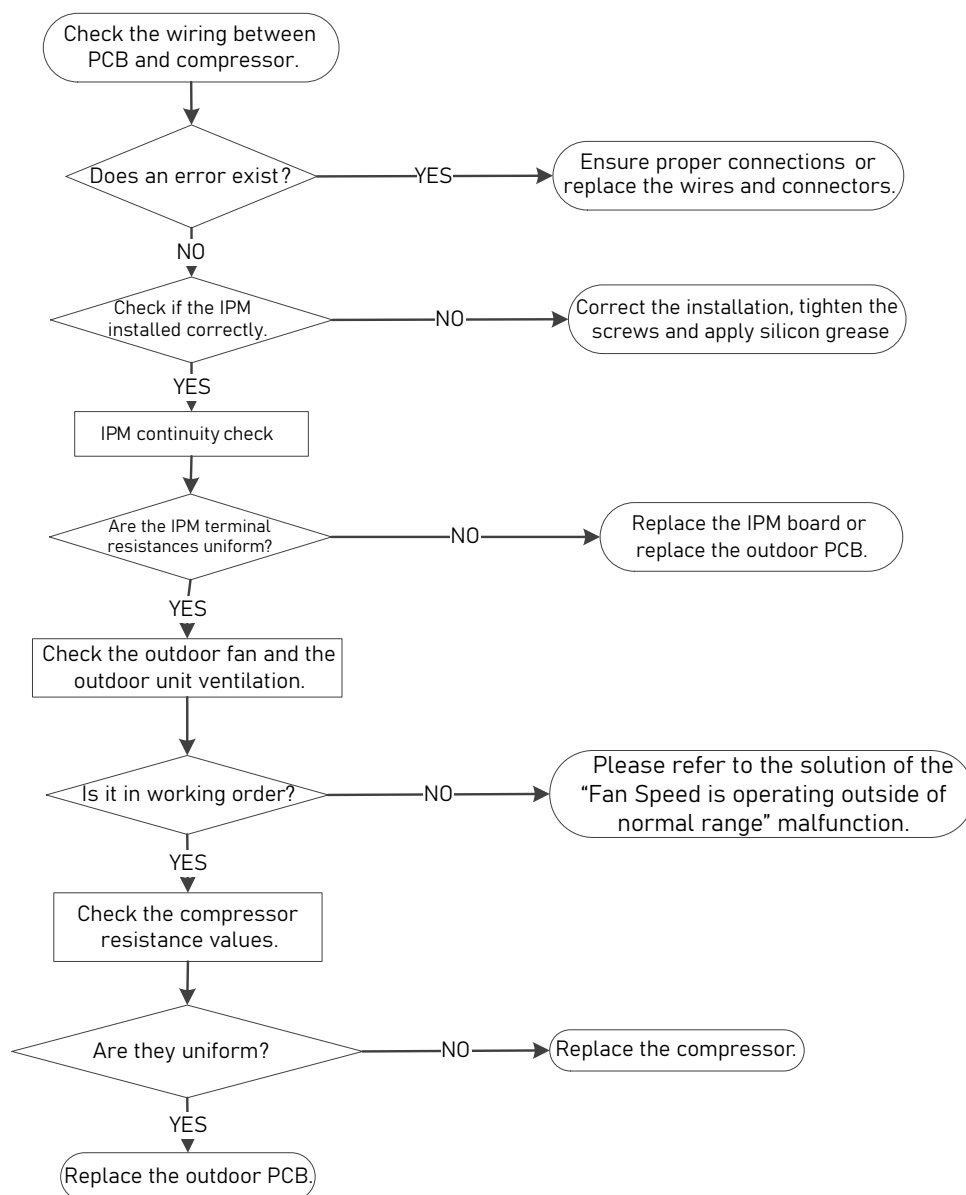
## 7.12 P4/PC 04(Inverter compressor drive error diagnosis and solution)

Description: An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on.

Recommended parts to prepare:

- Connection wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

Troubleshooting and repair:



**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

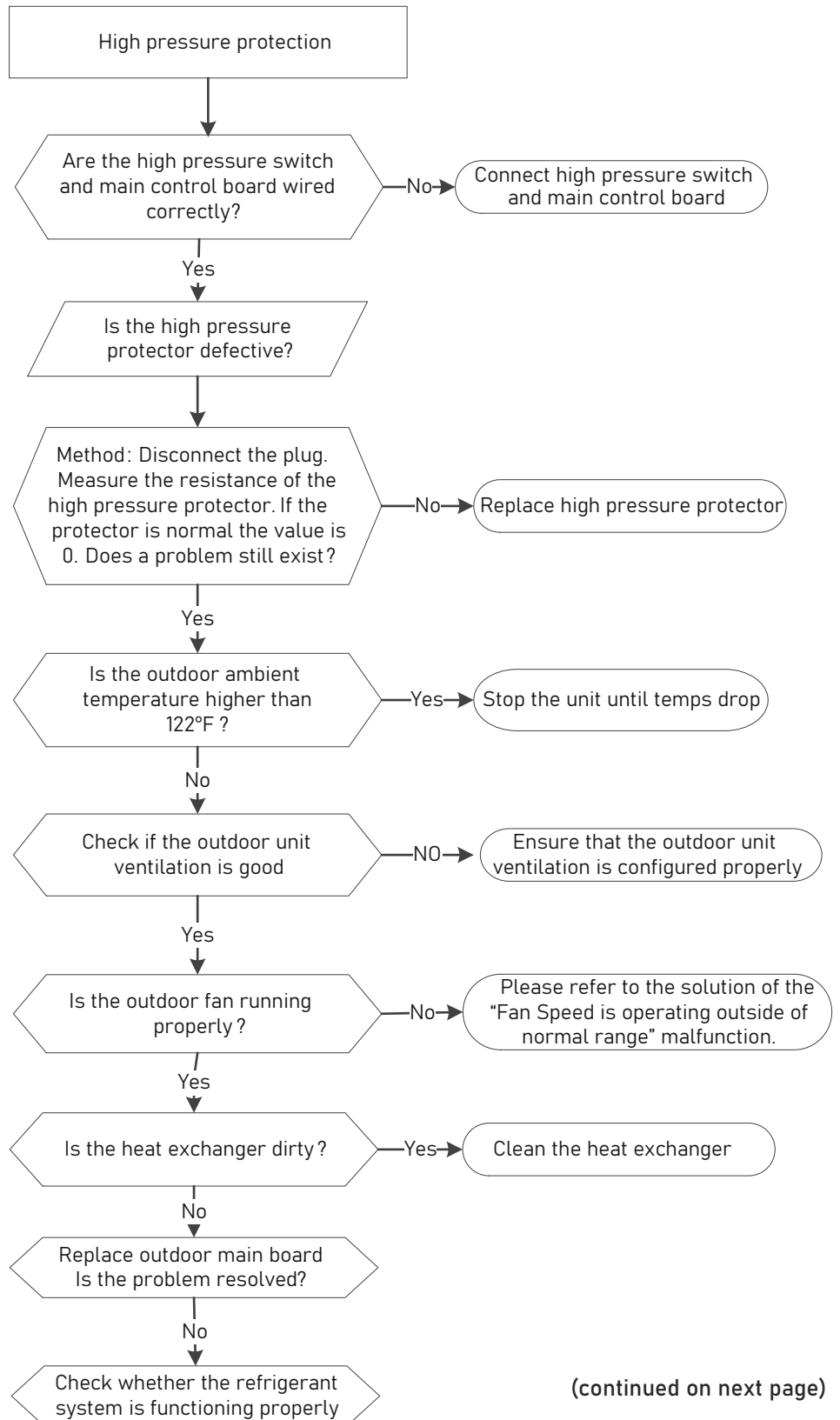
### 7.13 P6/PC 03(High pressure protection or Low pressure protection diagnosis and solution)

Description: Outdoor pressure switch cut off the system because high pressure is higher than 638 PSI or outdoor pressure switch cut off the system because low pressure is lower than 19 PSI, the LED displays the failure code.

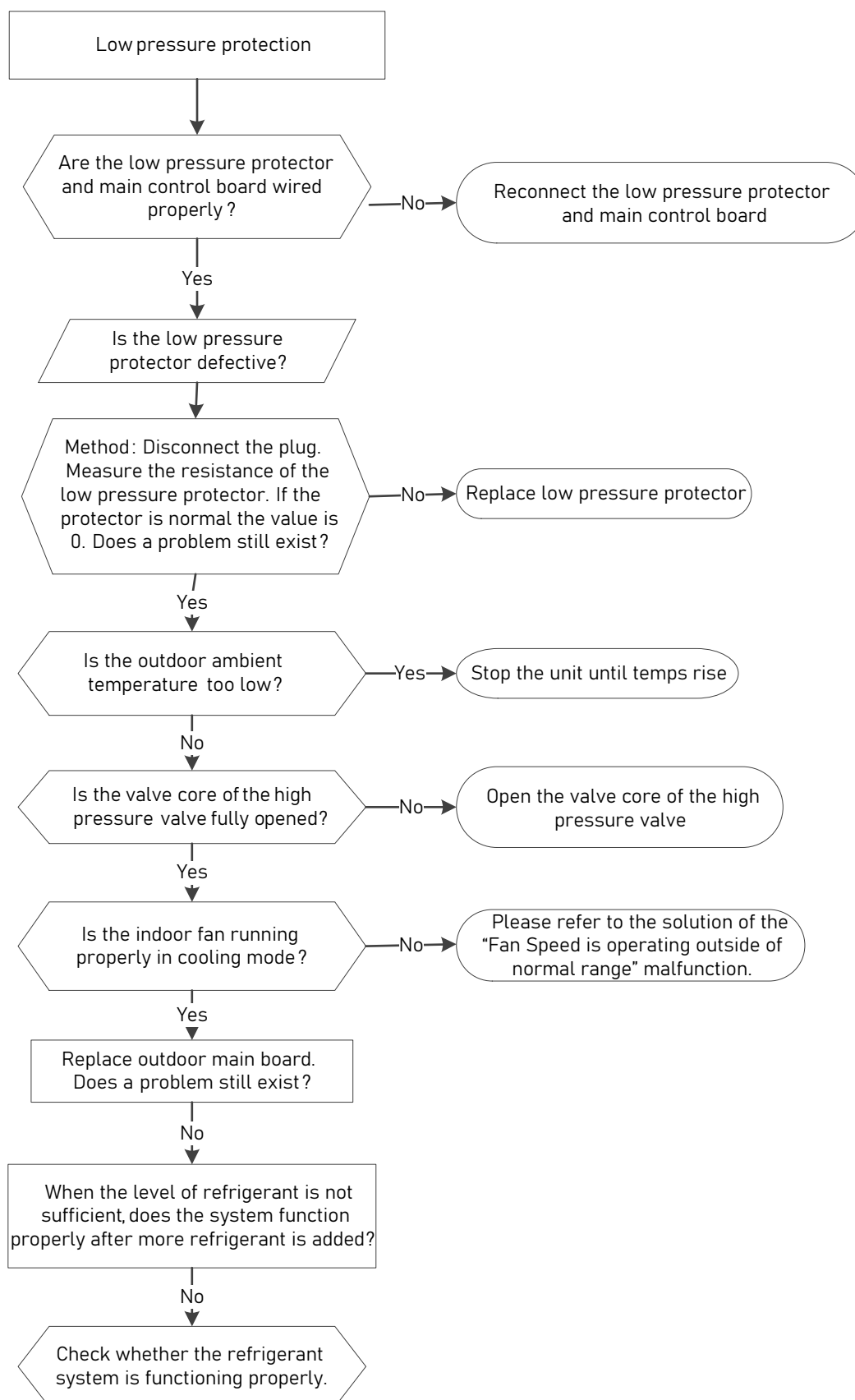
Recommended parts to prepare:

- Connection wires
- Outdoor PCB
- Refrigerant
- Pressure switch
- Outdoor fan

Troubleshooting and repair:



(continued on next page)



**Note:** For certain models, outdoor PCB cannot be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

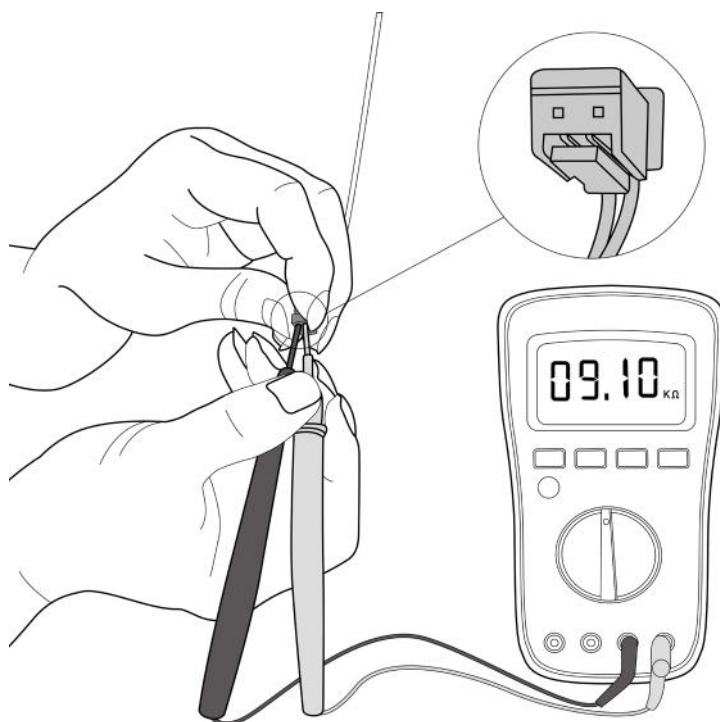
## 8. Check Procedures

### 8.1 Temperature Sensor Check

#### WARNING

**Be sure to turn off all power supplies or disconnect all wires to avoid electric shock.  
Operate after compressor and coil have returned to normal temperature to avoid risk of injury.**

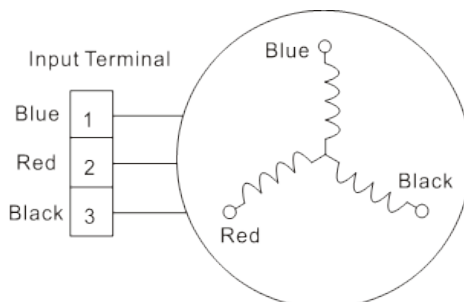
1. Disconnect the temperature sensor from PCB (Refer to Chapter 5 & 6, "Indoor & Outdoor Unit Disassembly").
2. Measure the resistance value of the sensor using a multi-meter.
3. Check corresponding temperature sensor resistance value table (Refer to Chapter 8. Appendix).



**Note: The picture and the value are only for reference, actual condition and specific value may vary.**

### 8.2 Compressor Check

1. Disconnect the compressor power cord from outdoor PCB (Refer to Chapter 6, "Outdoor Unit Disassembly").
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.



| Resistance Value | KSK103D33UEZ3 | KSN98D64UFZ3 | KSN140D21UFZ | KTM240D43UKT | KTF250D22UMT | KSN140D58UFZ |
|------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Blue-Red         | 2.13Ω         | 2.75Ω        | 1.28Ω        | 1.03Ω        | 0.75Ω        | 1.86Ω        |
| Blue-Black       |               |              |              |              |              |              |
| Red-Black        |               |              |              |              |              |              |

### Reference Table for Outdoor Condensing Unit Compressor Models

|               |                |                |
|---------------|----------------|----------------|
| KSK103D33UEZ3 | YN009AMFI22RPE | YN009GMFI22RPE |
|               | YN012AMFI22RPE | YN012GMFI22RPE |
|               | YN009AMFI20RPD | YN009GMFI20RPD |
| KSN98D64UFZ3  | YN012AMFI20RPD | YN012GMFI20RPD |
| KSN140D21UFZ  | YN018GMFI20RPD |                |
| KTM240D43UKT  | YN024GMFI20RPD | YN024GMFI22RPE |
| KTF250D22UMT  | YN030GMFI20RPD | YN036GMFI20RPD |
| KSN140D58UFZ  | YN018GMFI22RPD |                |

Use the above compressor values to confirm proper resistance values between compressor windings.

The integrity of the compressor should also be examined by testing each winding individually to ground. These should read 0 or OL (Open Line) to confirm the compressor has continuity and not been grounded.



**Note:** The picture and the value are only for reference, actual condition and specific value may vary.

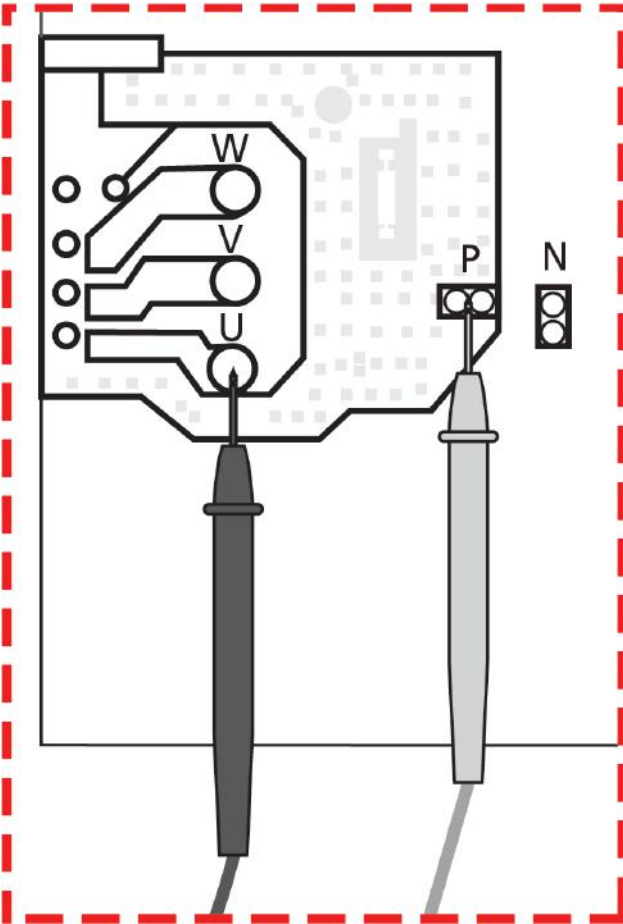
8.3 IPM Continuity Check

 **WARNING**

Electricity remains in capacitors even when the power supply is off.  
Ensure the capacitors are fully discharged before troubleshooting.

- 1. Turn off outdoor unit and disconnect power supply.
- 2. Discharge electrolytic capacitors and ensure all energy-storage unit has been discharged.
- 3. Disassemble outdoor PCB or disassemble IPM board.
- 4. Measure the resistance value between P and U(V, W, N); U(V, W) and N.

| Digital tester |          | Resistance value             | Digital tester |          | Resistance value             |
|----------------|----------|------------------------------|----------------|----------|------------------------------|
| (+)Red         | (-)Black | $\infty$<br><br>(Several MΩ) | (+)Red         | (-)Black | $\infty$<br><br>(Several MΩ) |
| P              | N        |                              | U              | N        |                              |
|                | U        |                              | V              |          |                              |
|                | V        |                              | W              |          |                              |
|                | W        |                              | -              |          |                              |

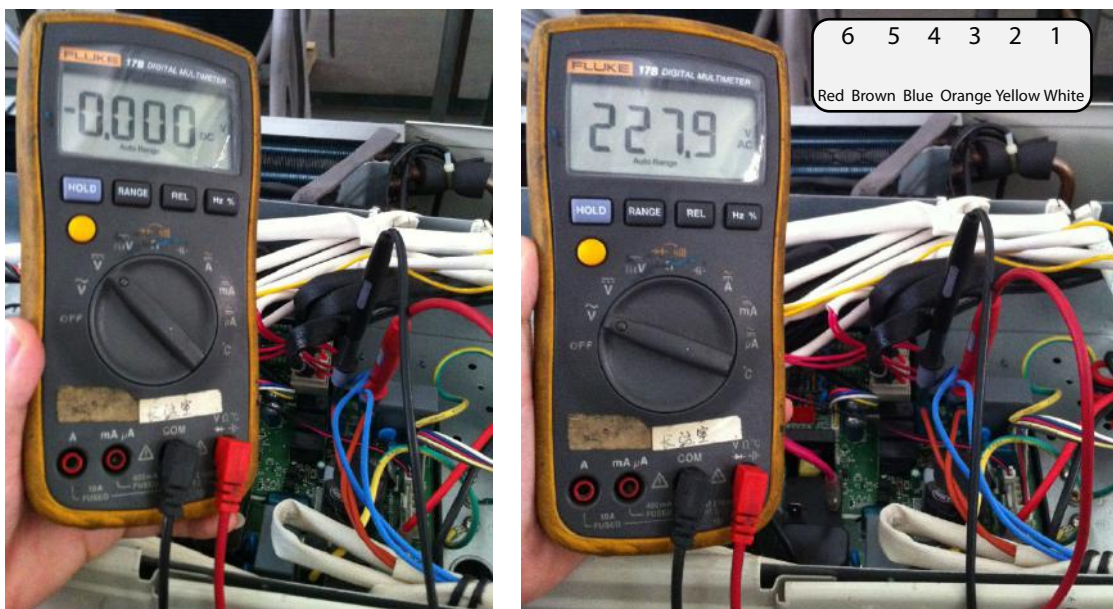


Note: The picture and the value are only for reference, actual condition and specific value may vary.

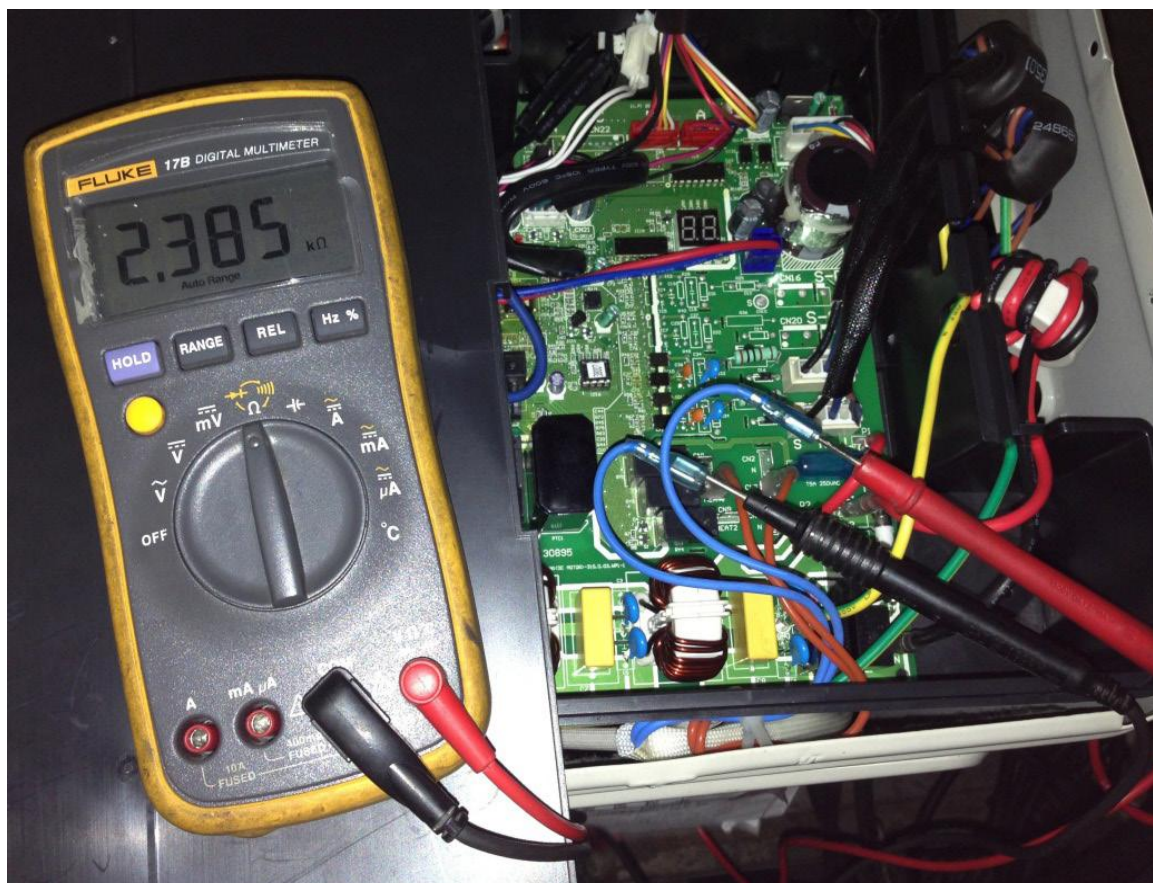
## 8.5 4-way Valve Check

1. Power on the system, and use a digital tester to measure the voltage. When the unit operates in cooling, it is 0V. When the unit operates in heating, it is about 230VAC.

If the value of the voltage is not in the range, the PCB has faulted and needs to be replaced.



2. Turn off the power, and use a digital tester to measure the valve's resistance. The value should be 1.8~2.5 K $\Omega$ .

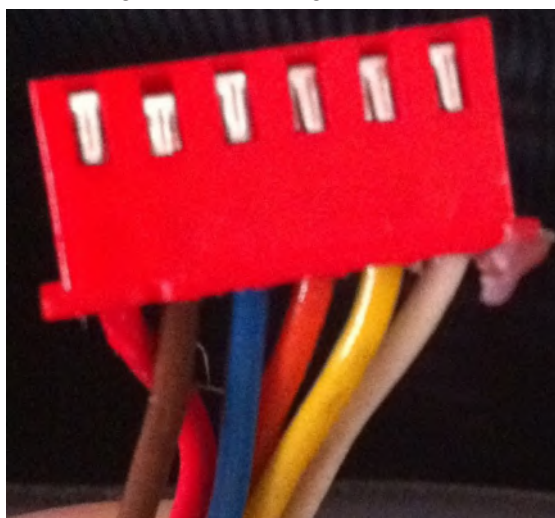


## 8.6 EEV Check

### WARNING

**Electricity remains in capacitors even when the power supply is off.  
Ensure the capacitors are fully discharged before troubleshooting.**

1. Disconnect the connector from outdoor PCB.
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.



| Color of lead winding | Normal Value |
|-----------------------|--------------|
| Red - Blue            | About 50Ω    |
| Red - Yellow          |              |
| Brown - Orange        |              |
| Brown - White         |              |

| Color of lead winding | Normal Value |
|-----------------------|--------------|
| Blue - Orange         | About 50Ω    |
| Blue - Yellow         |              |
| Gray - Red            |              |
| Gray - Black          |              |

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# Appendix

## Contents

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## i) Temperature Sensor Resistance Value Table for T1,T2,T3 and T4 (°C – °F – K)

| °C  | °F | K Ohm   | °C | °F  | K Ohm   | °C | °F  | K Ohm   | °C  | °F  | K Ohm   |
|-----|----|---------|----|-----|---------|----|-----|---------|-----|-----|---------|
| -20 | -4 | 115.266 | 20 | 68  | 12.6431 | 60 | 140 | 2.35774 | 100 | 212 | 0.62973 |
| -19 | -2 | 108.146 | 21 | 70  | 12.0561 | 61 | 142 | 2.27249 | 101 | 214 | 0.61148 |
| -18 | 0  | 101.517 | 22 | 72  | 11.5    | 62 | 144 | 2.19073 | 102 | 216 | 0.59386 |
| -17 | 1  | 96.3423 | 23 | 73  | 10.9731 | 63 | 145 | 2.11241 | 103 | 217 | 0.57683 |
| -16 | 3  | 89.5865 | 24 | 75  | 10.4736 | 64 | 147 | 2.03732 | 104 | 219 | 0.56038 |
| -15 | 5  | 84.219  | 25 | 77  | 10      | 65 | 149 | 1.96532 | 105 | 221 | 0.54448 |
| -14 | 7  | 79.311  | 26 | 79  | 9.55074 | 66 | 151 | 1.89627 | 106 | 223 | 0.52912 |
| -13 | 9  | 74.536  | 27 | 81  | 9.12445 | 67 | 153 | 1.83003 | 107 | 225 | 0.51426 |
| -12 | 10 | 70.1698 | 28 | 82  | 8.71983 | 68 | 154 | 1.76647 | 108 | 226 | 0.49989 |
| -11 | 12 | 66.0898 | 29 | 84  | 8.33566 | 69 | 156 | 1.70547 | 109 | 228 | 0.486   |
| -10 | 14 | 62.2756 | 30 | 86  | 7.97078 | 70 | 158 | 1.64691 | 110 | 230 | 0.47256 |
| -9  | 16 | 58.7079 | 31 | 88  | 7.62411 | 71 | 160 | 1.59068 | 111 | 232 | 0.45957 |
| -8  | 18 | 56.3694 | 32 | 90  | 7.29464 | 72 | 162 | 1.53668 | 112 | 234 | 0.44699 |
| -7  | 19 | 52.2438 | 33 | 91  | 6.98142 | 73 | 163 | 1.48481 | 113 | 235 | 0.43482 |
| -6  | 21 | 49.3161 | 34 | 93  | 6.68355 | 74 | 165 | 1.43498 | 114 | 237 | 0.42304 |
| -5  | 23 | 46.5725 | 35 | 95  | 6.40021 | 75 | 167 | 1.38703 | 115 | 239 | 0.41164 |
| -4  | 25 | 44      | 36 | 97  | 6.13059 | 76 | 169 | 1.34105 | 116 | 241 | 0.4006  |
| -3  | 27 | 41.5878 | 37 | 99  | 5.87359 | 77 | 171 | 1.29078 | 117 | 243 | 0.38991 |
| -2  | 28 | 39.8239 | 38 | 100 | 5.62961 | 78 | 172 | 1.25423 | 118 | 244 | 0.37956 |
| -1  | 30 | 37.1988 | 39 | 102 | 5.39689 | 79 | 174 | 1.2133  | 119 | 246 | 0.36954 |
| 0   | 32 | 35.2024 | 40 | 104 | 5.17519 | 80 | 176 | 1.17393 | 120 | 248 | 0.35982 |
| 1   | 34 | 33.3269 | 41 | 106 | 4.96392 | 81 | 178 | 1.13604 | 121 | 250 | 0.35042 |
| 2   | 36 | 31.5635 | 42 | 108 | 4.76253 | 82 | 180 | 1.09958 | 122 | 252 | 0.3413  |
| 3   | 37 | 29.9058 | 43 | 109 | 4.5705  | 83 | 181 | 1.06448 | 123 | 253 | 0.33246 |
| 4   | 39 | 28.3459 | 44 | 111 | 4.38736 | 84 | 183 | 1.03069 | 124 | 255 | 0.3239  |
| 5   | 41 | 26.8778 | 45 | 113 | 4.21263 | 85 | 185 | 0.99815 | 125 | 257 | 0.31559 |
| 6   | 43 | 25.4954 | 46 | 115 | 4.04589 | 86 | 187 | 0.96681 | 126 | 259 | 0.30754 |
| 7   | 45 | 24.1932 | 47 | 117 | 3.88673 | 87 | 189 | 0.93662 | 127 | 261 | 0.29974 |
| 8   | 46 | 22.5662 | 48 | 118 | 3.73476 | 88 | 190 | 0.90753 | 128 | 262 | 0.29216 |
| 9   | 48 | 21.8094 | 49 | 120 | 3.58962 | 89 | 192 | 0.8795  | 129 | 264 | 0.28482 |
| 10  | 50 | 20.7184 | 50 | 122 | 3.45097 | 90 | 194 | 0.85248 | 130 | 266 | 0.2777  |
| 11  | 52 | 19.6891 | 51 | 124 | 3.31847 | 91 | 196 | 0.82643 | 131 | 268 | 0.27078 |
| 12  | 54 | 18.7177 | 52 | 126 | 3.19183 | 92 | 198 | 0.80132 | 132 | 270 | 0.26408 |
| 13  | 55 | 17.8005 | 53 | 127 | 3.07075 | 93 | 199 | 0.77709 | 133 | 271 | 0.25757 |
| 14  | 57 | 16.9341 | 54 | 129 | 2.95896 | 94 | 201 | 0.75373 | 134 | 273 | 0.25125 |
| 15  | 59 | 16.1156 | 55 | 131 | 2.84421 | 95 | 203 | 0.73119 | 135 | 275 | 0.24512 |
| 16  | 61 | 15.3418 | 56 | 133 | 2.73823 | 96 | 205 | 0.70944 | 136 | 277 | 0.23916 |
| 17  | 63 | 14.6181 | 57 | 135 | 2.63682 | 97 | 207 | 0.68844 | 137 | 279 | 0.23338 |
| 18  | 64 | 13.918  | 58 | 136 | 2.53973 | 98 | 208 | 0.66818 | 138 | 280 | 0.22776 |
| 19  | 66 | 13.2631 | 59 | 138 | 2.44677 | 99 | 210 | 0.64862 | 139 | 282 | 0.22231 |

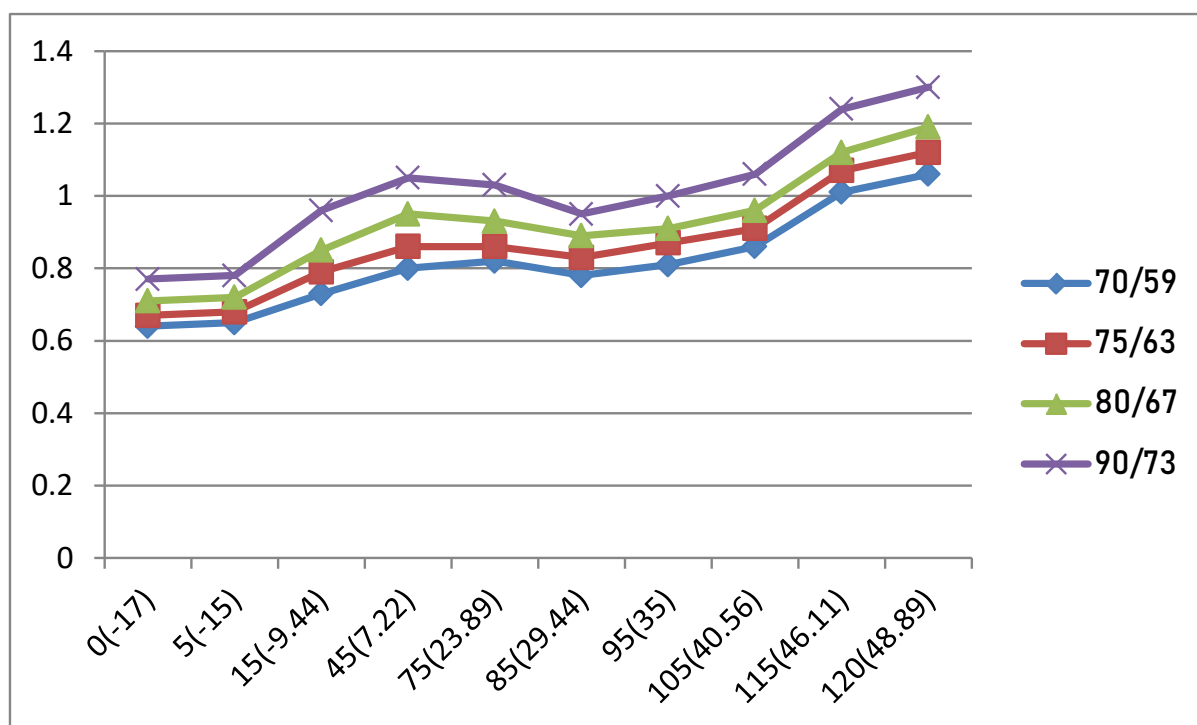
## ii) Temperature Sensor Resistance Value Table for TP(for some units) (°C - °F - K)

| °C  | °F | K Ohm | °C | °F  | K Ohm | °C | °F  | K Ohm | °C  | °F  | K Ohm |
|-----|----|-------|----|-----|-------|----|-----|-------|-----|-----|-------|
| -20 | -4 | 542.7 | 20 | 68  | 68.66 | 60 | 140 | 13.59 | 100 | 212 | 3.702 |
| -19 | -2 | 511.9 | 21 | 70  | 65.62 | 61 | 142 | 13.11 | 101 | 214 | 3.595 |
| -18 | 0  | 483   | 22 | 72  | 62.73 | 62 | 144 | 12.65 | 102 | 216 | 3.492 |
| -17 | 1  | 455.9 | 23 | 73  | 59.98 | 63 | 145 | 12.21 | 103 | 217 | 3.392 |
| -16 | 3  | 430.5 | 24 | 75  | 57.37 | 64 | 147 | 11.79 | 104 | 219 | 3.296 |
| -15 | 5  | 406.7 | 25 | 77  | 54.89 | 65 | 149 | 11.38 | 105 | 221 | 3.203 |
| -14 | 7  | 384.3 | 26 | 79  | 52.53 | 66 | 151 | 10.99 | 106 | 223 | 3.113 |
| -13 | 9  | 363.3 | 27 | 81  | 50.28 | 67 | 153 | 10.61 | 107 | 225 | 3.025 |
| -12 | 10 | 343.6 | 28 | 82  | 48.14 | 68 | 154 | 10.25 | 108 | 226 | 2.941 |
| -11 | 12 | 325.1 | 29 | 84  | 46.11 | 69 | 156 | 9.902 | 109 | 228 | 2.86  |
| -10 | 14 | 307.7 | 30 | 86  | 44.17 | 70 | 158 | 9.569 | 110 | 230 | 2.781 |
| -9  | 16 | 291.3 | 31 | 88  | 42.33 | 71 | 160 | 9.248 | 111 | 232 | 2.704 |
| -8  | 18 | 275.9 | 32 | 90  | 40.57 | 72 | 162 | 8.94  | 112 | 234 | 2.63  |
| -7  | 19 | 261.4 | 33 | 91  | 38.89 | 73 | 163 | 8.643 | 113 | 235 | 2.559 |
| -6  | 21 | 247.8 | 34 | 93  | 37.3  | 74 | 165 | 8.358 | 114 | 237 | 2.489 |
| -5  | 23 | 234.9 | 35 | 95  | 35.78 | 75 | 167 | 8.084 | 115 | 239 | 2.422 |
| -4  | 25 | 222.8 | 36 | 97  | 34.32 | 76 | 169 | 7.82  | 116 | 241 | 2.357 |
| -3  | 27 | 211.4 | 37 | 99  | 32.94 | 77 | 171 | 7.566 | 117 | 243 | 2.294 |
| -2  | 28 | 200.7 | 38 | 100 | 31.62 | 78 | 172 | 7.321 | 118 | 244 | 2.233 |
| -1  | 30 | 190.5 | 39 | 102 | 30.36 | 79 | 174 | 7.086 | 119 | 246 | 2.174 |
| 0   | 32 | 180.9 | 40 | 104 | 29.15 | 80 | 176 | 6.859 | 120 | 248 | 2.117 |
| 1   | 34 | 171.9 | 41 | 106 | 28    | 81 | 178 | 6.641 | 121 | 250 | 2.061 |
| 2   | 36 | 163.3 | 42 | 108 | 26.9  | 82 | 180 | 6.43  | 122 | 252 | 2.007 |
| 3   | 37 | 155.2 | 43 | 109 | 25.86 | 83 | 181 | 6.228 | 123 | 253 | 1.955 |
| 4   | 39 | 147.6 | 44 | 111 | 24.85 | 84 | 183 | 6.033 | 124 | 255 | 1.905 |
| 5   | 41 | 140.4 | 45 | 113 | 23.89 | 85 | 185 | 5.844 | 125 | 257 | 1.856 |
| 6   | 43 | 133.5 | 46 | 115 | 22.89 | 86 | 187 | 5.663 | 126 | 259 | 1.808 |
| 7   | 45 | 127.1 | 47 | 117 | 22.1  | 87 | 189 | 5.488 | 127 | 261 | 1.762 |
| 8   | 46 | 121   | 48 | 118 | 21.26 | 88 | 190 | 5.32  | 128 | 262 | 1.717 |
| 9   | 48 | 115.2 | 49 | 120 | 20.46 | 89 | 192 | 5.157 | 129 | 264 | 1.674 |
| 10  | 50 | 109.8 | 50 | 122 | 19.69 | 90 | 194 | 5     | 130 | 266 | 1.632 |
| 11  | 52 | 104.6 | 51 | 124 | 18.96 | 91 | 196 | 4.849 |     |     |       |
| 12  | 54 | 99.69 | 52 | 126 | 18.26 | 92 | 198 | 4.703 |     |     |       |
| 13  | 55 | 95.05 | 53 | 127 | 17.58 | 93 | 199 | 4.562 |     |     |       |
| 14  | 57 | 90.66 | 54 | 129 | 16.94 | 94 | 201 | 4.426 |     |     |       |
| 15  | 59 | 86.49 | 55 | 131 | 16.32 | 95 | 203 | 4.294 |     |     |       |
| 16  | 61 | 82.54 | 56 | 133 | 15.73 | 96 | 205 | 4.167 |     |     |       |
| 17  | 63 | 78.79 | 57 | 135 | 15.16 | 97 | 207 | 4.045 |     |     |       |
| 18  | 64 | 75.24 | 58 | 136 | 14.62 | 98 | 208 | 3.927 |     |     |       |
| 19  | 66 | 71.86 | 59 | 138 | 14.09 | 99 | 210 | 3.812 |     |     |       |

### iii) Pressure On Service Port

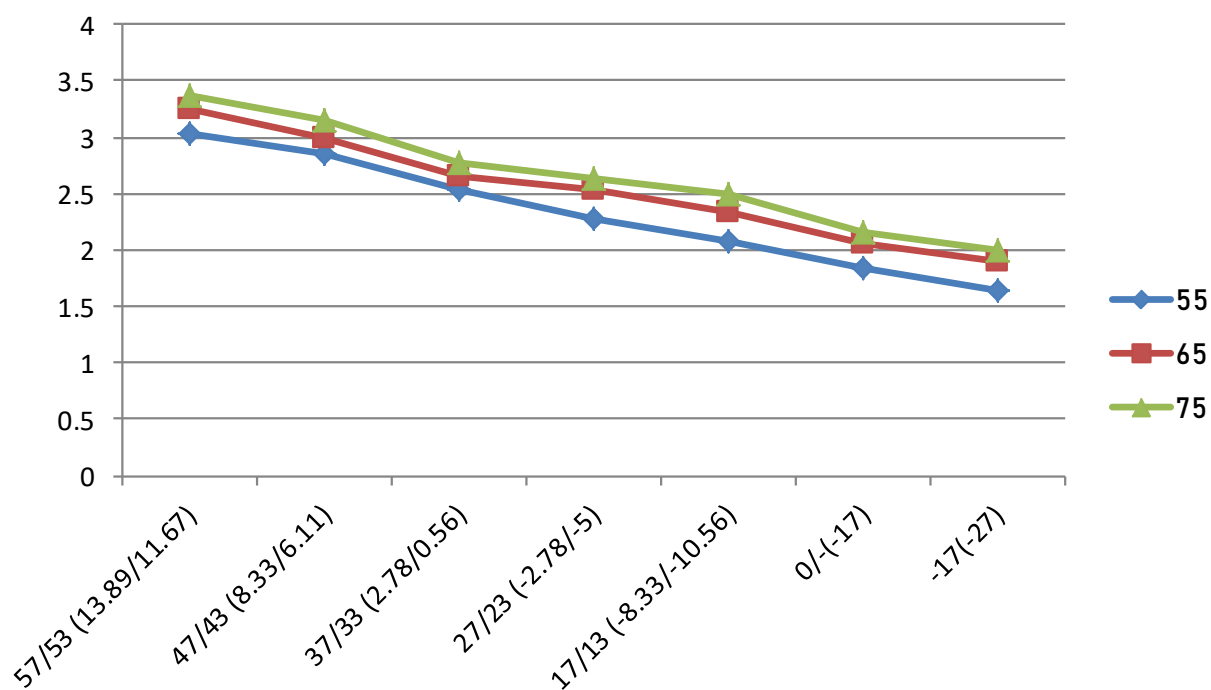
Cooling chart(R410A):

| °F(°C) | ODU(DB)<br>IDU(DB/WB) | 0(-17) | 5(-15) | 15<br>(-9.44) | 45<br>(7.22) | 75<br>(23.89) | 85<br>(29.44) | 95 (35) | 105<br>(40.56) | 115<br>(46.11) | 120<br>(48.89) |
|--------|-----------------------|--------|--------|---------------|--------------|---------------|---------------|---------|----------------|----------------|----------------|
|        |                       |        |        |               |              |               |               |         |                |                |                |
| BAR    | 70/59 (21.11/15)      | 6.4    | 6.5    | 7.3           | 8.0          | 8.2           | 7.8           | 8.1     | 8.6            | 10.1           | 10.6           |
|        | 75/63 (23.89/17.22)   | 6.7    | 6.8    | 7.9           | 8.6          | 8.6           | 8.3           | 8.7     | 9.1            | 10.7           | 11.2           |
|        | 80/67 (26.67/19.44)   | 7.1    | 7.2    | 8.5           | 9.5          | 9.3           | 8.9           | 9.1     | 9.6            | 11.2           | 11.9           |
|        | 90/73 (32.22/22.78)   | 7.7    | 7.8    | 9.6           | 10.5         | 10.3          | 9.5           | 10.0    | 10.6           | 12.4           | 13.0           |
| PSI    | 70/59 (21.11/15)      | 93     | 94     | 106           | 116          | 119           | 113           | 117     | 125            | 147            | 154            |
|        | 75/63 (23.89/17.22)   | 97     | 99     | 115           | 125          | 124           | 120           | 126     | 132            | 155            | 162            |
|        | 80/67 (26.67/19.44)   | 103    | 104    | 123           | 138          | 135           | 129           | 132     | 140            | 162            | 173            |
|        | 90/73 (32.22/22.78)   | 112    | 113    | 139           | 152          | 149           | 138           | 145     | 154            | 180            | 189            |
| MPa    | 70/59 (21.11/15)      | 0.64   | 0.65   | 0.73          | 0.8          | 0.82          | 0.78          | 0.81    | 0.86           | 1.01           | 1.06           |
|        | 75/63 (23.89/17.22)   | 0.67   | 0.68   | 0.79          | 0.86         | 0.86          | 0.83          | 0.87    | 0.91           | 1.07           | 1.12           |
|        | 80/67 (26.67/19.44)   | 0.71   | 0.72   | 0.85          | 0.95         | 0.93          | 0.89          | 0.91    | 0.96           | 1.12           | 1.19           |
|        | 90/73 (32.22/22.78)   | 0.77   | 0.78   | 0.96          | 1.05         | 1.03          | 0.95          | 1       | 1.06           | 1.24           | 1.3            |



## Heating chart (R410A) :

| °F(°C) | ODU(DB/WB) | 57/53<br>(13.89/11.67) | 47/43<br>(8.33/6.11) | 37/33<br>(2.78/0.56) | 27/23<br>(-2.78/-5) | 17/13<br>(-8.33/-10.56) | 0/-2<br>(-17/-19) | -17/-18<br>(-27/-28) |
|--------|------------|------------------------|----------------------|----------------------|---------------------|-------------------------|-------------------|----------------------|
|        | IDU(DB)    |                        |                      |                      |                     |                         |                   |                      |
| BAR    | 55(12.78)  | 30.3                   | 28.5                 | 25.3                 | 22.8                | 20.8                    | 18.5              | 16.5                 |
|        | 65(18.33)  | 32.5                   | 30.0                 | 26.6                 | 25.4                | 23.3                    | 20.5              | 19.0                 |
|        | 75(23.89)  | 33.8                   | 31.5                 | 27.8                 | 26.3                | 24.9                    | 21.5              | 20.0                 |
| PSI    | 55(12.78)  | 439                    | 413                  | 367                  | 330                 | 302                     | 268               | 239                  |
|        | 65(18.33)  | 471                    | 435                  | 386                  | 368                 | 339                     | 297               | 276                  |
|        | 75(23.89)  | 489                    | 457                  | 403                  | 381                 | 362                     | 312               | 290                  |
| MPa    | 55(12.78)  | 3.03                   | 2.85                 | 2.53                 | 2.28                | 2.08                    | 1.85              | 1.65                 |
|        | 65(18.33)  | 3.25                   | 3.00                 | 2.66                 | 2.54                | 2.33                    | 2.05              | 1.90                 |
|        | 75(23.89)  | 3.38                   | 3.15                 | 2.78                 | 2.63                | 2.49                    | 2.15              | 2.00                 |



## System Pressure Table-R410A

| Pressure |      |        | Temperature |         | Pressure |      |        | Temperature |         |
|----------|------|--------|-------------|---------|----------|------|--------|-------------|---------|
| Kpa      | bar  | PSI    | °C          | °F      | Kpa      | bar  | PSI    | °C          | °F      |
| 100      | 1    | 14.5   | -51.623     | -60.921 | 2350     | 23.5 | 340.75 | 38.817      | 101.871 |
| 150      | 1.5  | 21.75  | -43.327     | -45.989 | 2400     | 24   | 348    | 39.68       | 103.424 |
| 200      | 2    | 29     | -36.992     | -34.586 | 2450     | 24.5 | 355.25 | 40.531      | 104.956 |
| 250      | 2.5  | 36.25  | -31.795     | -25.231 | 2500     | 25   | 362.5  | 41.368      | 106.462 |
| 300      | 3    | 43.5   | -27.351     | -17.232 | 2550     | 25.5 | 369.75 | 42.192      | 107.946 |
| 350      | 3.5  | 50.75  | -23.448     | -10.206 | 2600     | 26   | 377    | 43.004      | 109.407 |
| 400      | 4    | 58     | -19.953     | -3.915  | 2650     | 26.5 | 384.25 | 43.804      | 110.847 |
| 450      | 4.5  | 65.25  | -16.779     | 1.798   | 2700     | 27   | 391.5  | 44.592      | 112.266 |
| 500      | 5    | 72.5   | -13.863     | 7.047   | 2750     | 27.5 | 398.75 | 45.37       | 113.666 |
| 550      | 5.5  | 79.75  | -11.162     | 11.908  | 2800     | 28   | 406    | 46.136      | 115.045 |
| 600      | 6    | 87     | -8.643      | 16.444  | 2850     | 28.5 | 413.25 | 46.892      | 116.406 |
| 650      | 6.5  | 94.25  | -6.277      | 20.701  | 2900     | 29   | 420.5  | 47.638      | 117.748 |
| 700      | 7    | 101.5  | -4.046      | 24.716  | 2950     | 29.5 | 427.75 | 48.374      | 119.073 |
| 750      | 7.5  | 108.75 | -1.933      | 28.521  | 3000     | 30   | 435    | 49.101      | 120.382 |
| 800      | 8    | 116    | 0.076       | 32.137  | 3050     | 30.5 | 442.25 | 49.818      | 121.672 |
| 850      | 8.5  | 123.25 | 1.993       | 35.587  | 3100     | 31   | 449.5  | 50.525      | 122.945 |
| 900      | 9    | 130.5  | 3.826       | 38.888  | 3150     | 31.5 | 456.75 | 51.224      | 124.203 |
| 950      | 9.5  | 137.75 | 5.584       | 42.052  | 3200     | 32   | 464    | 51.914      | 125.445 |
| 1000     | 10   | 145    | 7.274       | 45.093  | 3250     | 32.5 | 471.25 | 52.596      | 126.673 |
| 1050     | 10.5 | 152.25 | 8.901       | 48.022  | 3300     | 33   | 478.5  | 53.27       | 127.886 |
| 1100     | 11   | 159.5  | 10.471      | 50.848  | 3350     | 33.5 | 485.75 | 53.935      | 129.083 |
| 1150     | 11.5 | 166.75 | 11.988      | 53.578  | 3400     | 34   | 493    | 54.593      | 130.267 |
| 1200     | 12   | 174    | 13.457      | 56.223  | 3450     | 34.5 | 500.25 | 55.243      | 131.437 |
| 1250     | 12.5 | 181.25 | 14.879      | 58.782  | 3500     | 35   | 507.5  | 55.885      | 132.593 |
| 1300     | 13   | 188.5  | 16.26       | 61.268  | 3550     | 35.5 | 514.75 | 56.52       | 133.736 |
| 1350     | 13.5 | 195.75 | 17.602      | 63.684  | 3600     | 36   | 522    | 57.148      | 134.866 |
| 1400     | 14   | 203    | 18.906      | 66.031  | 3650     | 36.5 | 529.25 | 57.769      | 135.984 |
| 1450     | 14.5 | 210.25 | 20.176      | 68.317  | 3700     | 37   | 536.5  | 58.383      | 137.089 |
| 1500     | 15   | 217.5  | 21.414      | 70.545  | 3750     | 37.5 | 543.75 | 58.99       | 138.182 |
| 1550     | 15.5 | 224.75 | 22.621      | 72.718  | 3800     | 38   | 551    | 59.591      | 139.264 |
| 1600     | 16   | 232    | 23.799      | 74.838  | 3850     | 38.5 | 558.25 | 60.185      | 140.333 |
| 1650     | 16.5 | 239.25 | 24.949      | 76.908  | 3900     | 39   | 565.5  | 60.773      | 141.391 |
| 1700     | 17   | 246.5  | 26.074      | 78.933  | 3950     | 39.5 | 572.75 | 61.355      | 142.439 |
| 1750     | 17.5 | 253.75 | 27.174      | 80.913  | 4000     | 40   | 580    | 61.93       | 143.474 |
| 1800     | 18   | 261    | 28.251      | 82.852  | 4050     | 40.5 | 587.25 | 62.499      | 144.498 |
| 1850     | 18.5 | 268.25 | 29.305      | 84.749  | 4100     | 41   | 594.5  | 63.063      | 145.513 |
| 1900     | 19   | 275.5  | 30.338      | 86.608  | 4150     | 41.5 | 601.75 | 63.62       | 146.516 |
| 1950     | 19.5 | 282.75 | 31.351      | 88.432  | 4200     | 42   | 609    | 64.172      | 147.510 |
| 2000     | 20   | 290    | 32.344      | 90.219  | 4250     | 42.5 | 616.25 | 64.719      | 148.494 |
| 2050     | 20.5 | 297.25 | 33.319      | 91.974  | 4300     | 43   | 623.5  | 65.259      | 149.466 |
| 2100     | 21   | 304.5  | 34.276      | 93.697  | 4350     | 43.5 | 630.75 | 65.795      | 150.431 |
| 2150     | 21.5 | 311.75 | 35.215      | 95.387  | 4400     | 44   | 638    | 66.324      | 151.383 |
| 2200     | 22   | 319    | 36.139      | 97.050  | 4450     | 44.5 | 645.25 | 66.849      | 152.328 |
| 2250     | 22.5 | 326.25 | 37.047      | 98.685  | 4500     | 45   | 652.5  | 67.368      | 153.262 |
| 2300     | 23   | 333.5  | 37.939      | 100.290 |          |      |        |             |         |