



SLIM CEILING CASSETTE & PLATINUM CONDENSER SERVICE MANUAL

Models Covered:

**SCC-0609-HH-M
SCC-1218-HH-M
ACiQ-SCC-GRILLE-0618**

**ACiQ-09ZPL-HP230B
ACiQ-12ZPL-HP230B
ACiQ-18ZPL-HP230B**



VERSION DATE: 05-13-24

Table of Contents

§. Safety Precautions

1. Precautions
2. Information servicing

§. Model Reference & External Appearance

1. Model Reference
2. External Appearance

§. Indoor Unit

1. Indoor Unit - One-way Cassette Type

§. Outdoor Unit

1. Dimensional Drawings
2. Service Space
3. Capacity Correction Factor for Height Difference
4. Noise Criterion Curves
5. Refrigerant Cycle Diagrams
6. Electrical Wiring Diagrams

§. Installation

§. Maintenance

§. Product Features

Table of Contents

§. Troubleshooting

1. Safety Caution
2. General Troubleshooting
3. Information Inquiry
4. Error Diagnosis and Troubleshooting Without Error Code
5. Quick Maintenance by Error Code
6. Troubleshooting by Error Code
7. Check Procedures

§. Indoor Unit Disassembly

1. Indoor Unit - One-way Cassette Type

§. Outdoor Unit Disassembly

Appendix

- i) Temperature Sensor Resistance Value Table for T1,T2,T3 and T4 (°C – K)
- ii) Temperature Sensor Resistance Value Table for TP(for some units) (°C – K)
- iii) Pressure On Service Port

Safety Precautions

Contents

| | |
|--|---|
| 1. Precautions..... | 2 |
| 2. Information servicing(For flammable materials)..... | 3 |

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 do not operate 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.

2. Information servicing(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

- Works 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. Technical personnel in charge of operation, supervision, maintenance of air-conditioning systems shall be adequately instructed and competent with respect to their tasks. Works shall be undertaken with appropriate tools only (In case of uncertainty, please consult the manufacturer of the tools for use with flammable refrigerants)

2.3 General work area

- 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 CO₂ 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, and 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.

2.20 Venting of HC Refrigerant (R290)

Venting may be carried out as an alternative to recovering the refrigerant. Because HC refrigerants have no ODP and negligible GWP, under certain circumstances it may be considered acceptable to vent the refrigerant. However, if this is to be considered, it should be done in accordance with the relevant national rules or regulations, if they permit.

In particular, before venting a system, it would be necessary to:

- Ensure that legislation relating to waste material has been considered
- Ensure that environmental legislation has been considered
- Ensure that legislation addressing safety of hazardous substances is satisfied
- Venting is only carried out with systems that contain a small quantity of refrigerant, typically less than 500 g.
- Venting to inside a building is not permissible under any circumstances
- Venting must not be to a public area, or where people

- are unaware of the procedure taking place
- The hose must be of sufficient length and diameter such that it will extend to at least 3 m beyond the outside of the building
- The venting should only take place on the certainty that the refrigerant will not get blown back into any adjacent buildings, and that it will not migrate to a location below ground level
- The hose is made of material that is compatible for use with HC refrigerants and oil
- A device is used to raise the hose discharge at least 1 m above ground level and so that the discharge is pointed in an upwards direction (to assist with dilution)
- The end of the hose can now discharge and disperse the flammable fumes into the ambient air.
- There should not be any restriction or sharp bends within the vent-line which will hinder the ease of flow.
- There must be no sources of ignition near the hose discharge
- The hose should be regularly checked to ensure that there are no holes or kinks in it, that could lead to leakage or blocking of the passage of flow

When carrying out the venting, the flow of refrigerant should be metered using manifold gauges to a low flow rate, so as to ensure the refrigerant is well diluted. Once the refrigerant has ceased flowing, if possible, the system should be flushed out with OFN; if not, then the system should be pressurised with OFN and the venting procedure carried out two or more times, to ensure that there is minimal HC refrigerant remaining inside the system.

Model Reference

Contents

| | | |
|----|----------------------------------|----------|
| 1. | Model Reference..... | 2 |
| 2 | External Appearance | 3 |

1. Model Reference

Refer to the following table to determine the specific indoor and outdoor unit model number of your purchased equipment.

| Indoor Unit Model | | Outdoor Unit Model | Capacity (Btu/h) | Power Supply |
|---------------------|---------------|--------------------|-----------------------|-------------------------------|
| One-way Cassette | SCC-0609-HH-M | ACIQ-09ZPL-HP230B | 6K & 9k Hyper Heat | 1Phase, 208/230V~, 60Hz |
| | SCC-1218-HH-M | ACIQ-12ZPL-HP230B | 12k Hyper Heat | |
| | | ACIQ-18ZPL-HP230B | 18k Hyper Heat | |

2. External Appearance

2.1 Indoor Unit

One-way Cassette



2.2 Outdoor Unit

Outdoor



Indoor Unit-One-way Cassette

Contents

| | |
|---|----|
| 1. Feature..... | 2 |
| 2. Dimensional Drawings | 4 |
| 3. Part names | 5 |
| 4. Service Place..... | 6 |
| 5. Accessories | 7 |
| 6. Air Velocity and Temperature Distributions | 8 |
| 7. Noise Criterion Curves..... | 14 |
| 8. Electrical Characteristics..... | 16 |
| 9. Electrical Wiring Diagrams..... | 16 |

1. Feature

1.1 ELEVATION PANEL

- From now on, no more climbing up & down, because the panel itself can be up & down.
- By activating the Elevation Panel function on remote controller (or smart controller), the panel will go straight down to you for easily taking out the air filter. Cleaning gets all easy.
- The adjustable length of the ropes can be set as 1.5M or 2M for different height of the storey.
- You can simply use your hand to suspend the panel at you desired height in its process of the going down so that you don't have to bend down for the air filter.



1.2 2-way Installation

- PushIn INSTALLATION
 - When it comes to choosing the position to hang up the hooks and the unit, there are strict requirements for the ceiling condition, and not always the desired position you want to install the unit is the ideal position.
 - An unique & exclusive PushIn Case is designed for easy installation options.
 - Installers can fix the unit case on the beams with screws and then plug in the EVOX one-way cassette and connect conduits.
 - This method enables installation no longer subjecting to the ceiling conditions, and free the installers from manual measurement and adjustment of the hooks distance, guaranteeing the unit is precisely placed in the position you desired.



- HangUp INSTALLATION
 - For sure, installers can go with a more common approach to fix the unit with hooks.
 - Our hangers with optimized anti-cutting design are easy to grab and lift up, preventing hands from scratching by the sharp edge.

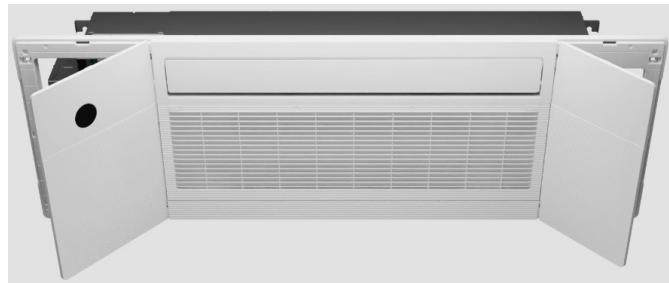


1.3 Build-in Drain Pump

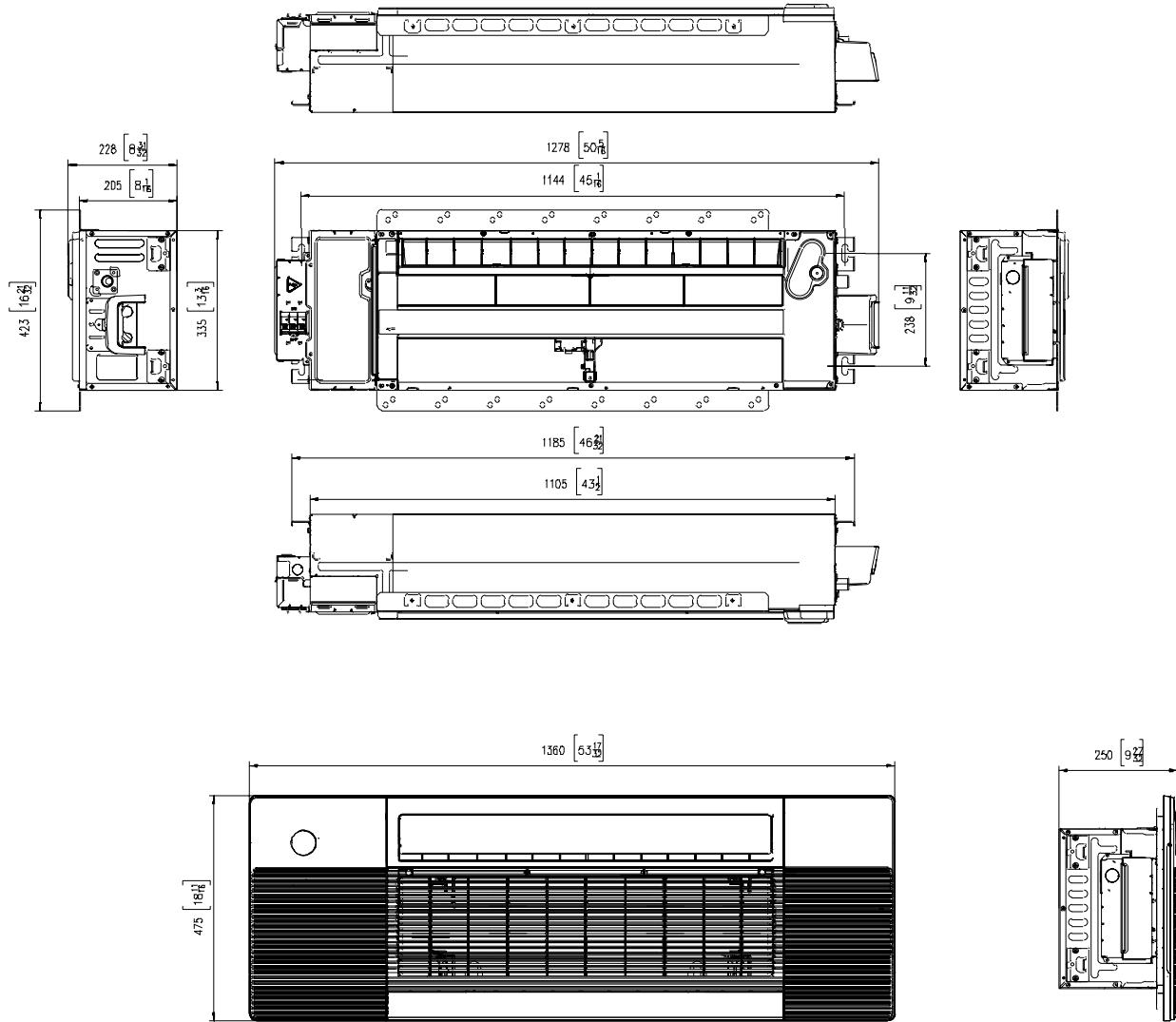
- The built-in water pump can discharge the condensate water.
- No need to add an extra water pump to the side of the unit.

1.4 Easy-to-access Core Components

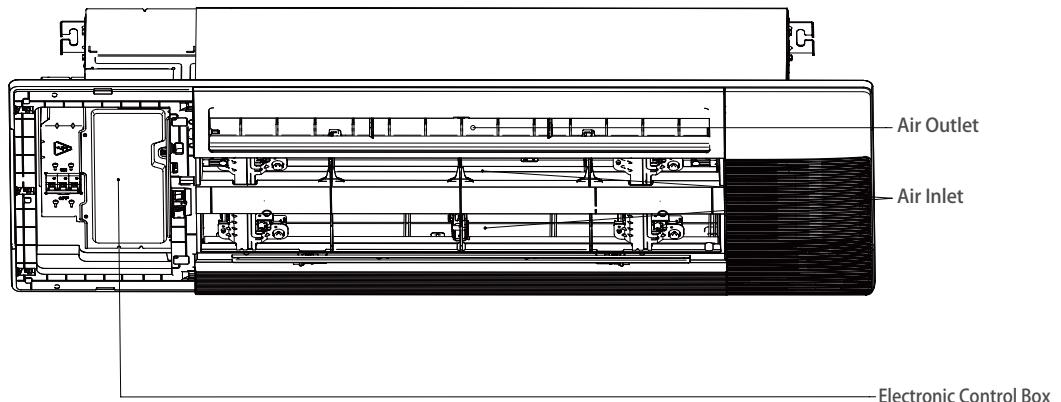
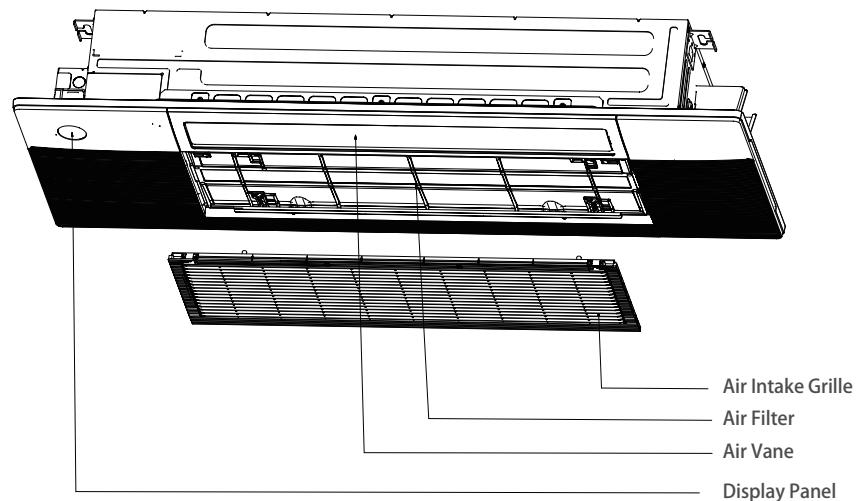
- Adopting the design of the high wall split, installers only have to open the front panel to gain access to PCB box and water pump sections.



2. Dimensional Drawings

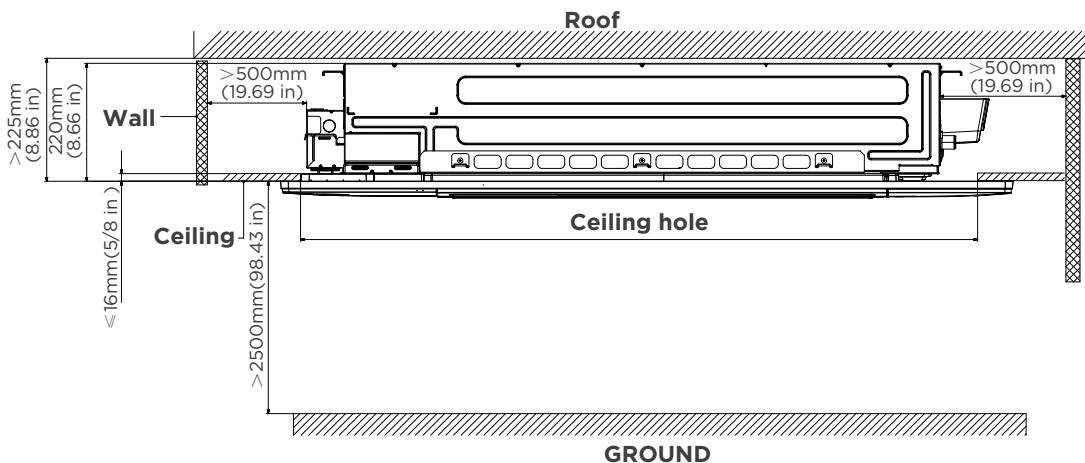


3. Part names

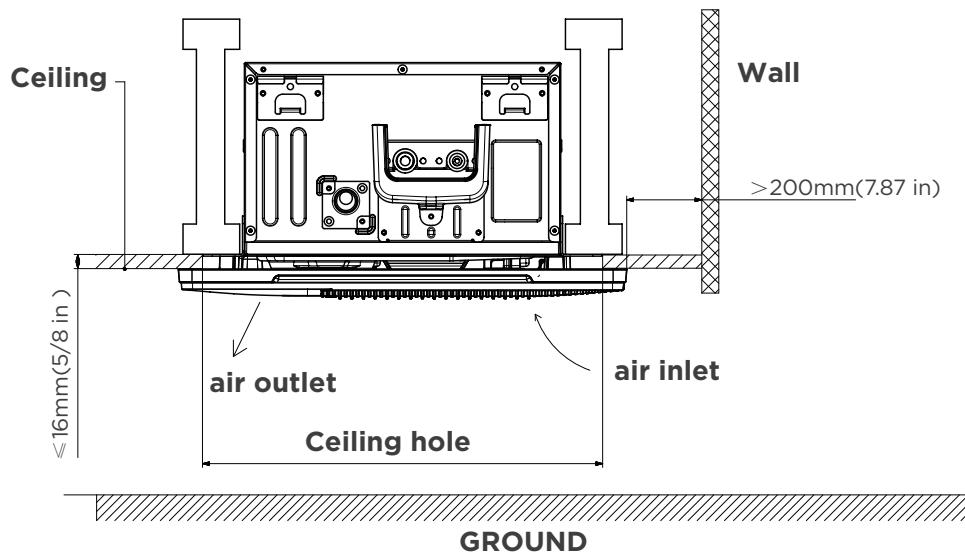


4. Service Place

Type A



Type B



5. Accessories

The air conditioning system comes with the following accessories. Use all of the installation parts and accessories to install the air conditioner. Improper installation may result in water leakage, electrical shock and fire, or equipment failure.

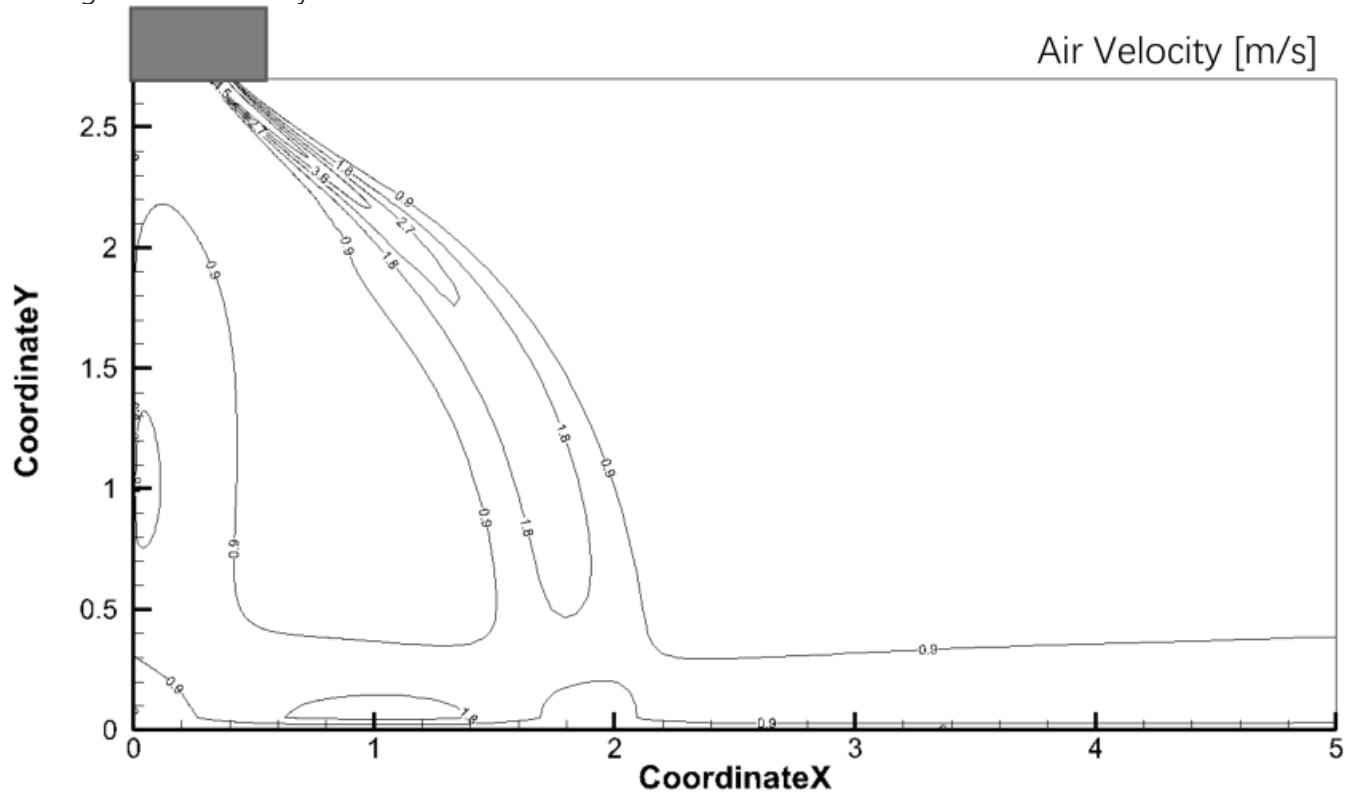
| Name | Shape | Quantity |
|---|-------|------------------|
| Installation cardboard template | | 1 |
| Remote controller | | 1 |
| Battery | | 2 |
| Cable tie | | 6 |
| Drainpipe adaptor | | 1 |
| Screw kits (ST8*50, M4*22, ST3.9*16, ST4.8*12, ST3.9*10) | | 1 (8,8,2,2,3) |
| Copper nut | | 2 |
| Water receiver | | 1 |
| Seal ring(optional) | | 1 |
| Drain joint(optional) | | 1 |
| Wire controller(optional) | | 1 |
| Rubber ring | | 1 |
| Wireless controller(optional) | | 1 |
| Panel | | 1 |
| Manual | | 2-4 |

NOTE: Panel installation should be performed after wiring and piping have been completed

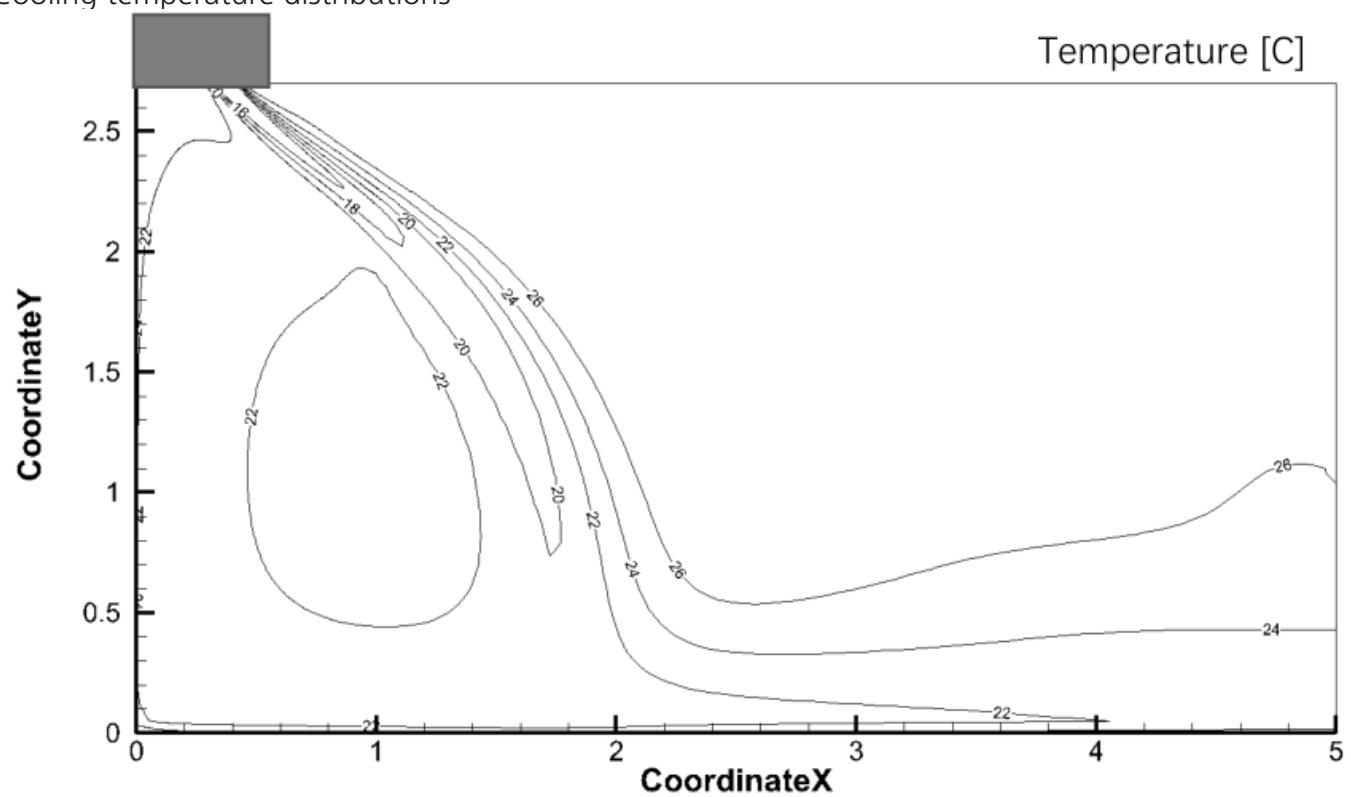
6. Air Velocity and Temperature Distributions

6k-Discharge Angle 45°

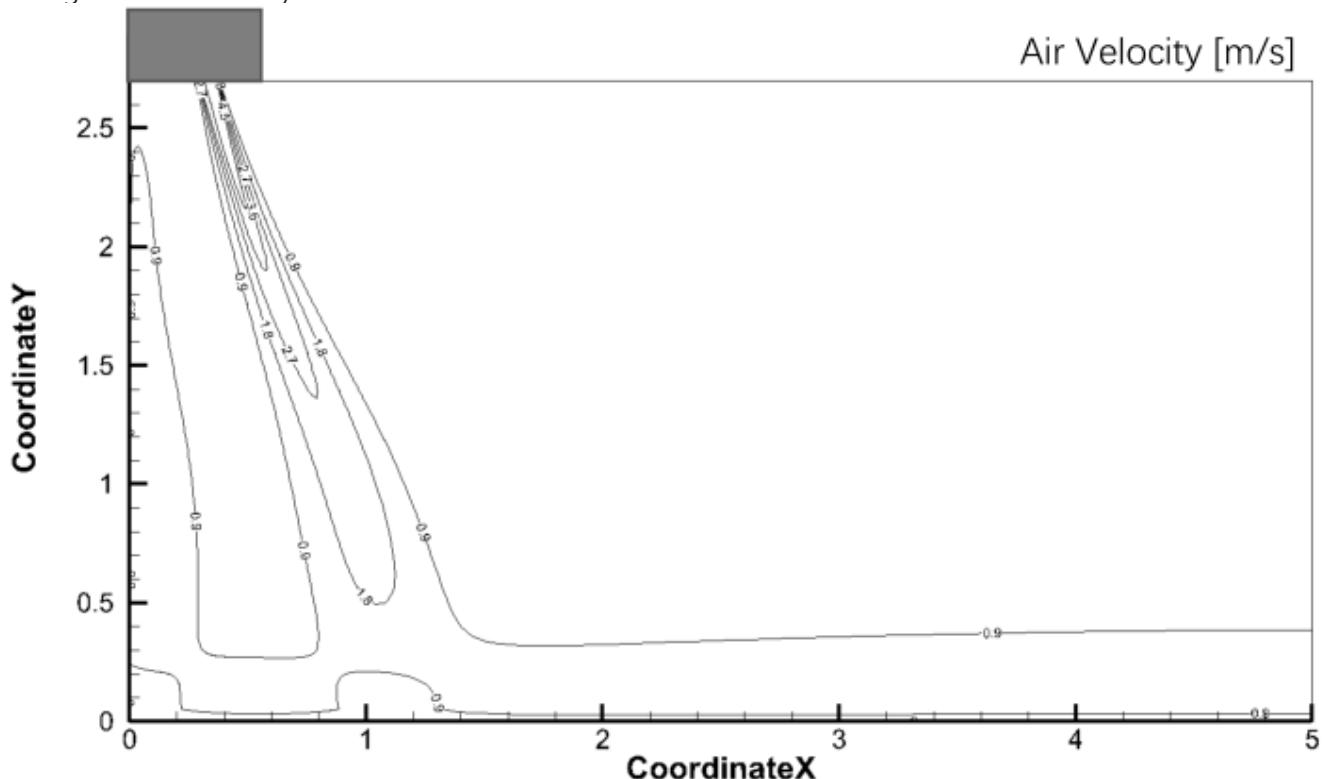
Cooling airflow velocity distributions



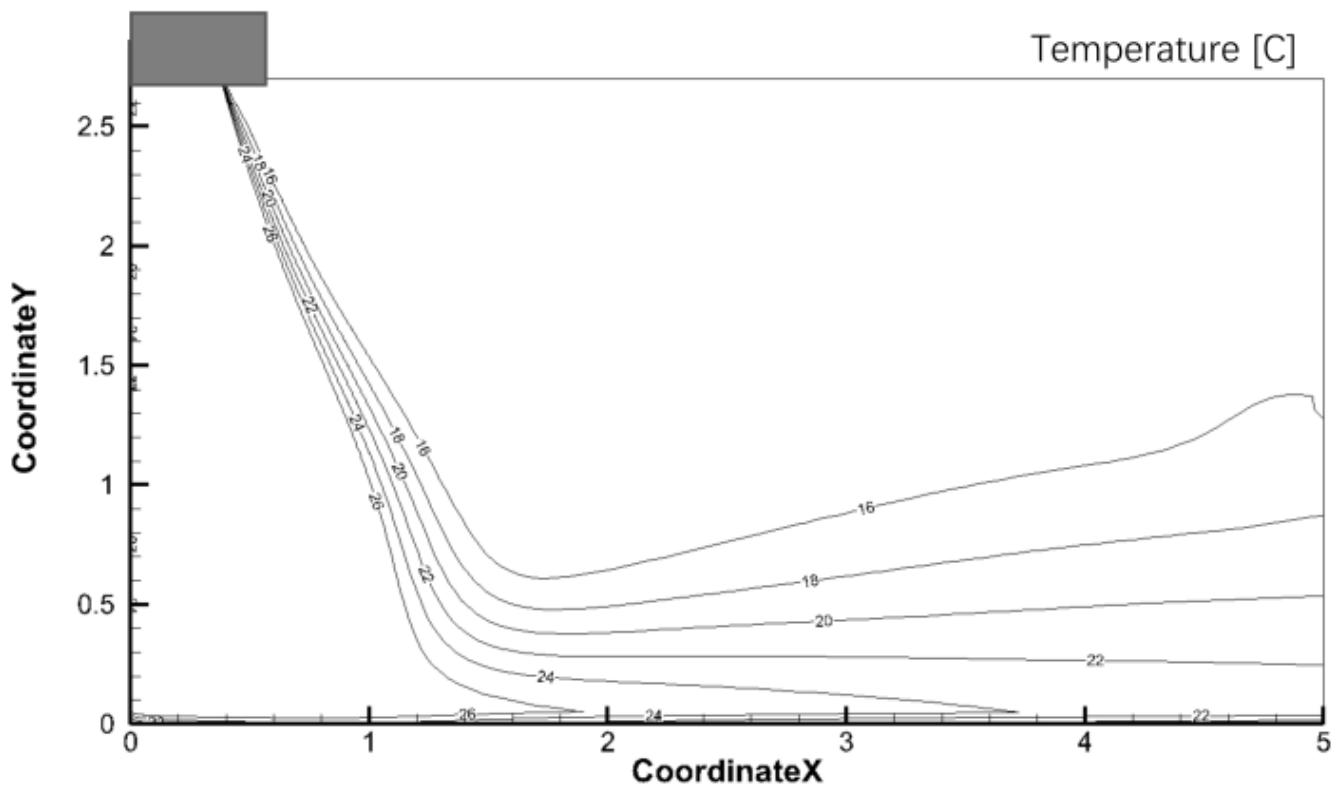
Cooling temperature distributions



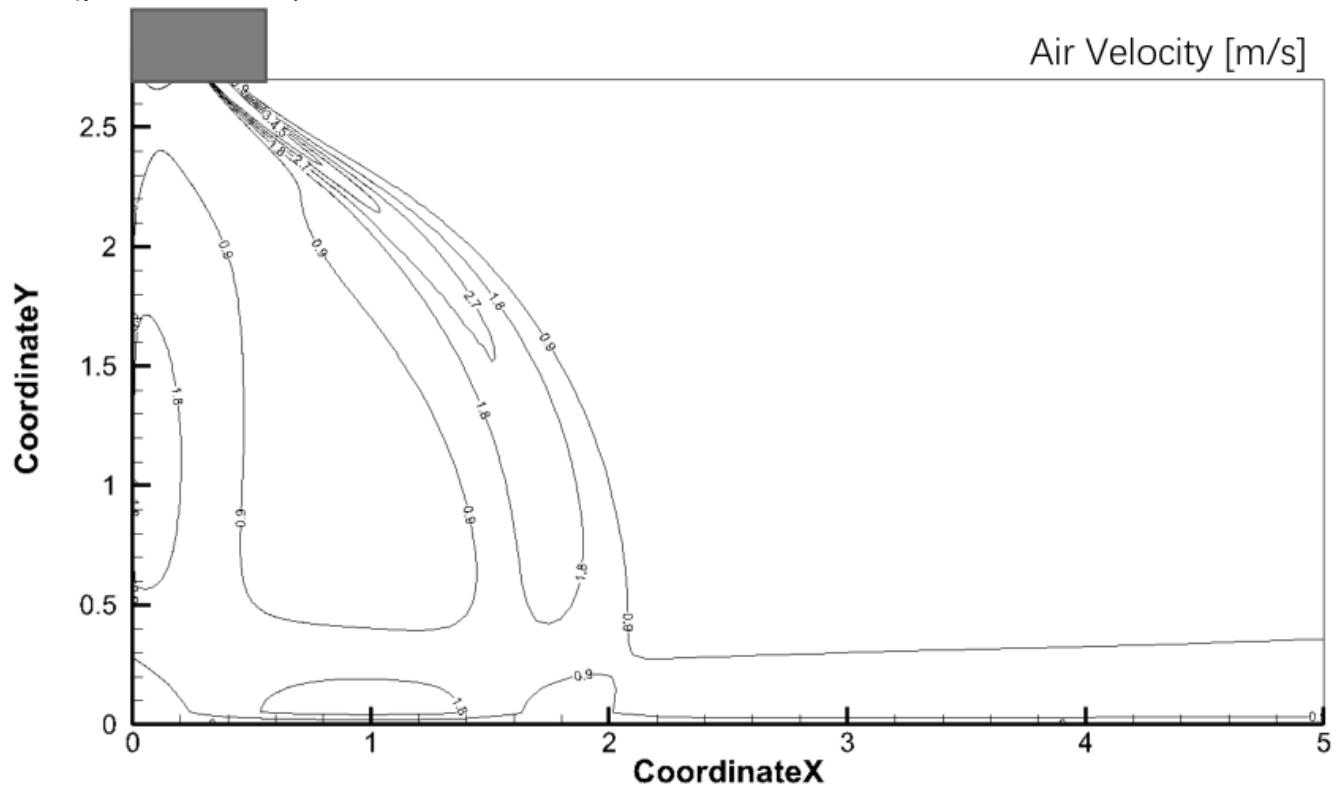
6k-Discharge Angle 65°
Heating airflow velocity distributions



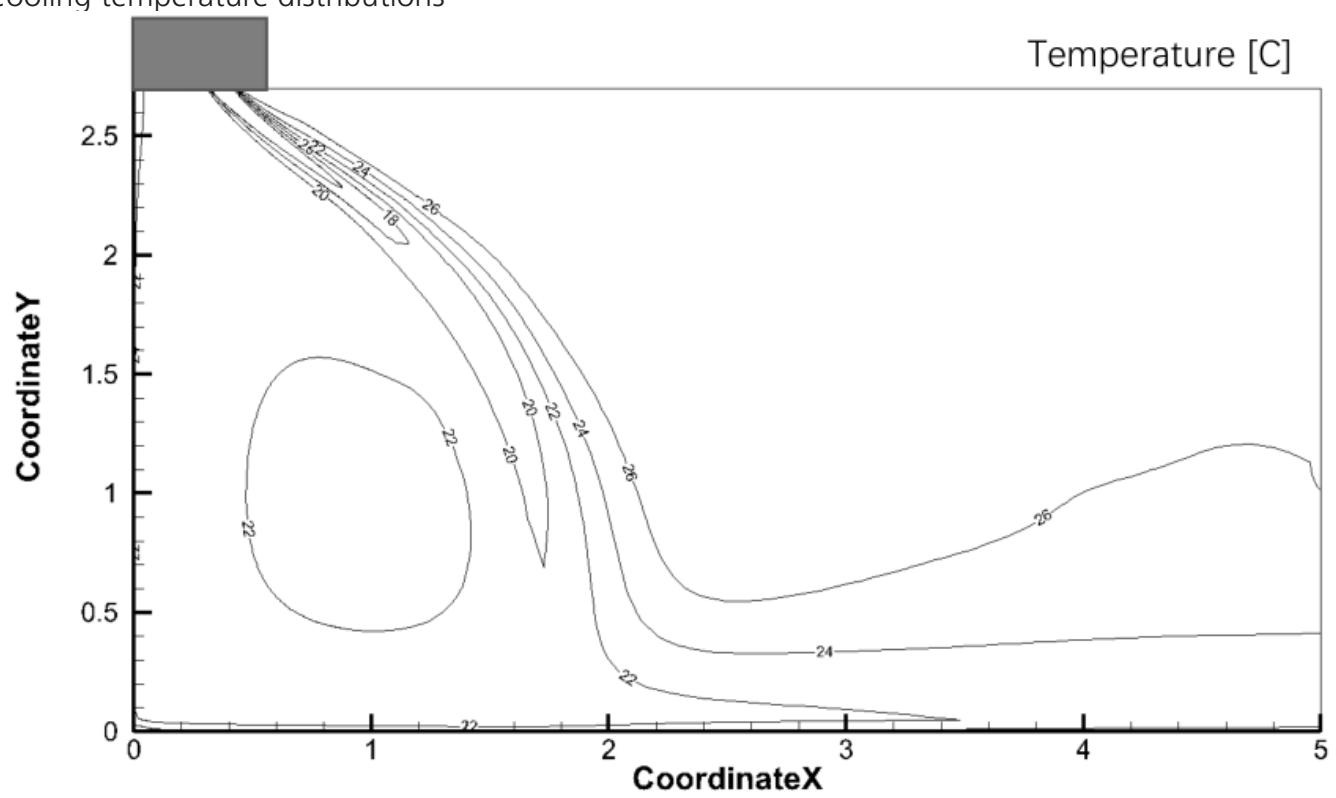
Heating temperature distributions



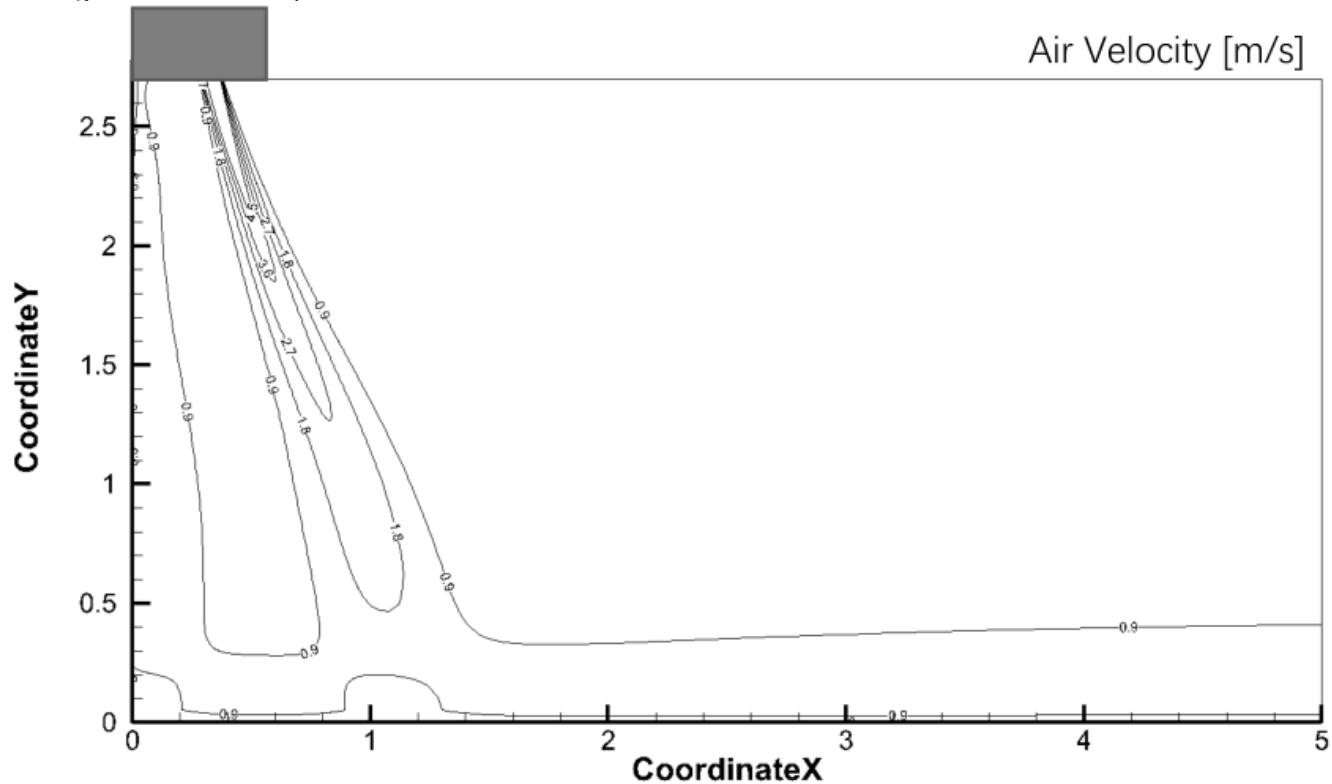
9k/12k-Discharge Angle 45°
Cooling airflow velocity distributions



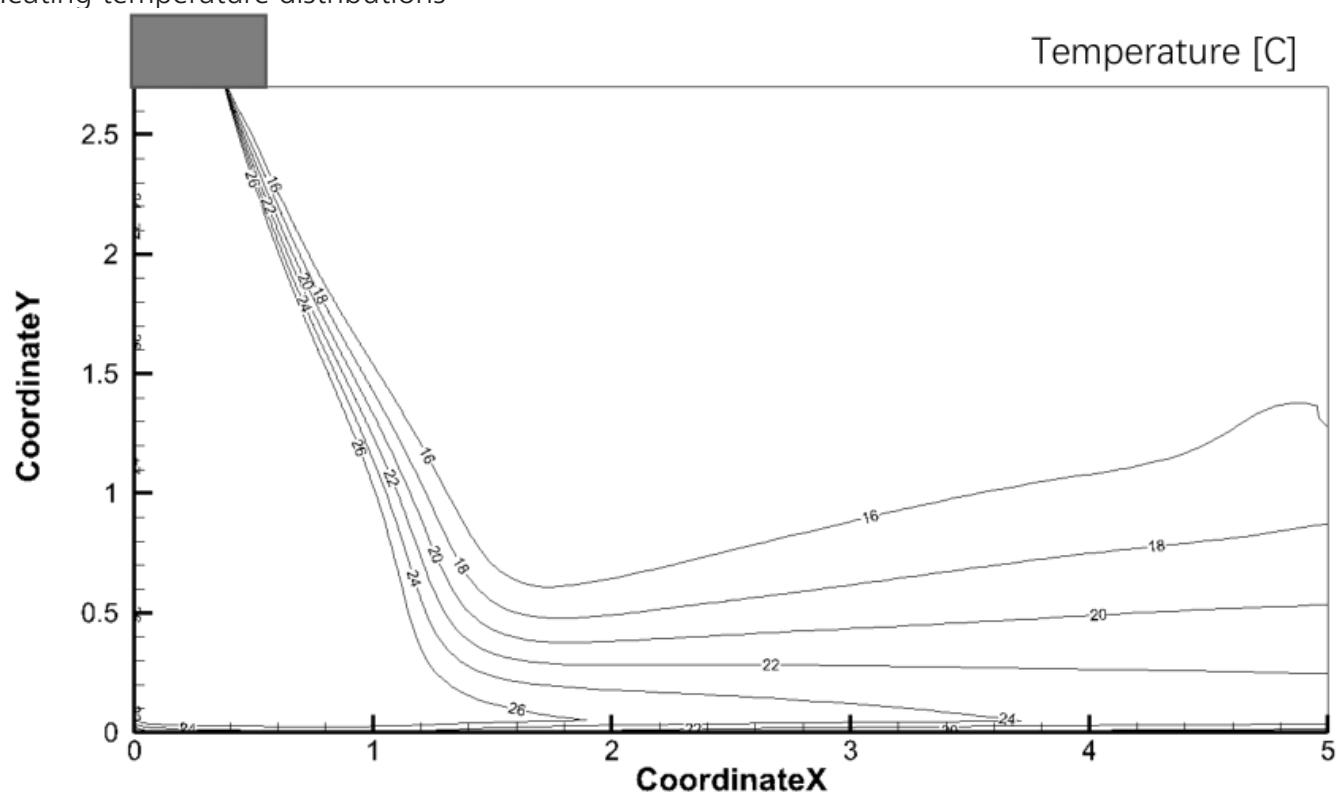
Cooling temperature distributions



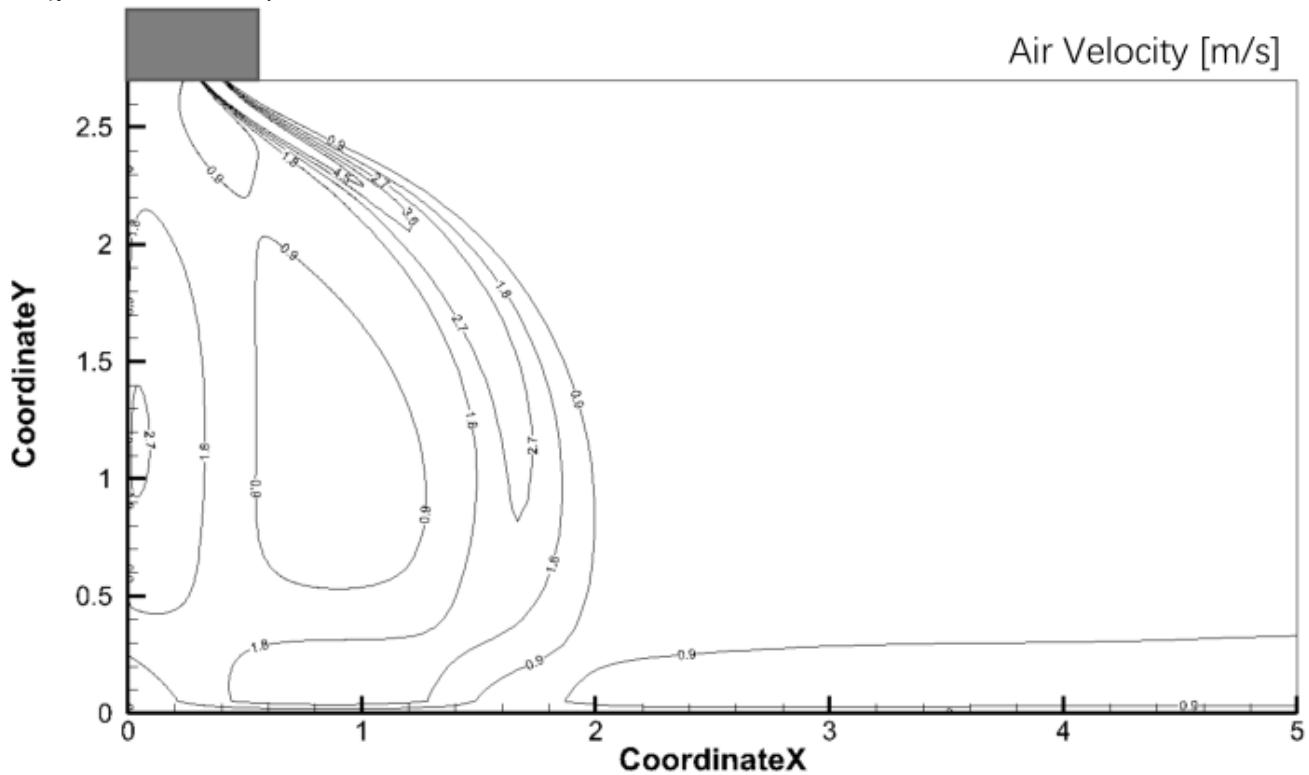
9k/12k-Discharge Angle 65°
Heating airflow velocity distributions



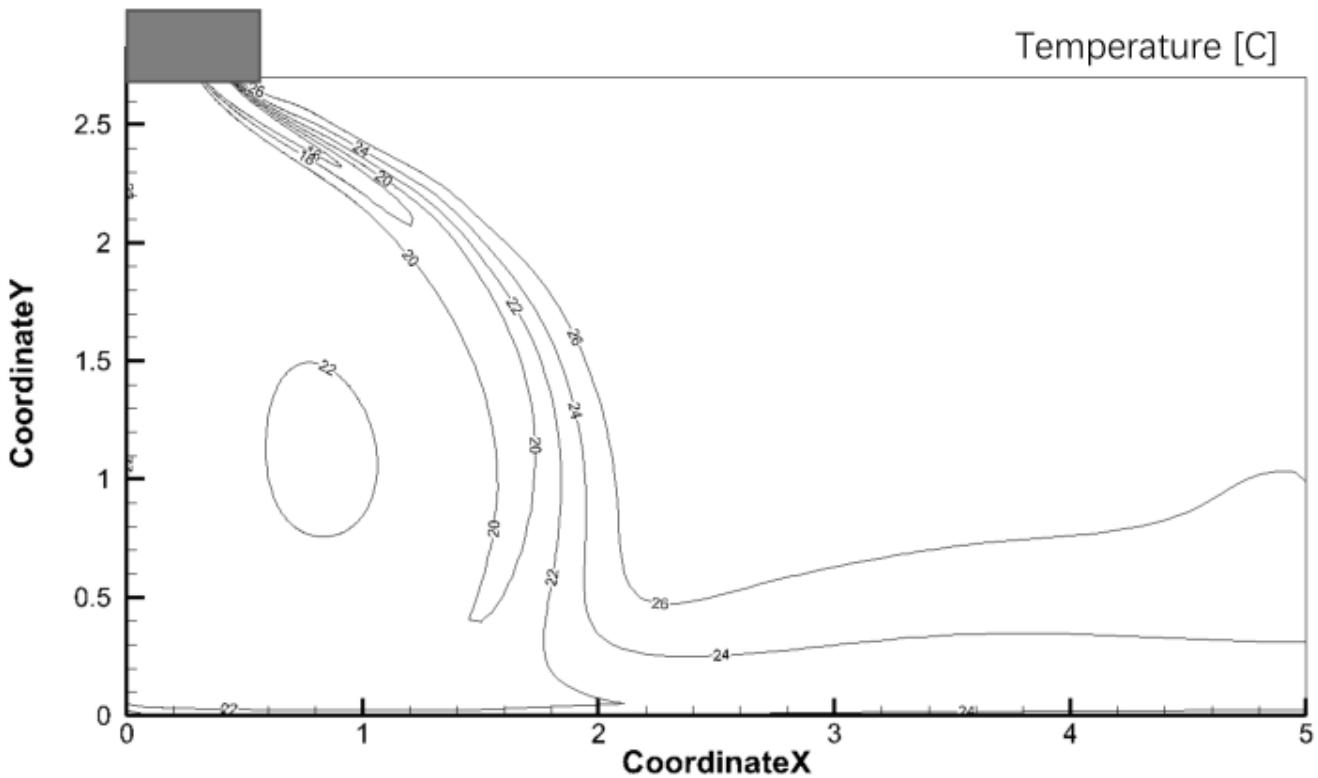
Heating temperature distributions



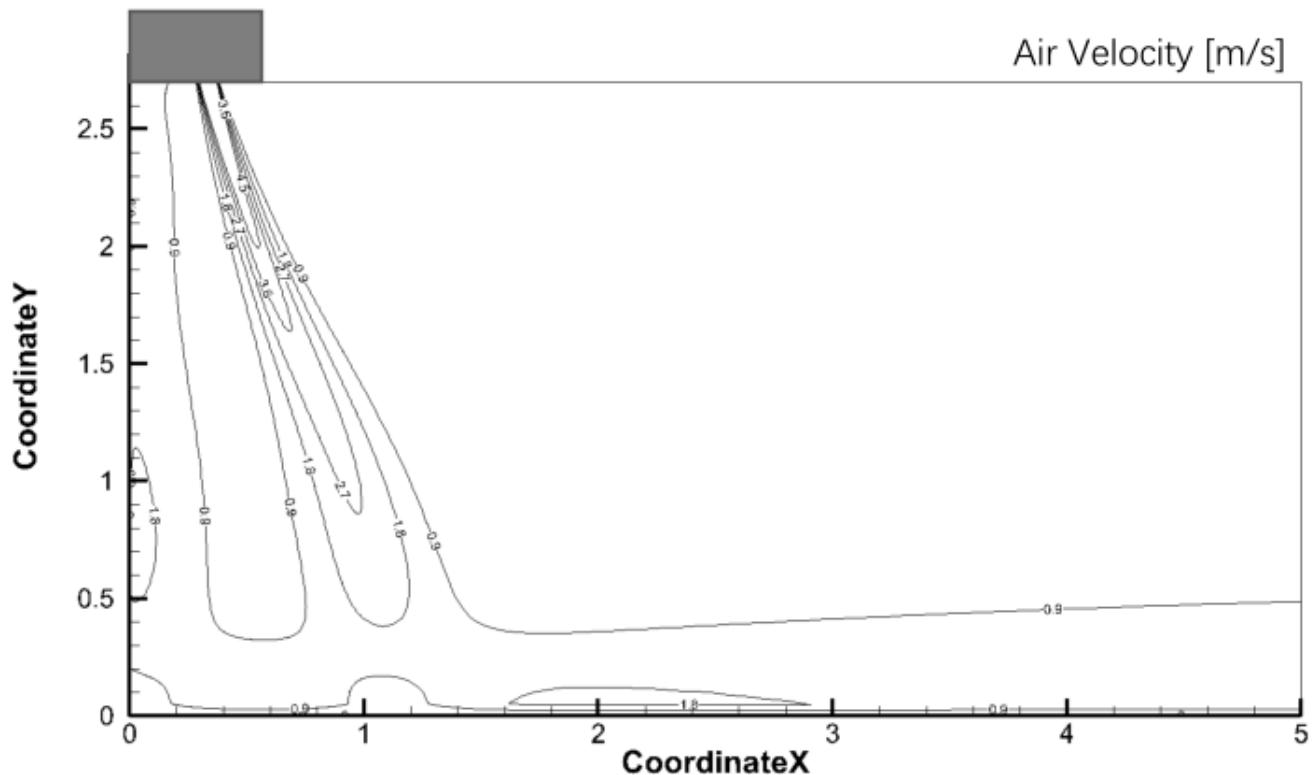
18k-Discharge Angle 45°
Cooling airflow velocity distributions



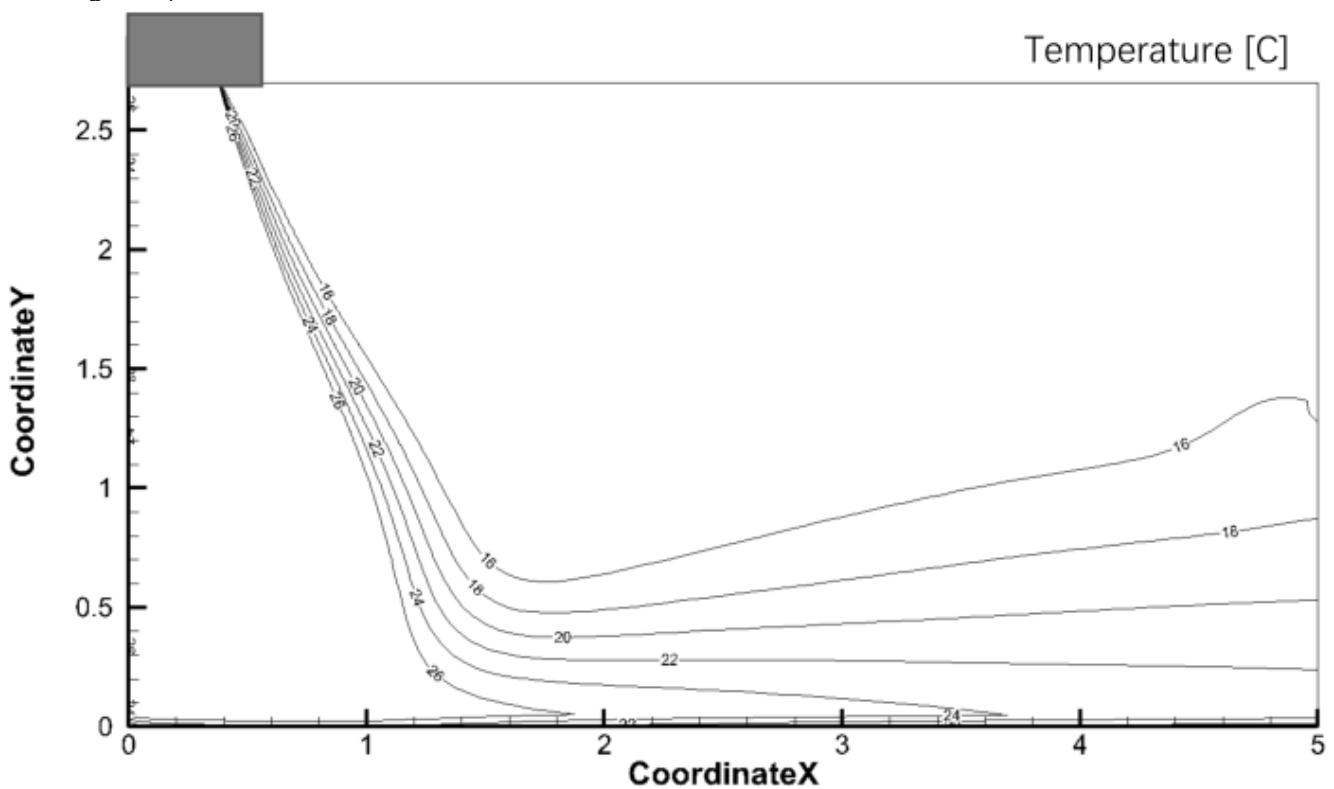
Cooling temperature distributions



18k-Discharge Angle 65°
Heating airflow velocity distributions

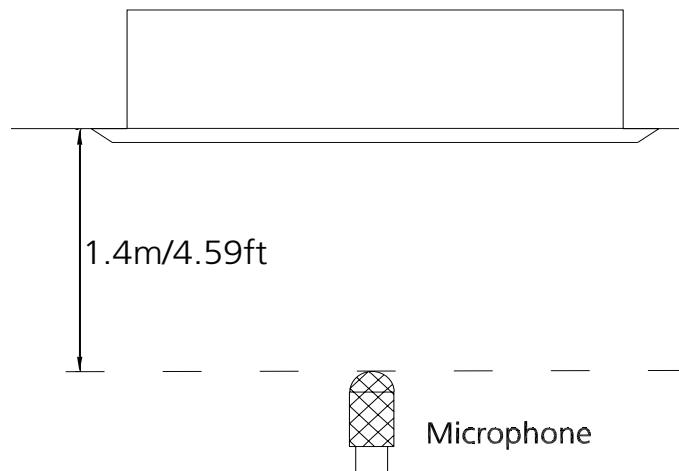


Heating temperature distributions



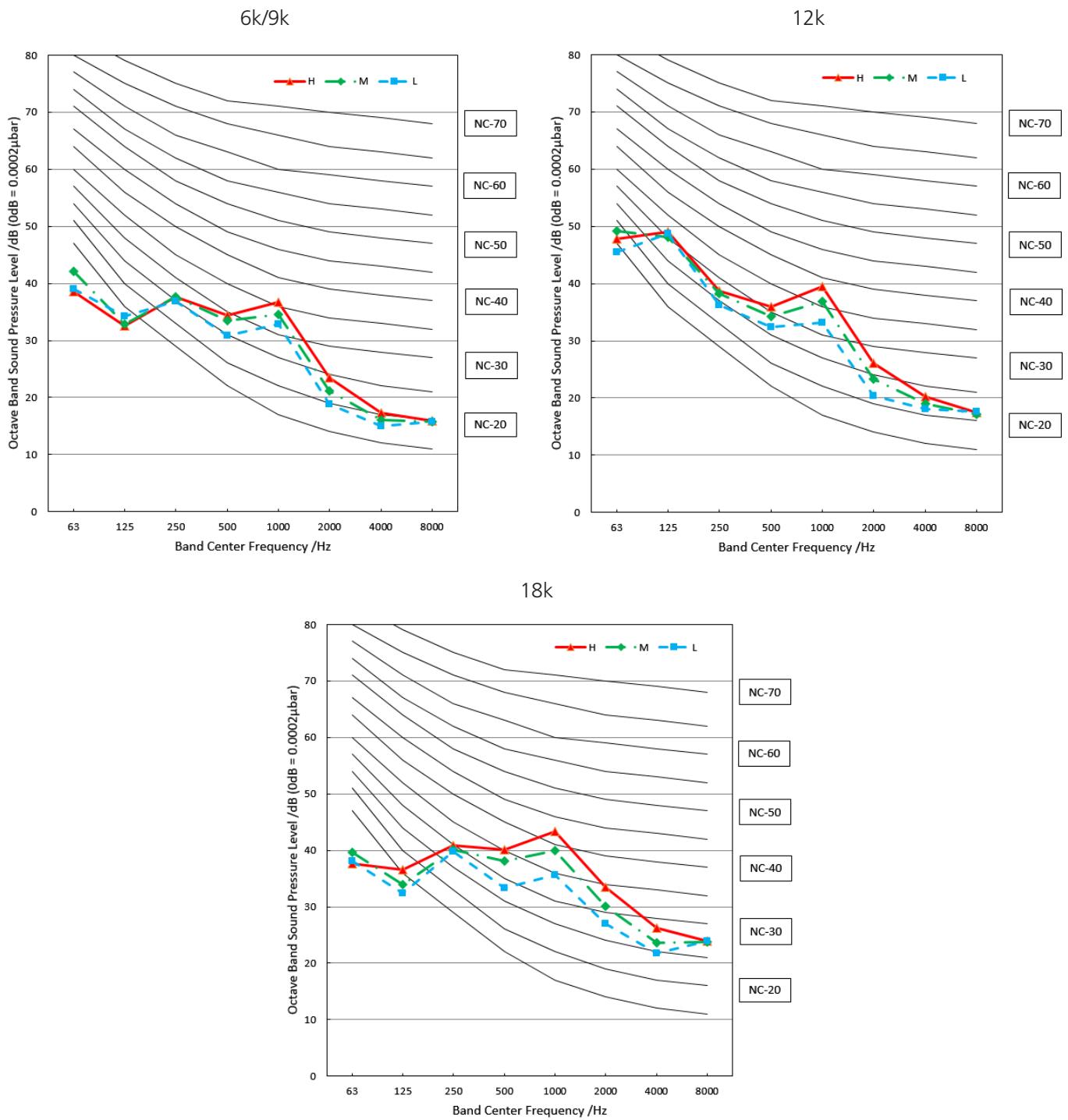
7. Noise Criterion Curves

7.1 Indoor Unit



Notes:

- Sound measured at 1.4m/4.59ft away from the noisiest location of the unit.
- Data is valid at free field condition
- Data is valid at nominal operation condition
- Reference acoustic pressure OdB = 20µPa
- Sound level will vary depending on a range of factors such as the construction -(acoustic absorption coefficient) of particular room in which the equipment is installed.
- The operating conditions are assumed to be standard.



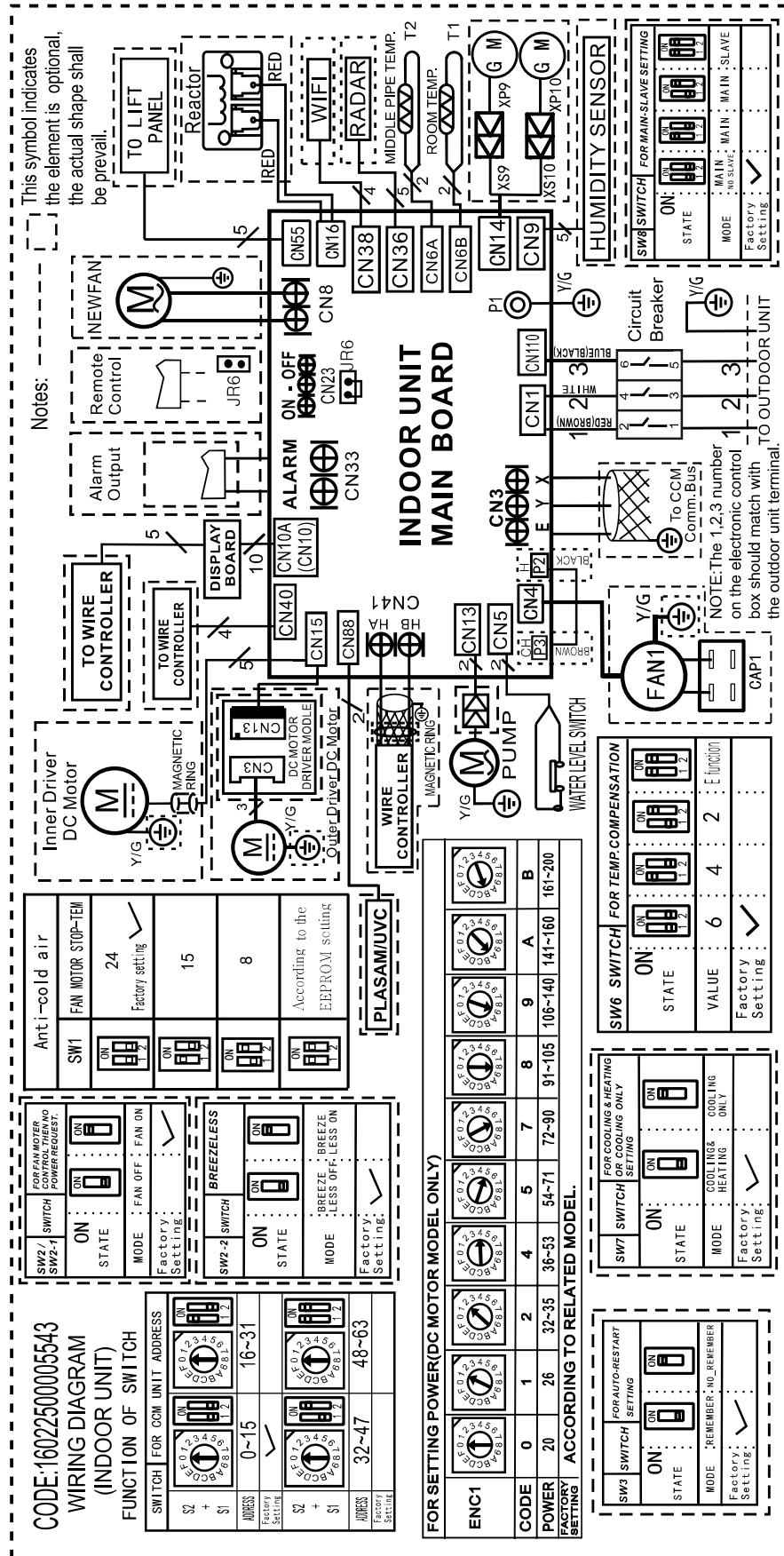
8. Electrical Characteristics

| Capacity (Btu/h) | | 9k/12k | 6k/9k/12k hyper Heat | 18k | 18k hyper Heat |
|--------------------------------|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Power (Outdoor) | Phase | 1 | 1 | 1 | 1 |
| | Frequency And Volt | 208/230V,60Hz | | | |
| Max Fuse | Indoor unit(A) | 15 | 15 | 15 | 15 |
| | Outdoor unit(A) | 15 | 15 | 30 | 25 |
| Outdoor Unit Power Wire | Line quantity | 3 | 3 | 3 | 3 |
| | Line diameter(AWG) | 14/2.5mm ² | 14/2.5mm ² | 14/2.5mm ² | 12/4.0mm ² |
| Outdoor-indoor Connection Wire | Line quantity | 4 | 4 | 4 | 4 |
| | Line diameter(AWG) | 16/1.5mm ² | 16/1.5mm ² | 16/1.5mm ² | 16/1.5mm ² |

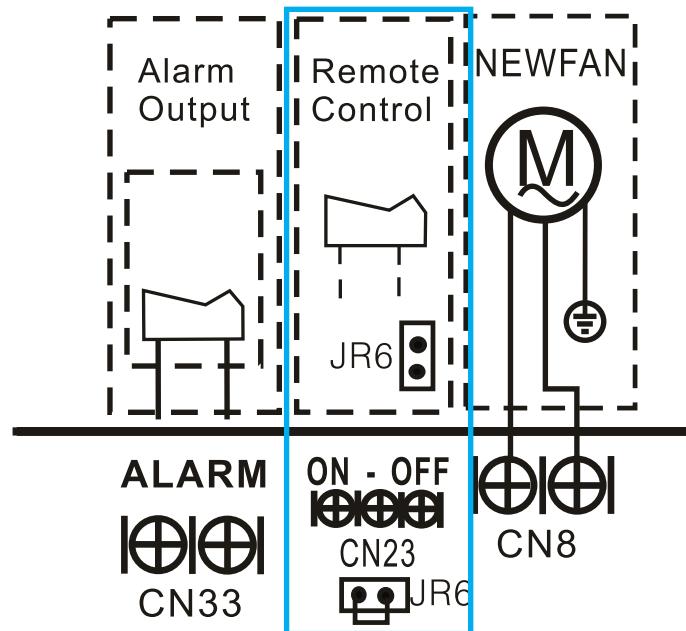
9. Electrical Wiring Diagrams

| IDU Capacity (Btu/h) | IDU Wiring Diagram |
|----------------------|--------------------|
| 6k~18k | 16022500005543 |

| Abbreviation | Paraphrase |
|-----------------|---|
| Y/G | Yellow-Green Conductor |
| CAP1 | Indoor Fan Capacitor |
| FAN1 | Indoor Fan |
| PUMP | PUMP |
| TO CCM Comm.Bus | Central Controller |
| T1 | Indoor Room Temperature |
| T2 | Coil Temperature of Indoor Heat Exchanger |
| P3 | Super High Speed |
| P2 | High Speed |

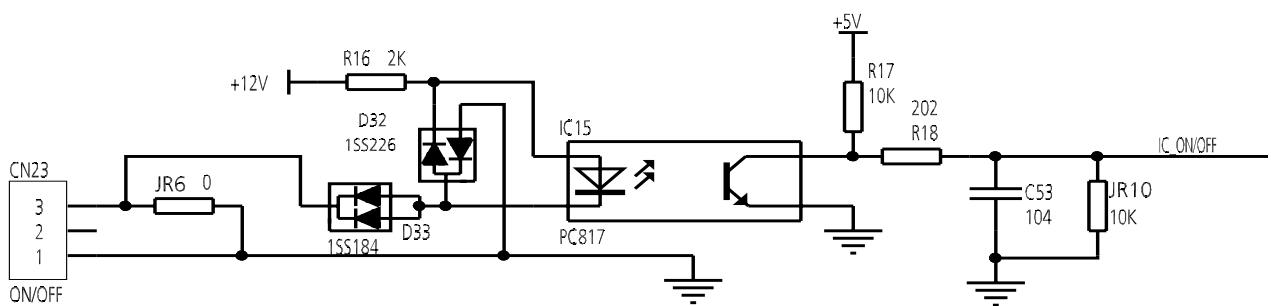


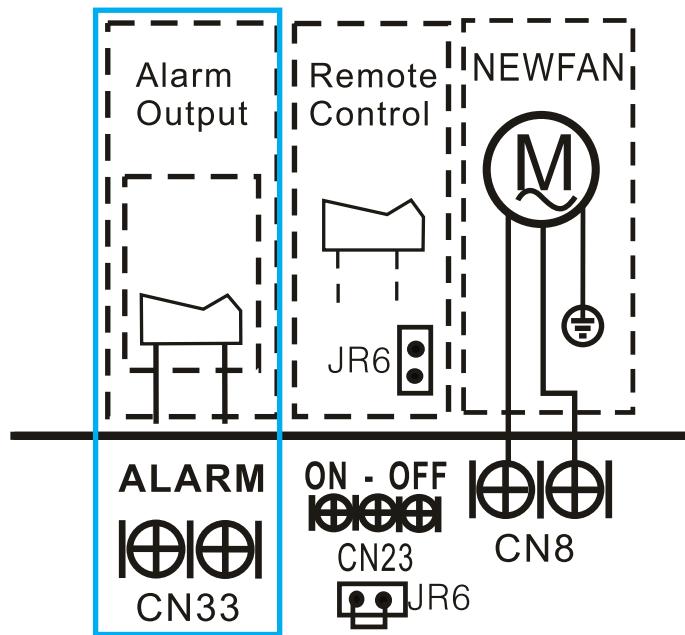
10.1 Some connectors introduce:



A For remote control (ON-OFF) terminal port CN23 and short connector of JR6

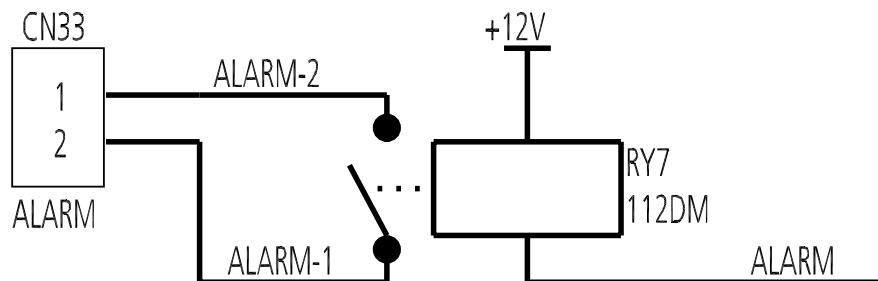
1. Remove the short connector of JR6 when you use ON-OFF function;
2. When remote switch off (OPEN) ;the unit would be off;
3. When remote switch on (CLOSE) ;the unit would be on;
4. When close/open the remote switch, the unit would be responded the demand within 2 seconds;
5. When the remote switch on. you can use remote controller/ wire controller to select the mode what you want ;when the remote switch off , the unit would not respond the demand from remote controller/wire controller.
when the remote switch off , but the remote controller / wire controller are on, CP code would be shown on the display board.
- 6.The voltage of the port is 12V DC , design Max.current is 5mA.

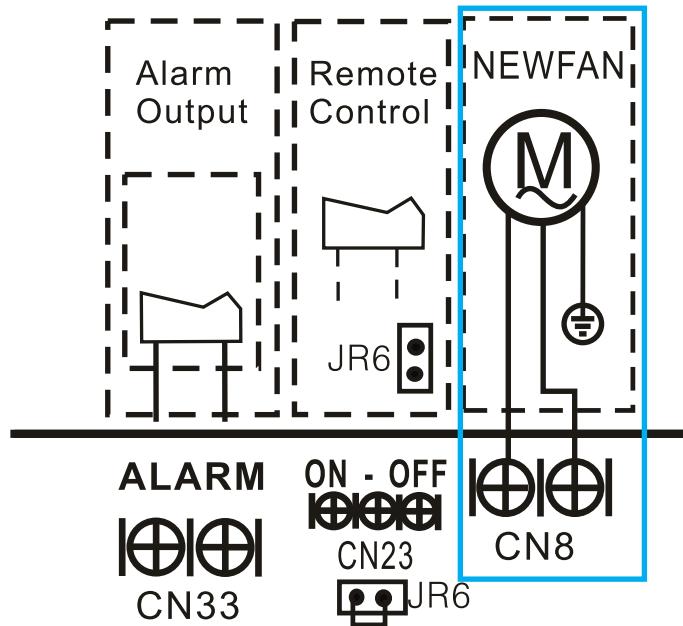




B For ALARM terminal port CN33

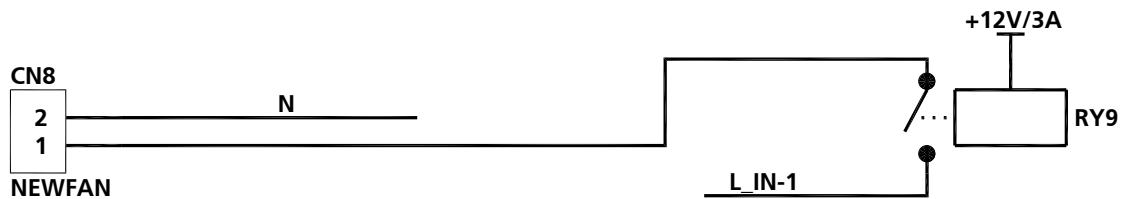
1. Provide the terminal port to connect ALARM ,but no voltage of the terminal port , the power from the ALARM system (not from the unit)
2. Although design voltage can support higher voltage ,but we strongly ask you connect the power less than 24V, current less than 0.5A
3. When the unit occurs the problem , the relay would be closed , then ALARM works



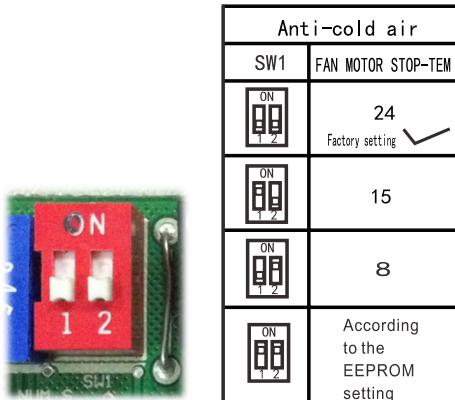


C. For new fresh motor terminal port CN8

1. Connect the fan motor to the port , no need care L/N of the motor ;
2. The output voltage is the power supply;
3. The fresh motor can not excess 200W or 1A , follow the smaller one ;
4. The new fresh motor will be worked when the indoor fan motor work ;when the indoor fan motor stops , the new fresh motor would be stopped ;
5. When the unit enter force cooling mode or capacity testing mode , the fresh motor isn't work .

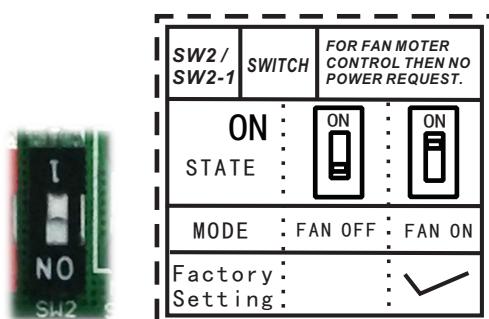
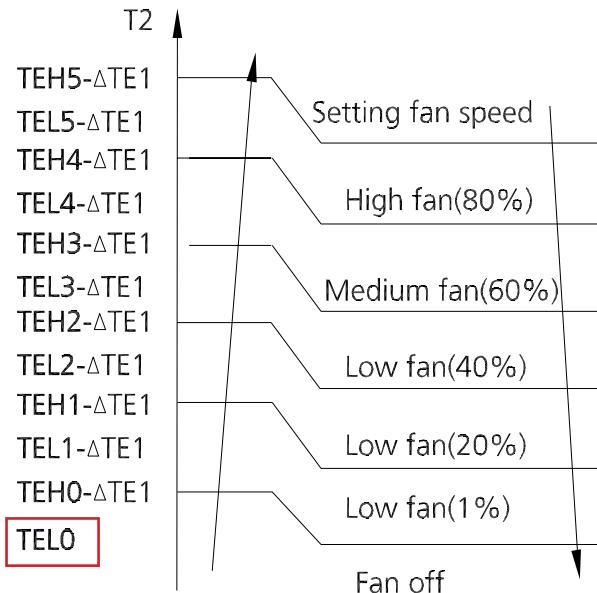


10.2 Micro-Switch Introduce:



A. Micro-switch SW1 is for selection of indoor fan stop temperature (TEL0) when it is in anti-cold wind action in heating mode.

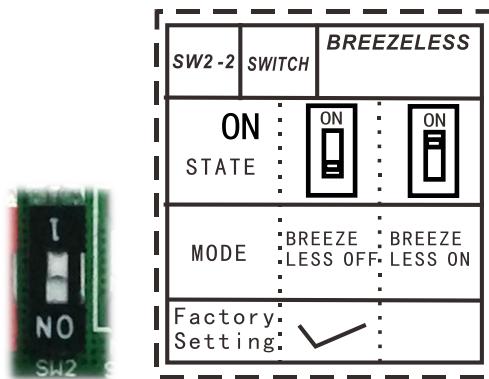
Range: 24°C, 15°C, 8°C, According to EEPROM setting (reserved for special customizing).



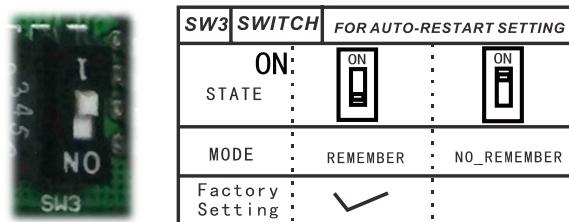
B. Micro-switch SW2/SW2-1 is for selection of indoor FAN ACTION if room temperature reaches the setpoint and the compressor stops.

Range: OFF (anti-cold wind is available in heating mode), Keep running (No anti-cold wind function).

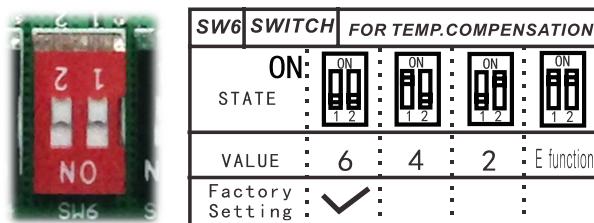
Note: SW2 dip switch is only reserved physical part but without mode modification function, if want to make change on the factory setting, should use remote controller or wire controller to reset(depend on model).



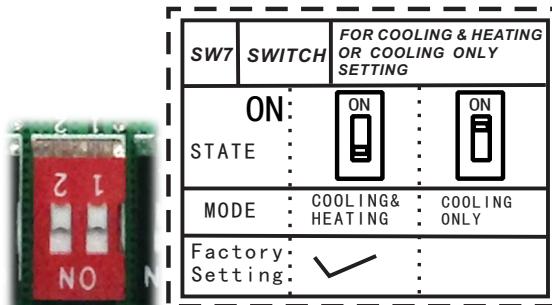
C. Micro-switch SW2-2 is for selection of Breezeless function.
Range: OFF, ON.



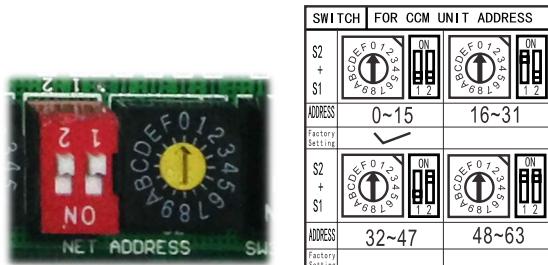
D. Micro-switch SW3 is for selection of auto-restart function.
Range: Active, inactive



E. Micro-switch SW6 is for selection of temperature compensation in heating mode. This helps to reduce the real temperature difference between ceiling and floor so that the unit could run properly. If the height of installation is lower, smaller value could be chosen.
Range: 6°C, 4°C, 2°C, E function (reserved for special customizing)



F. Micro-switch SW7 is for setting cooling & heating or cooling only.
Range: cooling & heating, cooling.



G. Micro-switch S1 and dial-switch S2 are for address setting when you want to control this unit by a central controller.

Range: 00-63



| FOR SETTING POWER(DC MOTOR MODEL ONLY) | | | | | | | | | | |
|--|-----------------------------|----|-------|-------|-------|-------|--------|---------|---------|---------|
| ENC1 | 0 | 1 | 2 | 4 | 5 | 7 | 8 | 9 | A | B |
| CODE | 0 | 1 | 2 | 4 | 5 | 7 | 8 | 9 | A | B |
| POWER | 20 | 26 | 32~35 | 36~53 | 54~71 | 72~90 | 91~105 | 106~140 | 141~160 | 161~200 |
| FACTORY SETTING | ACCORDING TO RELATED MODEL. | | | | | | | | | |

H. Dial-switch ENC1: The indoor PCB is universal designed for whole series units from 7K to 68K. This ENC1 setting will tell the main program what size the unit is.

NOTE: Usually there is glue on it because the switch position cannot be changed at random unless you want to use this PCB as a spare part to use in another unit. Then you have to select the right position to match the size of the unit.

"20" means 2kW (7K), "105" means 10.5kW(36K), and so on.

Outdoor Unit

Contents

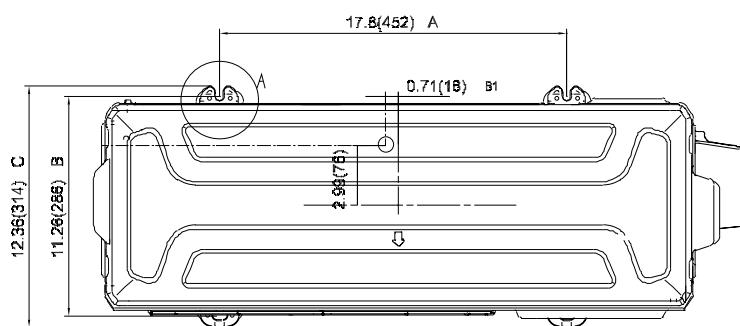
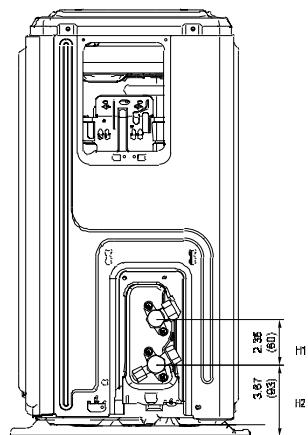
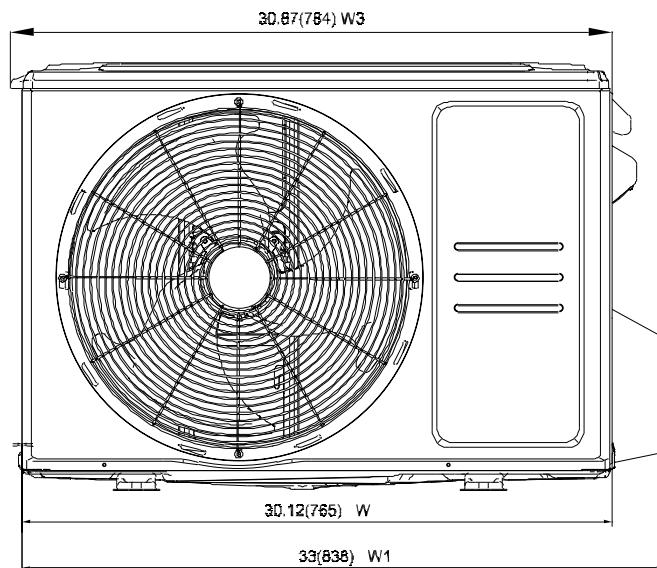
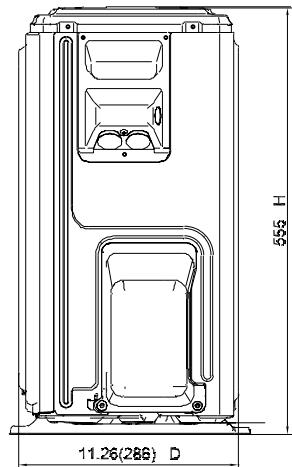
| | |
|---|----|
| 1. Dimensional Drawings | 2 |
| 2. Service Place..... | 18 |
| 3. Capacity Correction Factor for Height Difference | 19 |
| 4. Noise Criterion Curves..... | 25 |
| 5. Refrigerant Cycle Diagrams | 27 |
| 6. Electrical Wiring Diagrams..... | 29 |

1. Dimensional Drawings

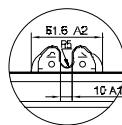
Please check the corresponding dimensional drawing according to the panel plate.

| ODU Model | Panel Plate |
|-------------------|-------------|
| ACIQ-09ZPL-HP230B | X330 |
| ACIQ-12ZPL-HP230B | X330 |
| ACIQ-18ZPL-HP230B | X430 |

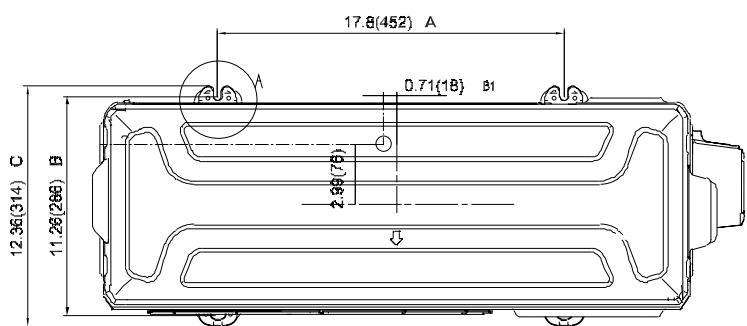
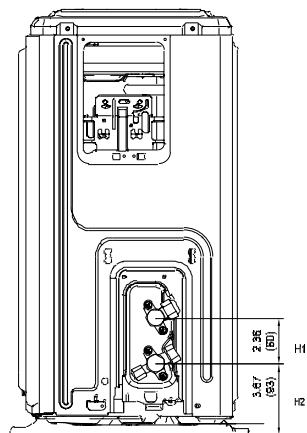
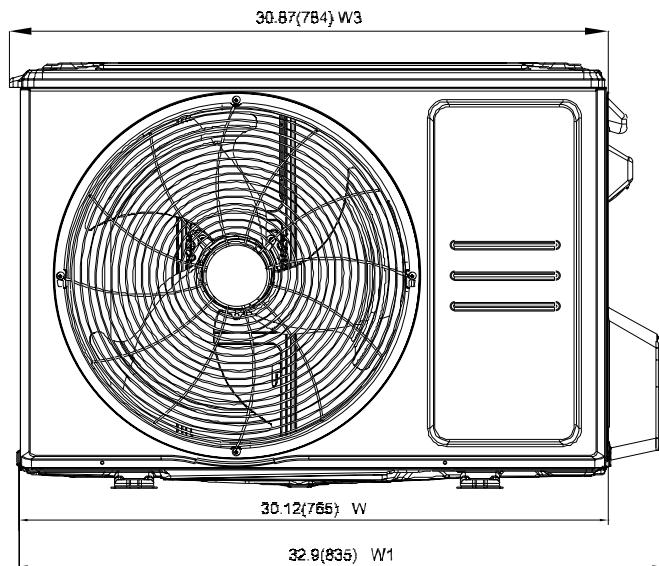
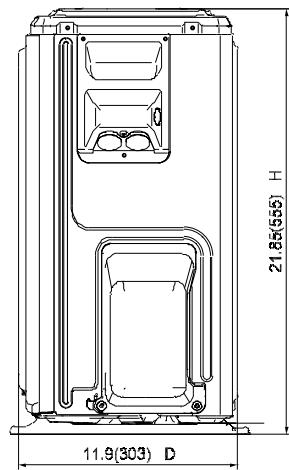
Panel Plate X230 (Rounded grille 1)



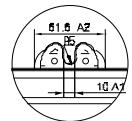
DETAIL A
SCALE 1:2



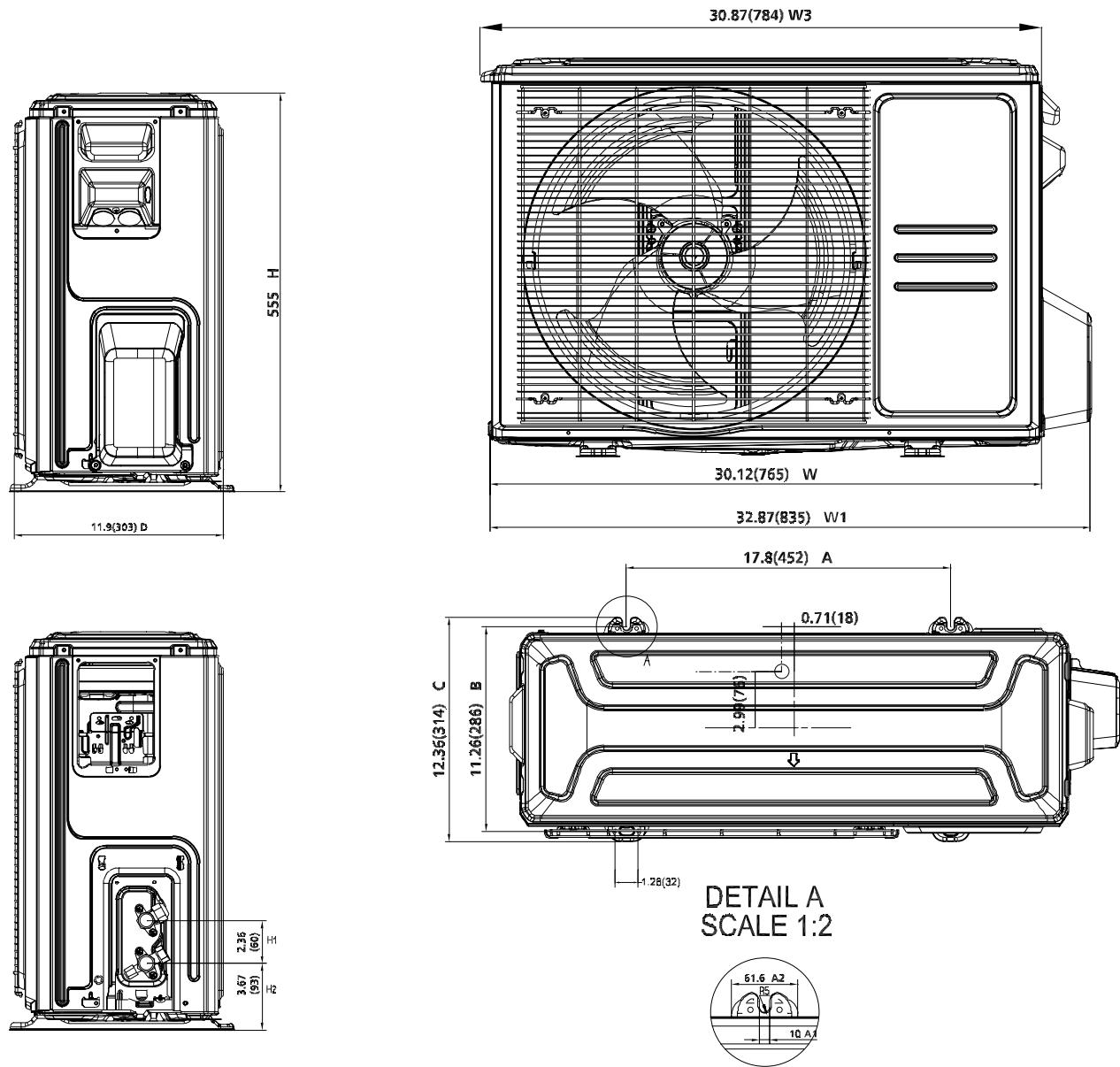
Panel Plate X230 (Rounded grille 2)



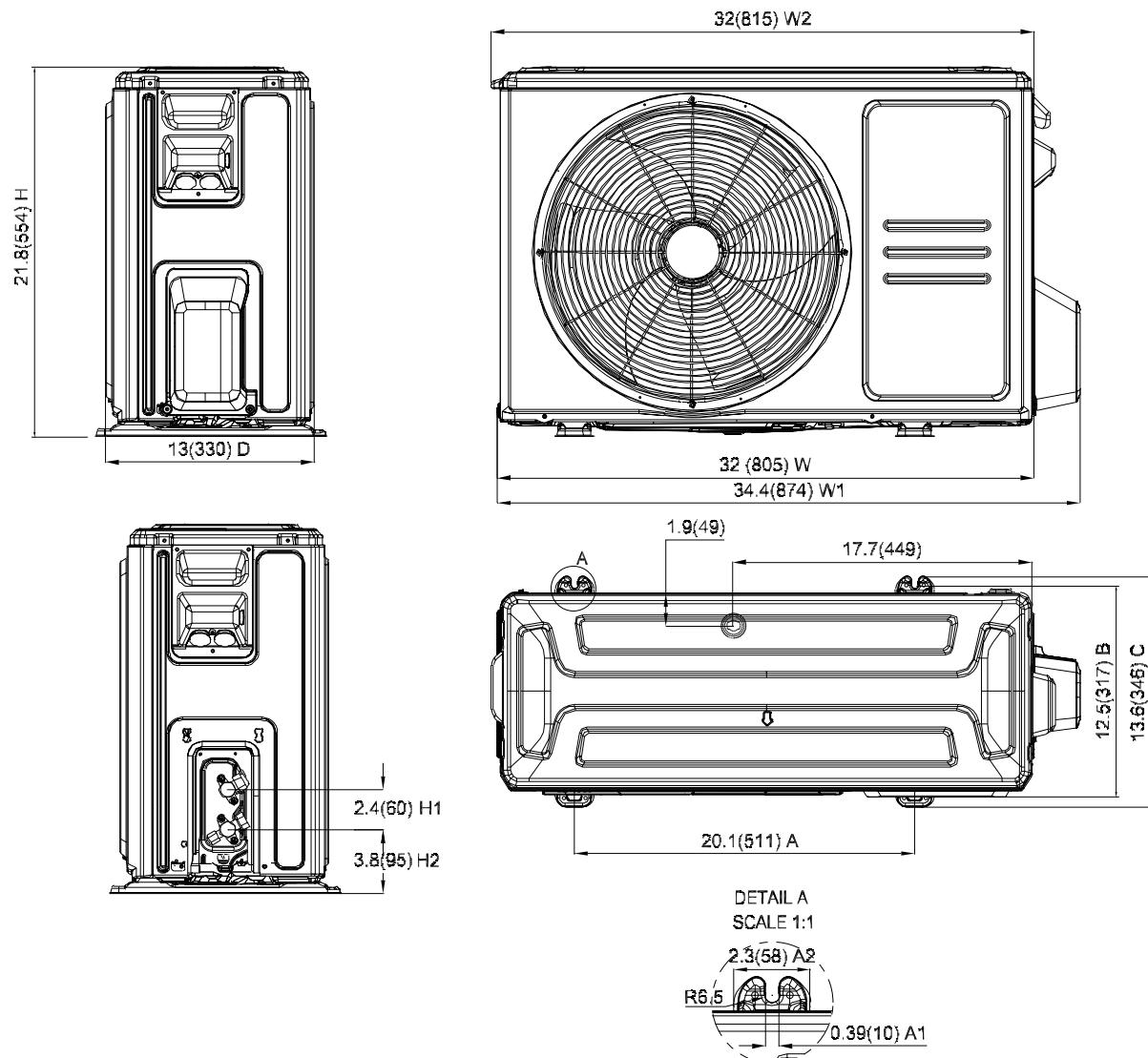
DETAIL A
SCALE 1:2



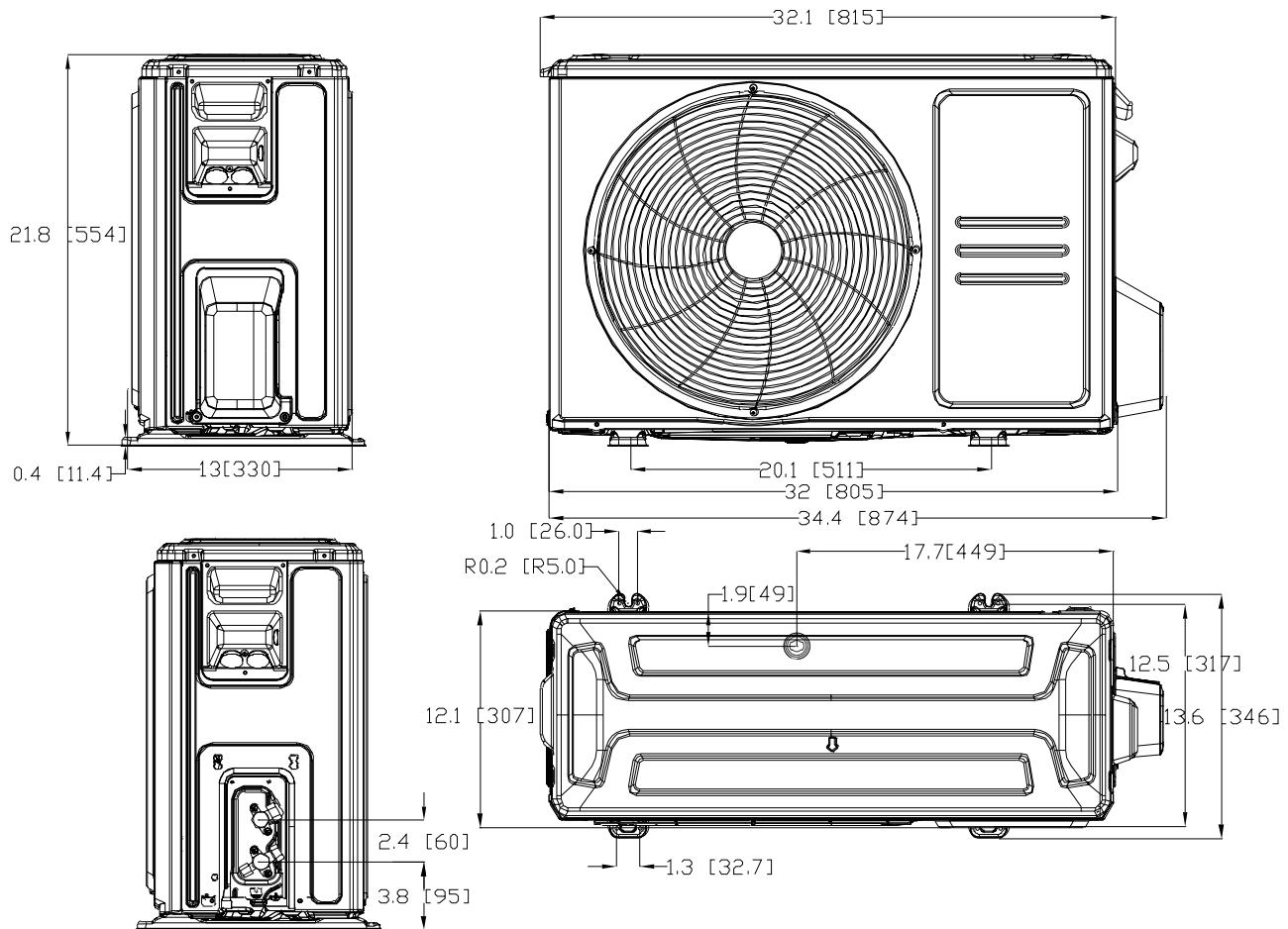
Panel Plate X230(Square grille)



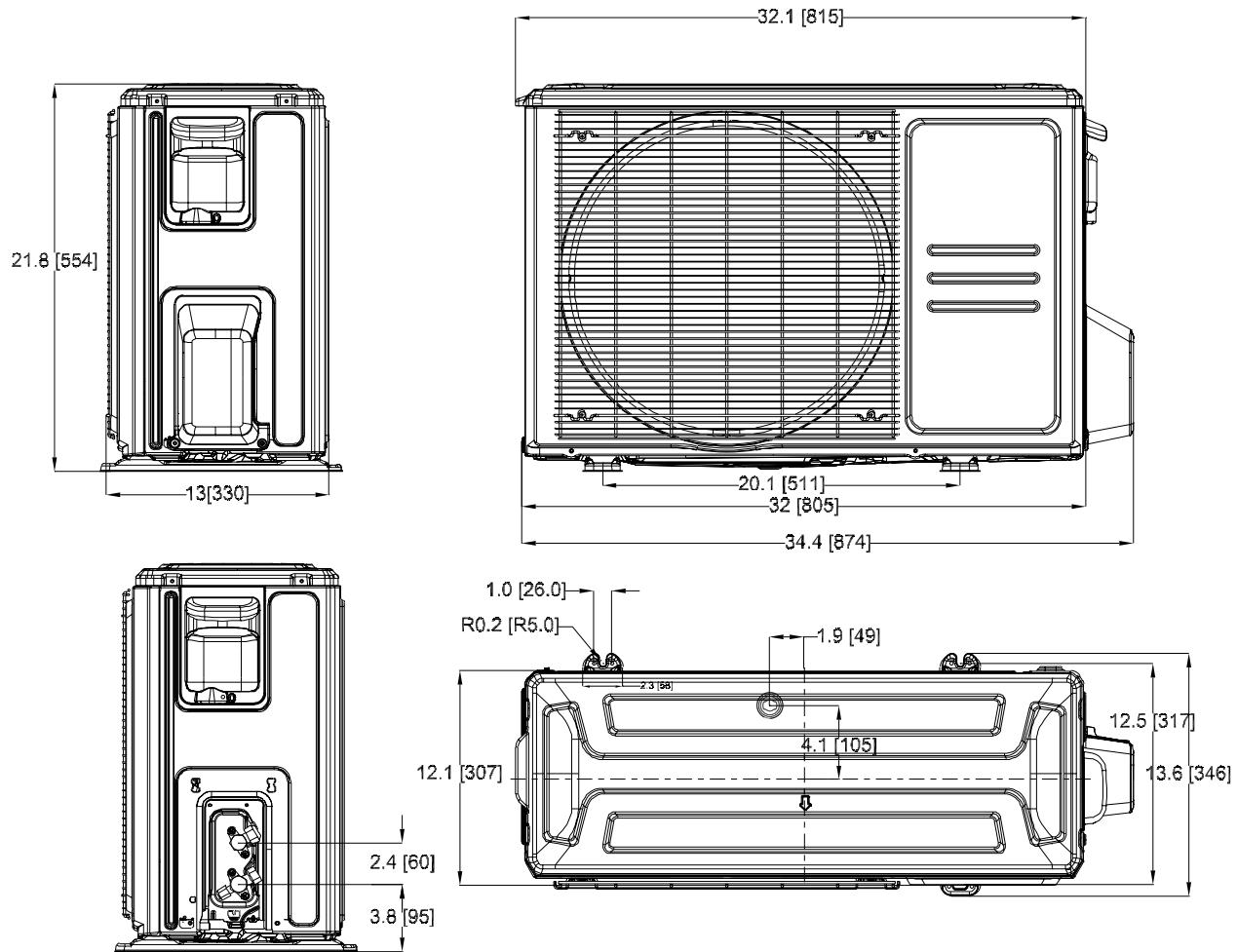
Panel Plate X330(Rounded grille 1)



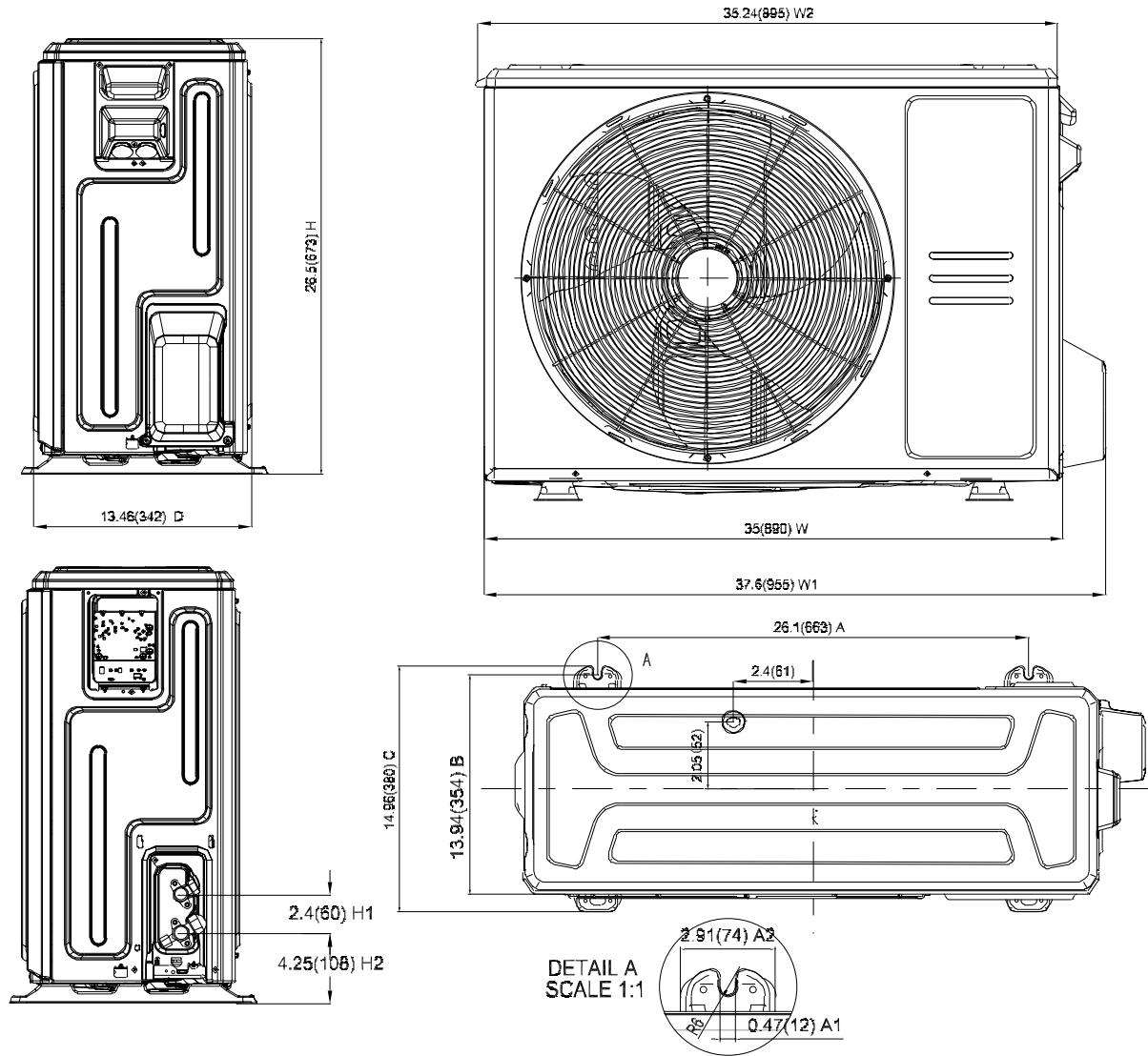
Panel Plate X330(Rounded grille 2)



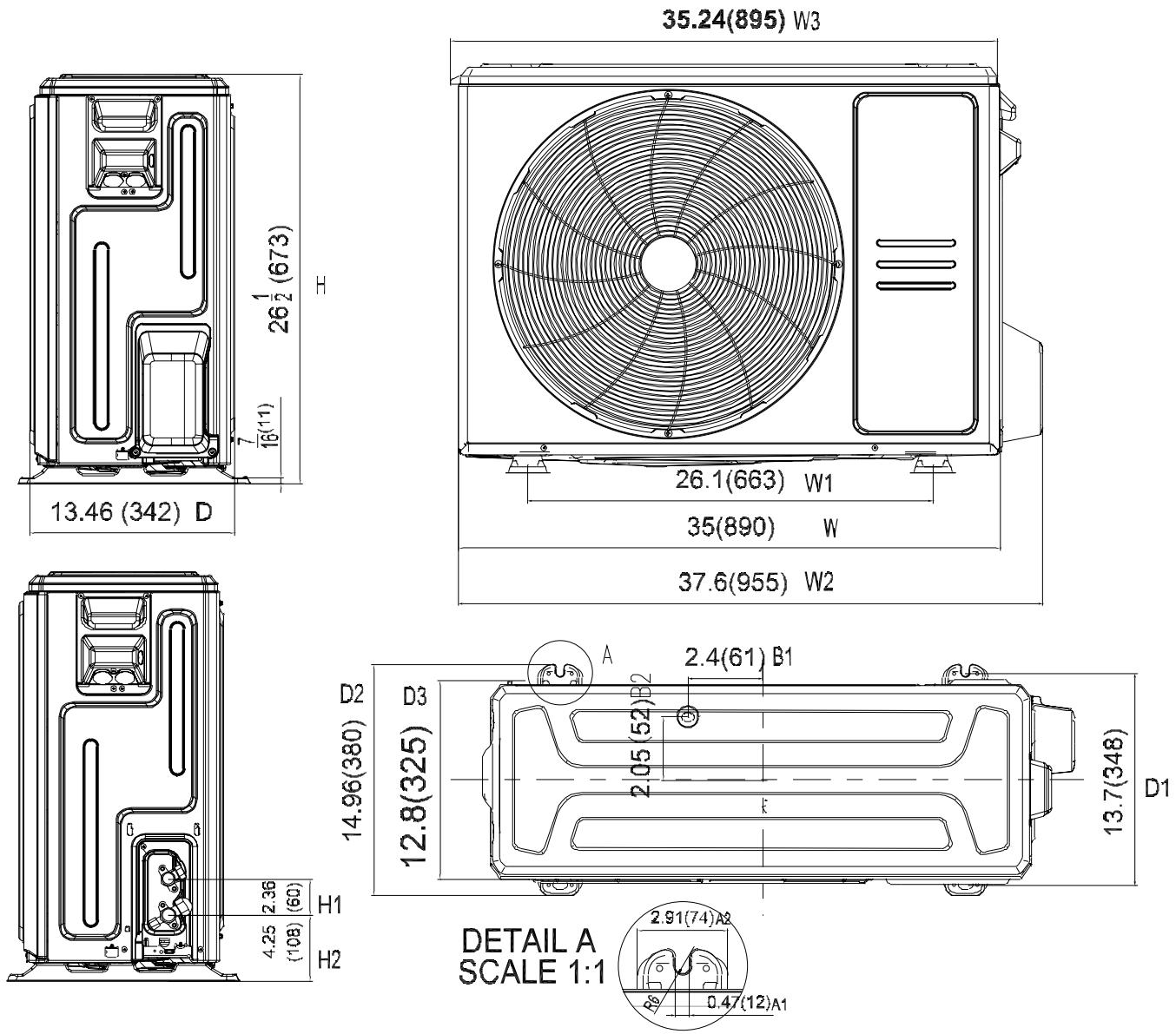
Panel Plate X330(Square grille)



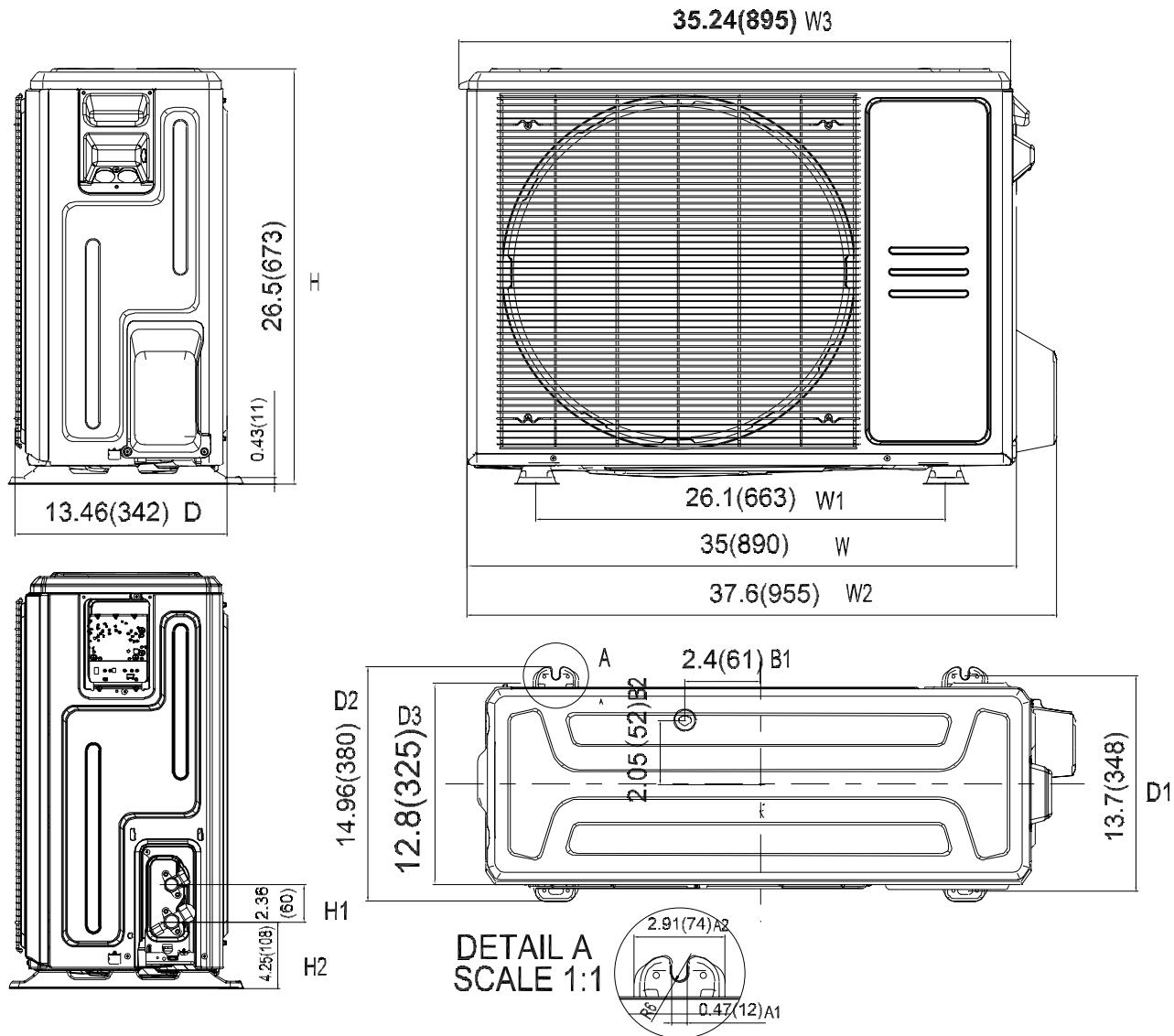
Panel Plate X430(Rounded grille 1)



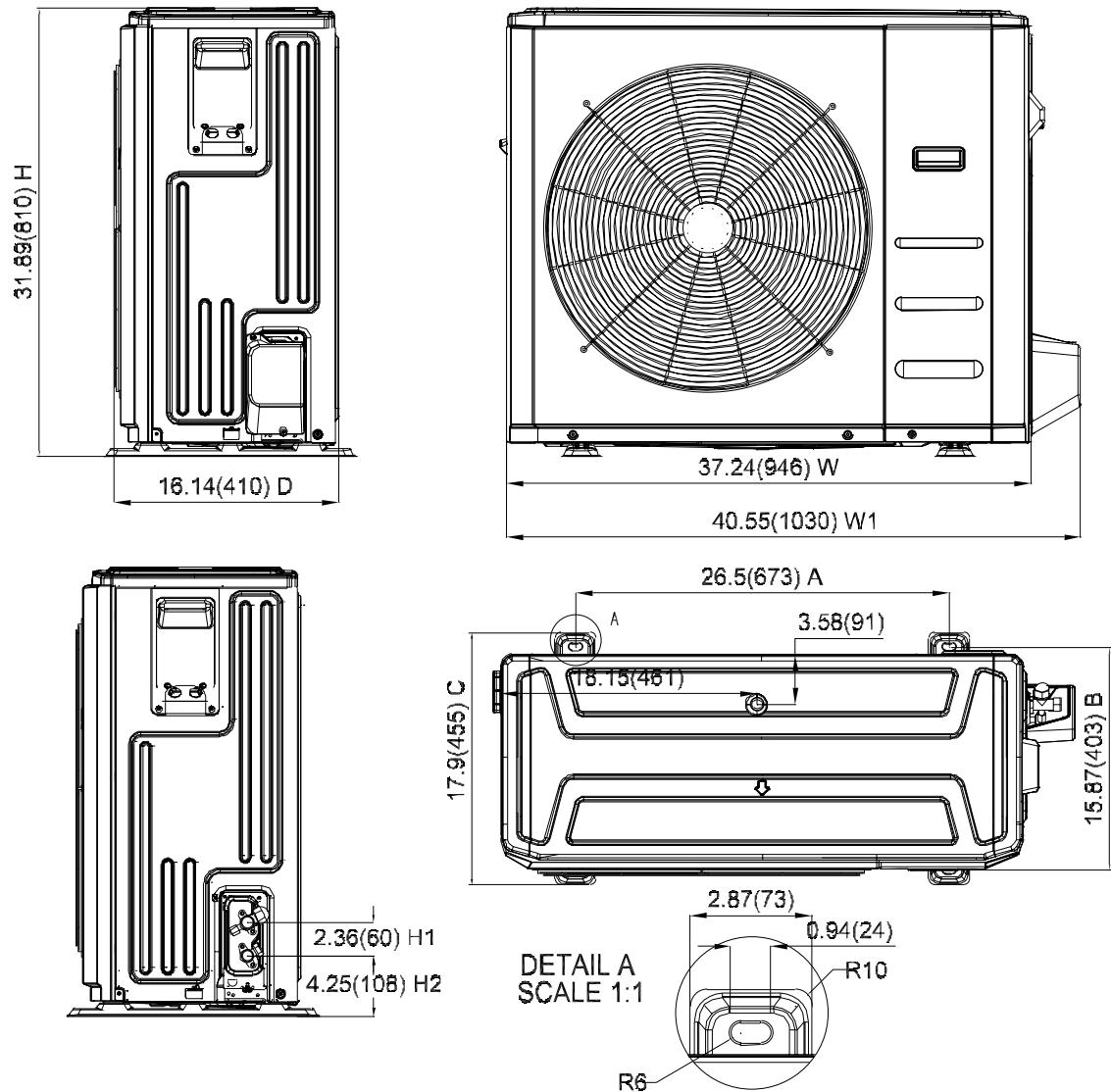
Panel Plate X430(Rounded grille 2)



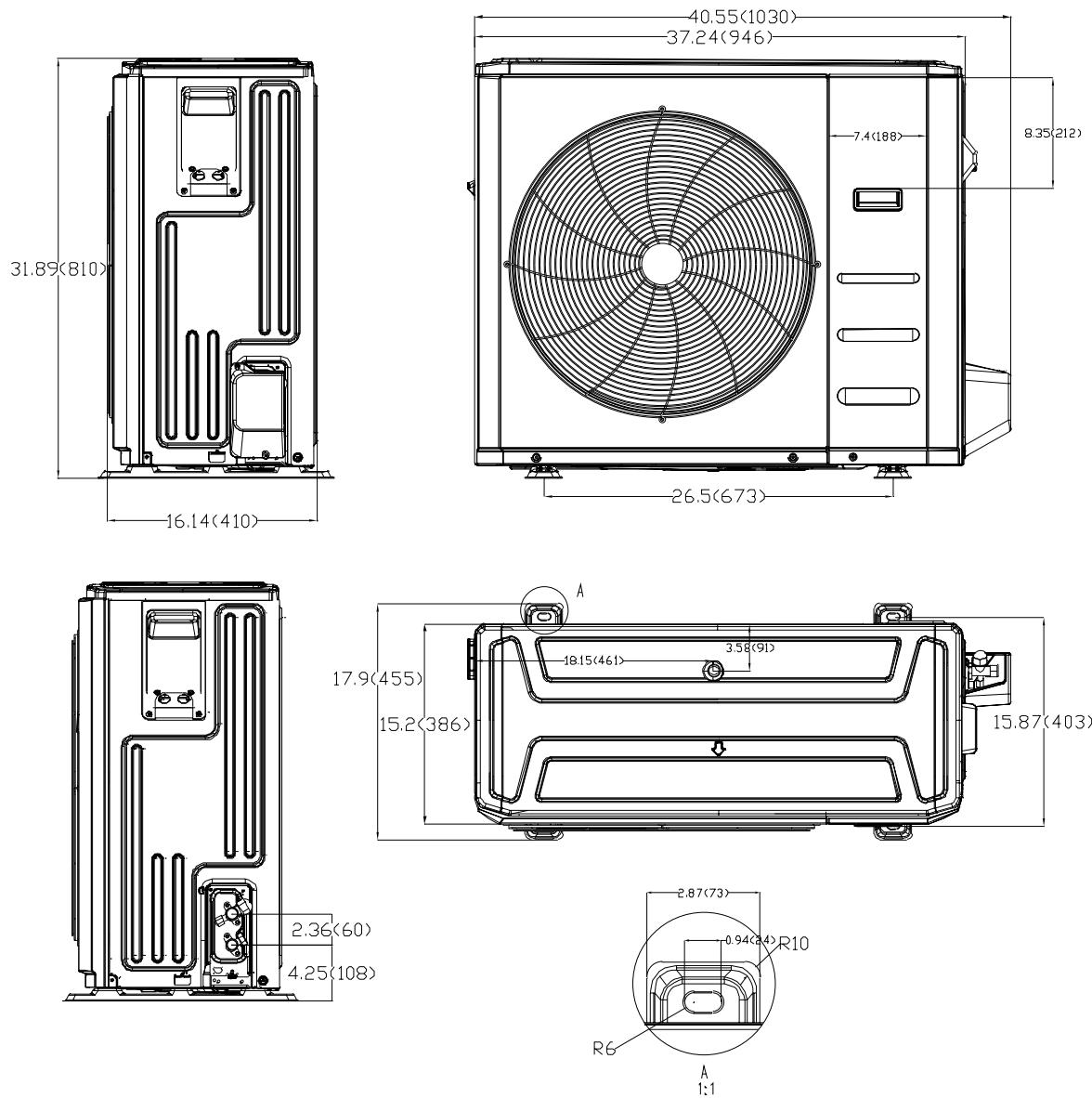
Panel Plate X430(Square grille)



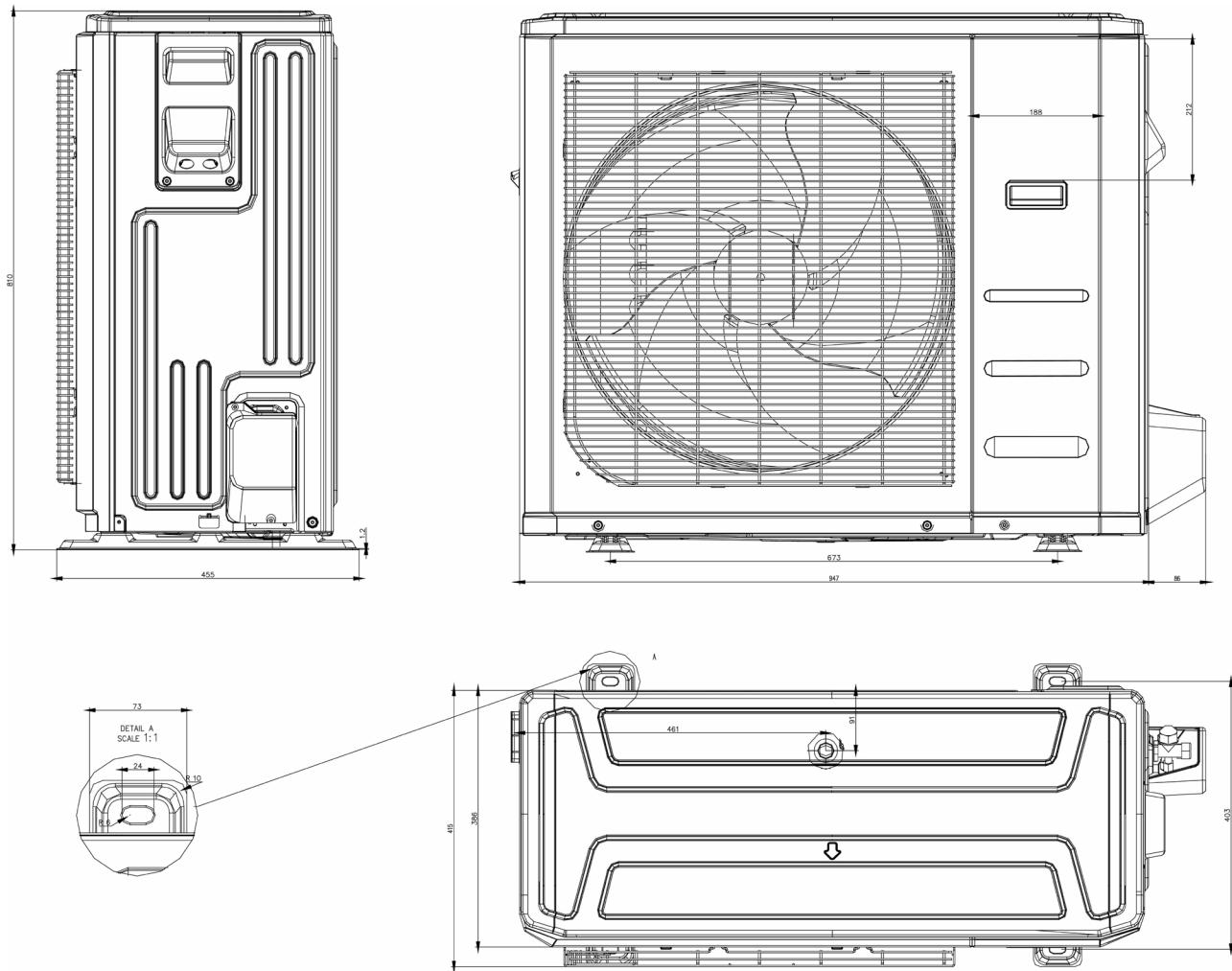
Panel Plate D30(Rounded grille 1)



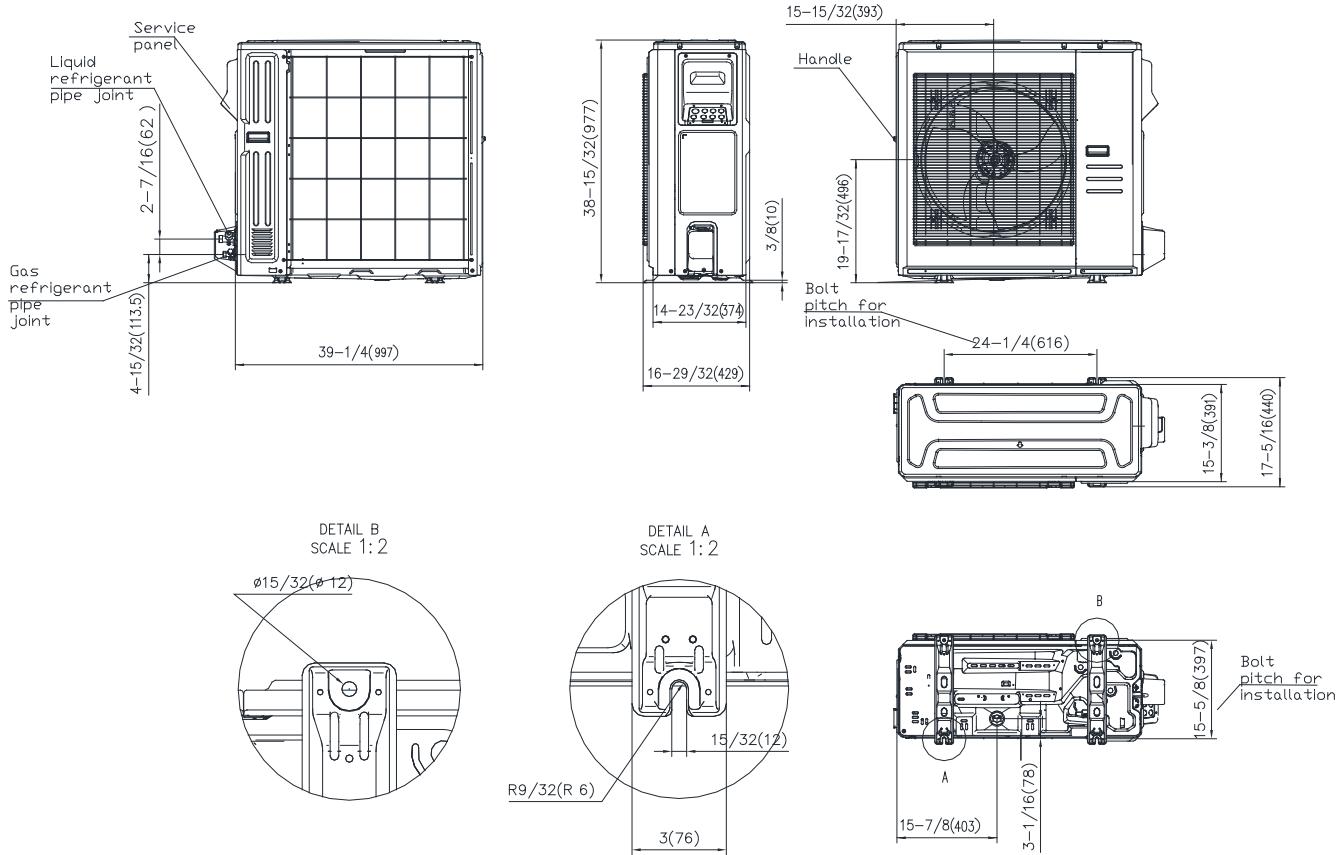
Panel Plate D30(Rounded grille 2)



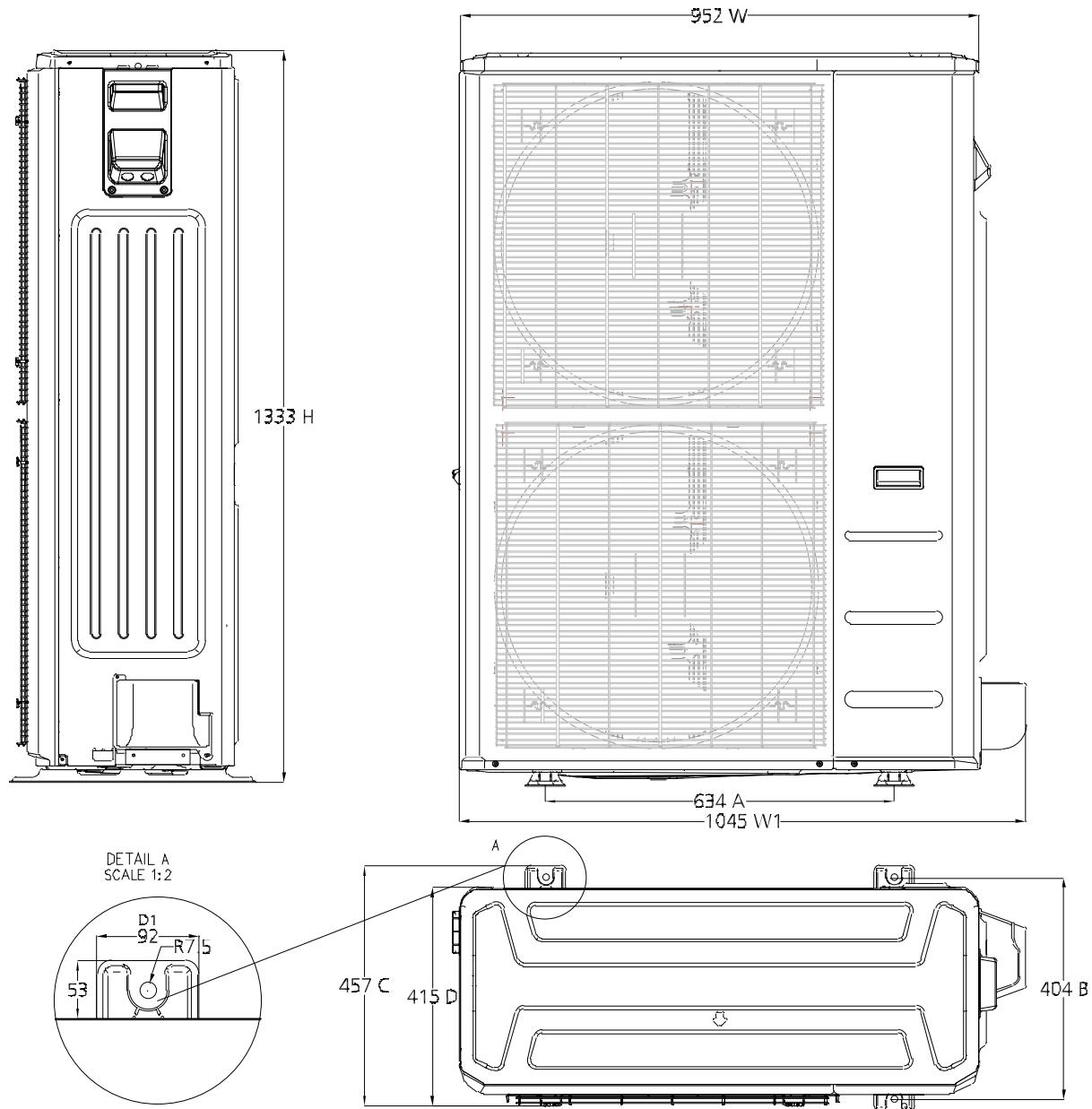
Panel Plate D30(Square grille)



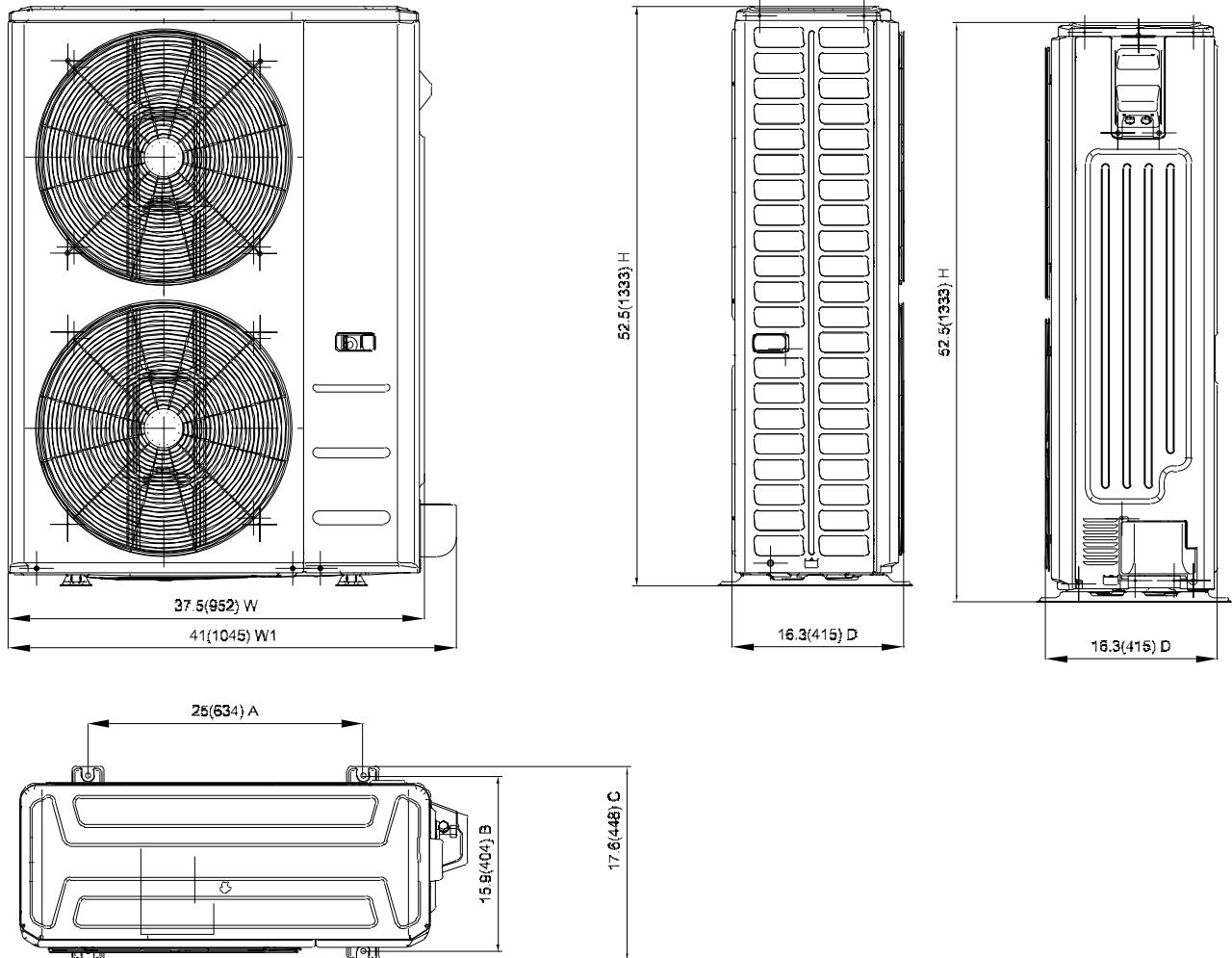
Panel Plate X630(Square grille)



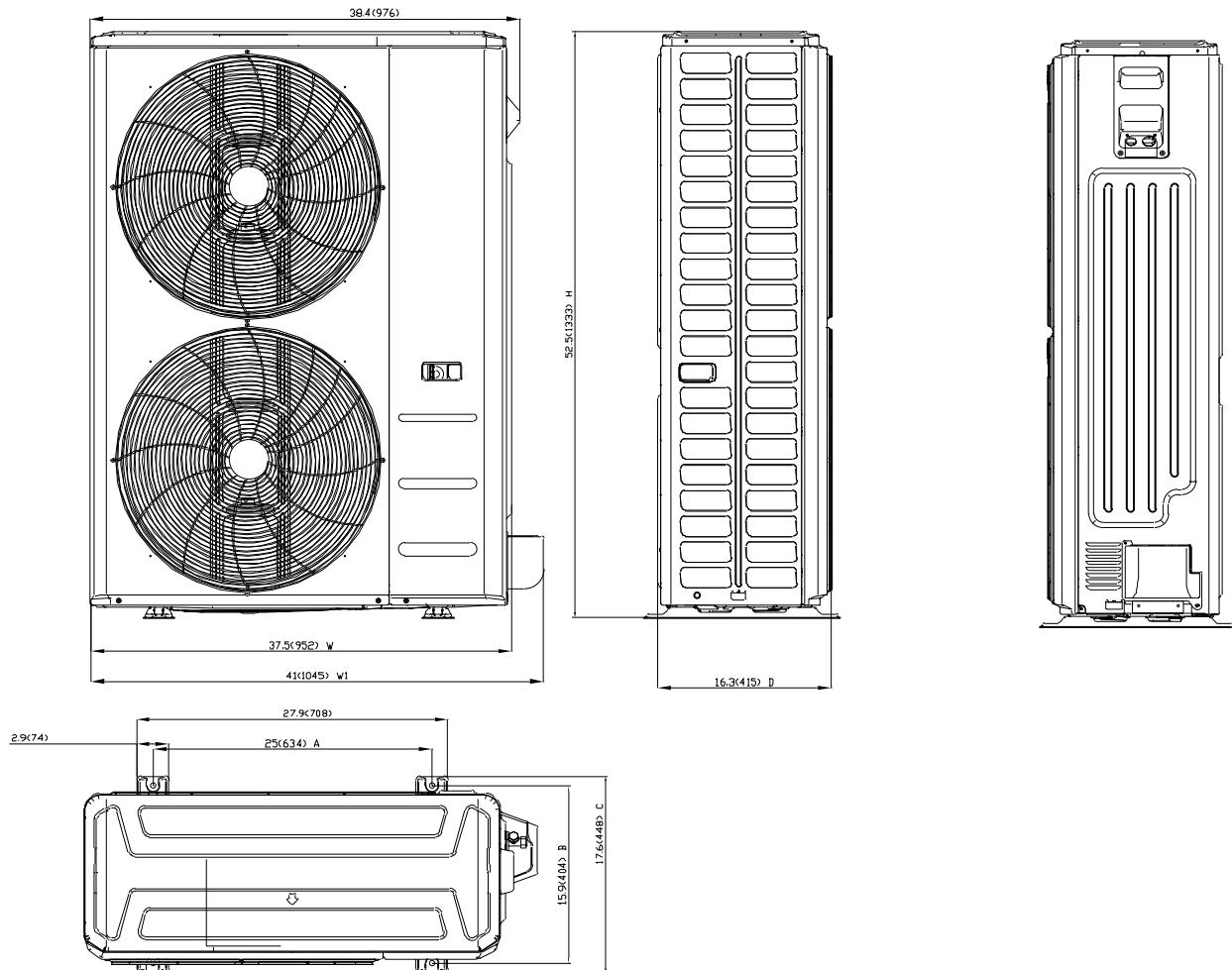
Panel Plate E30(Square grille)



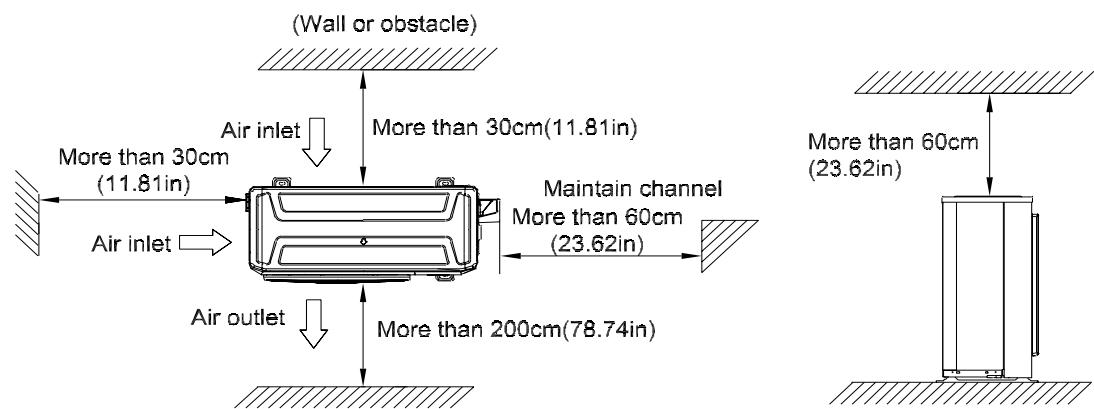
Panel Plate E30(Rounded grille 1)



Panel Plate E30(Rounded grille 2)



2. Service Place



3. Capacity Correction Factor for Height Difference

| Capacity(Btu/h) | 6k~9k | | Pipe Length (m/ft) | | | |
|-------------------------|---------------------------|-----------|--------------------|---------|---------|-------|
| Cooling | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 25/82 |
| Height difference H (m) | Indoor Upper than Outdoor | 10/32.8 | | 0.969 | 0.936 | 0.920 |
| | | 5/16.4 | 0.995 | 0.979 | 0.946 | 0.929 |
| | | 0 | 1.000 | 0.984 | 0.951 | 0.934 |
| | Outdoor Upper than Indoor | -5/-16.4 | 1.000 | 0.984 | 0.951 | 0.934 |
| | | -10/-32.8 | | 0.984 | 0.951 | 0.934 |
| | | | | | | |

| Capacity(Btu/h) | Heating | | 7.5/24.6 | 10/32.8 | 20/65.6 | 25/82 |
|-------------------------|---------------------------|-----------|----------|---------|---------|-------|
| Height difference H (m) | Indoor Upper than Outdoor | 10/32.8 | | 0.989 | 0.967 | 0.956 |
| | | 5/16.4 | 1.000 | 0.989 | 0.967 | 0.956 |
| | | 0 | 1.000 | 0.989 | 0.967 | 0.956 |
| | Outdoor Upper than Indoor | -5/-16.4 | 0.992 | 0.981 | 0.959 | 0.948 |
| | | -10/-32.8 | | 0.973 | 0.952 | 0.941 |
| | | | | | | |

| Capacity(Btu/h) | 12k | | Pipe Length (m/ft) | | | |
|-------------------------|---------------------------|-----------|--------------------|---------|---------|-------|
| Cooling | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 25/82 |
| Height difference H (m) | Indoor Upper than Outdoor | 10/32.8 | | 0.974 | 0.953 | 0.942 |
| | | 5/16.4 | 0.995 | 0.984 | 0.962 | 0.951 |
| | | 0 | 1.000 | 0.989 | 0.967 | 0.956 |
| | Outdoor Upper than Indoor | -5/-16.4 | 1.000 | 0.989 | 0.967 | 0.956 |
| | | -10/-32.8 | | 0.989 | 0.967 | 0.956 |
| | | | | | | |
| Heating | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 25/82 |
| Height difference H (m) | Indoor Upper than Outdoor | 10/32.8 | | 0.994 | 0.981 | 0.974 |
| | | 5/16.4 | 1.000 | 0.994 | 0.981 | 0.974 |
| | | 0 | 1.000 | 0.994 | 0.981 | 0.974 |
| | Outdoor Upper than Indoor | -5/-16.4 | 0.992 | 0.986 | 0.973 | 0.966 |
| | | -10/-32.8 | | 0.978 | 0.965 | 0.958 |
| | | | | | | |

| Capacity(Btu/h) | 18k | | Pipe Length (m/ft) | | | |
|-------------------------|---------------------------|-----------|--------------------|---------|---------|---------|
| Cooling | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 30/98.4 |
| Height difference H (m) | Indoor Upper than Outdoor | 20/65.6 | | | 0.941 | 0.919 |
| | | 10/32.8 | | 0.974 | 0.951 | 0.928 |
| | | 5/16.4 | 0.995 | 0.983 | 0.960 | 0.937 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.988 | 0.965 | 0.942 |
| | | -5/-16.4 | 1.000 | 0.988 | 0.965 | 0.942 |
| | | -10/-32.8 | | 0.988 | 0.965 | 0.942 |
| | | -20/-65.6 | | | 0.965 | 0.942 |

| Capacity(Btu/h) | 18k | | Pipe Length (m/ft) | | | |
|-------------------------|---------------------------|-----------|--------------------|---------|---------|---------|
| Heating | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 30/98.4 |
| Height difference H (m) | Indoor Upper than Outdoor | 20/65.6 | | | 0.987 | 0.978 |
| | | 10/32.8 | | 0.996 | 0.987 | 0.978 |
| | | 5/16.4 | 1.000 | 0.996 | 0.987 | 0.978 |
| | | 0 | 1.000 | 0.996 | 0.987 | 0.978 |
| | Outdoor Upper than Indoor | -5/-16.4 | 0.992 | 0.988 | 0.979 | 0.970 |
| | | -10/-32.8 | | 0.980 | 0.971 | 0.962 |
| | | -20/-65.6 | | | 0.963 | 0.955 |
| | | | | | | |

| Capacity (Btu/h) | 24k | | Pipe Length (m/ft) | | | | | |
|-------------------------|---------------------------|-----------|--------------------|---------|---------|---------|----------|--------|
| Cooling | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 30/98.4 | 40/131.2 | 50/164 |
| Height difference H (m) | Indoor Upper than Outdoor | 25/82 | | | | 0.917 | 0.898 | 0.879 |
| | | 20/65.6 | | | 0.946 | 0.926 | 0.907 | 0.887 |
| | | 10/32.8 | | 0.975 | 0.955 | 0.936 | 0.916 | 0.896 |
| | | 5/16.4 | 0.995 | 0.985 | 0.965 | 0.945 | 0.925 | 0.905 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.990 | 0.970 | 0.950 | 0.930 | 0.910 |
| | | -5/-16.4 | 1.000 | 0.990 | 0.970 | 0.950 | 0.930 | 0.910 |
| | | -10/-32.8 | | 0.990 | 0.970 | 0.950 | 0.930 | 0.910 |
| | | -20/-65.6 | | | 0.970 | 0.950 | 0.930 | 0.910 |
| | | -25/-82 | | | | 0.950 | 0.930 | 0.910 |

| Heating | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 30/98.4 | 40/131.2 | 50/164 |
|-------------------------|---------------------------|-----------|----------|---------|---------|---------|----------|--------|
| Height difference H (m) | Indoor Upper than Outdoor | 25/82 | | | | 0.984 | 0.978 | 0.972 |
| | | 20/65.6 | | | 0.991 | 0.984 | 0.978 | 0.972 |
| | | 10/32.8 | | 0.997 | 0.991 | 0.984 | 0.978 | 0.972 |
| | | 5/16.4 | 1.000 | 0.997 | 0.991 | 0.984 | 0.978 | 0.972 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.997 | 0.991 | 0.984 | 0.978 | 0.972 |
| | | -5/-16.4 | 0.992 | 0.989 | 0.983 | 0.977 | 0.970 | 0.964 |
| | | -10/-32.8 | | 0.981 | 0.975 | 0.969 | 0.963 | 0.957 |
| | | -20/-65.6 | | | 0.967 | 0.961 | 0.955 | 0.949 |
| | | -25/-82 | | | | 0.953 | 0.947 | 0.941 |

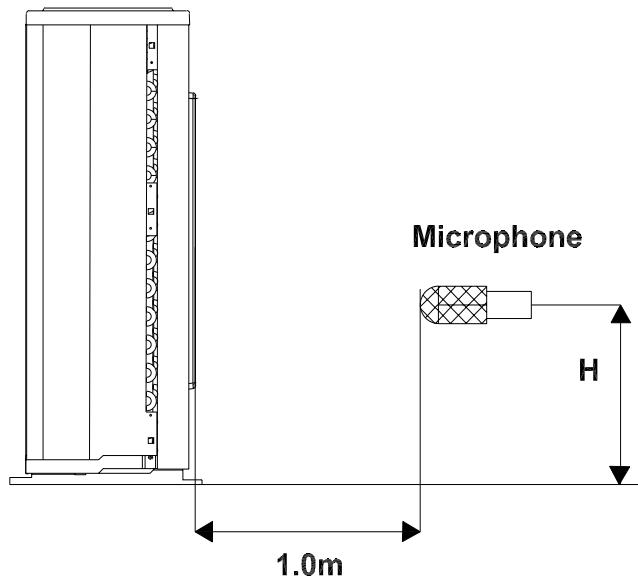
| Capacity (Btu/h) | 30k | | Pipe Length (m/ft) | | | | | |
|----------------------------|------------------------------|-----------|--------------------|---------|---------|---------|----------|--------|
| Cooling | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 30/98.4 | 40/131.2 | 50/164 |
| Height difference H (m) | Indoor Upper than Outdoor | 25/82 | | | | 0.891 | 0.862 | 0.832 |
| | | 20/65.6 | | | 0.930 | 0.900 | 0.871 | 0.841 |
| | | 10/32.8 | | 0.970 | 0.940 | 0.910 | 0.879 | 0.849 |
| | | 5/16.4 | 0.995 | 0.980 | 0.949 | 0.919 | 0.888 | 0.858 |
| | | 0 | 1.000 | 0.985 | 0.954 | 0.923 | 0.893 | 0.862 |
| | Outdoor Upper than Indoor | -5/-16.4 | 1.000 | 0.985 | 0.954 | 0.923 | 0.893 | 0.862 |
| | | -10/-32.8 | | 0.985 | 0.954 | 0.923 | 0.893 | 0.862 |
| | | -20/-65.6 | | | 0.954 | 0.923 | 0.893 | 0.862 |
| | | -25/-82 | | | | 0.923 | 0.893 | 0.862 |
| Heating | | | 7.5/24.6 | 10/32.8 | 20/65.6 | 30/98.4 | 40/131.2 | 50/164 |
| Height difference H (m) | Indoor Upper than Outdoor | 25/82 | | | | 0.961 | 0.945 | 0.929 |
| | | 20/65.6 | | | 0.976 | 0.961 | 0.945 | 0.929 |
| | | 10/32.8 | | 0.992 | 0.976 | 0.961 | 0.945 | 0.929 |
| | | 5/16.4 | 1.000 | 0.992 | 0.976 | 0.961 | 0.945 | 0.929 |
| | | 0 | 1.000 | 0.992 | 0.976 | 0.961 | 0.945 | 0.929 |
| | Outdoor Upper than Indoor | -5/-16.4 | 0.992 | 0.984 | 0.969 | 0.953 | 0.937 | 0.922 |
| | | -10/-32.8 | | 0.976 | 0.961 | 0.945 | 0.930 | 0.914 |
| | | -20/-65.6 | | | 0.953 | 0.938 | 0.922 | 0.907 |
| | | -25/-82 | | | | 0.930 | 0.915 | 0.900 |

| Capacity (Btu/h) | 36k | | Pipe Length (m/ft) | | | | | |
|-------------------------------|------------------------------|-----------|--------------------|---------|-------|----------|--------|----------|
| Cooling | | | 7.5/24.6 | 15/49.2 | 25/82 | 35/114.8 | 50/164 | 65/213.3 |
| Height difference H (m) | Indoor Upper than Outdoor | 30/98.4 | | | | 0.889 | 0.850 | 0.812 |
| | | 20/65.6 | | | 0.924 | 0.898 | 0.859 | 0.820 |
| | | 10/32.8 | | 0.959 | 0.933 | 0.907 | 0.868 | 0.828 |
| | | 5/16.4 | 0.995 | 0.969 | 0.942 | 0.916 | 0.876 | 0.837 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.974 | 0.947 | 0.921 | 0.881 | 0.841 |
| | | -5/-16.4 | 1.000 | 0.974 | 0.947 | 0.921 | 0.881 | 0.841 |
| | | -10/-32.8 | | 0.974 | 0.947 | 0.921 | 0.881 | 0.841 |
| | | -20/-65.6 | | | 0.947 | 0.921 | 0.881 | 0.841 |
| | | -30/-98.4 | | | | 0.921 | 0.881 | 0.841 |
| Heating | | | 7.5/24.6 | 15/49.2 | 25/82 | 35/114.8 | 50/164 | 65/213.3 |
| Height difference H (m) | Indoor Upper than Outdoor | 30/98.4 | | | | 0.964 | 0.945 | 0.927 |
| | | 20/65.6 | | | 0.976 | 0.964 | 0.945 | 0.927 |
| | | 10/32.8 | | 0.988 | 0.976 | 0.964 | 0.945 | 0.927 |
| | | 5/16.4 | 1.000 | 0.988 | 0.976 | 0.964 | 0.945 | 0.927 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.988 | 0.976 | 0.964 | 0.945 | 0.927 |
| | | -5/-16.4 | 0.992 | 0.980 | 0.968 | 0.956 | 0.938 | 0.920 |
| | | -10/-32.8 | | 0.972 | 0.960 | 0.948 | 0.930 | 0.912 |
| | | -20/-65.6 | | | 0.952 | 0.941 | 0.923 | 0.905 |
| | | -30/-98.4 | | | | 0.933 | 0.915 | 0.898 |

| Capacity (Btu/h) | 48k | | Pipe Length (m/ft) | | | | | |
|-------------------------------|------------------------------|-----------|--------------------|---------|-------|----------|--------|----------|
| Cooling | | | 7.5/24.6 | 15/49.2 | 25/82 | 35/114.8 | 50/164 | 65/213.3 |
| Height difference H (m) | Indoor Upper than Outdoor | 30/98.4 | | | | 0.884 | 0.843 | 0.802 |
| | | 20/65.6 | | | 0.920 | 0.893 | 0.852 | 0.810 |
| | | 10/32.8 | | 0.957 | 0.930 | 0.902 | 0.860 | 0.819 |
| | | 5/16.4 | 0.995 | 0.967 | 0.939 | 0.911 | 0.869 | 0.827 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.972 | 0.944 | 0.916 | 0.873 | 0.831 |
| | | -5/-16.4 | 1.000 | 0.972 | 0.944 | 0.916 | 0.873 | 0.831 |
| | | -10/-32.8 | | 0.972 | 0.944 | 0.916 | 0.873 | 0.831 |
| | | -20/-65.6 | | | 0.944 | 0.916 | 0.873 | 0.831 |
| | | -30/-98.4 | | | | 0.916 | 0.873 | 0.831 |
| Heating | | | 7.5/24.6 | 15/49.2 | 25/82 | 35/114.8 | 50/164 | 65/213.3 |
| Height difference H (m) | Indoor Upper than Outdoor | 30/98.4 | | | | 0.958 | 0.936 | 0.915 |
| | | 20/65.6 | | | 0.972 | 0.958 | 0.936 | 0.915 |
| | | 10/32.8 | | 0.986 | 0.972 | 0.958 | 0.936 | 0.915 |
| | | 5/16.4 | 1.000 | 0.986 | 0.972 | 0.958 | 0.936 | 0.915 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.986 | 0.972 | 0.958 | 0.936 | 0.915 |
| | | -5/-16.4 | 0.992 | 0.978 | 0.964 | 0.950 | 0.929 | 0.908 |
| | | -10/-32.8 | | 0.970 | 0.956 | 0.942 | 0.921 | 0.900 |
| | | -20/-65.6 | | | 0.949 | 0.935 | 0.914 | 0.893 |
| | | -30/-98.4 | | | | 0.927 | 0.907 | 0.886 |

| Capacity (Btu/h) | 60k | | Pipe Length (m/ft) | | | | | |
|-------------------------------|------------------------------|-----------|--------------------|---------|-------|----------|--------|----------|
| Cooling | | | 7.5/24.6 | 15/49.2 | 25/82 | 35/114.8 | 50/164 | 65/213.3 |
| Height difference H (m) | Indoor Upper than Outdoor | 30/98.4 | | | | 0.870 | 0.823 | 0.775 |
| | | 20/65.6 | | | 0.911 | 0.879 | 0.831 | 0.783 |
| | | 10/32.8 | | 0.953 | 0.920 | 0.888 | 0.840 | 0.791 |
| | | 5/16.4 | 0.995 | 0.962 | 0.930 | 0.897 | 0.848 | 0.799 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.967 | 0.934 | 0.902 | 0.852 | 0.803 |
| | | -5/-16.4 | 1.000 | 0.967 | 0.934 | 0.902 | 0.852 | 0.803 |
| | | -10/-32.8 | | 0.967 | 0.934 | 0.902 | 0.852 | 0.803 |
| | | -20/-65.6 | | | 0.934 | 0.902 | 0.852 | 0.803 |
| | | -30/-98.4 | | | | 0.902 | 0.852 | 0.803 |
| Heating | | | 7.5/24.6 | 15/49.2 | 25/82 | 35/114.8 | 50/164 | 65/213.3 |
| Height difference H (m) | Indoor Upper than Outdoor | 30/98.4 | | | | 0.955 | 0.932 | 0.909 |
| | | 20/65.6 | | | 0.970 | 0.955 | 0.932 | 0.909 |
| | | 10/32.8 | | 0.985 | 0.970 | 0.955 | 0.932 | 0.909 |
| | | 5/16.4 | 1.000 | 0.985 | 0.970 | 0.955 | 0.932 | 0.909 |
| | Outdoor Upper than Indoor | 0 | 1.000 | 0.985 | 0.970 | 0.955 | 0.932 | 0.909 |
| | | -5/-16.4 | 0.992 | 0.977 | 0.962 | 0.947 | 0.924 | 0.902 |
| | | -10/-32.8 | | 0.969 | 0.954 | 0.939 | 0.917 | 0.895 |
| | | -20/-65.6 | | | 0.947 | 0.932 | 0.910 | 0.887 |
| | | -30/-98.4 | | | | 0.924 | 0.902 | 0.880 |

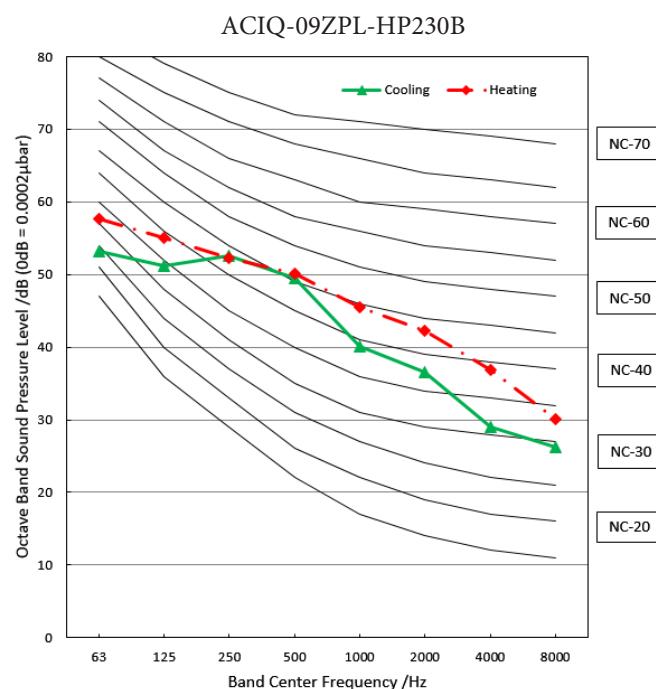
4. Noise Criterion Curves



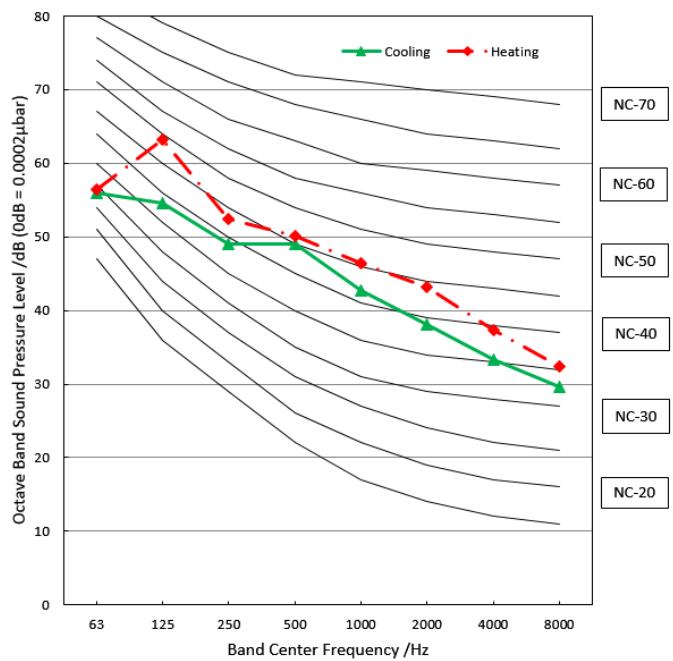
Note: $H = 0.5 \times \text{height of outdoor unit}$

Notes:

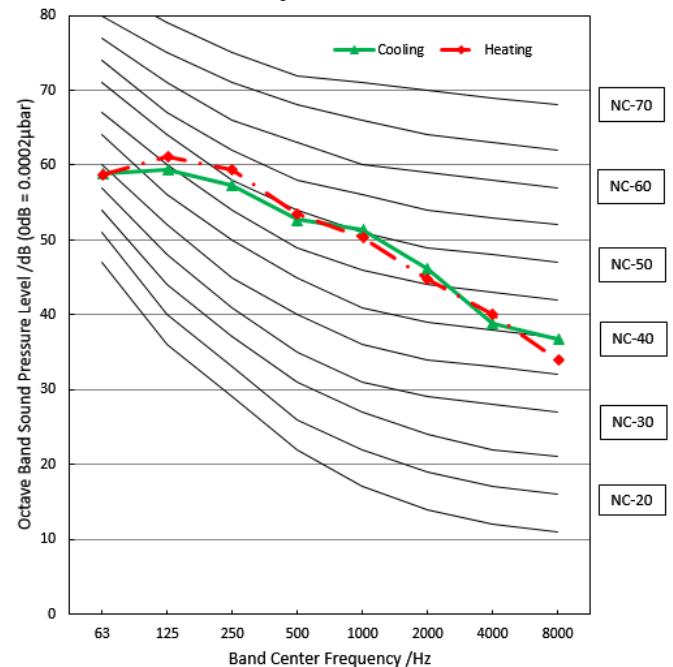
- Sound measured at 1.0m away from the center of the unit.
- Data is valid at free field condition
- Data is valid at nominal operation condition
- Reference acoustic pressure $OdB=20\mu Pa$
- Sound level will vary depending on arrangement of actors such as the construction (acoustic absorption coefficient) of particular room in which the equipment is installed.
- The operating conditions are assumed to be standard.



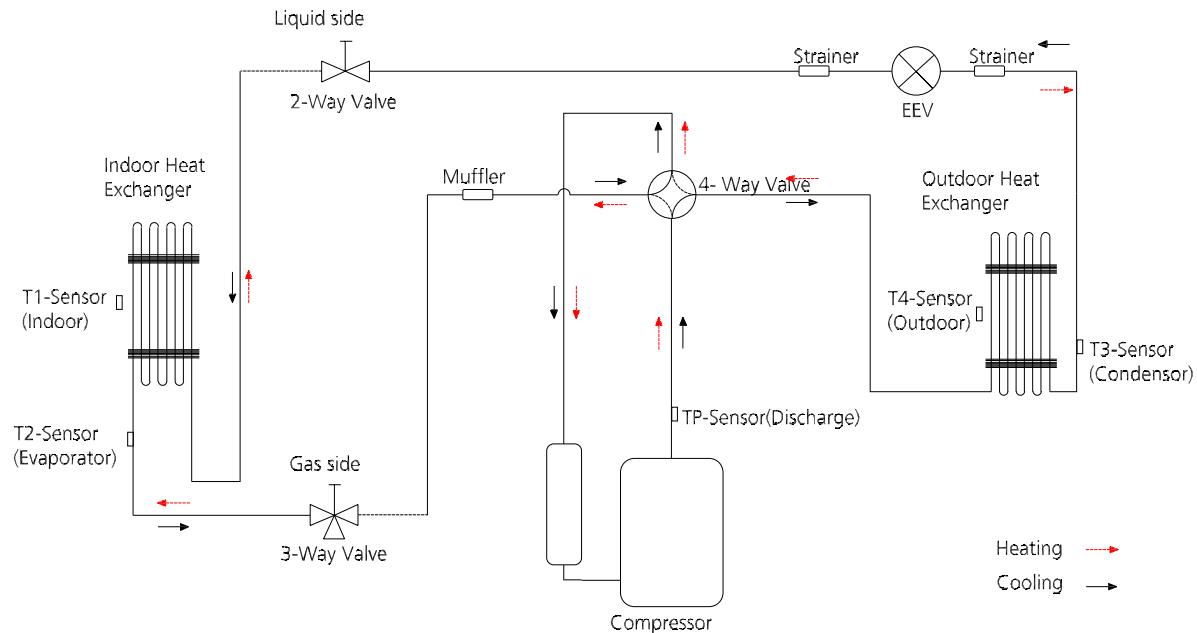
ACIQ-12ZPL-HP230B



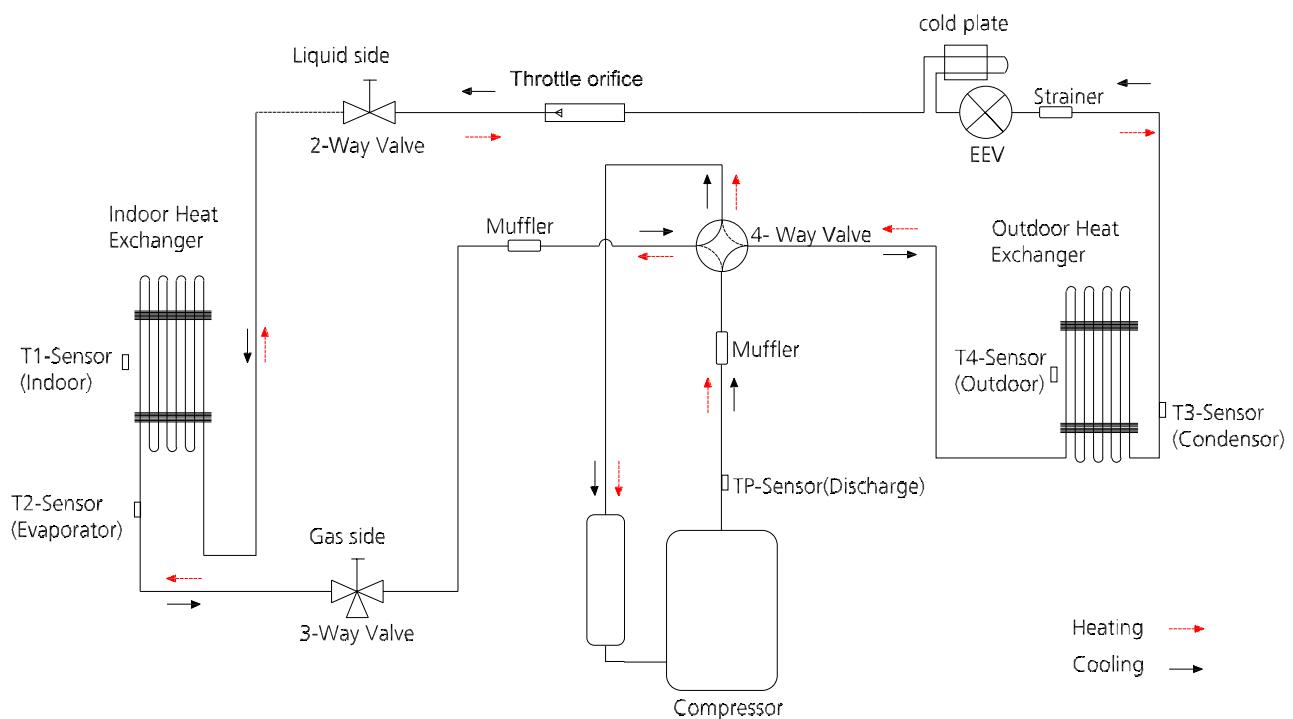
ACIQ-18ZPL-HP230B



5. Refrigerant Cycle Diagrams



| Model | Pipe Size (Diameter: \varnothing) mm(inch) | | Piping length (m/ft) | | Elevation (m/ft) | | Additional Refrigerant |
|-------------------|--|-----------|----------------------|-------|------------------|---------|------------------------|
| | Gas | Liquid | Rated | Max. | Rated | Max. | |
| ACIQ-09ZPL-HP230B | 9.52(3/8) | 6.35(1/4) | 7.5/24.6 | 25/82 | 0 | 10/32.8 | 15g/m (0.16oz/ft) |
| ACIQ-12ZPL-HP230B | 12.7(1/2) | 6.35(1/4) | 7.5/24.6 | 25/82 | 0 | 10/32.8 | |



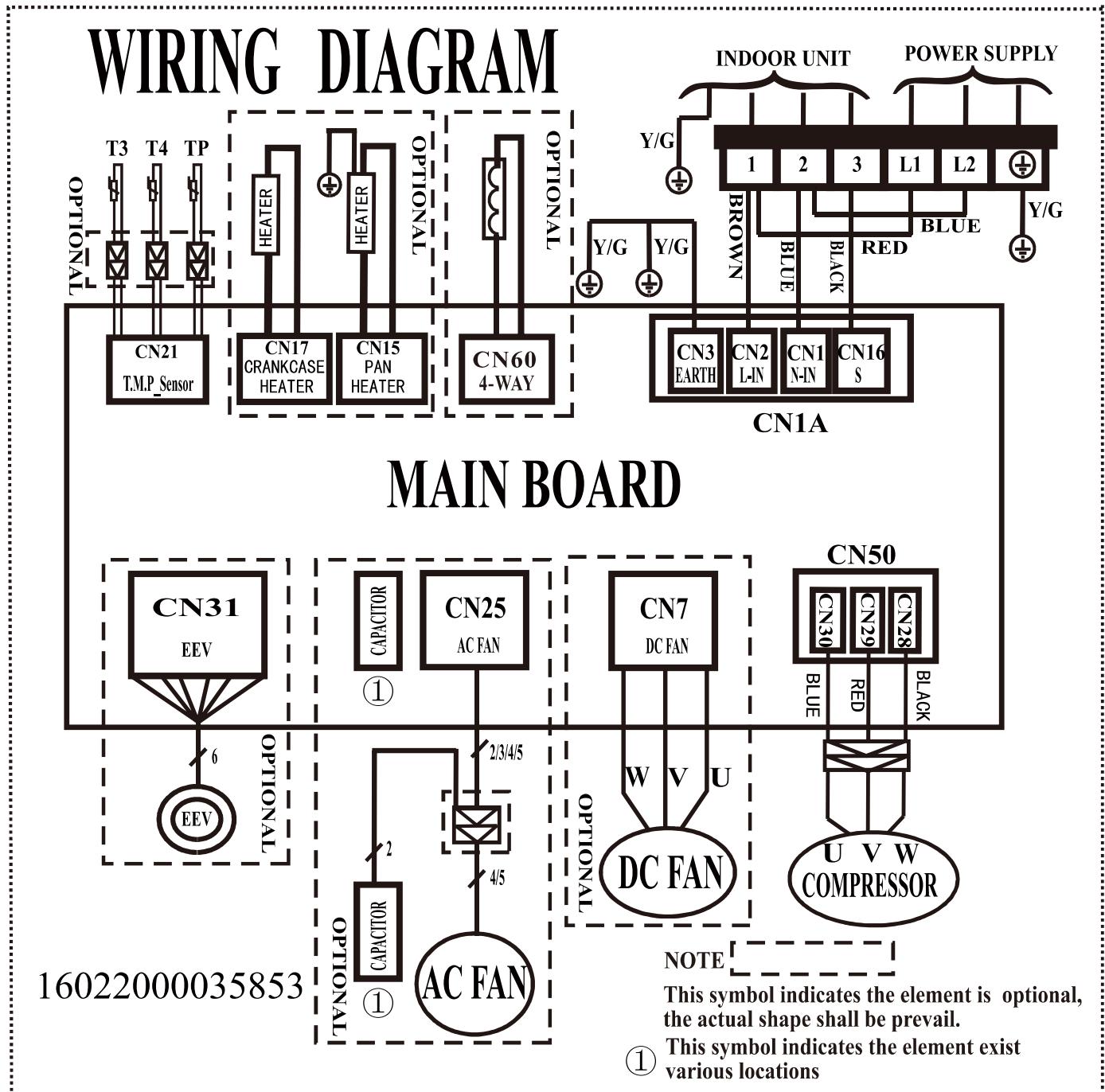
| Model | Pipe Size (Diameter:Ø mm(inch)) | | Piping length (m/ft) | | Elevation (m/ft) | | Additional Refrigerant |
|-------------------|---------------------------------|-----------|----------------------|---------|------------------|---------|------------------------|
| | Gas | Liquid | Rated | Max. | Rated | Max. | |
| ACIQ-18ZPL-HP230B | 12.7(1/2) | 6.35(1/4) | 7.5/24.6 | 30/98.4 | 0 | 20/65.6 | 15g/m (0.16oz/ft) |

6. Electrical Wiring Diagrams

| ODU Model | ODU Wiring Diagram |
|-------------------|--------------------|
| ACIQ-09ZPL-HP230B | |
| ACIQ-12ZPL-HP230B | 16022000035853 |
| ACIQ-18ZPL-HP230B | 16022000035849 |

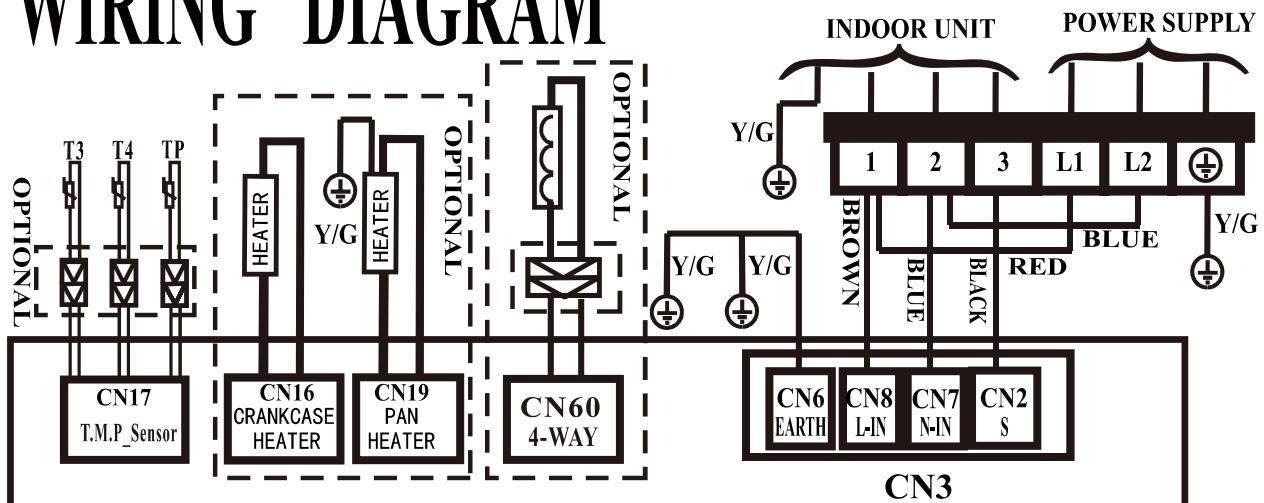
| ODU Model | ODU Main Printed Circuit Board |
|-------------------|--------------------------------|
| ACIQ-09ZPL-HP230B | |
| ACIQ-12ZPL-HP230B | 17122000048121 |
| ACIQ-18ZPL-HP230B | 17122000041117 |

Outdoor unit wiring diagram: 16022000035853

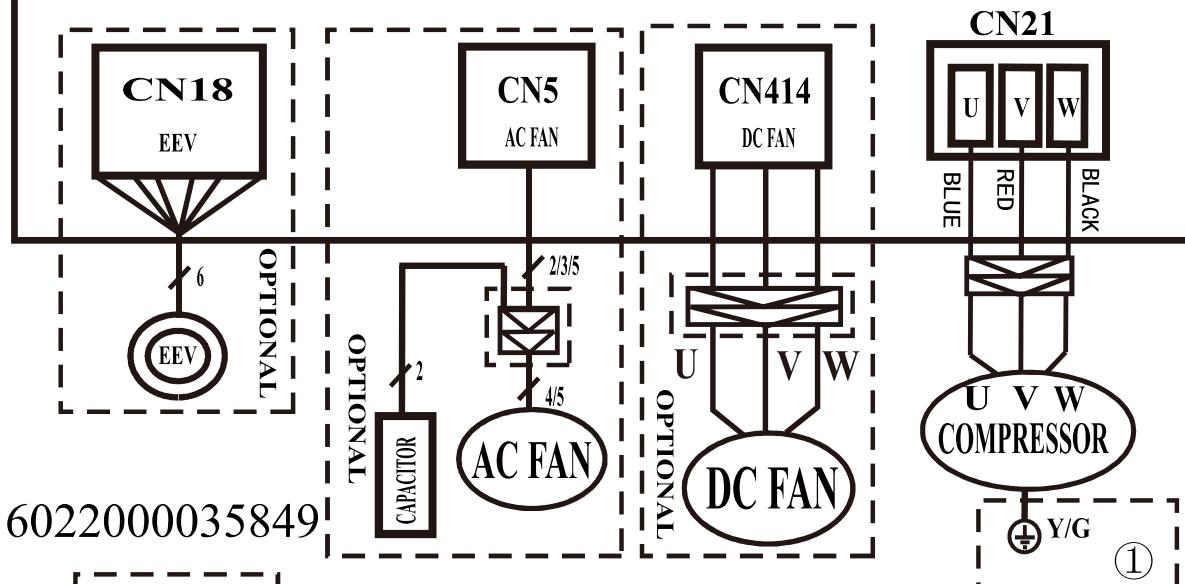


Outdoor unit wiring diagram: 16022000035849

WIRING DIAGRAM



MAIN BOARD

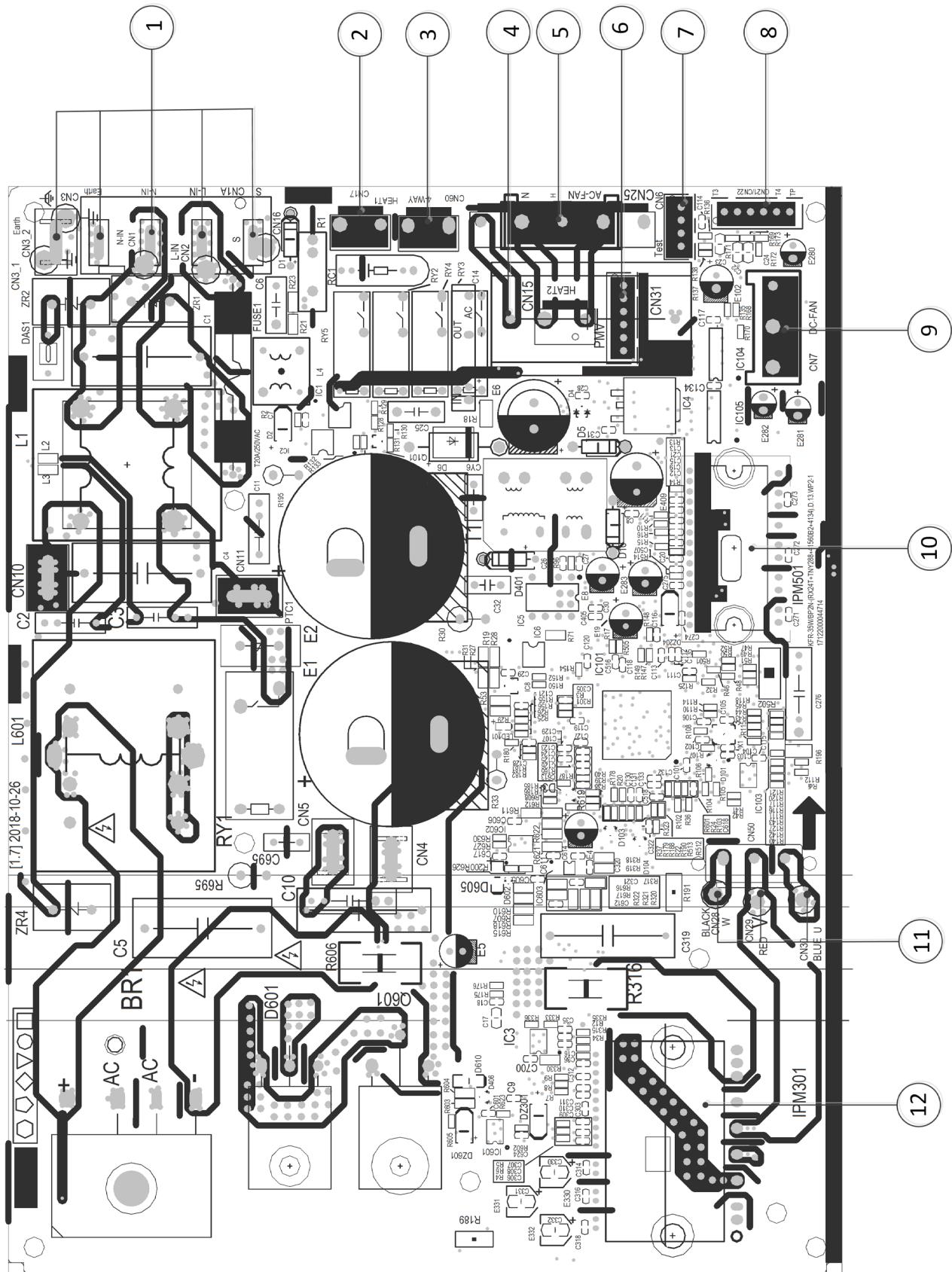


16022000035849

**This symbol indicates the element
the actual shape shall be prevail.**

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

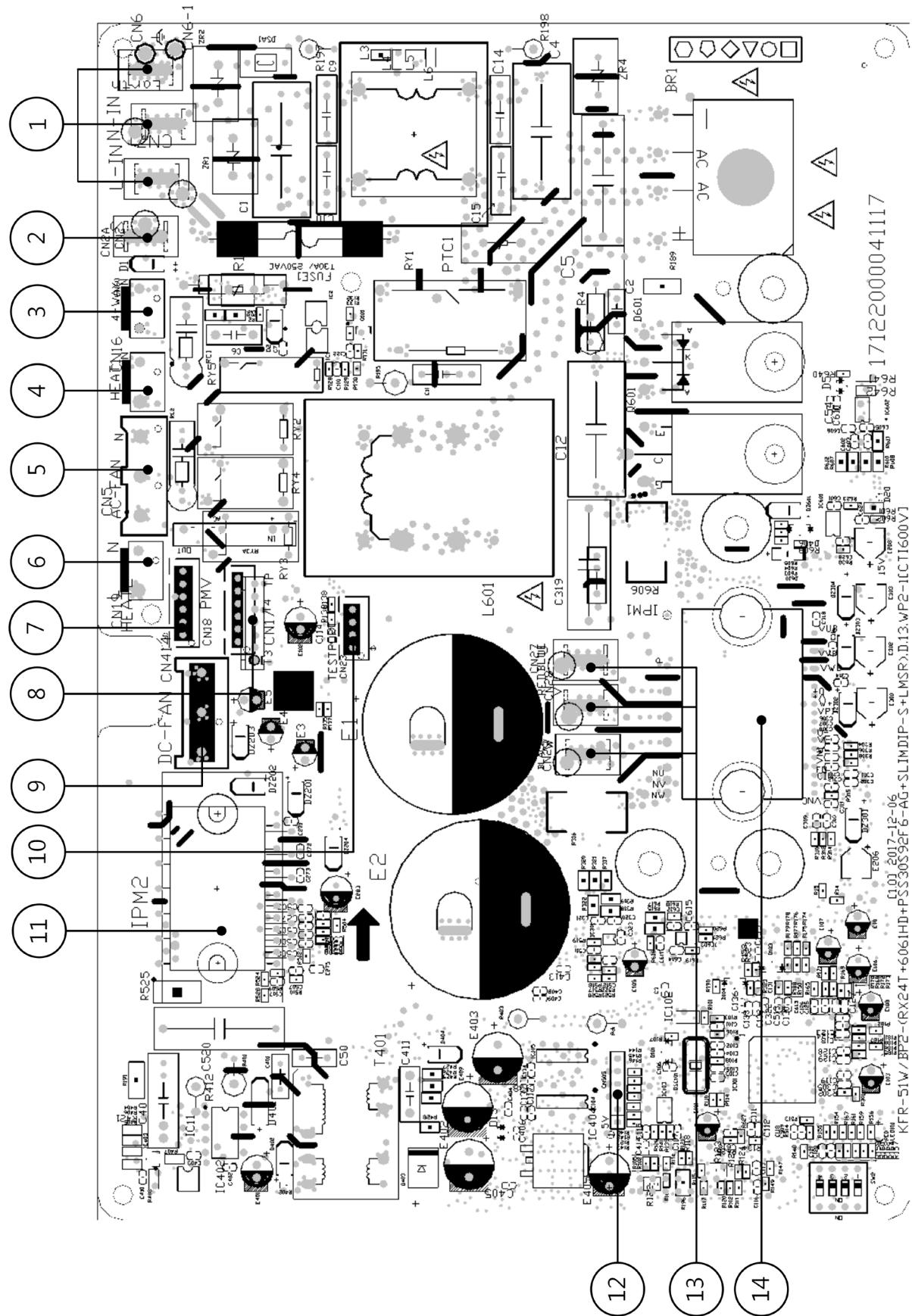
Outdoor unit printed circuit board diagram: 17122000048121



| 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.

Outdoor unit printed circuit board diagram: 17122000041117



| 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 | HEAT1 | CN16 | connect to compressor heater, 208-230V AC when is ON |
| 5 | AC-FAN | CN5 | connect to AC fan |
| 6 | HEAT2 | CN19 | connect to chassis heater, 208-230V AC when is ON |
| 7 | PMV | CN18 | connect to Electric Expansion Valve |
| 8 | TP T4 T3 | CN17 | connect to pipe temp. sensor T3, ambient temp. sensor T4, exhaust temp. sensor TP |
| 9 | DC-FAN | CN41 | connect to DC fan |
| 10 | TESTPORT | CN23 | used for testing |
| 11 | FAN_IPM | IPM2 | IPM for DC fan |
| 12 | EE_PORT | CN505 | EEPROM programer port |
| 13 | U | CN27 | connect to compressor |
| | V | CN28 | 0V AC (standby) |
| | W | CN29 | 200-300V AC (running) |
| 14 | COMP_IPM | IPM1 | IPM for compressor |

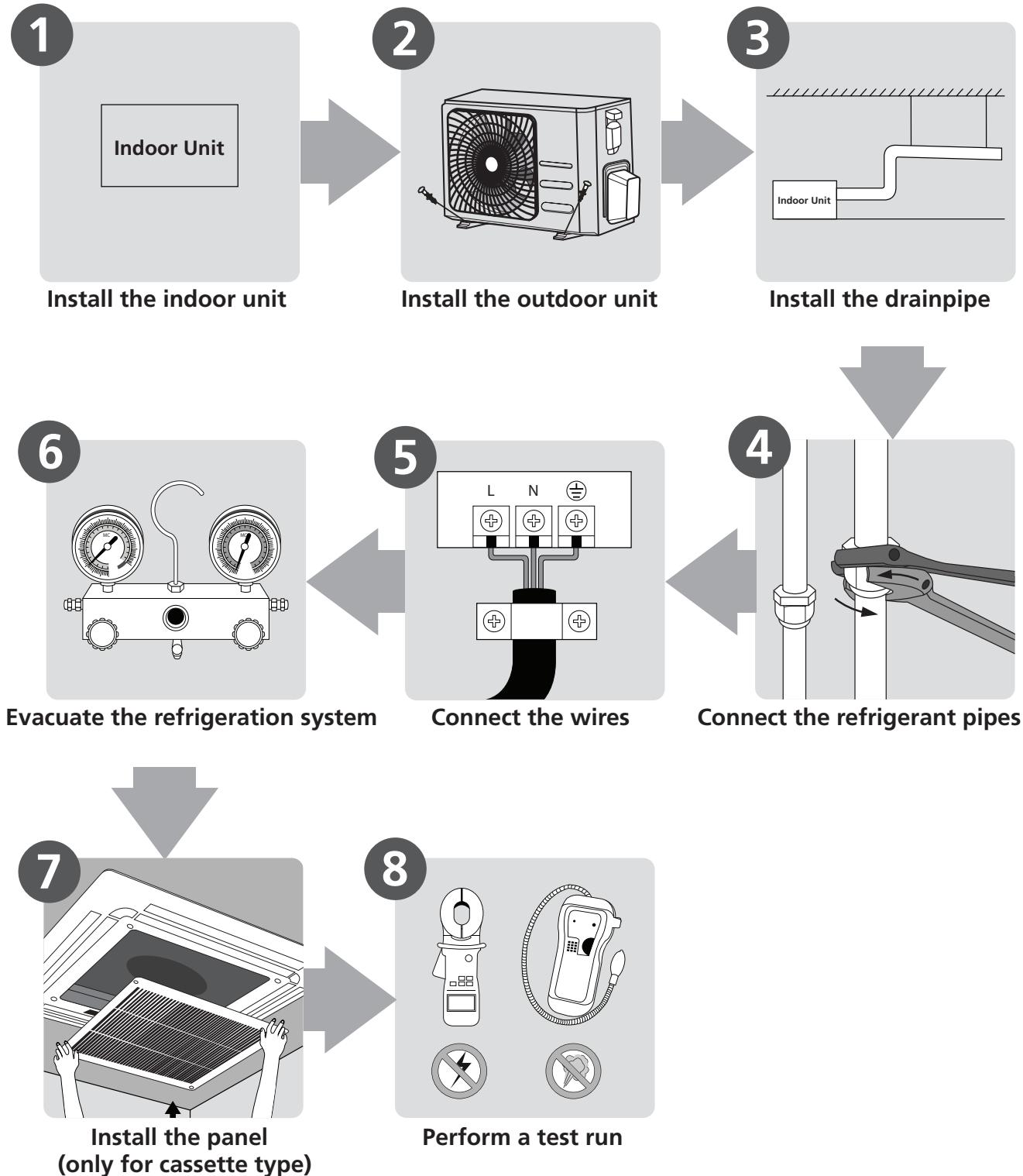
Note: This section is for reference only. Please take practicality as standard.

Installation

Contents

1. Installation Overview
2. Location Selection
3. Indoor Unit Installation
4. Outdoor Unit Installation
5. Drainage Pipe Installation
6. Refrigerant Pipe Installation
7. Vacuum Drying and Leakage Checking
8. Additional Refrigerant Charge
9. Engineering of Insulation
10. Engineering of Electrical Wiring
11. Test Operation

1. Installation Overview



2. Location selection

2.1 Unit location selection can refer to installation manual.

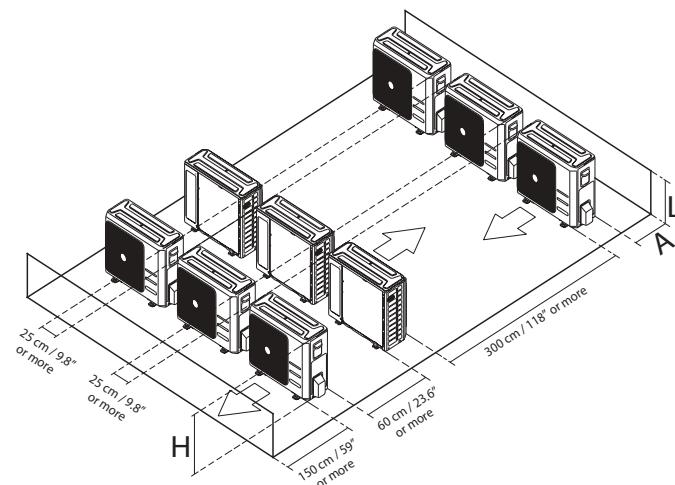
2.2 DO NOT install the unit in the following locations:

- Where oil drilling or fracking is taking place.
- Coastal areas with high salt content in the air.
- Areas with caustic gases in the air, such as near hot springs.
- Areas with power fluctuations, such as factories.
- Enclosed spaces, such as cabinets.
- Areas with strong electromagnetic waves.
- Areas that store flammable materials or gas.
- Rooms with high humidity, such as bathrooms or laundry rooms.
- If possible, DO NOT install the unit where it is exposed to direct sunlight.

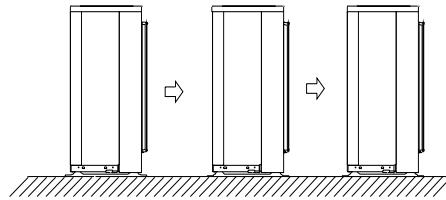
2.3 Rows of series installation

The relations between H, A and L are as follows.

| | L | A |
|------------|----------------------|-----------------------|
| $L \leq H$ | $L \leq 1/2H$ | 25 cm / 9.8" or more |
| | $1/2H < L \leq H$ | 30 cm / 11.8" or more |
| $L > H$ | Can not be installed | |

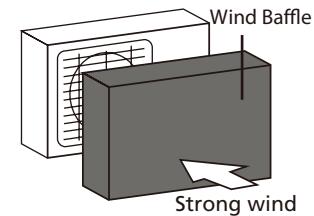
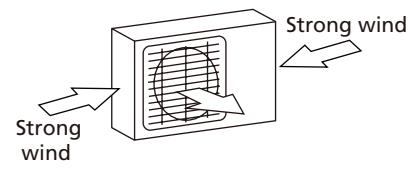


DO NOT install the rows of series like following figure.



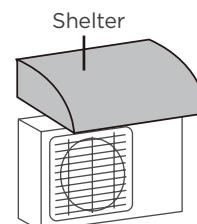
2.4 If the unit is exposed to heavy wind:

- Install unit so that air outlet fan is at a 90° angle to the direction of the wind. If needed, build a barrier in front of the unit to protect it from extremely heavy winds.



2.5 If the unit is frequently exposed to heavy rain or snow:

Build a shelter above the unit to protect it from the rain or snow. Be careful not to obstruct air flow around the unit.



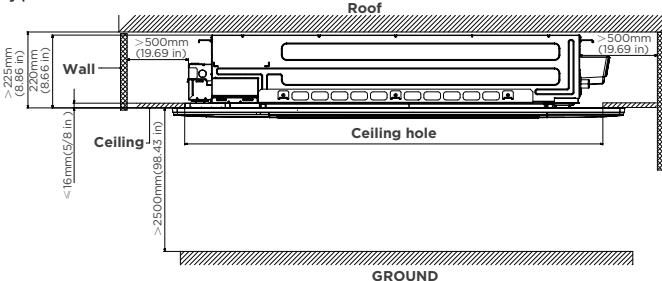
2.6 If the unit is frequently exposed to salty air (seaside):

Use outdoor unit that is specially designed to resist corrosion.

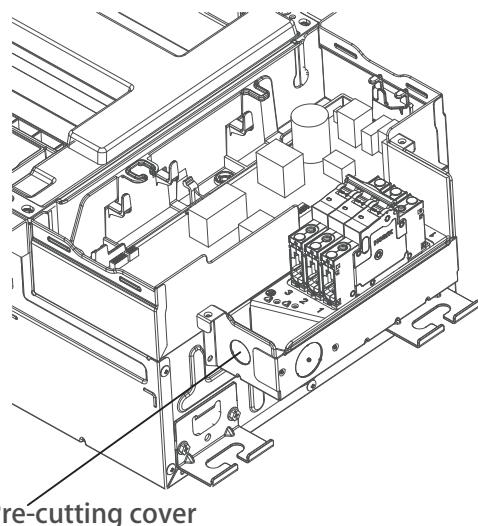
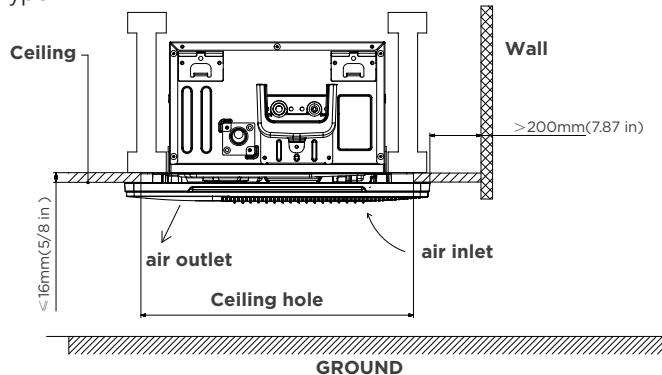
3. Indoor Unit Installation(1-way Cassette Type)

3.1 Service space for indoor unit

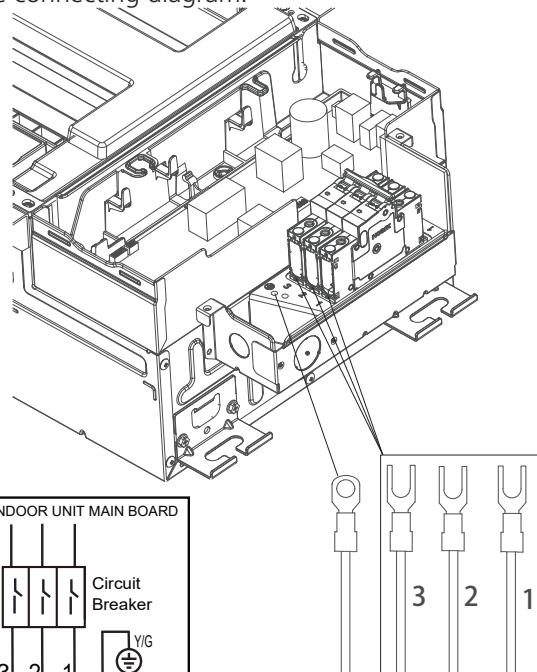
Type A:



Type B



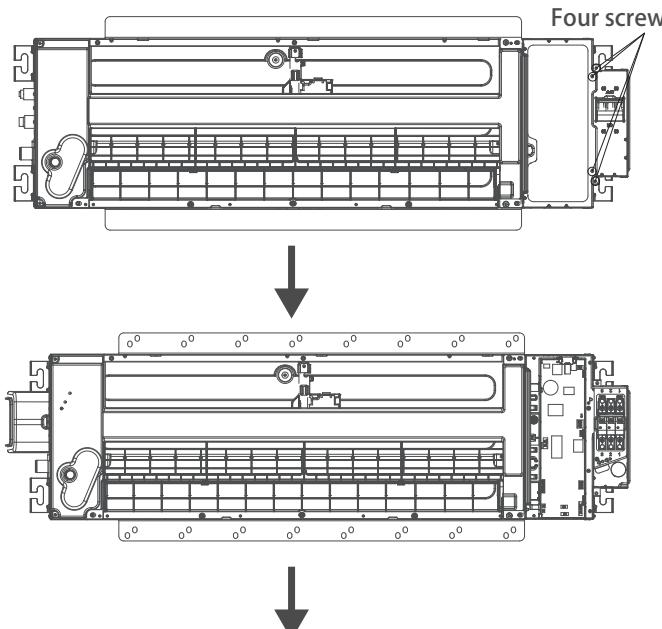
3. Connect the wire to the air breaker according to the wire connecting diagram.



3.2 Connect wire to indoor air handler

Model A: with circuit breaker

1. Remove the four screws to open the indoor control box and circuit breaker box.

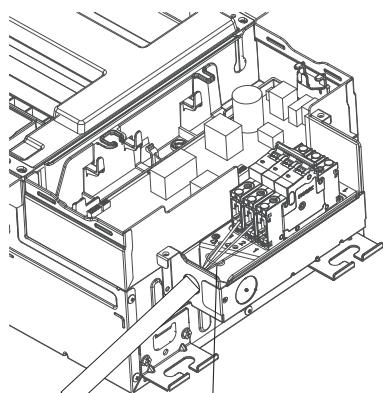


2. Remove the pre-cutting cover on the circuit breaker box.

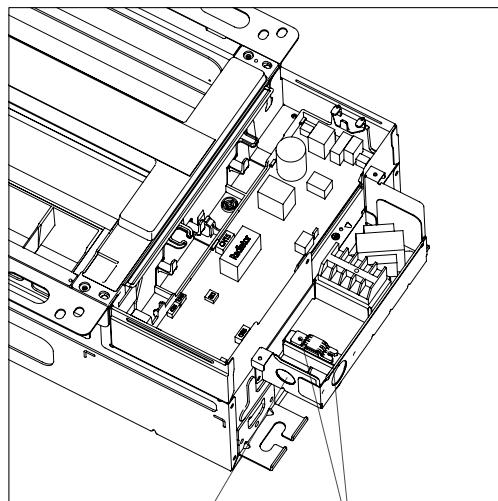
! WARNING:

The ground wire should be tighten firmly without loosening.

4. Fasten and fx the wire body with a tie



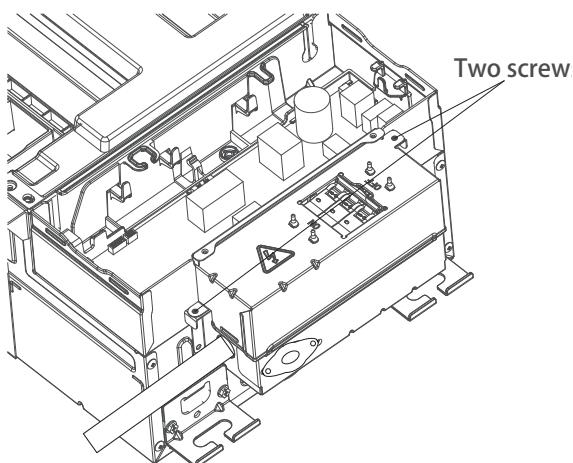
Fasten and fix the wire body with a tie



Pre-cutting cover

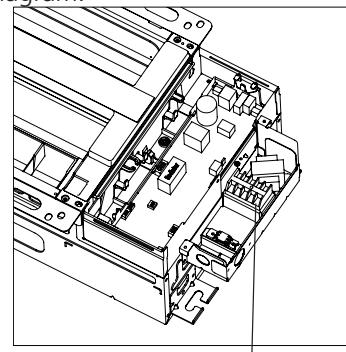
Two screws

5. Install the circuit breaker cover by fixing the two screws.



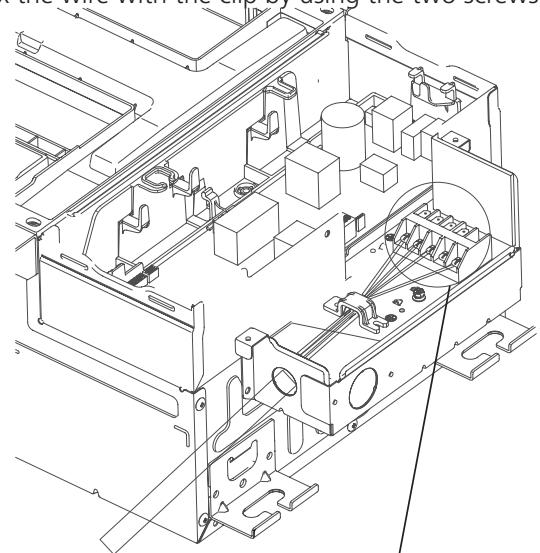
Two screw

3. Connect the wire to the terminal according to the wire connecting diagram.

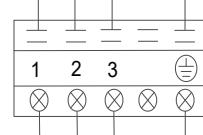


Connect ground wire

4. Fix the wire with the clip by using the two screws.

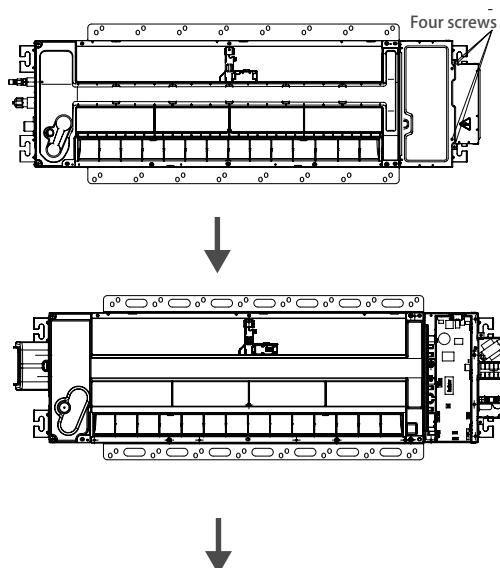


TO INDOOR UNIT MAIN BOARD



Model B: with terminal

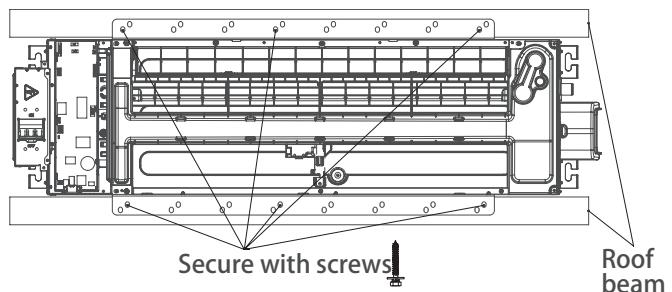
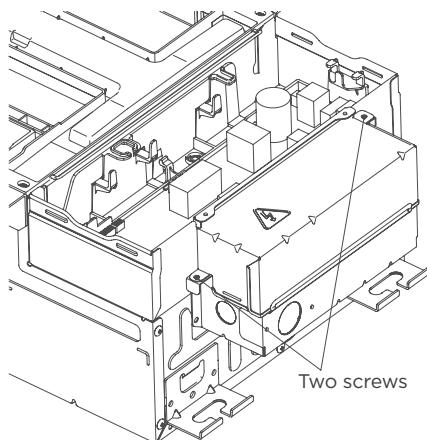
1. Remove the four screws to open the indoor control box and terminal box.



2. Remove the pre-cutting cover on the terminal box. Remove the two screws, then take out the clip.

◀ 3. IDU Installation-1-way Cassette ▶

5. Install the terminal cover by fixing the two screws.



⚠ CAUTION

The unit body must be completely aligned with the hole. Ensure that the unit and the hole are the same size before moving on. Ensure that the indoor unit is horizontal after installation.

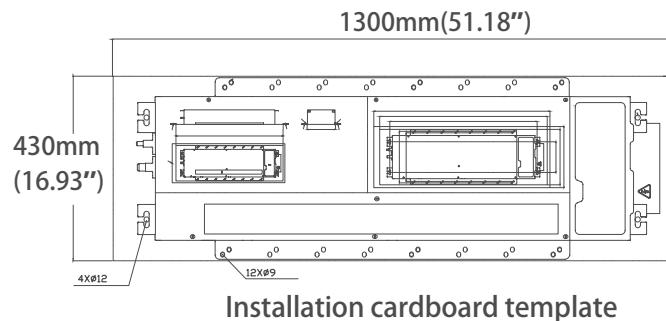
3.3 Install the indoor air handler

NOTICE:

After you have finished installing the main body, when choosing where to start, determine the direction of the pipes to be drawn out.

Especially in cases where there is a ceiling involved, align the refrigerant pipes, drain pipes, and indoor and outdoor lines with their connection points before mounting the unit.

1. After you selecting an installation location, drill a hole into the roof beam based on the layout of the installation board (accessory Installation cardboard template). After drilling the hole, remove the installation board.



2. Align the refrigerant pipes, drain pipes with their connection points before mounting the unit. Mount the indoor unit with at least two people to lift and secure it then fix the unit body to the roof beam by using 6x ST8.0*50 screws. Make sure that the screws do not come loose. Make sure you verify the size and positions of the opening in the ceiling before you do so.

NOTE: Eight ST8.0*50 screws are supplied, two of which are spare.

3.4 Panel Installation

1. Prepare and install ceiling

- Drill 430 mm x 1300 mm(16.93"x51.18") hole into the ceiling based on the layout of the installation board.

The centre of the ceiling opening should match the centre of the body of the indoor unit.

NOTICE:

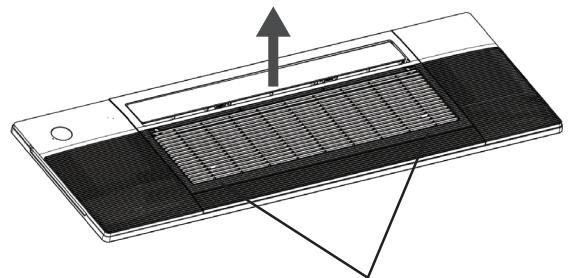
In order to keep the ceiling level and prevent vibrations, reinforce the strength of the ceiling when necessary.

- Once the ceiling is cut, remove the installation board.
- then install the ceiling.

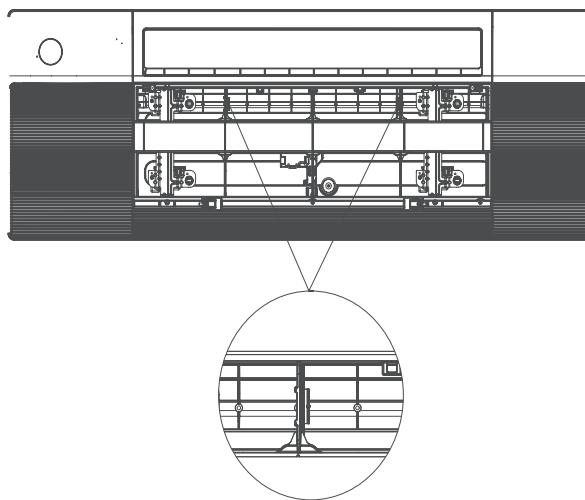
2. Panel Installation

MODEL A:

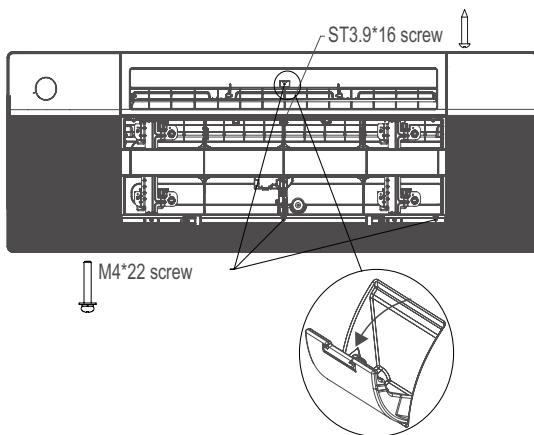
- Grab air grille with your fingers and pull it out slowly in the direction of the arrow.



- Fix the panel to the one-way cassette.

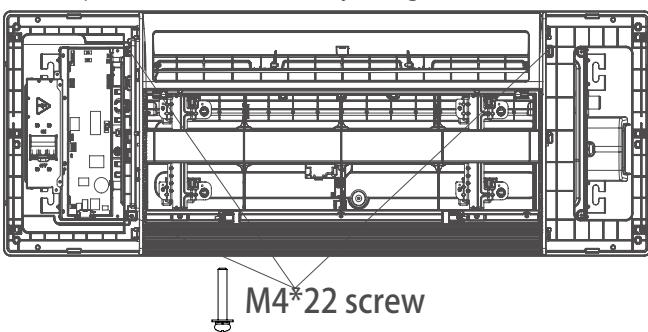


- Manually rotate the air defector, fix the panel to the cassette by using 3×M4*22 screws and a ST3.9*16 screw.



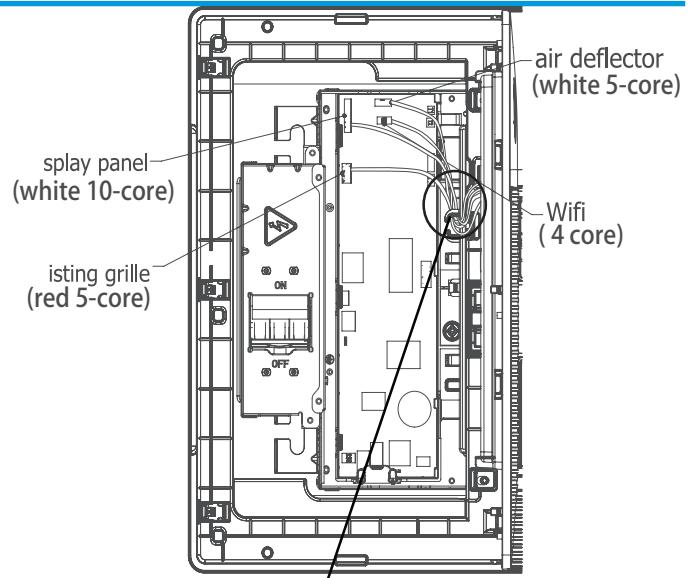
Before fixing this screw, you need to open the screw cover; and after fixing screw, please close the cover.

- Open the two covers on both sides of the panel, fix the panel to the cassette by using 3× M4*22 screws.



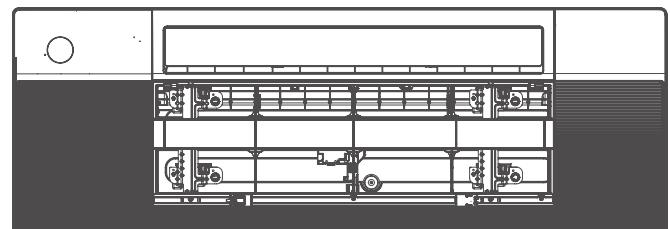
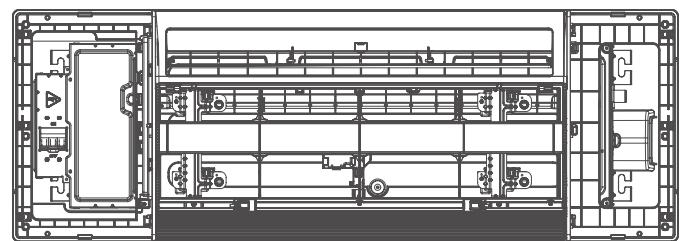
- Connect the display board to the main control board, up to four wires are required to connect.

NOTICE: The corresponding colors or corresponding pins are connected each other.

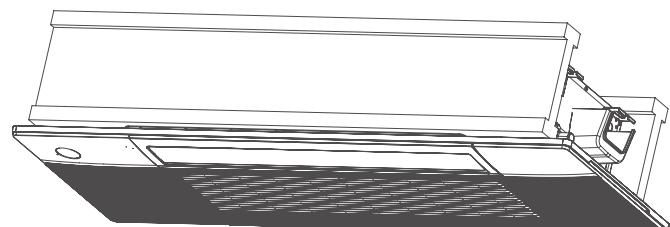


when connection is completed, please clip the wires to the buckle.

- Install the control box cover and turn the circuit breaker to ON, close the two plastic covers on both sides of the panel.

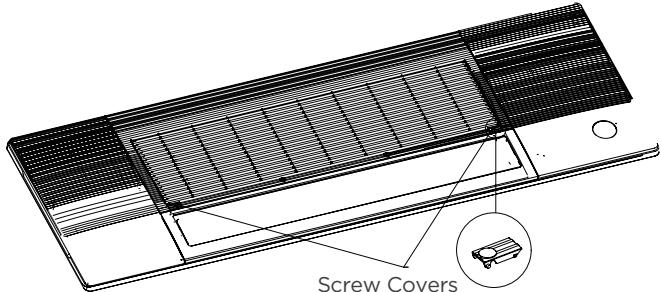


- During the test-run process, the display will be lighted and the air griller will rise automatically.

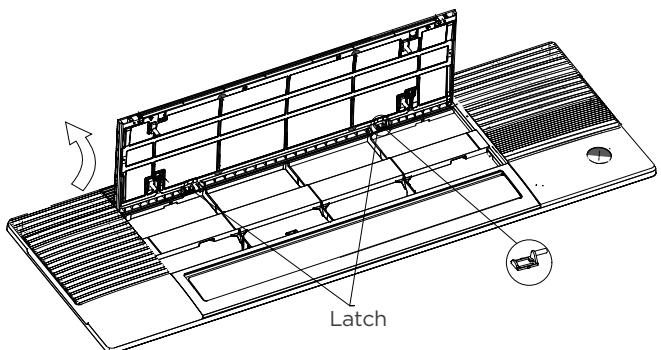


MODEL B:

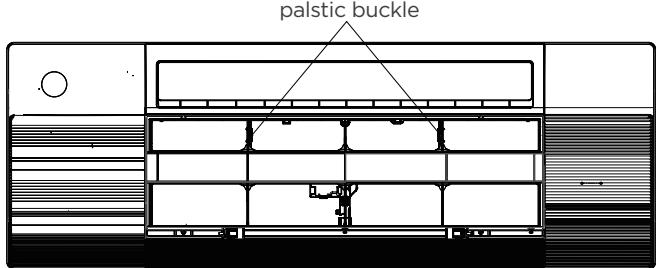
- Press the circular position to open the two screw covers, then remove the two screws.



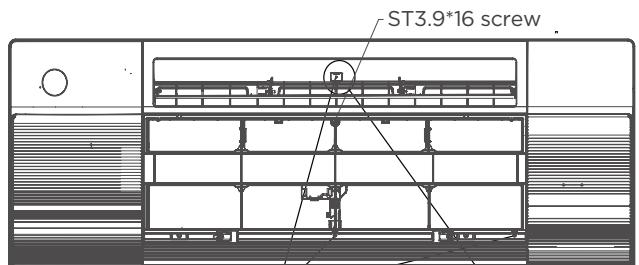
- Hold and open the air grille, then push both of the latch to the middle to unlock the air grille.



- Pull the panel grille out of the panel, fix the cassette panel to the one-way cassette by two plastic buckles.



- Manually rotate the air deflector, fix the panel to the cassette by using 3×M4*22 screws and a ST3.9*16 screw.

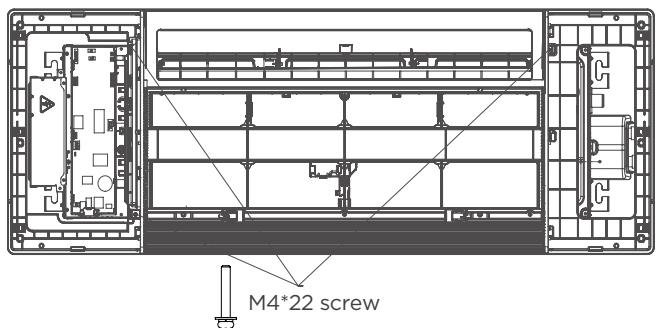


NOTE:

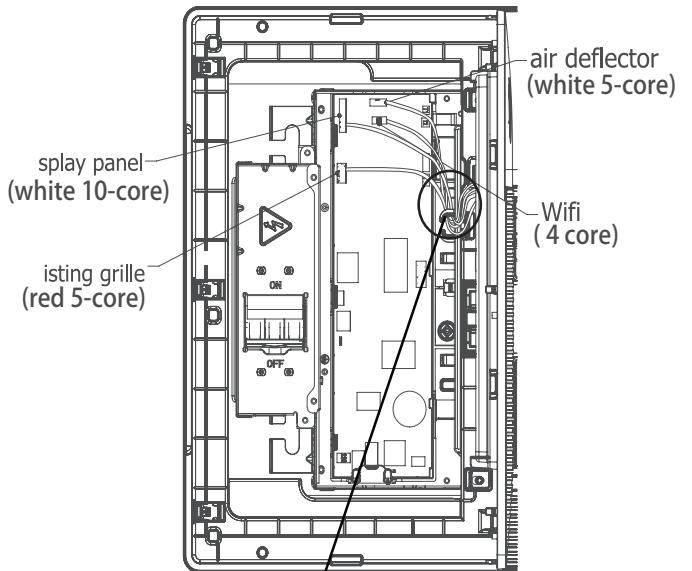
Eight M4*22 screws are supplied, two of which are spare. Two ST3.9*16 screws are supplied, one of which is spare.

Before fixing this screw, you need to open the screw cover; and after fixing screw, please close the cover.

- Open the two covers on both sides of the panel, fix the panel to the cassette by using 3× M4*22 screws.



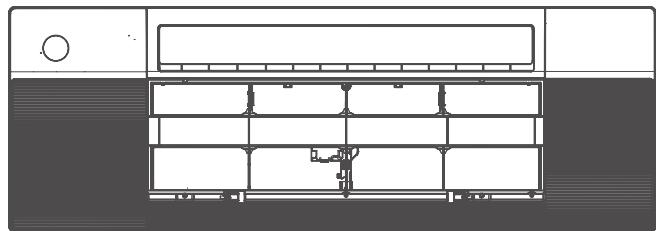
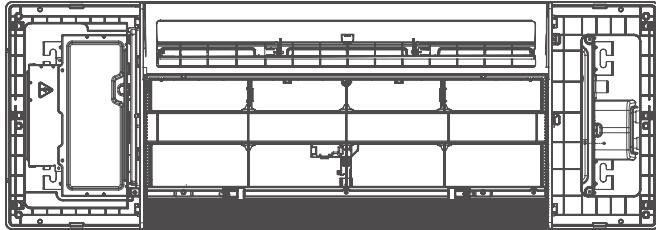
- Connect the display board to the main control board, up to four wires are required to connect.



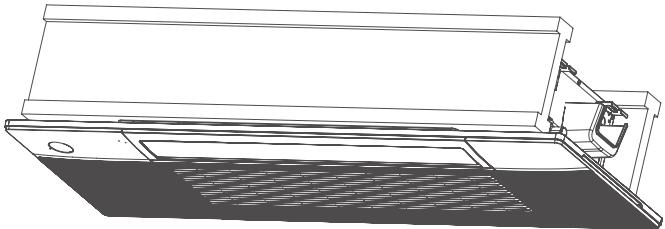
when connection is completed, please clip the wires to the buckle.

- Install the control box cover and turn the circuit breaker to ON, then close the two plastic covers on

both sides of the panel.



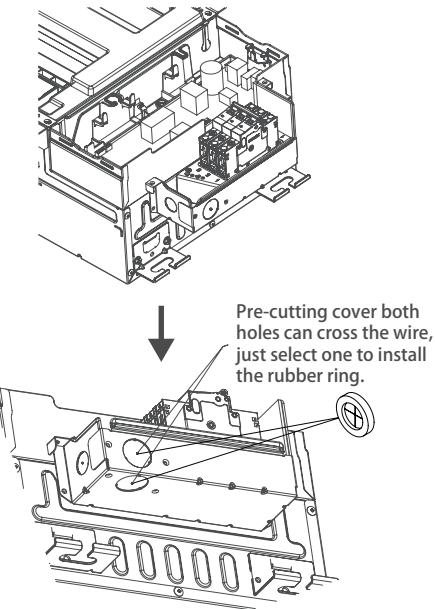
- Re-install the air grille by pushing the latch to lock it and fixing the two screws, then close the two screw covers.



3.5. Optional parts installation

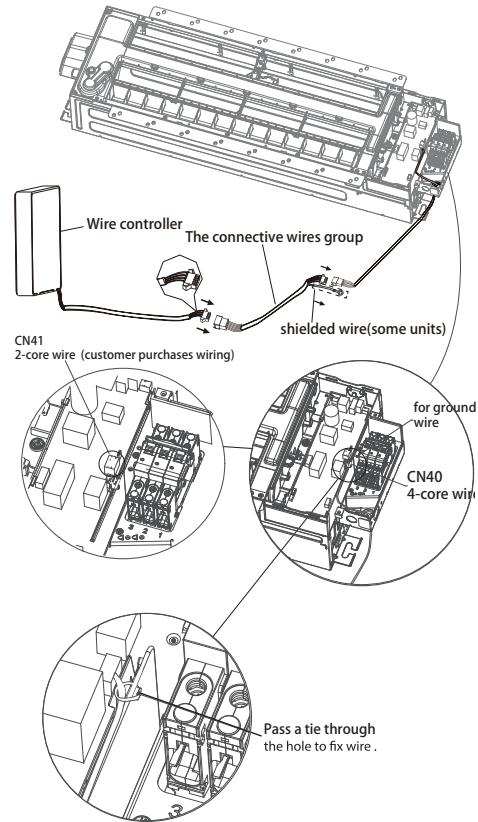
3.5.1 Install wire controller

1. Remove the specific pre-cutting cover on the circuit breaker box.



2. Connecting the wire from the control box.

3. Connecting the other side of the connecting cable to the wire controller.

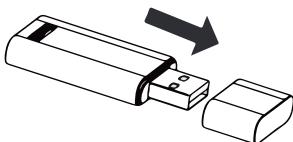


NOTICE

Be sure to reserve a length of the connecting wire for periodic maintenance. If there is a connection lug at the end of shielded wire, the connection lug should be properly grounded.

3.5.2 Install Wireless module

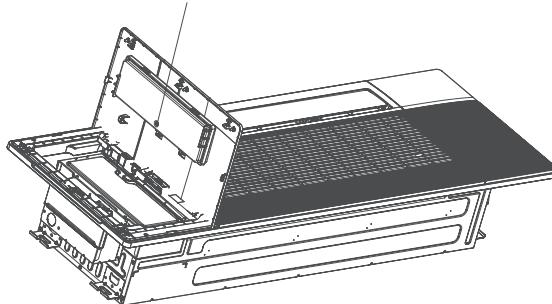
1. Remove the protective cap of the wireless module (smart kit).



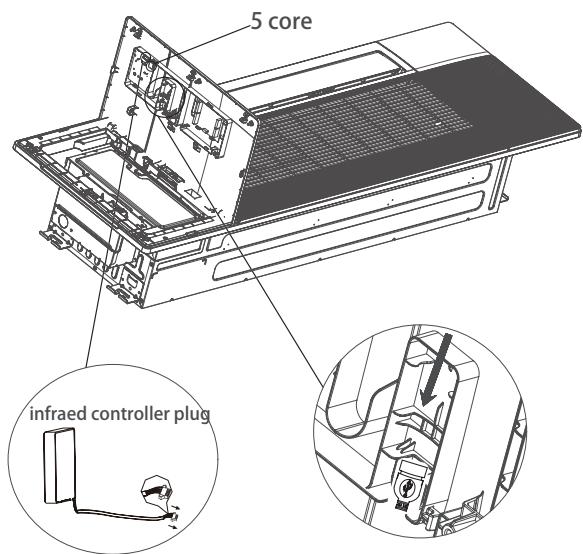
2. Open the cover with display panel, loosen the screw and remove the cover.



Loosen the screw and remove the cover



3. Open the front panel and insert the wireless module (smart kit) into the reserved interface.

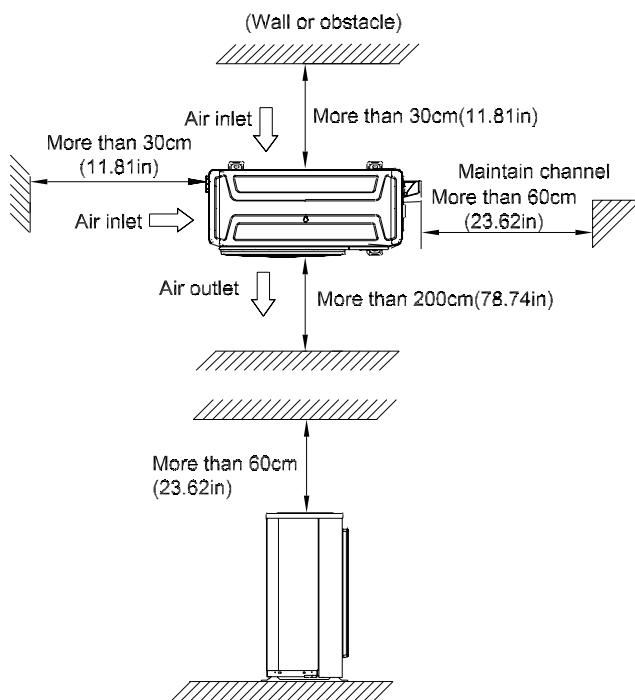


WARNING:

This interface is only compatible with wireless module (smart kit) provided by the manufacturer.

4. Outdoor unit installation

4.1 Service space for outdoor unit



4.2 Install drain joint(Heat pump unit only)

Before bolting the outdoor unit in place, you must install the drain joint at the bottom of the unit.

Note that there are two different types of drain joints depending on the type of outdoor unit.

If the drain joint comes with a rubber seal(see Fig. A), do the following:

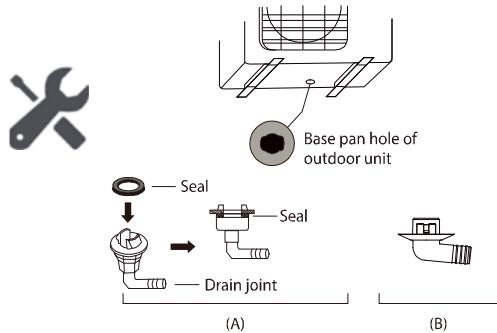
1. Fit the rubber seal on the end of the drain joint that will connect to the outdoor unit.
2. Insert the drain joint into the hole in the base pan of the unit.
3. Rotate the drain joint 90° until it clicks in place facing the front of the unit. **For some panel plates, you need to use tool.**

4. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.

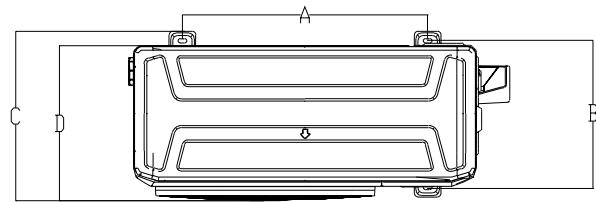
If the drain joint doesn't come with a rubber seal (see Fig. B), do the following:

1. Insert the drain joint into the hole in the base pan of the unit. The drain joint will click in place.

2. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.



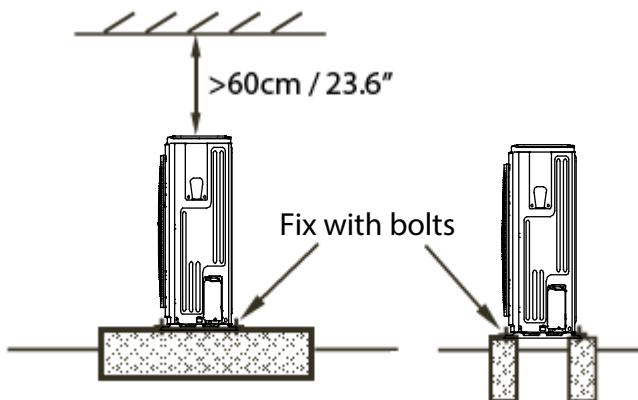
4.3 Bolt pitch



| Panel Plate | Unit | D | A | B | C |
|-------------|------|-------|-------|-------|-------|
| X2 | mm | 303 | 452 | 286 | 314 |
| | inch | 11.93 | 17.80 | 11.26 | 12.36 |
| X3 | mm | 330 | 511 | 317 | 346 |
| | inch | 12.99 | 20.12 | 12.48 | 13.62 |
| X4 | mm | 342 | 663 | 354 | 394 |
| | inch | 13.46 | 26.1 | 13.94 | 15.5 |
| X6 | mm | 375 | 615 | 397 | 440 |
| | inch | 14.76 | 24.2 | 15.6 | 17.3 |
| D30 | mm | 410 | 673 | 403 | 455 |
| | inch | 16.14 | 26.50 | 15.87 | 17.9 |
| E30 | mm | 415 | 634 | 404 | 457 |
| | inch | 16.34 | 24.96 | 15.9 | 17.99 |
| 590 | mm | 350 | 590 | 378 | 400 |
| | inch | 13.78 | 23.23 | 14.88 | 15.75 |

4.4 Install Outdoor Unit

Fix the outdoor unit with anchor bolts(M10)



Caution

Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.

Never hold the inlet of the outdoor unit to prevent it from deforming.

Do not touch the fan with hands or other objects.

Do not lean it more than 45, and do not lay it sidelong.

Make concrete foundation according to the specifications of the outdoor units.

Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.

5. Drainage Pipe Installation

Install the drainage pipe as shown below and take measures against condensation. Improperly installation could lead to leakage and eventually wet furniture and belongings.

5.1 Installation principle

- Ensure at least 1/100 slope of the drainage pipe
- Adopt suitable pipe diameter
- Adopt nearby condensate water discharge

5.2 Key points of drainage water pipe installation

1. Considering the pipeline route and elevation.
 - Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is straight.
2. Drainage pipe selection
 - The drainage pipe diameter shall not be smaller than the drain hose of indoor unit
 - According to the water flowrate and drainage pipe slope to choose the suitable pipe, the water flowrate is decided by the capacity of indoor unit.

Relationship between water flowrate and capacity of indoor unit

| Capacity (kBtu/h) | Water flowrate (l/h) |
|-------------------|----------------------|
| 12 | 2.4 |
| 18 | 4 |
| 24 | 6 |
| 30 | 7 |
| 36 | 8 |
| 42 | 10 |
| 48 | 12 |
| 60 | 14 |

According to the above table to calculate the total water flowrate for the confluence pipe selection.

For horizontal drainage pipe (The following table is for reference)

| PVC pipe | Reference value of inner diameter of pipe (mm) | Allowable maximum water flowrate (l/h) | | Remark |
|----------|--|--|-------------|-----------------------------------|
| | | Slope 1/50 | Slope 1/100 | |
| PVC25 | 20 | 39 | 27 | For branch pipe |
| PVC32 | 25 | 70 | 50 | |
| PVC40 | 31 | 125 | 88 | Could be used for confluence pipe |
| PVC50 | 40 | 247 | 175 | |
| PVC63 | 51 | 473 | 334 | |

Attention: Adopt PVC40 or bigger pipe to be the main pipe.

For Vertical drainage pipe (The following table is for reference)

| PVC pipe | Reference value of inner diameter of pipe (mm) | Allowable maximum water flowrate (l/h) | Remark |
|----------|--|--|-----------------------------------|
| PVC25 | 20 | 220 | For branch pipe |
| PVC32 | 25 | 410 | |
| PVC40 | 31 | 730 | |
| PVC50 | 40 | 1440 | Could be used for confluence pipe |
| PVC63 | 51 | 2760 | |
| PVC75 | 67 | 5710 | |
| PVC90 | 77 | 8280 | |

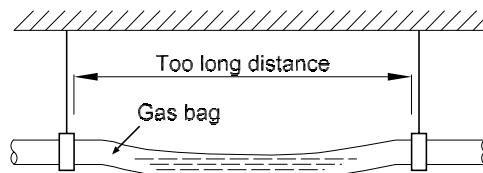
Attention: Adopt PVC40 or bigger pipe to be the main pipe.

3. Individual design of drainage pipe system

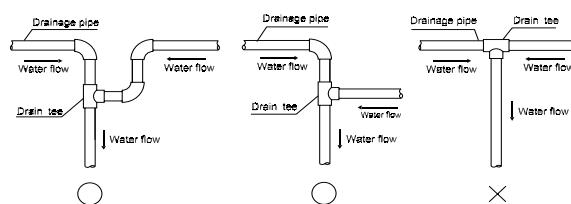
- The drainage pipe of air conditioner shall be installed separately with other sewage pipe, rainwater pipe and drainage pipe in building.
- The drainage pipe of the indoor unit with water pump should be apart from the one without water pump.

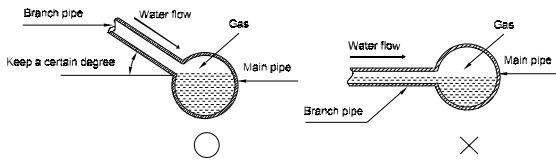
4. Supporter gap of drainage pipe

- In general, the supporter gap of the drainage pipe horizontal pipe and vertical pipe is respectively 1m~1.5m/3.28ft~4.92ft and 1.5m~2.0m/4.92ft~6.56ft.
- Each vertical pipe shall be equipped with not less than two hangers.
- Overlarge hanger gap for horizontal pipe shall create bending, thus leading to air block.



5. The horizontal pipe layout should avoid converse flow or bad flow

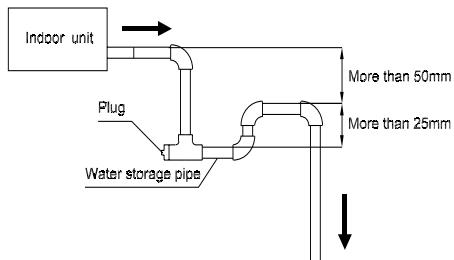




- The correct installation will not cause converse water flow and the slope of the branch pipes can be adjusted freely
- The false installation will cause converse water flow and the slope of the branch pipe can not be adjusted.

6. Water storage pipe setting

- If the indoor unit has high extra static pressure and without water pump to elevate the condensate water, such as high extra static pressure duct unit, the water storage pipe should be set to avoid converse flow or blow water phenomena.

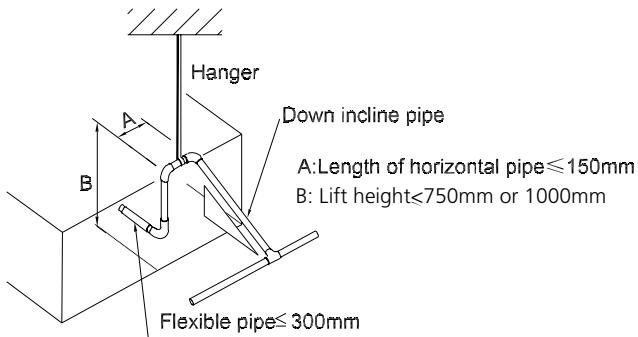


7. Lifting pipe setting of indoor unit with water pump

- The length of lifting pipe should not exceed 750mm/29.5in or 1m/39.4in(for new 4-way cassette);

The drainage pipe should be set down inclined after the lifting pipe immediately to avoid wrong operation of water level switch.

- Refer the following picture for installation reference.

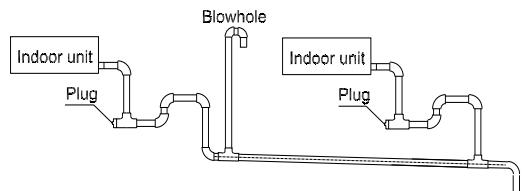


8. Blowhole setting

- For the concentrated drainage pipe system, there

should design a blowhole at the highest point of main pipe to ensure the condensate water discharge smoothly.

- The air outlet shall face down to prevent dirt entering pipe.
- Each indoor unit of the system should be installed it.
- The installation should be considering the convenience for future cleaning.



9. The end of drainage pipe shall not contact with ground directly.

5.3 Insulation work of drainage pipe

Refer the introduction to the insulation engineering parts.

6. Refrigerant Pipe Installation

6.1 Recommended copper pipe thickness

| Pipe Diameter | Thickness(mm/inch) |
|---------------|--------------------|
| 1/4" (6.35) | 0.6/0.024 |
| 3/8" (9.52) | 0.7/0.028 |
| 1/2" (12.7) | 0.75/0.03 |
| 5/8" (15.9) | 0.75/0.03 |
| 3/4" (19) | 0.8/0.031 |
| 7/8" (22) | 1.0/0.039 |

6.2 Maximum length and drop height

Ensure that the length of the refrigerant pipe, the number of bends, and the drop height between the indoor and outdoor units meets the requirements shown in the following table.

| Capacity(kBtu/h) | Max. Length (m/ft) | Max. Elevation (m/ft) |
|------------------|--------------------|-----------------------|
| <15 | 25/82 | 10/32.8 |
| 15~23 | 30/98.4 | 20/65.6 |
| 24~35 | 50/164 | 25/82 |
| 36~60 | 65/213.3 | 30/98.4 |

Caution:

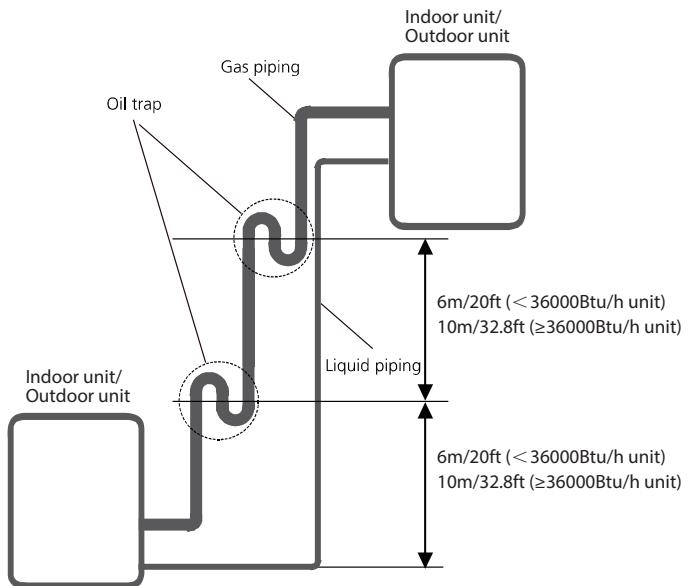
1. The capacity test is based on the standard length and the maximum permissive length is based on the system reliability.

2. Oil traps

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 piping can prevent this.

An oil trap should be installed every 6m(20ft) of vertical suction line riser (<36000Btu/h unit).

An oil trap should be installed every 10m(32.8ft) of vertical suction line riser ($\geq 36000\text{Btu/h}$ unit).



6.3 The procedure of connecting pipes

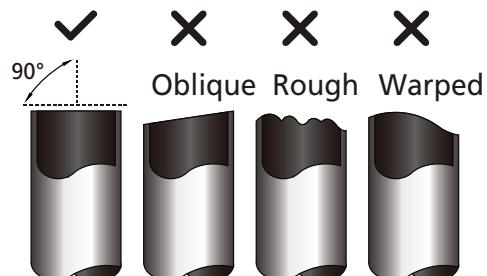
1. Choose the pipe size according to the specification table.

2. Confirm the cross way of the pipes.

3. Measure the necessary pipe length.

4. Cut the selected pipe with pipe cutter

- Make the section flat and smooth.



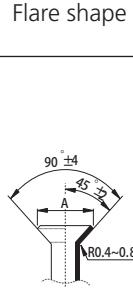
5. Insulate the copper pipe

- Before test operation, the joint parts should not be heat insulated.

6. Flare the pipe

- Insert a flare nut into the pipe before flaring the pipe
- According to the following table to flare the pipe.

| Pipe diameter (inch(mm)) | Flare dimension A (mm/inch) | | Flare shape |
|-----------------------------|-----------------------------|-----------|-------------|
| | Min | Max | |
| 1/4" (6.35) | 8.4/0.33 | 8.7/0.34 | |
| 3/8" (9.52) | 13.2/0.52 | 13.5/0.53 | |
| 1/2" (12.7) | 16.2/0.64 | 16.5/0.65 | |
| 5/8" (15.9) | 19.2/0.76 | 19.7/0.78 | |
| 3/4" (19) | 23.2/0.91 | 23.7/0.93 | |
| 7/8" (22) | 26.4/1.04 | 26.9/1.06 | |



- After flared the pipe, the opening part must be seal by end cover or adhesive tape to avoid duct or exogenous impurity come into the pipe.

7. Drill holes if the pipes need to pass the wall.

8. According to the field condition to bend the pipes so that it can pass the wall smoothly.

9. Bind and wrap the wire together with the insulated pipe if necessary.

10. Set the wall conduit

11. Set the supporter for the pipe.

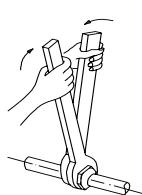
12. Locate the pipe and fix it by supporter

- For horizontal refrigerant pipe, the distance between supporters should not be exceed 1m.
- For vertical refrigerant pipe, the distance between supporters should not be exceed 1.5m.

13. Connect the pipe to indoor unit and outdoor unit by using two spanners.

- Be sure to use two spanners and proper torque to fasten the nut, too large torque will damage the bellmouthing, and too small torque may cause leakage. Refer the following table for different pipe connection.

| Pipe Diameter | Torque | Sketch map |
|---------------|-----------------------|------------|
| | N.m(lb.ft) | |
| 1/4" (6.35) | 18~20 (13.3~14.8) | |
| 3/8" (9.52) | 32~39 (23.6~28.8) | |
| 1/2" (12.7) | 49~59 (36.1~43.5) | |
| 5/8" (15.9) | 57~71 (42~52.4) | |
| 3/4" (19) | 67~101 (49.4~74.5) | |
| 7/8" (22) | 85~110 (62.7~81.1) | |



7. Vacuum Drying and Leakage Checking

7.1 Purpose of vacuum drying

- Eliminating moisture in system to prevent the phenomena of ice-blockage and copper oxidation. Ice-blockage shall cause abnormal operation of system, while copper oxide shall damage compressor.
- Eliminating the non-condensable gas (air) in system to prevent the components oxidizing, pressure fluctuation and bad heat exchange during the operation of system.

7.2 Selection of vacuum pump

- The ultimate vacuum degree of vacuum pump shall be -756mmHg or above.
- Precision of vacuum pump shall reach 0.02mmHg or above.

7.3 Operation procedure for vacuum drying

Due to different construction environment, two kinds of vacuum drying ways could be chosen, namely ordinary vacuum drying and special vacuum drying.

7.3.1 Ordinary vacuum drying

- When conduct first vacuum drying, connect pressure gauge to the infusing mouth of gas pipe and liquid pipe, and keep vacuum pump running for 1 hour (vacuum degree of vacuum pump shall be reached -755mmHg).
- If the vacuum degree of vacuum pump could not reach -755mmHg after 1 hour of drying, it indicates that there is moisture or leakage in pipeline system and need to go on with drying for half an hour.
- If the vacuum degree of vacuum pump still could not reach -755mmHg after 1.5 hours of drying, check whether there is leakage source.
- Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

7.3.2 Special vacuum drying

The special vacuum drying method shall be adopted when:

- Finding moisture during flushing refrigerant pipe.
- Conducting construction on rainy day, because rain water might penetrated into pipeline.
- Construction period is long, and rain water might penetrated into pipeline.

4. Rain water might penetrate into pipeline during construction.

Procedures of special vacuum drying are as follows:

1. Vacuum drying for 1 hour.
2. Vacuum damage, filling nitrogen to reach 0.5Kgf/cm² .

Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn to prevent the entering of water and the formation of condensate water.

3. Vacuum drying again for half an hour.

If the pressure reached -755mmHg, start to pressure leakage test. If it cannot reached the value, repeat vacuum damage and vacuum drying again for 1 hour.

4. Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

8. Additional Refrigerant Charge

- After the vacuum drying process is carried out, the additional refrigerant charge process need to be performed.
- The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between indoor and outdoor unit. Refer the following formula to calculate the charge volume.

| | Diameter of liquid pipe (mm(inch)) | Formula |
|--|------------------------------------|--|
| R410A(Throttling part in the indoor unit) | 6.35(1/4) | $V=30(0.32)g/m(oz/ft) \times (L\text{-standard pipe length})$ |
| | 9.52(3/8) | $V=65(0.69)g/m(oz/ft) \times (L\text{-standard pipe length})$ |
| | 12.7(1/2) | $V=115(1.23)g/m(oz/ft) \times (L\text{-standard pipe length})$ |
| R410A(Throttling part in the outdoor unit) | 6.35(1/4) | $V=15(0.16)g/m(oz/ft) \times (L\text{-standard pipe length})$ |
| | 9.52(3/8) | $V=30(0.32)g/m(oz/ft) \times (L\text{-standard pipe length})$ |
| | 12.7(1/2) | $V=65(0.69)g/m(oz/ft) \times (L\text{-standard pipe length})$ |
| R32 | 6.35(1/4) | $V=12(0.13)g/m(oz/ft) \times (L\text{-standard pipe length})$ |
| | 9.52(3/8) | $V=24(0.26)g/m(oz/ft) \times (L\text{-standard pipe length})$ |
| | 12.7(1/2) | $V=40(0.42)g/m(oz/ft) \times (L\text{-standard pipe length})$ |

V: Additional refrigerant charge volume.

L : The length of the liquid pipe.

Note:

- Refrigerant may only be charged after performed the vacuum drying process.
- Always use gloves and glasses to protect your hands and eyes during the charge work.
- Use electronic scale or fluid infusion apparatus to weight refrigerant to be recharged. Be sure to avoid extra refrigerant charged, it may cause liquid hammer of the compressor or protections.
- Use supplementing flexible pipe to connect refrigerant cylinder, pressure gauge and outdoor unit. And The refrigerant should be charged in liquid state. Before recharging, The air in the flexible pipe and manifold gauge should be exhausted.
- After finished refrigerant recharge process, check whether there is refrigerant leakage at the connection joint part.(Using gas leakage detector or soap water to detect).

9 . Engineering of Insulation

9.1 Insulation of refrigerant pipe

1. Operational procedure of refrigerant pipe insulation

Cut the suitable pipe → insulation (except joint section) → flare the pipe → piping layout and connection → vacuum drying → insulate the joint parts

2. Purpose of refrigerant pipe insulation

- During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall debase the performance of unit and burn compressor.
- Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
- Temperature of gas pipe is very high (generally 50-100°C/122-212°F) during heating. Insulation work must be carried out to prevent hurt by carelessness touching.

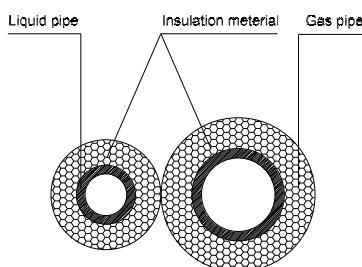
3. Insulation material selection for refrigerant pipe

- The burning performance should over 120°C/248°F
- According to the local law to choose insulation materials
- Recommended insulation casing thickness

| Humidity<80%RH | Humidity ≥80%RH |
|----------------|-----------------|
| 10mm/0.39in | 15mm/0.59in |

4. Installation highlights of insulation construction

- Gas pipe and liquid pipe shall be insulated separately, if the gas pipe and liquid pipe were insulated together; it will decrease the performance of air conditioner.



- The insulation material at the joint pipe shall be 5~10cm/1.97~3.97in longer than the gap of the insulation material.
- The insulation material at the joint pipe shall be inserted into the gap of the insulation material.
- The insulation material at the joint pipe shall be banded to the gap pipe and liquid pipe tightly.
- The linking part should be use glue to paste together

- Be sure not bind the insulation material over-tight, it may extrude out the air in the material to cause bad insulation and cause easy aging of the material.

9.2 Insulation of drainage pipe

1. Operational procedure of refrigerant pipe insulation

Select the suitable pipe → insulation (except joint section) → piping layout and connection → drainage test → insulate the joint parts

2. Purpose of drainage pipe insulation

The temperature of condensate drainage water is very low. If insulation is not enough, it shall form dew and cause leakage to damage the house decoration.

3. Insulation material selection for drainage pipe

- The insulation material should be flame retardant material, the flame retardancy of the material should be selected according to the local law.
- Thickness of insulation layer is usually above 10mm/0.39in.
- Use specific glue to paste the seam of insulation material, and then bind with adhesive tape. The width of tape shall not be less than 5cm/1.97in. Make sure it is firm and avoid dew.

4. Installation and highlights of insulation construction

- The single pipe should be insulated before connecting to another pipe, the joint part should be insulated after the drainage test.
- There should be no insulation gap between the insulation material.

10. Engineering of Electrical Wring

1. Highlights of electrical wiring installation

- All field wiring construction should be finished by qualified electrician.
- Air conditioning equipment should be grounded according to the local electrical regulations.
- Current leakage protection switch should be installed.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put wires to their own wire tube and remain at least 300mm/11.8in gap.
- According to table in indoor part named "the specification of the power" to choose the wiring, make sure the selected wiring not small than the date showing in the table.
- Select different colors for different wire according to relevant regulations.
- Do not use metal wire tube at the place with acid or alkali corrosion, adopt plastic wire tube to replace it.
- There must be not wire connect joint in the wire tube If joint is a must, set a connection box at the place.
- The wiring with different voltage should not be in one wire tube.
- Ensure that the color of the wires of outdoor and the terminal No. are same as those of indoor unit respectively.

Table: Minimum Cross-Sectional Area able of Power and Signal Cables

| Rated Current of Appliance (A) | AWG |
|--------------------------------|-----|
| ≤ 6 | 18 |
| 6 - 10 | 16 |
| 10 - 16 | 14 |
| 16 - 25 | 12 |
| 25 - 32 | 10 |

11. Test Operation

1. The test operation must be carried out after the entire installation has been completed.

2. Please confirm the following points before the test operation.

- The indoor unit and outdoor unit are installed properly.
- Piping and wiring are properly connected.
- Ensure that there are no obstacles near the inlet and outlet of the unit that might cause poor performance or product malfunction.
- The refrigeration system does not leak.
- The drainage system is unimpeded and draining to a safe location.
- The heating insulation is properly installed.
- The grounding wires are properly connected
- The length of the piping and the added refrigerant stow capacity have been recorded.
- The power voltage is the correct voltage for the air conditioner.

CAUTION: Failure to perform the test run may result in unit damage, property damage or personal injury.

3. Test Run Instructions

1. Open both the liquid and gas stop valves.
2. Turn on the main power switch and allow the unit to warm up.
3. Set the air conditioner to COOL mode, and check the following points.

Indoor unit

- a. Ensure the remote control and its buttons work properly.
- b. Ensure the louvers move properly and can be changed using the remote control.
- c. Double check to see if the room temperature is being registered correctly.
- d. Ensure the indicators on the remote control and the display panel on the indoor unit work properly.
- e. Ensure the manual buttons on the indoor unit works properly.
- f. Check to see that the drainage system is unimpeded and draining smoothly.
- g. Ensure there is no vibration or abnormal noise during operation.

Outdoor unit

- a. Check to see if the refrigeration system is leaking.

- b. Make sure there is no vibration or abnormal noise during operation.
- c. Ensure the wind, noise, and water generated by the unit do not disturb your neighbors or pose a safety hazard.

4. Drainage Test

For other types,

- a. Ensure the drainpipe flows smoothly. New buildings should perform this test before finishing the ceiling.
- b. Remove the test cover. Add 2,000ml of water to the tank through the attached tube.
- c. Turn on the main power switch and run the air conditioner in COOL mode.
- d. Listen to the sound of the drain pump to see if it makes any unusual noises.
- e. Check to see that the water is discharged. It may take up to one minute before the unit begins to drain depending on the drainpipe.
- f. Make sure that there are no leaks in any of the piping.
- g. Stop the air conditioner. Turn off the main power switch and reinstall the test cover.

For one-way cassette type,

- Before the test, make sure that the water discharge pipeline is smooth, and check that each connection is sealed properly.
- Conduct the water discharge test in the new room before the ceiling is paved.

1. Connect the power supply, and set the air conditioner to operate in the cool mode.
- Check the running sound of the drainage pump.
2. keep cool mode running at least 10 min.
3. Stop the air conditioner. Wait for three minutes, and then check if there is anything unusual. If the water discharge piping layout is not correct, the excessive water flow will cause the water level error and "EH OE" error code will be displayed on the display panel. There may even be water overflowing from the water pan.
4. Continue to add water until the alarm for excessive water levels is triggered. Check if the drainage pump drains water immediately. After three minutes, if the water level does not fall below the warning level, the unit will shut down.

At this time, you need to turn off the power supply, and drain away the accumulated water before you can turn on the unit normally.

5. Turn off the power supply, remove the water manually

using the drainage plug, and put the test cap back to the original place.

CAUTION:

The drainage plug at the bottom of the unit body is used to discharge accumulated water from the drain pan when the air conditioner malfunctions. When the air conditioner is operating normally, make sure the drainage plug is properly plugged to prevent water from leaking.

Maintenance

Contents

| | | |
|-----|--|---|
| 1. | First Time Installation Check | 2 |
| 2 | Refrigerant Recharge | 4 |
| 3 | Re-Installation | 5 |
| 3.1 | Indoor Unit..... | 5 |
| 3.2 | Outdoor Unit..... | 7 |

1. First Time Installation Check

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

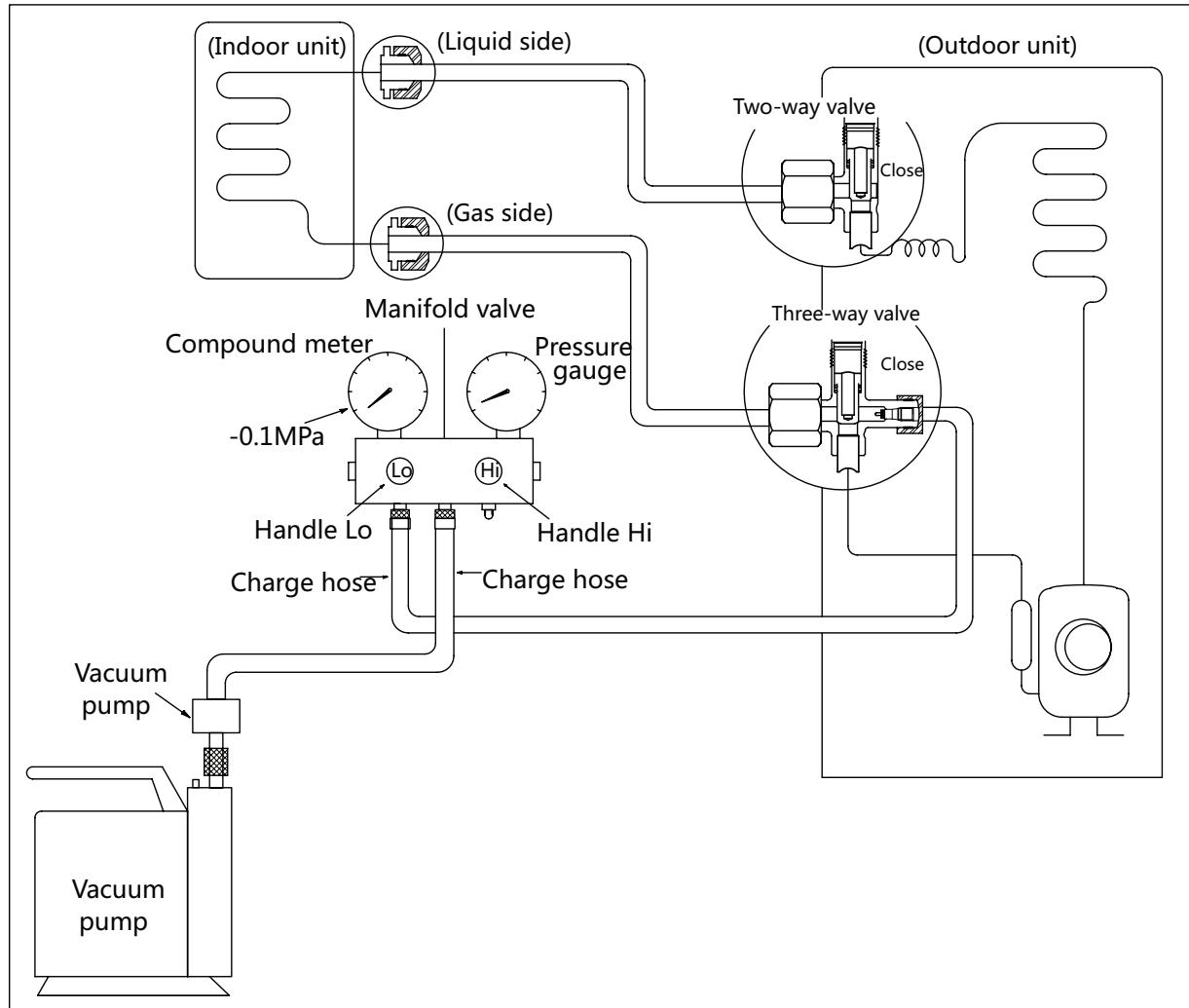
- Increasing pressure in the system.
- Increasing the operating current.
- Decreasing the cooling or heating efficiency.
- Congesting the capillary tubing due to ice build-up in the refrigerant circuit.
- Corroding the refrigerant system.

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.

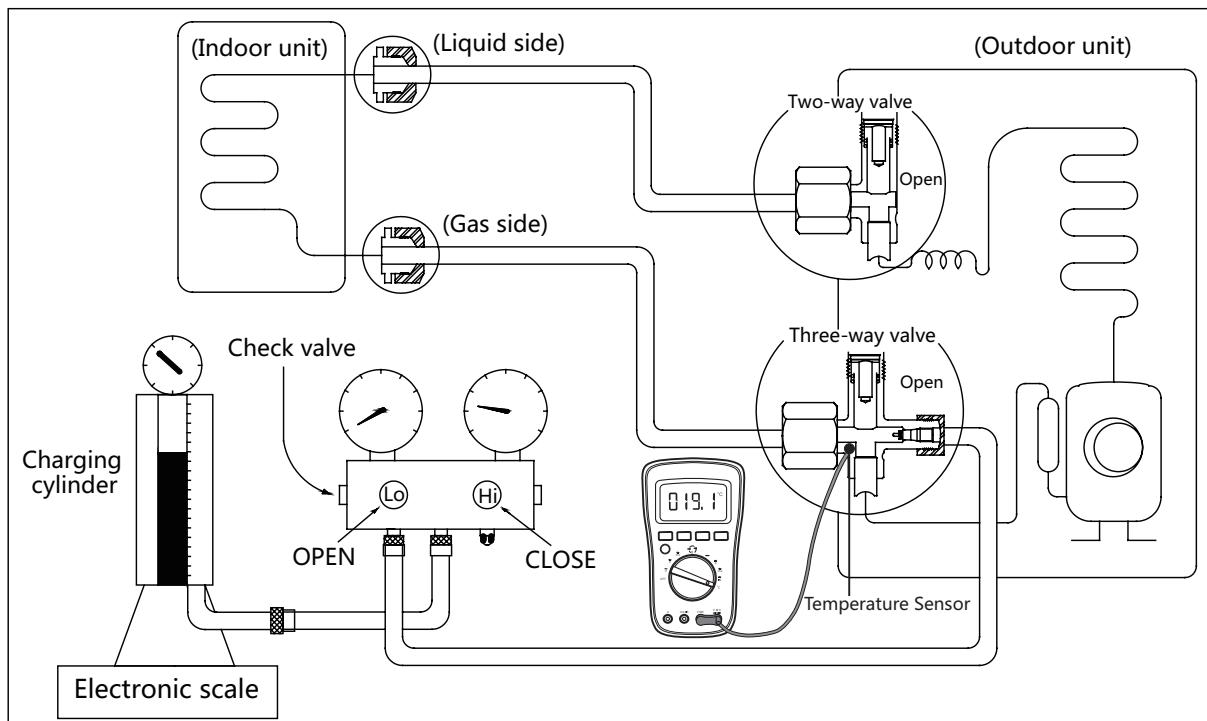
Air purging with vacuum pump



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.
6. If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then cease vacuum pump operations.
 - b. 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.
7. 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 Recharge



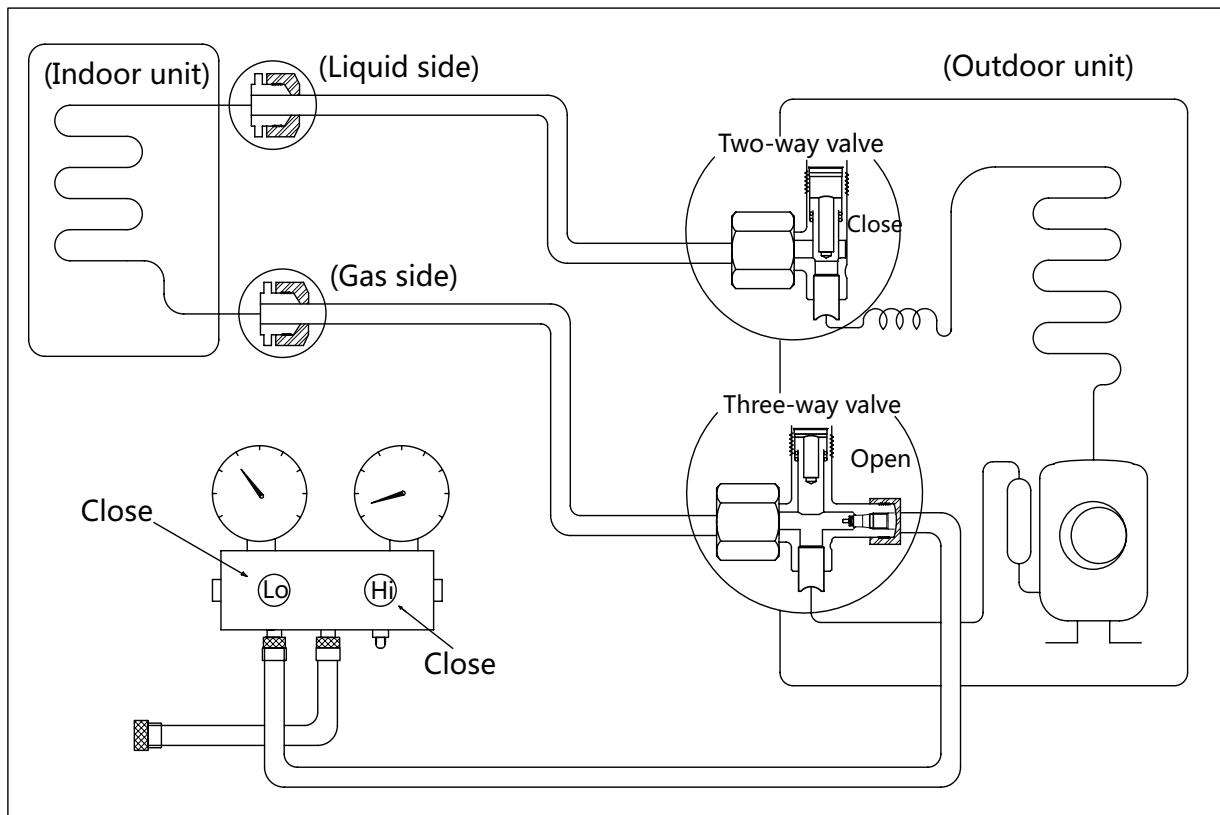
Procedure:

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.
12. Check for gas leakage.

3. Re-Installation

3.1 Indoor Unit

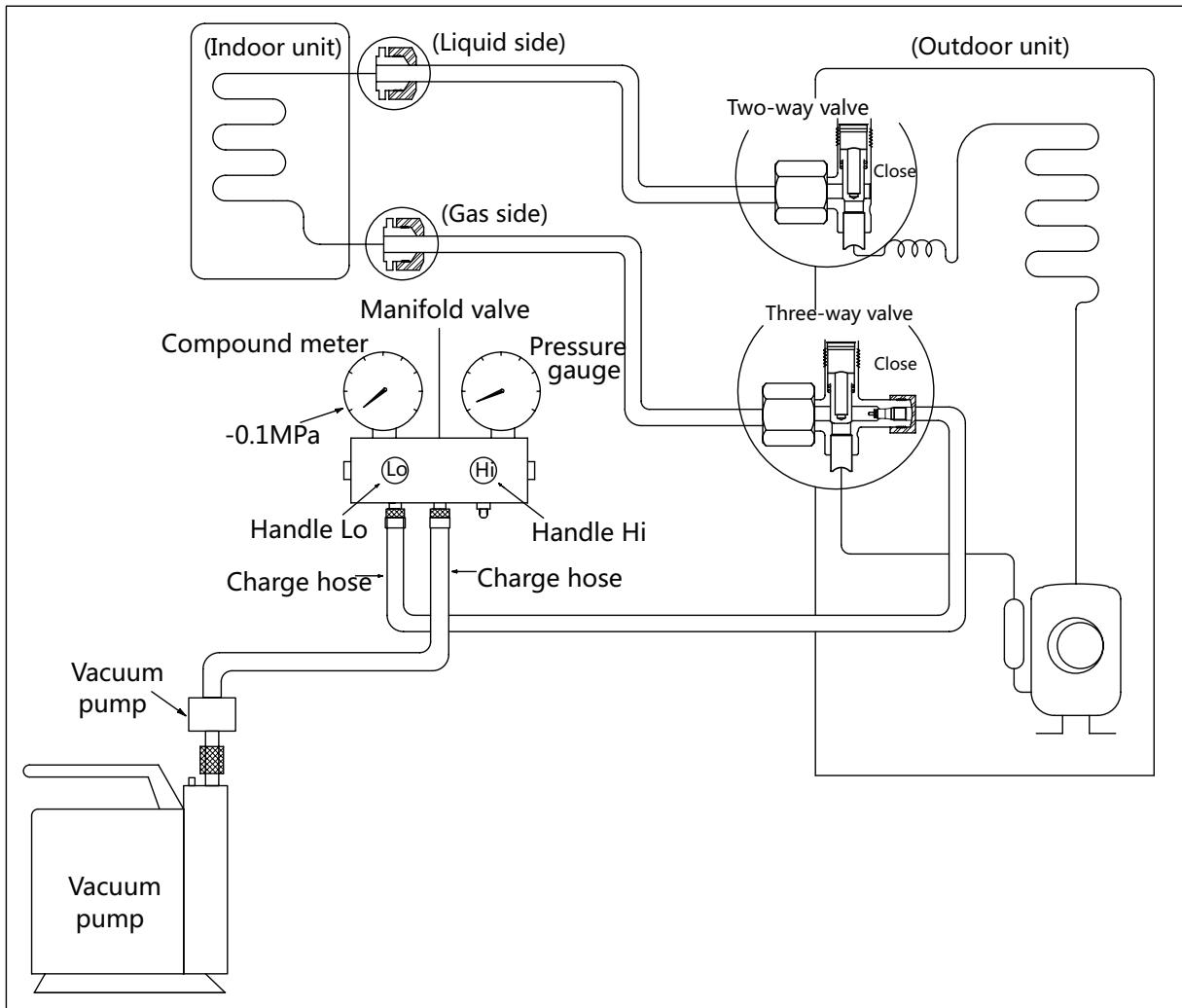
Collecting the refrigerant into the outdoor unit



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.
9. Check for gas leakage.

Air purging with vacuum pump

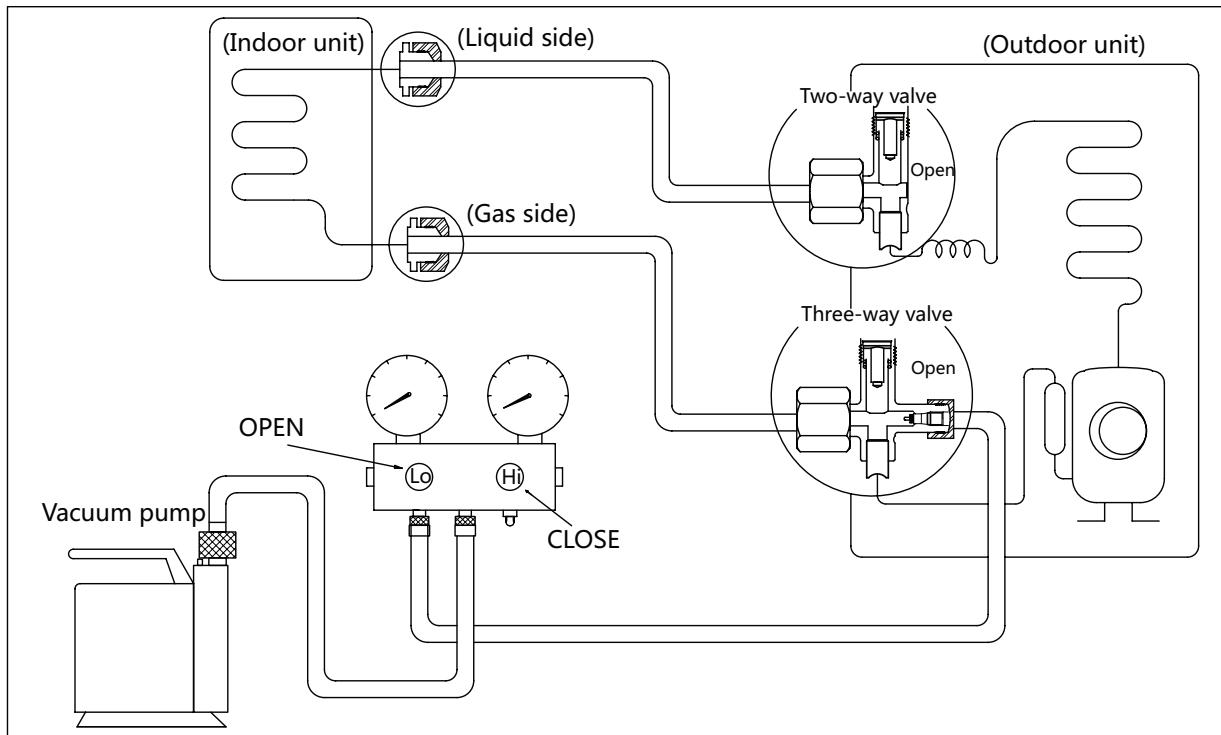


Procedure:

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.
6. If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then cease vacuum pump operations.
 - a. 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.
 - b. 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

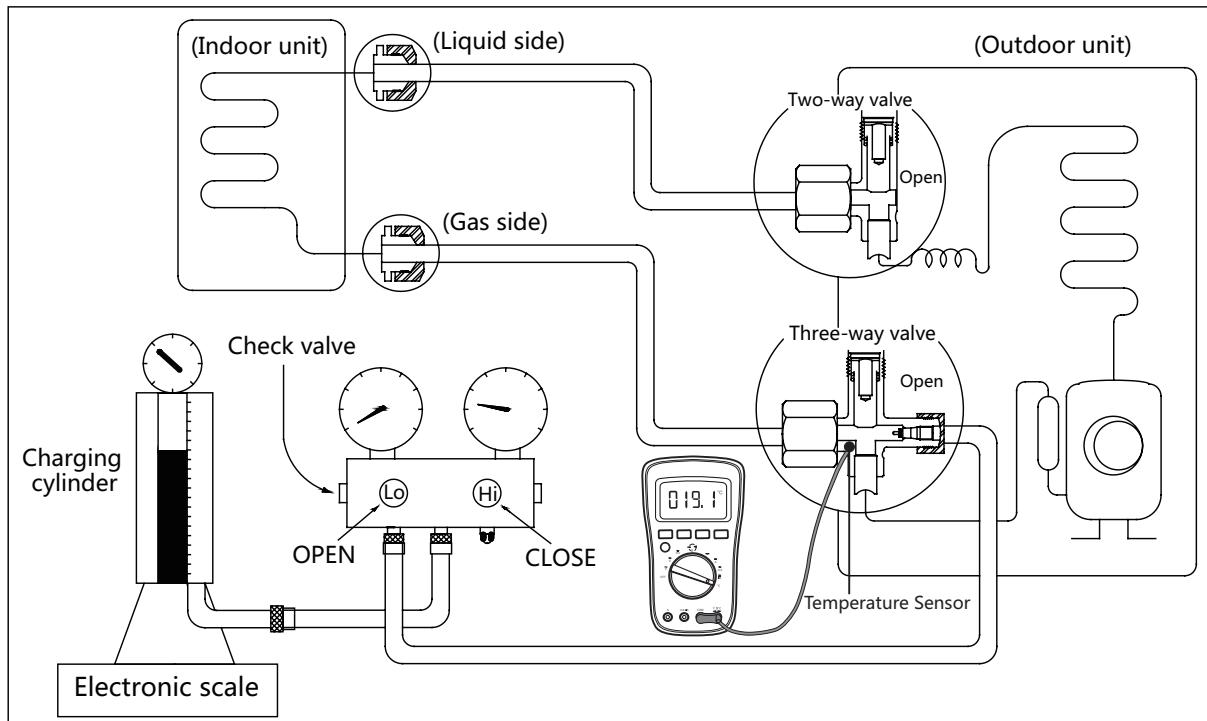
Evacuation for the whole system



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.

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.
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. When flared joints are reused indoors, the flare part shall be re-fabricated.

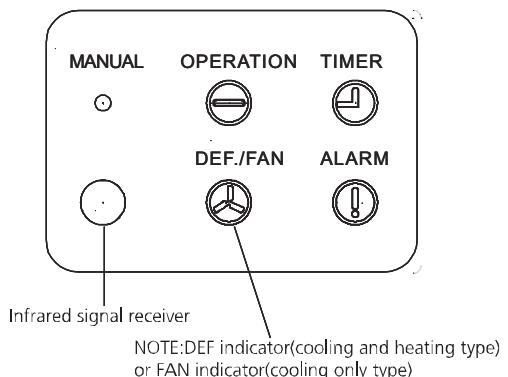
Product Features

Contents

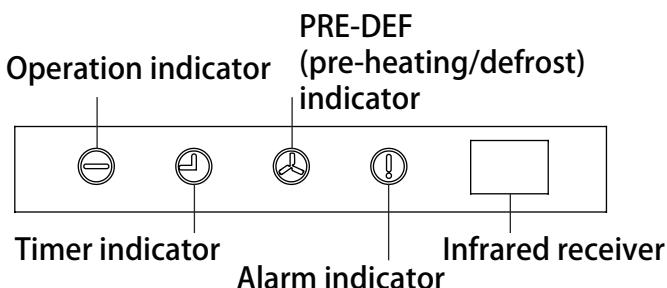
| | | |
|-----------|--|-----------|
| 1. | Display Function | 2 |
| 2 | Safety Features | 5 |
| 3. | Basic Functions..... | 6 |
| 3.1 | Table | 6 |
| 3.2 | Abbreviation..... | 7 |
| 3.3 | Fan Mode..... | 7 |
| 3.4 | Cooling Mode | 7 |
| 3.5 | Heating Mode(Heat Pump Units) | 8 |
| 3.6 | Auto-mode..... | 9 |
| 3.7 | Drying Mode | 10 |
| 3.8 | Forced Operation Function | 10 |
| 3.9 | Timer Function | 10 |
| 3.10 | ECO Function | 10 |
| 3.11 | Auto-Restart Function..... | 10 |
| 3.12 | Drain Pump Control..... | 10 |
| 4. | Optional Functions | 11 |
| 5. | Remote Controller Functions | 12 |
| 5.1 | Infrared Wireless Remote Controller..... | 12 |
| 5.2 | LCD Wired Remote Controller | 16 |
| 5.3 | Centralized Controller | 32 |

1. Display Function

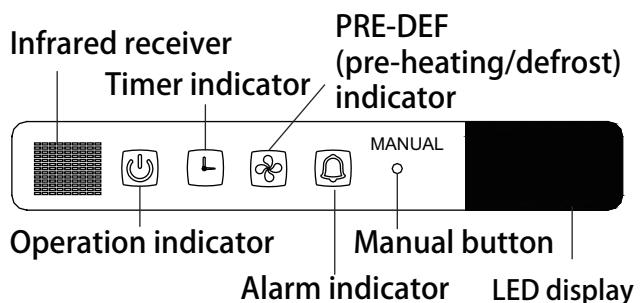
Floor Ceiling Type



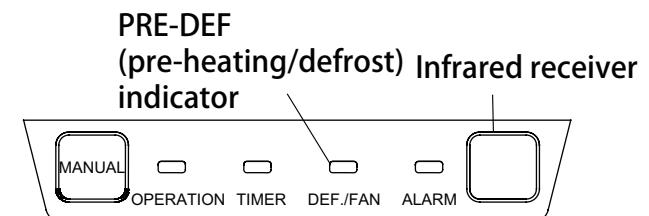
Display 1



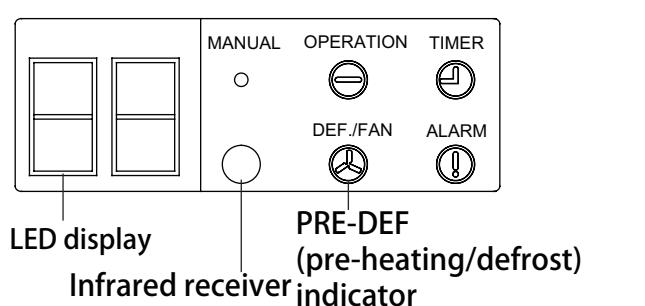
Display 2



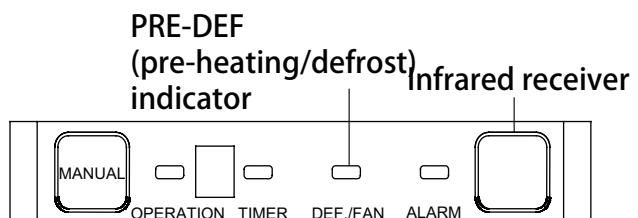
Display 3



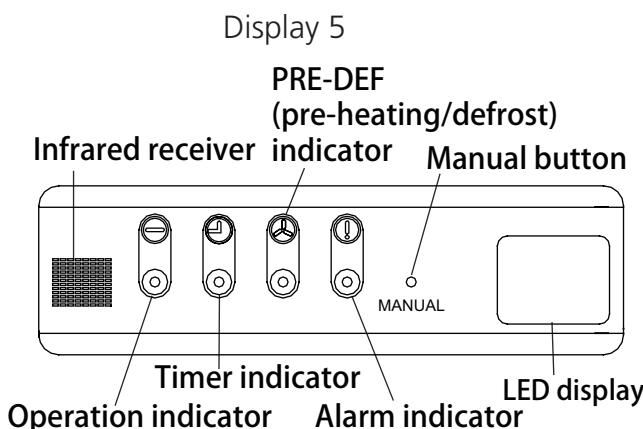
Display 4



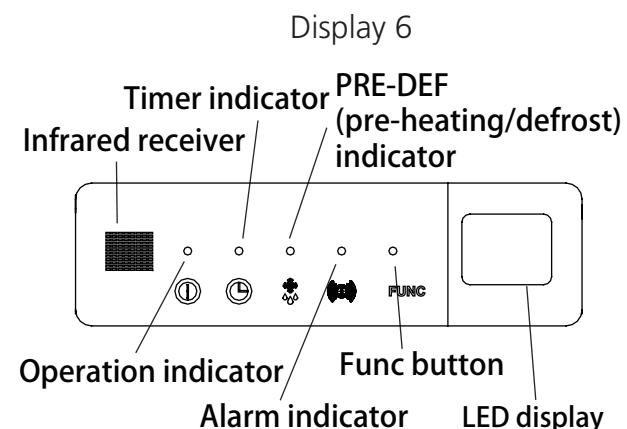
Display 5



Display 6

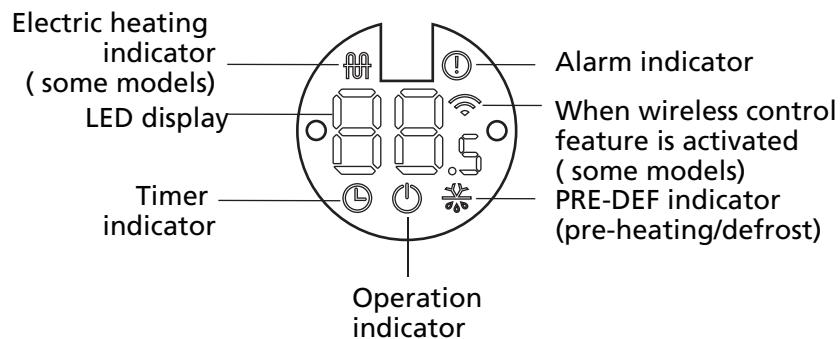


Display 7

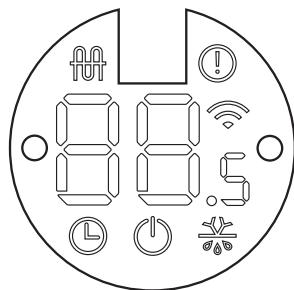


Display 8

New 4-way Cassette Type & New Compact Cassette Type

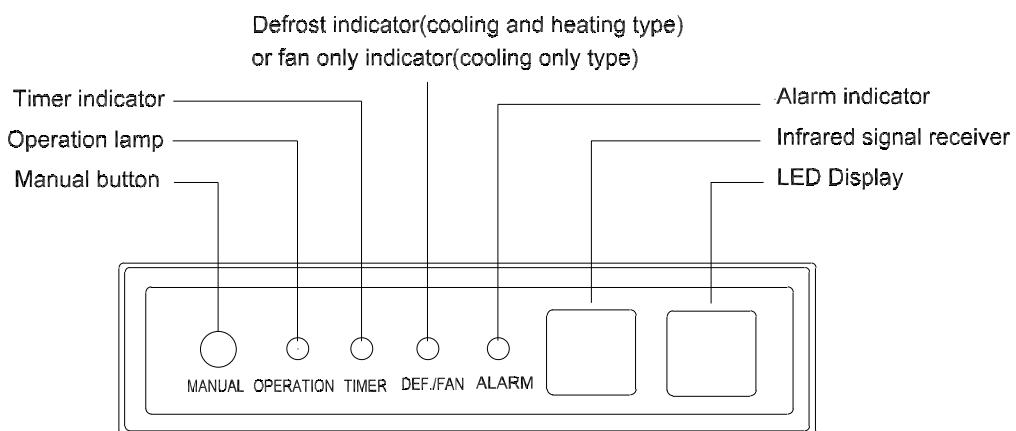


1-way Cassette Type

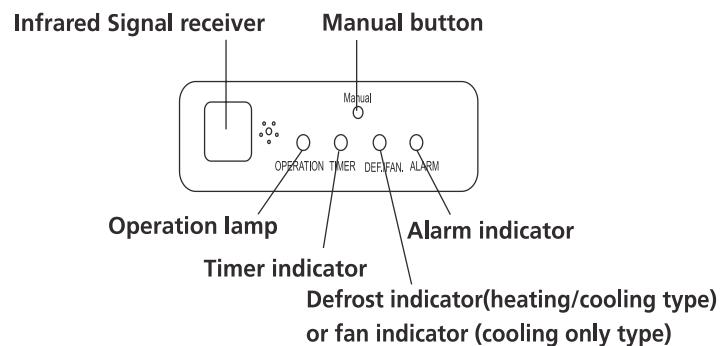


- " " when Electric heating feature is activated (Not available for this unit).
- " " when TIMER is set.
- " " when the unit is on.
- " " Alarm indicator.
- " " when Wireless Control feature is activated(some units).
- " " when pre-heating/defrost feature is activated.
- " " Displays temperature, operation feature and Error codes.
- " " when 8°C heating feature is turned on.
- " " when Active Clean feature is turned on.
- " " when WiFi module enters AP mode (some units).
- " " when Forced cooling feature is turned on.
- " " Filter cleaning reminder.

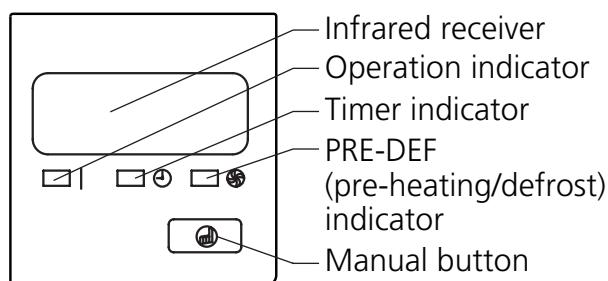
Duct Type



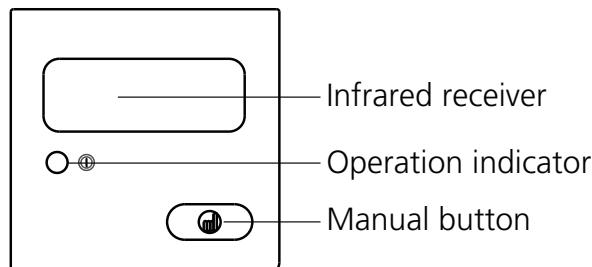
Compact Cassette Type



Console Type

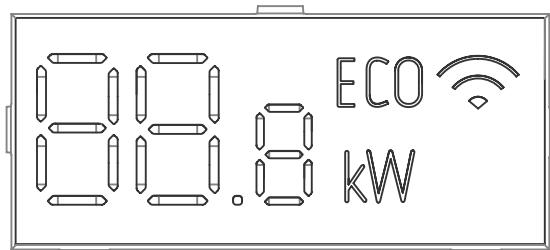


Display 1



Display 2

New Console Type



| Display | Function | |
|----------|---|-------------|
| ECO | ECO function (available on select units only) | |
| Wi-Fi | When Wireless Control feature is activated (some units) | |
| 88.8 | Temperature value | Temperature |
| ON (3s) | Timer ON is set. Activation of Swing, Boost, Silence or UV-C lamp | |
| OFF (3s) | Timer OFF is set. Cancellation of Swing, Boost, Silence or UV-C lamp | |
| DF | Defrost | |
| CL | Active Clean | |
| FP | Heating in room temperature under 8°C(46°F) | |

Note: Please select the display function according to your purchase product.

2. Safety Features

Compressor three-minute delay at restart

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

Automatic shutoff based on discharge temperature

If the compressor discharge temperature exceeds a certain level for nine seconds, the compressor ceases operation.

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 setting time or the louver is in place.
- If the unit is in heating mode, the indoor fan is regulated by the anti-cold wind function.

Compressor preheating

Preheating is automatically activated when T4 sensor is lower than setting temperature.

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.

3. Basic Functions

3.1 Table

| Functions | | Cooling Mode&Heating mode | | Heating Mode | | | | Auto mode | | |
|-----------|--------|---|-----------|-----------------|--------|------------------------|--------|-----------|--------|--------|
| | | Outdoor Fan Control | | Defrosting Mode | | Anti-cold Air Function | | | | |
| Cases | | Case 1: Compressor Frequency and T4 | Case 2:T4 | Case 1 | Case 2 | Case 1 | Case 2 | Case 1 | Case 2 | Case 3 |
| Models | 6k~18k | ✓ | | | ✓ | | ✓ | | | ✓ |

Note: The detailed description of case 1 or case 2 is shown in the following function 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 |
| TP | Compressor discharge temperature |
| Tsc | Adjusted setting temperature |
| CDIFTEMP | Cooling shutdown temperature |
| HDFTEMP2 | Heating shutdown temperature |
| TCDE1 | Exit defrost temperature1 |
| TCDE2 | Exit defrost temperature2 (maintain for a period of time) |
| TIMING_DEFROST_TIME | Enter defrost time |

In this manual, such as CDIFTEMP, HDFTEMP2, TCDE1, TCDE2, TIMING_DEFROST_TIME...etc., they are well-setting parameter 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 1%~100%, or low, medium, high and 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°F).

3.4 Cooling Mode

3.4.1 Compressor Control

Reach the configured temperature:

- 1) When the compressor runs continuously for less than 120 minutes.
 - If the following conditions are satisfied, the compressor ceases operation.
 - Calculated frequency(fb) is less than minimum limit frequency(FminC).
 - Compressor runs at FminC more than ten minutes.
 - T1 is lower than or equal to (Tsc-CDIFTEMP-0.5°C/0.9°F)
- 2) When the compressor runs continuously for more than

120 minutes.

- If the following conditions are satisfied, the compressor ceases operation.
 - Calculated frequency(fb) is less than minimum limit frequency(FminC).
 - Compressor runs at FminC more than 10 minutes.
 - When T1 is lower than or equal to (Tsc-CDIFTEMP).

Note: CDIFTEMP is EEPROM setting parameter. It is 2°C(35.6°F) usually.

- 3) If one of the following conditions is satisfied, not judge protective time.
 - Compressor running frequency is more than test frequency.
 - When compressor running frequency is equal to test frequency, T4 is more than 15°C(59 °F) or T4 fault.
 - Change setting temperature.
 - Turning on/off turbo or sleep function
 - Various frequency limit shutdown occurs.

3.4.2 Indoor Fan Control

- 1) In cooling mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or low, medium, high and auto.
- 2) Auto fan action in cooling mode:
 - Descent curve
 - When T1-Tsc is lower than or equal to 3.5°C/6.3°F, fan speed reduces to 80%(High);
 - When T1-Tsc is lower than or equal to 1°C/1.8°F, fan speed reduces to 60%(Medium);
 - When T1-Tsc is lower than or equal to 0.5°C/0.9°F, fan speed reduces to 40%(Low);
 - When T1-Tsc is lower than or equal to 0°C/0°F, fan speed reduces to 20%(Low);
 - When T1-Tsc is lower than or equal to -0.5°C/-0.9°F, fan speed reduces to 1%(Low);

- Rise curve
 - When T1-Tsc is higher than 0°C/0°F, fan speed increases to 20%(Low);
 - When T1-Tsc is higher than 0.5°C/0.9°F, fan speed increases to 40%(Low);
 - When T1-Tsc is higher than 1°C/1.8°F, fan speed increases to 60%(Medium);
 - When T1-Tsc is higher than 1.5°C/2.7°F, fan speed increases to 80%(High);
 - When T1-Tsc is higher than 4°C/7.2°F, fan speed increases to 100%(High).

3.4.3 Outdoor Fan Control

Case 1:

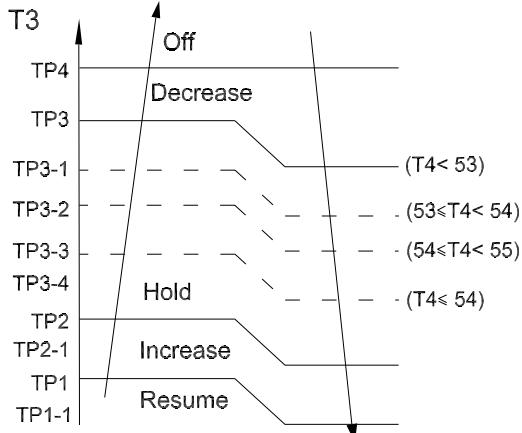
- The outdoor unit will be run at different fan speed according to T4 and compressor frequency.

- For different outdoor units, the fan speeds are different.

Case 2:

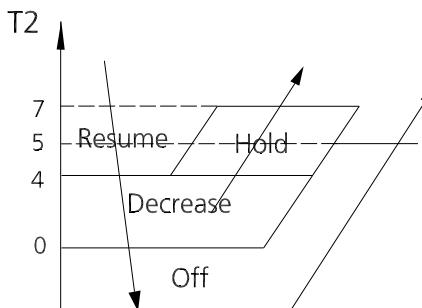
- The outdoor unit will be run at different fan speed according to T4.
- For different outdoor units, the fan speeds are different.

3.4.4 Condenser Temperature Protection



When the condenser temperature exceeds a configured value, the compressor ceases operation.

3.4.5 Evaporator Temperature Protection



- Off: Compressor stops.
- Decrease: Decrease the running frequency to the lower level per 1 minute.
- Hold: Keep the current frequency.
- Resume: No limitation for frequency.

3.5 Heating Mode(Heat Pump Units)

3.5.1 Compressor Control

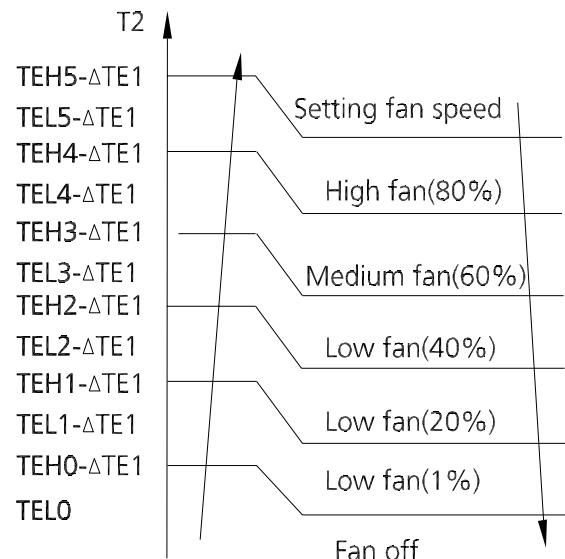
- Reach the configured temperature
 - If the following conditions are satisfied, the compressor ceases operation.
 - Calculated frequency(fb) is less than minimum limit frequency(FminH).
 - Compressor runs at FminH more than 10 minutes.
 - T1 is higher than or equal to Tsc+ HDIFTEMP2.

Note: HDIFTEMP2 is EEPROM setting parameter. It is 2°C(35.6°F) usually.

- If one of the following conditions is satisfied, not judge protective time.
 - Compressor running frequency is more than test frequency.
 - Compressor running frequency is equal to test frequency, T4 is more than 15°C(59 °F) or T4 fault.
 - Change setting temperature.
 - Turning on/off turbo or sleep function
- When the current is higher than the predefined safe value, surge protection is activated, causing the compressor to cease operations.

3.5.2 Indoor Fan Control:

- In heating mode, the indoor fan operates continuously. The fan speed can be set to 1%-100%, or low, medium, high and auto.
- Anti-cold air function
 - If the temperature difference of T2 changes during auto fan and causes the fan speed to change, run the current fan speed for 30 seconds first, the default interval is the interval before the fan speed changes, and then judge T2 according to the current interval after 30 seconds to get the final anti-cold air interval.



Case 1:

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

Case 2: $\Delta\text{TE1}=0$

- Auto fan action in heating mode:

- Rise curve
 - When $T_1 - T_{sc}$ is higher than $-1.5^\circ C / -2.7^\circ F$, fan speed reduces to 80%(High);
 - When $T_1 - T_{sc}$ is higher than $0^\circ C / 0^\circ F$, fan speed reduces to 60%(Medium);
 - When $T_1 - T_{sc}$ is higher than $0.5^\circ C / 0.9^\circ F$, fan speed reduces to 40%(Low);
 - When $T_1 - T_{sc}$ is higher than $1^\circ C / 1.8^\circ F$, fan speed reduces to 20%(Low).
- Descent curve
 - When $T_1 - T_{sc}$ is lower than or equal to $0.5^\circ C / 0.9^\circ F$, fan speed increases to 40%(Low);
 - When $T_1 - T_{sc}$ is lower than or equal to $0^\circ C / 0^\circ F$, fan speed increases to 60%(Medium);
 - When $T_1 - T_{sc}$ is lower than or equal to $-1.5^\circ C / -2.7^\circ F$, fan speed increases to 80%(high);
 - When $T_1 - T_{sc}$ is lower than or equal to $-3^\circ C / -5.4^\circ F$, fan speed increases to 100%(High).

3.5.3 Outdoor Fan Control:

Case 1:

- The outdoor unit will be run at different fan speed according to T_4 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 T_4 .
- For different outdoor units, the fan speeds are different.

3.5.4 Defrosting mode

- The unit enters defrosting mode according to the temperature value of T_3 and T_4 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 “” symbol is displayed.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
 - T_3 rises above $TCDE1$.
 - T_3 maintained above $TCDE2$ for 80 seconds.
 - Unit runs for 15 minutes consecutively in defrosting mode.
- If T_4 is lower than or equal to $-22^\circ C (-7.6^\circ F)$ and compressor running time is more than $TIMING_DEFROST_TIME$, if any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
 - Unit runs for 10 minutes consecutively in defrosting mode.

- T_3 rises above $10^\circ C / 50^\circ F$.

The following conditions apply only to certain models, see table in section 3.1 for details.

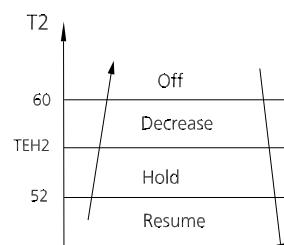
Case 1:

- T_3 is lower than $3^\circ C (37.4^\circ F)$ and compressor running time is more than 120 minutes, at this time, if T_3 is lower than $TCDI1+4^\circ C (39.2^\circ F)$ for 3 minutes, the unit enters defrosting mode. If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
 - T_3 rises above $TCDE1+4^\circ C / 7.2^\circ F$.
 - T_3 maintained above $TCDE2+4^\circ C / 7.2^\circ F$ for 80 seconds.
 - Unit runs for 15 minutes consecutively in defrosting mode.

Case 2:

- If any one of the following conditions is satisfied, the unit enters defrosting mode
 - If T_3 or T_4 is lower than $-3^\circ C$ for 30 seconds, $T_3 - T_1$ is lower than $5^\circ C$ and compressor running time is more than $EE_TIME_DEFROST7$.
 - If T_3 or T_4 is lower than $-3^\circ C$ for 30 seconds and compressor running time is more than $EE_TIME_DEFROST7+30$ minutes.
- If any one of the following conditions is satisfied, defrosting ends and the machine switches to normal heating mode:
 - T_3 rises above $TCDE1+4^\circ C / 7.2^\circ F$.
 - T_3 maintained above $TCDE2+4^\circ C / 7.2^\circ F$ for 80 seconds.
 - Unit runs for 15 minutes consecutively in defrosting mode.

3.5.5 Evaporator Coil Temperature Protection



- Off: Compressor stops.
- Decrease: Decrease the running frequency to the lower level per 20 seconds.
- Hold: Keep the current frequency.
- Resume: No limitation for frequency.

3.6 Auto-mode

- This mode can be selected with the remote controller and the temperature setting can be adjusted between $16^{\circ}\text{C} \sim 30^{\circ}\text{C}$.

Case 1:

- In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of ΔT ($\Delta T = T1 - TS$).

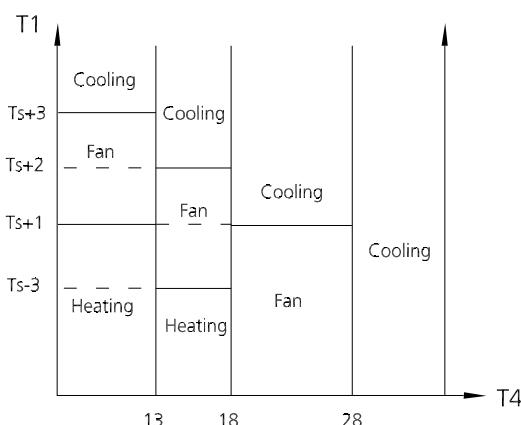
| ΔT | Running mode |
|--|--------------|
| $\Delta T > 2^{\circ}\text{C}(3.6^{\circ}\text{F})$ | Cooling |
| $-3^{\circ}\text{C}(-5.4^{\circ}\text{F}) \leq \Delta T \leq 2^{\circ}\text{C}(3.6^{\circ}\text{F})$ | Fan-only |
| $\Delta T < -3^{\circ}\text{C}(-5.4^{\circ}\text{F})$ | Heating* |

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 .

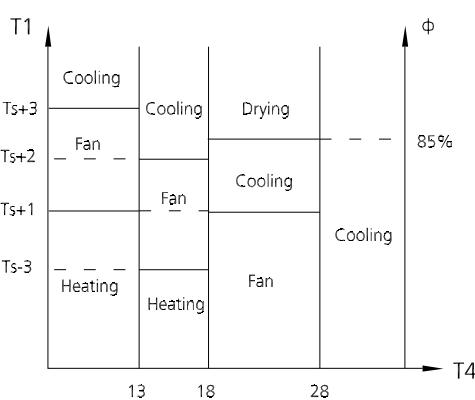
Case 2:

In auto mode, the machine selects cooling, heating or fan-only mode on the basis of $T1, TS$ and $T4$.



Case 3:

In auto mode, the machine selects cooling, heating or fan-only mode on the basis of $T1, TS, T4$ and relative humidity (ϕ).



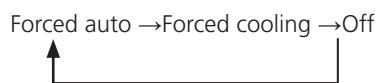
3.7 Drying mode

- In drying mode, AC operates the same as auto fan in cooling mode.
- All protections are activated and operate the same as they do that in cooling mode.
- Low Room Temperature Protection

If the room temperature is lower than $10^{\circ}\text{C}/50^{\circ}\text{F}$, the compressor ceases operations and does not resume until room temperature exceeds $12^{\circ}\text{C}/53.6^{\circ}\text{F}$.

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 $24^{\circ}\text{C}(76^{\circ}\text{F})$.

- Forced auto mode:

Forced auto mode operates the same as normal auto mode with a preset temperature of $24^{\circ}\text{C}(76^{\circ}\text{F})$.

- The unit exits forced operation when it receives the following signals:
 - Switch off
 - Changes in:
 - mode
 - fan speed
 - sleep mode
 - Follow me

3.9 Timer Function

- The timing range is 24 hours.
- Timer On. The machine turns on automatically at the preset time.
- Timer Off. The machine turns off automatically at the preset time.
- Timer On/Off. The machine turns on automatically at the preset On Time, and then turns off automatically at the preset Off Time.
- Timer Off/On. The machine turns off automatically at the preset Off Time and then turns on automatically at the preset On Time.
- The timer does not change the unit operation mode. If the unit is off now, it does not start up immediately after the "timer off" function is set. When the setting time is reached, the timer LED switches off and the unit running mode remains unchanged.
- The timer uses relative time, not clock time

3.10 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/1.8°F (to not 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/1.8°F (to not lower than 16°C/60.8°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.
- The timer setting is available in this mode.

3.11 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 and in the case of a sudden power failure, will restore those settings automatically within 3 minutes after power returns.

4. Optional Functions

4.1 8°C Heating(Heat pump units)

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

4.2 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.

4.3 Silence

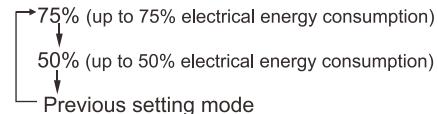
- Press "Silence" or keep pressing Fan button for more than 2 seconds on the remote control to enable the SILENCE function. While this function is active, the compressor frequency is maintained at a lower level than F3. The indoor unit will run at faint breeze(1%), which reduces noise to the lowest possible level.
- When match with multi outdoor unit, this function is disabled.

4.4 ECO Function

- Used to enter the energy efficient mode.
 - Under cooling mode, press ECO button, the remote controller will adjust the temperature automatically to 24°C/75°F, fan speed of Auto to save energy (but only if the set temperature is less than 24°C/75°F). If the set temperature is more than 24°C/75°F and 30°C/86°F, press the ECO button, the fan speed will change to Auto, the set temperature will remain unchanged.
 - When pressing the ECO button, or modifying the mode or adjusting the set temperature to less than 24°C/75°F, the AC will quit the ECO operation.
 - Operation time in ECO mode is 8 hours. After 8 hours the AC quits this mode.

4.5 Electrical energy consumption control function (Optional)

Press the "Gear" button on remote controller to enter the energy efficient mode in a sequence of following:



Turn off the unit or activate ECO, sleep, Super cool, 8°C Heating, Silence or self clean function will quit this function.

4.6 Breeze Away function (for some models)

- This feature avoids direct airflow blowing on the body and makes you feel indulging in silky coolness.
- NOTE: This feature is available under cooling mode, fan-only mode and drying mode.

4.7 Active Clean function

- The Active Clean Technology washes away dust, mold, and grease that may cause odors when it adheres to the heat exchanger by automatically freezing and then rapidly thawing the frost. The internal wind wheel then keeps operating to blow-dry the evaporator, thus preventing the growth of mold and keeping the inside clean.
- When this function is turned on, the indoor unit display window appears "CL", after 20 to 45 minutes, the unit will turn off automatically and cancel Active Clean function.

5. Remote Controller Functions

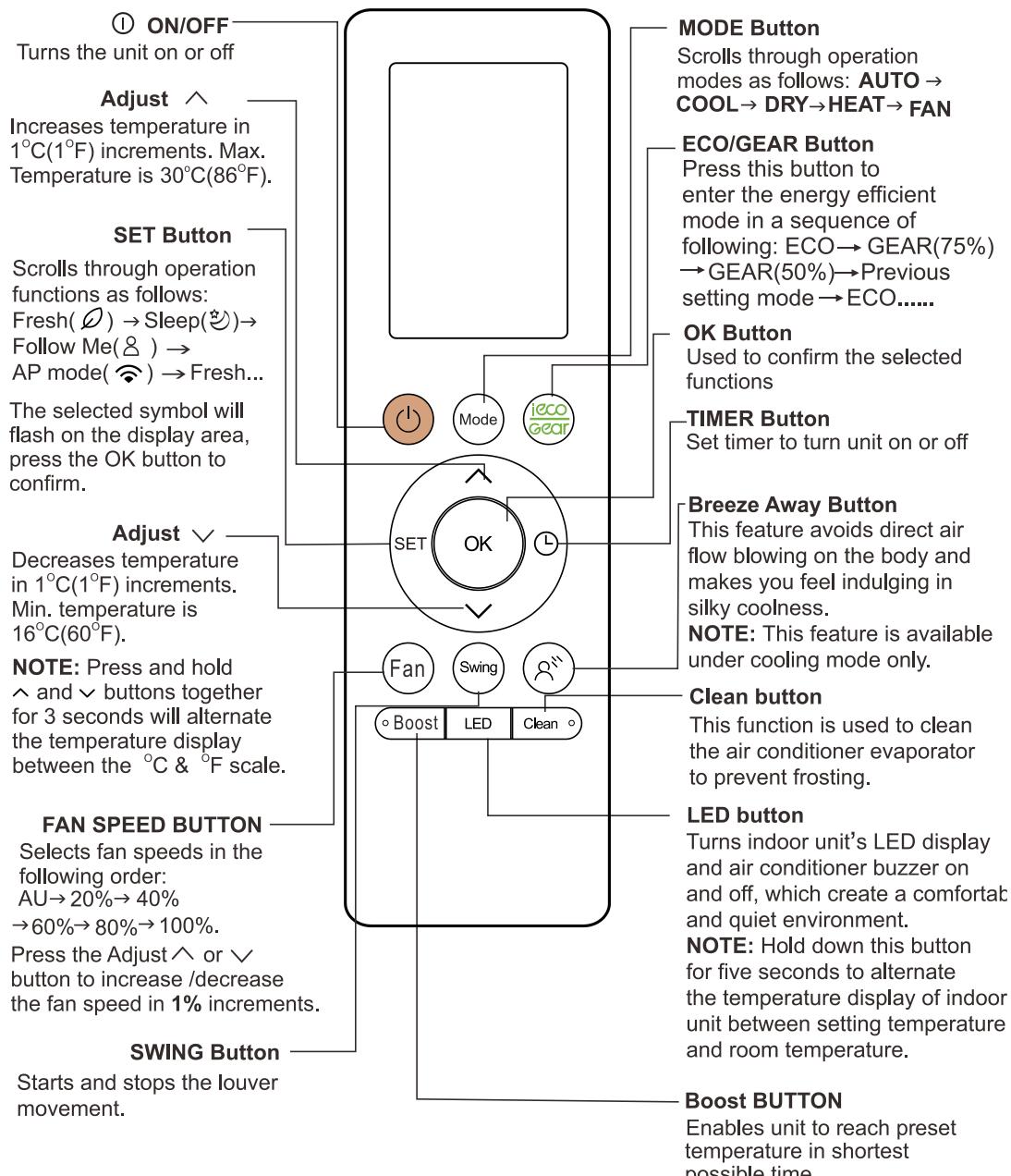
5.1 Infrared Wireless Remote Controller

5.1.1 RG10A(B2S)/BGEF (Standard for some units)

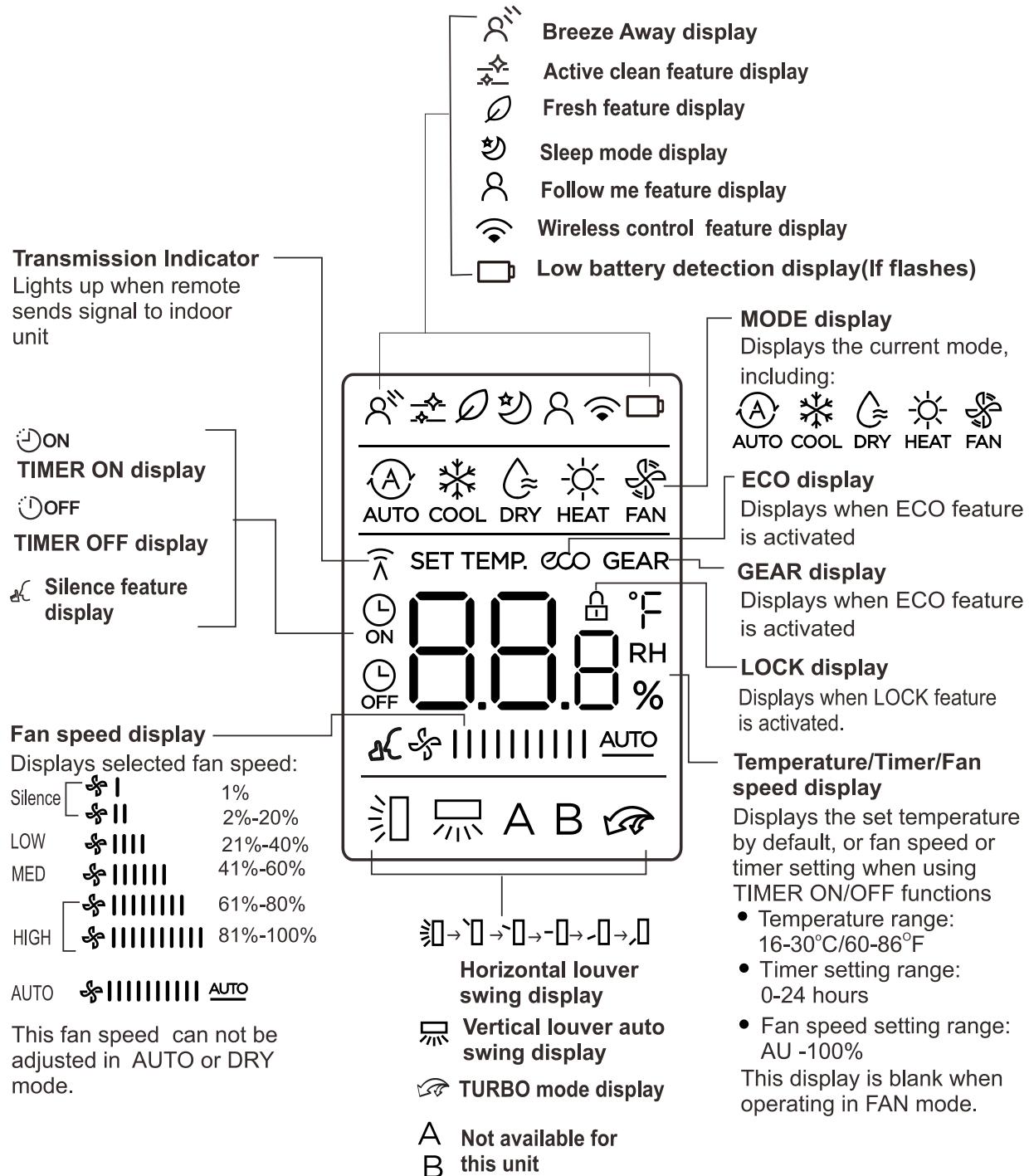
Remote Controller Specifications

| Model | RG10A(B2S)/BGEF |
|-------------------------------|---------------------------------|
| Rated Voltage | 3.0V (Dry batteries R03/LR03×2) |
| Reaching Distance | 8m |
| Environment Temperature Range | -5°C~60°C(23°F~140°F) |

Buttons and Functions



Remote LCD Screen Indicators



Note:

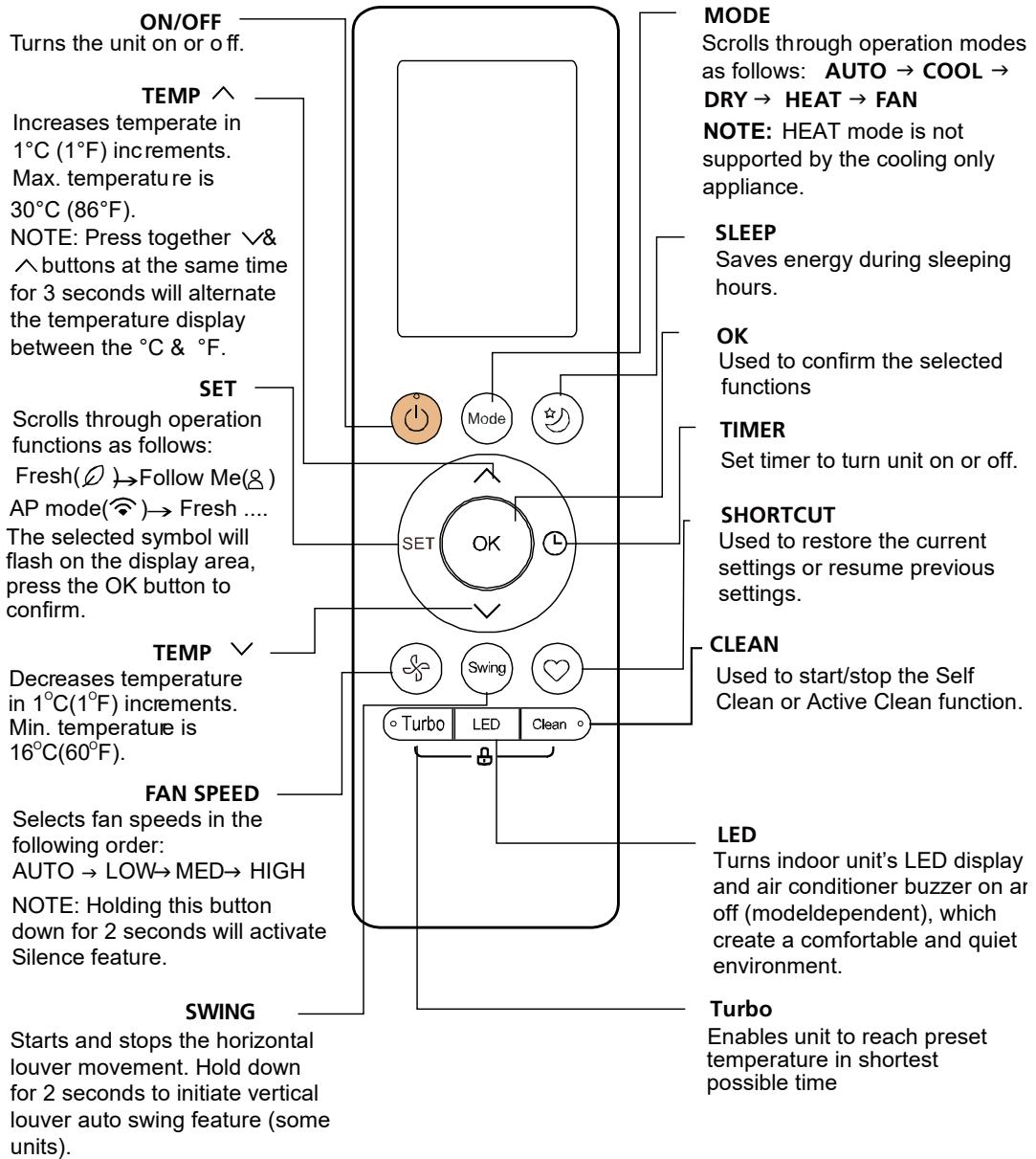
All indicators shown in the figure are for the purpose of clear presentation. But during the actual operation, only the relative function signs are shown on the display window.

5.1.2 RG10B(B2)/BGEF (Standard for some units)

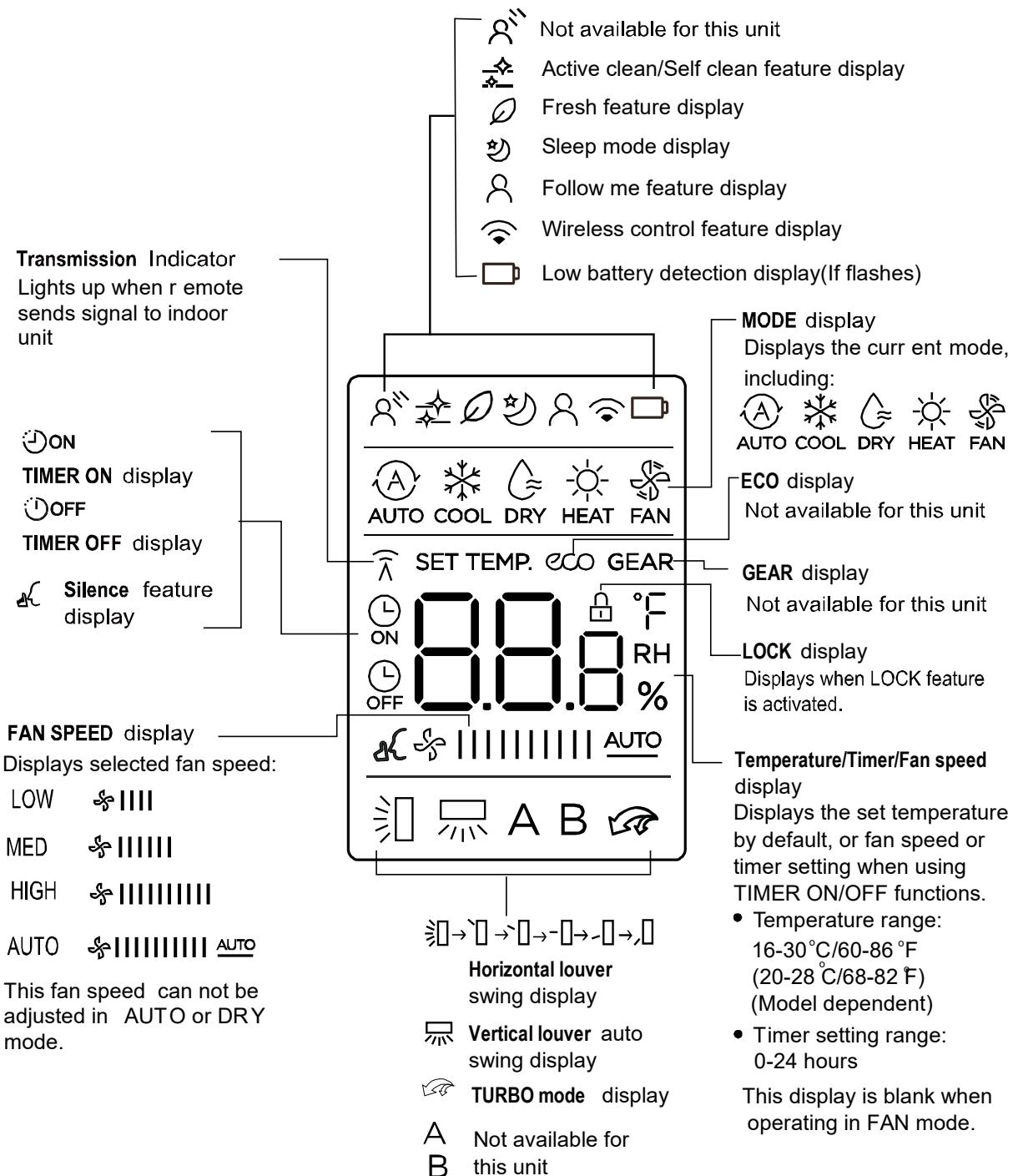
Remote Controller Specifications

| Model | RG10B(B2)/BGEF |
|-------------------------------|---------------------------------|
| Rated Voltage | 3.0V (Dry batteries R03/LR03×2) |
| Reaching Distance | 8m |
| Environment Temperature Range | -5°C~60°C(23°F~140°F) |

Buttons and Functions



Remote LCD Screen Indicators



Note:

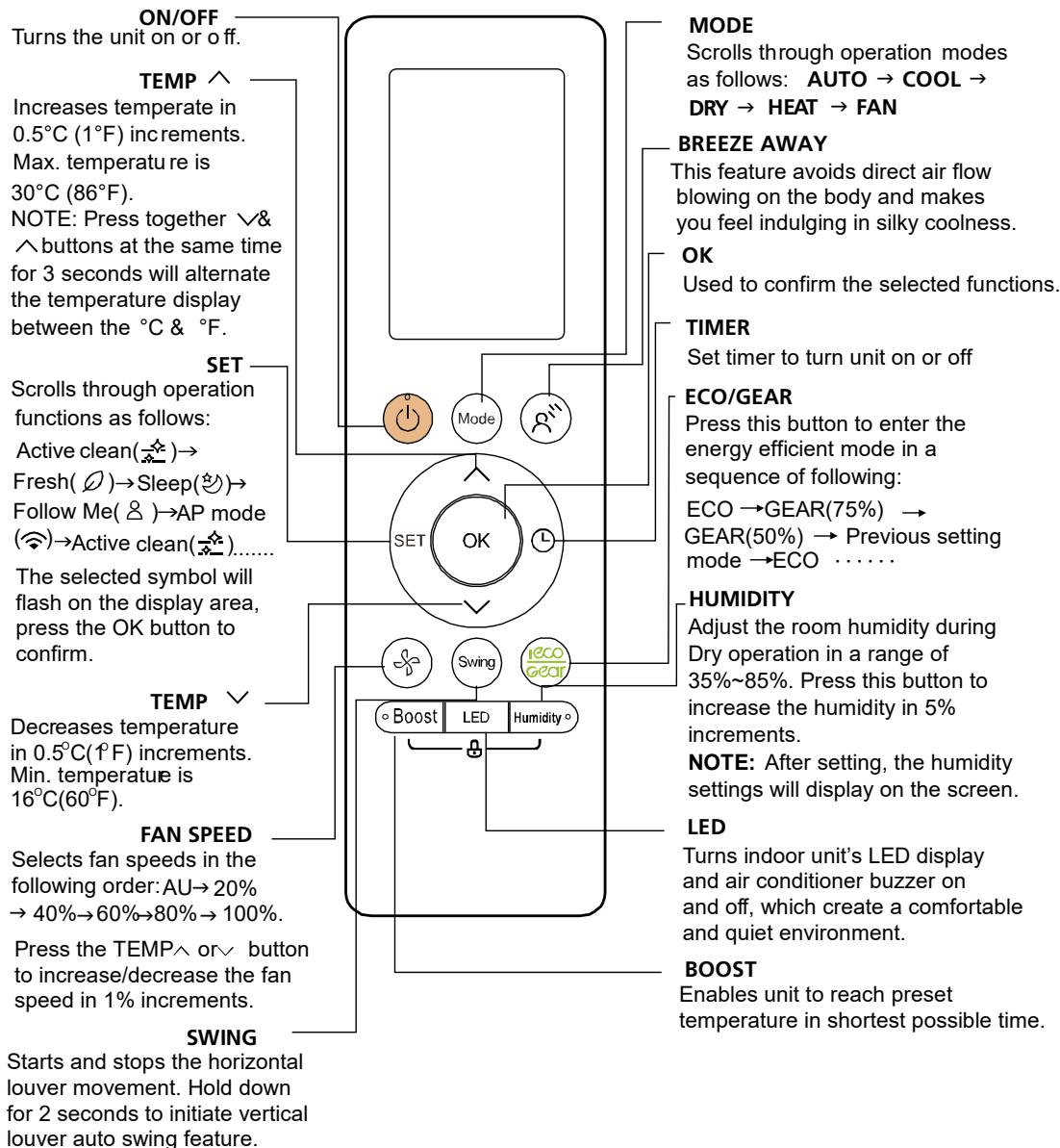
All indicators shown in the figure are for the purpose of clear presentation. But during the actual operation, only the relative function signs are shown on the display window.

5.1.3 RG10L3(2HS)/BGEFU1 (Standard for some units)

Remote Controller Specifications

| Model | RG10L3(2HS)/BGEFU1 |
|-------------------------------|---------------------------------|
| Rated Voltage | 3.0V (Dry batteries R03/LR03×2) |
| Reaching Distance | 8m |
| Environment Temperature Range | -5°C~60°C(23°F~140°F) |

Buttons and Functions



Remote LCD Screen Indicators

| | | | |
|--|------------------------------|--|--|
| | Not applicable for this unit | | Active clean feature display |
| | Breeze Away display | | Fresh feature display |
| | Not applicable for this unit | | Sleep mode display |
| | Not applicable for this unit | | Follow me feature display |
| | ECO intelligent eye display | | Wireless control feature display |
| | | | Low battery detection display (If flashes) |

Transmission Indicator
Lights up when remote sends signal to indoor unit



TIMER ON display



TIMER OFF display

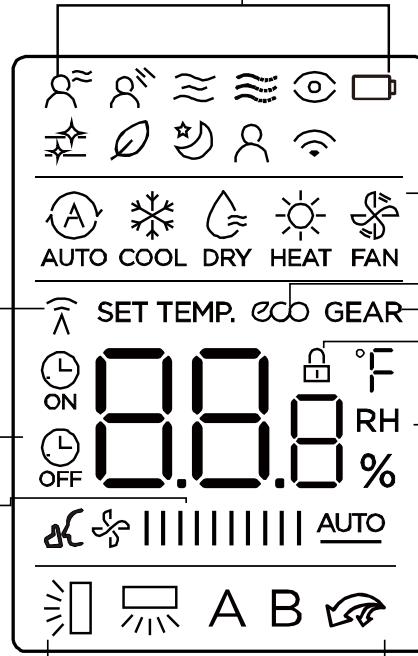


FAN SPEED display

Displays selected fan speed:

| | | |
|---------|--|----------|
| Silence | | 1% |
| | | 2%-20% |
| LOW | | 21%-40% |
| MED | | 41%-60% |
| HIGH | | 61%-80% |
| AUTO | | 81%-100% |

This fan speed can not be adjusted in AUTO or DRY mode.



MODE display

Displays the current mode, including:



ECO display

Displays when ECO feature is activated

GEAR display

Displays when GEAR feature is activated

LOCK display

Displays when LOCK feature is activated.

Temperature/Timer/Fan speed display

Displays the set temperature by default, or fan speed or timer setting when using TIMER ON/OFF functions.

- Temperature range:

16-30 °C/60-86 °F

(20-28 °C/68-82 °F)

(Model dependent)

- Timer setting range:

0-24 hours

- Fan speed setting range:

AU -100%

- Humidity setting range:

35% -85%

This display is blank when operating in FAN mode.

Note:

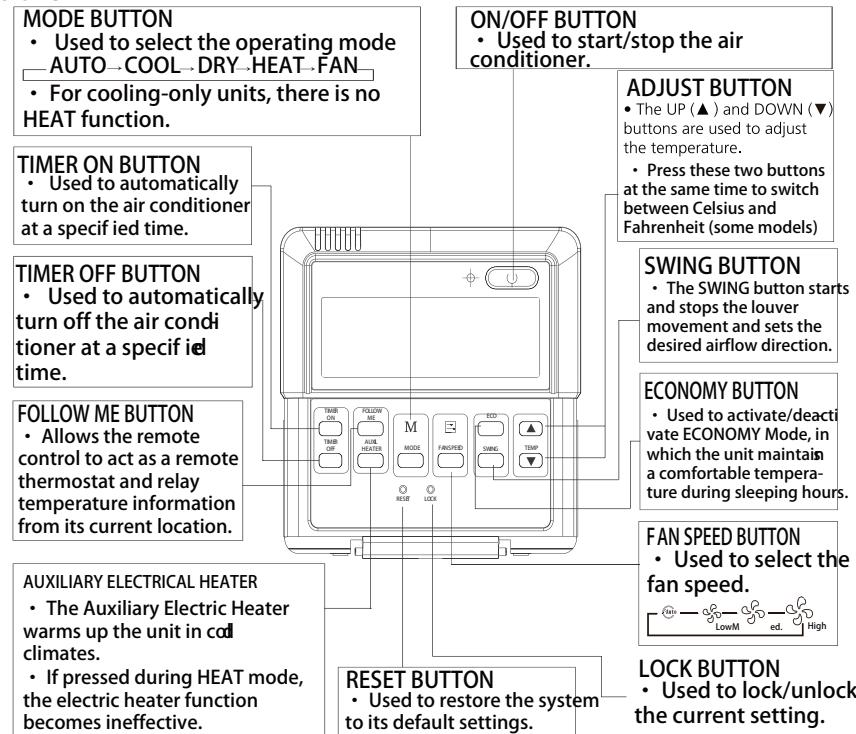
All indicators shown in the figure are for the purpose of clear presentation. But during the actual operation, only the relative function signs are shown on the display window.

5.2 LCD Wired Remote Controller

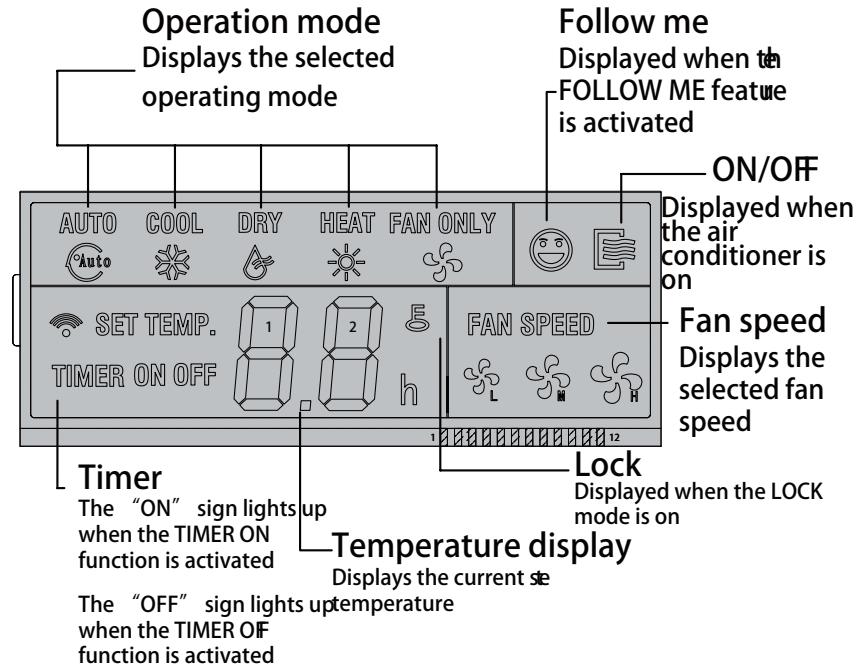
5.2.1 LCD Wired Remote Controller KJR-12B/DP(T)

The KJR-12B/DP(T) wired remote controller is standard for Duct type and is optional for some types.

i) Buttons and Functions

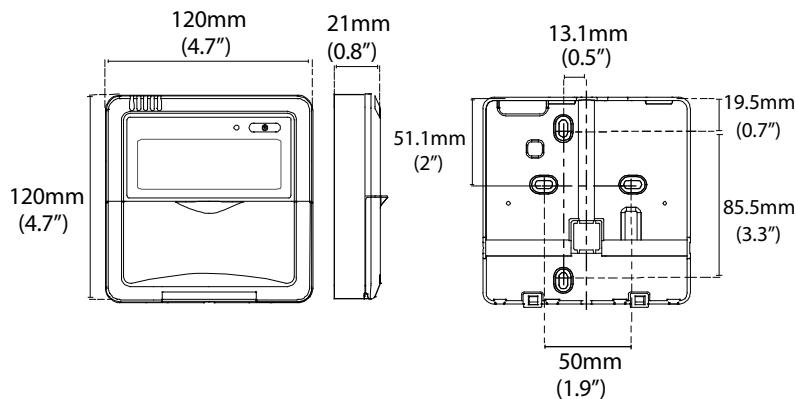


ii) LCD Screen



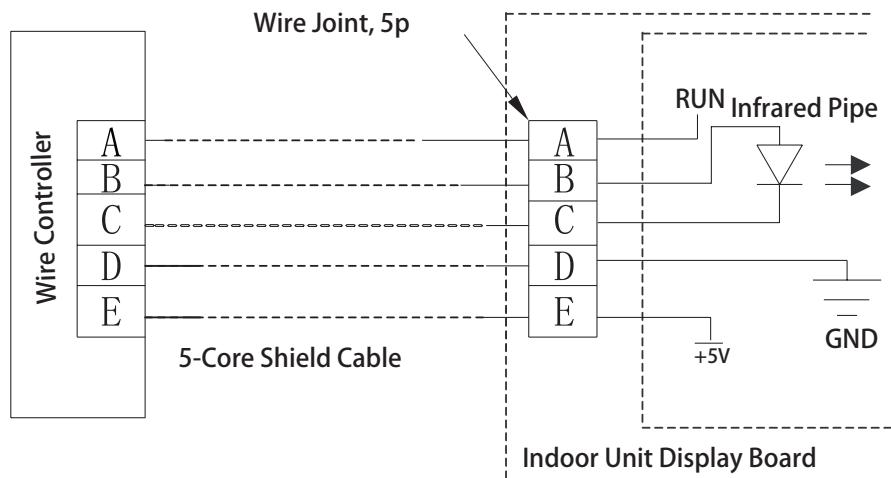
iii) Installation

- Dimensions



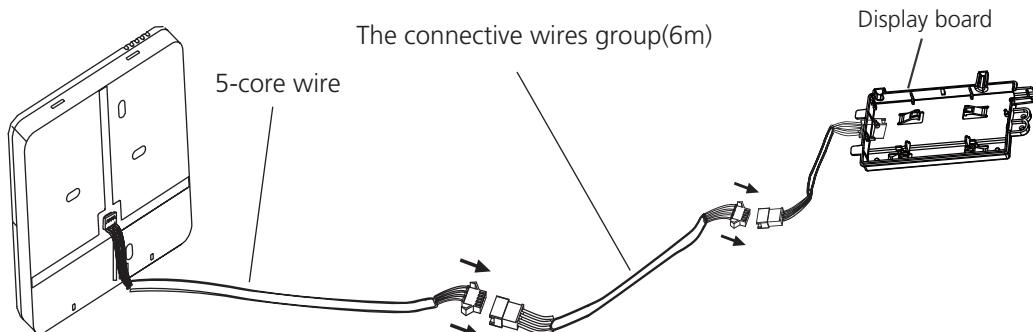
- Wiring diagram

Refer to the following diagram to wire the wall-mounted remote control to the indoor unit.

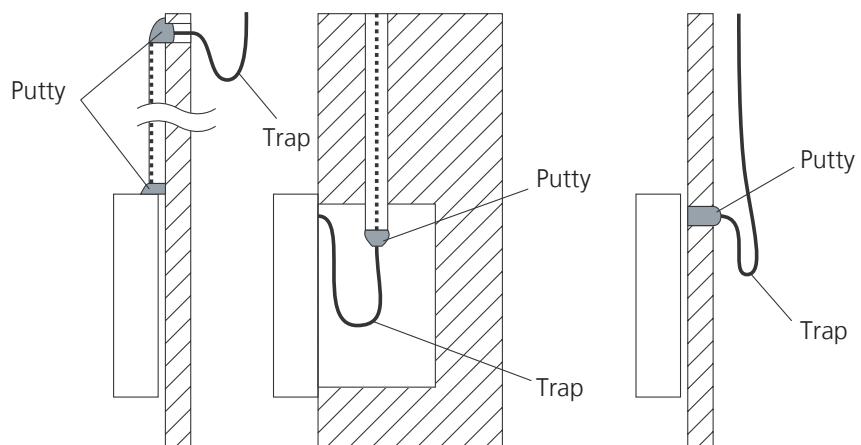


- Installation Diagram

Connect the wire from the display panel of the indoor unit to a connecting cable. Then connect the other side of the connecting cable to the remote control.

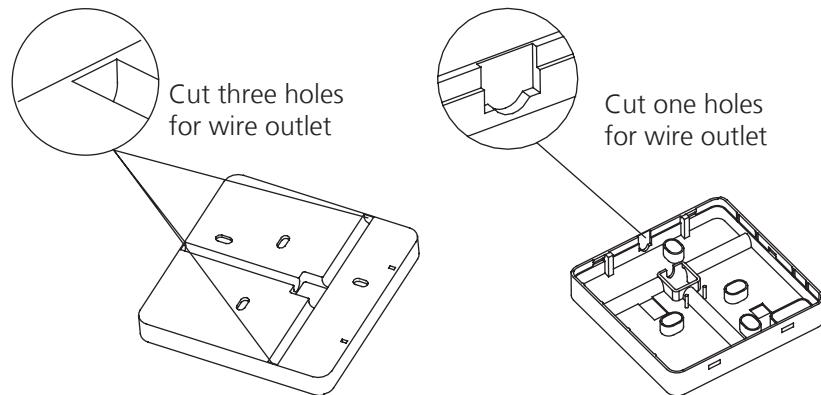


Note: Be sure to reserve a length of the connecting wire for periodic maintenance.



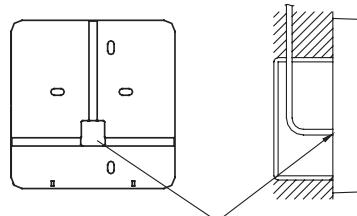
Note: DO NOT allow water to enter the remote control. Use the trap and putty to seal the wires.

- For exposed mounting, cut holes on four of the sides according to the picture below.



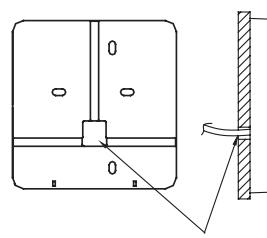
- For shielded wiring, please refer to the picture below.

Embedded switch box wiring



Wiring hole

Wiring through the wall

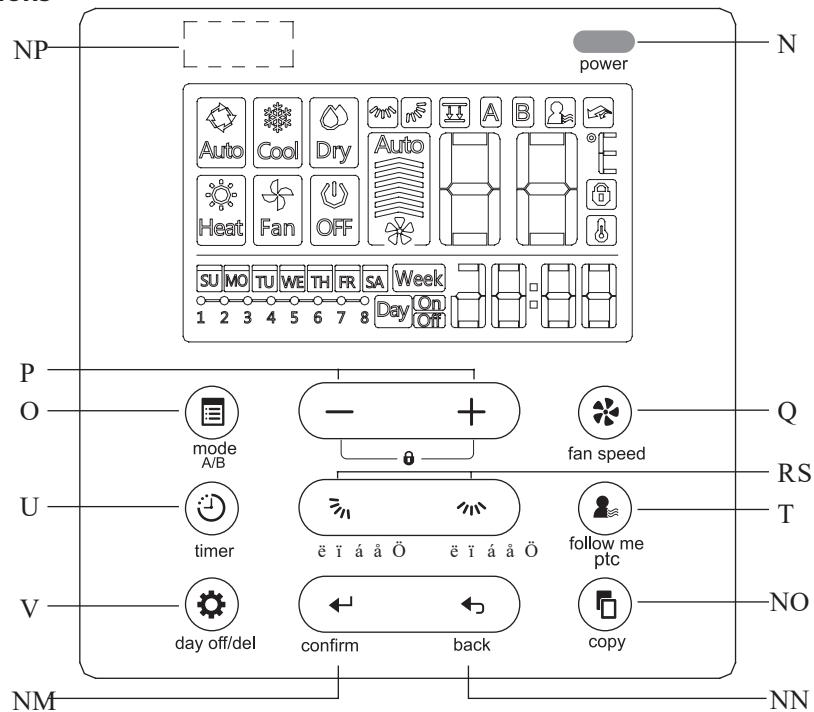


Wall hole and wiring hole
Diameter of wall hole: Φ 2cm

5.2.2 LCD Wired Remote Controller KJR-120C/TF-E(Optional)

The KJR-120C/TF-E wired remote controller is optional for some types.

i) Buttons and Functions



1. POWER button

Turn on or turn off the unit.

2. MODE(A/B) button

Used to select the operation mode: Auto / Cooling / Drying / Heating / Fan;

Hold to active the operation of auto-lifting panel when off

3. Adjust button

To set temperature, time and timer; set up or down the auto-lifting panel

4. FAN SPEED button

Used to select the fan speed.

5. Up-down airflow direction and swing Button

Press for adjusting the angel of louver, hold for vertical swing; individual louver control for cassette panel

6. Left-right airflow swing Button

Press for stop or start the horizontal swing

7. FOLLOW ME(PTC) button

Allows the remote control to act as a remote thermostat and send temperature information from its current location.

8. TIMER button

To set timer on and timer off time of one day

9. DELAY/DAY OFF button

To set 1 to 2 hours delay off for each day or a whole day off in a weekly timer schedule

10. CONFIRM button

To confirm an setting or call up the menu

11. BACK button

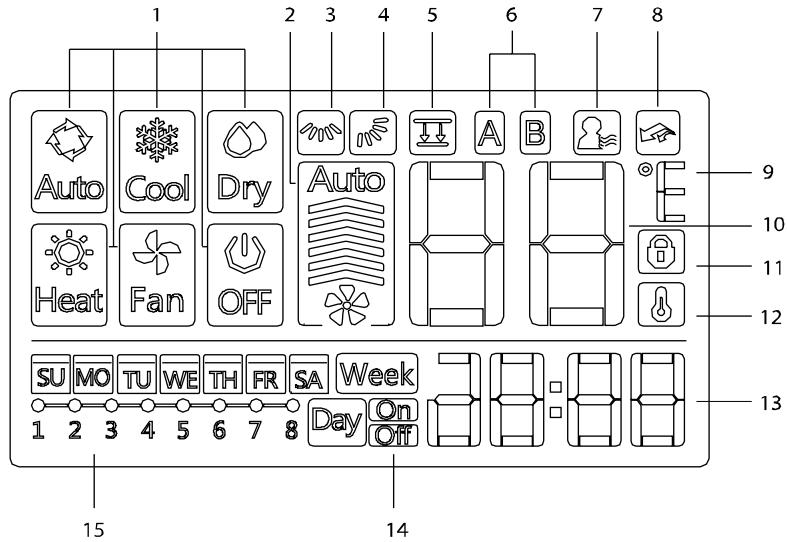
Back to previous operation or superior menu

12. COPY button

Copy timer setting of one day to another in weekly schedule setting

13. Infrared remote receiver (on some models)

ii) LCD Screen



1 Operation mode indication

8 PTC function indication

2 Fan speed indication

9 $^{\circ}\text{C}$ / $^{\circ}\text{F}$ indication

3 Left-right swing indication

10 Temperature display

4 Up-down swing indication

11 Lock indication

5 Faceplate function indication

12 Room temperature indication

6 Main unit and secondary unit indication

13 Clock display

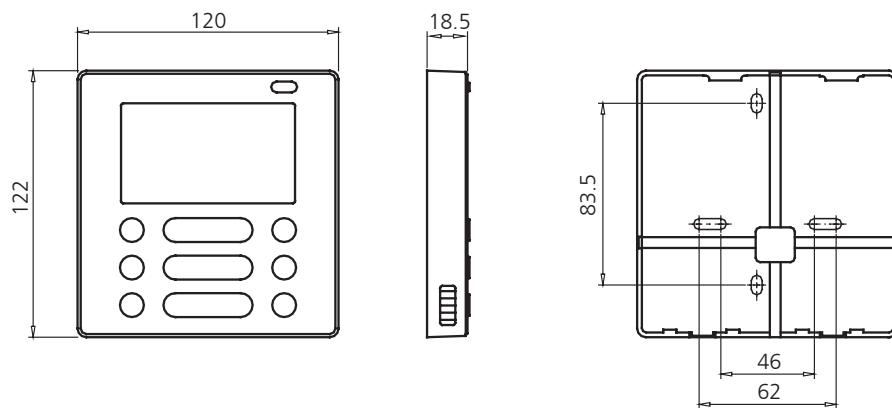
7 Follow me function indication

14 On/Off timer

15 Timer display

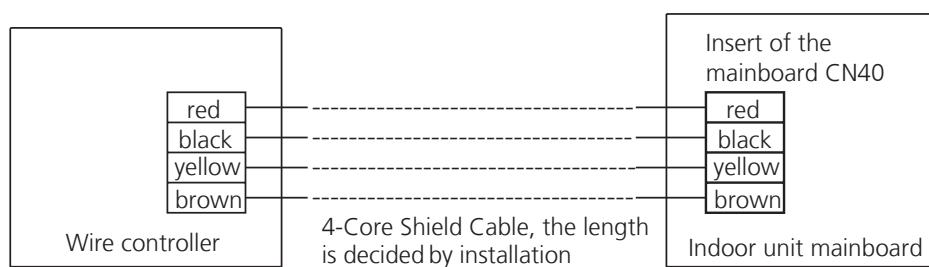
iii) Installation

- Dimensions



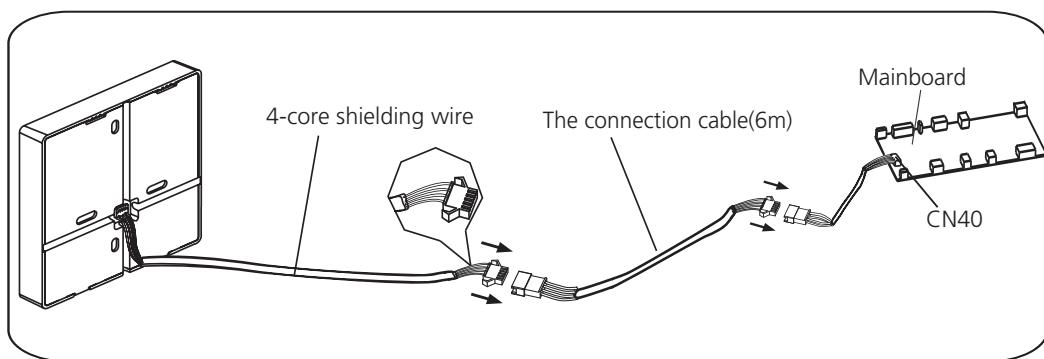
- Wiring diagram

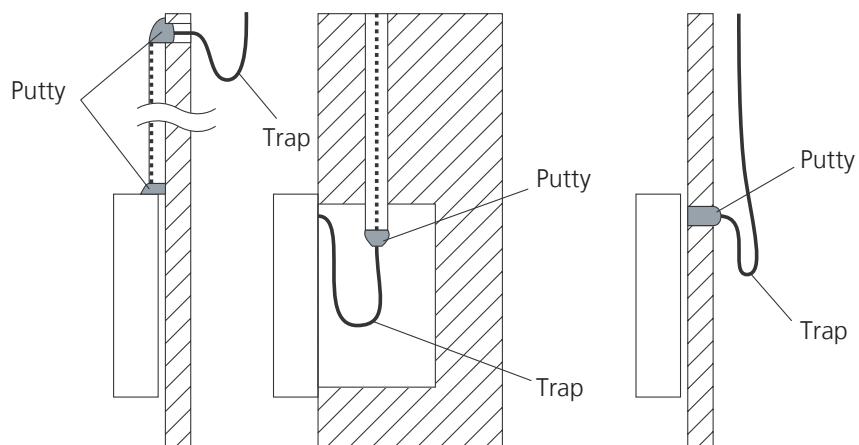
Refer to the following diagram to wire the wall-mounted remote control to the indoor unit.



- Installation Diagram

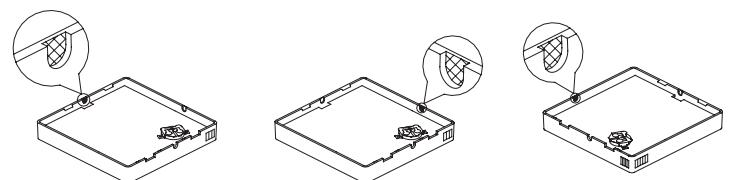
Connect the female joint of wires group from the main board with the male joint of connective wires group. Then connect the other side of connective wires group with the male joint of wires group leads from wire controller.





Note: DO NOT allow water to enter the remote control. Use the trap and putty to seal the wires.

- For exposed mounting, four outletting positions. There are three need cutting.



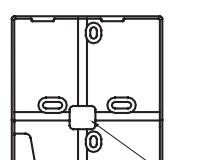
Cutting place of top side wire outlet

Cutting place of left side wire outlet

Cutting place of right side wire outlet

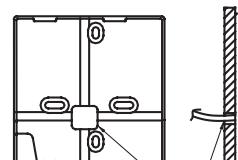
- For shielded wiring, please refer to the picture below.

Embedded switch box wiring



Wiring hole

Wiring through the wall

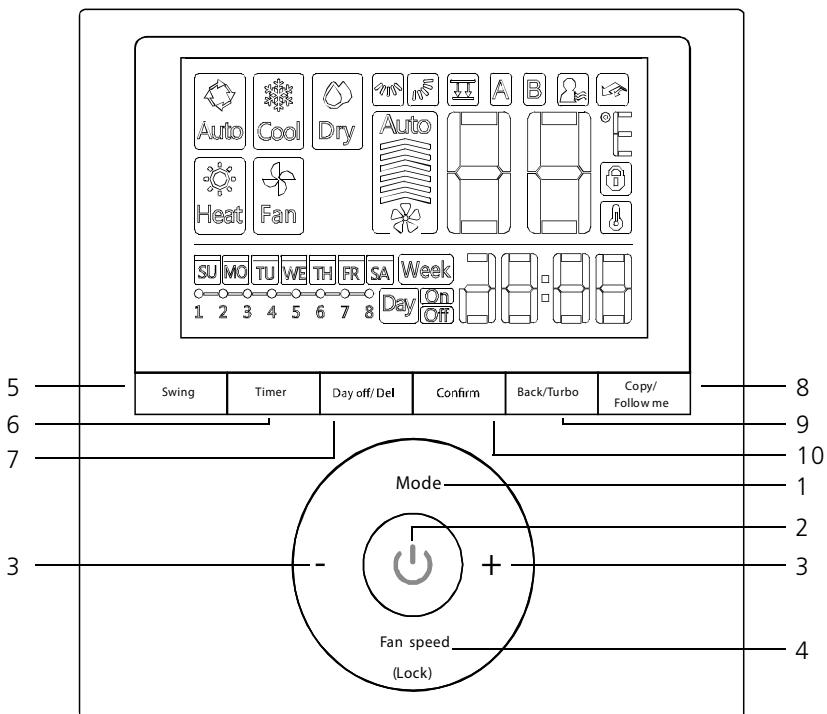


Wall hole and wiring hole
Diameter of wall hole: $\phi 2\text{cm}$

5.2.3 LCD Wired Remote Controller KJR-120G/TF-E(Optional)

The KJR-120G/TF-E wired remote controller is optional for some types.

i) Buttons and Functions



1 MODE button

Used to select the operation mode: Auto / Cooling / Drying / Heating / Fan;

Hold to active the operation of auto-lifting panel when off

2. POWER button

Turn on or turn off the unit.

3. Adjust button

To set temperature, time and timer; set up or down the auto-lifting panel

4. FAN SPEED button

Used to select the fan speed.

5. Swing Button

Press to active vertical swing, hold for horizontal swing

6. TIMER button

To set timer on and timer off time of one day

7. DELAY/DAY OFF button

To set 1 to 2 hours delay off for each day or a whole day off in a weekly timer schedule

8. COPY/FOLLOW ME button

To copy timer setting of one day to another in weekly schedule setting;

To active the follow me function while in normal operation.

9. BACK/TURBO button

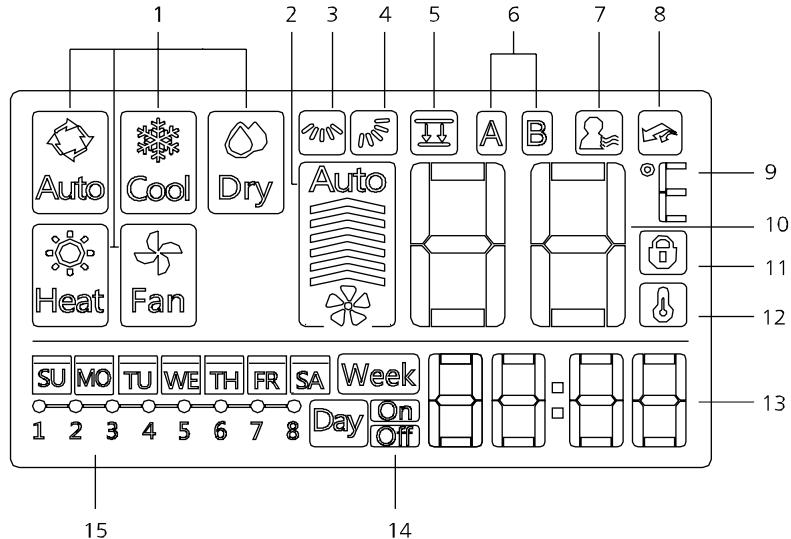
Back to previous operation or superior menu

To active turbo mode while in normal operation

10. CONFIRM button

To confirm an setting or call up the superior menu

ii) LCD Screen



1 Operation mode indication

8 Turbo/PTC function indication

2 Fan speed indication

9 C° / F° indication

3 Left-right swing indication

10 Temperature display

4 Up-down swing indication

11 Lock indication

5 Faceplate function indication

12 Room temperature indication

6 Main unit and secondary unit indication

13 Clock display

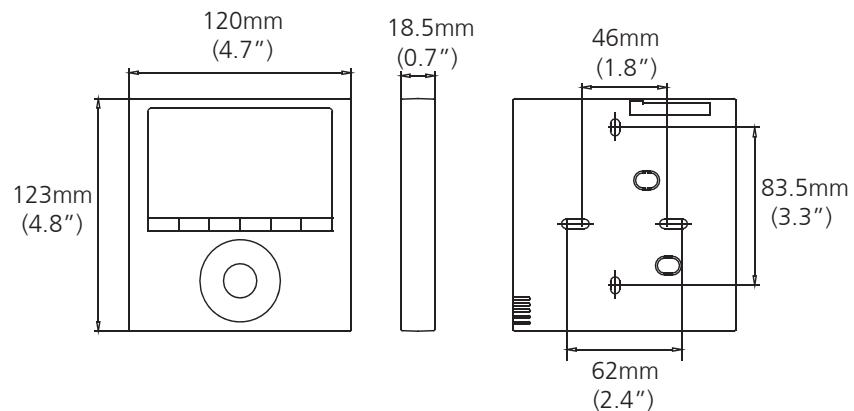
7 Follow me function indication

14 On/Off timer

15 Timer display

iii) Installation

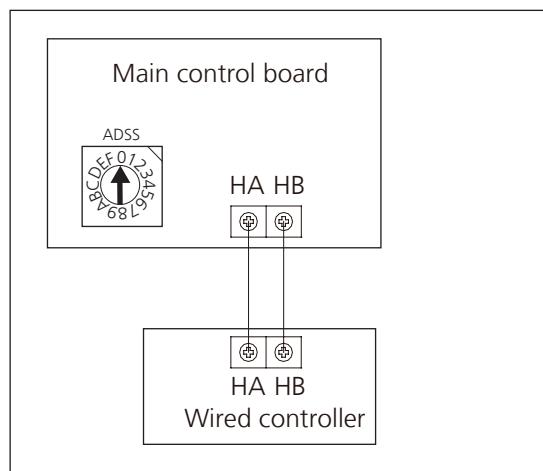
- Dimensions



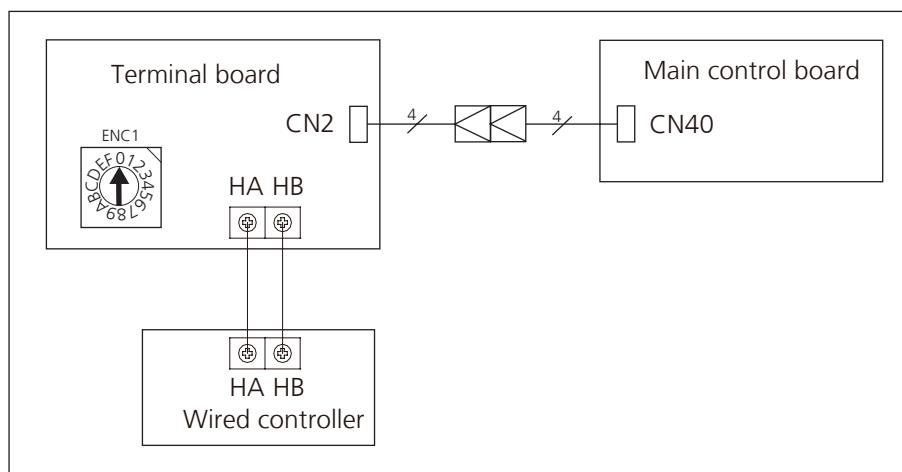
- Wiring diagram

- 1) Connection

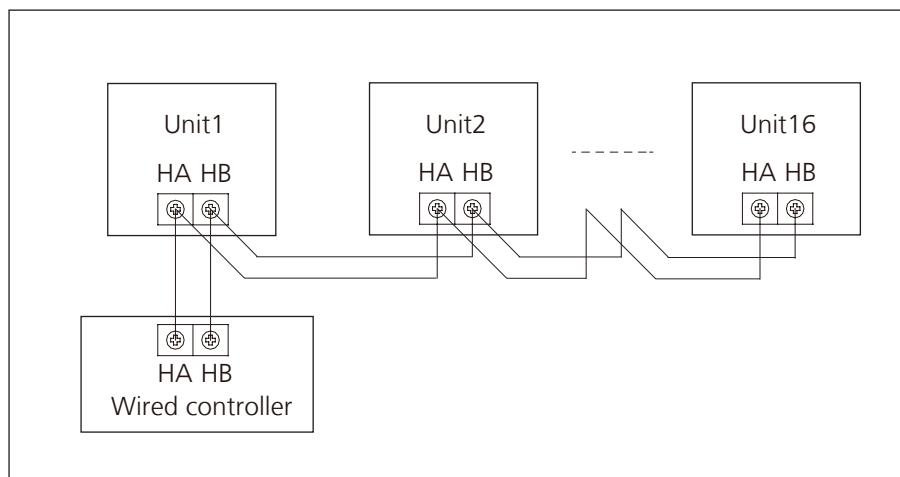
For Cassette: The wired controller connects to main control board directly.



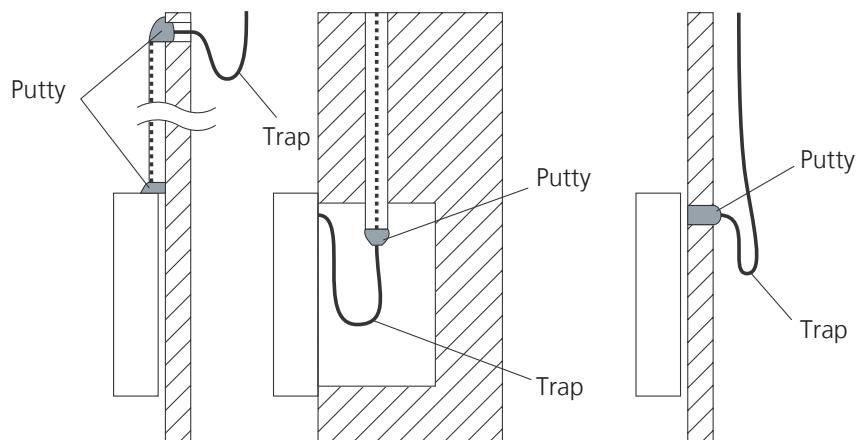
For Duct, Ceiling& floor: The wired controller connects to terminal board, terminal board connects to main control board.



2) Address setting



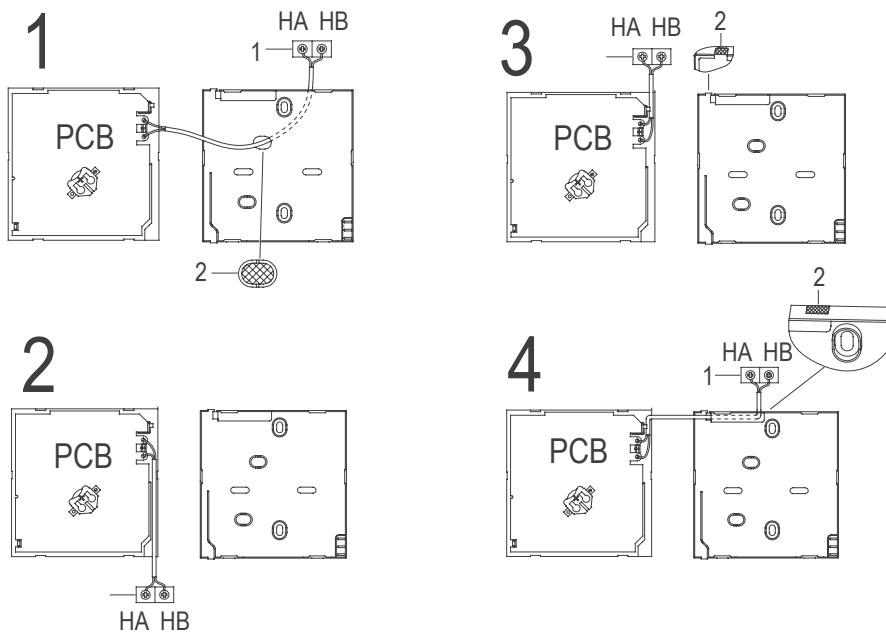
- a. One non-polarity controller can control up to 16 indoor units.
- b. When the non-polarity controller is connected to several units, every air-conditioner in network has only one network address to distinguish each other.
- c. Address code of air-conditioner in LAN is set by code switch ENC1(Duct and Ceiling& Floor) or ADSS(Cassette) of the indoor unit, and the set range is 0-15.
- d. Note: The indoor units are controlled at the same time, not independently. The purpose of setting network address is identify the unit when error occurs.



Note: DO NOT allow water to enter the remote control. Use the trap and putty to seal the wires.

- **For wiring the indoor unit, there are four methods:**

- From the rear;
- From the bottom;
- From the top;
- From the top center.

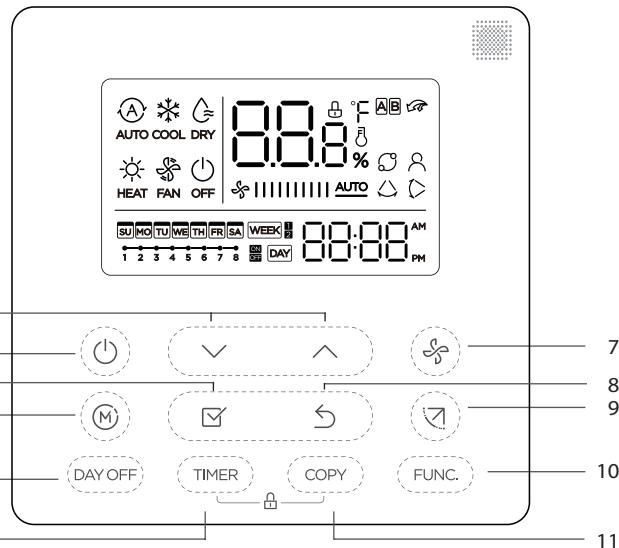


- 1: Indoor Unit.
- 2: Notch the part for the wiring to pass through with a nipper tool.
- Connect the terminals on the remote controller (HA ,HB), and the terminals of the indoor unit. (HA ,HB). (HA and HB do not have polarity.)

5.2.4 LCD Wired Remote Controller KJR-120X/TFBG-E(Optional)

The KJR-120X/TFBG-E wired remote controller is optional for some types.

i) Buttons and Functions



1. POWER button

Turn on or turn off the unit.

2 MODE button

Used to select the operation mode: Auto / Cooling / Drying / Heating / Fan;

3. DAY OFF/DEL button

To set 1 to 2 hours delay off for each day or a whole day off in a weekly timer schedule.

4. Adjust button

To set temperature, time and timer

5. CONFIRM button

To confirm a setting or call up the superior menu

6. TIMER button

To set timer on and timer off time of one day 7. FAN SPEED button

Used to select the fan speed.

8. BACK button

Back to previous operation or superior menu

9. SWING Button

Press to active vertical swing, hold for horizontal swing

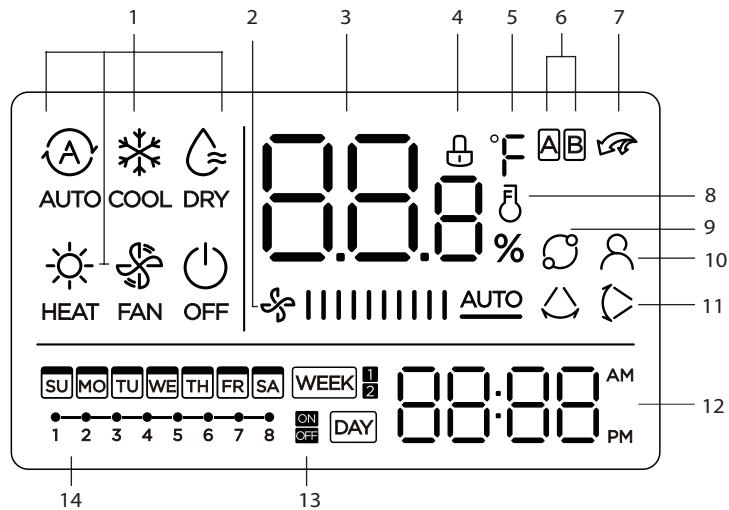
10. FUNC. button

Press the FUNC. button to set the turbo or rotating or Ifeel function.

11. COPY button

To copy timer setting of one day to another in weekly schedule setting.

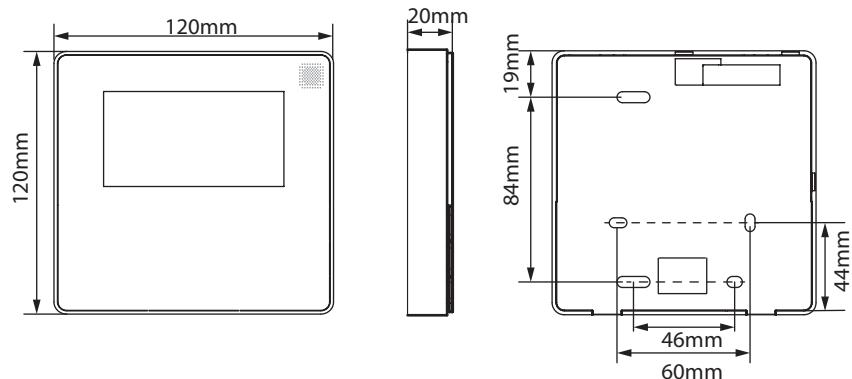
ii) LCD Screen



| | |
|--|---|
| 1 Operation mode indication | 8 Room temperature indication |
| 2 Fan speed indication | 9 Rotating indication |
| 3 Temperature display | 10 Follow Me function indication |
| 4 Lock indication | 11 Left-right swing indication (some models) |
| 5 °C / °F indication | 12 Clock display |
| 6 Main unit and secondary unit indication | 13 On/Of timer |
| 7 Turbo function indication | 14 Timer display |

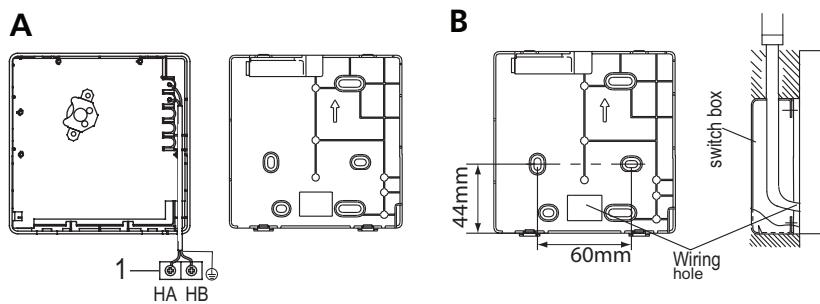
iii) Installation

- Dimensions



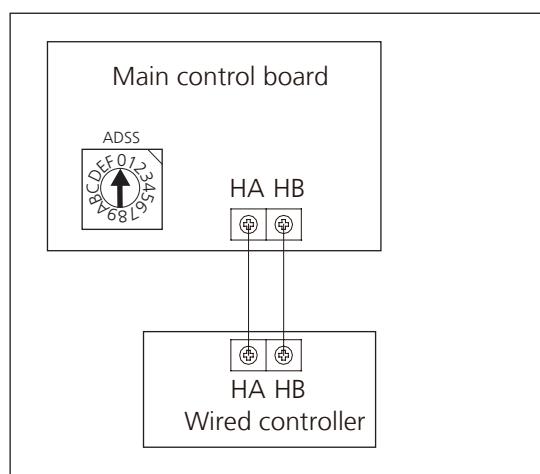
3) Connection

- Wire with the indoor unit:

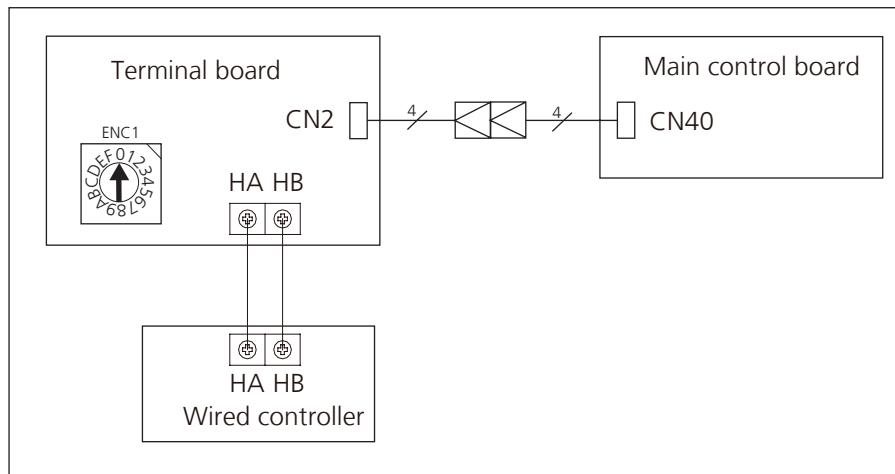


- 1: Indoor Unit.
- 2: Notch the part for the wiring to pass through with a nipper tool.
- Connect the terminals on the remote controller (HA ,HB), and the terminals of the indoor unit. (HA ,HB). (HA and HB do not have polarity.)

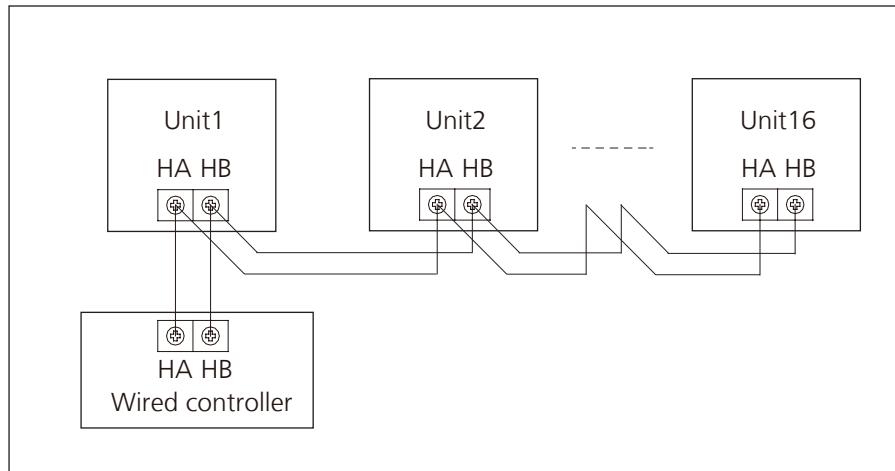
For some models: The wired controller connects to main control board directly.



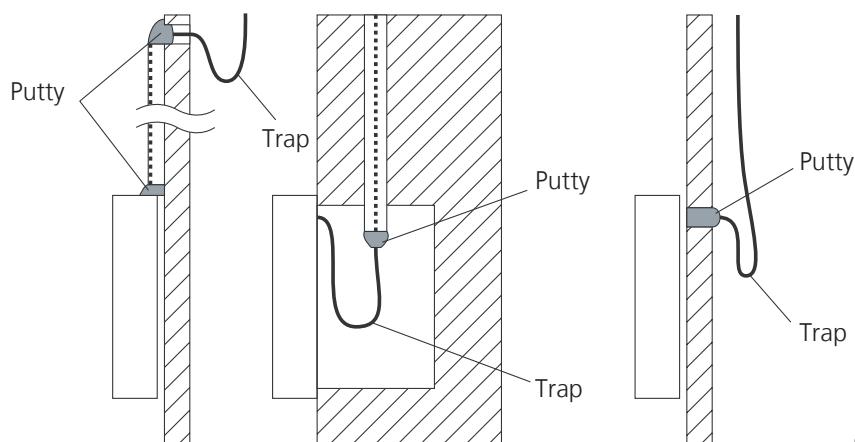
For some models: The wired controller connects to terminal board, terminal board connects to main control board.



4) Address setting



- One non-polarity controller can control up to 16 indoor units.
- When the non-polarity controller is connected to several units, every air-conditioner in network has only one network address to distinguish each other.
- Address code of air-conditioner in LAN is set by code switch ENC1(Duct and Ceiling& Floor) or ADSS(Cassette) of the indoor unit, and the set range is 0-15.
- Note: The indoor units are controlled at the same time, not independently. The purpose of setting network address is identify the unit when error occurs.



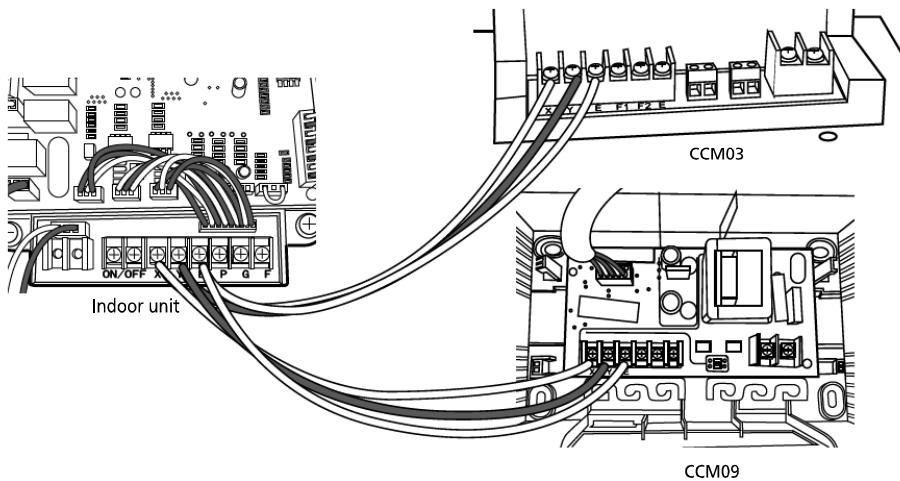
c

Note: DO NOT allow water to enter the remote control. Use the trap and putty to seal the wires.

5.3 Centralized Controller

1) Connection

For Light commercial air conditioner with XYE port, it can be directly connected to Centralized Controller (CCM03, CCM09).



2) Address setting

When setting the address, please make sure the unit is powered off. The address can be set from 0 to 63 by the switch. Turn on the unit, then the address will be effective.

| SWITCH | | FOR CCM UNIT ADDRESS | |
|-----------------|-------|----------------------|--|
| S2 | | | |
| + | | | |
| S1 | | | |
| ADDRESS | 0~15 | 16~31 | |
| Factory Setting | | | |
| S2 | | | |
| + | | | |
| S1 | | | |
| ADDRESS | 32~47 | 48~63 | |
| Factory Setting | | | |

Note: For light commercial aire conditioner with XYE port, it can be also connected to BMS (Building Management System).

If there is any CAC (central air conditioner) connecting with the central controller at the same time, please set the address from largest (63.62.61...), since the CAC units could obtain address automatically from the smallest (00.01.02...)

Troubleshooting

Contents

| | | |
|-----------|--|-----------|
| 1. | Safety Caution | 3 |
| 2. | General Troubleshooting | 4 |
| 3. | Information Inquiry | 6 |
| 4. | Error Diagnosis and Troubleshooting Without Error Code..... | 9 |
| 4.1 | Remote maintenance..... | 9 |
| 4.2 | Field maintenance | 10 |
| 5. | Quick Maintenance by Error Code..... | 15 |
| 6. | Troubleshooting by Error Code..... | 16 |
| 6.1 | EH 00/EH 0A / EC 51 (EEPROM parameter error Diagnosis and Solution)..... | 16 |
| 6.2 | EL 01 (Indoor and outdoor unit communication error Diagnosis and Solution)17 | 17 |
| 6.3 | EH 03 / EH 31/EH 32/EC 07 (Fan speed is operating outside of the normal range Diagnosis and Solution) | 19 |
| 6.4 | EH 60/EH 61/EC 53/EC 52/EC 54 (Open circuit or short circuit of temperature sensor diagnosis and solution) | 22 |
| 6.5 | EL 0C (Refrigerant Leakage Detection Diagnosis and Solution) | 23 |
| 6.6 | EH 0E (Water-Level Alarm Malfunction Diagnosis and Solution)..... | 24 |
| 6.7 | PC 00 (IPM Malfunction or IGBT Over-strong Current Protection Diagnosis and Solution)..... | 25 |
| 6.8 | PC 01 (Over Voltage or Too Low Voltage Protection Diagnosis and Solution)26 | 26 |

Troubleshooting

Contents

| | | |
|------|--|-----------|
| 6.9 | PC 04 (Inverter Compressor Drive Error Diagnosis and Solution)..... | 27 |
| 6.10 | PC 03 (High Pressure Protection or low Pressure Protection Diagnosis and Solution)..... | 28 |
| 6.11 | PC 02 (Top temperature protection of compressor or High temperature protection of IPM module Diagnosis and Solution)..... | 31 |
| 6.12 | PC 0L (Low ambient temperature protection)..... | 32 |
| 6.13 | EC 0d (Outdoor unit malfunction Diagnosis and Solution)..... | 32 |
| 6.14 | EH 0b (Communication error between display board and main board Diagnosis and Solution)..... | 33 |
| 6.15 | EH b3 (Communication error between wired controller and indoor unit Diagnosis and Solution) | 34 |
| 6.16 | EH bA(Communication malfunction between external fan module and indoor unit)/EH 3A(External fan DC bus voltage is too low protection)/ EH 3b(External fan DC bus voltage is too high fault) diagnosis and solution | 35 |
| 6.17 | FH 07(Communication malfunction between indoor unit and auto-lifting panel) diagnosis and solution | 36 |
| 7. | Check Procedures | 37 |

1. Safety Caution

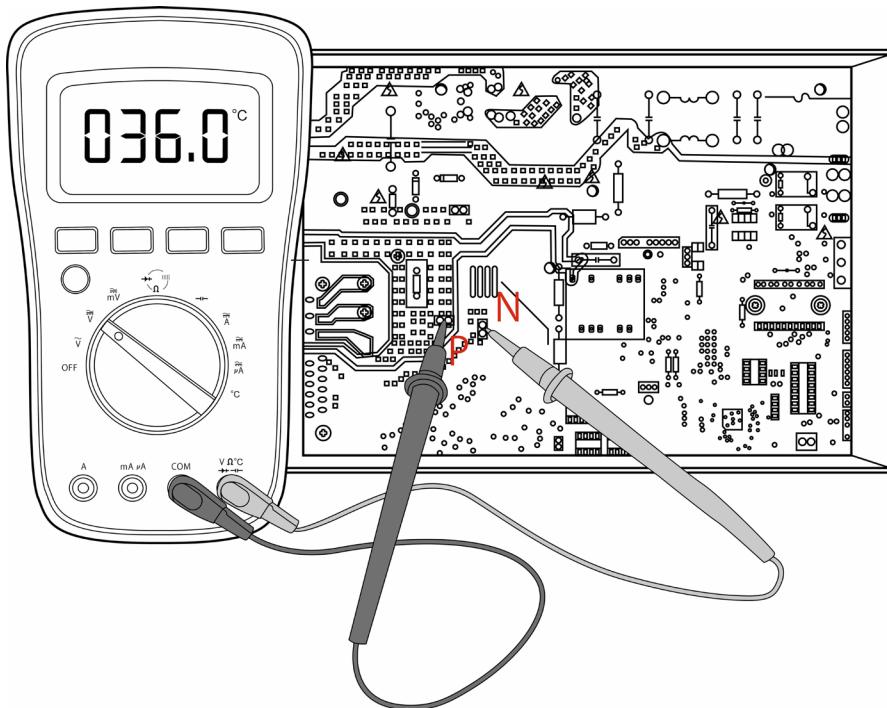
⚠️ WARNING

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



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

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 table:

| Operation Lamp | Timer Lamp | Display | Error Information | Solution |
|----------------|------------|-------------------|--|----------|
| 1 time | OFF | EH00/ EH01 | Indoor unit EEPROM parameter error | TS16 |
| 2 times | OFF | EL01 | Indoor / outdoor unit communication error | TS17 |
| 4 times | OFF | EH03 | The indoor fan speed is operating outside of the normal range(for some models) | TS19 |
| 4 times | OFF | EH31 | Upper indoor fan speed is operating outside of the normal range(for new console type) | TS19 |
| 4 times | OFF | EH32 | Lower indoor fan speed is operating outside of the normal range(for new console type) | TS19 |
| 6 times | OFF | EH60 | Indoor room temperature sensor T1 is in open circuit or has short circuited | TS22 |
| 6 times | OFF | EH61 | Evaporator coil temperature sensor T2 is in open circuit or has short circuited | TS22 |
| 8 times | OFF | EL0C | Refrigerant leakage detection | TS23 |
| 9 times | OFF | EH0B | Communication error between display board and main board | TS33 |
| 13 times | OFF | EH0E | Water-level alarm malfunction | TS24 |
| 5 times | OFF | EC53 | Outdoor room temperature sensor T4 is in open circuit or has short circuited | TS22 |
| 5 times | OFF | EC52 | Condenser coil temperature sensor T3 is in open circuit or has short circuited | TS22 |
| 5 times | OFF | EC54 | Compressor discharge temperature sensor TP is in open circuit or has short circuited | TS22 |
| 5 times | OFF | EC55 | IGBT temperature sensor TH is in open circuit or has short circuited | TS22 |
| 5 times | OFF | EC56 | Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited(for free-match indoor units) | TS22 |
| 5 times | ON | EC51 | Outdoor unit EEPROM parameter error | TS16 |
| 12 times | OFF | EC01 | The outdoor fan speed is operating outside of the normal range(for some models) | TS19 |

| | | | | |
|----------|-------|--------------|--|------|
| 7 times | FLASH | PC00 | IPM malfunction or IGBT over-strong current protection | TS25 |
| 2 times | FLASH | PC01 | Over voltage or over low voltage protection | TS26 |
| 3 times | FLASH | PC02 | Top temperature protection of compressor or High temperature protection of IPM module | TS31 |
| 5 times | FLASH | PC04 | Inverter compressor drive error | TS27 |
| 7 times | FLASH | PC03 | High pressure protection or low pressure protection (for some models) | TS28 |
| 14 times | OFF | EC0d | Outdoor unit malfunction(for some models) | TS32 |
| 15 times | OFF | FH 01 | Communication malfunction between indoor unit and auto-lifting panel | TS36 |
| -- | -- | EH bA | Communication malfunction between external fan module and indoor unit(for some models) | TS35 |
| 4 times | OFF | EH 3A | External fan DC bus voltage is too low protection(for some models) | TS35 |
| 4 times | OFF | EH 3b | External fan DC bus voltage is too high fault(for some models) | TS35 |
| 1 time | ON | -- | Indoor units mode conflict(match with multi outdoor unit) | -- |
| 4 times | FLASH | PC04 | Low ambient temperature protection(for some models) | TS32 |

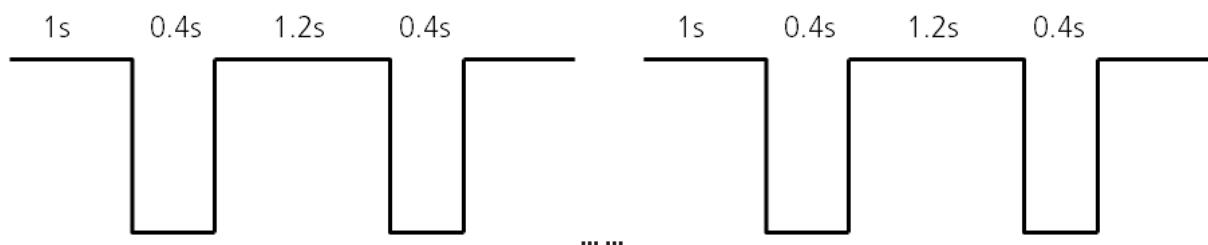
For other errors:

The display board may show a garbled code or a code undefined by the service manual. 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, the indoor PCB requires replacement. If the unit responds, the display board requires replacement.

LED flash frequency:



2.2 Error Display on Two Way Communication Wired Controller

| Display | Malfunction or Protection | Solution |
|--------------|---|----------|
| EH b3 | Communication error between wire controller and indoor unit(for KJR-120X series wired controller) | TS34 |

The other error codes displayed on the wire controller are same from those on the unit.

3. Information Inquiry

- To enter engineer mode, in power-on or standby mode, and in non-locked state, press the key combination “ON/OFF + Air Speed” for 7s;
- After entering the engineer mode, the remote control will display icons of “Auto, Cool, Dry, Heat”, and the Battery icon; at the same time, it will also display the numeric code of the current engineer mode (for the initial engineer mode, the numeric code displayed is 0), and all other icons are inactive.
- In engineer mode, the value of the current numeric code can be adjusted circularly through the Up/Down key, with the setting range of 0 to 30.

| Code | Query Content | Additional Notes |
|------|---|----------------------------------|
| 0 | Error code | Refer to next list of error code |
| 1 | Room temperature | T1 temperature |
| 2 | Indoor coil temperature | T2 temperature |
| 3 | Outdoor coil temperature | T3 temperature |
| 4 | Ambient temperature | T4 temperature |
| 5 | Discharge temperature | TP temperature |
| 6 | Compressor Target Frequency FT | Targeted Frequency |
| 7 | Compressor Running Frequency Fr | Actual Frequency |
| 8 | Unit Current dL | N/A |
| 9 | Outdoor AC Voltage Uo | N/A |
| 10 | Current indoor capacity test state Sn | N/A |
| 11 | Running mode od | |
| 12 | Set Speed Pr of the outdoor fan | Outdoor fan speed=value*8 |
| 13 | Opening Lr of EEV | EXV opening angle-value*8 |
| 14 | Actual Running Speed ir of the indoor fan | Indoor fan speed=value*8 |
| 15 | Indoor Humidity Hu | N/A |
| 16 | Set Temperature TT after compensation | N/A |
| 17 | | N/A |
| 18 | | N/A |
| 19 | / | N/A |
| 20 | Indoor Target Frequency oT | N/A |
| 21 | Reserve | |
| 22 | | |
| 23 | | |
| 24 | | |
| 25 | | |
| 26 | | |
| 27 | | |
| 28 | | |
| 29 | | |
| 30 | | |

Exit of engineer mode:

1)In engineer mode, press the key combination of “On/Off + Air speed” for 2s;

2)The engineer mode will be exited if there are no valid key operations for continuous 60s.

rror code of engineer mode

| Display | Error Information |
|--------------------|---|
| EH 00/EH 0R | Indoor unit EEPROM parameter error |
| EH 01 | Indoor / outdoor unit communication error |
| EH 0R | Communication error between indoor unit and indoor external fan module |
| EH 30 | Parameters error of indoor external fan |
| EH 31 | Upper indoor fan speed is operating outside of the normal range(for new console type) |
| EH 32 | Lower indoor fan speed is operating outside of the normal range(for new console type) |
| EH 35 | Phase failure of indoor external fan |
| EH 36 | Indoor external fan current sampling bias fault |
| EH 37 | Indoor external fan zero speed failure |
| EH 38 | Indoor external fan stall failure |
| EH 39 | Out of step failure of indoor external fan |
| EH 3R | Low voltage protection of indoor external fan DC bus |
| EH 3b | Indoor external fan DC bus voltage is too high fault |
| EH 3E | Indoor external fan overcurrent fault |
| EH 3F | Indoor external fan module protection/hardware overcurrent protection |
| EH 03 | The indoor fan speed is operating outside of the normal range |
| EC 51 | Outdoor unit EEPROM parameter error |
| EC 52 | Condenser coil temperature sensor T3 is in open circuit or has short circuited |
| EC 53 | Outdoor room temperature sensor T4 is in open circuit or has short circuited |
| EC 54 | Compressor discharge temperature sensor TP is in open circuit or has short circuited |
| EC 55 | IGBT temperature sensor TH is in open circuit or has short circuited |
| EC 0d | Outdoor unit malfunction |
| EH 60 | Indoor room temperature sensor T1 is in open circuit or has short circuited |
| EH 61 | Evaporator coil temperature sensor T2 is in open circuit or has short circuited |
| EC 71 | Outdoor external fan overcurrent fault |
| EC 75 | Outdoor external fan module protection/hardware overcurrent protection |
| EC 72 | Outdoor external fan phase failure |
| EC 74 | Outdoor external fan current sampling bias fault |
| EC 73 | Zero speed failure of outdoor unit DC fan |
| EC 07 | The outdoor fan speed is operating outside of the normal range |
| EH b5 | Intelligent eye communication failure |
| EH 0C | Refrigerant leak detected |
| EH 0b | Communication error between indoor two chips |
| EH 0b | Communication error between display board and main board(for new console type) |
| EH 0E | Water-level alarm malfunction |
| EH 0F | Intelligent eye malfunction |
| EH 07 | Communication malfunction between indoor unit and auto-lifting panel |

| | |
|-------|---|
| PC 00 | IPM malfunction or IGBT over-strong current protection |
| PC 10 | Over low voltage protection |
| PC 11 | Over voltage protection |
| PC 12 | DC voltage protection |
| PC 02 | Top temperature protection of compressor or High temperature protection of IPM module |
| PC 40 | Communication error between outdoor main chip and compressor driven chip |
| PC 41 | Current Input detection protection |
| PC 42 | Compressor start error |
| PC 43 | Lack of phase (3 phase) protection |
| PC 44 | Outdoor unit zero speed protection |
| PC 45 | 341PWM error |
| PC 46 | Compressor speed malfunction |
| PC 49 | Compressor over current protection |
| PC 06 | Compressor discharge temperature protection |
| PC 08 | Outdoor current protection |
| PH 09 | Anti-cold air in heating mode |
| PC 0F | PFC module malfunction |
| PC 30 | System overpressure protection |
| PC 31 | System pressure is too low protection |
| PC 03 | Pressure protection |
| PC 04 | Outdoor low ambient temperature protection |
| PH 90 | Evaporator coil temperature over high protection |
| PH 91 | Evaporator coil temperature over low Protection |
| PC 08 | Condenser high temperature protection |
| PH 0C | Indoor unit humidity sensor failure |
| LH 00 | Frequency limit caused by T2 |
| LH 30 | Indoor external fan current limit |
| LH 31 | Indoor external fan voltage limit |
| LC 01 | Frequency limit caused by T3 |
| LC 02 | Frequency limit caused by TP |
| LC 05 | Frequency limit caused by voltage |
| LC 03 | Frequency limit caused by current |
| LC 06 | Frequency limit caused by PFC |
| LC 30 | Frequency limit caused by high pressure |
| LC 31 | Frequency limit caused by low pressure |
| LH 07 | Frequency limit caused by remote controller |
| -- | Indoor units mode conflict(match with multi outdoor unit) |
| NR | No malfunction and protection |

4. Error Diagnosis and Troubleshooting Without Error Code



WARNING

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

4.1 Remote maintenance

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

| No. | Problem | Solution |
|-----|--|-------------|
| 1 | Unit will not start | TS11 - TS12 |
| 2 | The power switch is on but fans will not start | TS11 - TS12 |
| 3 | The temperature on the display board cannot be set | TS11 - TS12 |
| 4 | Unit is on but the wind is not cold(hot) | TS11 - TS12 |
| 5 | Unit runs, but shortly stops | TS11 - TS12 |
| 6 | The unit starts up and stops frequently | TS11 - TS12 |
| 7 | Unit runs continuously but insufficient cooling(heating) | TS11 - TS12 |
| 8 | Cool can not change to heat | TS11 - TS12 |
| 9 | Unit is noisy | TS11 - TS12 |

4.2 Field maintenance

| | Problem | Solution |
|----|---|-------------|
| 1 | Unit will not start | TS13 - TS14 |
| 2 | Compressor will not start but fans run | TS13 - TS14 |
| 3 | Compressor and condenser (outdoor) fan will not start | TS13 - TS14 |
| 4 | Evaporator (indoor) fan will not start | TS13 - TS14 |
| 5 | Condenser (Outdoor) fan will not start | TS13 - TS14 |
| 6 | Unit runs, but shortly stops | TS13 - TS14 |
| 7 | Compressor short-cycles due to overload | TS13 - TS14 |
| 8 | High discharge pressure | TS13 - TS14 |
| 9 | Low discharge pressure | TS13 - TS14 |
| 10 | High suction pressure | TS13 - TS14 |
| 11 | Low suction pressure | TS13 - TS14 |
| 12 | Unit runs continuously but insufficient cooling | TS13 - TS14 |
| 13 | Too cool | TS13 - TS14 |
| 14 | Compressor is noisy | TS13 - TS14 |
| 15 | Horizontal louver can not revolve | TS13 - TS14 |

| 1. Remote Maintenance | Electrical Circuit | | | | Refrigerant Circuit | | | |
|--|--------------------|------------------------|-------------------------------|------------------------|------------------------------------|---|----------------------------|--------------------------------|
| Possible causes of trouble | Power failure | The main power tripped | Loose connections | Faulty transformer | The voltage is too high or too low | The remote control is powered off | Broken remote control | Dirty air filter |
| 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(heating) | | | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ |
| 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 battery of the remote control | Replace the remote control | Clean or replace |
| | | | | | | | | Clean |
| | | | | | | | | Adjust the setting temperature |
| | | | | | | | | Turn the AC later |
| | | | | | | | | Adjust to cool mode |
| | | | | | | | | Turn off SILENCE function. |
| | | | | | | | | Turn 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 |
| 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(heating) | ☆ | ☆ | ☆ | | |
| Cool can not 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 larger capacity or add the number of AC plate | 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 |
| 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

5. Quick Maintenance by Error Code

If you do not have the time 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 | | | | | | | | |
|----------------------------|-------------|-------|-------------------|-------|-------|-------|-------|-------|-------------|
| | EH 00/EH 01 | EH 01 | EH 03/EH 31/EH 32 | EH 60 | EH 61 | EH 05 | EH 06 | EC 53 | EH 0b/FH 01 |
| Indoor PCB | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✓ |
| Outdoor PCB | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✗ |
| Indoor fan motor | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| T1 sensor | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| T2 Sensor | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ | ✗ | ✗ |
| T3 Sensor | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| T4 Sensor | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✗ |
| Reactor | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Compressor | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Additional refrigerant | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✗ | ✗ |
| Water-level switch | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ |
| Water pump | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ |
| Display board | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ |

| Part requiring replacement | EC 54 | EC 51 | EC 52 | EC 01 | PC 00 | PC 01 | PC 02 | PC 04 | PC 03 |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Outdoor PCB | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Outdoor fan motor | ✗ | ✗ | ✗ | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| T3 Sensor | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| TP Sensor | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Reactor | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ |
| Compressor | ✗ | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| IPM module board | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ | ✓ | ✗ |
| Pressure protector | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ |
| Additional refrigerant | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ |

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

6. Troubleshooting by Error Code

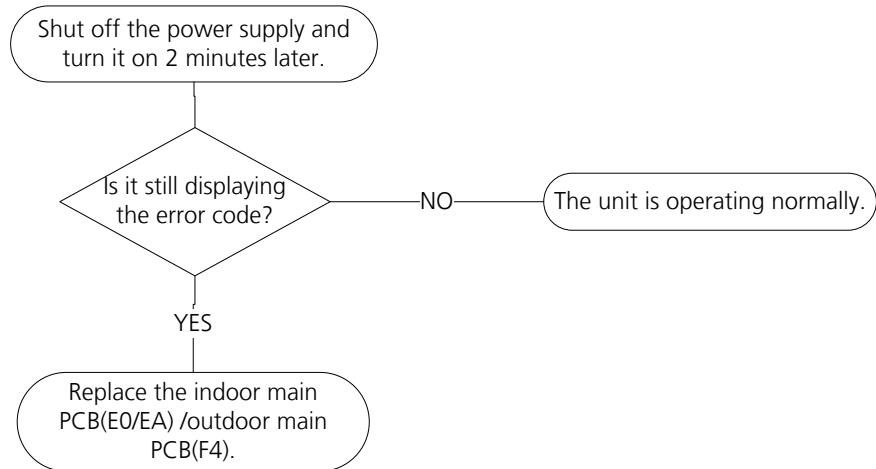
6.1 EH 00/ EH 0A / EC 51 (EEPROM Parameter Error Diagnosis and Solution)

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

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB

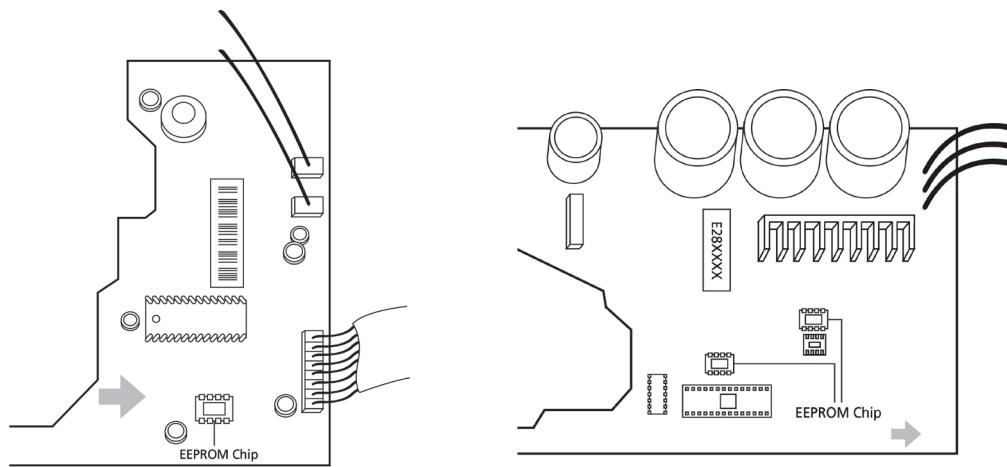
Troubleshooting and repair:



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 could not 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 EC 51.

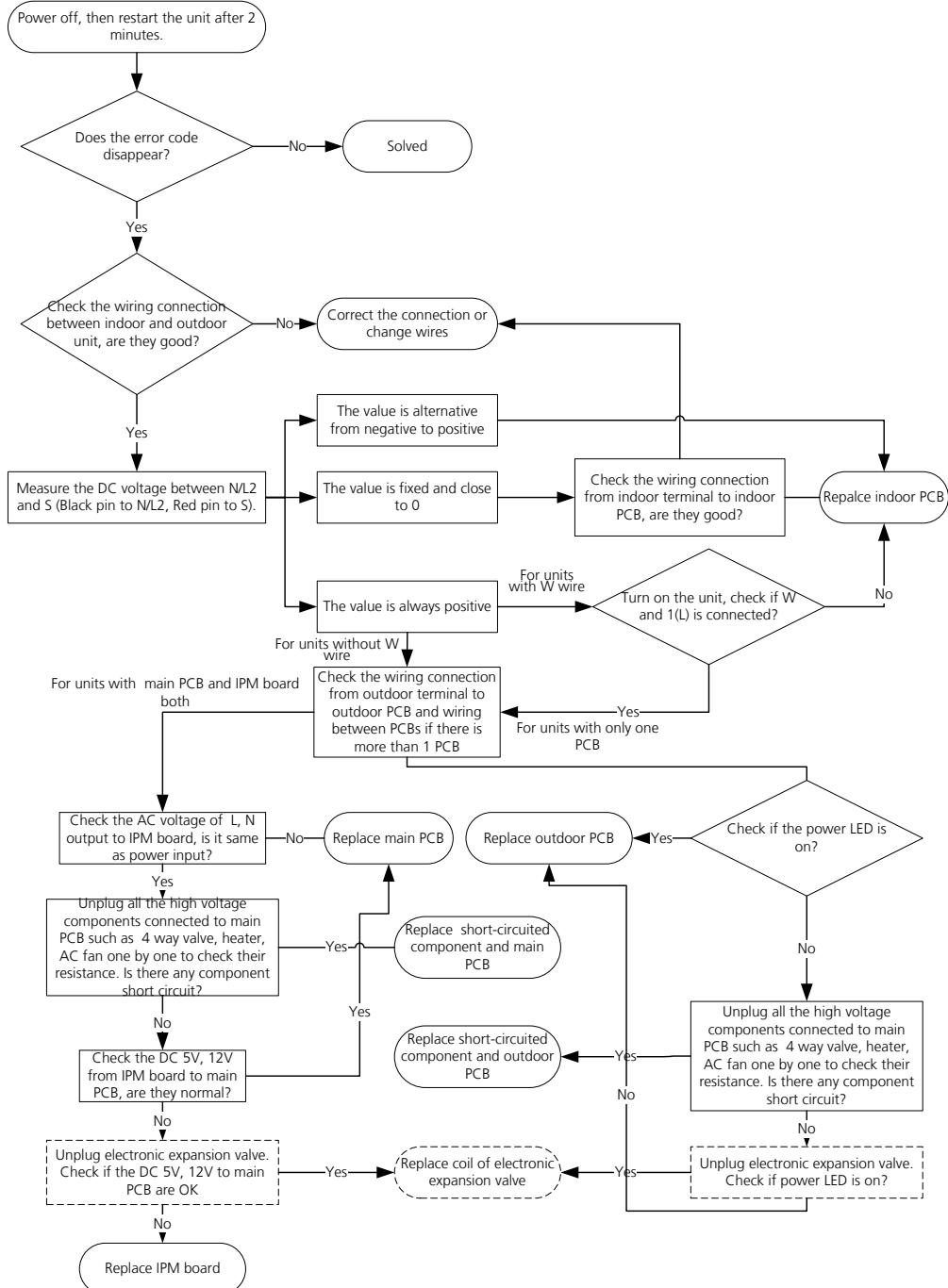
6.2 EL 01 (Indoor and Outdoor Unit Communication Error Diagnosis and Solution)

Description: Indoor unit can not communicate with outdoor unit

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB
- Reactor

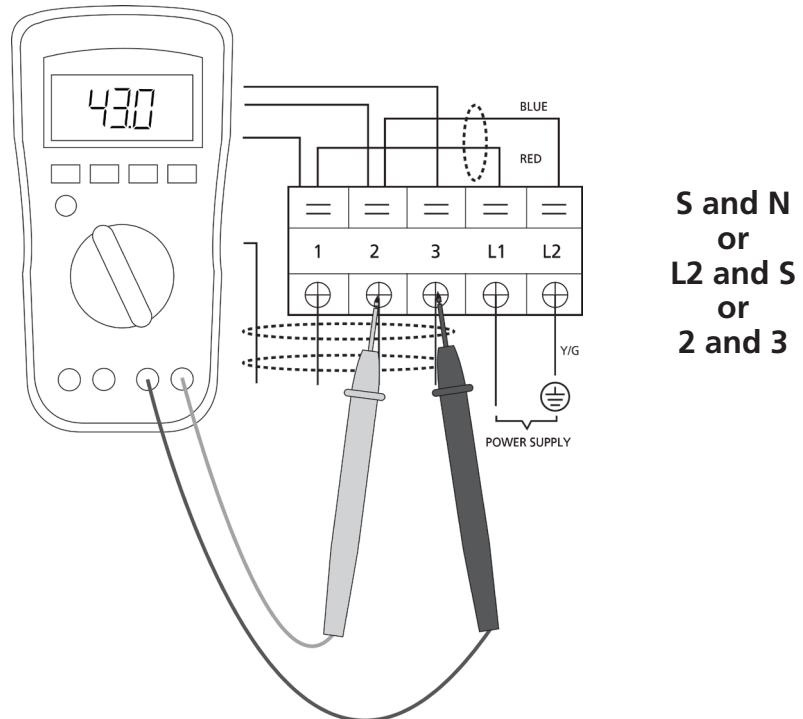
Troubleshooting and repair:



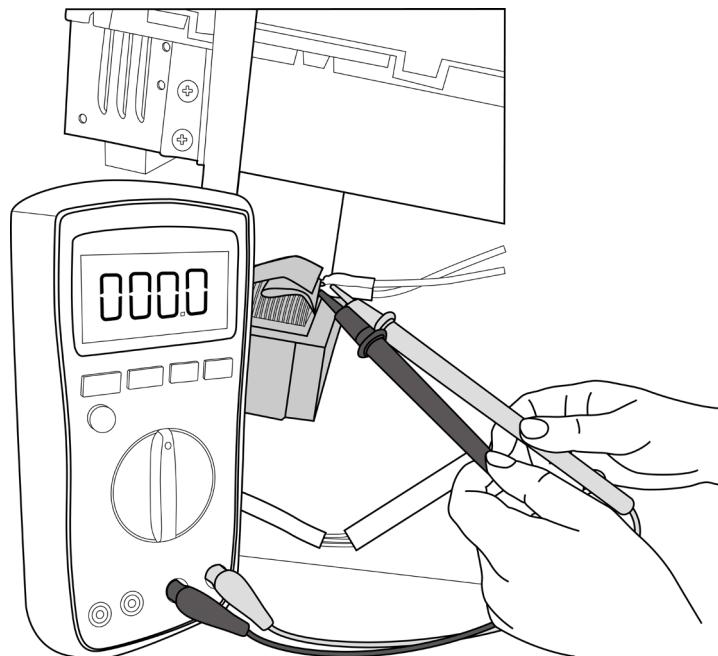
Note: For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

Remarks:

- Use a multimeter to test the DC voltage between 2 port(or S or L2 port) and 3 port(or N or 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 AC is operating normally, the voltage is moving alternately as positive values and negative values
- If the outdoor unit has malfunction, the voltage has always been the positive value.
- While if the indoor unit has malfunction, the voltage has always been 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 must have malfunction.



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

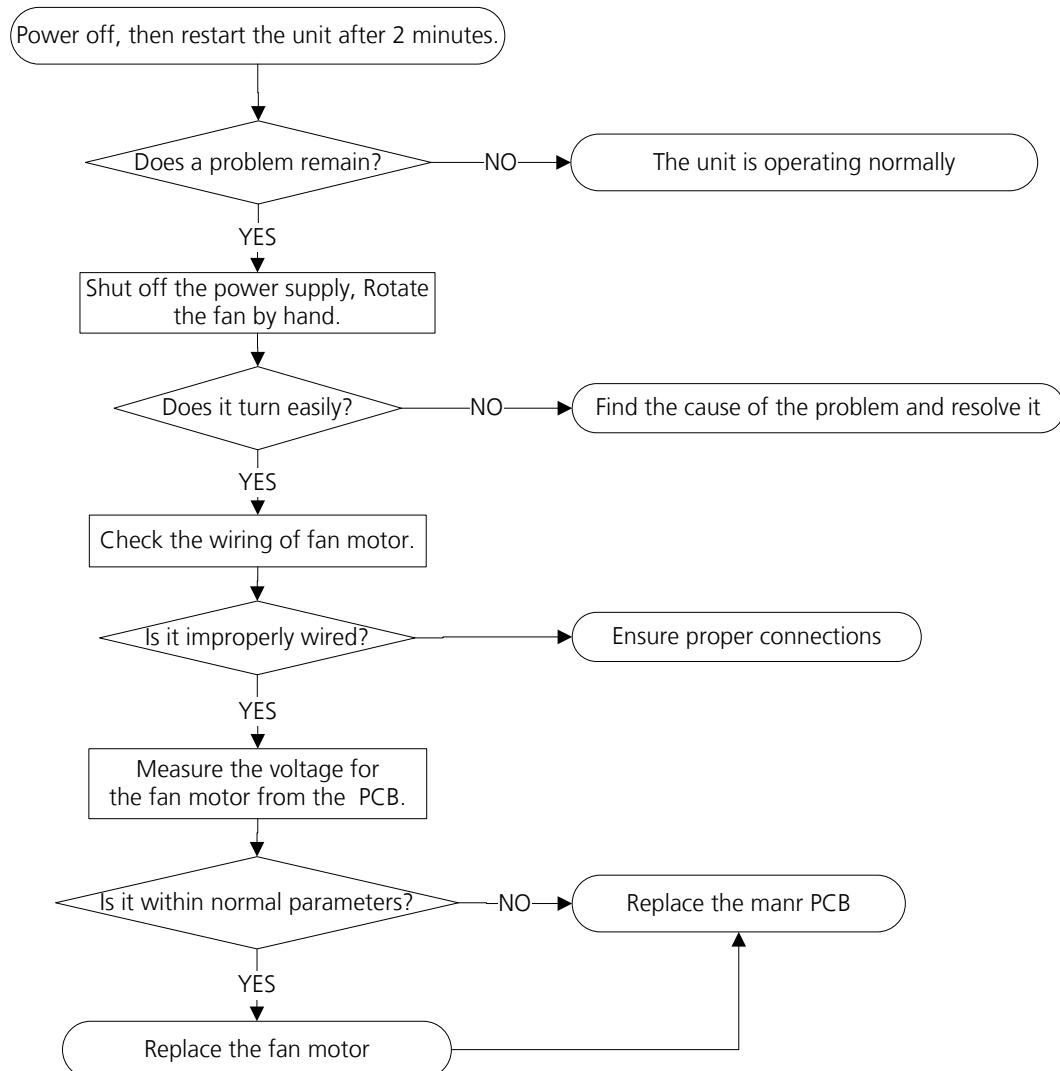
6.3 EH 03 / EH 31/EH 32/ EC 07 (Fan Speed Is Operating Outside of Normal Range Diagnosis and Solution)

Description: When indoor / outdoor fan speed keeps too low or too high for a certain time, the unit ceases operation and the LED displays the failure.

Recommended parts to prepare:

- Connection wires
- Fan assembly
- Fan motor
- PCB

Troubleshooting and repair:



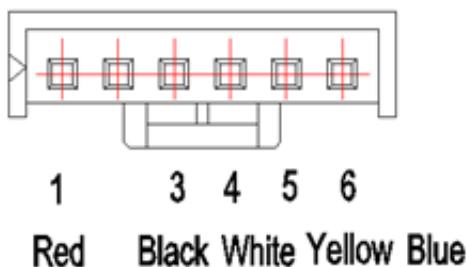
Note: For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

Index:

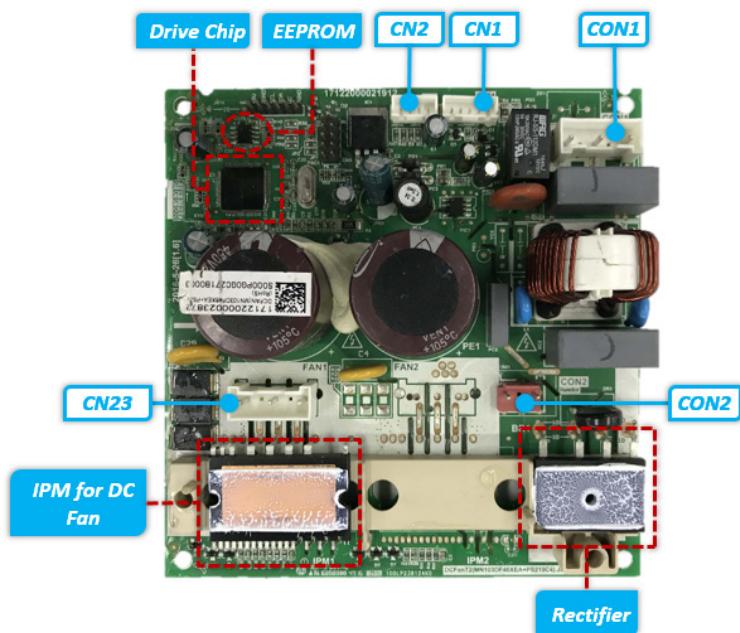
1. Indoor or Outdoor DC Fan Motor(control chip is in fan motor)

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 in the range showing in below table, the PCB must has problems and need to be replaced.

| No. | Color | Signal | Voltage |
|-----|--------|--------|------------|
| 1 | Red | Vs/Vm | 192V~380V |
| 2 | --- | --- | --- |
| 3 | Black | GND | 0V |
| 4 | White | Vcc | 13.5-16.5V |
| 5 | Yellow | Vsp | 0~6.5V |
| 6 | Blue | FG | 13.5-16.5V |

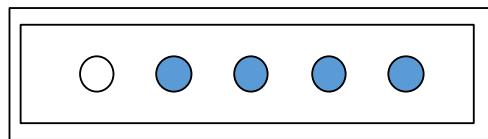


2. Indoor DC Fan IPM Board (Duct and Ceiling-floor Unit)



| Port | Description | Parameter | Remark |
|------|-----------------------------|-----------|---------------------|
| CON1 | Power input for the PCB | 230V/AC | |
| CN1 | Communication with main PCB | DC | |
| CN2 | Test port | 5V/DC | For debugging board |
| CN23 | UVW output for DC fan motor | | |
| CON2 | Ports for reactor | | |

CN1 Communication with main PCB

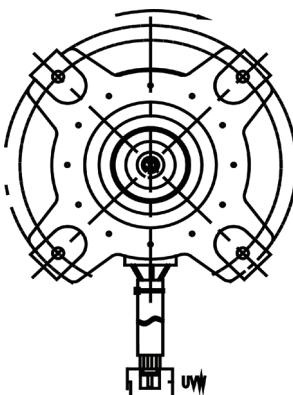


5 4 3 2 1

| NO. | Signal | Voltage |
|-----|--------|---------|
| 1 | Vcc | +15V |
| 2 | GND | |
| 3 | TXD | 0~6V |
| 4 | RXD | 0~15V |
| 5 | -- | -- |

3. 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 must has problems and need to be replaced. otherwise the PCB must has problems and need to be replaced.



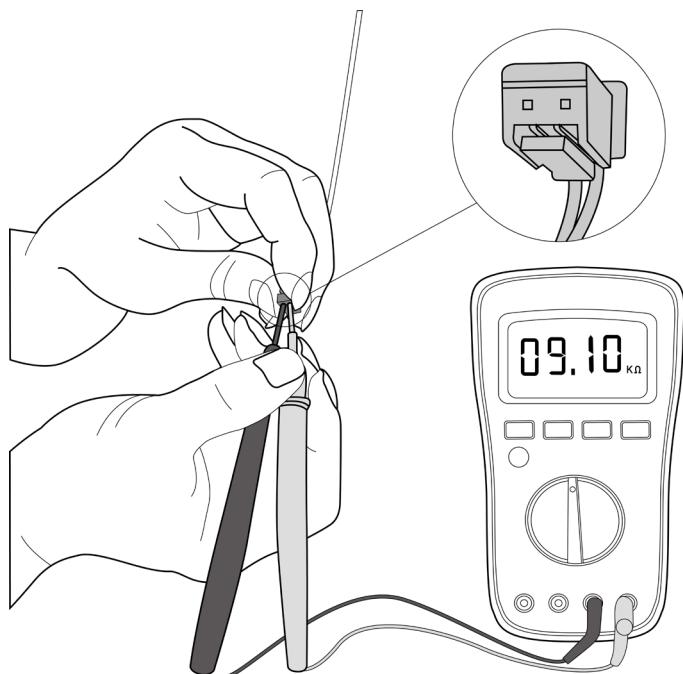
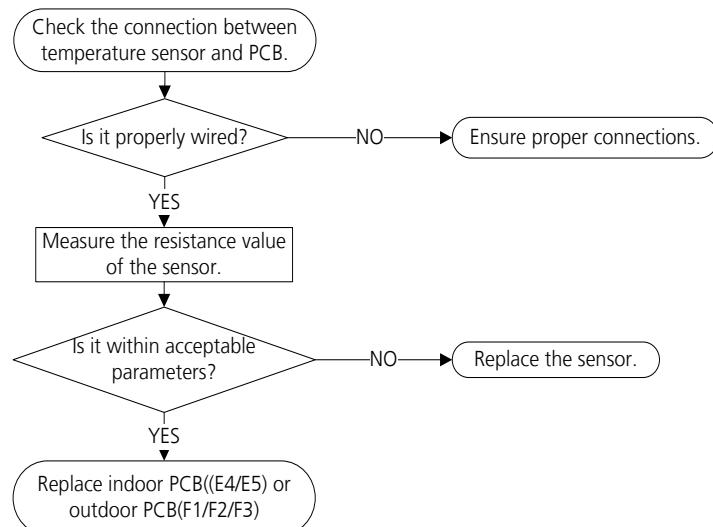
6.4 EH 60/EH 61/EC 53/EC 52/EC 54 (Open Circuit or Short Circuit of Temperature Sensor Diagnosis and Solution)

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

Recommended parts to prepare:

- Connection wires
- Sensors
- PCB

Troubleshooting and repair:



Note: For certain models, outdoor PCB could not 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

6.5 EL 0C (Refrigerant Leakage Detection Diagnosis and Solution)

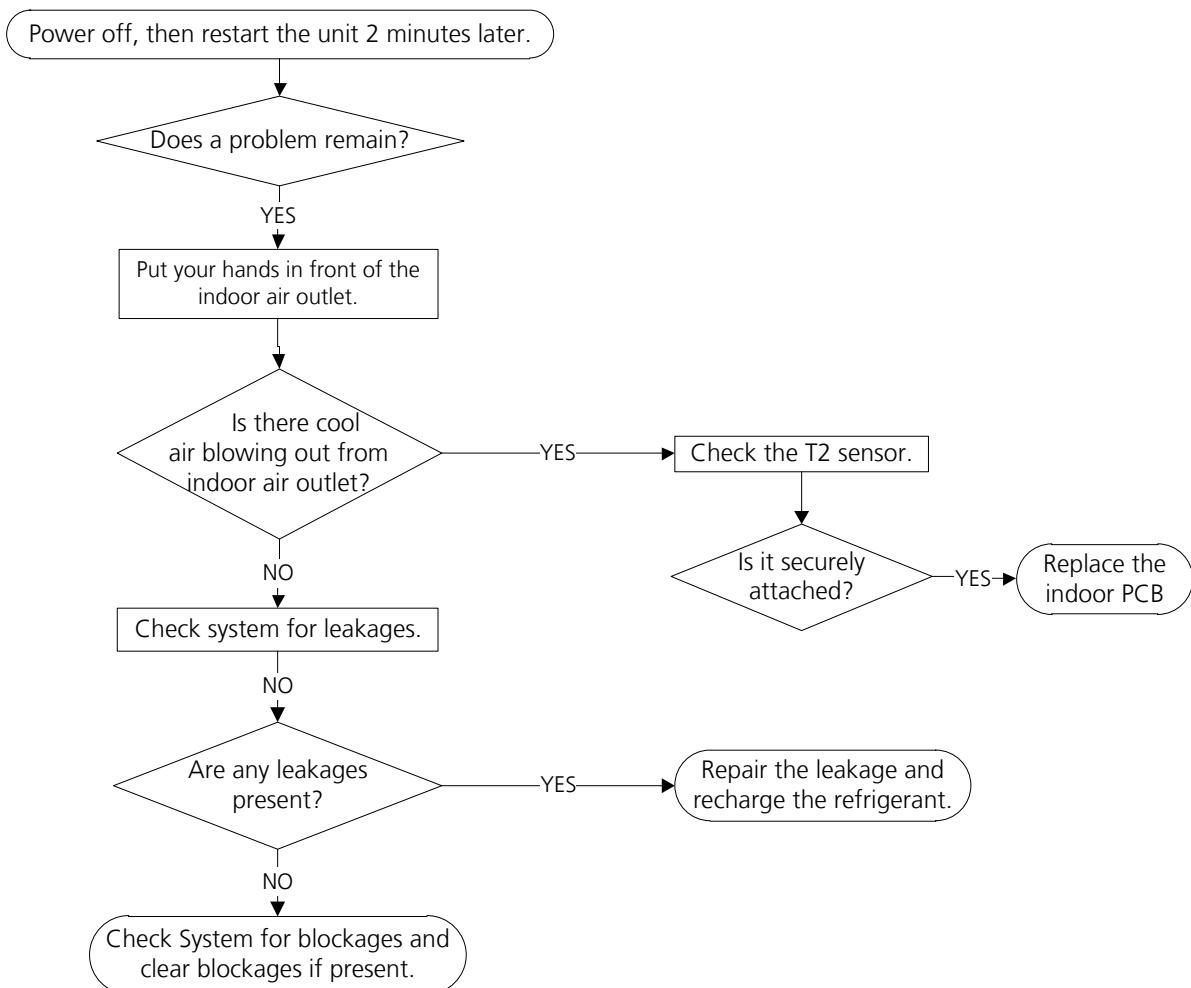
Description: Define the evaporator coil temperature T2 of the compressor just starts running as Tcool.

In the beginning 5 minutes after the compressor starts up, if $T2 < Tcool - 1^\circ C (1.8^\circ F)$ 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 display area will show "EL 0C" and AC will turn off.

Recommended parts to prepare:

- T2 sensor
- Indoor PCB
- Additional refrigerant

Troubleshooting and repair:

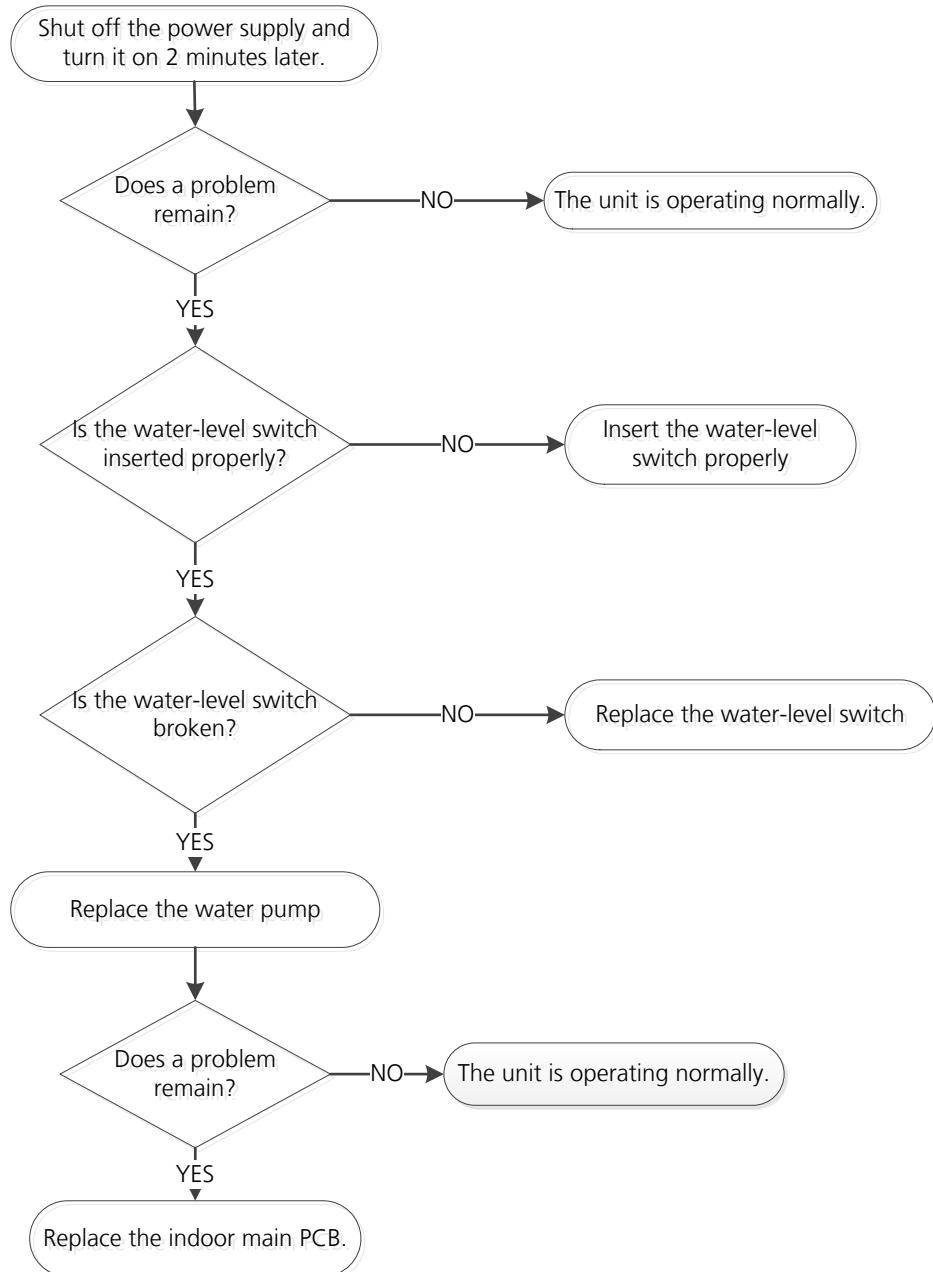


6.6 EH 0E(Water-Level Alarm Malfunction Diagnosis and Solution)

Description: If the sampling voltage is not 5V, the LED displays the failure code.

Recommended parts to prepare:

- Connection wires
- Water-level switch
- Water pump
- Indoor PCB



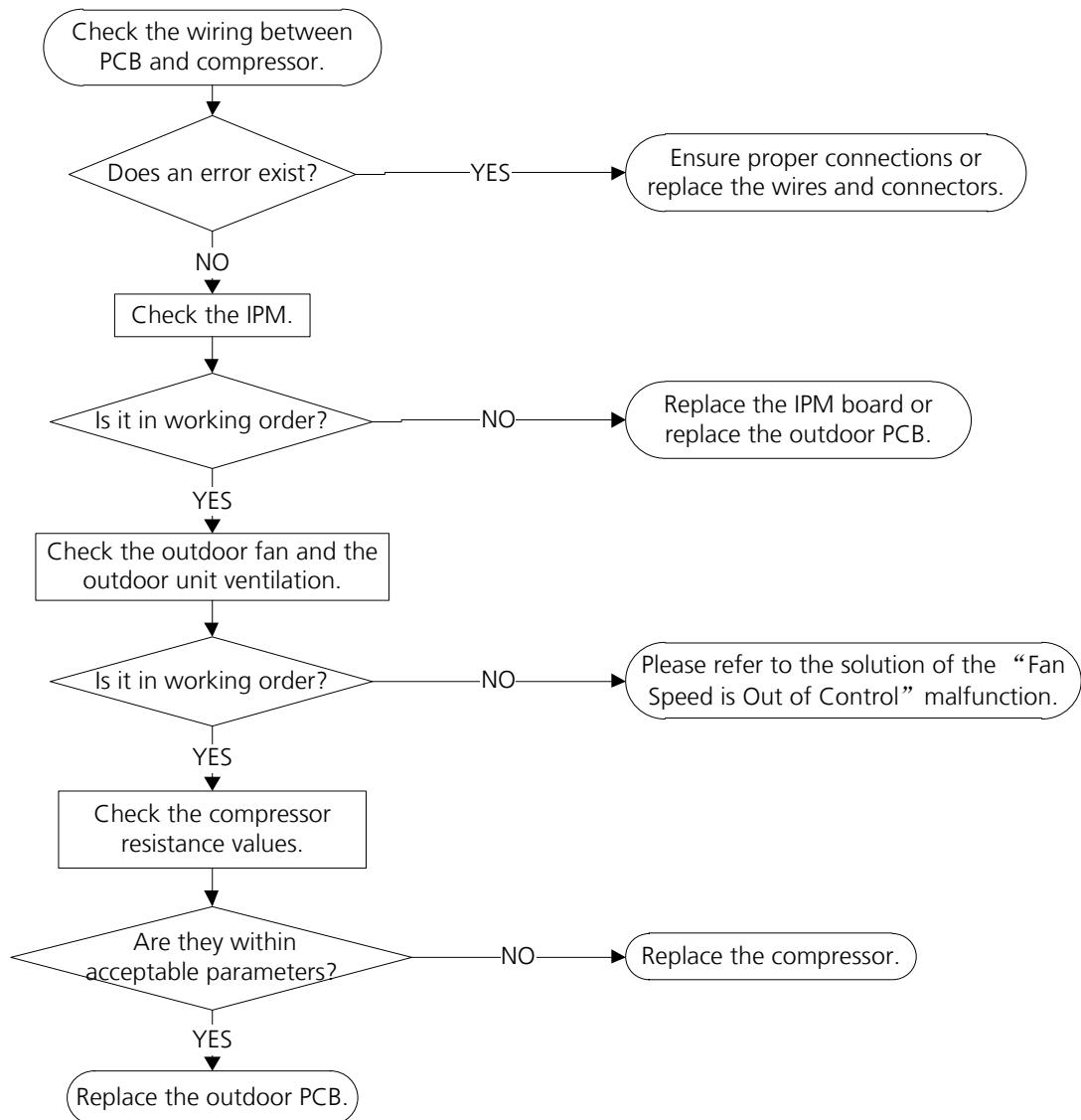
6.7 PC 00(IPM malfunction or IGBT over-strong current protection Diagnosis and Solution)

Description: When the voltage signal the IPM sends to the compressor drive chip is abnormal, the display LED shows "PC 00" and the AC turn 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 could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

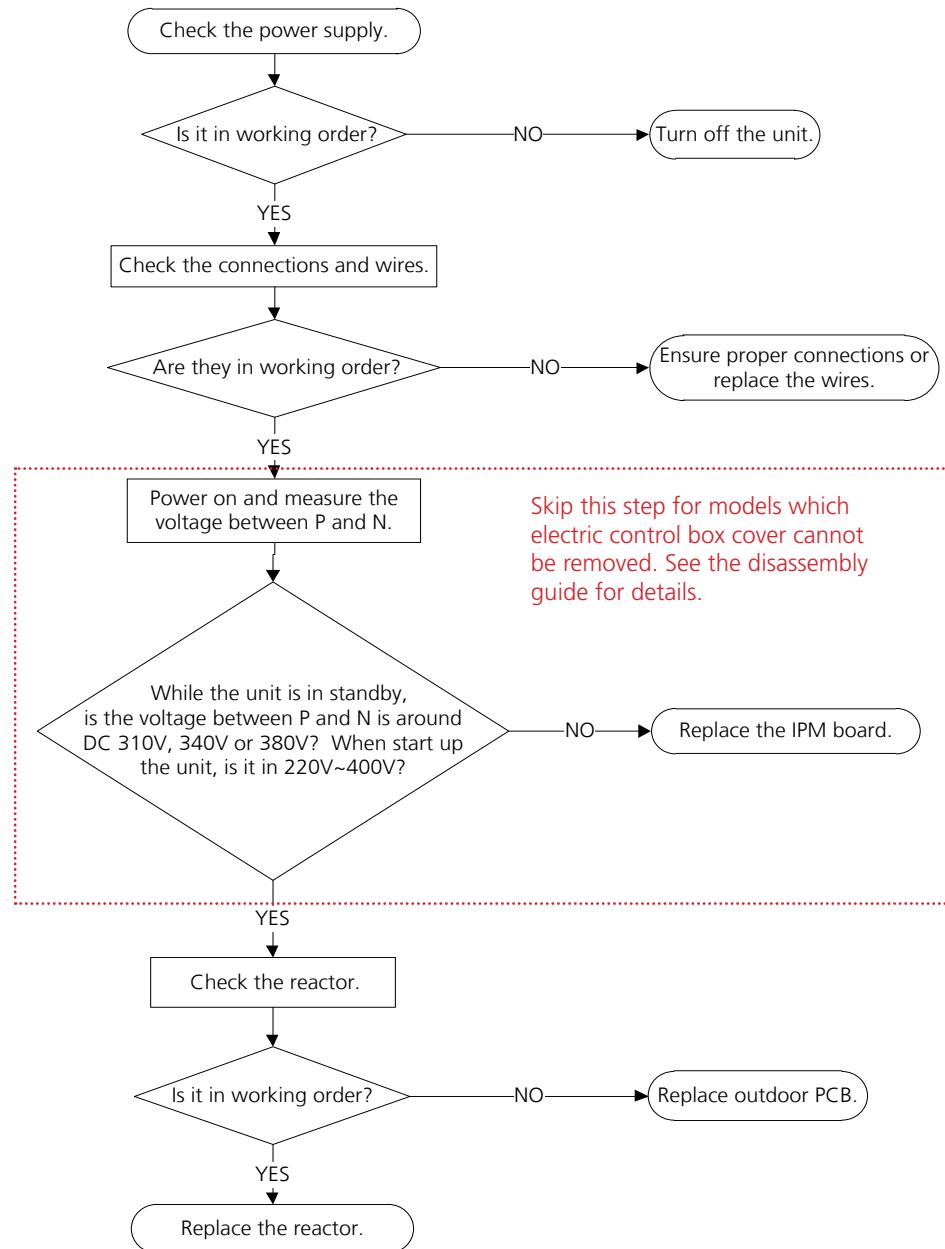
6.8 PC 01(Over voltage or too low voltage protection Diagnosis and Solution)

Description: Abnormal increases or decreases in voltage are detected by checking 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 could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

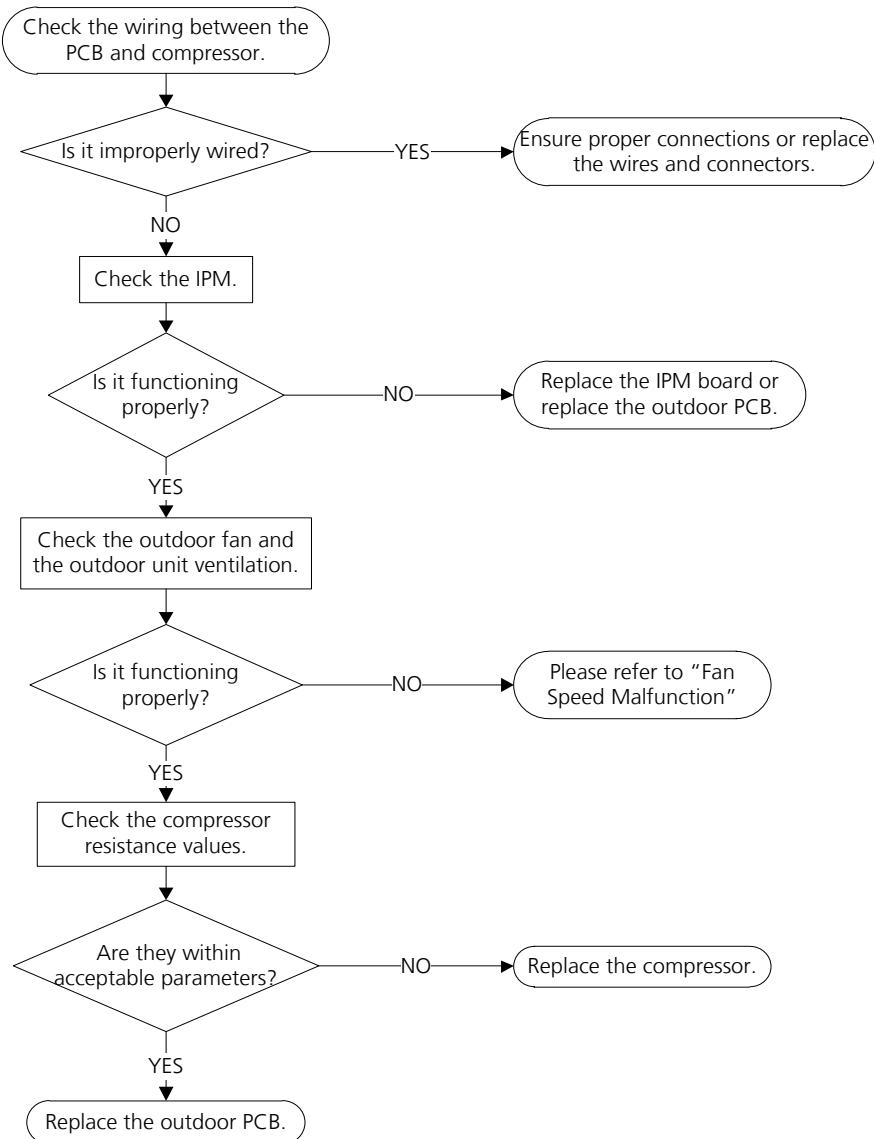
6.9 PC 04 (Inverter compressor drive error Diagnosis and Solution)

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 could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

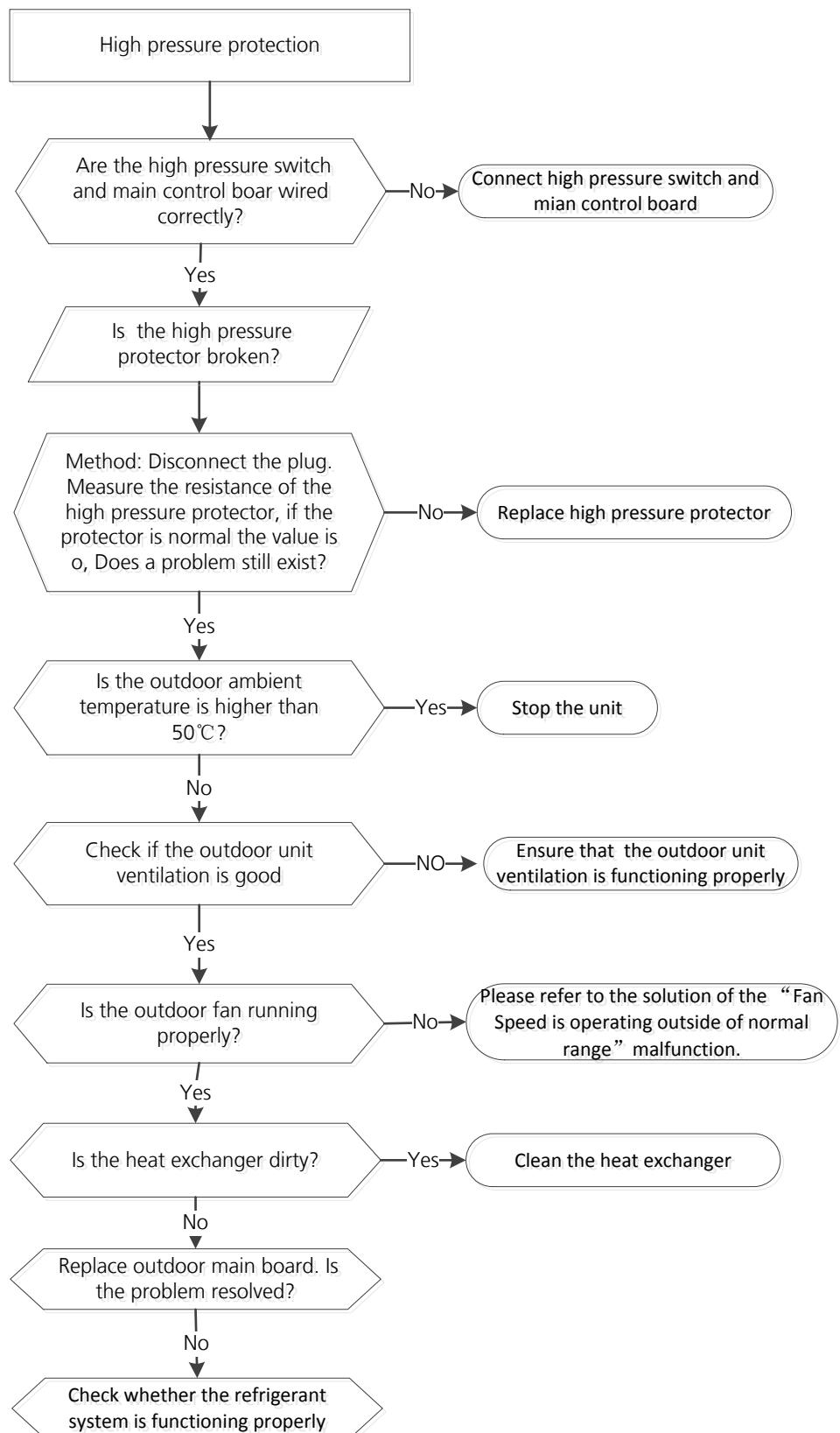
6.10 PC 03(High pressure protection or Low Pressure Protection Diagnosis and Solution)

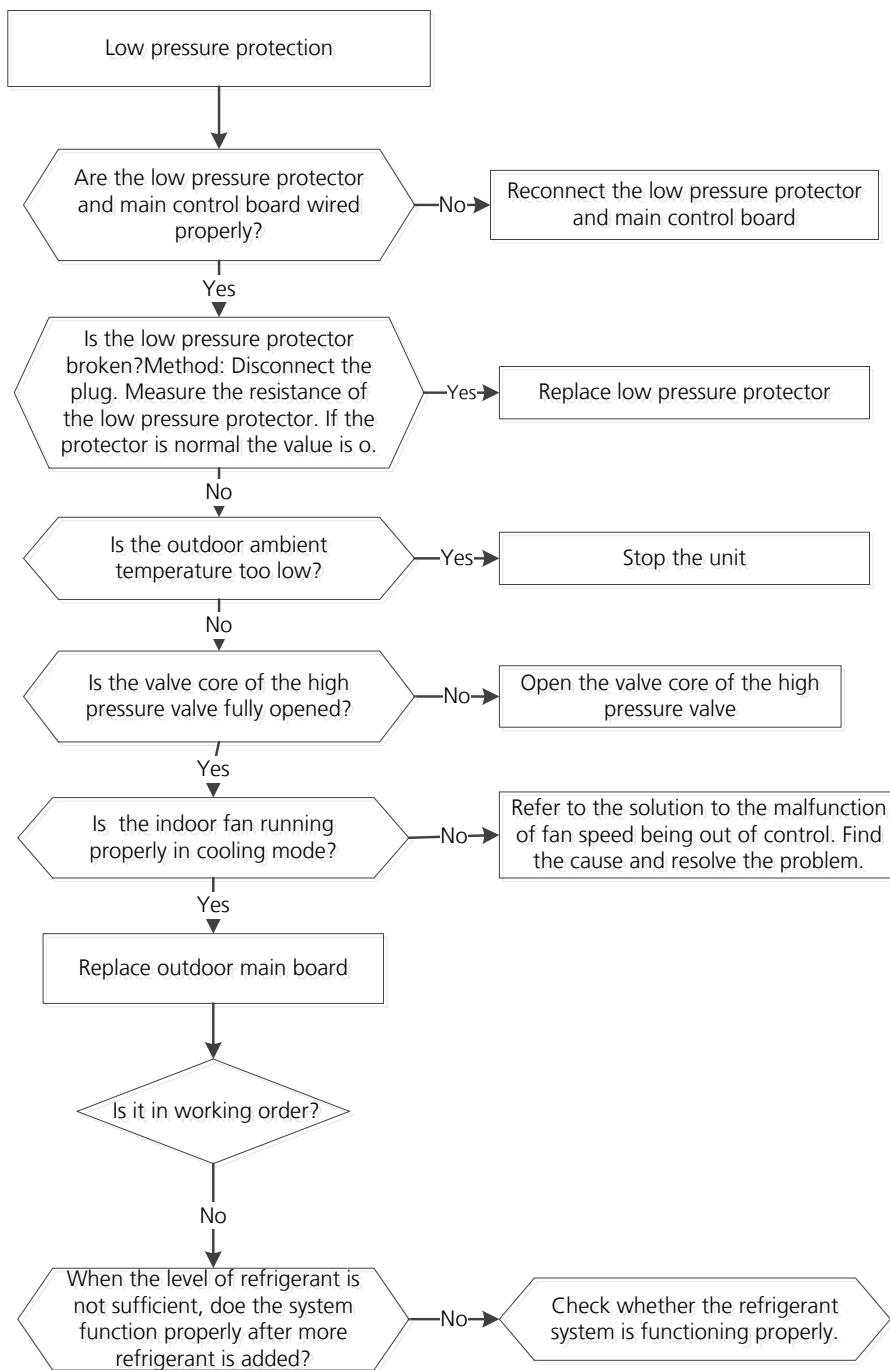
Description: Outdoor pressure switch cut off the system because high pressure is higher than 4.4 MPa or outdoor pressure switch cut off the system because low pressure is lower than 0.13 MPa, the LED displays the failure code.

Recommended parts to prepare:

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

Troubleshooting and repair:





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

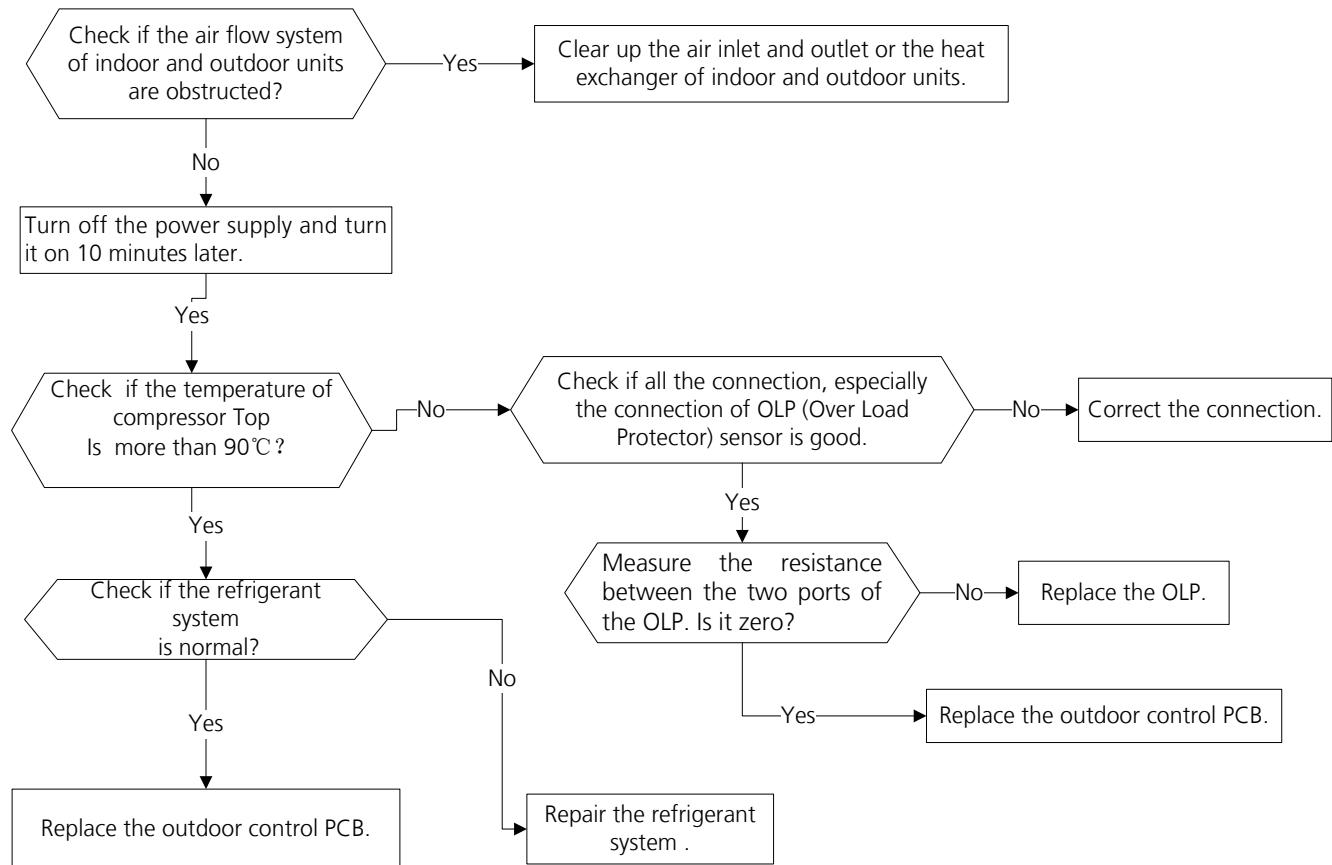
6.11 PC 02(Top temperature protection of compressor or High temperature protection of IPM module diagnosis and solution)

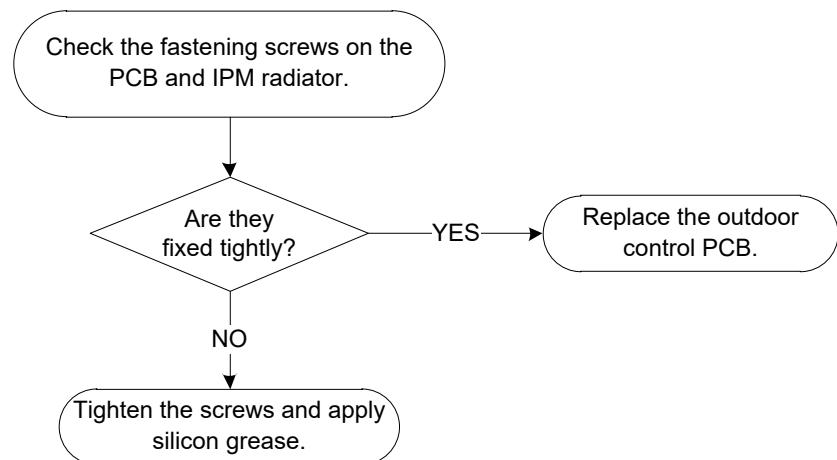
Description: For some models with overload protection, If the sampling voltage is not 5V, the LED will display the failure. If the temperature of IPM module is higher than a certain value, the LED displays the failure code.

Recommended parts to prepare:

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

Troubleshooting and repair:





6.12 PC 0L (Low ambient temperature protection)

Description: It is a protection function. When compressor is off, outdoor ambient temperature(T4) is lower than -35°C. for 10s, the AC will stop and display the failure code.

When compressor is on, outdoor ambient temperature(T4) is lower than -40°C. for 10s, the AC will stop and display the failure code.

When outdoor ambient temperature(T4) is no lower than -32°C. for 10s, the unit will exit protection.

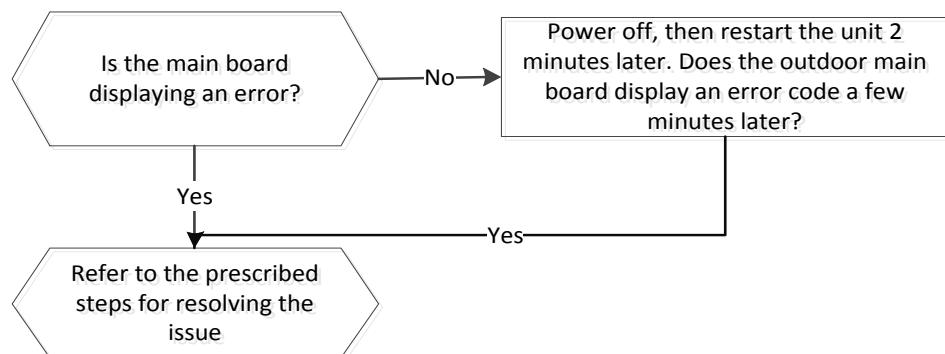
6.13 EC 0d(Outdoor unit malfunction Diagnosis and Solution)

Description: The indoor unit detect the outdoor unit is error.

Recommended parts to prepare:

- Outdoor unit

Troubleshooting and repair:



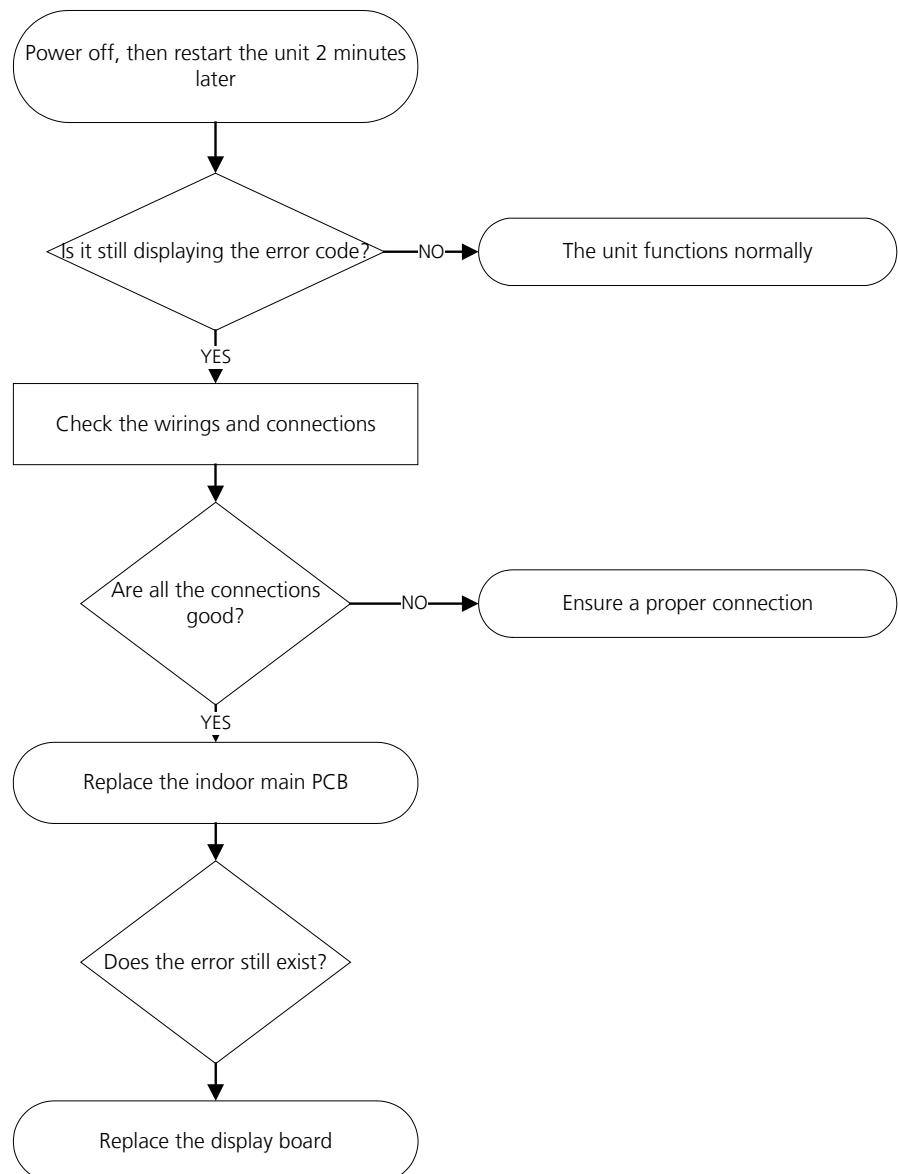
6.14 EH 0b(Communication error between display board and main board diagnosis and solution)

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

Recommended parts to prepare:

- Communication wire
- Indoor PCB
- Display board

Troubleshooting and repair:



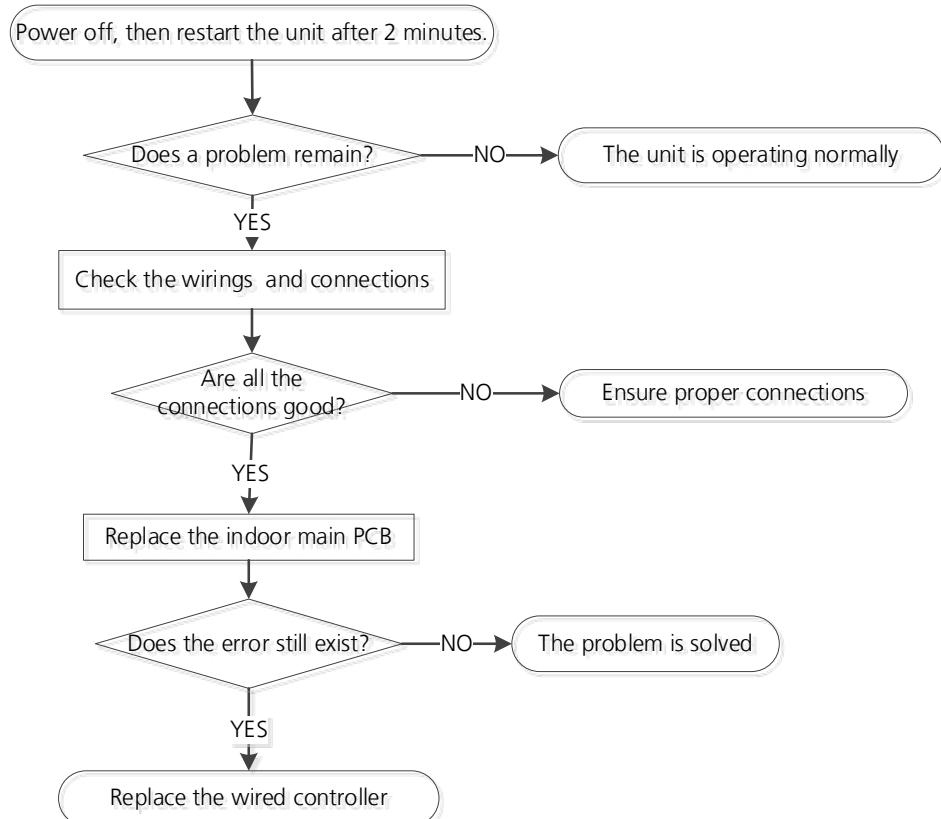
6.15 EH b3 (Communication error between wired controller and indoor unit Diagnosis and Solution

Description: If Indoor PCB does not receive feedback from wired controller, the error displays on the wired controller

Recommended parts to prepare:

- Connection wires
- Indoor PCB
- Wired controller

Troubleshooting and repair:



6.16 EH bA(Communication malfunction between external fan module and indoor unit)/ EH 3A(External fan DC bus voltage is too low protection)/ EH 3b(External fan DC bus voltage is too high fault) diagnosis and solution

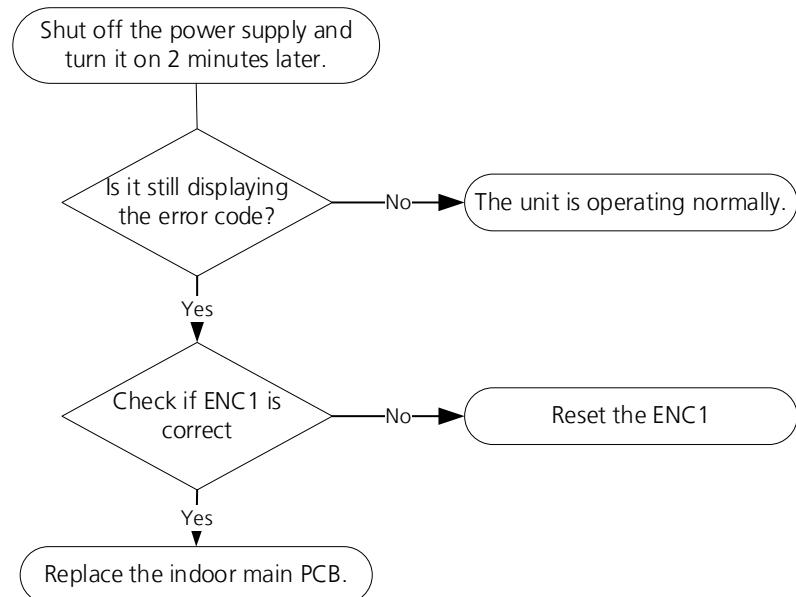
Description: Indoor unit does not receive the feedback from external fan module during 150 seconds.

or Indoor unit receives abnormal increases or decreases in voltage from external fan module.

Recommended parts to prepare:

- Indoor main PCB

Troubleshooting and repair:



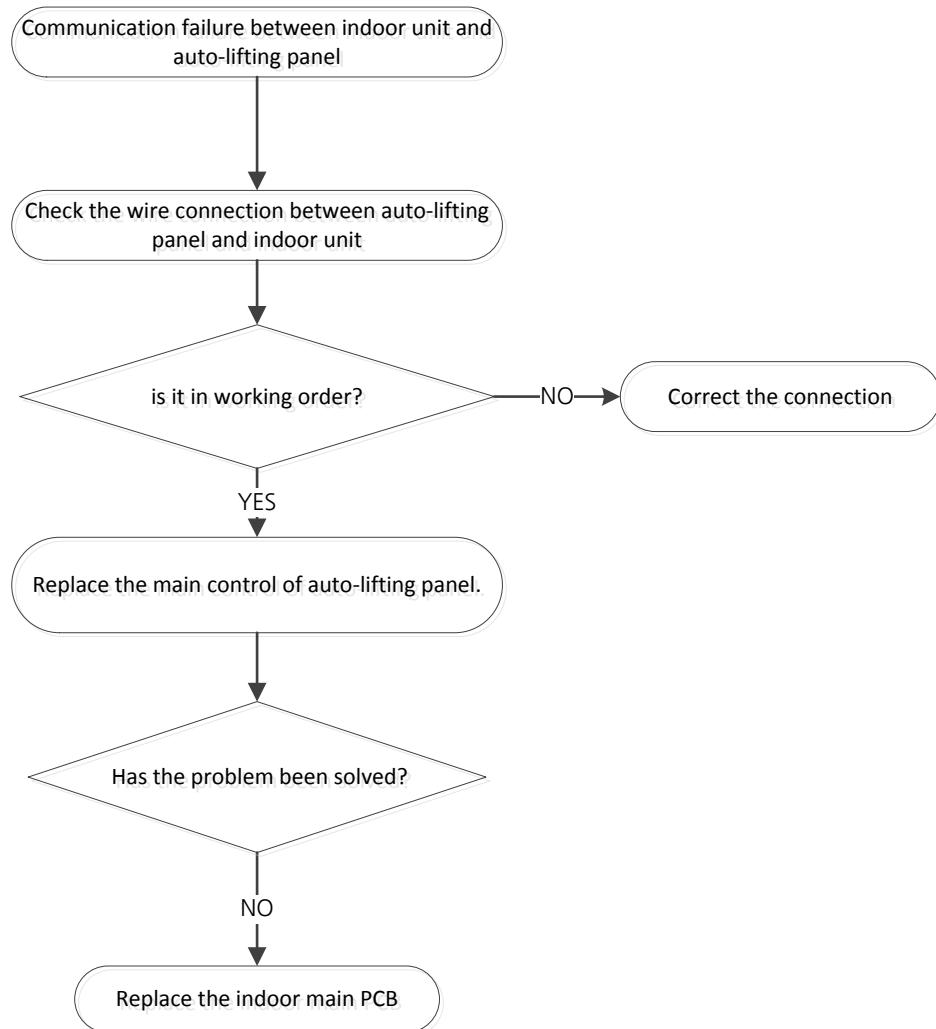
6.17 FH 07(Communication malfunction between indoor unit and auto-lifting panel) diagnosis and solution

Description: Indoor PCB does not get the feedback from the PCB of auto-lifting panel.

Recommended parts to prepare:

- Connection wires
- PCB of auto-lifting panel
- Indoor PCB

Troubleshooting and repair:



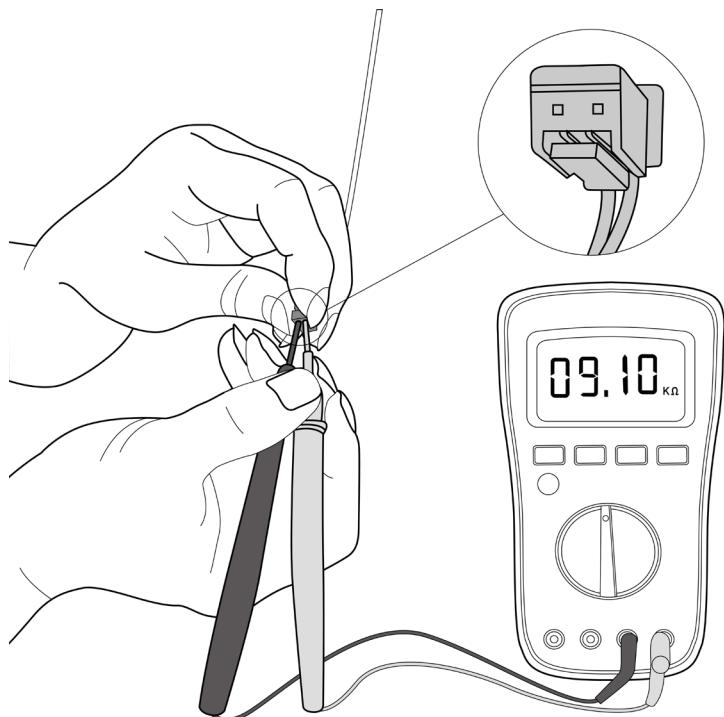
8. Check Procedures

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 in case of injury.

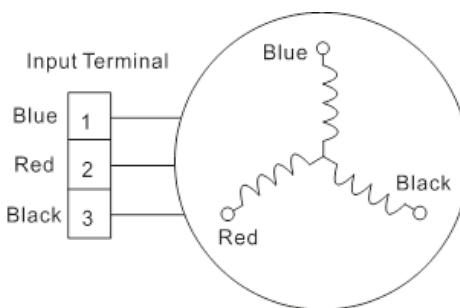
1. Disconnect the temperature sensor from PCB (Refer to Chapter 5&6. Indoor&Outdoor Unit Disassembly).
2. Measure the resistance value of the sensor using a multi-meter.
3. Check corresponding temperature sensor resistance value table (Refer to Chapter 8. Appendix).



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

8.2 Compressor Check

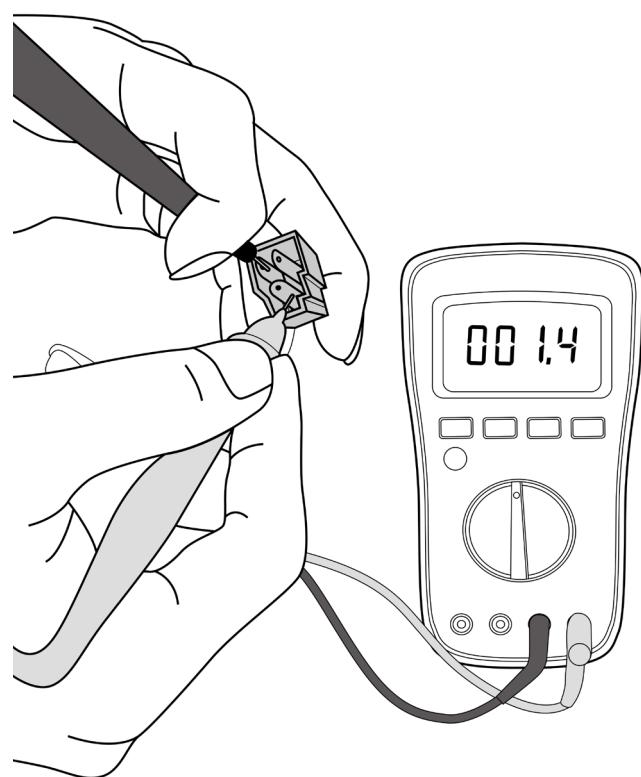
1. Disconnect the compressor power cord from outdoor PCB (Refer to Chapter 6. Outdoor Unit Disassembly).
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.



| Resistance Value | KSN98D64UFZ3 | KSN140D21UFZ | KTM240D43UKT | KTM240D57UMT |
|------------------|--------------|--------------|--------------|--------------|
| Blue-Red | 2.7Ω | 1.28Ω | 1.03Ω | 0.62Ω |
| Blue-Black | | | | |
| Red-Black | | | | |

| Resistance Value | KTF250D22UMT ATF235D22TMT | KSN140D58UFZ | KTF310D43UMT ATF310D43TMT | KTQ420D1UMU ATQ420D1SN5A1 |
|------------------|------------------------------|--------------|------------------------------|------------------------------|
| Blue-Red | 0.75Ω | 1.86Ω | 0.65Ω | 0.37Ω |
| Blue-Black | | | | |
| Red-Black | | | | |

| Resistance Value | ATM150D23TFZ | ATH307CDRC8DUL | KSK103D33UEZ3 | KTN110D42UFZ |
|------------------|--------------|----------------|---------------|--------------|
| Blue-Red | 1.72Ω | 1.09Ω | 2.13Ω | 1.82Ω |
| Blue-Black | | | | |
| Red-Black | | | | |



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

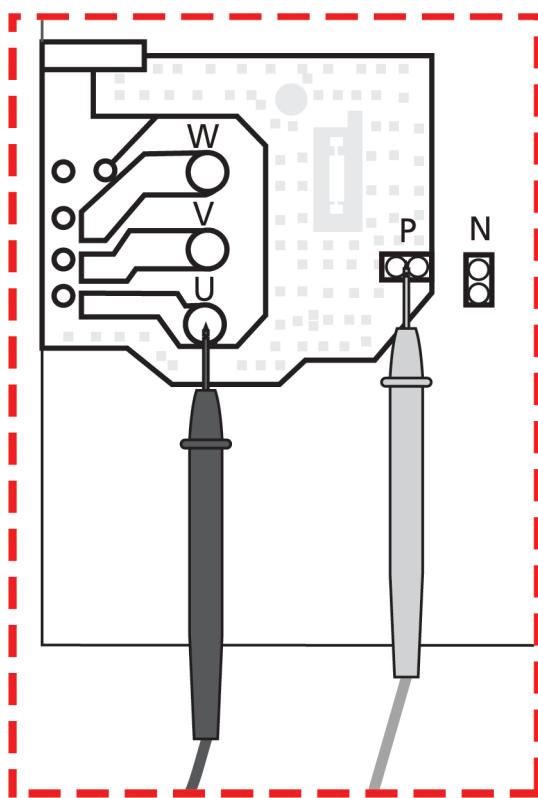
8.3 IPM Continuity Check

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 | ∞ (Several M Ω) | (+)Red | (-)Black | ∞ (Several M Ω) |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



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

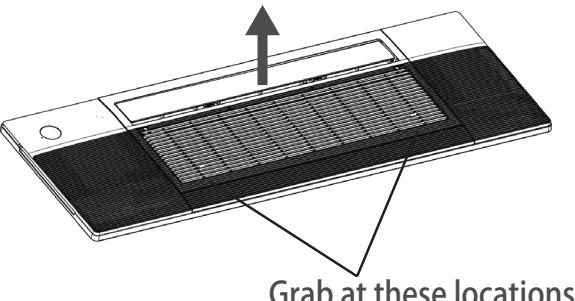
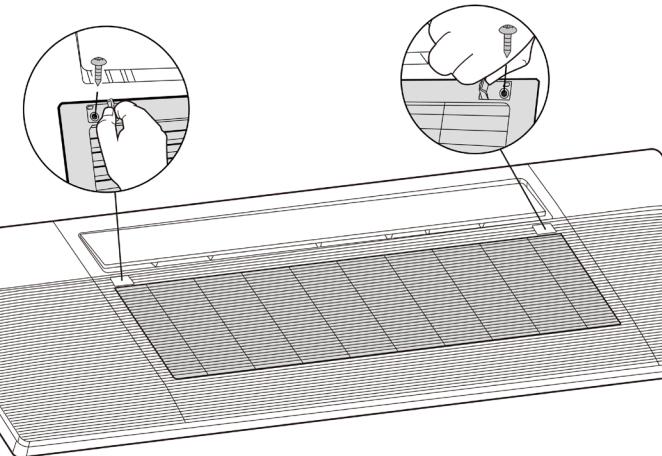
Indoor Unit Disassembly-One-way Cassette

Contents

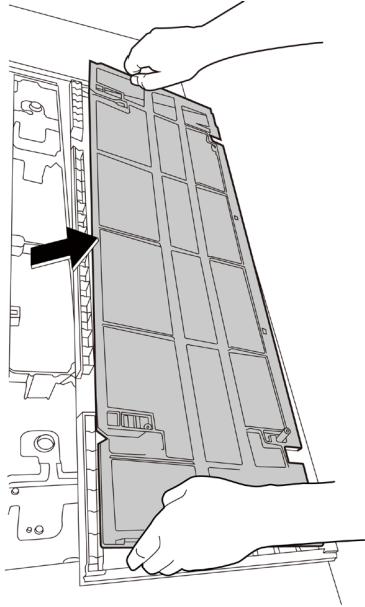
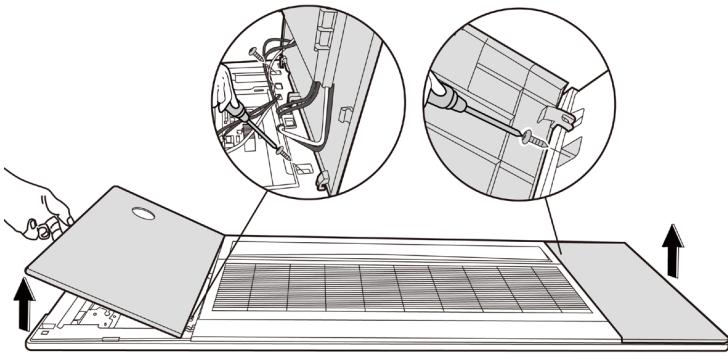
| | | |
|-----|---|----------|
| 1. | Indoor Unit Disassembly | 1 |
| 1.1 | Filter and Panel..... | 2 |
| 1.2 | Display Board | 6 |
| 1.3 | Electrical Parts | 7 |
| 1.4 | Water Collector & Water Level Switch..... | 10 |
| 1.5 | Water Pump | 11 |
| 1.6 | Evaporator..... | 12 |
| 1.7 | Fan Motor and Fan | 14 |
| 1.8 | Stepper Motor..... | 15 |

1. Indoor Unit Disassembly

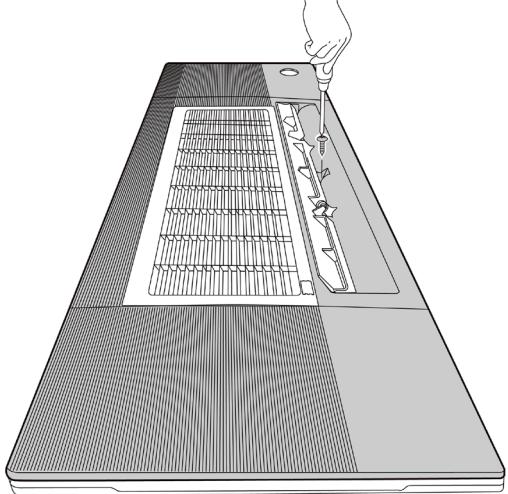
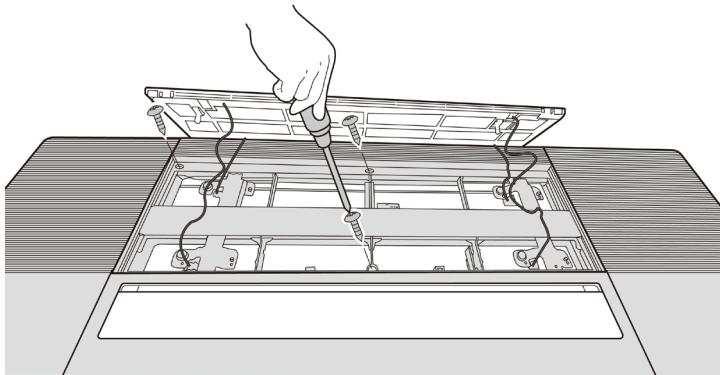
1.1 Filter and Panel

| Procedure | Illustration |
|---|---|
| <ol style="list-style-type: none">1) For panel with lift function, grab air grille with your fingers and pull it out slowly in the direction of the arrow. (see CJ_MCB_001)2) For panel without lift function, push one side of the grille clamp (on the both sides of the grille), and then remove 2 screws. (see CJ_MCB_002) |  <p>CJ_MCB_001</p>  <p>CJ_MCB_002</p> |

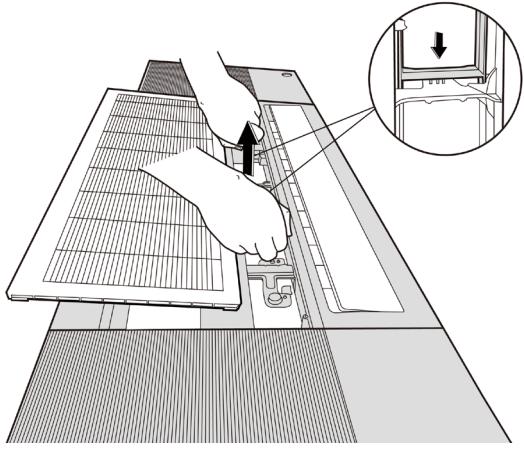
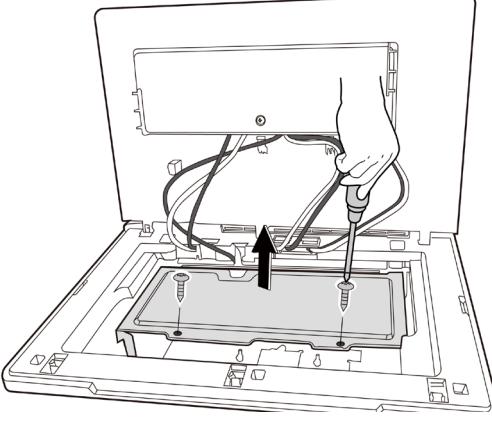
Note: This section is for reference only. Actual unit appearance may vary.

| Procedure | Illustration |
|--|--|
| 3) Turn over the air inlet grille assembly then take out the filter. (see CJ_MCB_003) |  <p data-bbox="933 983 1092 1012">CJ_MCB_003</p> |
| 4) Open the two covers on both sides of the panel and remove 3 screws.(see CJ_MCB_004) |  <p data-bbox="925 1477 1092 1507">CJ_MCB_004</p> |

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

| Procedure | Illustration |
|---|--|
| 5) Open the louver and open the screw cover, then remove the screw.(see CJ_MCB_005) |  |
| 6) Remove 3 screws.(see CJ_MCB_006) |  |

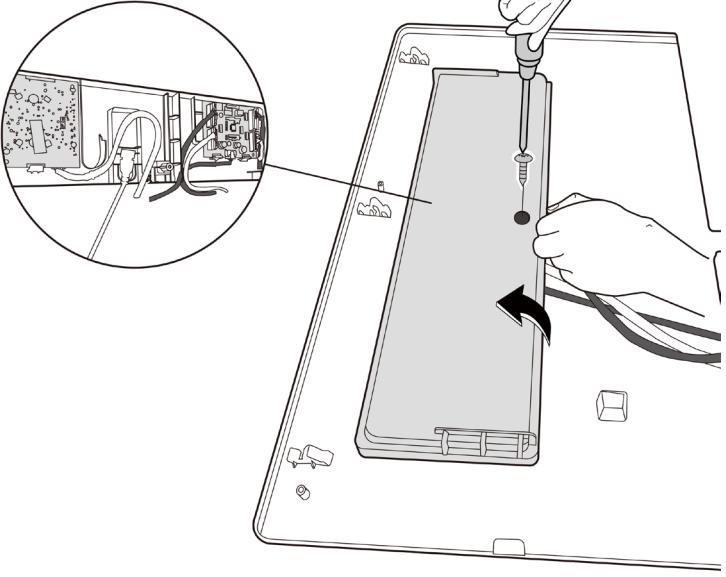
Note: This section is for reference only. Actual unit appearance may vary.

| Procedure | Illustration |
|---|--|
| 7) Separate panel and water collector, then remove the panel.(see CJ_MCB_007) |  <p data-bbox="933 878 1092 911">CJ_MCB_007</p> |
| 8) Remove 2 screws and remove the cover of electronic control box. (see CJ_MCB_008) 9) Disconnect the connectors of display board and stepper motor and release the panel. |  <p data-bbox="933 1448 1092 1482">CJ_MCB_008</p> |

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

1.2 Display Board

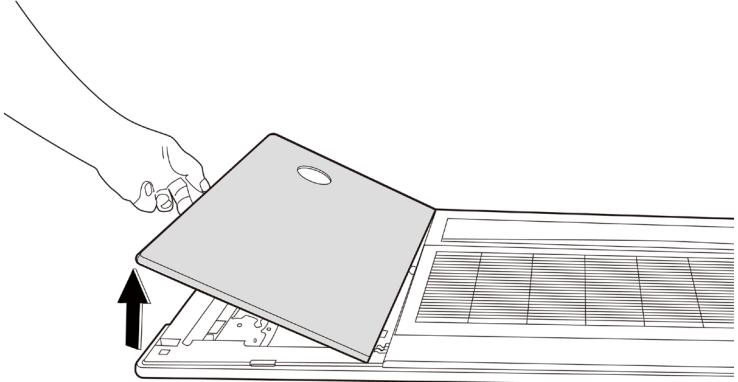
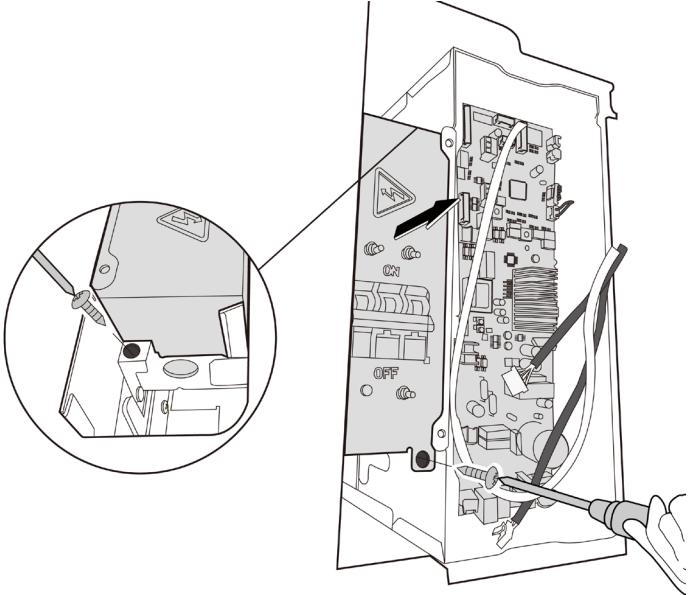
Note: Open the left cover of panel (refer to 1.1. filter and panel) before disassembling display board.

| Procedure | Illustration |
|--|---|
| 1) Remove 1 screw of display board subassembly. (see CJ_MCB_009) |  <p>CJ_MCB_009</p> |

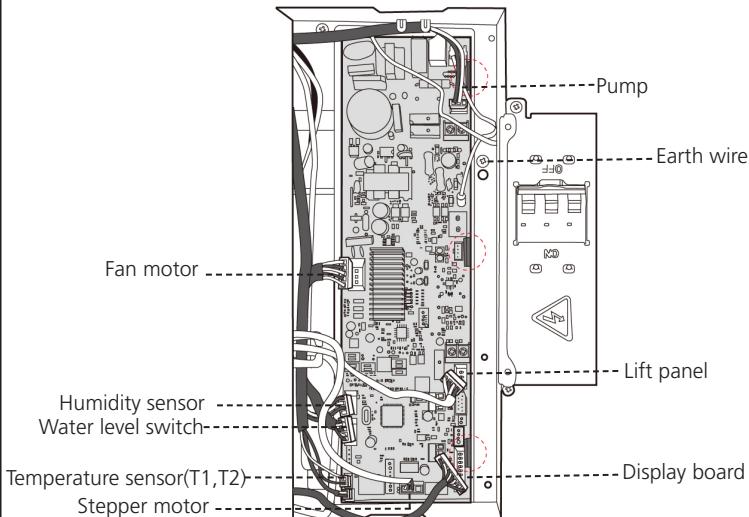
Note: This section is for reference only. Actual unit appearance may vary.

1.3 Electrical Parts (Antistatic gloves must be worn.)

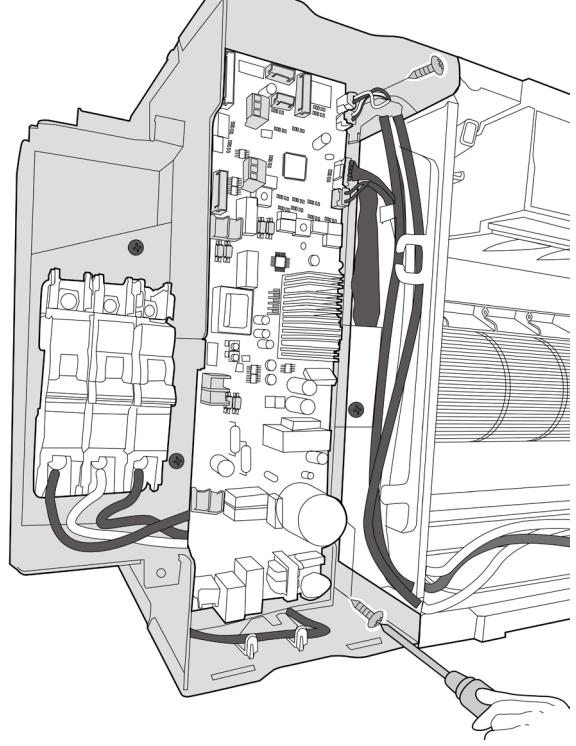
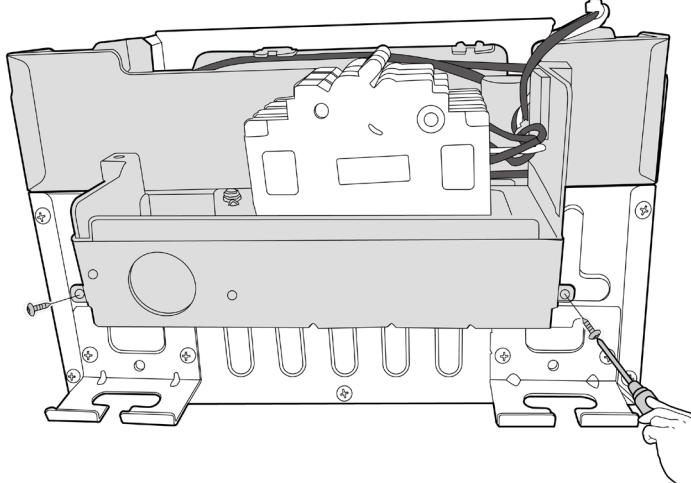
Note: Remove the panel (refer to 1.1) before disassembling electronic control box subassembly.

| Procedure | Illustration |
|--|--|
| <ol style="list-style-type: none">1) Open left cover of panel.(see CJ_MCB_010)2) Remove 2 screws and remove the cover of electronic control box. (see CJ_MCB_008) |  <p>CJ_MCB_010</p> |
| <ol style="list-style-type: none">3) Remove 2 screws of air switch cover. (see CJ_MCB_011)(for some models) |  <p>CJ_MCB_011</p> |

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

| Procedure | Illustration |
|--|--|
| <p>4) Disconnect connectors and then remove the main control board(3 clips). (see CJ_MCB_012)</p> <p>(If you want to repair the main control board assembly, perform the step 1 to step 4;If you want to repair the electrical control box subassembly, perform step 5 to step 6 below.)</p> |  <p>The diagram illustrates the internal components of the main control board assembly (CJ_MCB_012). The components labeled are:</p> <ul style="list-style-type: none"> Pump Earth wire Lift panel Display board Stepper motor Temperature sensor(T1,T2) Water level switch Humidity sensor Fan motor |

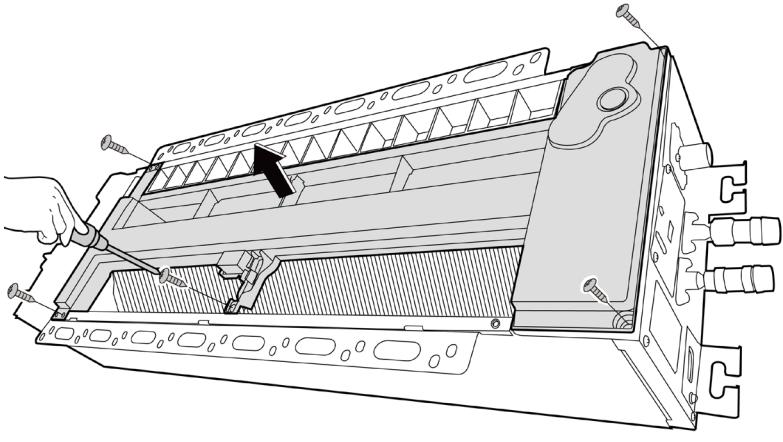
Note: This section is for reference only. Actual unit appearance may vary.

| Procedure | Illustration |
|---|---|
| <p>5) Remove 4 screws of electronic control box subassembly.(see CJ_MCB_013-1&CJ_MCB_013-2)</p> <p>6) Remove the electronic control box subassembly.</p> <p>Note: Remove the panel (refer to 1.1) before disassembling electronic control box subassembly.</p> |  <p data-bbox="906 1156 1108 1190">CJ_MCB_013-1</p>  <p data-bbox="906 1785 1113 1819">CJ_MCB_013-2</p> |

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

1.4 Water Collector

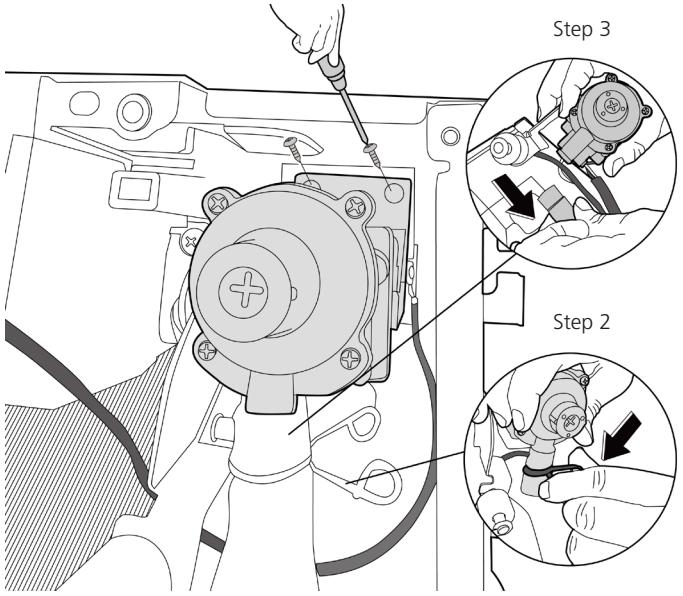
Note: Remove the panel (refer to 1.1) before disassembling water collector.

| Procedure | Illustration |
|---|---|
| 1) Remove the 5 screws and remove the water collector. (see CJ_MCB_014) |  <p data-bbox="922 1012 1097 1046">CJ_MCB_014</p> |

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

1.5 Water Pump

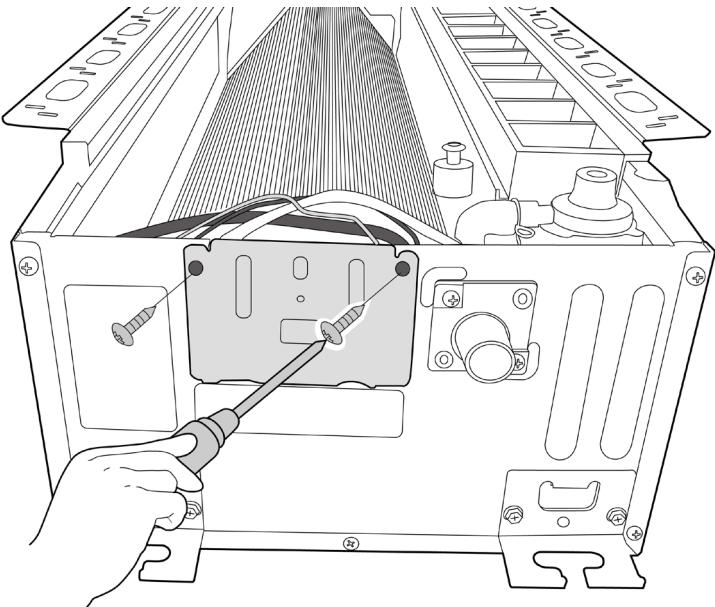
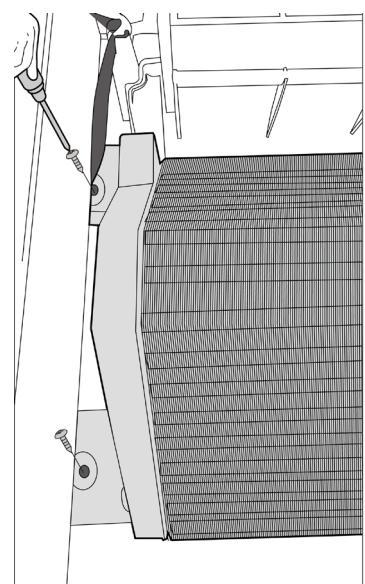
Note: Remove the panel&water collector (refer to 1.1&1.4) before disassembling water pump.

| Procedure | Illustration |
|--|--|
| <ol style="list-style-type: none">1) Remove 2 screws and take out water pump assembly.(see CJ_MCB_015)2) Loosen the spring. (see CJ_MCB_015)3) Pull out the drain pipe. (see CJ_MCB_015) |  <p data-bbox="927 1087 1097 1125">CJ_MCB_015</p> |

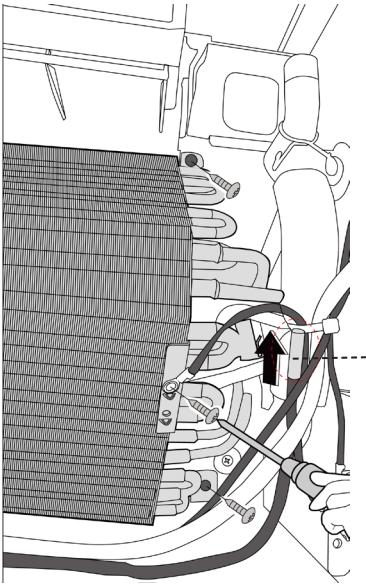
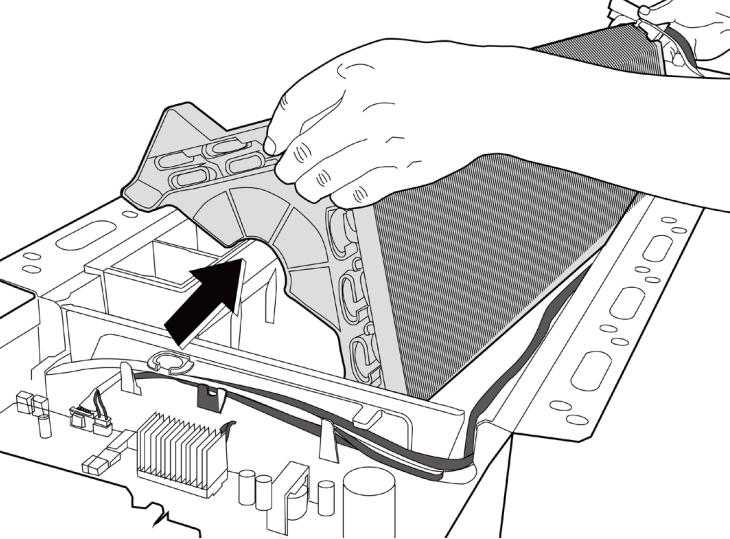
Note: This section is for reference only. Actual unit appearance may vary.

1.6 Evaporator

Note: Remove the panel, water collector& water pump(refer to 1.1,1.4&1.5) before disassembling evaporator.

| Procedure | Illustration |
|---|--|
| 1) Remove 2 screws of pipe clamp board. (see CJ_MCB_016) |  |
| 2) Remove 2 screws on the left of the evaporator fixing bracket. (see CJ_MCB_017) |  |

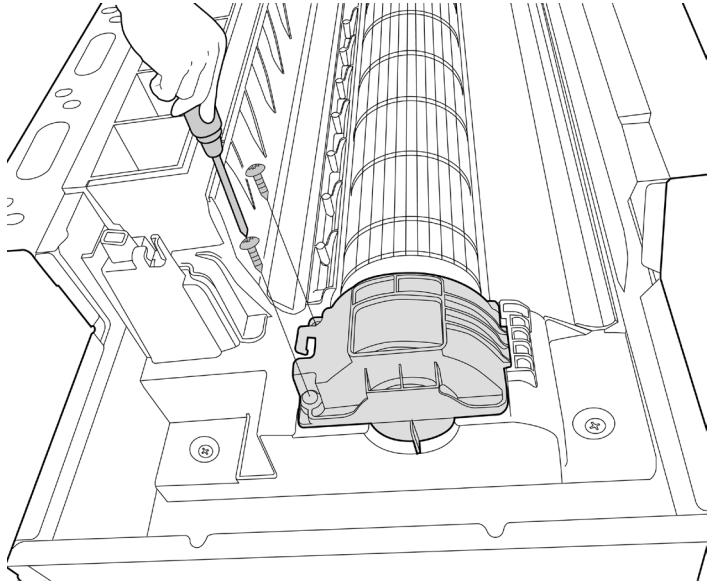
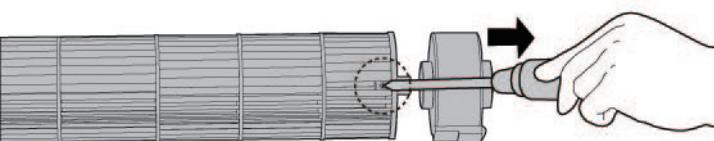
Note: This section is for reference only. Actual unit appearance may vary.

| Procedure | Illustration |
|---|---|
| <p>3) Remove 2 screws on the right of the evaporator.</p> <p>4) Cut the ribbon by a shear, then pull out the coil temperature sensor (T2) and remove 1 earthing screw. (see CJ_MCB_018)</p> |  <p style="text-align: center;">CJ_MCB_018</p> |
| <p>5) Remove the evaporator. (see CJ_MCB_019)</p> |  <p style="text-align: center;">CJ_MCB_019</p> |

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

1.7 Fan Motor and Fan

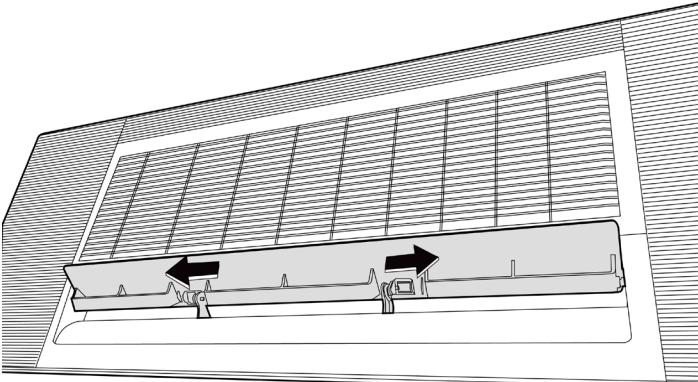
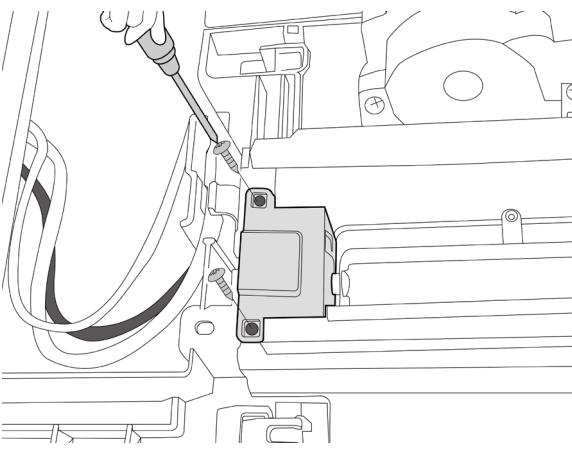
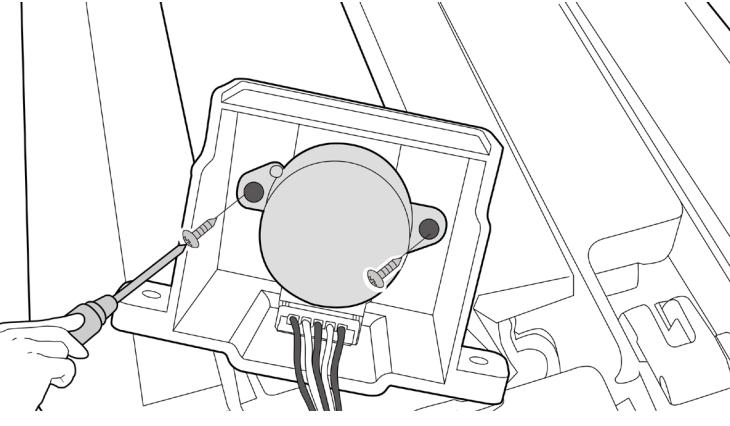
Note: Remove the panel, Electrical Parts, water collector, water pump, evaporator(refer to 1.1,1.3, 1.4,1.5&1.6) before disassembling fan motor.

| Procedure | Illustration |
|---|---|
| 1) Remove 2 screws of fan motor base. (see CJ_MCB_020) |  CJ_MCB_020 |
| 2) Pull out the fan motor and fan assembly. 3) Remove the fixing screw and remove the the fan motor.(see CJ_MCB_021) |  CJ_MCB_021 |

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

1.8 Stepper Motor

Note: Remove the panel(refer to 1.1) before disassembling stepper motor.

| Procedure | Illustration |
|---|---|
| 1) Open the louver and push the hooks in the direction shown in the right picture. (see CJ_MCB_022) |  CJ_MCB_022 |
| 2) Remove two screws fixing motor cover, and take out it.(see CJ_MCB_023) |  CJ_MCB_023 |
| 3) Remove two screws and remove stepper motor.(see CJ_MCB_024) |  CJ_MCB_024 |

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

Outdoor Unit Disassembly

Contents

| | | |
|-----|---------------------------------------|----|
| 1. | Outdoor Unit Table | 2 |
| 2. | Outdoor Unit Disassembly | 3 |
| 2.1 | Panel Plate..... | 3 |
| 2.2 | Electrical Parts | 16 |
| 2.3 | Fan Assembly | 41 |
| 2.4 | Fan Motor | 42 |
| 2.5 | Sound Blanket..... | 43 |
| 2.6 | Four-way Valve | 44 |
| 2.7 | Compressor..... | 45 |

1. Outdoor Unit Disassembly

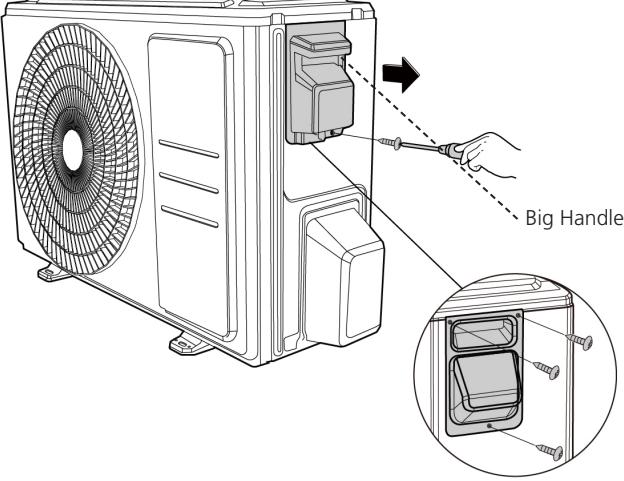
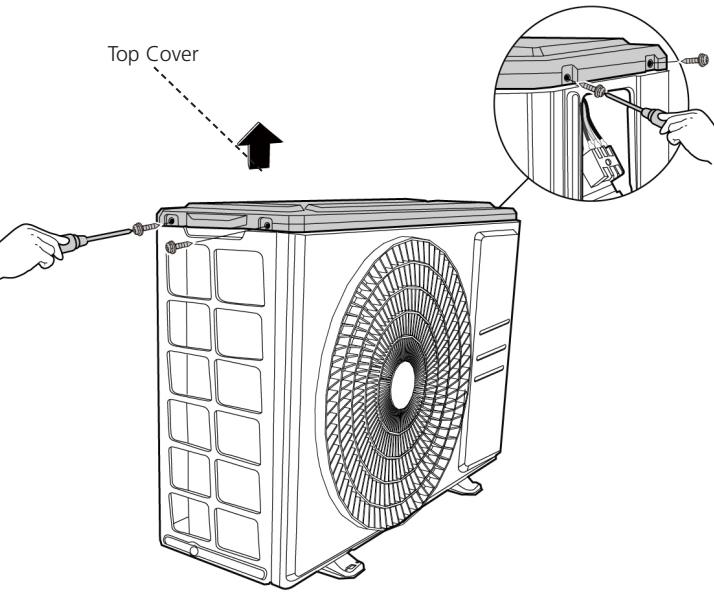
1.1 Outdoor Unit Table

| Outdoor Unit Model | Panel Plate | PCB Board |
|--------------------|-------------|--------------|
| ACIQ-09ZPL-HP230B | X330 | PCB Board 11 |
| ACIQ-12ZPL-HP230B | X330 | PCB Board 11 |
| ACIQ-18ZPL-HP230B | X430 | PCB Board 3 |

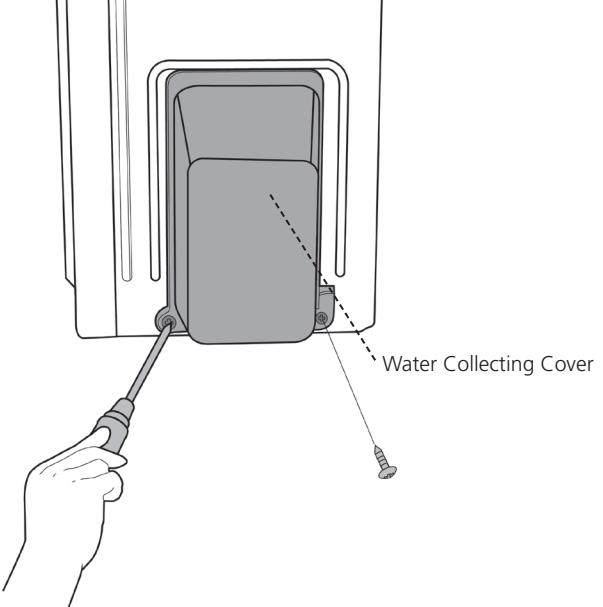
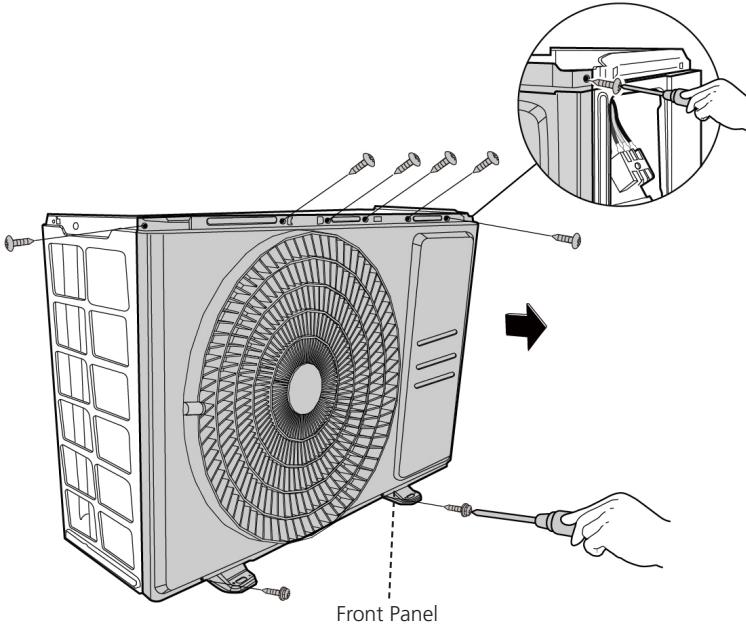
2. Outdoor Unit Disassembly

2.1 Panel Plate

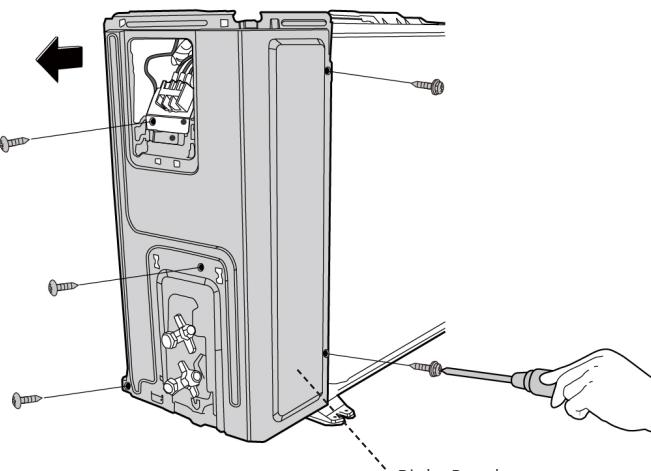
1. X330

| Procedure | Illustration |
|---|---|
| <ol style="list-style-type: none">1) Turn off the air conditioner and the power breaker.2) Remove the screw of the big handle and then remove the big handle (1 screws) (see CJ_X230_001).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 CJ_X230_002). |  <p data-bbox="928 1066 1103 1100">CJ_X230_001</p>  <p data-bbox="928 1774 1103 1808">CJ_X230_002</p> |

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

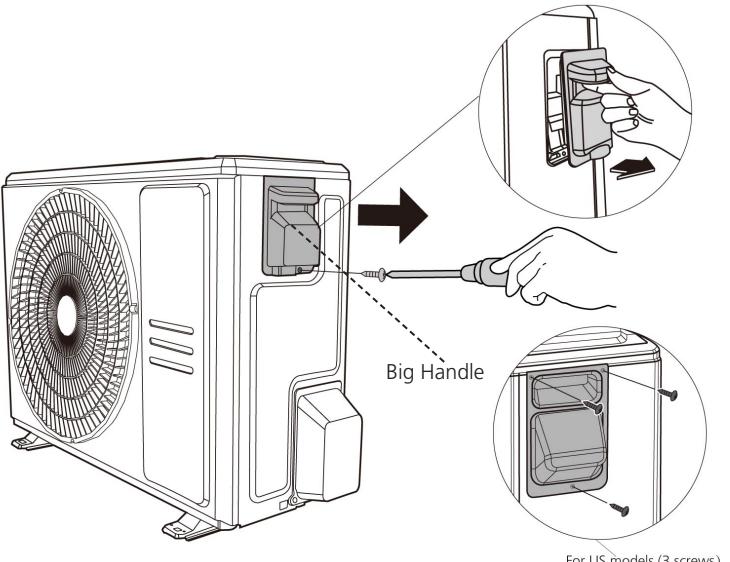
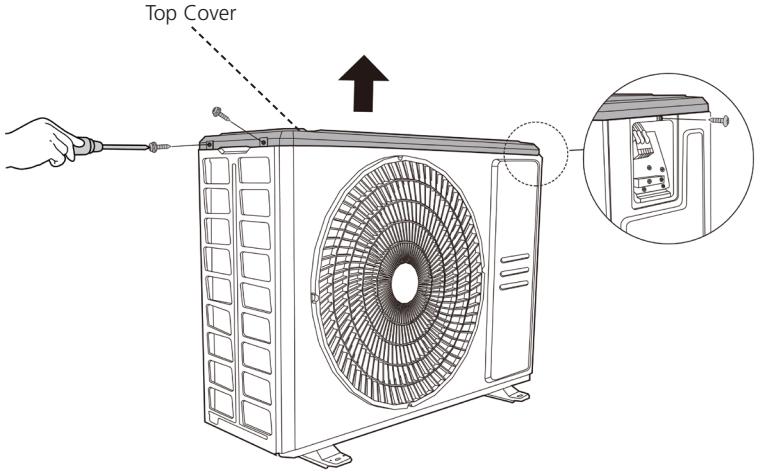
| Procedure | Illustration |
|--|--|
| <p>4) Remove the screws of water collecting cover and then remove the water collecting cover (2 screws) (see CJ_X230_003).</p> |  <p data-bbox="922 1019 1102 1051">CJ_X230_003</p> |
| <p>5) Remove the screws of the front panel and then remove the front panel (7 screws(onoff models) or 9 screws(inverter models) (see CJ_X230_004).</p> |  <p data-bbox="922 1866 1102 1897">CJ_X230_004</p> |

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

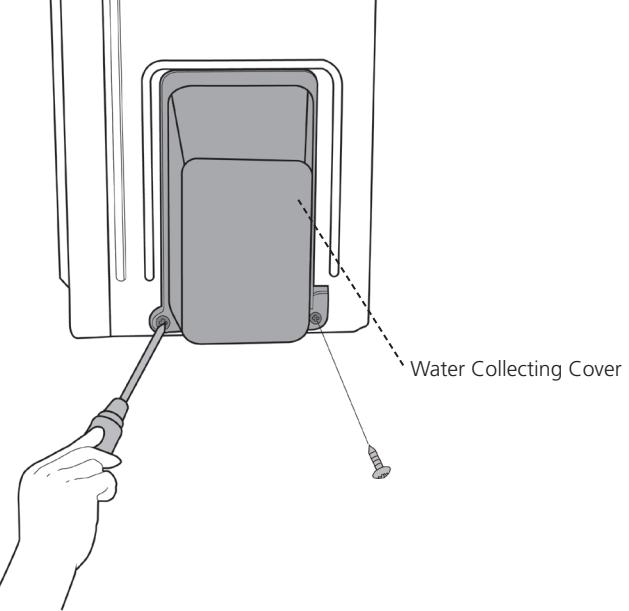
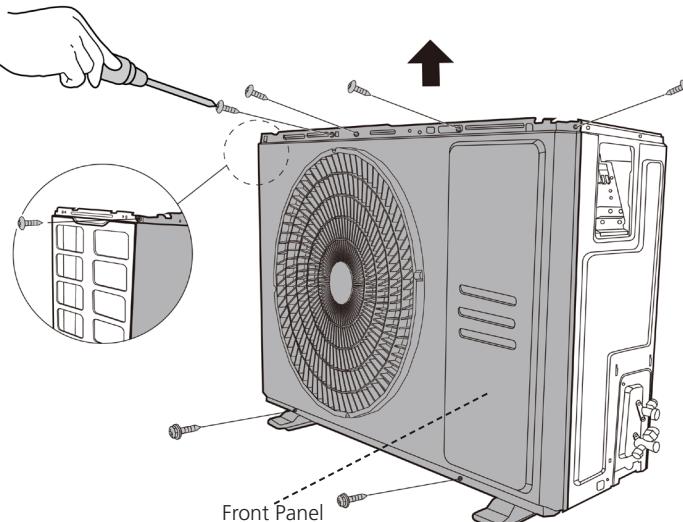
| Procedure | Illustration |
|---|---|
| 6) Remove the screws of the right panel and then remove the right panel (5 screws) (see CJ_X230_005). |  <p data-bbox="921 920 1095 954">CJ_X230_005</p> |

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

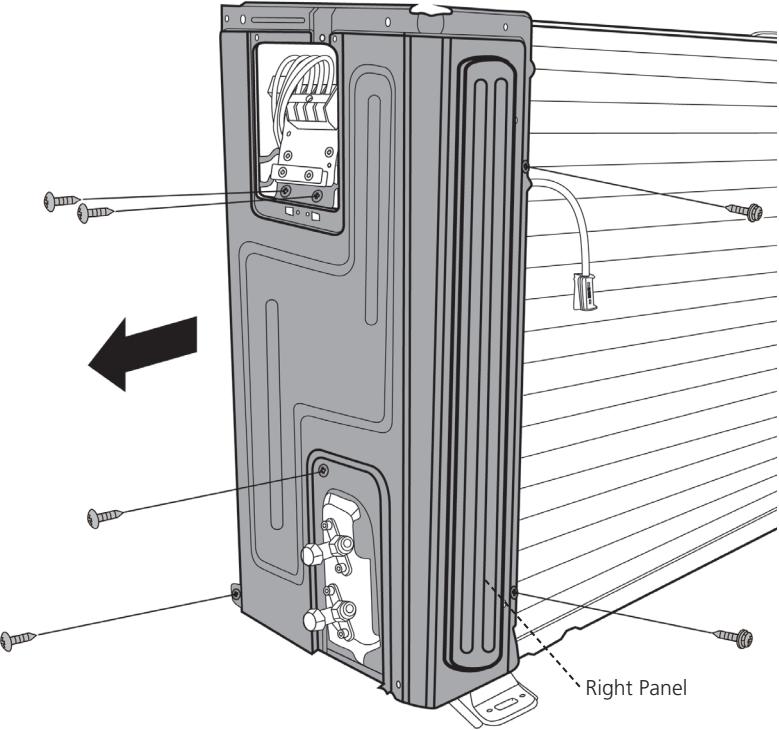
2.X430

| Procedure | Illustration |
|--|--|
| <ol style="list-style-type: none">1) Turn off the air conditioner and the power breaker.2) Remove the screw of the big handle and then remove the big handle (1 screw) (see CJ_X430_001). |  |
| <ol style="list-style-type: none">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 CJ_X430_002). |  |

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

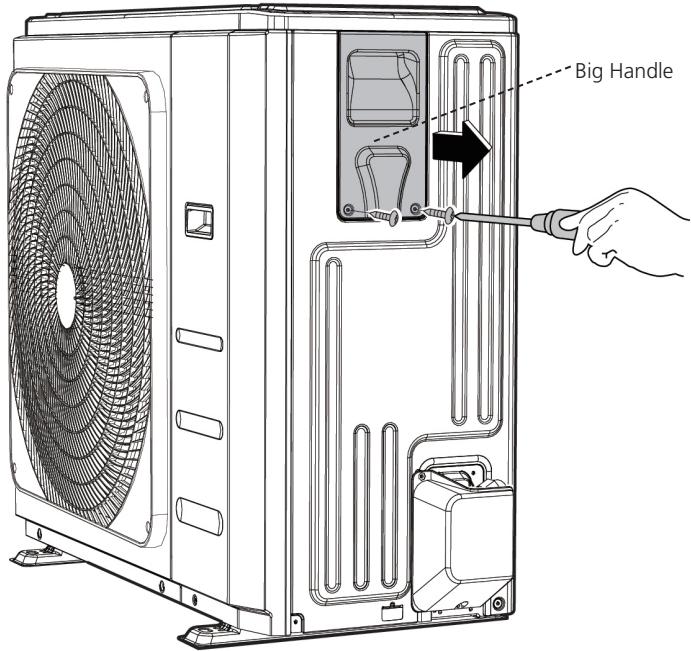
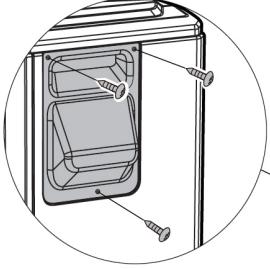
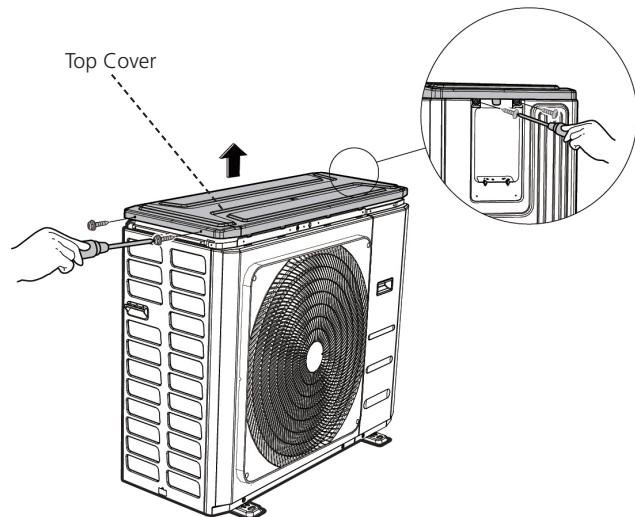
| Procedure | Illustration |
|--|--|
| <p>4) Remove the screws of water collecting cover and then remove the water collecting cover (2 screws) (see CJ_X430_003).</p> |  <p data-bbox="933 1021 1108 1055">CJ_X430_003</p> |
| <p>5) Remove the screws of the front panel and then remove the front panel (7 screws(onoff models) or 9 screws(inverter models) (see CJ_X430_004).</p> |  <p data-bbox="933 1695 1108 1729">CJ_X430_004</p> |

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

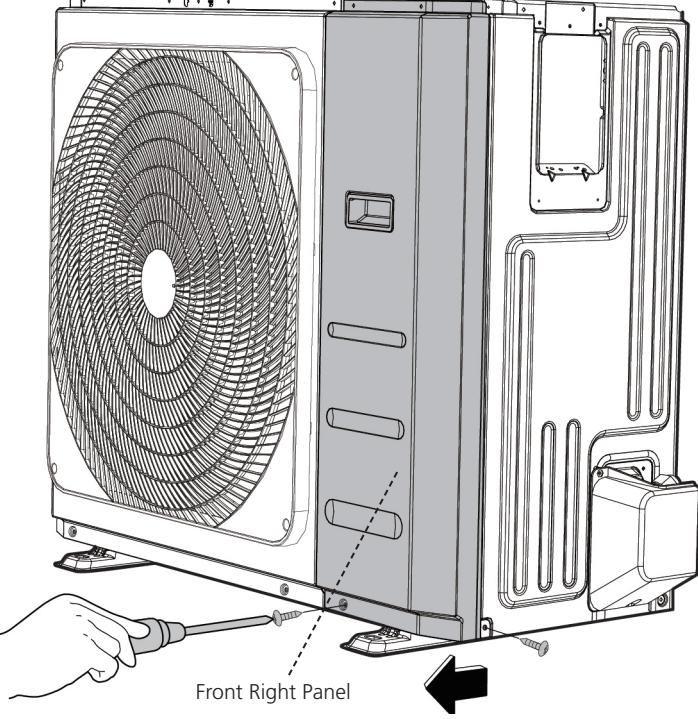
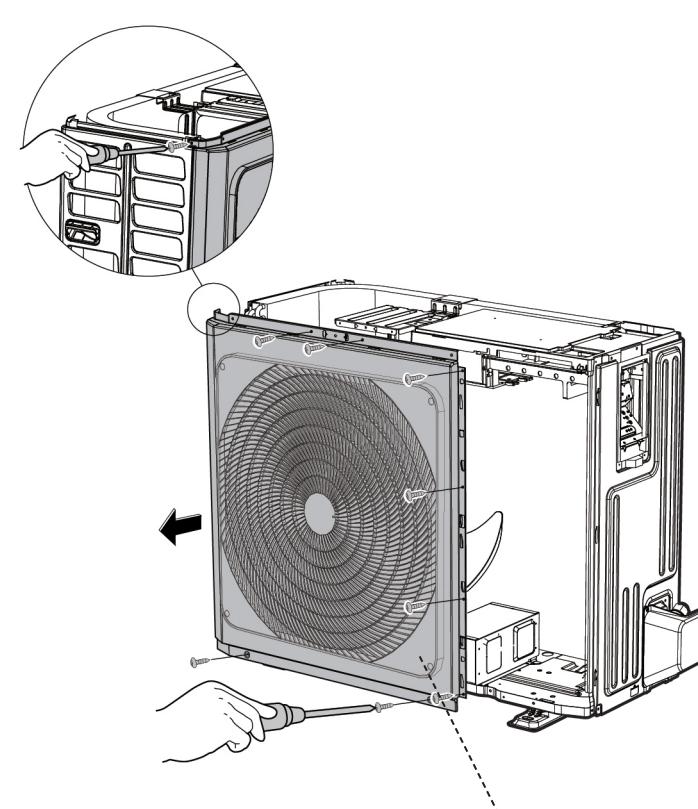
| Procedure | Illustration |
|---|---|
| 6) Remove the screws of the right panel and then remove the right panel (6 screws) (see CJ_X430_005). |  <p data-bbox="925 1163 1102 1197">CJ_X430_005</p> |

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

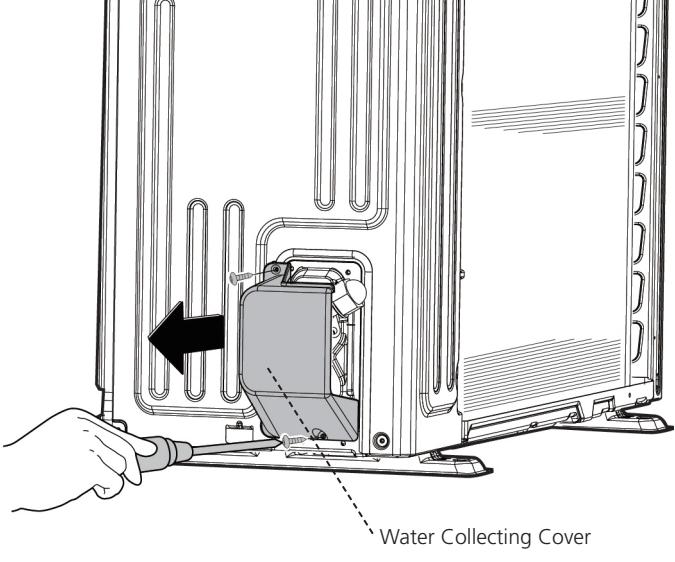
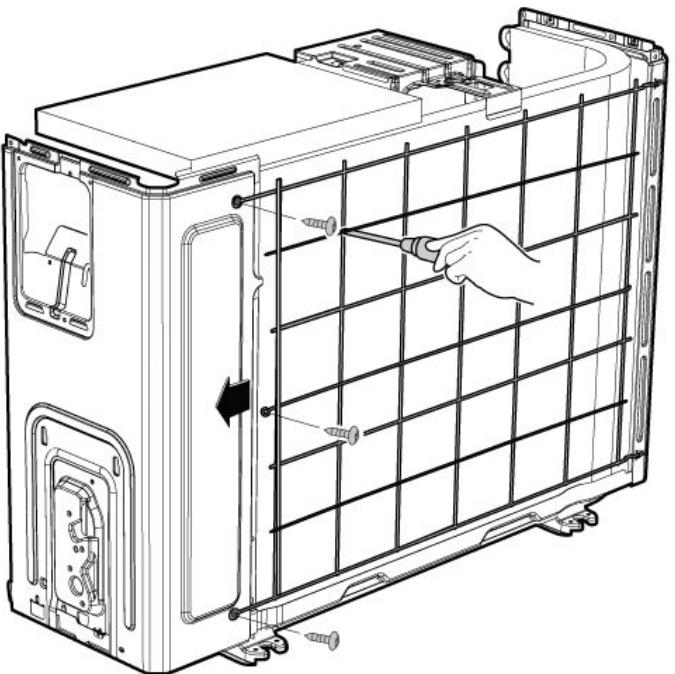
3. D30

| Procedure | Illustration |
|--|--|
| <ol style="list-style-type: none"> 1) Turn off the air conditioner and the power breaker. 2) Remove the screws of the big handle and then remove the big handle (2 screws) (see CJ_D30_001). |   |
| <ol style="list-style-type: none"> 3) Remove the screws of the top cover and then remove the top cover (4 screws). Two of the screws is located underneath the big handle (see CJ_D30_002). |  CJ_D30_002 |

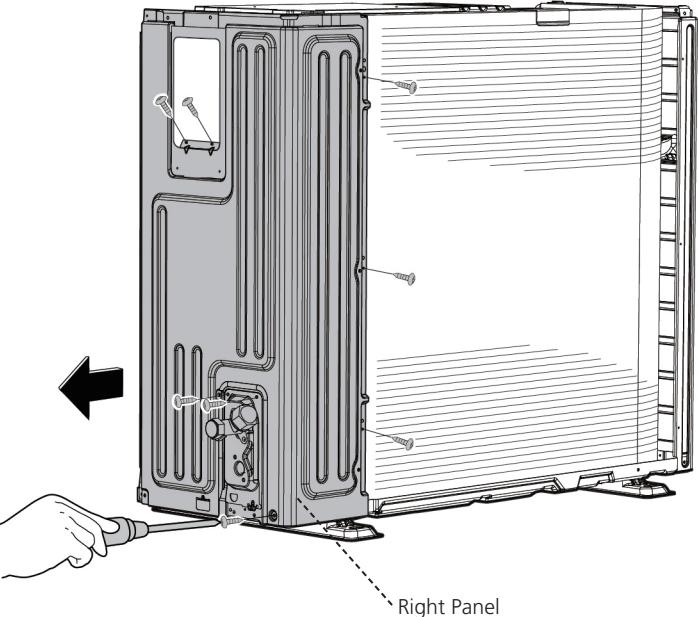
Note: This section is for reference only. Actual unit appearance may vary.

| Procedure | Illustration |
|---|---|
| <p>4) Remove the screws of the front right panel and then remove the front right panel (2 screws) (see CJ_D30_003).</p> <p>5) Remove the screws of the front panel and then remove the front panel (9 screws) (see CJ_D30_004).</p> |  <p>CJ_D30_003</p>  <p>CJ_D30_004</p> |

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

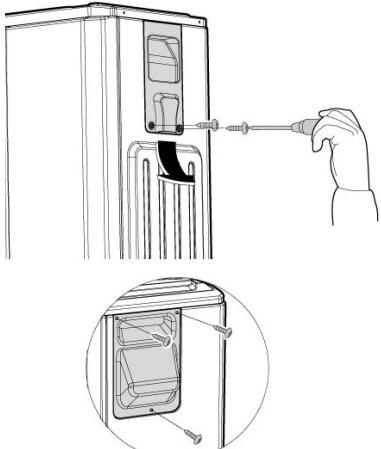
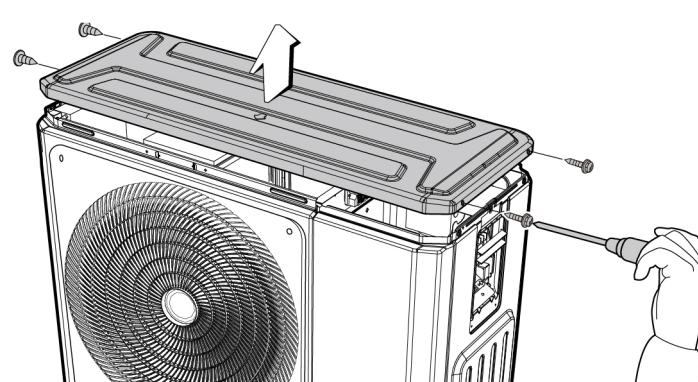
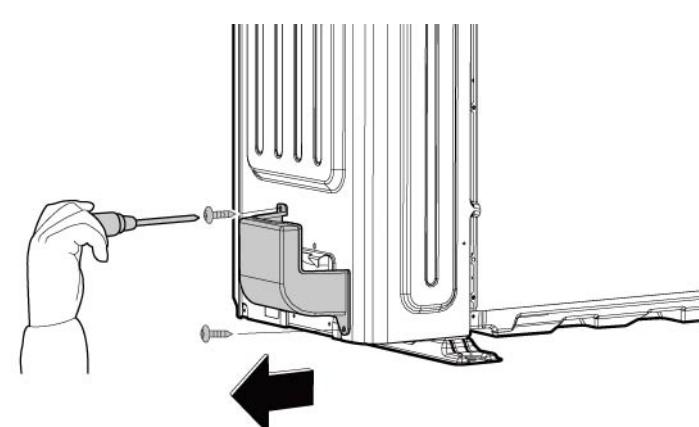
| Procedure | Illustration |
|---|---|
| <p>6) Remove the screws of water collecting cover and then remove the water collecting cover (2 screws) (see CJ_D30_005).</p> |  <p>CJ_D30_005</p> |
| <p>7) Remove the screws of the rear net and then remove the rear net (2 screws) (see CJ_D30_006). (for some models)</p> |  <p>CJ_D30_006</p> |

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

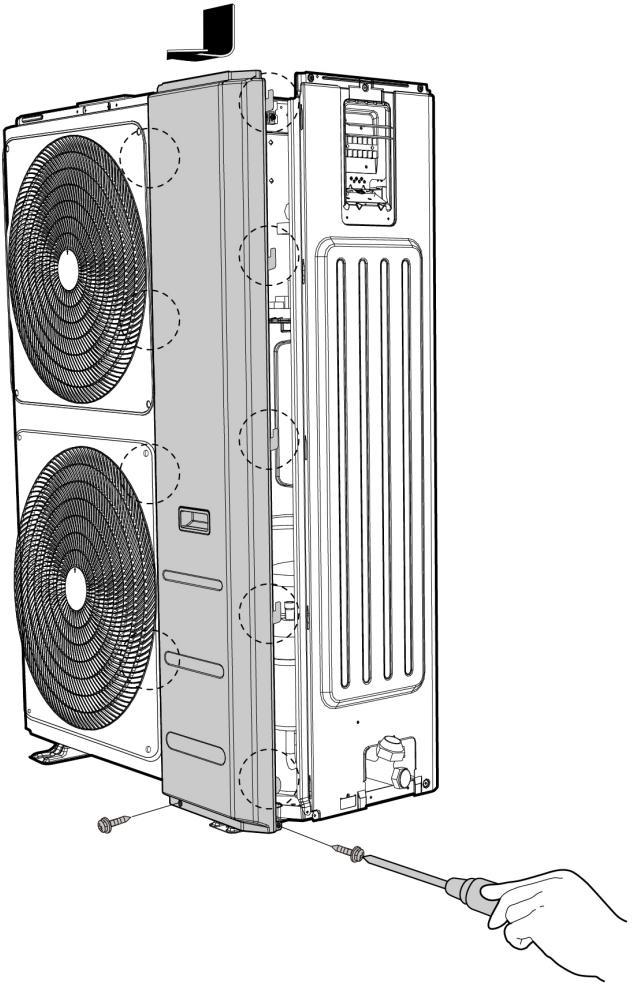
| Procedure | Illustration |
|--|--|
| 8) Remove the screws of the right panel and then remove the right panel (8 screws) (see CJ_D30_007). |  <p data-bbox="928 1089 1087 1123">CJ_D30_007</p> |

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

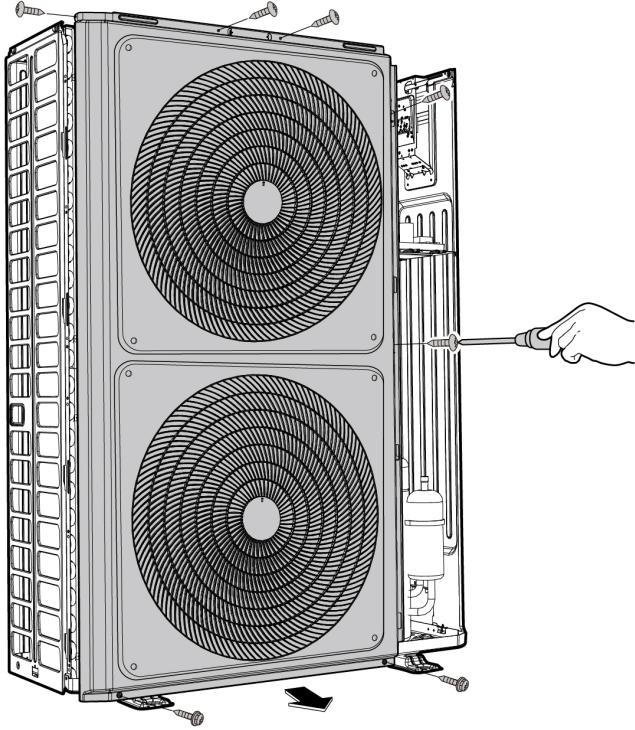
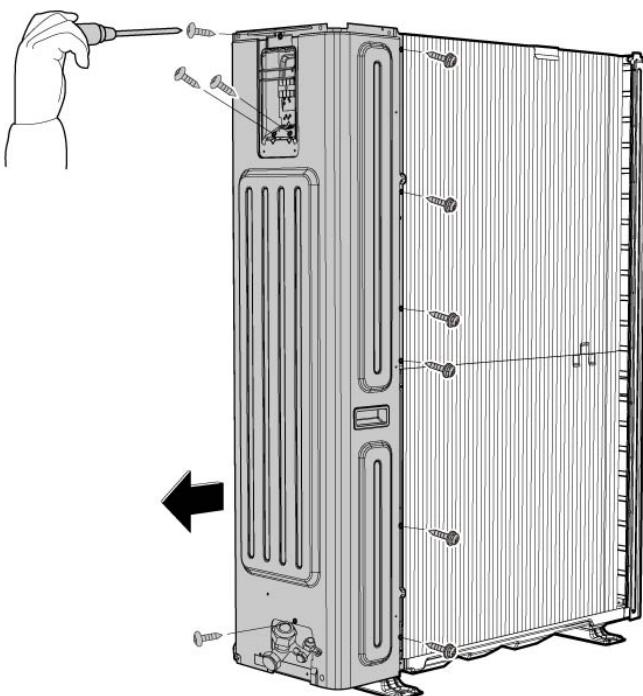
4. E30/590

| Procedure | Illustration |
|--|---|
| <ol style="list-style-type: none"> 1) Turn off the air conditioner and the power breaker. 2) Remove the screws of the big handle and then remove the big handle (2 screws) (see CJ_E30_001). |  <p style="text-align: center;">CJ_E30_001</p> |
| <ol style="list-style-type: none"> 3) Remove the screws of the top cover and then remove the top cover (4 screws). Two of the screws is located underneath the big handle (see CJ_E30_002). |  <p style="text-align: center;">CJ_E30_002</p> |
| <ol style="list-style-type: none"> 4) Remove the screws of water collecting cover and then remove the water collecting cover (2 screw) (see CJ_E30_003). |  <p style="text-align: center;">CJ_E30_003</p> |

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

| Procedure | Illustration |
|--|--|
| 5) Remove the screws of the front right panel and then remove the front right panel (2 screws) (see CJ_E30_004). |  <p data-bbox="933 1356 1092 1388">CJ_E30_004</p> |

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

| Procedure | Illustration |
|--|---|
| <p>1) Remove the screws of the front panel and then remove the front panel (7 screws) (see CJ_E30_005).</p> |  <p style="text-align: center;">CJ_E30_005</p> |
| <p>2) Remove the screws of the right panel and then remove the right panel (10 screws) (see CJ_E30_006).</p> |  <p style="text-align: center;">CJ_E30_006</p> |

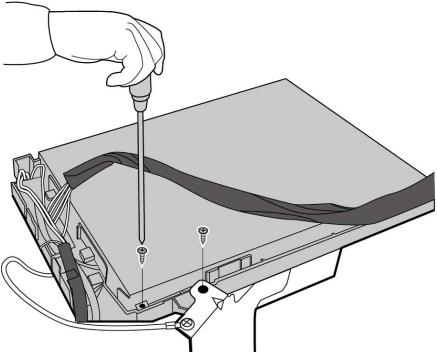
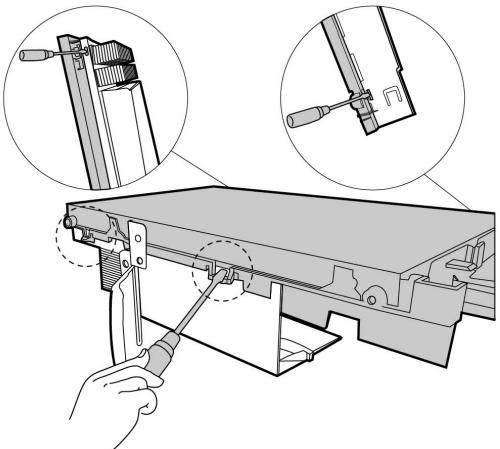
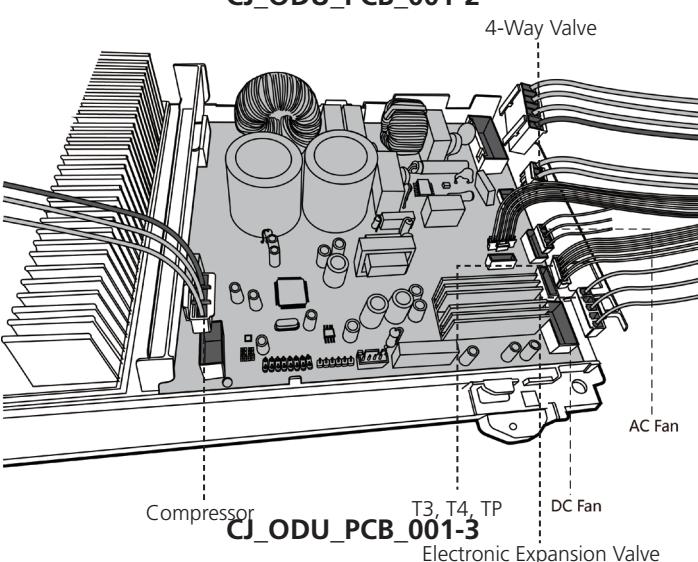
Note: This section is for reference only. Actual unit appearance may vary.

2.2 Electrical parts

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

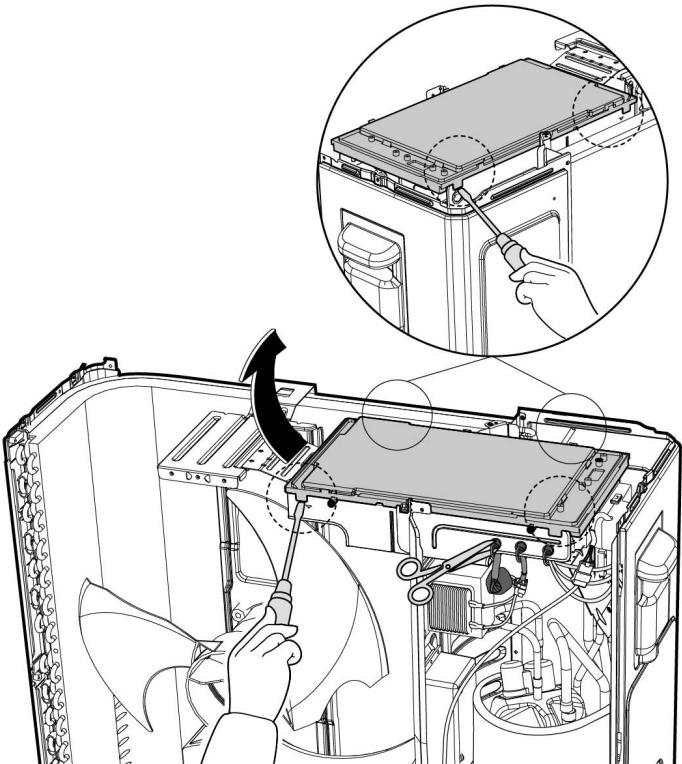
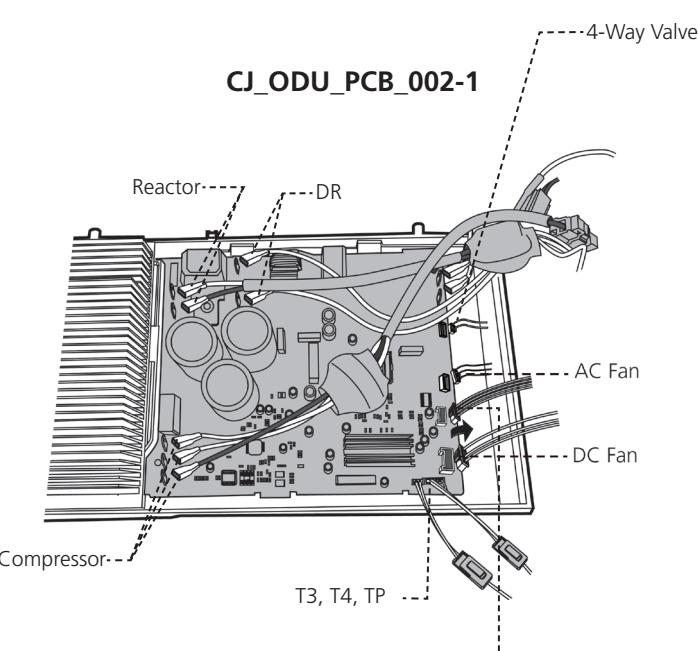
Note: Remove the air outlet grille(refer to 3.1 Panel Plate) before disassembling electrical parts.

1. PCB board 1

| Procedure | Illustration |
|---|--|
| <ol style="list-style-type: none"> 1) Remove the screws of the top cover. (2 screws) (see CJ_ODU_PCB_001-1). 2) Unfix the hooks and then open the electronic control box cover (4 hooks) (see CJ_ODU_PCB_001-2). 3) Disconnect the connector for fan motor from the electronic control board (see CJ_ODU_PCB_001-3). 4) Remove the connector for the compressor (see CJ_ODU_PCB_001-3). 5) Pull out the two blue wires connected with the four way valve (CJ_ODU_PCB_001-3). 6) Pull out connectors of the condenser coil temp. sensor(T3),outdoor ambient temp. sensor(T4) and discharge temp. sensor(TP) (CJ_ODU_PCB_001-3). 7) Disconnect the electronic expansion valve wire (CJ_ODU_PCB_001-3). 8) Then remove the electronic control board. |  <p>CJ_ODU_PCB_001-1</p>  <p>CJ_ODU_PCB_001-2</p>  <p>CJ_ODU_PCB_001-3</p> |

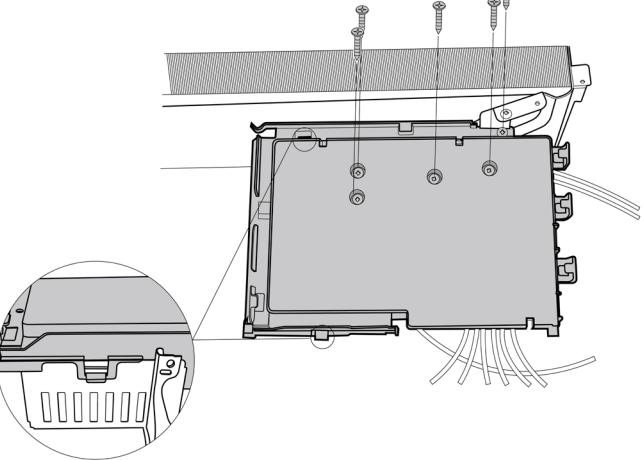
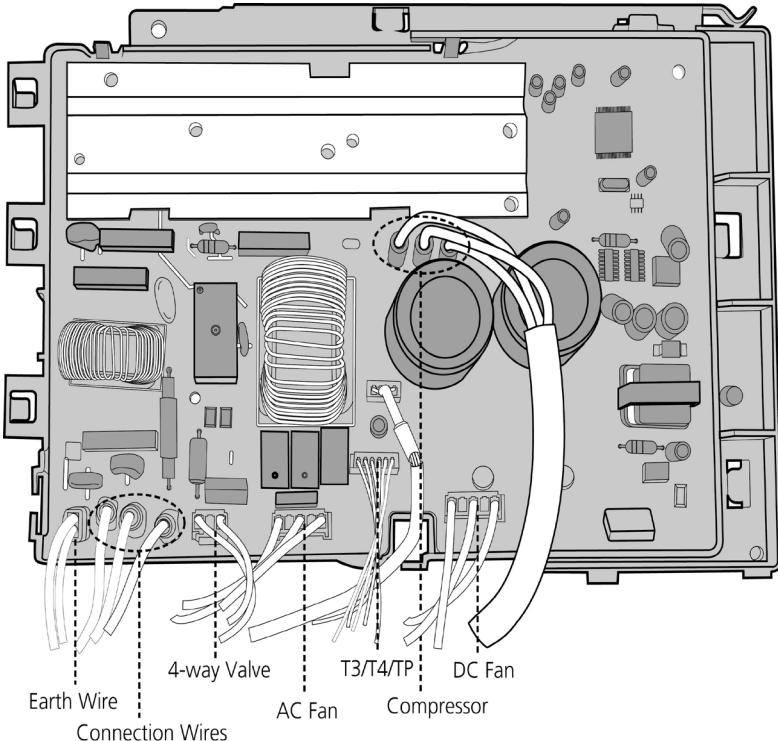
Note: This section is for reference only. Actual unit appearance may vary.

2. PCB board 2

| Procedure | Illustration |
|--|---|
| <ol style="list-style-type: none"> 1) Unfix the hooks and then open the electronic control box cover (4 hooks) (see CJ_ODU_PCB_002-1). 2) Disconnect the connector for fan motor from the electronic control board (see CJ_ODU_PCB_002-2). 3) Remove the connector for the compressor (see CJ_ODU_PCB_002-2). 4) Pull out the two blue wires connected with the four way valve (see CJ_ODU_PCB_002-2). 5) Pull out connectors of the condenser coil temp. sensor(T3),outdoor ambient temp. sensor(T4) and discharge temp. sensor(TP) (see CJ_ODU_PCB_002-2). 6) Disconnect the electronic expansion valve wire (see Fig CJ_ODU_PCB_002-2). 7) Then remove the electronic control board. |   <p>CJ_ODU_PCB_002-1</p> <p>4-Way Valve</p> <p>Reactor</p> <p>DR</p> <p>AC Fan</p> <p>DC Fan</p> <p>Compressor</p> <p>T3, T4, TP</p> <p>Electronic Expansion Valve</p> <p>CJ_ODU_PCB_002-2</p> |

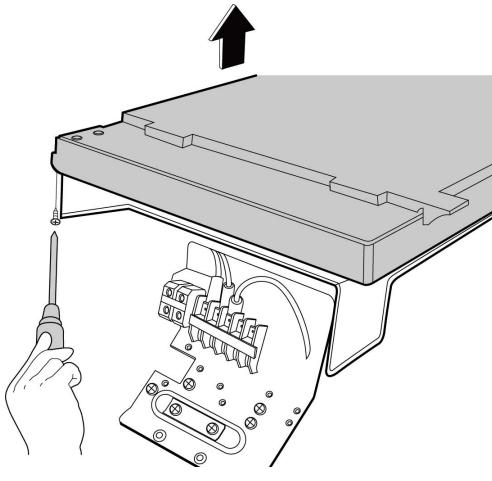
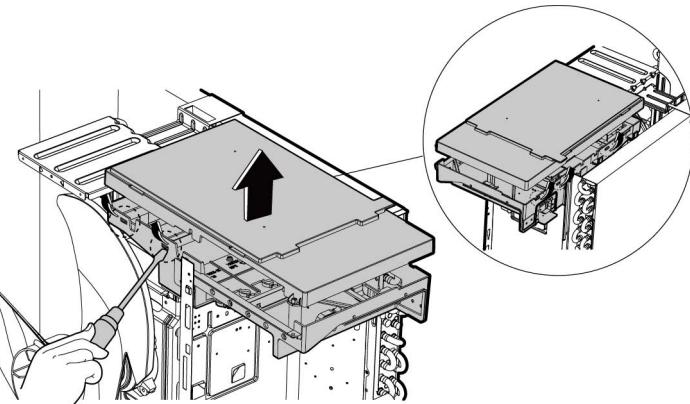
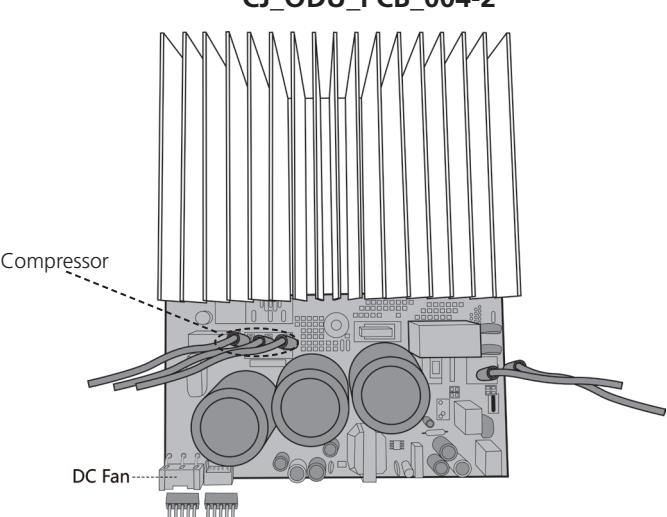
Note: This section is for reference only. Actual unit appearance may vary.

3. PCB board 3

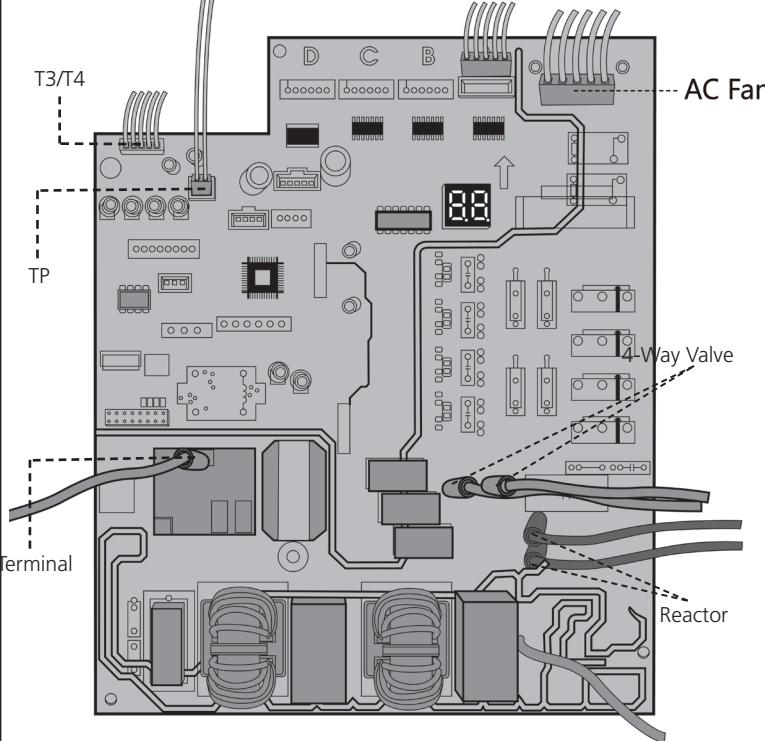
| Procedure | Illustration |
|--|---|
| <p>1) Remove the screws and unfix the hooks, then open the electronic control box cover (5 screws and 2 hooks)(see CJ_ODU_PCB_003-1).</p> <p>Note: Electric control box cover cannot be removed, so the voltage between P and N cannot be measured.</p> |  <p>CJ_ODU_PCB_003-1</p> |
| <p>2) Remove all of connectors (see Fig CJ_ODU_PCB_003-2).</p> <p>3) Then remove the electronic control box subassembly.</p> <p>Note: When replacing the electronic control box subassembly with a new one, pay attention to applying thermal paste on the heat sink.</p> |  <p>CJ_ODU_PCB_003-2</p> |

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

4. PCB board 4

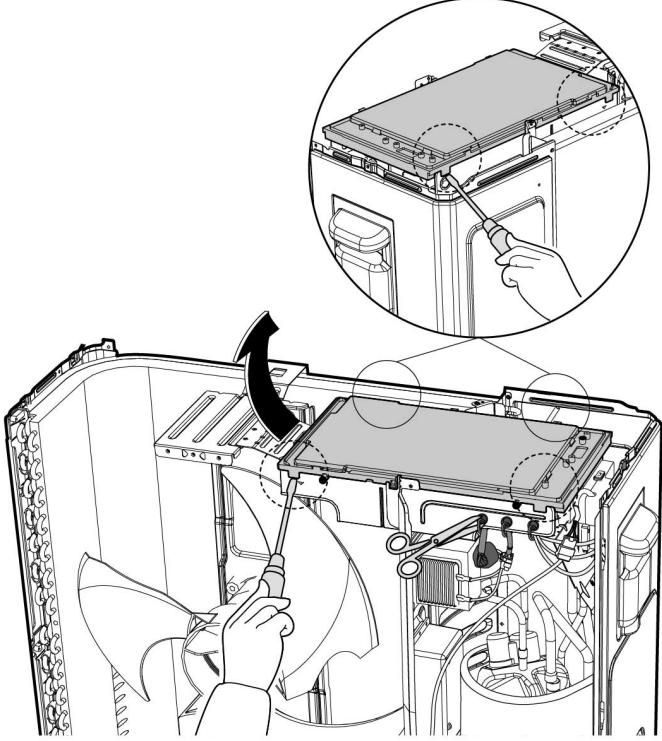
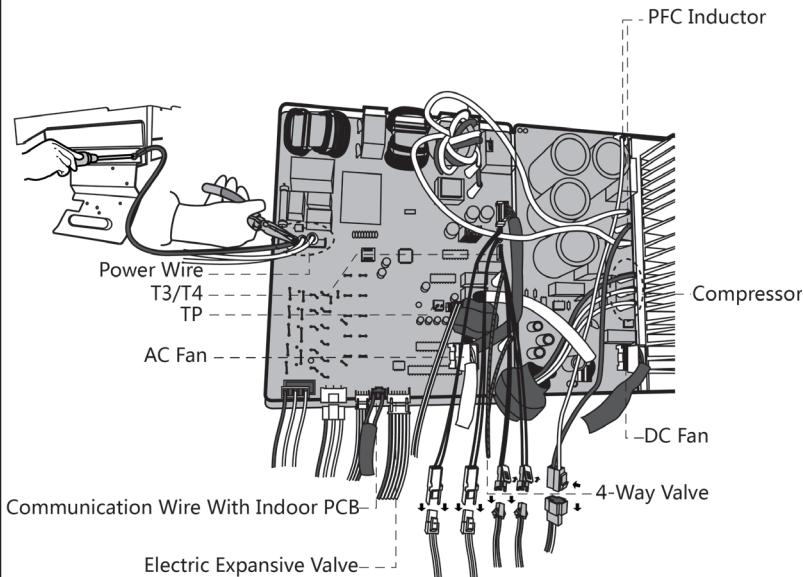
| Procedure | Illustration |
|--|---|
| 1) Remove the screws of the top cover. (1 screws) (see CJ_ODU_PCB_004-1). |  <p>CJ_ODU_PCB_004-1</p> |
| 2) Unfix the hooks and then open the electronic control box cover (5 hooks) (see CJ_ODU_PCB_004-2). |  <p>CJ_ODU_PCB_004-2</p> |
| 3) Disconnect the connector for fan motor from the IPM board (see CJ_ODU_PCB_004-3). 4) Remove the connector for the compressor (see CJ_ODU_PCB_004-3). |  <p>CJ_ODU_PCB_004-3</p> |

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

| Procedure | Illustration |
|---|---|
| <p>5) Pull out the wire connected with the terminal. (see CJ_ODU_PCB_004-4).</p> <p>6) Pull out connectors of the condenser coil temp. sensor(T3),outdoor ambient temp. sensor(T4) and discharge temp. sensor(TP) (see CJ_ODU_PCB_004-4).</p> <p>7) Disconnect the electronic expansion valve wire (see Fig CJ_ODU_PCB_004-4).</p> <p>8) Remove the connector for 4-way valve. (see Fig CJ_ODU_PCB_004-4).</p> <p>9) Remove the connector for the reactor (see Fig CJ_ODU_PCB_004-4).</p> <p>10) Then remove the electronic control box (see Fig CJ_ODU_PCB_004-4).</p> |  <p>The diagram shows a complex circuit board (CJ_ODU_PCB_004-4) with various electronic components. Labels indicate specific points of interest: 'T3/T4' and 'TP' are labeled near the top left, with dashed lines pointing to the respective connection points. 'Terminal' is labeled on the left side, pointing to a row of pins. 'AC Fan' is labeled on the right side, pointing to a component with a fan-like appearance. '4-Way Valve' and 'Reactor' are also labeled on the right side, pointing to other specific components on the board.</p> <p>CJ_ODU_PCB_004-4</p> |

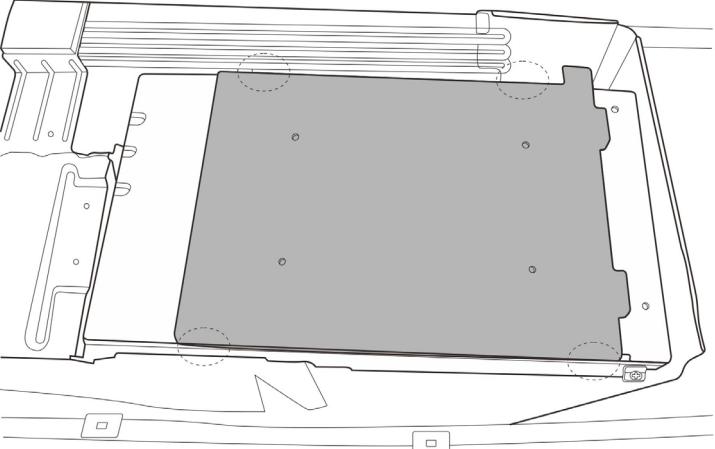
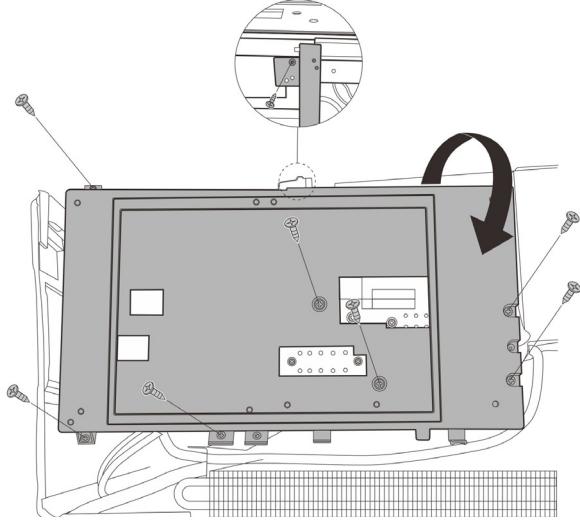
Note: This section is for reference only. Actual unit appearance may vary.

5. PCB board 5

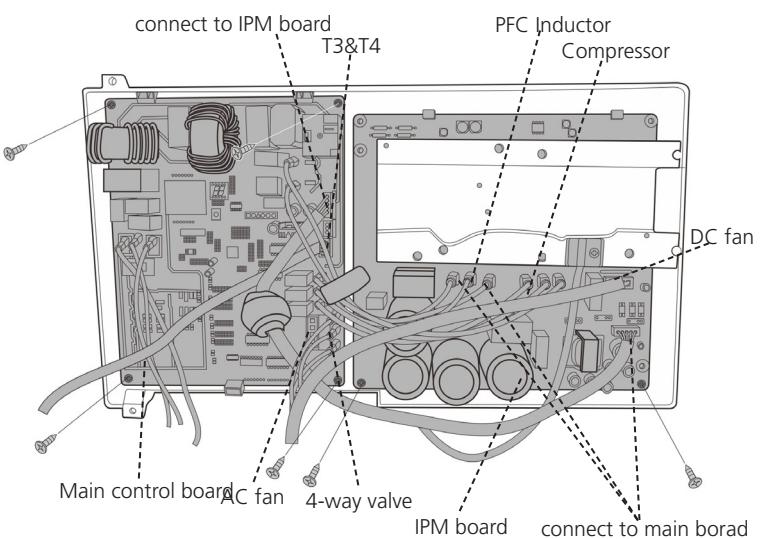
| Procedure | Illustration |
|---|--|
| <ol style="list-style-type: none"> 1) Unfix the hooks and then open the electronic control box cover (4 hooks) (see CJ_ODU_PCB_005-1). 2) Disconnect the connector for outdoor DC fan from the electronic control board (see CJ_ODU_PCB_005-2). 3) Remove the connector for the compressor (see CJ_ODU_PCB_005-2). 4) Pull out the two blue wires connected with the four way valve (see CJ_ODU_PCB_005-2). 5) Pull out connectors of the condenser coil temp. sensor(T3),outdoor ambient temp. sensor(T4) and discharge temp. sensor(TP) (see CJ_ODU_PCB_005-2). 6) Disconnect the electronic expansion valve wire (see Fig CJ_ODU_PCB_005-2). 7) Disconnect the communication wire indoor PCB (see Fig CJ_ODU_PCB_005-2). 8) Disconnect the PFC inductor (see Fig CJ_ODU_PCB_005-2). 9) Then remove the electronic control box (see CJ_ODU_PCB_005-2). |  <p style="text-align: center;">CJ_ODU_PCB_005-1</p>  <p style="text-align: center;">CJ_ODU_PCB_005-2</p> |

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

6. PCB board 6

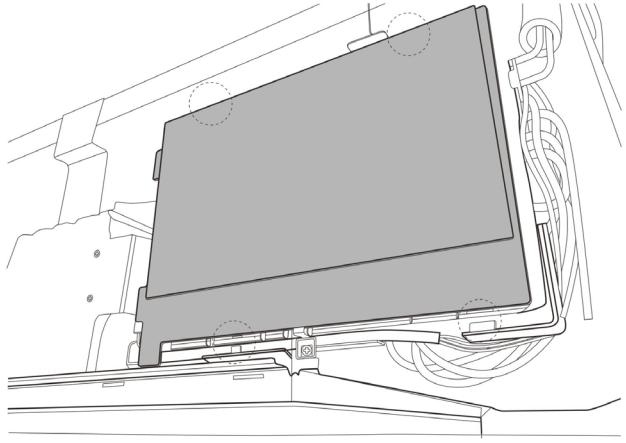
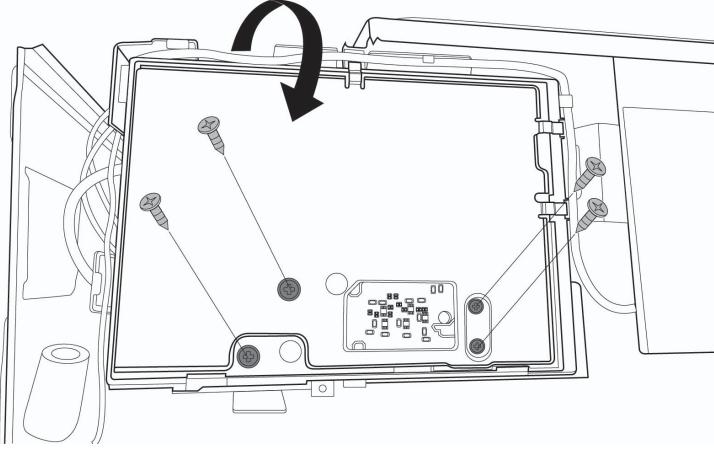
| Procedure | Illustration |
|--|---|
| 1) Unfix the hooks and then open the electronic control box cover (4 hooks) (see CJ_ODU_PCB_006-1). |  CJ_ODU_PCB_006-1 |
| 2) Remove 8 screws on the electronic control board and then turn over the electronic control board (see CJ_ODU_PCB_006-2). Note: Electric control box cover cannot be removed, so the voltage between P and N cannot be measured. |  CJ_ODU_PCB_006-2 |

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

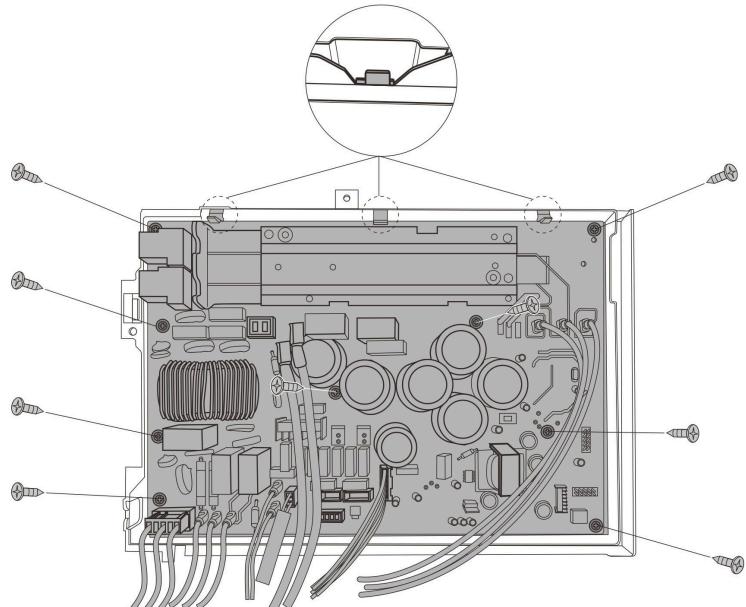
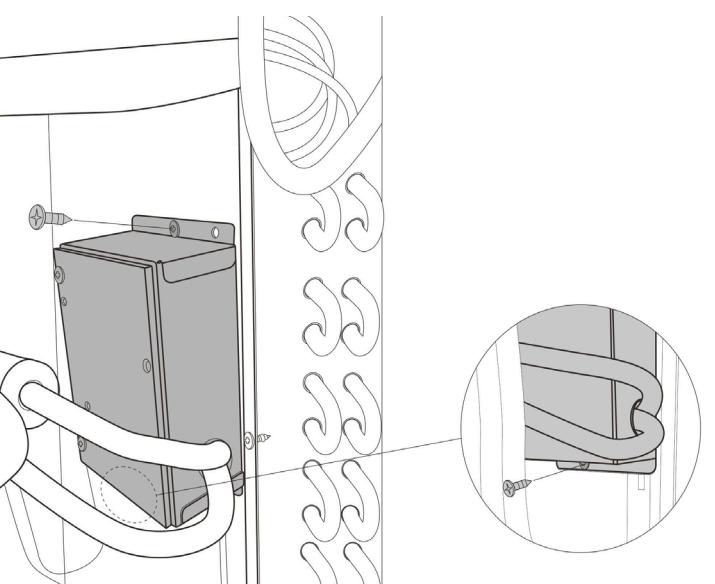
| Procedure | Illustration |
|--|---|
| <p>3) Pull out the two blue wires connected with the four way valve. (see CJ_ODU_PCB_006-3)(for heat pump models)</p> <p>4) Pull out connectors of the condenser coil temp. sensor(T3),outdoor ambient temp. sensor(T4) and discharge temp. sensor(TP). (see CJ_ODU_PCB_006-3)</p> <p>5) Disconnect the electronic expansion valve wire. (see Fig CJ_ODU_PCB_006-3)(for some models)</p> <p>6) Remove four screws and unfix the 3 hooks and then remove the main control board. (see CJ_ODU_PCB_006-3)</p> <p>7) Disconnect the connector for outdoor DC fan from the IPM board. (see CJ_ODU_PCB_006-3)(for some models)</p> <p>8) Remove the connector for the compressor. (see CJ_ODU_PCB_006-3)</p> <p>9) Remove the connector for the PFC Inductor. (see CJ_ODU_PCB_006-3)</p> <p>10) Pull out 3 connectors between IPM board and main control board.(see CJ_ODU_PCB_006-3)</p> <p>11) Remove two screws and unfix the 4 hooks and then remove the IPM board. (see CJ_ODU_PCB_006-3)</p> <p>Note: When replacing the IPM board with a new one, pay attention to applying thermal paste on the heat sink.</p> |  <p>CJ_ODU_PCB_006-3</p> |

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

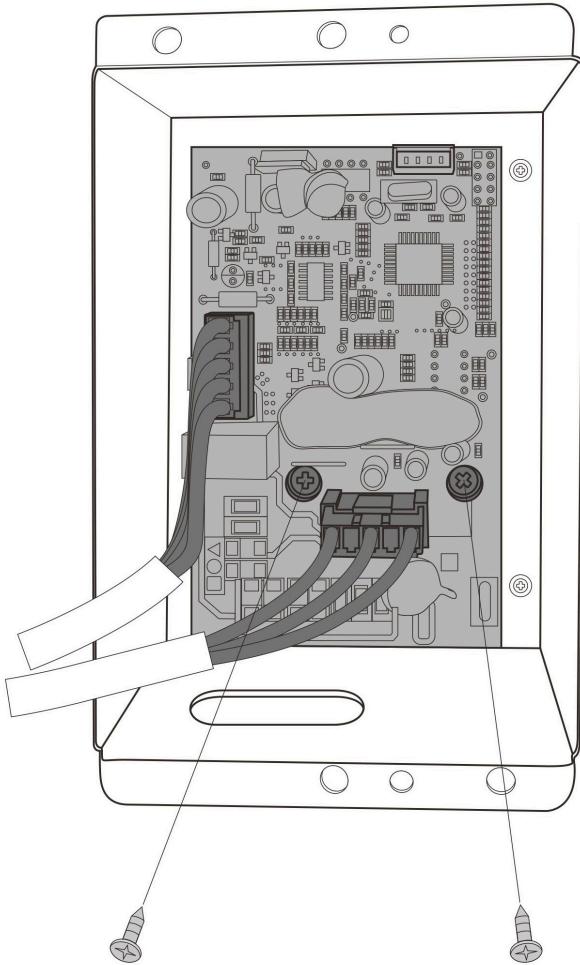
7. PCB board 7

| Procedure | Illustration |
|--|---|
| 1) Unfix the hooks and then open the electronic control box cover (4 hooks) (see CJ_ODU_PCB_007-1). |  CJ_ODU_PCB_007-1 |
| 2) Remove 4 screws on the electronic control board and then remove the electronic control box subassembly. (see CJ_ODU_PCB_007-2). Note: Electronic installing box cannot be opened, so the voltage between P and N cannot be measured. |  CJ_ODU_PCB_007-2 |

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

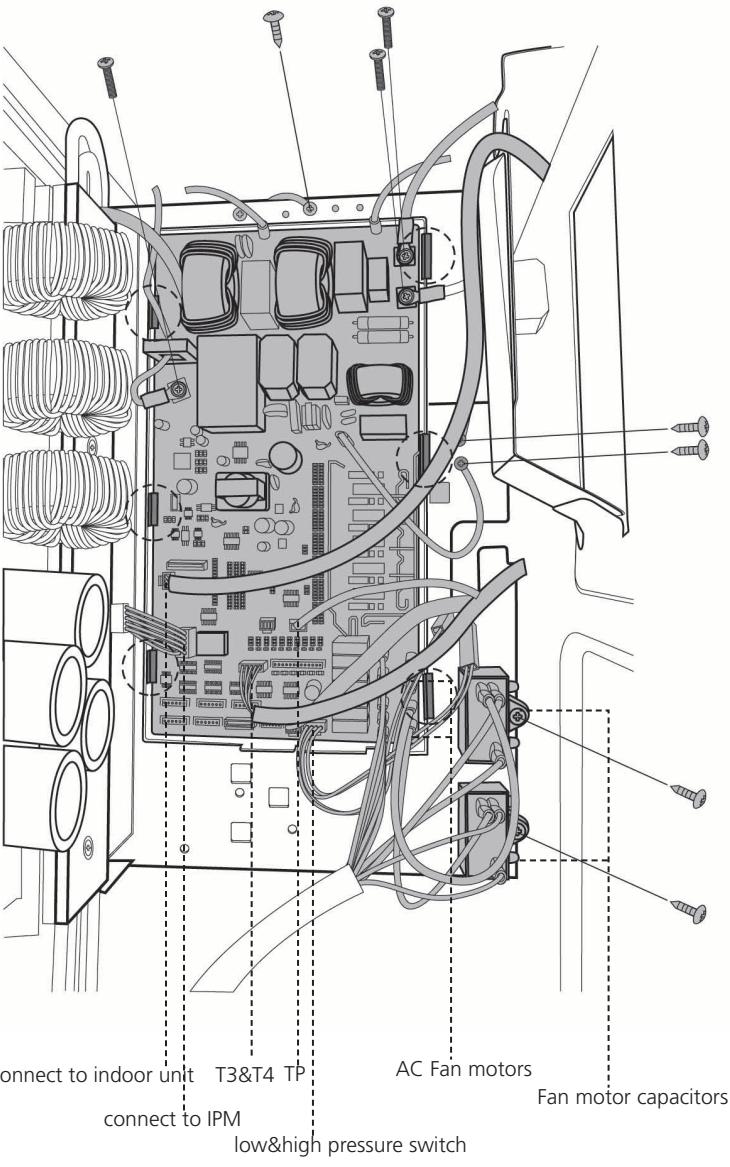
| Procedure | Illustration |
|---|--|
| <p>3) Pull out the connectors (see CJ_ODU_PCB_007-3).</p> <p>4) Remove the 9 screws and unfix the 3 hooks and then remove the electronic control board(see CJ_ODU_PCB_007-3).</p> |  |
| <p>5) Remove two screws and then remove the electronic control box subassembly on partition board assembly. (see CJ_ODU_PCB_007-4).</p> |  <p style="text-align: center;">CJ_ODU_PCB_007-3</p> <p style="text-align: center;">CJ_ODU_PCB_007-4</p> |

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

| Procedure | Illustration |
|--|--|
| 6) Remove two screws and two connectors and then remove the inverter control board (see CJ_ODU_PCB_007-5). |  <p data-bbox="865 1381 1135 1414">CJ_ODU_PCB_007-5</p> |

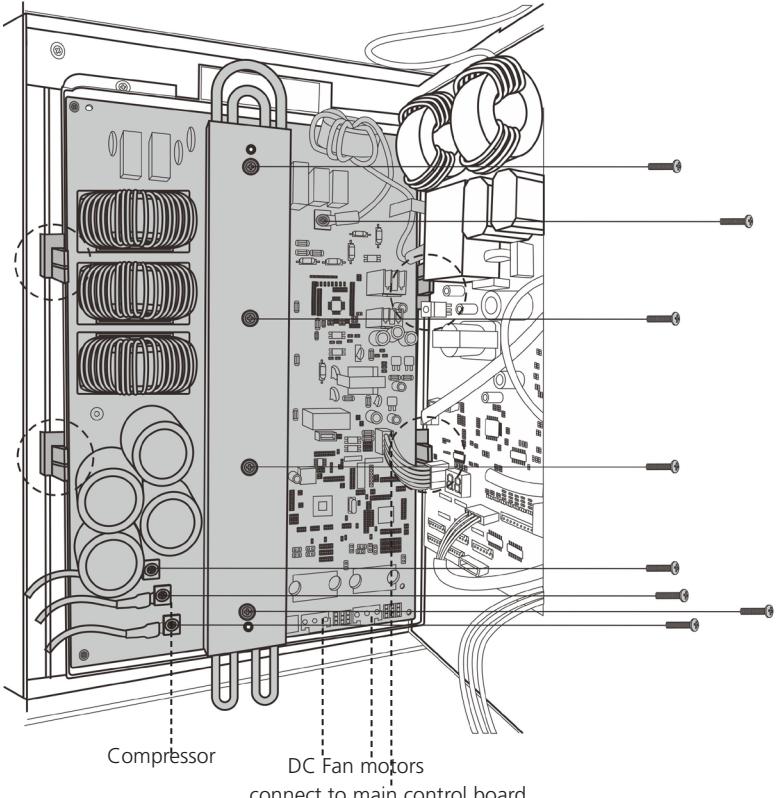
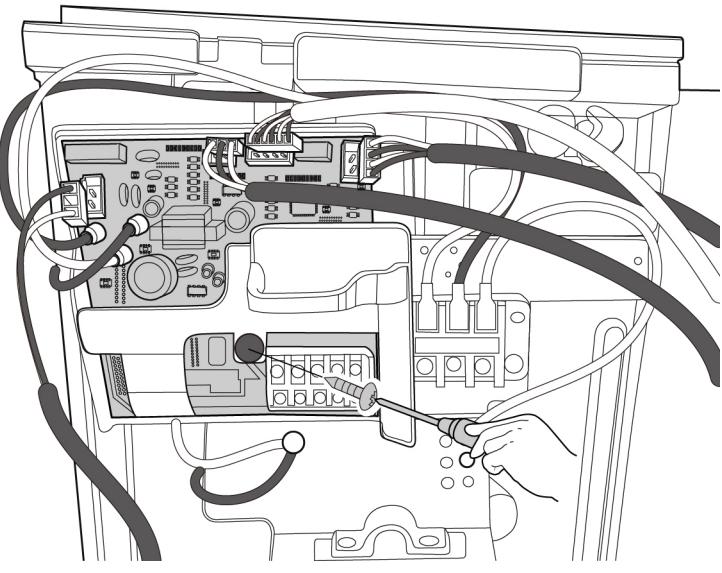
Note: This section is for reference only. Actual unit appearance may vary.

8. PCB board 8

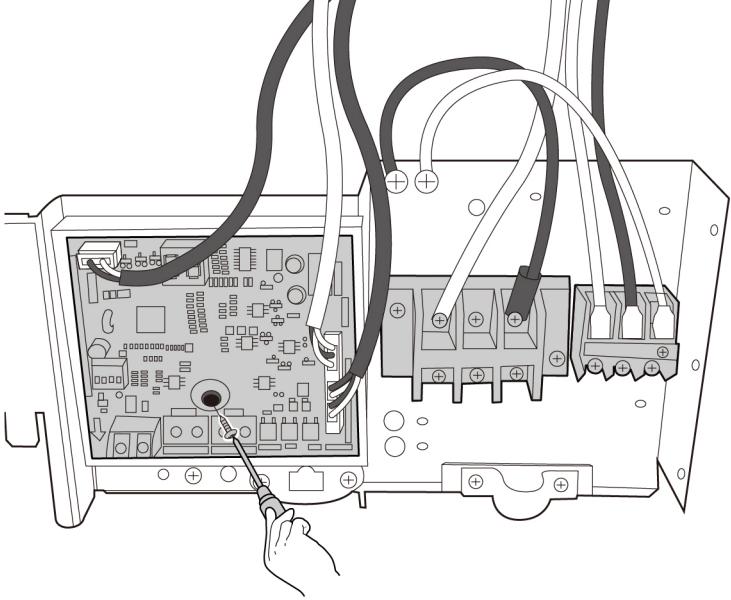
| Procedure | Illustration |
|---|---|
| <ol style="list-style-type: none"> 1) Remove 2 screws to disconnect the power supply wires. (see CJ_ODU_PCB_008-1) 2) Remove 3 screws to disconnect ground wires. (see CJ_ODU_PCB_008-1) 3) Disconnect the wires connected to main control board. (see CJ_ODU_PCB_008-1) 4) Disconnect the wires between main control board and IPM module board. (see CJ_ODU_PCB_008-1) 5) Remove the 4 screws and unfix the 6 hooks and then remove the main control board.(see CJ_ODU_PCB_008-1) 6) Remove 1 screw to remove the fan motor capacitor(1 screw for each capacitor).(see CJ_ODU_PCB_008-1). |  |

CJ_ODU_PCB_008-1

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

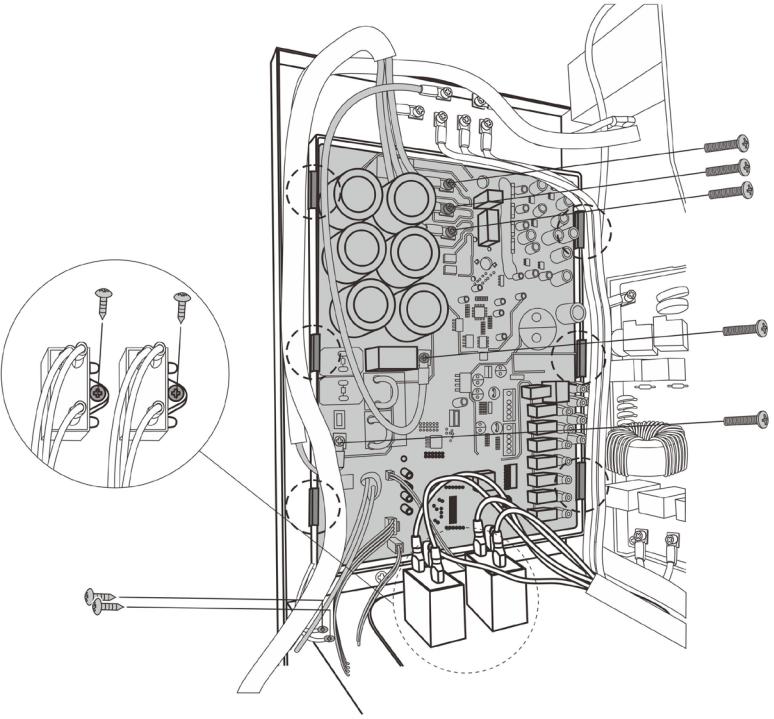
| Procedure | Illustration |
|--|--|
| <ol style="list-style-type: none"> 1) Remove 2 screws to disconnect the power supply wires. (see CJ_ODU_PCB_008-2) 2) Remove 3 screws to disconnect the wires connected to the compressor. (see CJ_ODU_PCB_008-2) 3) Remove 3 screws to remove the radiator.(see CJ_ODU_PCB_008-2) 4) Disconnect the wires between IPM module board and main control board. (see CJ_ODU_PCB_008-2) 5) Remove the 4 screws and unfix the 4 hooks and then remove the IPM moduel board.(see CJ_ODU_PCB_008-2) |  <p>CJ_ODU_PCB_008-2</p> |
| <ol style="list-style-type: none"> 6) Remove the 1 screw and disconnect the wires and then remove the 24V board.(see CJ_ODU_PCB_008-3)(for some models) |  <p>CJ_ODU_PCB_008-3(for some models)</p> |

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

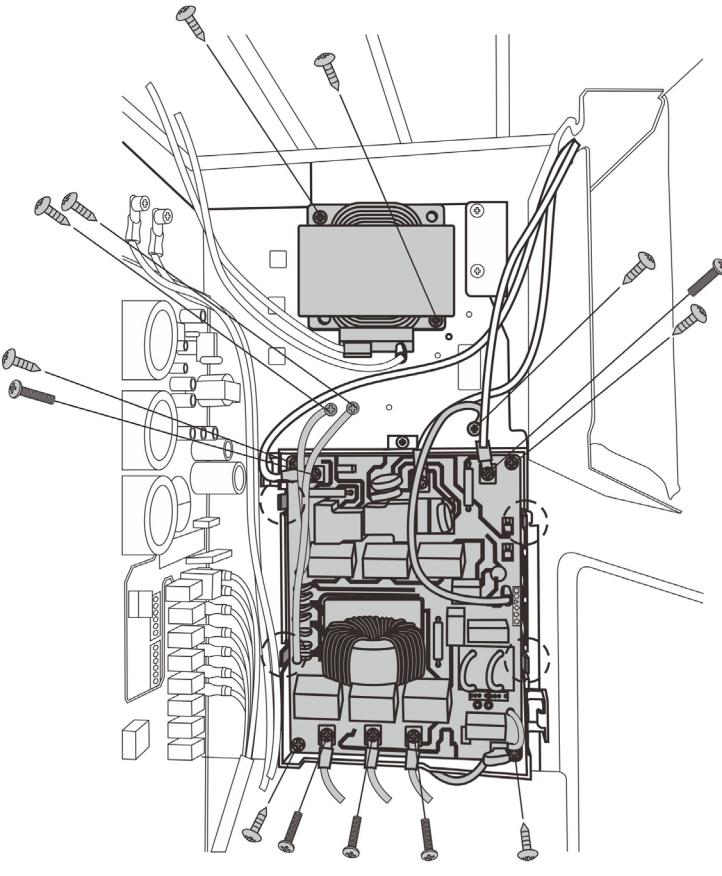
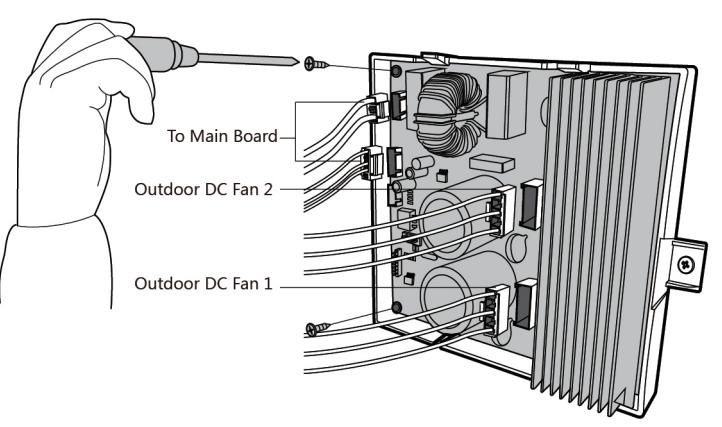
| Procedure | Illustration |
|---|--|
| <p>1) Remove the 1 screw and disconnect the wires and then remove the key board.(see CJ_ODU_PCB_008-4)(for some models)</p> |  <p style="text-align: center;">CJ_ODU_PCB_008-4(for some models)</p> |

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

9. PCB board 9

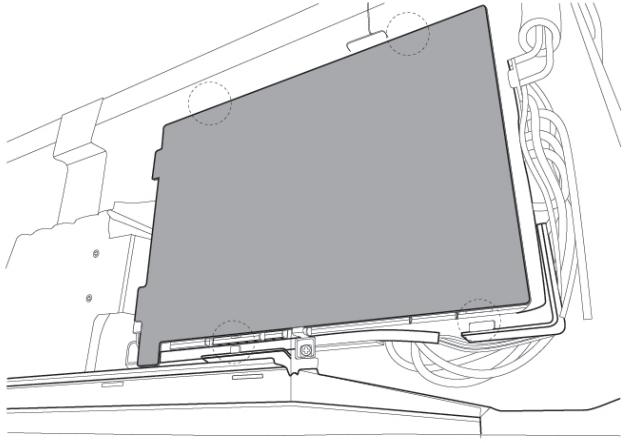
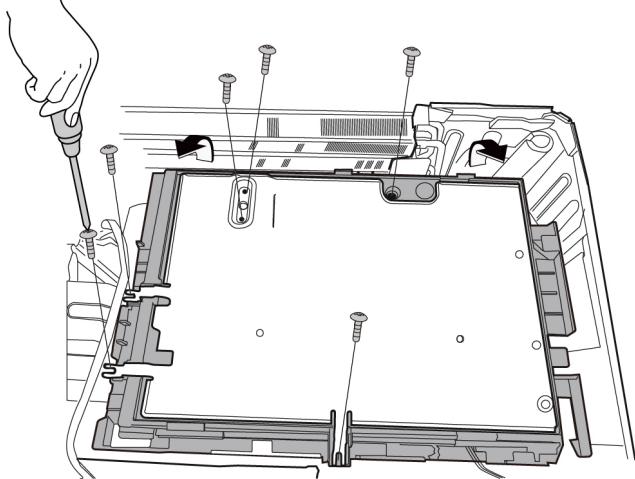
| Procedure | Illustration |
|---|---|
| <p>2) Remove 3 screws to disconnect the wires connected to the compressor. (see CJ_ODU_PCB_009-1)</p> <p>3) Remove 2 screws to disconnect the power supply wires. (see CJ_ODU_PCB_009-1)</p> <p>4) Disconnect the wires connected to main control board. (see CJ_ODU_PCB_009-1)</p> <p>5) Remove the 4 screws and unfix the 6 hooks and then remove the main control board.(see CJ_ODU_PCB_009-1)</p> <p>6) Remove the screw of the fan capacitor and then remove it (1 screw for each capacitor). (see CJ_ODU_PCB_009-1)</p> |  <p style="text-align: center;">CJ_ODU_PCB_009-1</p> |

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

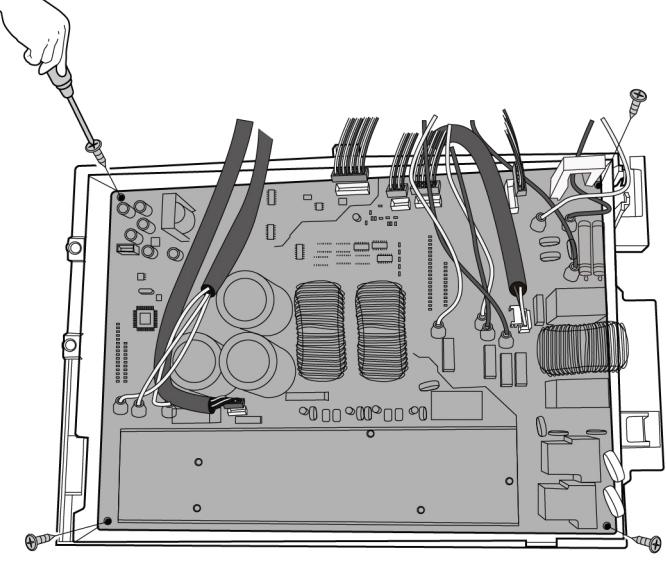
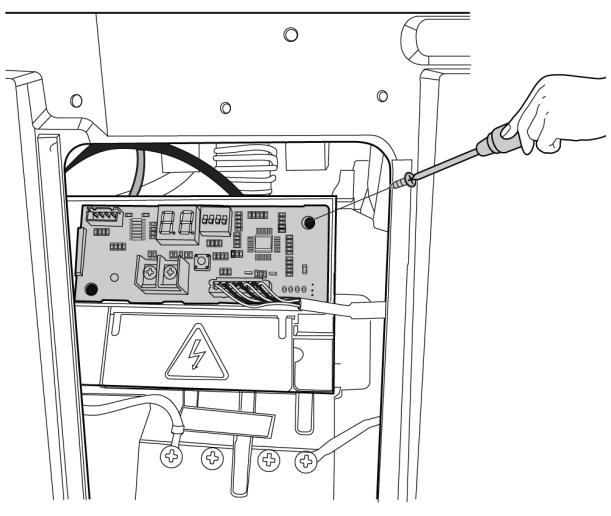
| Procedure | Illustration |
|---|--|
| <p>7) Remove 3 screws to disconnect the power supply wires. (see CJ_ODU_PCB_009-1)</p> <p>8) Remove 3 screws to disconnect ground wires. (see CJ_ODU_PCB_009-1)</p> <p>9) Disconnect the wires connected to main control board. (see CJ_ODU_PCB_009-2)</p> <p>10) Remove the 4 screws and unfix the 4 hooks and then remove the filter board. (see CJ_ODU_PCB_009-2)</p> <p>11) Remove the 2 screws of the reactor and then remove it. (see CJ_ODU_PCB_009-2)</p> |  |
| <p>12) Disconnect the wires connected to main control board. (see CJ_ODU_PCB_009-3)(for some models)</p> <p>13) Remove the 2 screws and then remove the DC motor driver board. (see CJ_ODU_PCB_009-3)(for some models)</p> | <p>CJ_ODU_PCB_009-2</p>  <p>CJ_ODU_PCB_009-3 (for some models)</p> |

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

10. PCB board 10

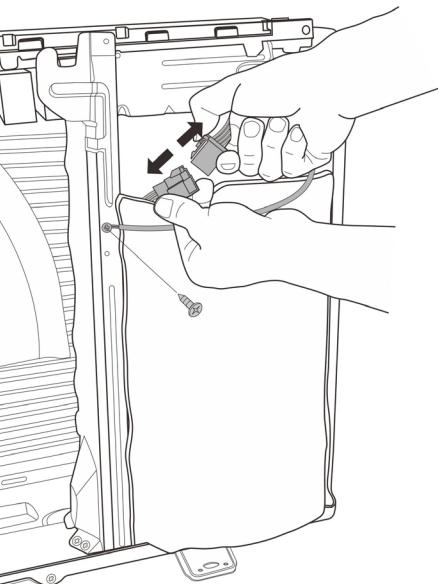
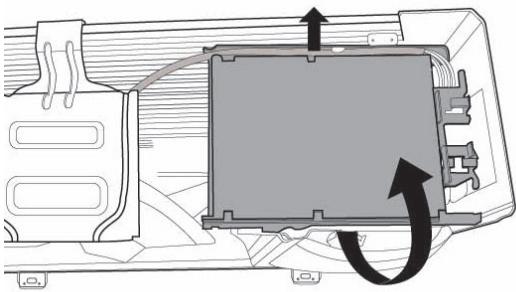
| Procedure | Illustration |
|--|---|
| 1) Unfix the hooks and then open the electronic control box cover (4 hooks) (see CJ_ODU_PCB_010-1). |  CJ_ODU_PCB_010-1 |
| 2) Remove 6 screws on the electronic control board and then remove the electronic control box subassembly. (see CJ_ODU_PCB_010-2). Note: Electronic installing box cannot be opened, so the voltage between P and N cannot be measured. |  CJ_ODU_PCB_010-2 |

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

| Procedure | Illustration |
|---|--|
| <p>3) Pull out the connectors (see CJ_ODU_PCB_010-3).</p> <p>4) Remove the 4 screws and then remove the electronic control board (see CJ_ODU_PCB_010-3).</p> <p>Note: When replacing the main control board with a new one, pay attention to applying thermal paste on the heat sink.</p> |  |
| <p>5) Pull out the connector, remove one screw and then remove the key board subassembly on terminal board. (see CJ_ODU_PCB_010-4) (for some models).</p> |  <p>CJ_ODU_PCB_010-3</p> <p>CJ_ODU_PCB_010-4</p> |

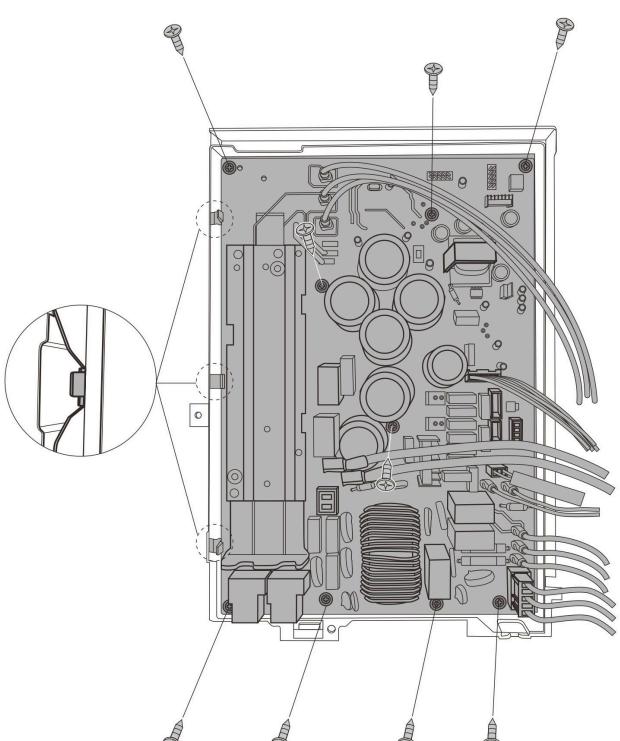
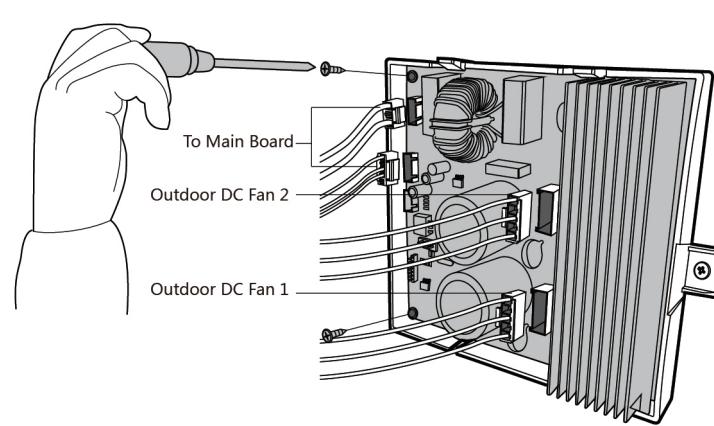
Note: This section is for reference only. Actual unit appearance may vary.

11. PCB board 11

| Procedure | Illustration |
|---|--|
| <ol style="list-style-type: none">1) Disconnect the connector for compressor and release the ground wire(1 screw). (see CJ_ODU_PCB_011-1).2) Remove the electronic control box subassembly. (see CJ_ODU_PCB_011-2). <p>Note: Electric control box cover cannot be removed, so the voltage between P and N cannot be measured.</p> |  <p>CJ_ODU_PCB_011-1</p>  <p>CJ_ODU_PCB_011-2</p> |

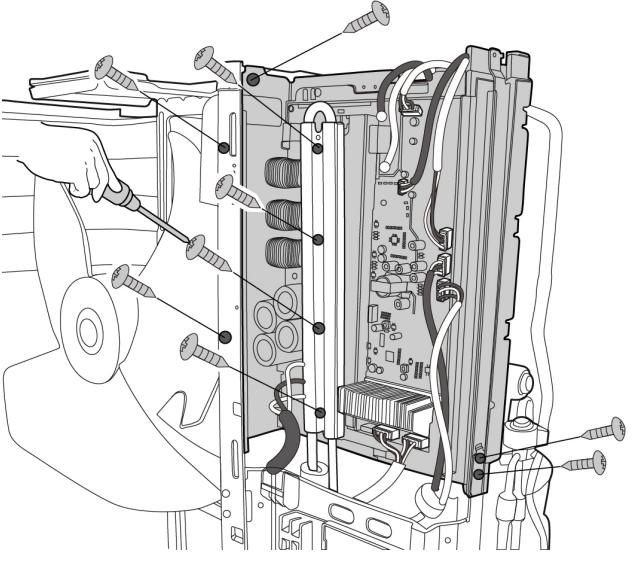
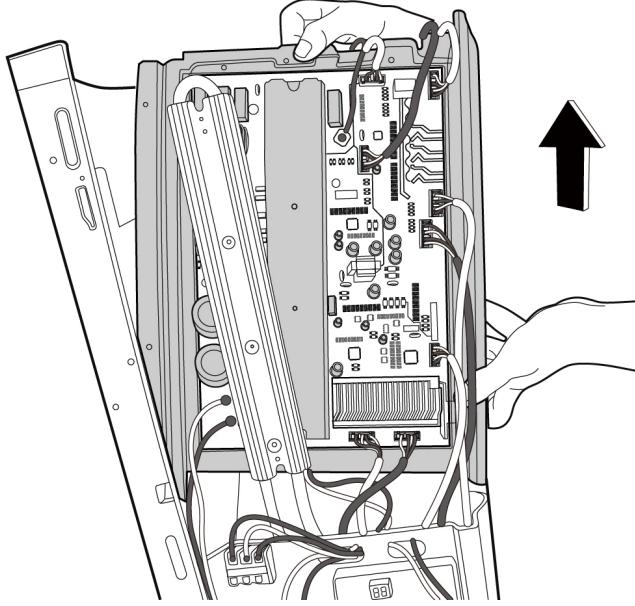
Note: This section is for reference only. Actual unit appearance may vary.

12. PCB board 12

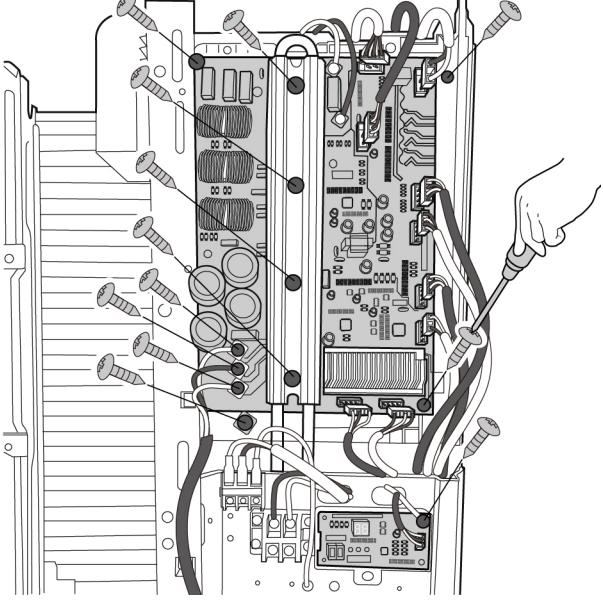
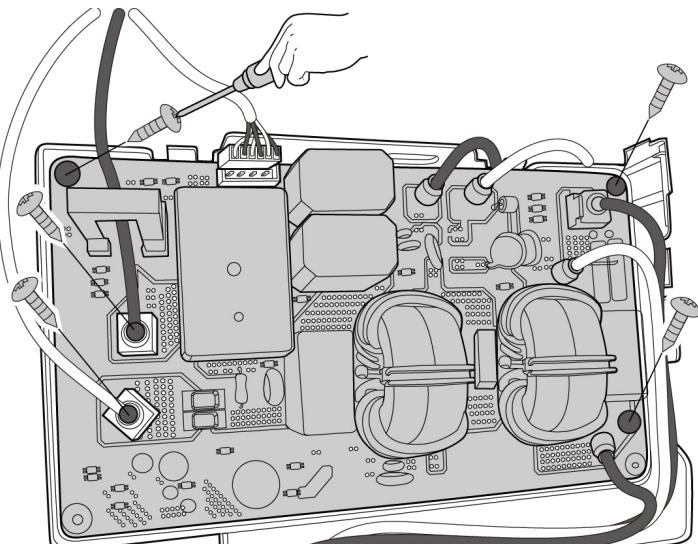
| Procedure | Illustration |
|---|--|
| <ol style="list-style-type: none"> 1) Pull out the connectors (see CJ_ODU_PCB_012-1). 2) Remove the 9 screws and unfix the 3 hooks and then remove the electronic control board(see CJ_ODU_PCB_012-2). |  <p style="text-align: center;">CJ_ODU_PCB_012-1</p> |
| <ol style="list-style-type: none"> 3) Disconnect the wires connected to main control board. (see CJ_ODU_PCB_012-2)(for some models) 4) Remove the 2 screws and then remove the DC motor driver board. (see CJ_ODU_PCB_012-2)(for some models) |  <p style="text-align: center;">CJ_ODU_PCB_012-2 (for some models)</p> |

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

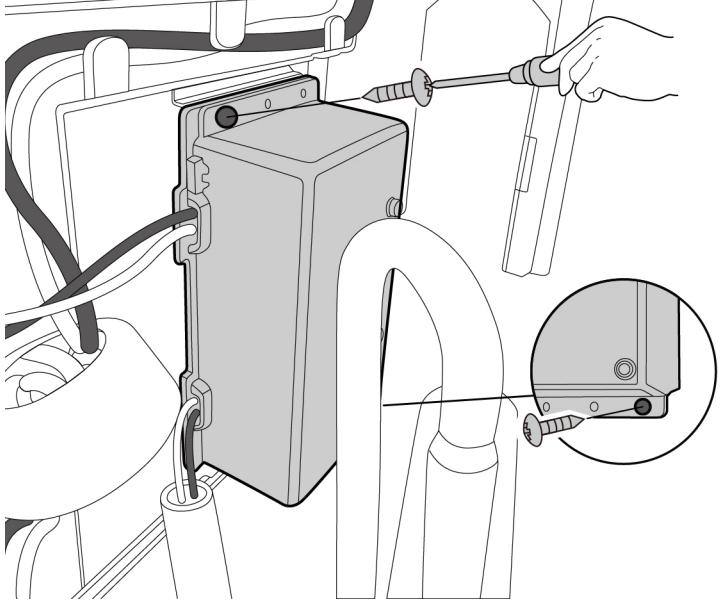
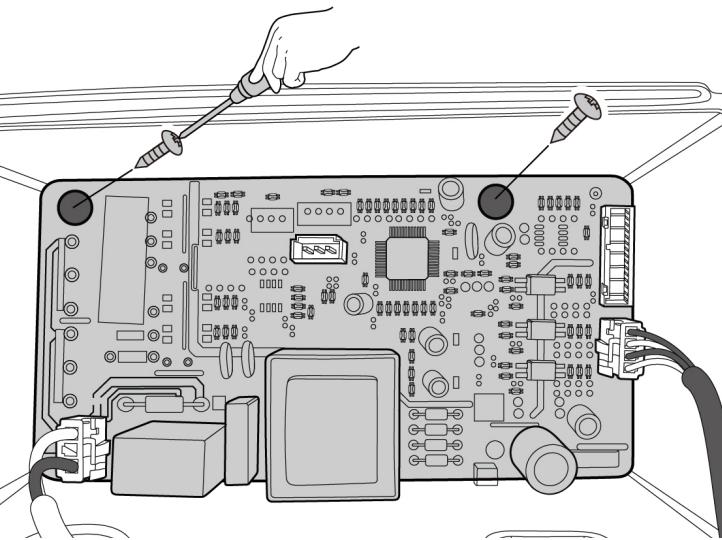
13. PCB board 13

| Procedure | Illustration |
|--|---|
| <ol style="list-style-type: none">1) Remove 4 screws unfix the radiator. (see CJ_ODU_PCB_013-1)2) Remove 3 screws unfix the electronic control box assembly and partition board. (see CJ_ODU_PCB_013-1)3) Remove 2 screws unfix the electronic control box assembly and terminal board subassembly. (see CJ_ODU_PCB_013-1) |  <p>CJ_ODU_PCB_013-1</p> |
| <ol style="list-style-type: none">4) Move upward and slowly remove the electronic control box assembly. (CJ_ODU_PCB_013-2) <p>(If you want to repair the electrical control box components, perform the steps 1 to 4; If you want to repair the main control board assembly, perform steps 5 to 7 below.)</p> |  <p>CJ_ODU_PCB_013-2</p> |

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

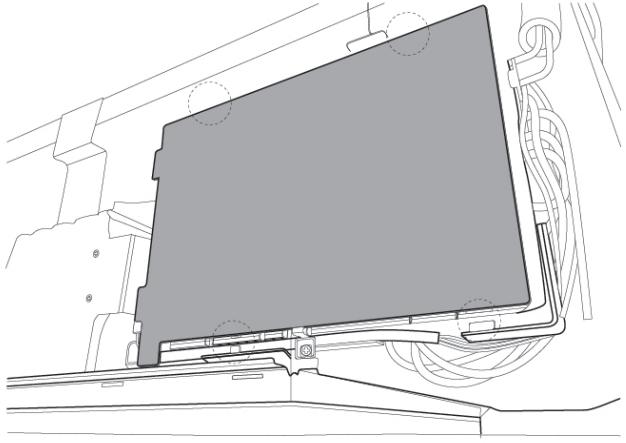
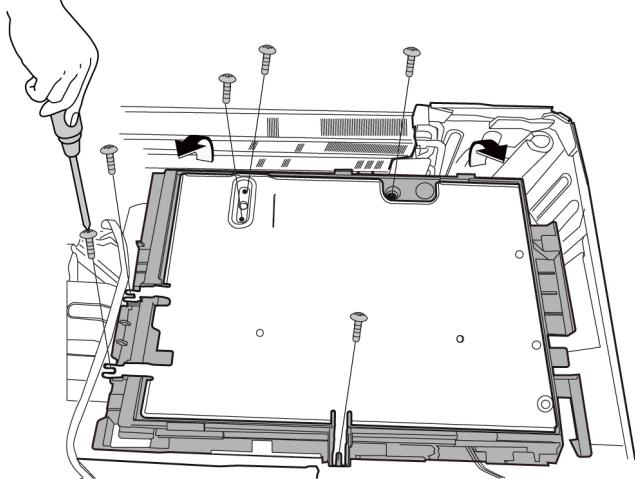
| Procedure | Illustration |
|---|--|
| <p>5) Disconnect the wires connected to main control board. (see CJ_ODU_PCB_013-3)</p> <p>6) Remove the 4 screws and then remove the main control board.(see CJ_ODU_PCB_013-3)</p> <p>7) Remove 1 screw to remove the key board .(see CJ_ODU_PCB_013-3).</p> |  <p>CJ_ODU_PCB_013-3</p> |
| <p>8) Disconnect the wires between filter board and main control board. (see CJ_ODU_PCB_013-4)</p> <p>9) Remove the 3 screws and then remove the filter board.(see CJ_ODU_PCB_013-4) (Filter board is on the back of the electronic control box assembly)</p> |  <p>CJ_ODU_PCB_013-4</p> |

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

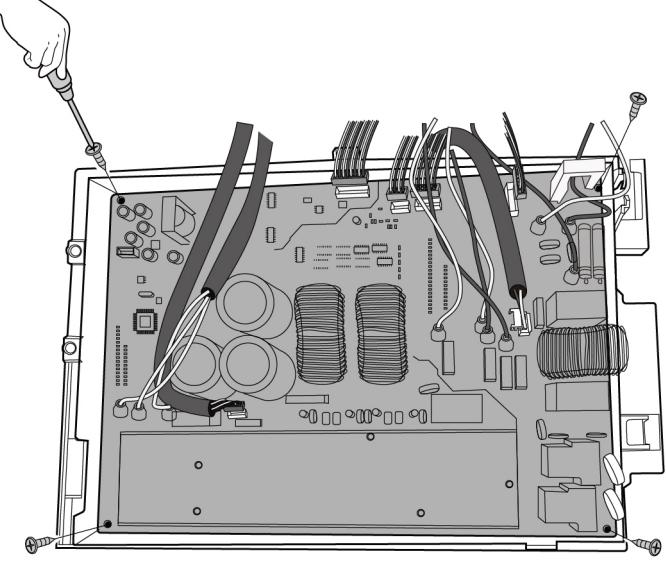
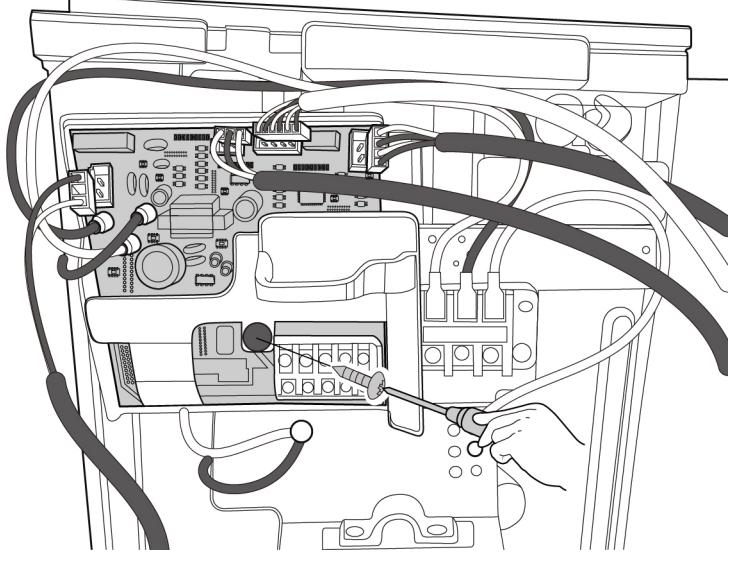
| Procedure | Illustration |
|--|---|
| 10) Remove the 2 screws and then remove the DR module box subassembly.(see CJ_ODU_PCB_013-5)(DR module box subassembly is on the back of the electronic control box assembly)(for some models) |  <p>CJ_ODU_PCB_013-5(for some models)</p> |
| 11) Remove the 2 screws and then remove the DR module board.(see CJ_ODU_PCB_013-6)(for some models) |  <p>CJ_ODU_PCB_013-6(for some models)</p> |

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

14. PCB board 14

| Procedure | Illustration |
|--|---|
| 1) Unfix the hooks and then open the electronic control box cover (4 hooks) (see CJ_ODU_PCB_014-1). |  CJ_ODU_PCB_014-1 |
| 2) Remove 6 screws on the electronic control board and then remove the electronic control box subassembly. (see CJ_ODU_PCB_014-2). Note: Electronic installing box cannot be opened, so the voltage between P and N cannot be measured. |  CJ_ODU_PCB_014-2 |

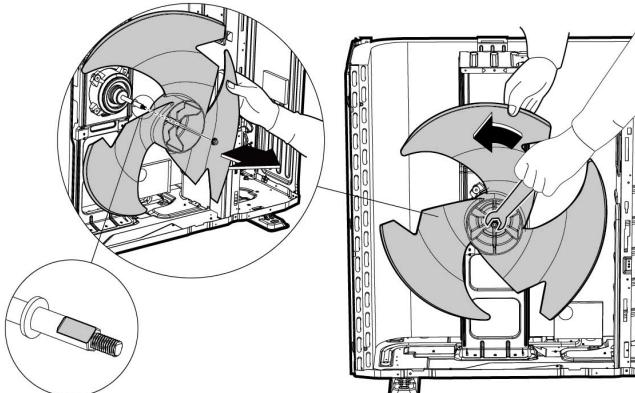
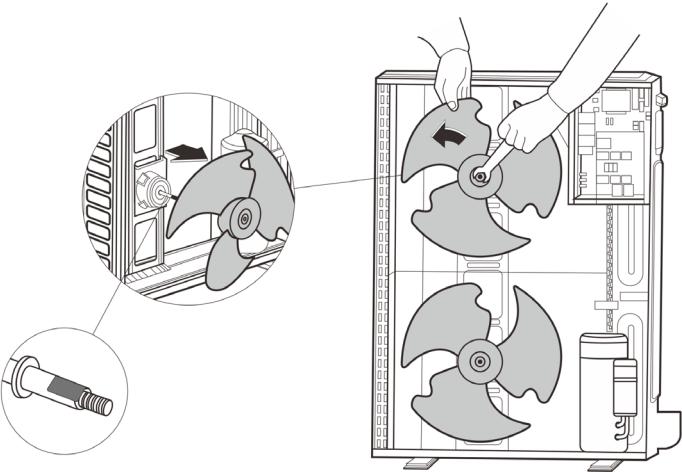
Note: This section is for reference only. Actual unit appearance may vary.

| Procedure | Illustration |
|--|--|
| <p>3) Pull out the connectors (see CJ_ODU_PCB_014-3).</p> <p>4) Remove the 4 screws and then remove the electronic control board(see CJ_ODU_PCB_041-3).</p> <p>Note: When replacing the main control board with a new one, pay attention to applying thermal paste on the heat sink.</p> |  |
| <p>5) Remove the 1 screw and disconnect the wires and then remove the 24V board.(see CJ_ODU_PCB_014-4)(for some models)</p> |  |

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

2.3 Fan Assembly

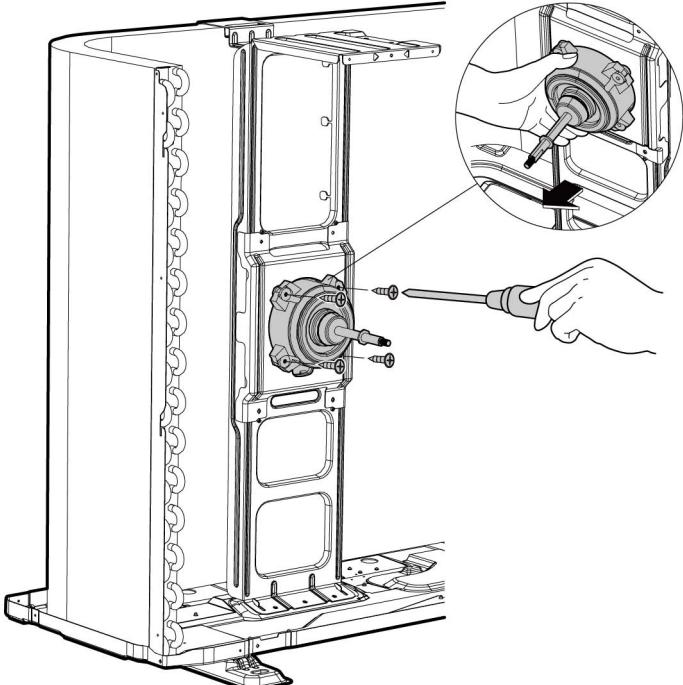
Note: Remove the panel plate (refer to 3.1 Panel Plate) before disassembling fan.

| Procedure | Illustration |
|--|---|
| <ol style="list-style-type: none">1) Remove the nut securing the fan with a spanner (see CJ_ODU_FAN_001-1&2).2) Remove the fan. |  <p>CJ_ODU_FAN_001-1</p>  <p>CJ_ODU_FAN_001-2</p> |

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

2.4 Fan Motor

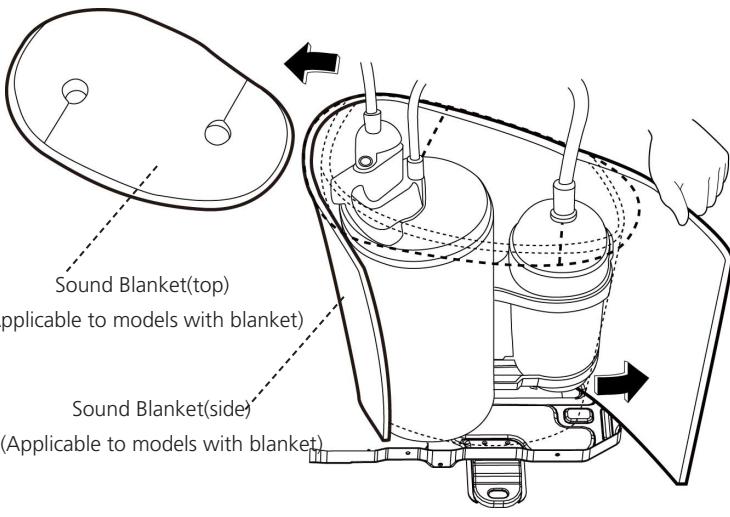
Note: Remove the panel plate and the connection of fan motor on PCB (refer to 3.1 Panel Plate and 3.2 Electrical parts) before disassembling fan motor.

| Procedure | Illustration |
|--|--|
| <ol style="list-style-type: none">3) Remove the fixing screws of the fan motor (4 screws) (see CJ_ODU_MOTOR_001).4) Remove the fan motor. |  <p data-bbox="889 1235 1175 1268">CJ_ODU_MOTOR_001</p> |

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

2.5 Sound blanket

Note: Remove the panel plate (refer to 3.1 Panel plate) before disassembling sound blanket.

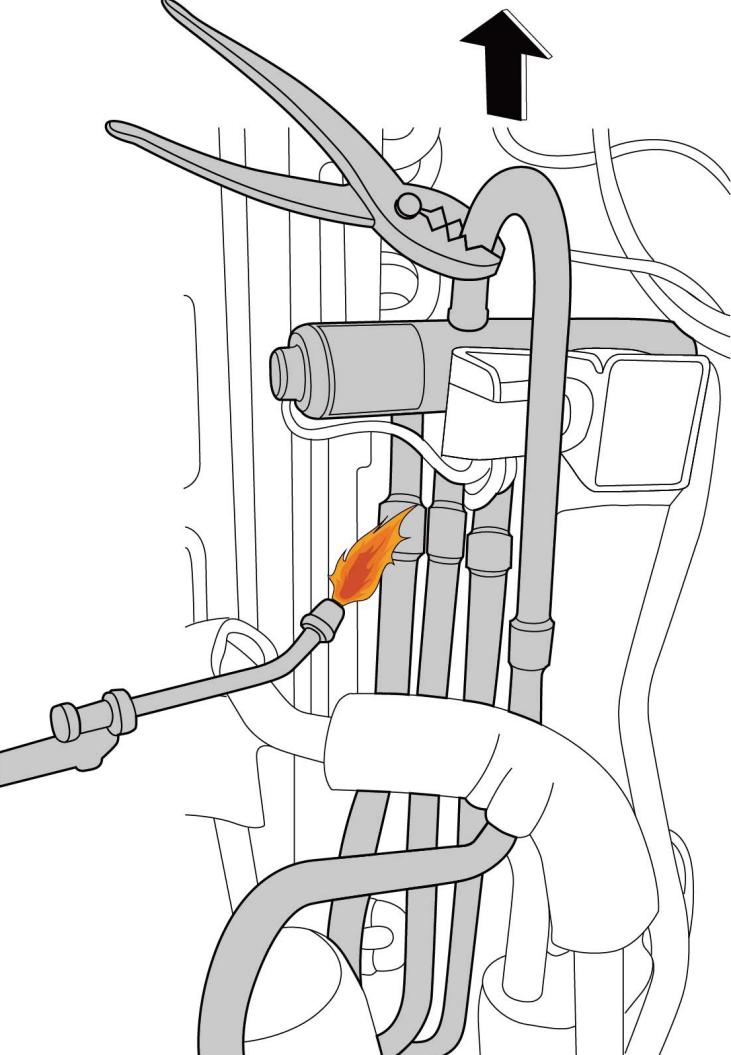
| Procedure | Illustration |
|--|--|
| 1) Remove the sound blanket (side and top) (see CJ_ODU_BLANKET_001). |  <p data-bbox="865 977 1167 1010">CJ_ODU_BLANKET_001</p> |

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

2.6 Four-way valve (for heat pump models)

! WARNING: Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. (For R32 & R290, you should evacuate the system with the vacuum pump; flush the system with nitrogen; then repeat the two steps before heating up the brazed parts. The operations above should be implemented by professionals.)

Note: Remove the panel plate, connection of four-way valve on PCB (refer to 3.1 Panel plate and 3.2 Electrical parts) before disassembling sound blanket.

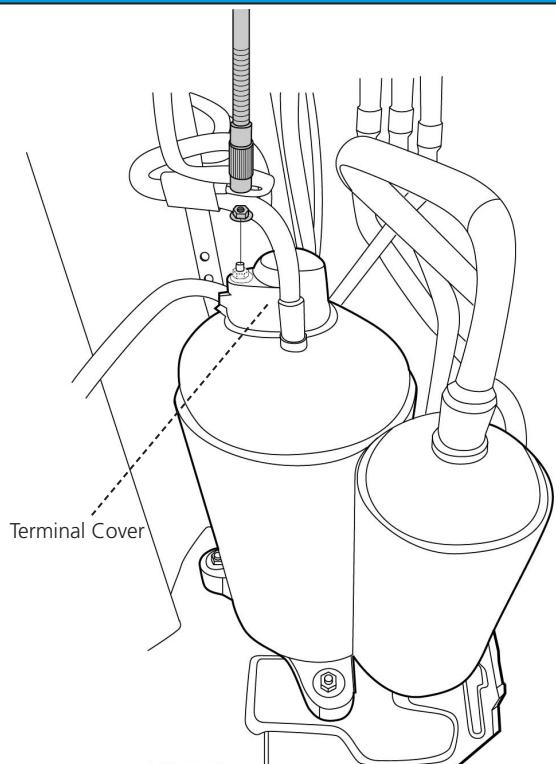
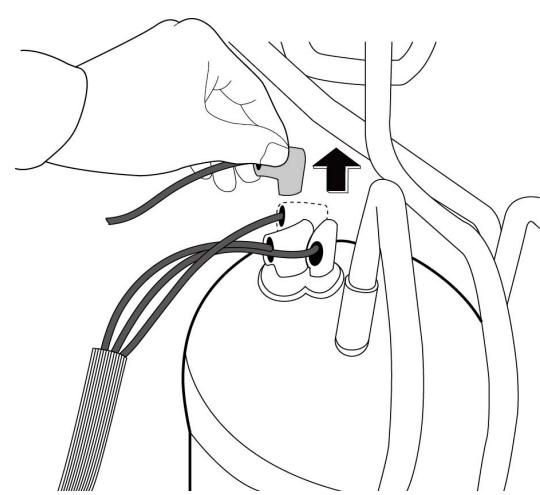
| Procedure | Illustration |
|--|---|
| <ol style="list-style-type: none">1) Heat up the brazed parts and then detach the the four-way valve and the pipe (see CJ_ODU_VALVE_001).2) Remove the four-way valve assembly with pliers. |  <p>CJ_ODU_VALVE_001</p> |

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

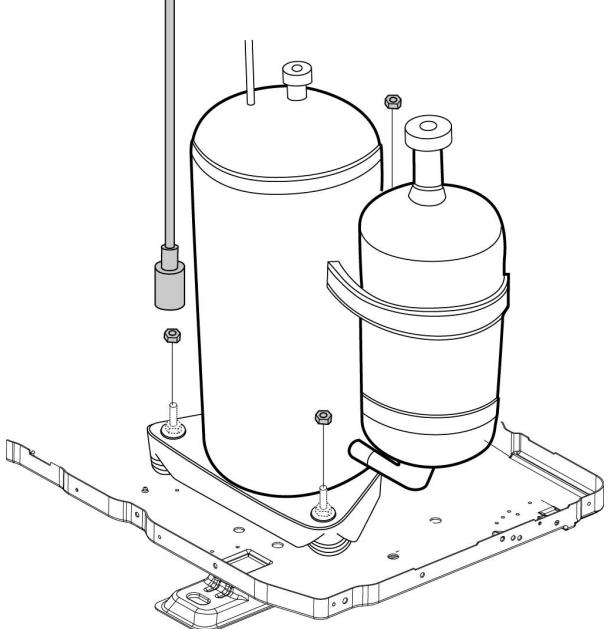
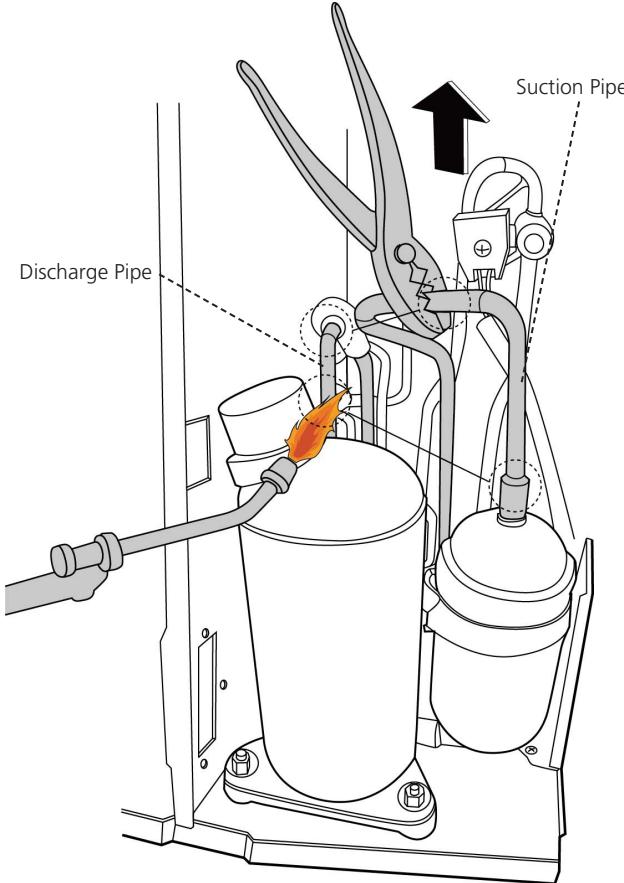
2.7 Compressor

! WARNING: Evacuate the system and confirm that there is no refrigerant left in the system before removing the four-way valve and the compressor. (For R32 & R290, you should evacuate the system with the vacuum pump; flush the system with nitrogen; then repeat the two steps before heating up the brazed parts. The operations above should be implemented by professionals.)

Note: Remove the panel plate, connection of compressor on PCB (refer to 3.1 Panel plate and 3.2 Electrical parts) before disassembling sound blanket.

| Procedure | Illustration |
|---|--|
| 1) Remove the flange nut of terminal cover and remove the terminal cover (see CJ_ODU_COMP_001). |  <p>CJ_ODU_COMP_001</p> |
| 2) Disconnect the connectors (see CJ_ODU_COMP_002). |  <p>CJ_ODU_COMP_002</p> |

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

| Procedure | Illustration |
|---|--|
| <p>3) Remove the hex nuts and washers securing the compressor, located on the bottom plate (see CJ_ODU_COMP_003).</p> |  <p>CJ_ODU_COMP_003</p> |
| <p>4) Heat up the brazed parts and then remove the the discharge pipe and the suction pipe (see CJ_ODU_COMP_004).</p> <p>5) Lift the compressor from the base pan assembly with pliers.</p> |  <p>CJ_ODU_COMP_004</p> |

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

Appendix

Contents

- i) Temperature Sensor Resistance Value Table for T1, T2, T3, and T4 (°C – K)2
- ii) Temperature Sensor Resistance Value Table for TP (for some units)(°C --K)3
- iii) Pressure On Service Port4

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

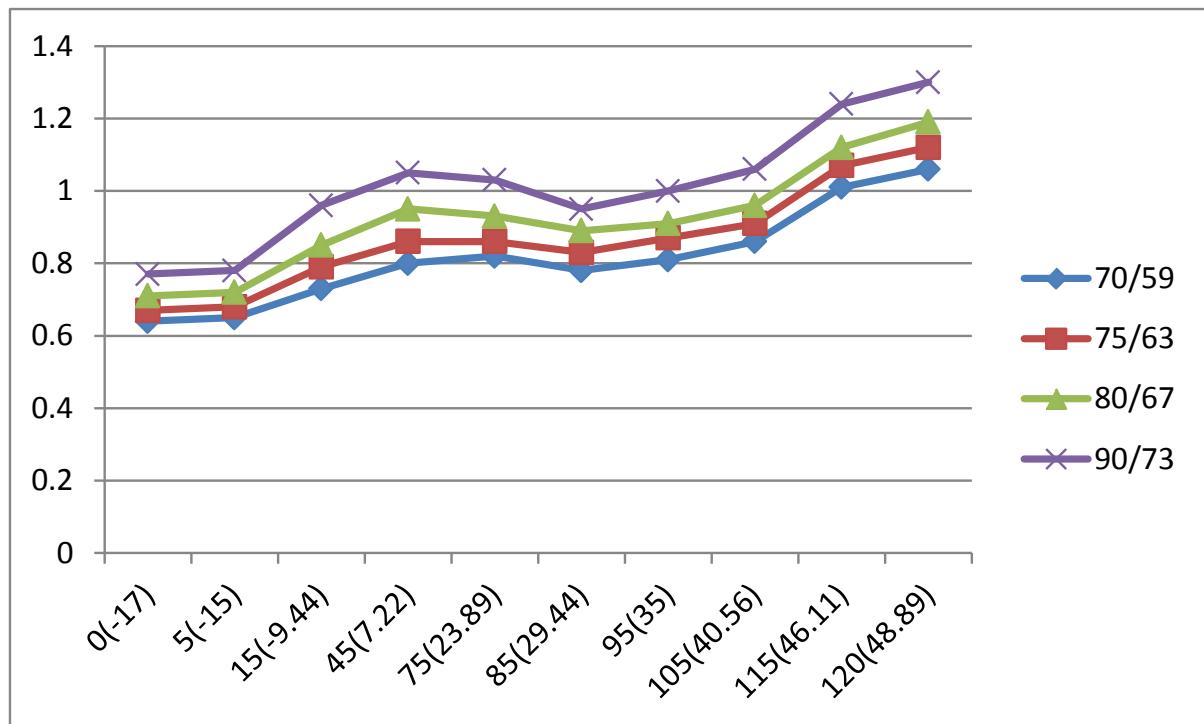
ii) Temperature Sensor Resistance Value Table for TP(for some units) (°C --K)

| °C | °F | K Ohm | °C | °F | K Ohm | °C | °F | K Ohm | °C | °F | K Ohm |
|-----|----|-------|----|-----|-------|----|-----|-------|-----|-----|-------|
| °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

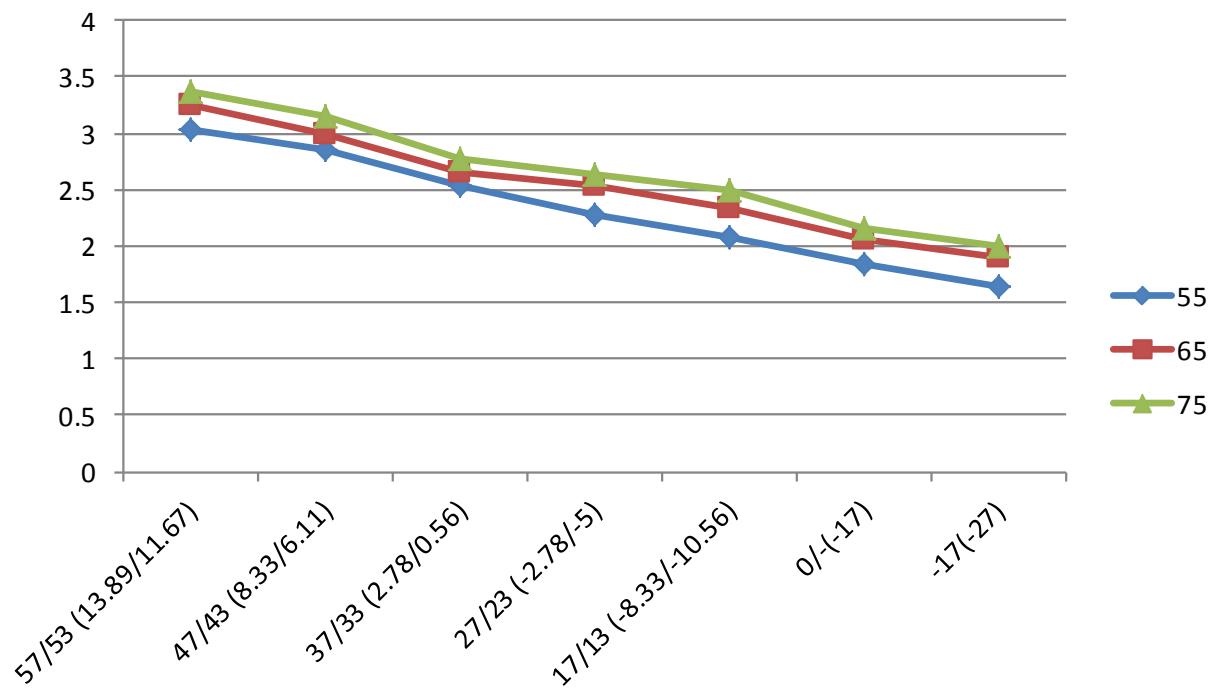
Cooling chart(R410A):

| °F(°C) | ODU(DB) IDU(DB/WB) | | | | | | | | | | |
|--------|-----------------------|--------|--------|---------------|--------------|---------------|---------------|---------|----------------|----------------|----------------|
| | | 0(-17) | 5(-15) | 15 (-9.44) | 45 (7.22) | 75 (23.89) | 85 (29.44) | 95 (35) | 105 (40.56) | 115 (46.11) | 120 (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 |



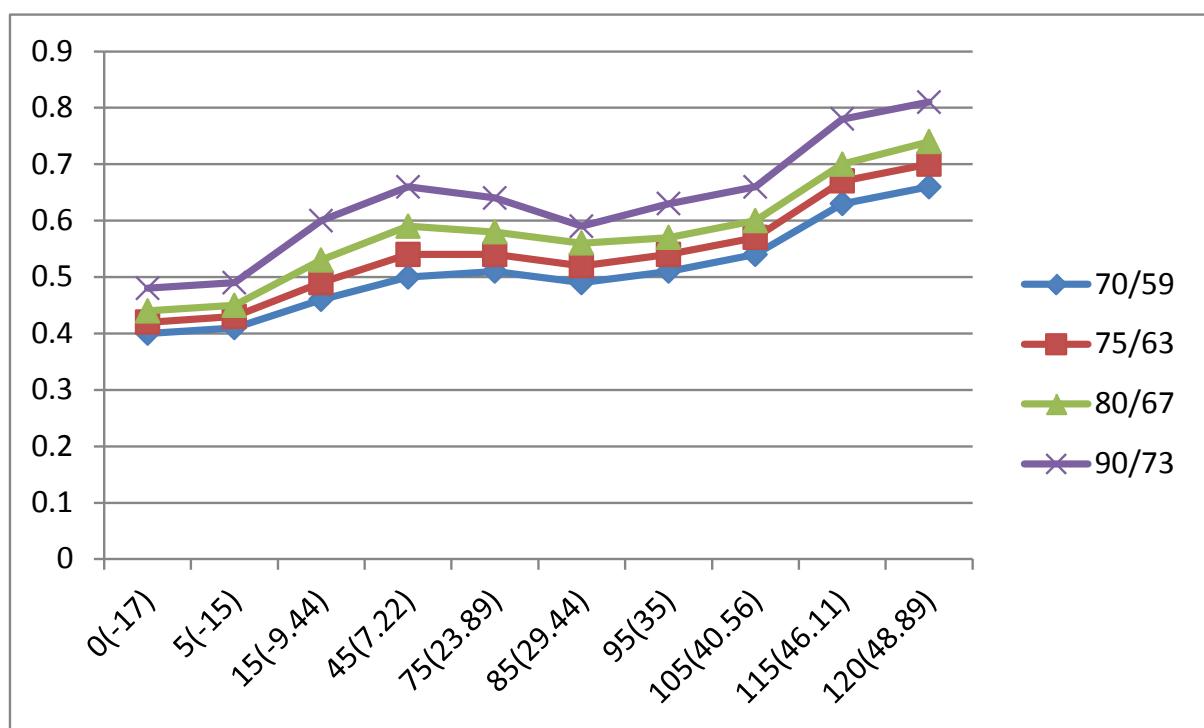
Heating chart(R410A):

| °F(°C) | ODU(DB/WB) IDU(DB) | 57/53 (13.89/11.67) | 47/43 (8.33/6.11) | 37/33 (2.78/0.56) | 27/23 (-2.78/-5) | 17/13 (-8.33/-10.56) | 0/-2 (-17/-19) | -17/-18 (-27/-28) |
|--------|-----------------------|------------------------|----------------------|----------------------|---------------------|----------------------|-------------------|----------------------|
| 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 |



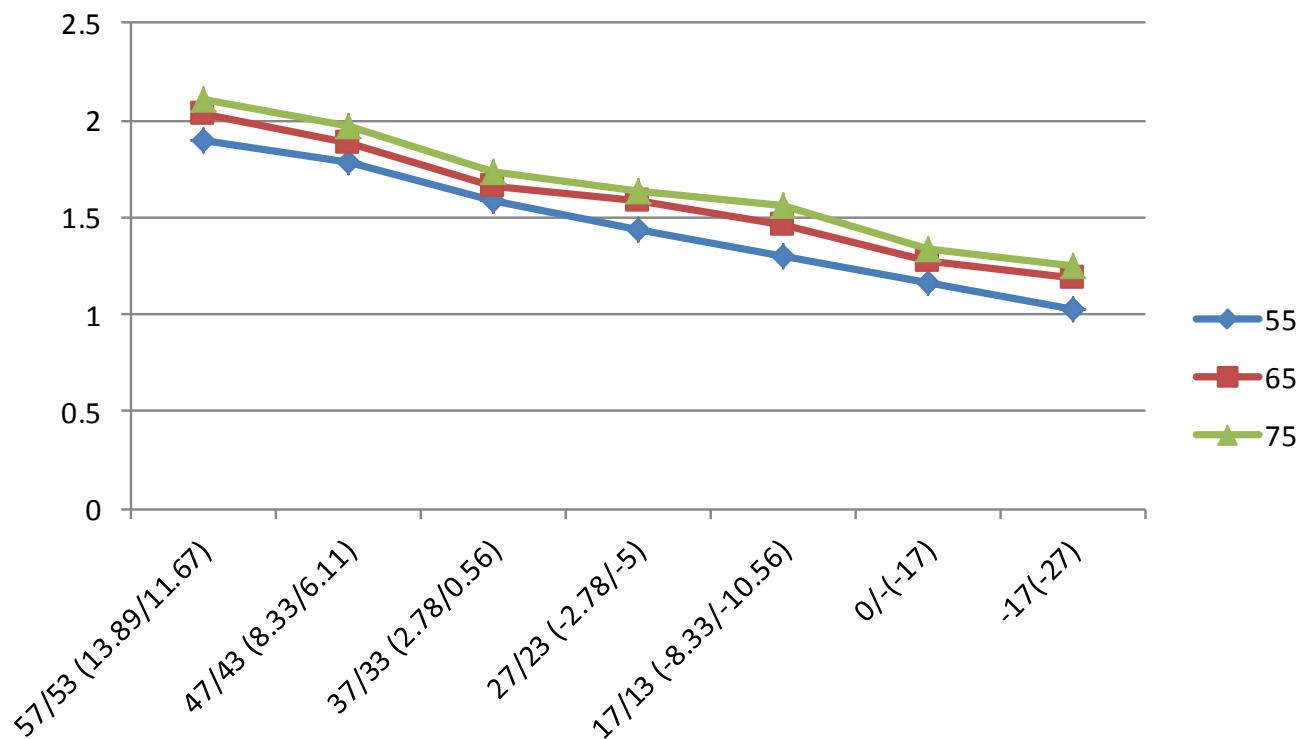
Cooling chart(R22):

| °F(°C) | ODU(DB) IDU(DB/WB) | 0(-17) | 5(-15) | 15 (-9.44) | 45 (7.22) | 75 (23.89) | 85 (29.44) | 95 (35) | 105 (40.56) | 115 (46.11) | 120 (48.89) |
|--------|-----------------------|--------|--------|---------------|--------------|---------------|---------------|---------|----------------|----------------|----------------|
| | | | | | | | | | | | |
| BAR | 70/59 (21.11/15) | 4.0 | 4.1 | 4.6 | 5.0 | 5.1 | 4.9 | 5.1 | 5.4 | 6.3 | 6.6 |
| | 75/63 (23.89/17.22) | 4.2 | 4.3 | 4.9 | 5.4 | 5.4 | 5.2 | 5.4 | 5.7 | 6.7 | 7.0 |
| | 80/67 (26.67/19.44) | 4.4 | 4.5 | 5.3 | 5.9 | 5.8 | 5.6 | 5.7 | 6.0 | 7.0 | 7.4 |
| | 90/73 (32.22/22.78) | 4.8 | 4.9 | 6.0 | 6.6 | 6.4 | 5.9 | 6.3 | 6.6 | 7.8 | 8.1 |
| PSI | 70/59 (21.11/15) | 58 | 59 | 67 | 73 | 74 | 71 | 74 | 78 | 91 | 96 |
| | 75/63 (23.89/17.22) | 61 | 62 | 71 | 78 | 78 | 75 | 78 | 83 | 97 | 102 |
| | 80/67 (26.67/19.44) | 64 | 65 | 77 | 86 | 84 | 81 | 83 | 87 | 102 | 107 |
| | 90/73 (32.22/22.78) | 70 | 71 | 87 | 96 | 93 | 86 | 91 | 96 | 113 | 117 |
| MPa | 70/59 (21.11/15) | 0.40 | 0.41 | 0.46 | 0.50 | 0.51 | 0.49 | 0.51 | 0.54 | 0.63 | 0.66 |
| | 75/63 (23.89/17.22) | 0.42 | 0.43 | 0.49 | 0.54 | 0.54 | 0.52 | 0.54 | 0.57 | 0.67 | 0.70 |
| | 80/67 (26.67/19.44) | 0.44 | 0.45 | 0.53 | 0.59 | 0.58 | 0.56 | 0.57 | 0.60 | 0.70 | 0.74 |
| | 90/73 (32.22/22.78) | 0.48 | 0.49 | 0.60 | 0.66 | 0.64 | 0.59 | 0.63 | 0.66 | 0.78 | 0.81 |



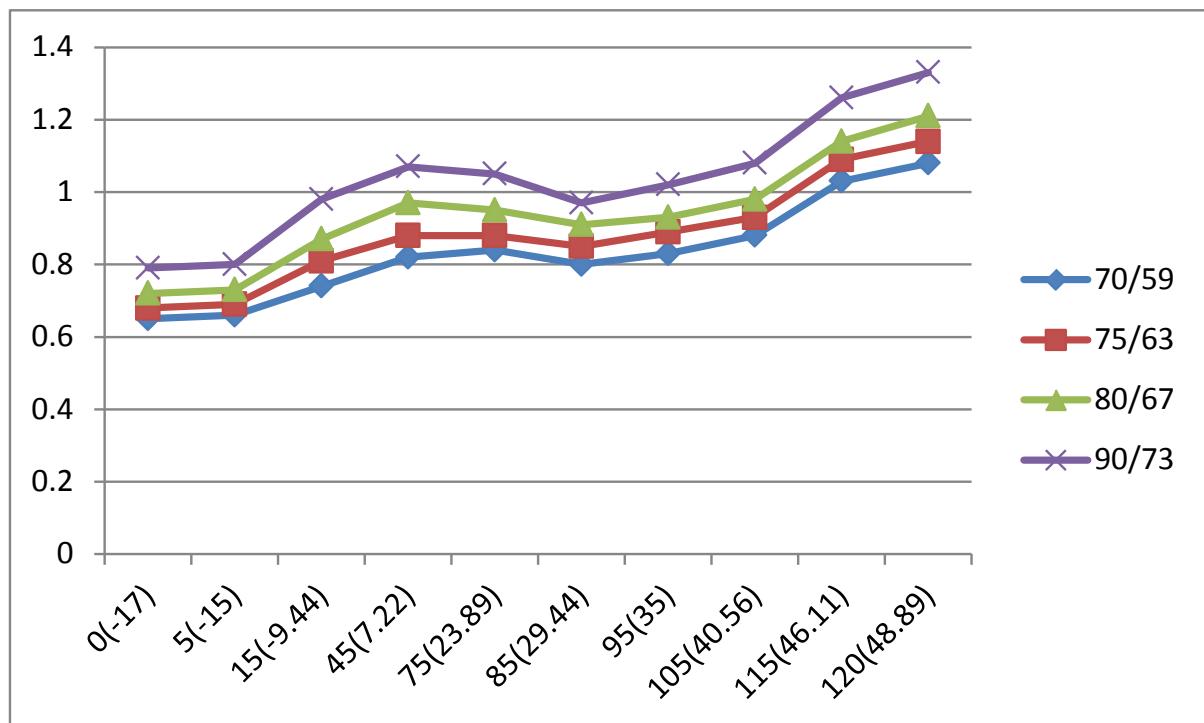
Heating chart(R22):

| °F(°C) | QDU(DB/WB) IDU(DB) | 57/53 (13.89/11.67) | 47/43 (8.33/6.11) | 37/33 (2.78/0.56) | 27/23 (-2.78/-5) | 17/13 (-8.33/-10.56) | 0/-2 (-17/-19) | -17/-18 (-27/-28) |
|--------|-----------------------|------------------------|----------------------|----------------------|---------------------|----------------------|-------------------|----------------------|
| BAR | 55(12.78) | 18.9 | 17.8 | 15.8 | 14.3 | 13.0 | 11.6 | 10.3 |
| | 65(18.33) | 20.3 | 18.8 | 16.6 | 15.9 | 14.6 | 12.8 | 11.9 |
| | 75(23.89) | 21.1 | 19.7 | 17.3 | 16.4 | 15.6 | 13.4 | 12.5 |
| PSI | 55(12.78) | 274 | 258 | 229 | 207 | 189 | 168 | 149 |
| | 65(18.33) | 294 | 273 | 241 | 231 | 212 | 186 | 172.6 |
| | 75(23.89) | 306 | 286 | 251 | 238 | 226 | 194 | 181 |
| MPa | 55(12.78) | 1.89 | 1.78 | 1.58 | 1.43 | 1.30 | 1.16 | 1.03 |
| | 65(18.33) | 2.03 | 1.88 | 1.66 | 1.59 | 1.46 | 1.28 | 1.19 |
| | 75(23.89) | 2.11 | 1.97 | 1.73 | 1.64 | 1.56 | 1.34 | 1.25 |



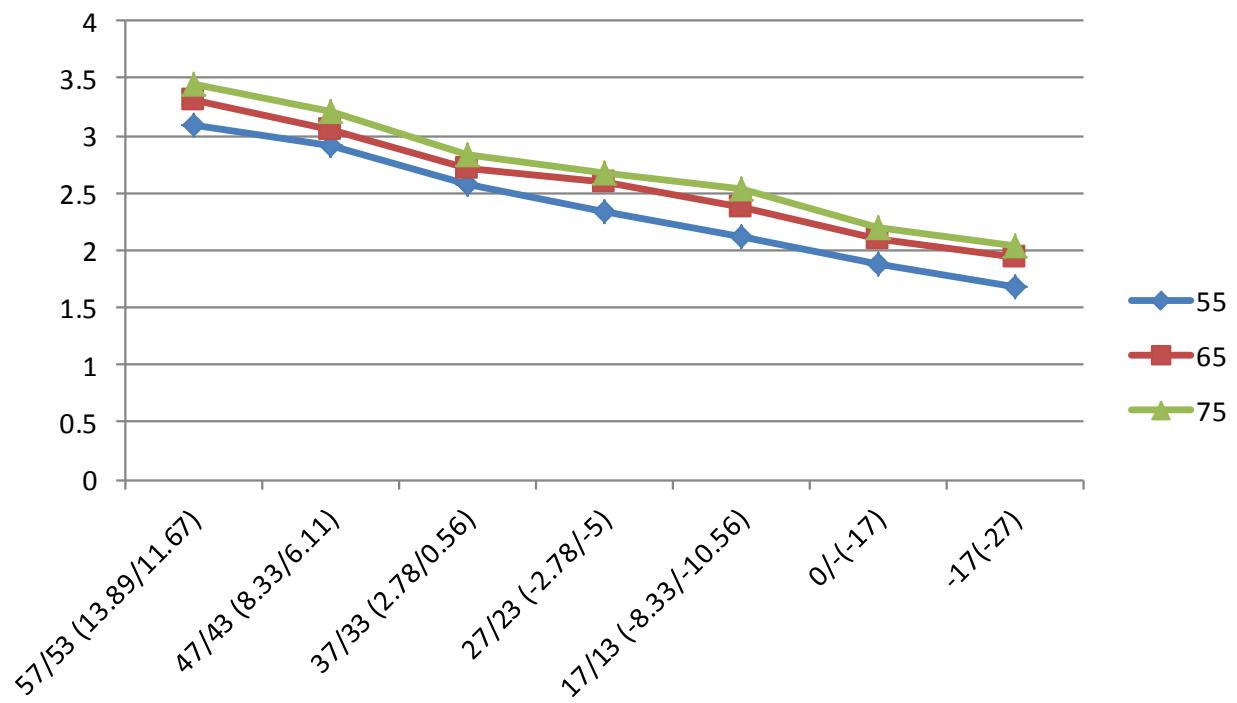
Cooling chart(R32):

| °F(°C) | ODU(DB) IDU(DB/WB) | | | | | | | | | | |
|--------|-----------------------|--------|--------|---------------|--------------|---------------|---------------|---------|----------------|----------------|----------------|
| | | 0(-17) | 5(-15) | 15 (-9.44) | 45 (7.22) | 75 (23.89) | 85 (29.44) | 95 (35) | 105 (40.56) | 115 (46.11) | 120 (48.89) |
| BAR | 70/59 (21.11/15) | 6.5 | 6.6 | 7.4 | 8.2 | 8.4 | 8.0 | 8.3 | 8.8 | 10.3 | 10.8 |
| | 75/63 (23.89/17.22) | 6.8 | 6.9 | 8.1 | 8.8 | 8.8 | 8.5 | 8.9 | 9.3 | 10.9 | 11.4 |
| | 80/67 (26.67/19.44) | 7.2 | 7.3 | 8.7 | 9.7 | 9.5 | 9.1 | 9.3 | 9.8 | 11.4 | 12.1 |
| | 90/73 (32.22/22.78) | 7.9 | 8.0 | 9.8 | 10.7 | 10.5 | 9.7 | 10.2 | 10.8 | 12.6 | 13.3 |
| PSI | 70/59 (21.11/15) | 95 | 96 | 108 | 118 | 121 | 115 | 119 | 128 | 150 | 157 |
| | 75/63 (23.89/17.22) | 99 | 101 | 117 | 128 | 126 | 122 | 129 | 135 | 158 | 165 |
| | 80/67 (26.67/19.44) | 105 | 106 | 125 | 141 | 138 | 132 | 135 | 143 | 165 | 176 |
| | 90/73 (32.22/22.78) | 114 | 115 | 142 | 155 | 152 | 141 | 148 | 157 | 184 | 193 |
| MPa | 70/59 (21.11/15) | 0.65 | 0.66 | 0.74 | 0.82 | 0.84 | 0.80 | 0.83 | 0.88 | 1.03 | 1.08 |
| | 75/63 (23.89/17.22) | 0.68 | 0.69 | 0.81 | 0.88 | 0.88 | 0.85 | 0.89 | 0.93 | 1.09 | 1.14 |
| | 80/67 (26.67/19.44) | 0.72 | 0.73 | 0.87 | 0.97 | 0.95 | 0.91 | 0.93 | 0.98 | 1.14 | 1.21 |
| | 90/73 (32.22/22.78) | 0.79 | 0.80 | 0.98 | 1.07 | 1.05 | 0.97 | 1.02 | 1.08 | 1.26 | 1.33 |



Heating chart(R32):

| °F(°C) | ODU(DB/WB) IDU(DB) | 57/53 (13.89/11.67) | 47/43 (8.33/6.11) | 37/33 (2.78/0.56) | 27/23 (-2.78/-5) | 17/13 (-8.33/-10.56) | 0/-2 (-17/-19) | -17/-18 (-27/-28) |
|--------|-----------------------|------------------------|----------------------|----------------------|---------------------|----------------------|-------------------|----------------------|
| | | | | | | | | |
| BAR | 55(12.78) | 30.9 | 29.1 | 25.8 | 23.3 | 21.2 | 18.9 | 16.8 |
| | 65(18.33) | 33.2 | 30.6 | 27.1 | 25.9 | 23.8 | 20.9 | 19.4 |
| | 75(23.89) | 34.5 | 32.1 | 28.4 | 26.8 | 25.4 | 21.9 | 20.4 |
| PSI | 55(12.78) | 448 | 421 | 374 | 337 | 308 | 273 | 244 |
| | 65(18.33) | 480 | 444 | 394 | 375 | 346 | 303 | 282 |
| | 75(23.89) | 499 | 466 | 411 | 389 | 369 | 318 | 296 |
| MPa | 55(12.78) | 3.09 | 2.91 | 2.58 | 2.33 | 2.12 | 1.89 | 1.68 |
| | 65(18.33) | 3.32 | 3.06 | 2.71 | 2.59 | 2.38 | 2.09 | 1.94 |
| | 75(23.89) | 3.45 | 3.21 | 2.84 | 2.68 | 2.54 | 2.19 | 2.04 |



System Pressure Table-R22

| Pressure | | | Temperature | | Pressure | | | Temperature | |
|----------|------|--------|-------------|---------|----------|------|--------|-------------|---------|
| Kpa | bar | PSI | °C | °F | Kpa | bar | PSI | °C | °F |
| 100 | 1 | 14.5 | -41.091 | -41.964 | 1600 | 16 | 232 | 41.748 | 107.146 |
| 150 | 1.5 | 21.75 | -32.077 | -25.739 | 1650 | 16.5 | 239.25 | 43.029 | 109.452 |
| 200 | 2 | 29 | -25.177 | -13.319 | 1700 | 17 | 246.5 | 44.281 | 111.706 |
| 250 | 2.5 | 36.25 | -19.508 | -3.114 | 1750 | 17.5 | 253.75 | 45.506 | 113.911 |
| 300 | 3 | 43.5 | -14.654 | 5.623 | 1800 | 18 | 261 | 46.706 | 116.071 |
| 350 | 3.5 | 50.75 | -10.384 | 13.309 | 1850 | 18.5 | 268.25 | 47.882 | 118.188 |
| 400 | 4 | 58 | -6.556 | 20.199 | 1900 | 19 | 275.5 | 49.034 | 120.261 |
| 450 | 4.5 | 65.25 | -3.075 | 26.464 | 1950 | 19.5 | 282.75 | 50.164 | 122.295 |
| 500 | 5 | 72.5 | 0.124 | 32.223 | 2000 | 20 | 290 | 51.273 | 124.291 |
| 550 | 5.5 | 79.75 | 3.091 | 37.563 | 2050 | 20.5 | 297.25 | 52.361 | 126.250 |
| 600 | 6 | 87 | 5.861 | 42.550 | 2100 | 21 | 304.5 | 53.43 | 128.174 |
| 650 | 6.5 | 94.25 | 8.464 | 47.234 | 2150 | 21.5 | 311.75 | 54.48 | 130.064 |
| 700 | 7 | 101.5 | 10.92 | 51.656 | 2200 | 22 | 319 | 55.512 | 131.922 |
| 750 | 7.5 | 108.75 | 13.249 | 55.848 | 2250 | 22.5 | 326.25 | 56.527 | 133.749 |
| 800 | 8 | 116 | 15.465 | 59.837 | 2300 | 23 | 333.5 | 57.526 | 135.547 |
| 850 | 8.5 | 123.25 | 17.58 | 63.644 | 2350 | 23.5 | 340.75 | 58.508 | 137.314 |
| 900 | 9 | 130.5 | 19.604 | 67.287 | 2400 | 24 | 348 | 59.475 | 139.055 |
| 950 | 9.5 | 137.75 | 21.547 | 70.785 | 2450 | 24.5 | 355.25 | 60.427 | 140.769 |
| 1000 | 10 | 145 | 23.415 | 74.147 | 2500 | 25 | 362.5 | 61.364 | 142.455 |
| 1050 | 10.5 | 152.25 | 25.216 | 77.389 | 2550 | 25.5 | 369.75 | 62.288 | 144.118 |
| 1100 | 11 | 159.5 | 26.953 | 80.515 | 2600 | 26 | 377 | 63.198 | 145.756 |
| 1150 | 11.5 | 166.75 | 28.634 | 83.541 | 2650 | 26.5 | 384.25 | 64.095 | 147.371 |
| 1200 | 12 | 174 | 30.261 | 86.470 | 2700 | 27 | 391.5 | 64.98 | 148.964 |
| 1250 | 12.5 | 181.25 | 31.839 | 89.310 | 2750 | 27.5 | 398.75 | 65.852 | 150.534 |
| 1300 | 13 | 188.5 | 33.371 | 92.068 | 2800 | 28 | 406 | 66.712 | 152.082 |
| 1350 | 13.5 | 195.75 | 34.86 | 94.748 | 2850 | 28.5 | 413.25 | 67.561 | 153.610 |
| 1400 | 14 | 203 | 36.308 | 97.354 | 2900 | 29 | 420.5 | 68.399 | 155.118 |
| 1450 | 14.5 | 210.25 | 37.719 | 99.894 | 2950 | 29.5 | 427.75 | 69.226 | 156.607 |
| 1500 | 15 | 217.5 | 39.095 | 102.371 | 3000 | 30 | 435 | 70.042 | 158.076 |
| 1550 | 15.5 | 224.75 | 40.437 | 104.787 | | | | | |

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 | | | | | |

System Pressure Table-R32

| Pressure | | | Temperature | | Pressure | | | Temperature | |
|----------|------|--------|-------------|---------|----------|------|--------|-------------|---------|
| Kpa | bar | PSI | °C | °F | Kpa | bar | PSI | °C | °F |
| 100 | 1 | 14.5 | -51.909 | -61.436 | 1850 | 18.5 | 268.25 | 28.425 | 83.165 |
| 150 | 1.5 | 21.75 | -43.635 | -46.543 | 1900 | 19 | 275.5 | 29.447 | 85.005 |
| 200 | 2 | 29 | -37.323 | -35.181 | 1950 | 19.5 | 282.75 | 30.448 | 86.806 |
| 250 | 2.5 | 36.25 | -32.15 | -25.87 | 2000 | 20 | 290 | 31.431 | 88.576 |
| 300 | 3 | 43.5 | -27.731 | -17.916 | 2050 | 20.5 | 297.25 | 32.395 | 90.311 |
| 350 | 3.5 | 50.75 | -23.85 | -10.93 | 2100 | 21 | 304.5 | 33.341 | 92.014 |
| 400 | 4 | 58 | -20.378 | -4.680 | 2150 | 21.5 | 311.75 | 34.271 | 93.688 |
| 450 | 4.5 | 65.25 | -17.225 | 0.995 | 2200 | 22 | 319 | 35.184 | 95.331 |
| 500 | 5 | 72.5 | -14.331 | 6.204 | 2250 | 22.5 | 326.25 | 36.082 | 96.948 |
| 550 | 5.5 | 79.75 | -11.65 | 11.03 | 2300 | 23 | 333.5 | 36.965 | 98.537 |
| 600 | 6 | 87 | -9.150 | 15.529 | 2350 | 23.5 | 340.75 | 37.834 | 100.101 |
| 650 | 6.5 | 94.25 | -6.805 | 19.752 | 2400 | 24 | 348 | 38.688 | 101.638 |
| 700 | 7 | 101.5 | -4.593 | 23.734 | 2450 | 24.5 | 355.25 | 39.529 | 103.152 |
| 750 | 7.5 | 108.75 | -2.498 | 27.505 | 2500 | 25 | 362.5 | 40.358 | 104.644 |
| 800 | 8 | 116 | -0.506 | 31.089 | 2550 | 25.5 | 369.75 | 41.173 | 106.111 |
| 850 | 8.5 | 123.25 | 1.393 | 34.507 | 2600 | 26 | 377 | 41.977 | 107.559 |
| 900 | 9 | 130.5 | 3.209 | 37.777 | 2650 | 26.5 | 384.25 | 42.769 | 108.984 |
| 950 | 9.5 | 137.75 | 4.951 | 40.911 | 2700 | 27 | 391.5 | 43.55 | 110.39 |
| 1000 | 10 | 145 | 6.624 | 43.923 | 2750 | 27.5 | 398.75 | 44.32 | 111.776 |
| 1050 | 10.5 | 152.25 | 8.235 | 46.823 | 2800 | 28 | 406 | 45.079 | 113.142 |
| 1100 | 11 | 159.5 | 9.790 | 49.621 | 2850 | 28.5 | 413.25 | 45.828 | 114.490 |
| 1150 | 11.5 | 166.75 | 11.291 | 52.324 | 2900 | 29 | 420.5 | 46.567 | 115.821 |
| 1200 | 12 | 174 | 12.745 | 54.941 | 2950 | 29.5 | 427.75 | 47.296 | 117.133 |
| 1250 | 12.5 | 181.25 | 14.153 | 57.475 | 3000 | 30 | 435 | 48.015 | 118.427 |
| 1300 | 13 | 188.5 | 15.52 | 59.936 | 3050 | 30.5 | 442.25 | 48.726 | 119.707 |
| 1350 | 13.5 | 195.75 | 16.847 | 62.325 | 3100 | 31 | 449.5 | 49.428 | 120.970 |
| 1400 | 14 | 203 | 18.138 | 64.648 | 3150 | 31.5 | 456.75 | 50.121 | 122.218 |
| 1450 | 14.5 | 210.25 | 19.395 | 66.911 | 3200 | 32 | 464 | 50.806 | 123.451 |
| 1500 | 15 | 217.5 | 20.619 | 69.114 | 3250 | 32.5 | 471.25 | 51.482 | 124.668 |
| 1550 | 15.5 | 224.75 | 21.813 | 71.263 | 3300 | 33 | 478.5 | 52.15 | 125.87 |
| 1600 | 16 | 232 | 22.978 | 73.360 | 3350 | 33.5 | 485.75 | 52.811 | 127.060 |
| 1650 | 16.5 | 239.25 | 24.116 | 75.409 | 3400 | 34 | 493 | 53.464 | 128.235 |
| 1700 | 17 | 246.5 | 25.229 | 77.412 | 3450 | 34.5 | 500.25 | 54.11 | 129.398 |
| 1750 | 17.5 | 253.75 | 26.317 | 79.371 | 3500 | 35 | 507.5 | 54.748 | 130.546 |
| 1800 | 18 | 261 | 27.382 | 81.288 | | | | | |