



CERTUS

KSM-IW10-WCT10MIM32

KSM-IW15-WCT10MIM32

KSM-IW20-WCT10MIM32

KSM-IW25-WCT10MIM32

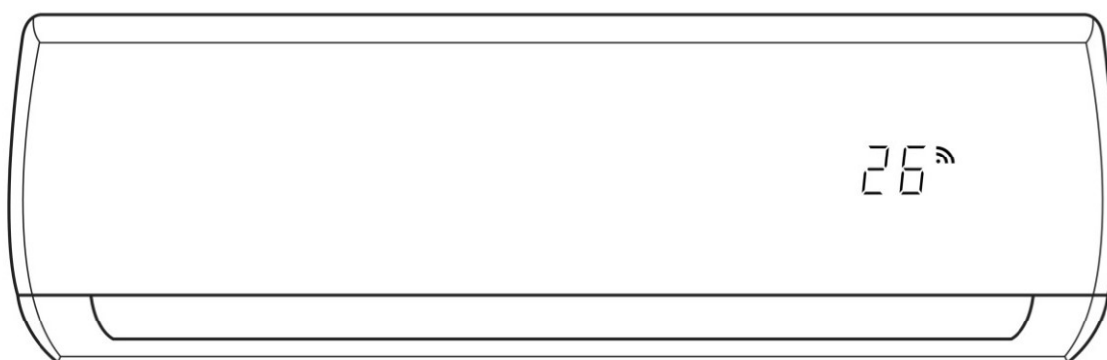


Table of Contents

§. Safety Precautions

1. Precautions
2. Information servicing(For flammable materials)

§. Specifications

1. Model Reference
2. Pipe length and the Drop Height
3. Refrigerant Cycle Diagrams
4. Electrical Wiring Diagrams

§. Product Features

1. Display Function
2. Safety Features
3. Basic Features
4. Optional Features

§. Maintenance

1. First Time Installation Check
2. Refrigerant Recharge
3. Re-Installation

§. Indoor Unit Disassembly

1. Dimension
2. Indoor Unit Disassembly

§. Outdoor Unit Disassembly

1. Outdoor Unit Table
2. Dimension
3. Outdoor Unit Disassembly

Table of Contents

§. Troubleshooting

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

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



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

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 operates in areas water or other liquids.
- Ensure the drain hose is installed correctly to ensure proper water drainage.
- When lifting or transporting the unit, it is recommended that two or more people are used for this task.
- When the unit is not to be used for an extended time, disconnect the power supply or turn off the breaker.



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

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

2.3 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.

2.4 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.

2.5 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.

2.6 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.

2.7 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.

2.8 Checks to electrical devices

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



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

2.9 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.

2.10 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.

2.11 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.

2.12 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.

2.13 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.

2.14 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.

2.15 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.

2.16 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.

2.17 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.

2.18 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.

Specifications

Contents

1.	Model Reference.....	2
2.	Pipe Length and Drop Height	3
3.	Refrigerant Cycle Diagrams	4
4.	Electrical Wiring Diagrams.....	5



1. Model Reference

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

Model	Nominal Capacity (hp)	Cooling Capacity (kJ/h)	Power Supply
KSM-IW10-WCT10M1M32	1.0	9,792	230V / 1 Phase / 60 Hz
KSM-IW15-WCT10M1M32	1.5	12,660	
KSM-IW20-WCT10M1M32	2.0	18,990	
KSM-IW25-WCT10M1M32	2.5	23,210	



2. Pipe Length and Drop Height

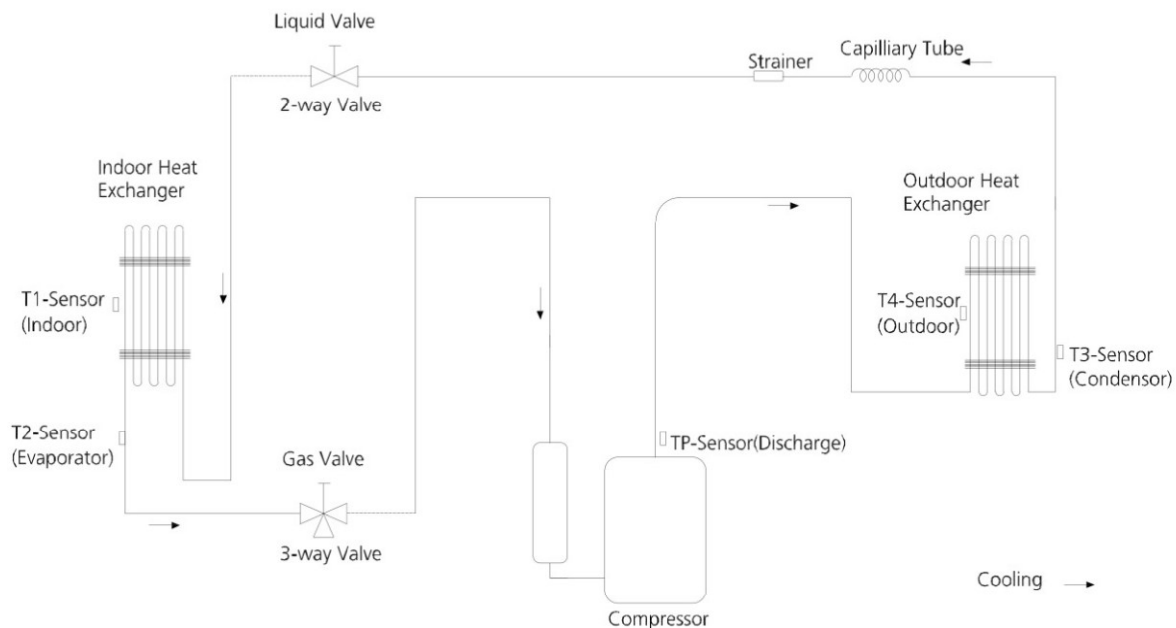
The length and elevation of connection pipe are shown in the table below.

additional refrigerant should be charged to ensure nominal cooling/heating capacity.

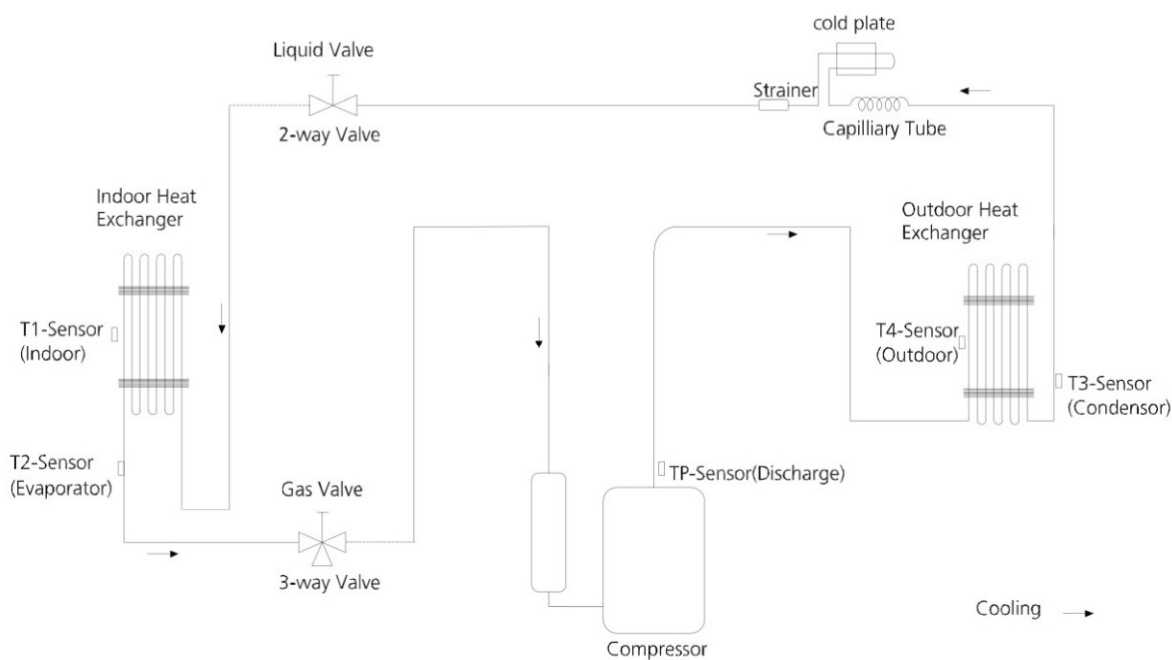
Model	Min. Pipe Length	Max. Pipe Length	Max. Pipe Height	Additional Refrigerant
KSM-IW10-WCT10M1M32	3 m / 9.8 ft	20 m / 65 ft	10 m / 32 ft	12 g/m
KSM-IW15-WCT10M1M32				
KSM-IW20-WCT10M1M32				
KSM-IW25-WCT10M1M32				

3. Refrigerant Cycle Diagrams

KSM-IW10-WCT10M1M32
KSM-IW15-WCT10M1M32



KSM-IW20-WCT10M1M32
KSM-IW25-WCT10M1M32





4. Electrical Wiring Diagrams

Indoor unit abbreviations

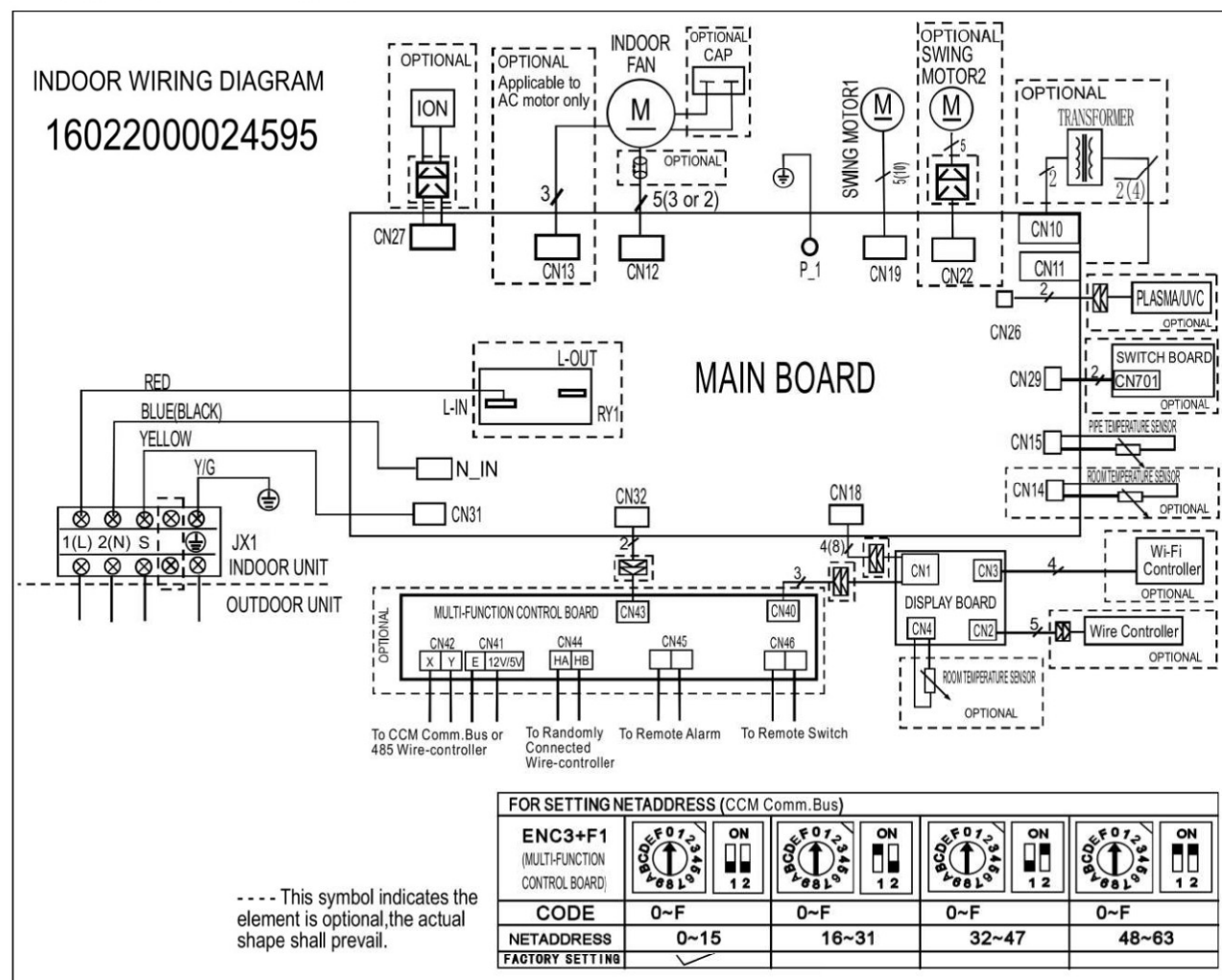
Abbreviation	Paraphrase
Y/G	Yellow-Green Conductor
ION	Positive and Negative Ion Generator
CAP	Capacitor
PLASMA	Electronic Dust Collector
L	LIVE
N	NEUTRAL

Outdoor unit abbreviations

Abbreviation	Paraphrase
4-WAY	Gas Valve Assembly/4-WAY VALVE
AC-FAN	Alternating Current FAN
DC-FAN	Direct Current FAN
COMP	Compressor



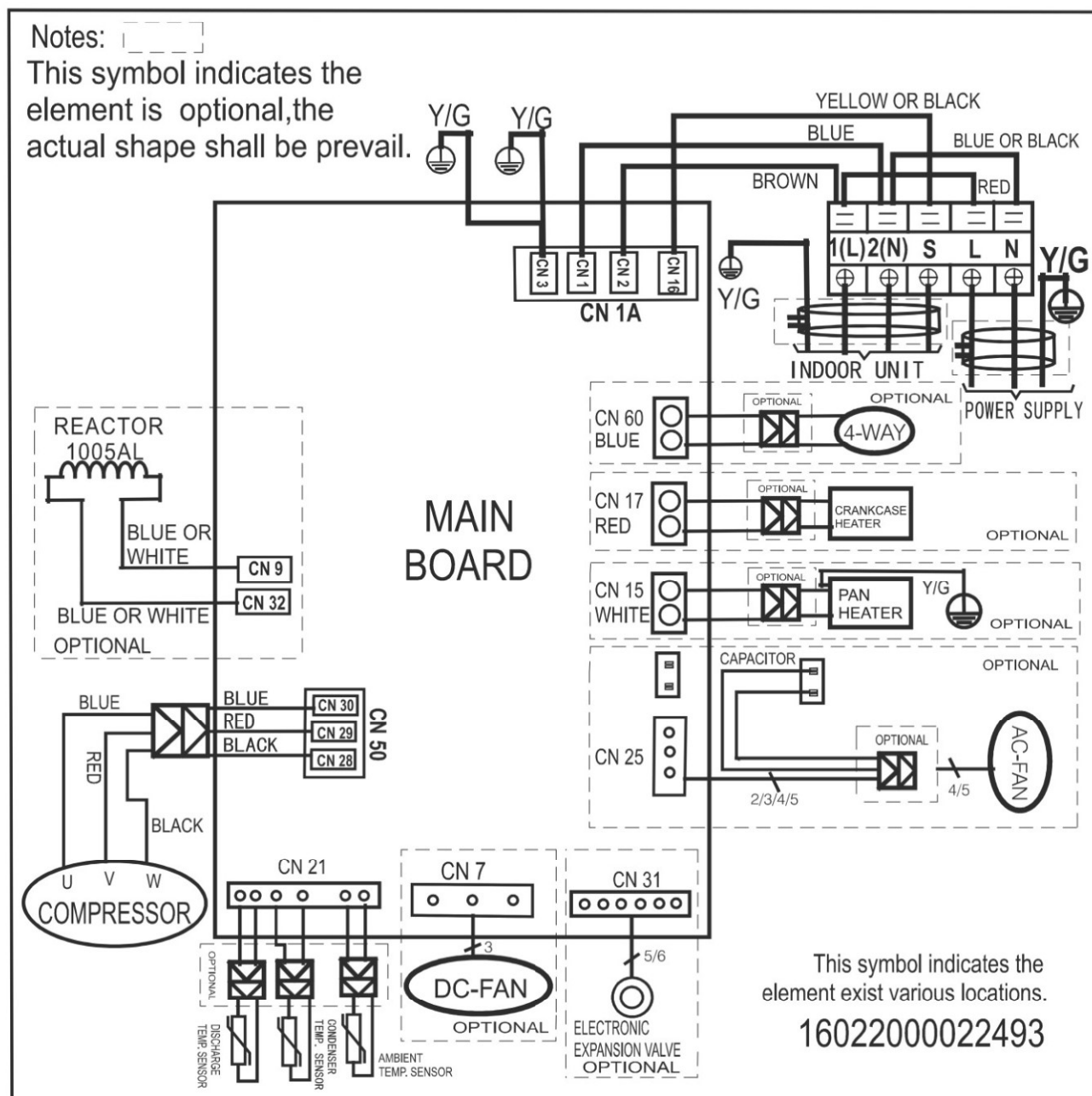
Indoor Unit Wiring Diagram: KSM-IW10-WCT10M1M32 / KSM-IW15-WCT10M1M32 / KSM-IW20-WCT10M1M32



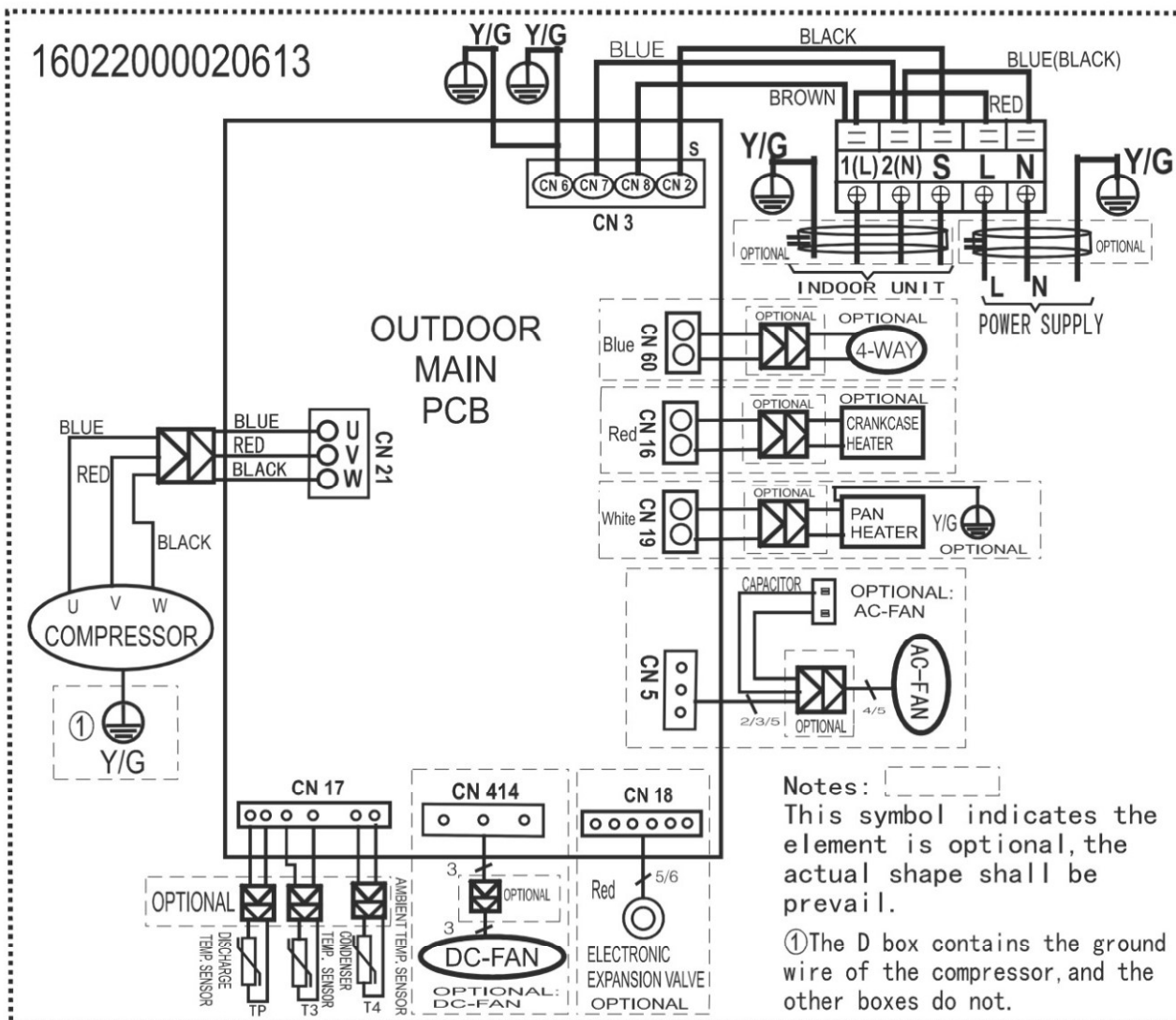
Outdoor Unit Wiring Diagram: KSM-IW10-WCT10M1M32 / KSM-IW15-WCT10M1M32

Notes: []

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



Outdoor Unit Wiring Diagram: KSM-IW20-WCT10M1M32



Product Features







Contents

1.	Display Function	2
2	Safety Features	3
3.	Basic Functions.....	4
	3.1 Abbreviation.....	4
	3.2 Fan Mode.....	4
	3.3 Cooling Mode.....	4
	3.4 Auto Mode.....	5
	3.5 Drying Mode.....	5
	3.6 Forced Operation Function.....	5
	3.7 Sleep Function.....	5
	3.8 Auto Restart Function.....	5
	3.9 Refrigerant Leakage Detection.....	6
	3.10 Ionizer / Plasma.....	6
	3.11 Timer.....	6
	3.12 Active Clean.....	6
	3.13 ECO Function	

1. Display Function

Unit display functions



Display		Function
		WiFi control
	Temperature value	Temperature
	 (3s)	Activation of Timer ON, Fresh, Swing, Turbo, or Silent
	 (3s)	Cancellation of Timer OFF, Fresh, Swing, Turbo, or Silent
		Active Clean
	E → [→ 0 → set temperature → E gradually illuminates to  in one second intervals	ECO function



2. Safety Features

Compressor three-minute delay at restart

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

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

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

Automatic shutoff based on discharge temperature

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

Automatic shutoff based on fan speed

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

Inverter module protection

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

Indoor fan delayed operation

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

Sensor redundancy and automatic shutoff

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

Refrigerant leakage detection

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

3. Basic Functions

3.1 Abbreviation

Unit element abbreviations

Abbreviation	Element
T1	Indoor room temperature
T2	Coil temperature of evaporator
T3	Coil temperature of condenser
T4	Outdoor ambient temperature
T5	Set temperature
Td	Control target temperature
TP	Compressor discharge temperature

In this manual, such as TCE1, TCE2...etc., they are well-setting parameter of EEPROM.

3.2 Fan Mode

When fan mode is activated:

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

3.3 Cooling Mode

3.3.1 Compressor Control

Cooling temperature compensation($\Delta T5$) is a well-setting parameter of EEPROM. It's value ranges from -2°C to 2°C. The default value is 0.

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

3.3.2 Indoor Fan Control

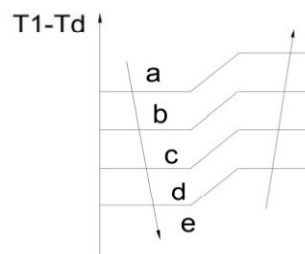
- In cooling mode, the indoor fan operates continuously. The fan speed can be set to high, medium, low, or

auto.

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

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

- The auto fan acts as below rules:



3.3.3 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.



3.3.4 Condenser Temperature Protection

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

3.3.5 Evaporator Temperature Protection

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

3.4 Auto Mode

- This mode can be selected with the remote controller and the setting temperature can be changed between 17°C~30°C(62°F~86°F).
- In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of ΔT ($\Delta T = T_1 - T_S$).

ΔT	Running mode
$\Delta T > A$	Cooling
$B < \Delta T \leq A$	Fan-only
$\Delta T < B$	Heating*

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

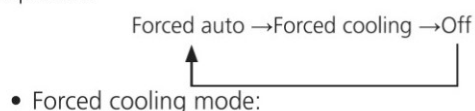
- Indoor fan will run at auto fan speed.
- The louver operates same as in relevant mode.
- If the machine switches mode between heating and cooling, the compressor will keep stopping for certain time and then choose mode according to ΔT .

3.5 Drying Mode

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

3.6 Forced Operation Function

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



- Forced cooling mode:

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

- Forced auto mode:

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

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

3.7 Sleep Function

- The sleep function is available in cooling, heating, or auto mode.
- The operational process for sleep mode is as follows:
 - When cooling, the temperature rises 1°C(2°F) (to 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(2°F) (to not lower than 17°C(62.6°F)) every hour. After 2 hours, the temperature stops decreasing and the indoor fan is fixed at low speed. Anti-cold wind function takes priority.
- The operating time for sleep mode is 8 hours, after which, the unit exits this mode and does not switch off.

3.8 Auto Restart Function

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



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

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

3.9 Refrigerant Leakage Detection

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

3.10 Ionizer/Plasma (for some models)

Press "Fresh" for at least 2 seconds on the remote control to enable the IONIZER function. While this function is active, the Ionizer/Plasma Dust Collector(dependent on models) is energized and will help to remove pollen and impurities from the air.

3.11 Timer Function

- Timing range is 24 hours.
- Timer on. The machine will turn on automatically when reaching the setting time.
- Timer off. The machine will turn off automatically when reaching the setting time.
- Timer on/off. The machine will turn on automatically when reaching the setting "on" time, and then turn off automatically when reaching the setting "off" time.
- Timer off/on. The machine will turn off automatically when reaching the setting "off" time, and then turn on automatically when reaching the setting "on" time.
- The timer function will not change the AC current operation mode. Suppose AC is off now, it will not start up firstly after setting the "timer off" function. And when reaching the setting time, the timer LED will be off and the AC running mode has not been changed.
- The setting time is relative time.
- The AC will quit the timer function when it has malfunction

3.12 Active Clean

- 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.

3.13 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, fan speed of Auto to save energy (but only if the set temperature is less than 24°C). If the set temperature is more than 24°C and 30°C, press the ECO button, the fan speed will change to Auto, the set temperature will remain unchanged.
- When AC receives signals. such as switch off. Turbo , Forced cooling operation, mode setting, Sleeping mode, or adjusting the set temperature to less than 24°C, it will quit the ECO operation.
- Operation time in ECO mode is 8 hours. After 8 hours the AC quits this mode.
- When there's any one temperature sensor in malfunction, the AC will quit ECO mode .
- Indoor fan will run at auto fan when enter into the ECO mode .The setting temperature and setting fan speed can be changed through remote controller signal.

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:

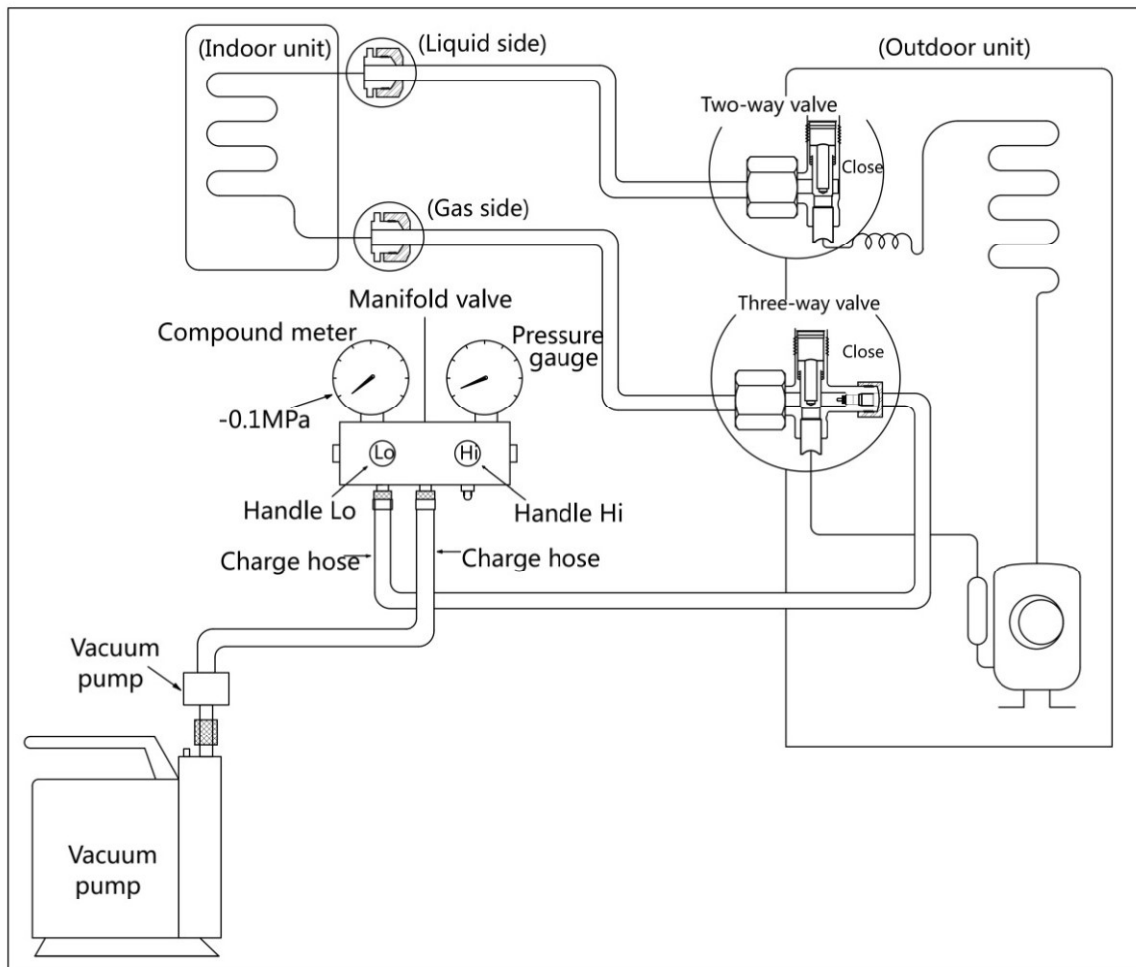
- Increasing pressure in the system.
- Increasing the operating current.
- Decreasing the cooling or heating efficiency.
- Congesting the capillary tubing due to ice build-up in the refrigerant circuit.
- Corroding the refrigerant system.

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

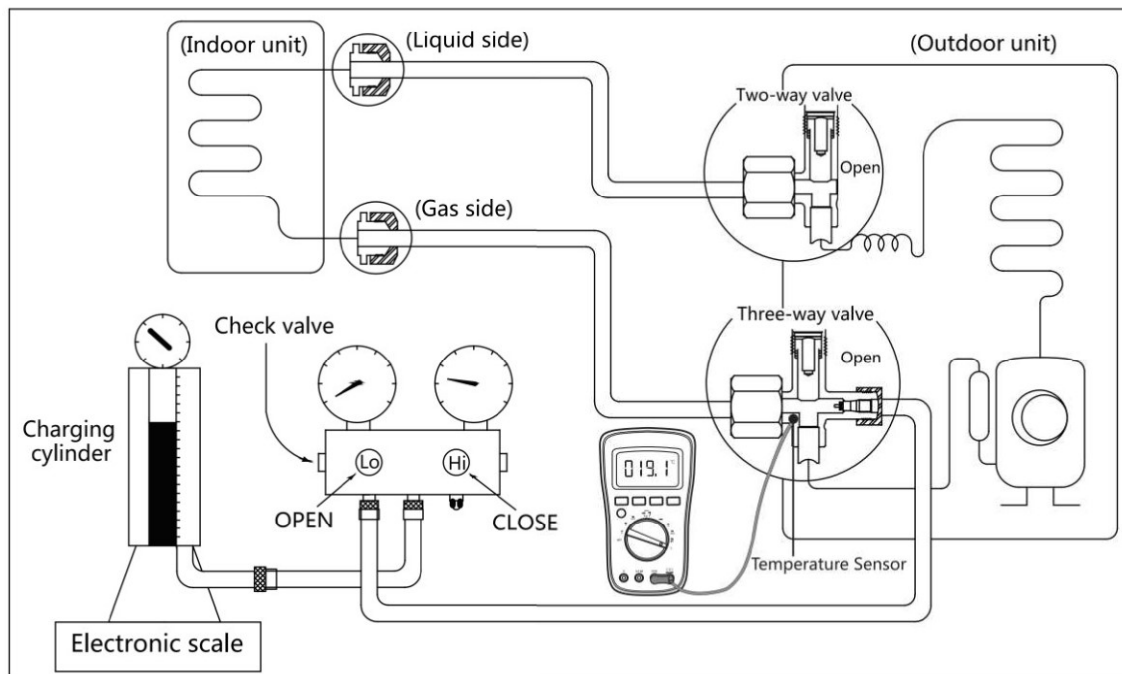




Procedure:

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.
 - b. If the pressure successfully reaches -0.1 MPa (14.5 Psi), fully close the Handle Lo valve, then cease vacuum pump operations.
6. Loosen the flare nut of the 3-way valve for 6 or 7 seconds and then tighten the flare nut again.
 - a. Confirm the pressure display in the pressure indicator is slightly higher than the atmospheric pressure.
 - b. Remove the charge hose from the 3-way valve.
7. Fully open the 2- and 3-way valves and tighten the cap of the 2- and 3-way valves.

2. Refrigerant Recharge



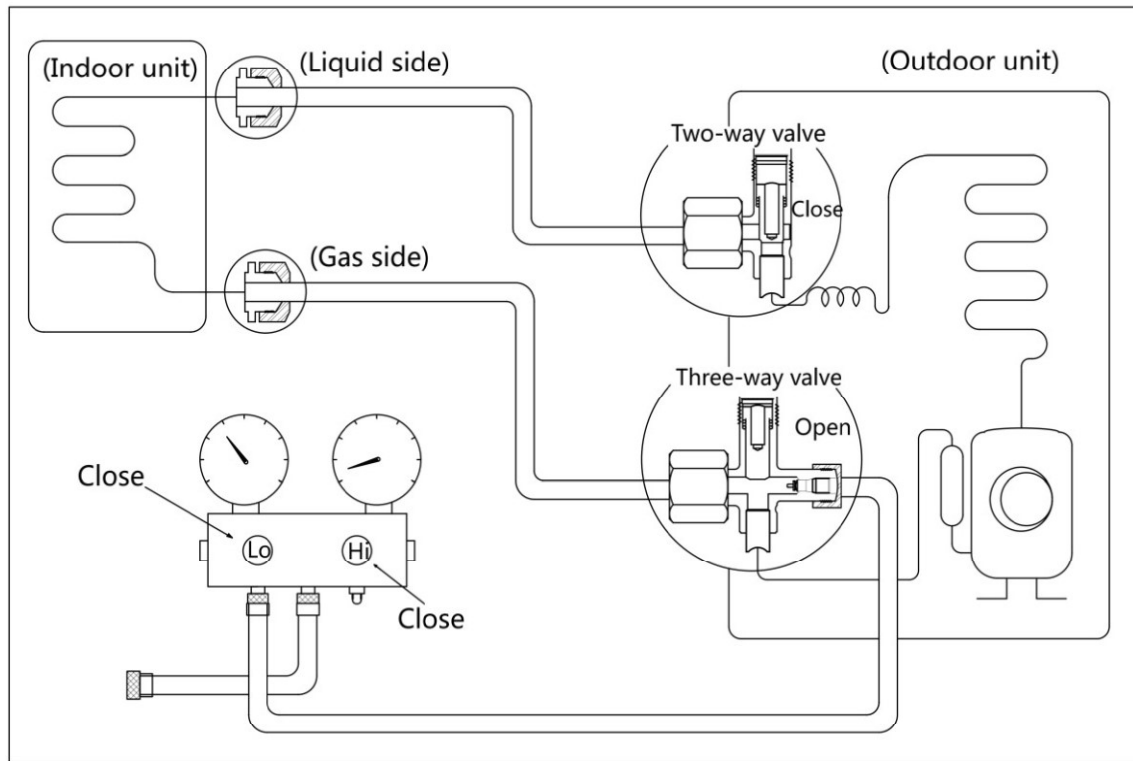
Procedure:

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

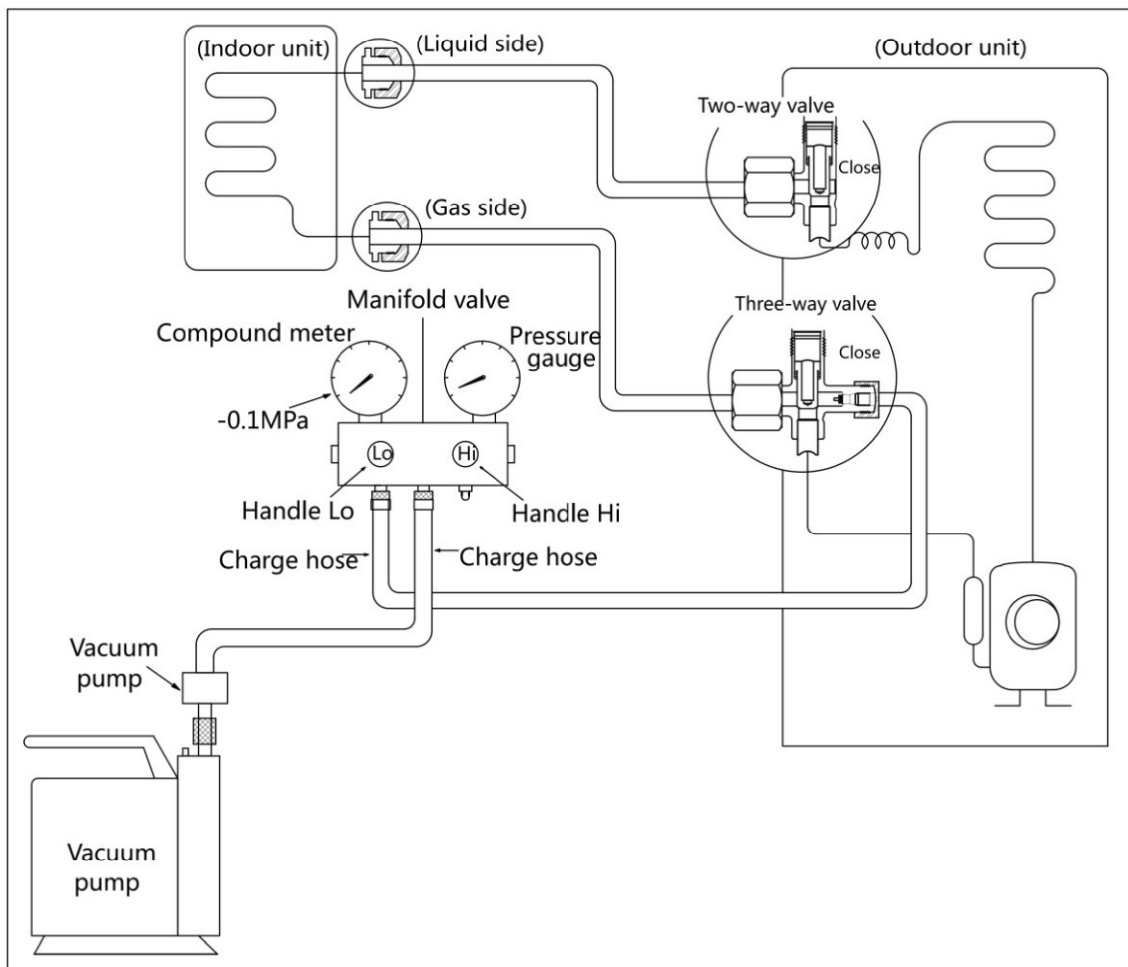
Collecting the refrigerant into the outdoor unit



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

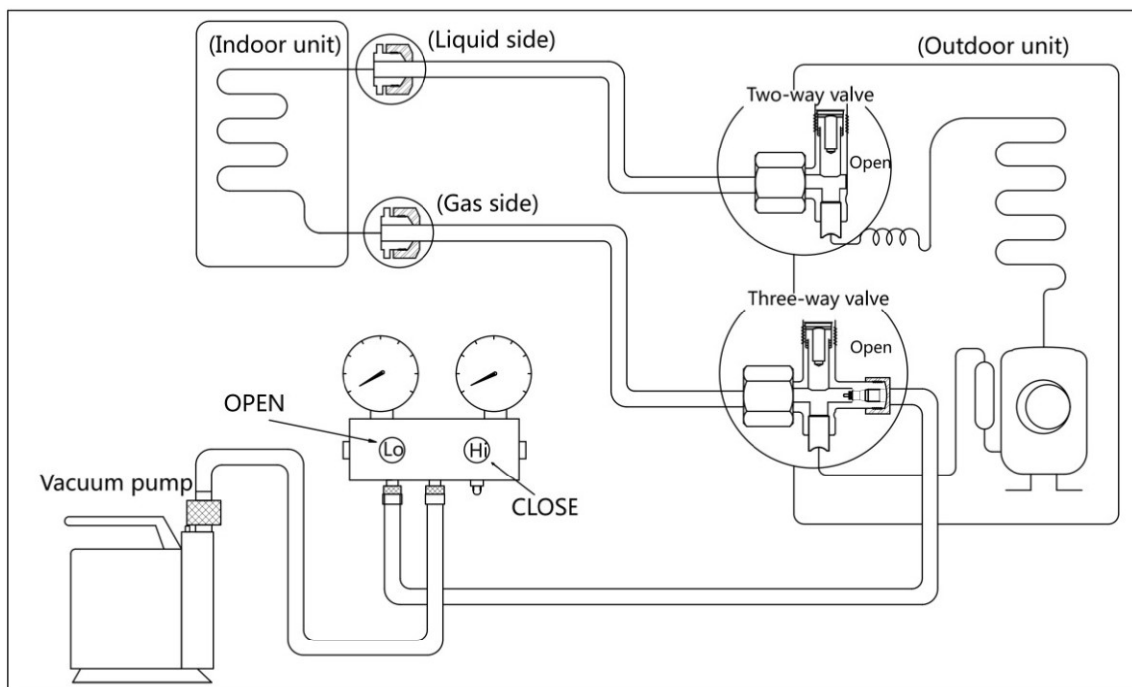


Procedure:

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

3.2 Outdoor Unit

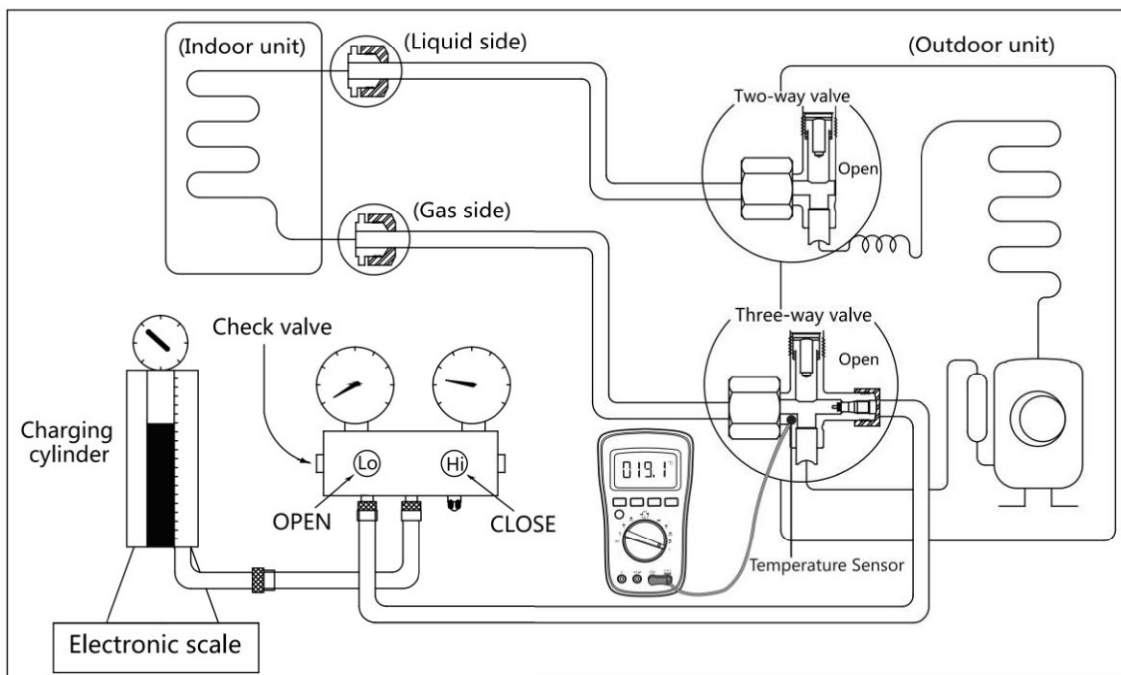
Evacuation for the whole system



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.

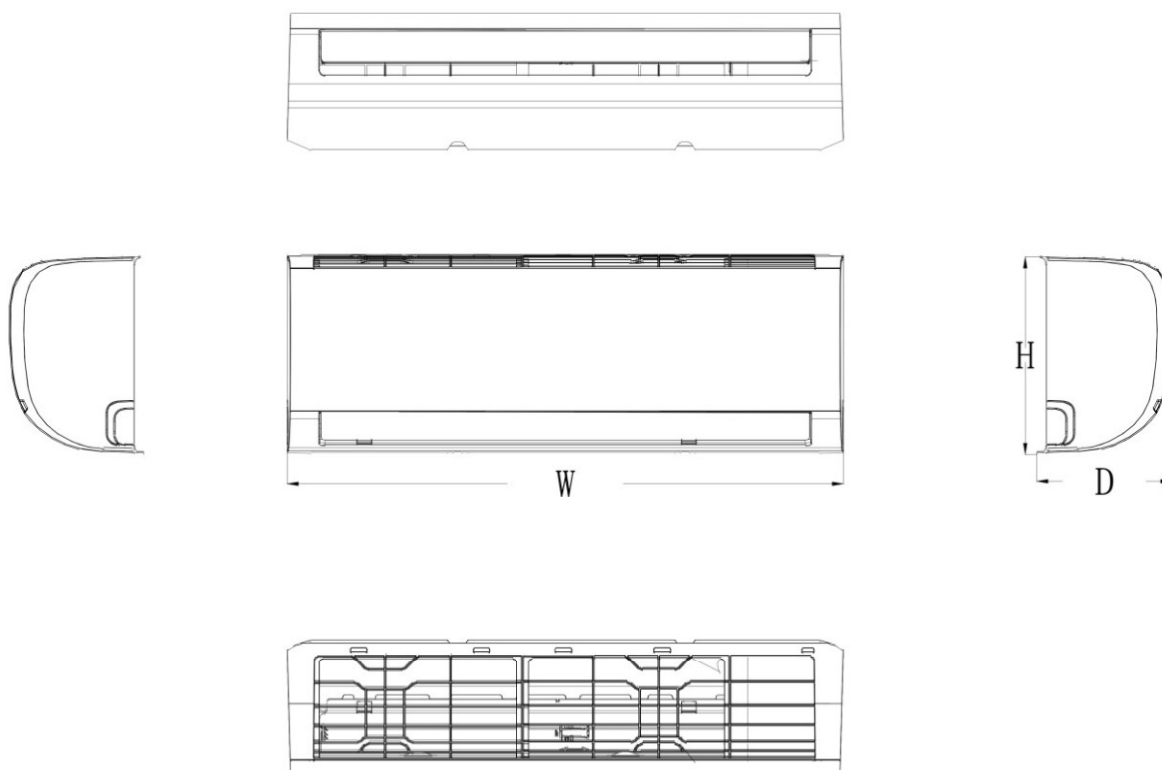
2. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated.

Indoor Unit Disassembly

Contents

1.	Dimension	2
2.	Indoor Unit Disassembly	3
2.1	Front Panel	3
2.2	Electrical parts	8
2.3	Evaporator.....	12
2.4	Fan motor and fan.....	14
2.5	Step motor	16
2.6	Drain Hose	17

1. Dimension

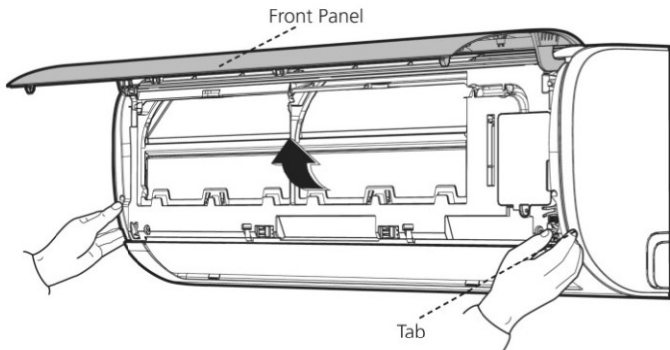
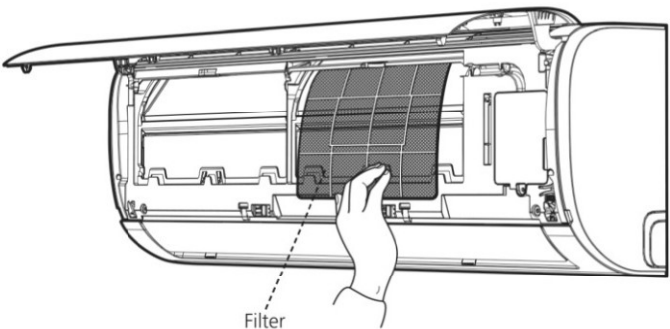


Model	Width (mm)	Depth (mm)	Height (mm)
KSM-IW10-WCT10M1M32	715	194	285
KSM-IW15-WCT10M1M32	805	194	285
KSM-IW20-WCT10M1M32	957	213	302
KSM-IW25-WCT10M1M32	1040	220	327

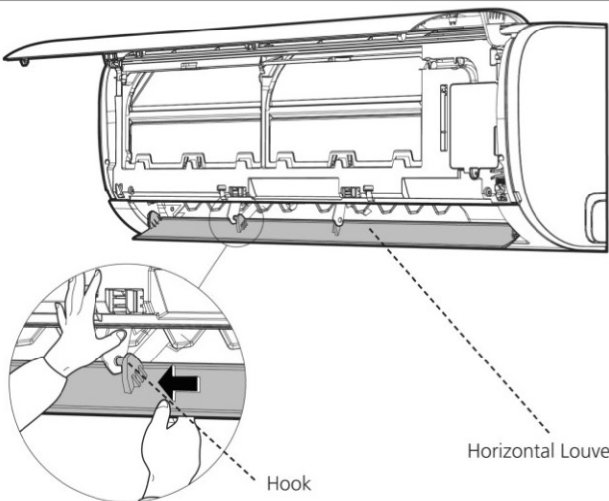
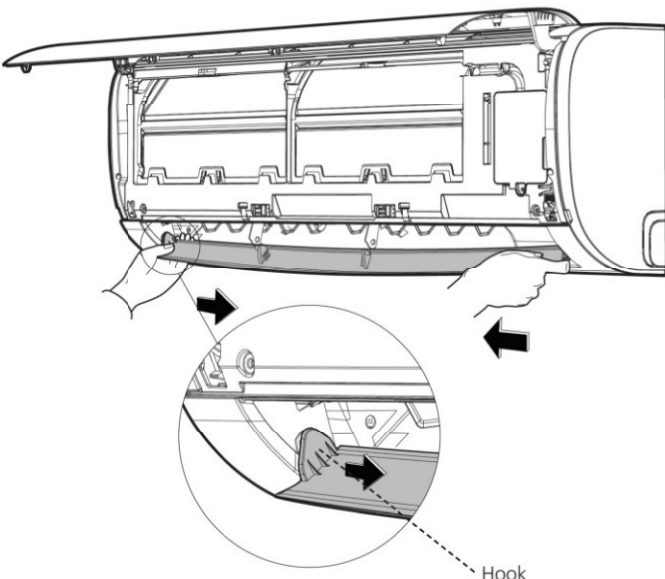
2. Disassembly

2.1 Indoor unit

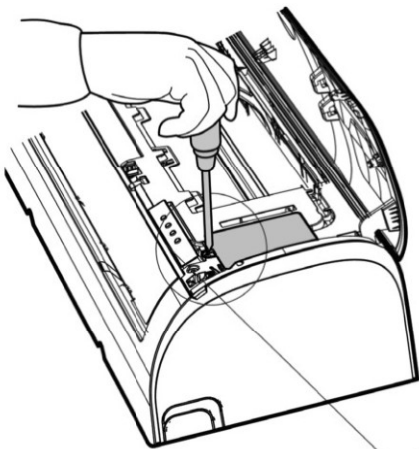
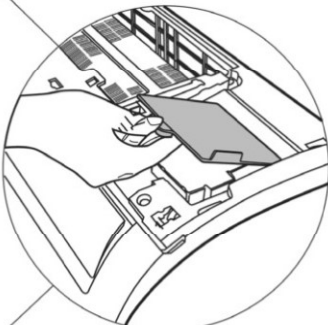

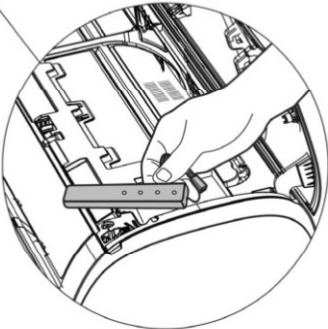
1. Front Panel

Procedure	Illustration
<p>1) Hold the front panel by the tabs on the both sides and lift it (see CJ_AF_001).</p>	 <p style="text-align: center;">CJ_AF_001</p>  <p style="text-align: center;">CJ_AF_002</p>



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

Procedure	Illustration
<p>3) Open the horizontal louver and push the hook towards left to open it (see CJ_AF_003).</p>	 <p style="text-align: center;">CJ_AF_003</p>  <p style="text-align: center;">CJ_AF_004</p>

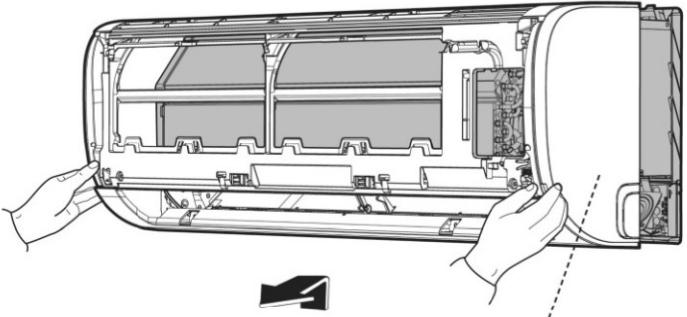
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
5) Remove 1 screw and then remove the electrical cover(see CJ_AF_005-1 and CJ_AF_005-2).	 <p>CJ_AF_005-1</p>  <p>CJ_AF_005-2</p>
6) Disconnect the connector for display board(see CJ_AF_005-3) .	 <p>CJ_AF_005-3</p>
7) Remove the display board(see CJ_AF_005-4).	 <p>CJ_AF_005-4</p>
	CJ_AF_005

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

Procedure	Illustration
<p>8) Open the screw caps(2) and the remove the screws(see CJ_AF_006).</p> <p>9) Release the 4 hooks.</p>	
<p>10)Release the seven hooks in the back (see CJ_AF_007).</p>	

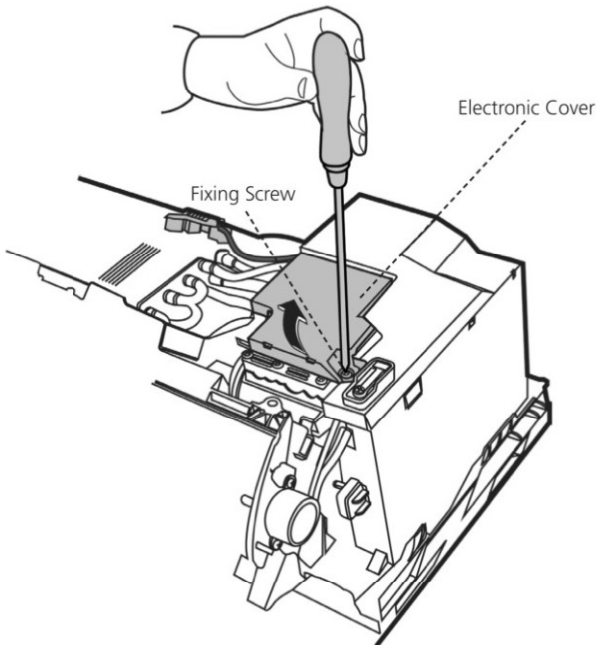
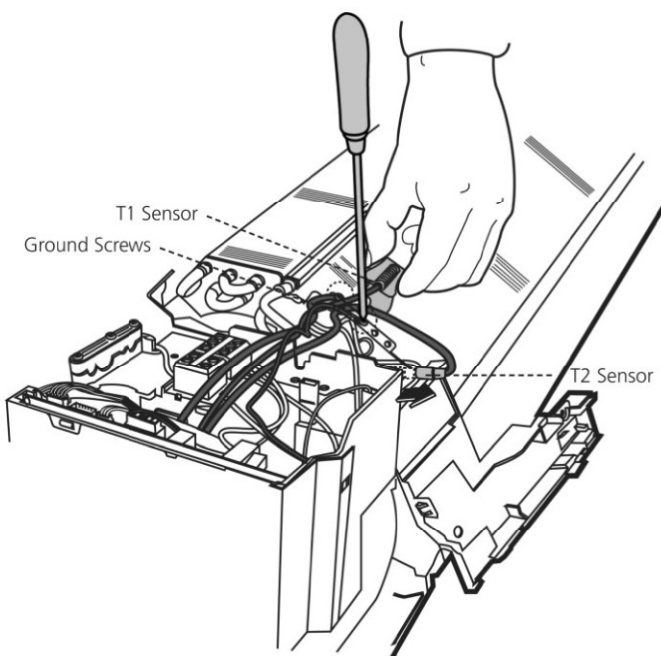
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>11) Pull out the panel frame while pushing the hook through a clearance between the panel frame and the heat exchanger (see CJ_AF_008).</p>	 <p>CJ_AF_008</p> <p>Panel Frame</p>

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

2. Electrical parts

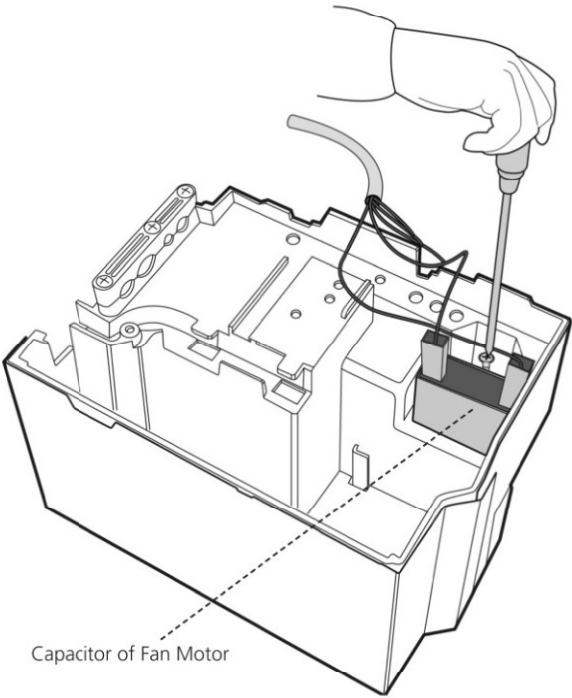
Note: Remove the front panel (refer to 1. Front panel) before disassembling electrical parts.

Procedure	Illustration
1) Remove the fixing screw and then remove the cover of electronic box and the terminal cover (see CJ_AF_009).	 <p style="text-align: center;">CJ_AF_009</p>
2) Pull out the room temperature sensor (T1) and the coil temperature sensor (T2) (see CJ_AF_010). 3) Remove the two screws used for the ground connection (see CJ_AF_010).	 <p style="text-align: center;">CJ_AF_010</p>

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

Procedure	Illustration
<p>4) Remove the fixing screw (see CJ_AF_011-1).</p> <p>5) Pull out the Electrical control box along the direction indicated in right image. to remove it (CJ_AF_011-2).</p>	<p>Fixing Screw</p> <p>Electronic Box</p> <p>CJ_AF_011-1</p> <p>CJ_AF_011-2</p>
<p>6) Disconnect the wires. Then remove the electronic main board (CJ_AF_012).</p>	<p>Swing Motor</p> <p>Applicable to AC Motor Only</p> <p>Indoor Fan Motor</p> <p>Display Board</p> <p>Pipe Temperature Sensor</p> <p>Room Temperature Sensor</p> <p>CJ_AF_012</p>

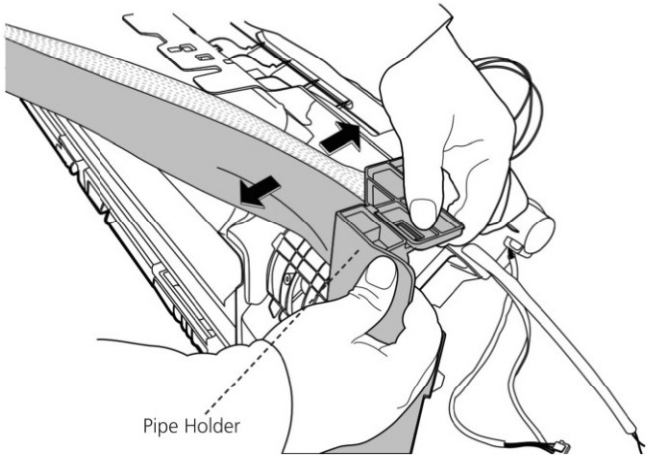
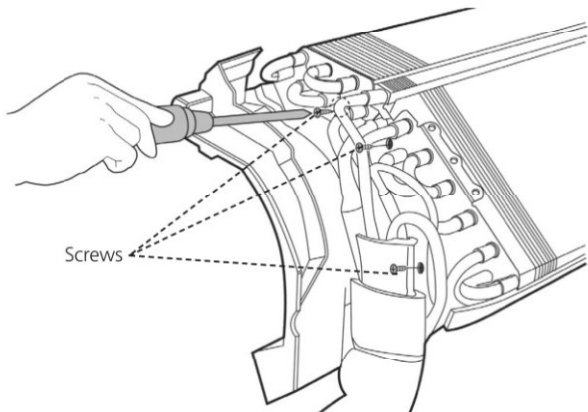
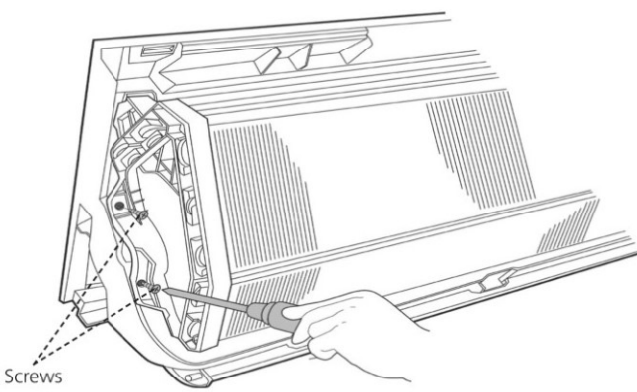
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>7) Remove the fixing screw, then remove the capacitor of fan motor (see CJ_AF_013).</p>	 <p>Capacitor of Fan Motor</p> <p>CJ_AF_013</p>

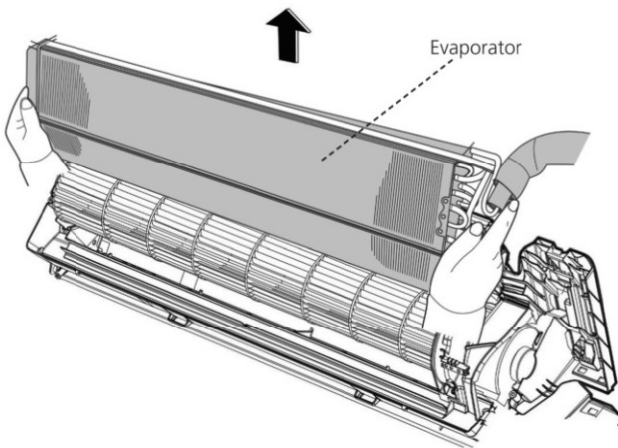
Note: This section is for reference only. Actual unit appearance may vary.

3. Evaporator

Note: Remove the front panel and electrical parts (refer to 1. Front panel and 2. Electrical parts) before disassembling evaporator.

Procedure	Illustration
1) Disassemble the pipe holder located at the rear of the unit (see CJ_AF_014).	 <p>Pipe Holder</p> <p>CJ_AF_014</p>
2) Remove the screws on the evaporator located at the fixed plate (see CJ_AF_015).	 <p>Screws</p> <p>CJ_AF_015</p>
3) Remove the two screws on the evaporator located at the base of the bearing side (see CJ_AF_016).	 <p>Screws</p> <p>CJ_AF_016</p>

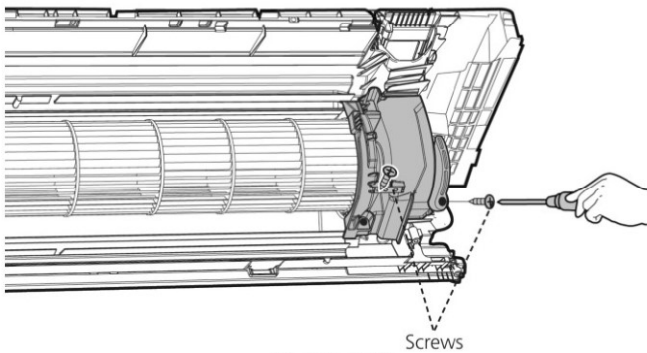
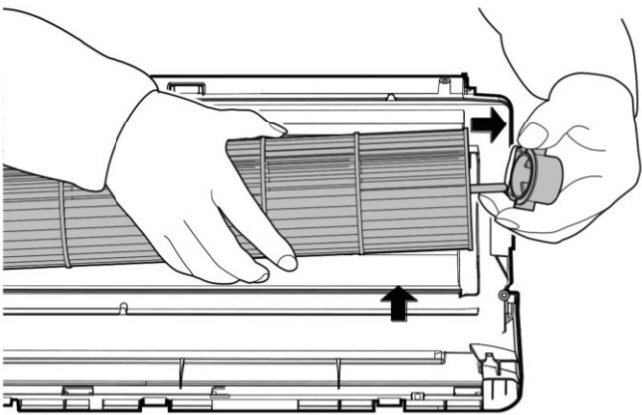
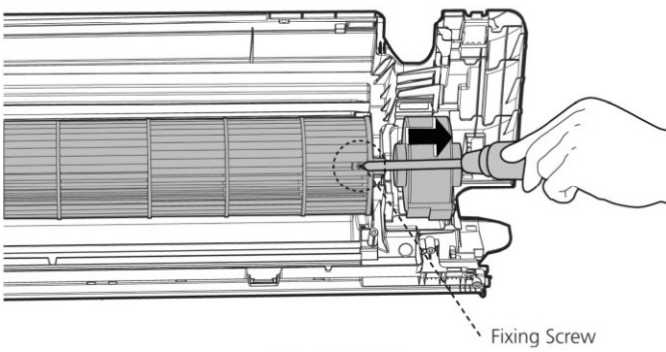
Note: This section is for reference only. Actual unit appearance may vary.

Procedure	Illustration
<p>4) Pull out the evaporator (see CJ_AF_017).</p>	 <p style="text-align: center;">CJ_AF_017</p>

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

4. Fan motor and fan

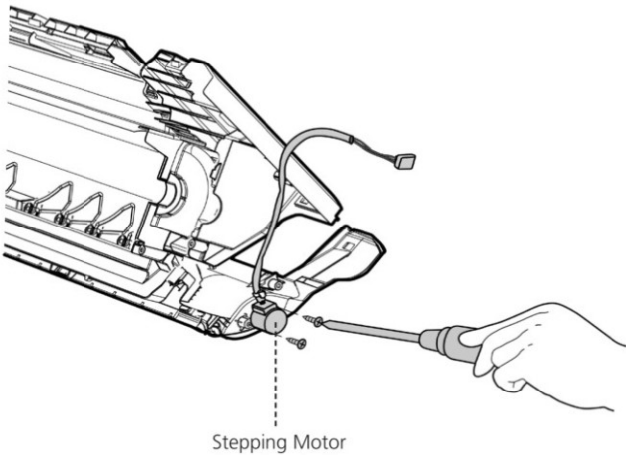
Note: Remove the front panel, electrical parts and evaporator (refer to 1. Front panel, 2. Electrical parts, and 3. Evaporator). before disassembling fan motor and fan.

Procedure	Illustration
1) Remove the two screws and remove the fixing board of the fan motor (see CJ_AF_018).	 <p>CJ_AF_018</p>
2) Remove the Bearing sleeve(see CJ_AF_019).	 <p>CJ_AF_019</p>
3) Remove the fixing screw (see CJ_AF_020).	 <p>CJ_AF_020</p>
4) Pull out the fan motor and fan assembly from the side.	

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

5. Step motor

Note: Remove the front panel and electrical parts (refer to 1. Front panel, 2. Electrical parts) before disassembling step motor.

Procedure	Illustration
<p>1) Remove the two screws, then remove the stepping motor (see CJ_AF_021).</p>	 <p>Stepping Motor</p> <p>CJ_AF_021</p>

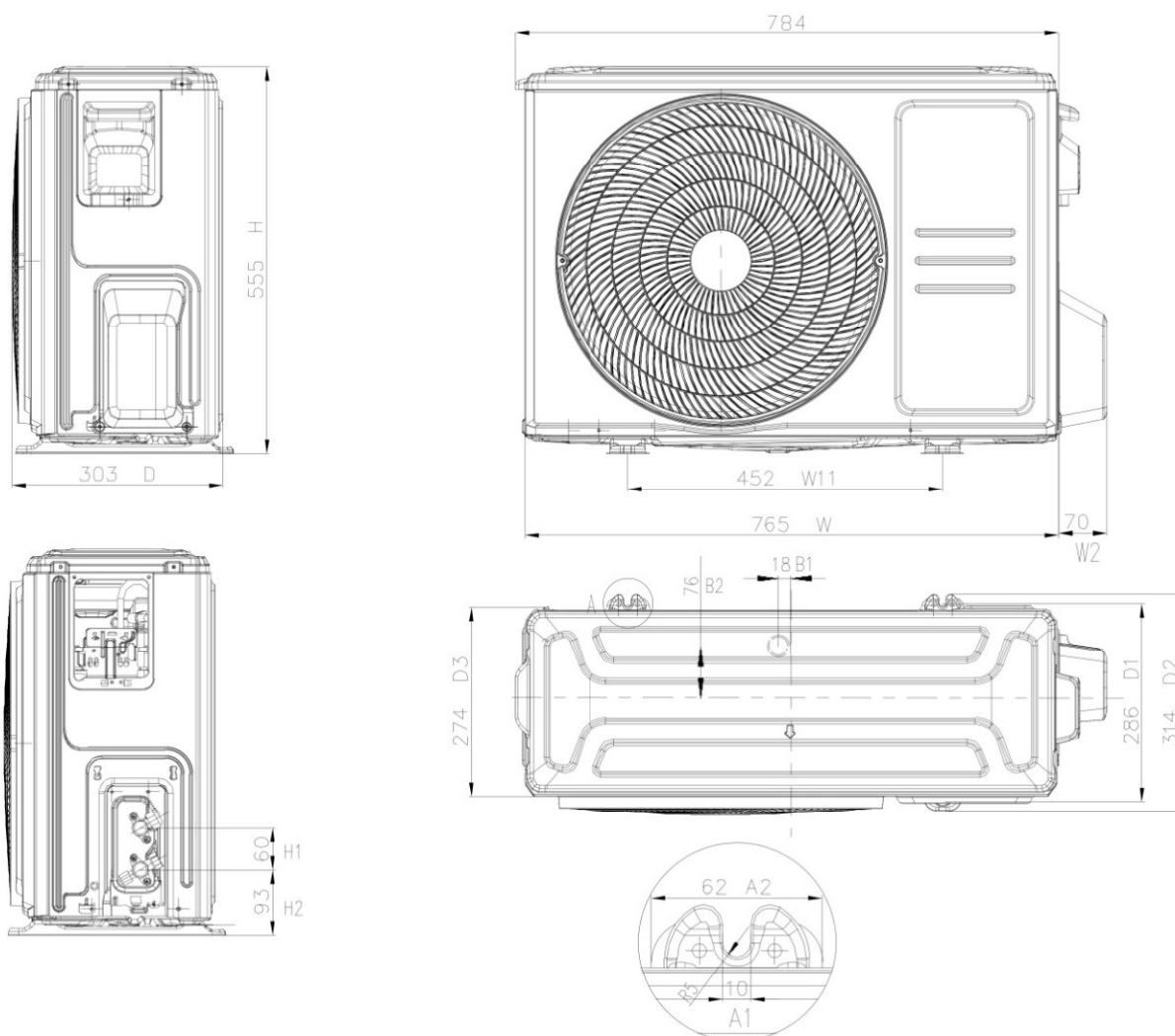
Note: This section is for reference only. Actual unit appearance may vary.

Outdoor Unit Disassembly

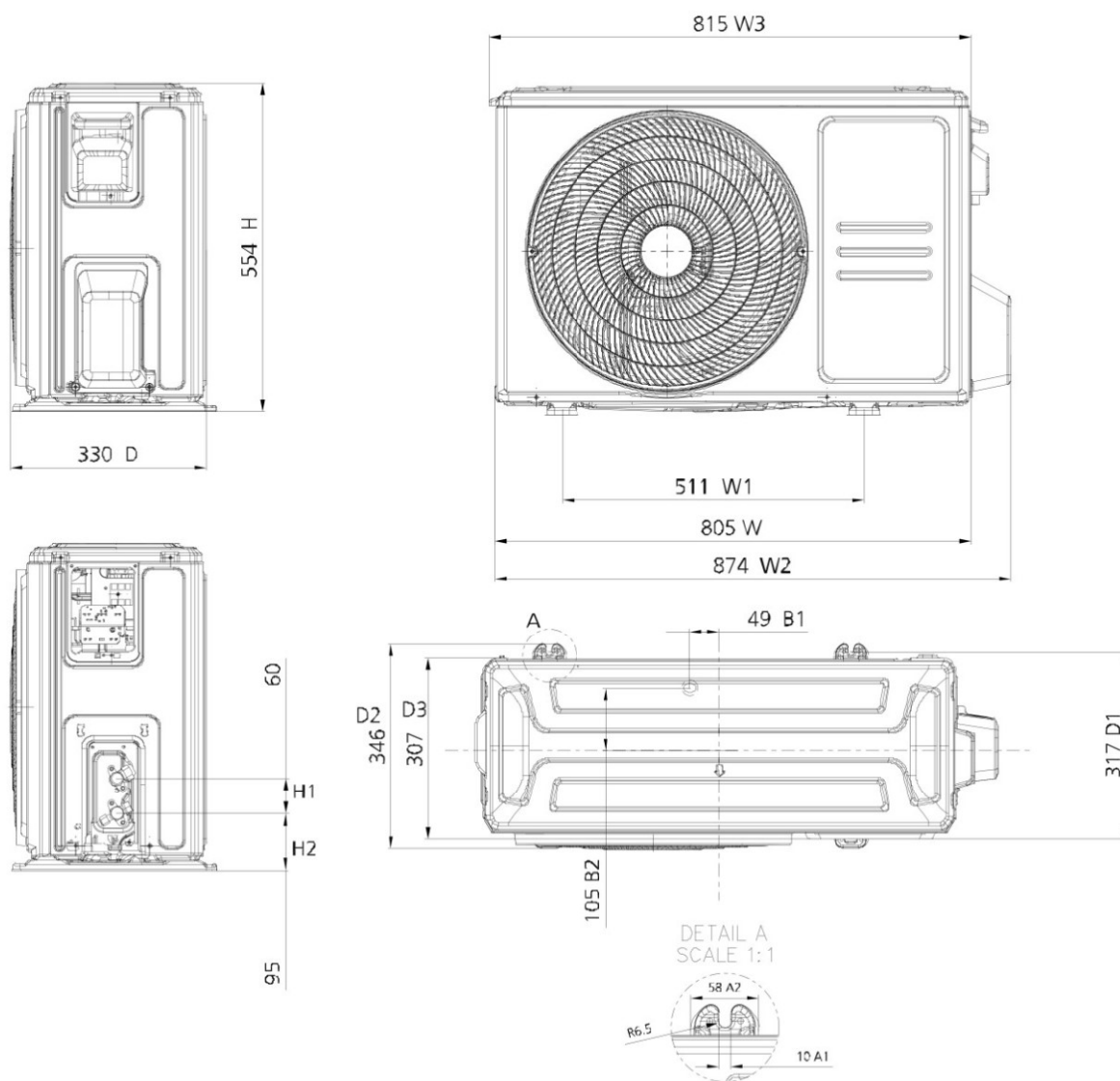
Contents

1. Dimension.....	2
2. Outdoor Unit Disassembly.....	5
3. Electrical Parts.....	11
4. Fan Assembly.....	14
5. Fan Motor.....	15
6. Sound Blanket.....	16
7. Compressor.....	17

1.2 KSM-IW20-WCT10M1M32

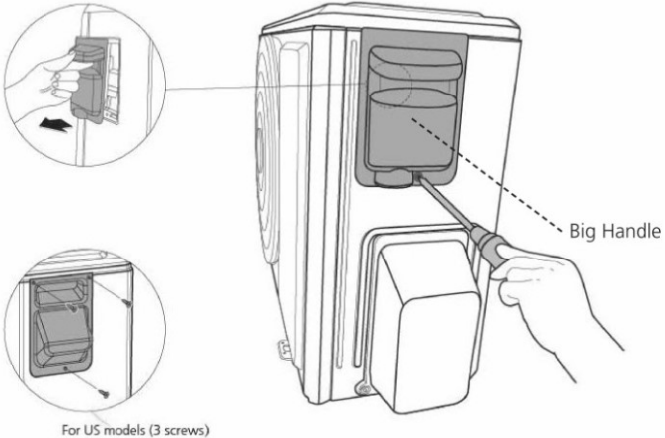
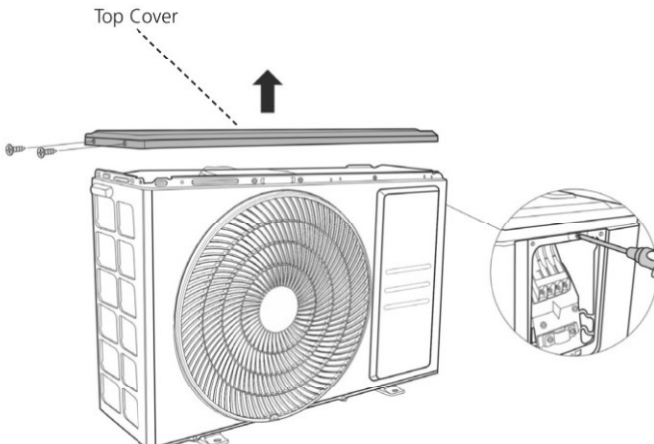


1.3 KSM-IW25-WCT10M1M32

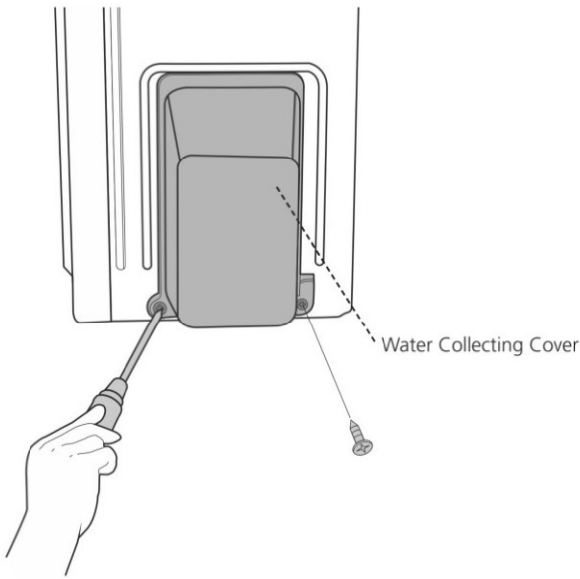
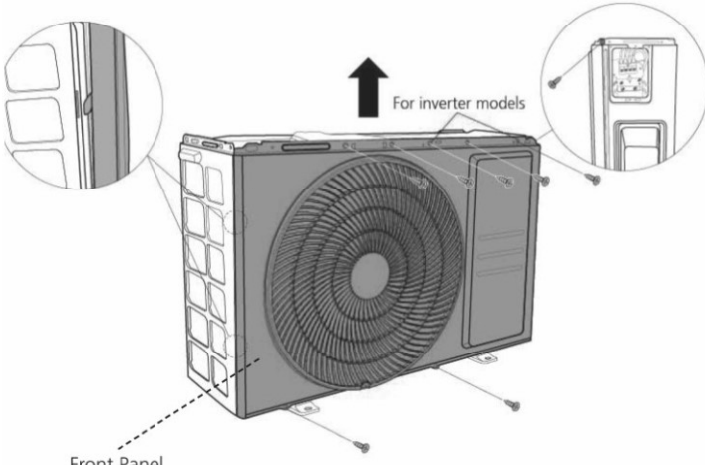


2. Outdoor Unit Disassembly

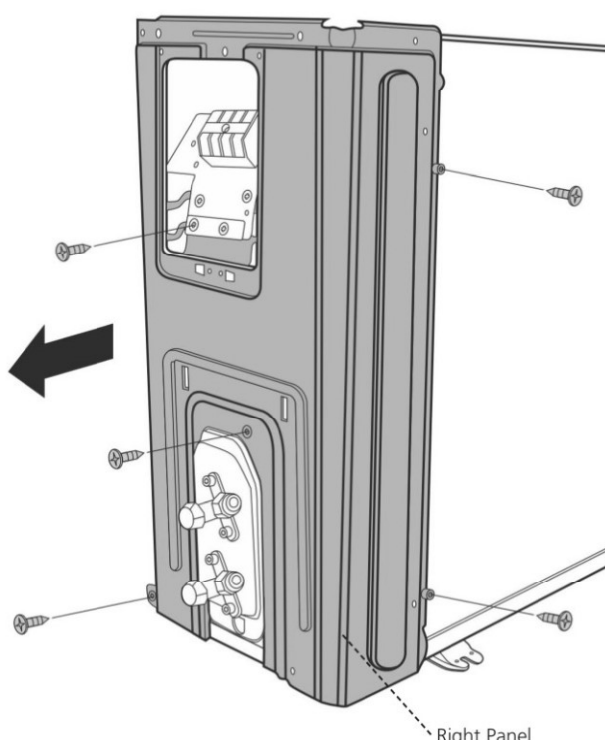
KSM-IW10/15-WCT10M1M32

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_X130_001). 	 <p>Big Handle</p> <p>For US models (3 screws)</p> <p>CJ_X130_001</p>
<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_X130_002). 	 <p>Top Cover</p> <p>CJ_X130_002</p>

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

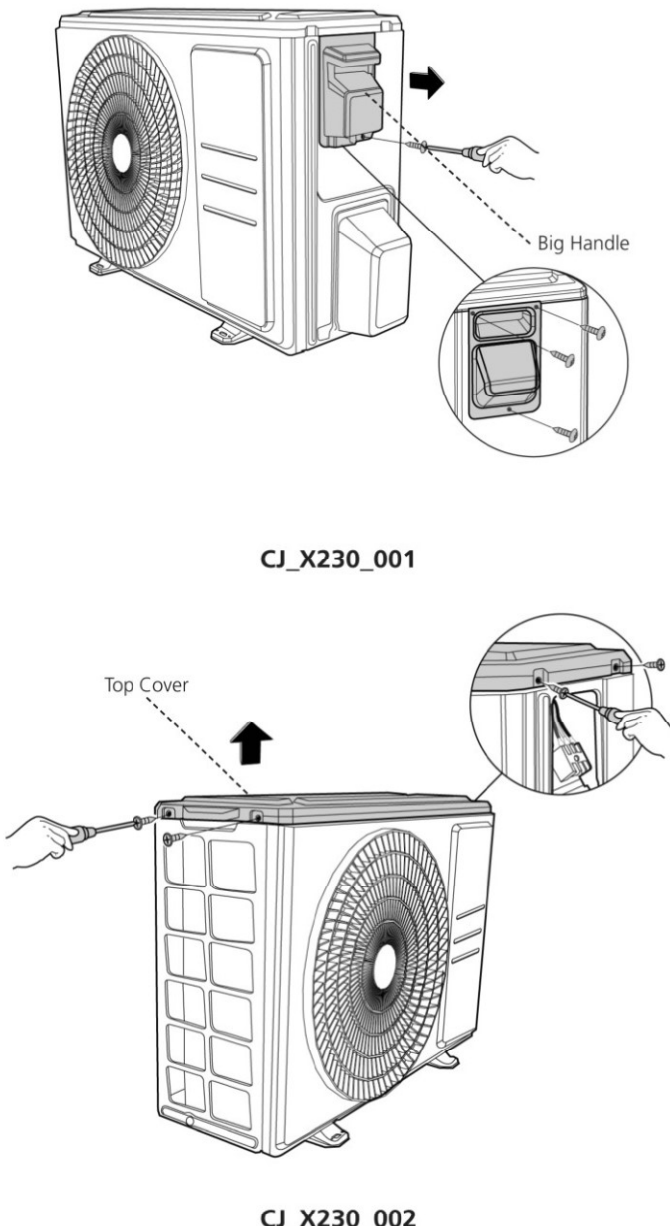
Procedure	Illustration
<p>4) Remove the screws of water collecting cover and then remove the water collecting cover (2 screws) (see CJ_X130_003).</p>	 <p style="text-align: center;">CJ_X130_003</p>
<p>5) Remove the screws of the front panel and then remove the front panel (6 screws(onoff models) or 8 screws(inverter models) (see CJ_X130_004).</p>	 <p style="text-align: center;">CJ_X130_004</p>

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

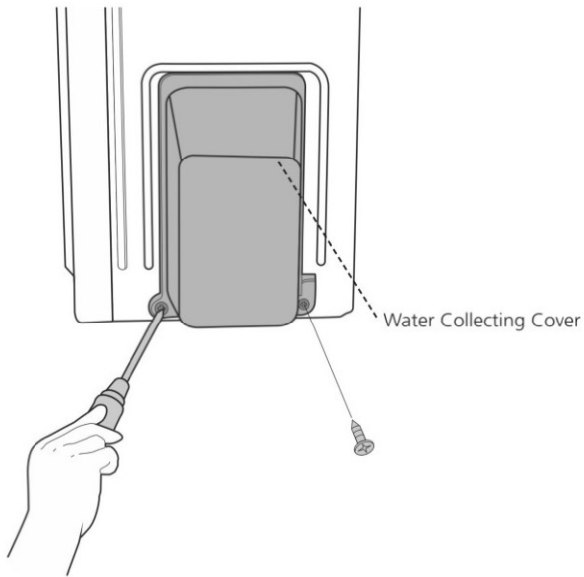
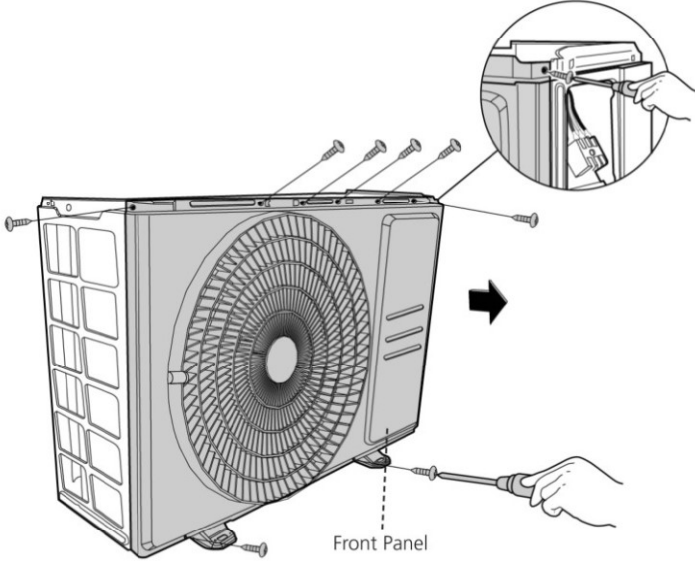
Procedure	Illustration
<p>6) Remove the screws of the right panel and then remove the right panel (5 screws) (see CJ_X130_005).</p>	 <p style="text-align: center;">CJ_X130_005</p>

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

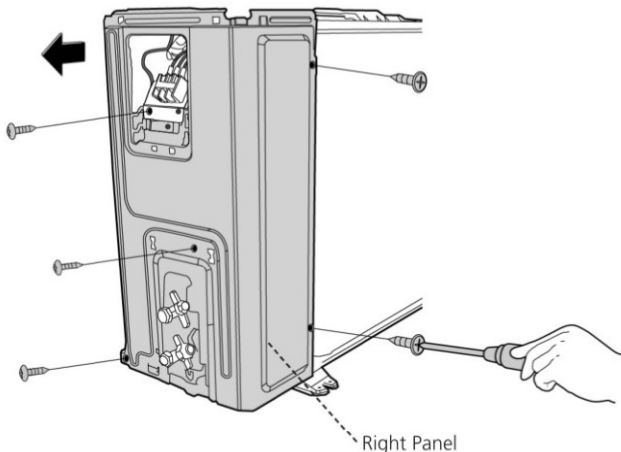
KSM-IW20/25-WCT10M1M32

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>The illustration consists of two parts. The top part, labeled CJ_X230_001, shows a side view of the outdoor unit with a hand using a screwdriver to remove a screw from the 'Big Handle'. A circular inset provides a close-up of the handle being removed. The bottom part, labeled CJ_X230_002, shows a front view of the outdoor unit with a hand using a screwdriver to remove a screw from the 'Top Cover'. A circular inset provides a close-up of the top cover being removed.</p> <p style="text-align: center;">CJ_X230_001</p> <p style="text-align: center;">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 style="text-align: center;">CJ_X230_003</p>
<p>5) Remove the screws of the front panel and then remove the front panel (7 screws(on off models) or 9 screws(inverter models) (see CJ_X230_004).</p>	 <p style="text-align: center;">CJ_X230_004</p>

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

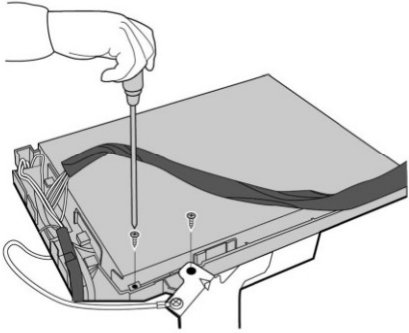
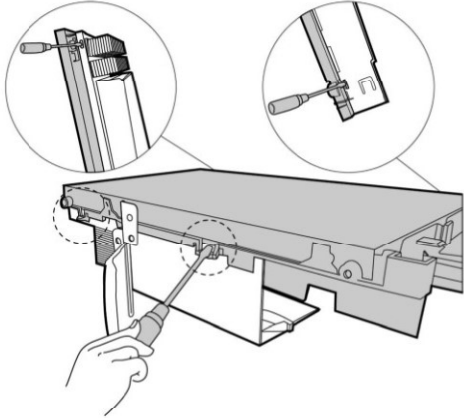
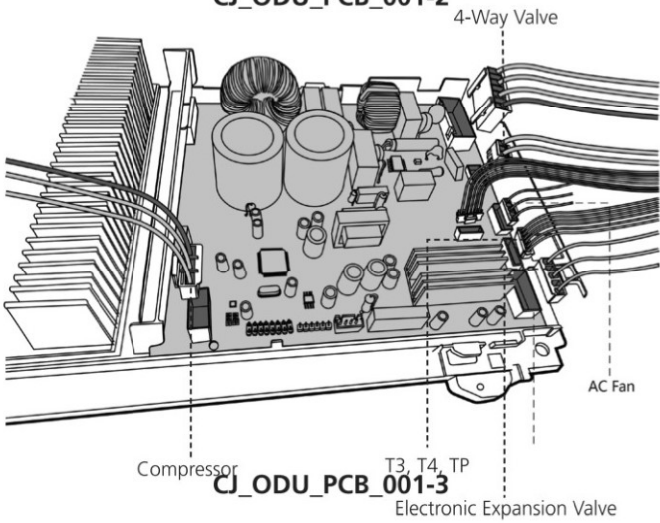
Procedure	Illustration
<p>6) Remove the screws of the right panel and then remove the right panel (5 screws) (see CJ_X230_005).</p>	 <p>Right Panel</p> <p>CJ_X230_005</p>

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

3. Electrical Parts

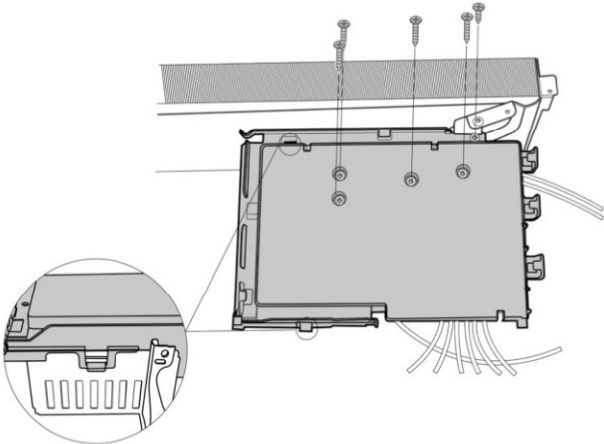
! WARNING: Antistatic gloves must be worn when you disassemble the electronic box.

1. PCB board 1

Procedure	Illustration
1) Remove the screws of the top cover. (2 screws) (see CJ_ODU_PCB_001-1).	 <p>CJ_ODU_PCB_001-1</p>
2) Unfix the hooks and then open the electronic control box cover (4 hooks) (see CJ_ODU_PCB_001-2).	 <p>CJ_ODU_PCB_001-2</p>
3) Disconnect the connector for fan motor from the electronic control board (see CJ_ODU_PCB_001-3).	 <p>CJ_ODU_PCB_001-3</p>
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.	

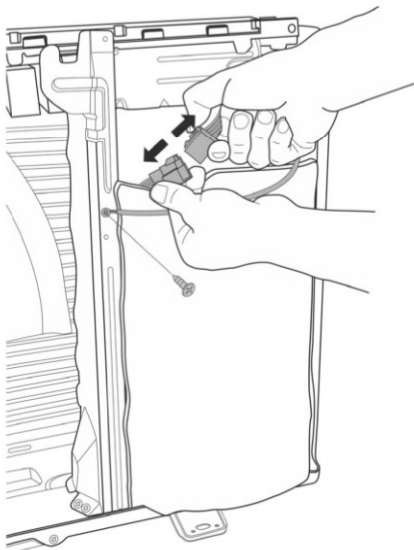
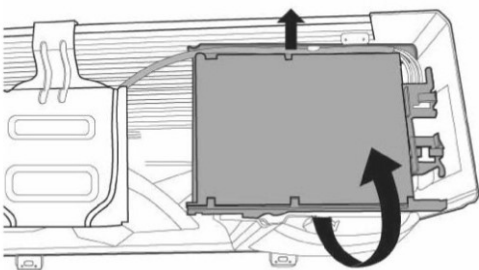
Note: This section is for reference only. Actual unit appearance may vary.

2. PCB board 2

Procedure	Illustration
<p>1) Remove the 5 screws and unfix two hooks, then remove the electronic control box subassembly.(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>The diagram illustrates the removal of the electronic control box subassembly. It shows a top-down view of the unit with five screws being removed from the top cover. A circular inset provides a magnified view of the bottom edge, showing two hooks that are to be unfastened. Wires are visible exiting from the bottom of the unit.</p> <p style="text-align: center;">CJ_ODU_PCB_003-1</p>

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

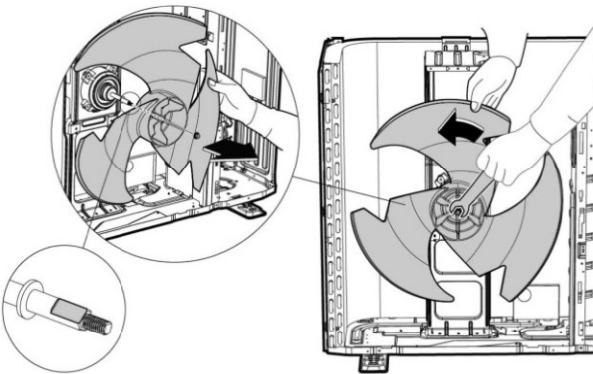
3. PCB board 3

Procedure	Illustration
<p>1) Disconnect the connector for compressor and release the ground wire(1 screw,for some models). (see CJ_ODU_PCB_006-1).</p> <p>2) Remove the electronic control box subassembly. (see CJ_ODU_PCB_006-2).</p> <p>Note:Electric control box cover cannot be removed, so the voltage between P and N cannot be measured.</p>	 <p style="text-align: center;">CJ_ODU_PCB_006-1</p>  <p style="text-align: center;">CJ_ODU_PCB_006-2</p>

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

4. Fan Assembly

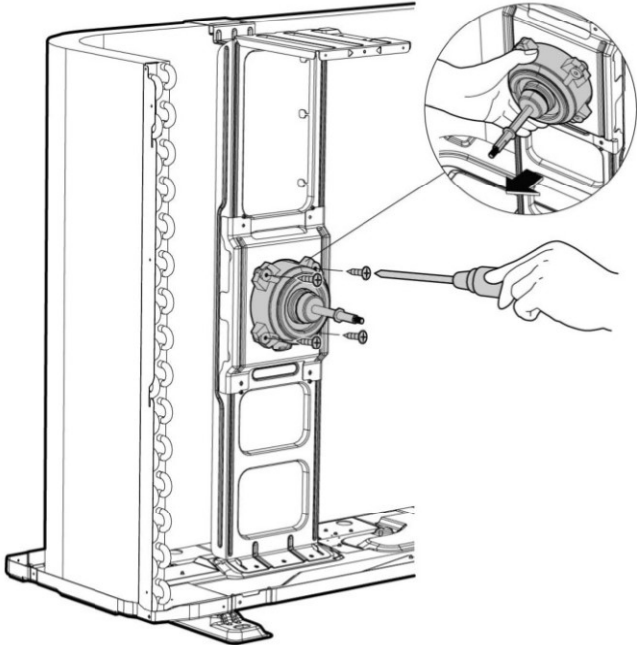
Note: Remove the panel plate before disassembling fan

Procedure	Illustration
<ol style="list-style-type: none"> 1) Remove the nut securing the fan with a spanner (see CJ_ODU_FAN_001). 2) Remove the fan. 	 <p data-bbox="898 940 1114 968">CJ_ODU_FAN_001</p>

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

5. Fan Motor

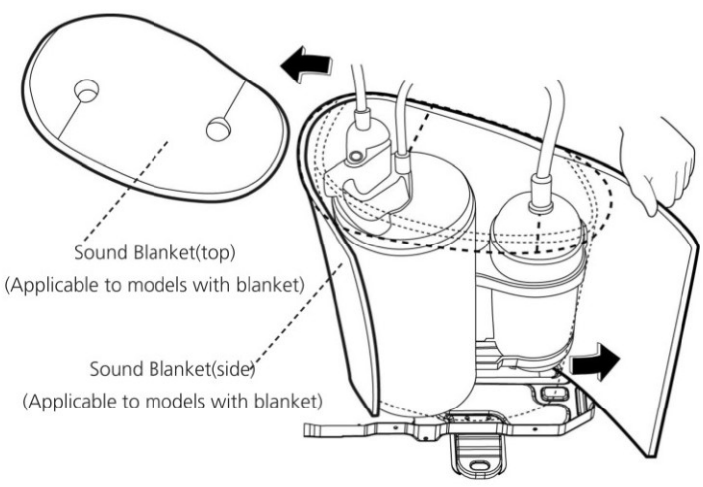
Note: Remove the panel plate and the connection of fan motor before disassembling fan motor

Procedure	Illustration
<p>3) Remove the fixing screws of the fan motor (4 screws) (see CJ_ODU_MOTOR_001).</p> <p>4) Remove the fan motor.</p>	 <p>CJ_ODU_MOTOR_001</p>

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

6. Sound Blanket

Note: Remove the panel plate before disassembling sound blanket

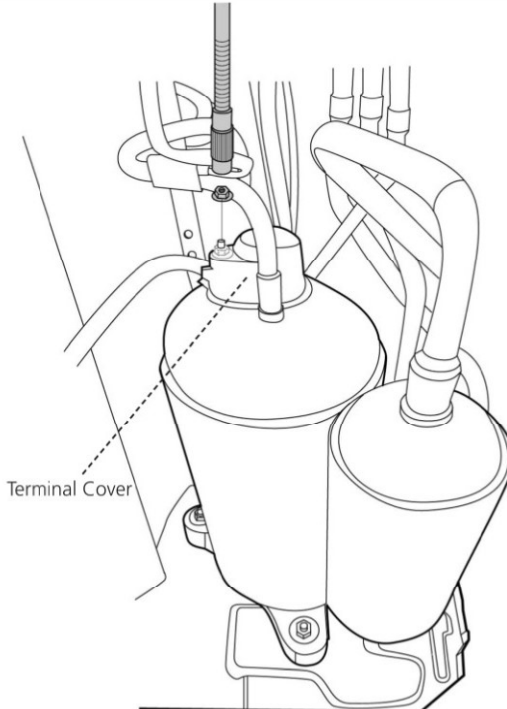
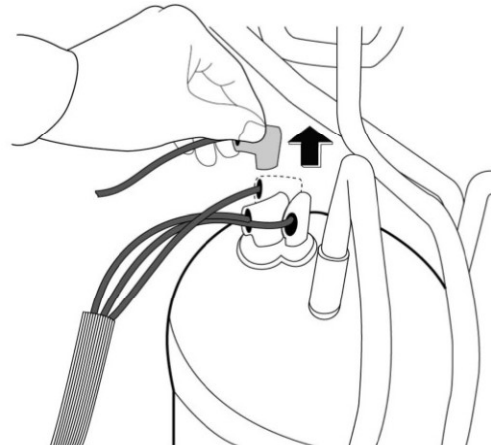
Procedure	Illustration
<p>1) Remove the sound blanket (side and top) (see CJ_ODU_BLANKET_001).</p>	 <p>Sound Blanket(top) (Applicable to models with blanket)</p> <p>Sound Blanket(side) (Applicable to models with blanket)</p> <p>CJ_ODU_BLANKET_001</p>

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

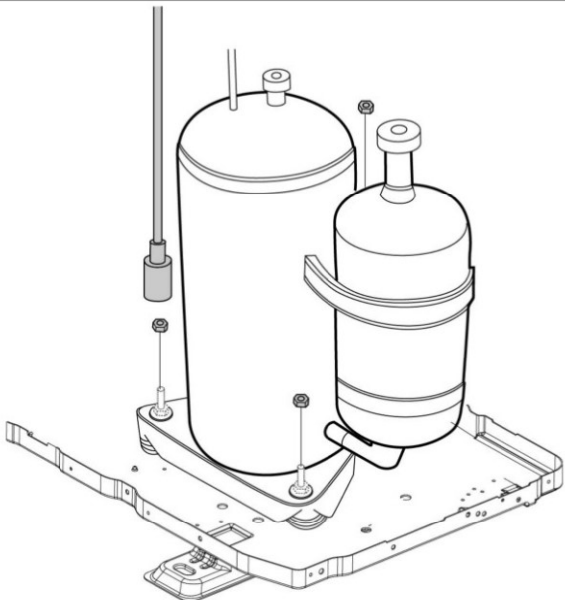
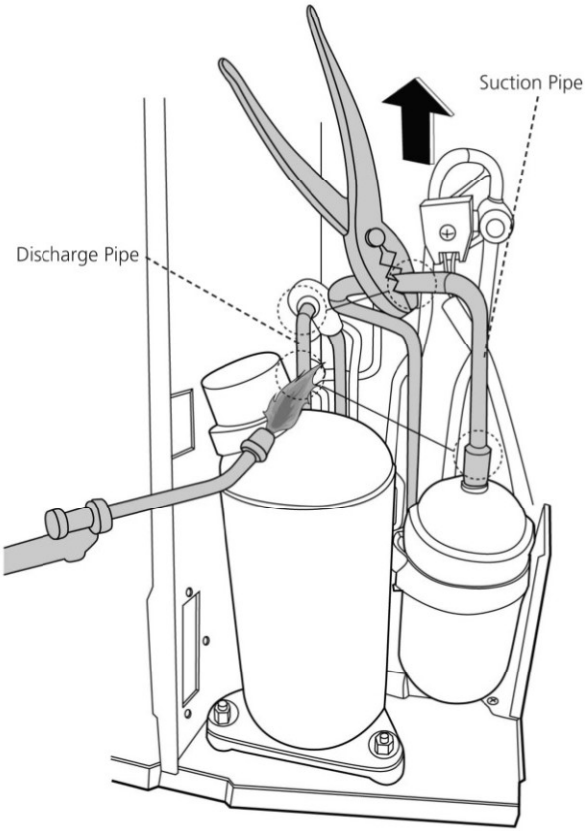
7. Compressor

! 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 and remove sound blanket before disassembling the compressor

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>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 style="text-align: center;">CJ_ODU_COMP_003</p>  <p style="text-align: center;">CJ_ODU_COMP_004</p>

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

Troubleshooting

Contents

1. Safety Caution.....	3
2. General Troubleshooting.....	4
3. Error Diagnosis and Troubleshooting without Error Code.....	6
3.1 Remote Maintenance.....	6
3.2 Field Maintenance.....	7
4. Quick Maintenance by Error Code.....	12
5. Troubleshooting by Error Code.....	13
5.1 EH 00 / EH 0A / EC 51 (EEPROM Parameter Error).....	13
5.2 EL 01 (Indoor and Outdoor Unit Communication Error).....	14
5.3 EH 02 (Zero Crossing Detection Error).....	16
5.4 EH 03 / EC 07 (Fan Speed is Operating Outside of Normal Range).....	17
5.5 EH 06 / EH 61 / EC 53 / EC 52 / EC 54 / EC 56 (Open Circuit or Short Circuit of Temperature Sensor)	20
5.6 EH 0b (Indoor PCB / Display Board Communication Error).....	21
5.7 EL 0C (Refrigerant Leakage Detection).....	22
5.8 PC 08 (Current Overload Protection).....	23
5.9 PC 00 (IPM Malfunction IGBT Over-Strong Current Protection).....	24
5.10 PC 01 (Over Voltage or Too Low Voltage Protection).....	25
5.11 PC 02 (High Temperature Protection of IPM Module or High Pressure Protection).....	26
5.12 PC 04 (Inverter Compressor Drive Error).....	28
5.13 PC 03 (High Pressure Protection or Low Pressure Protection).....	29

Troubleshooting

Contents

6. Check Procedures.....	32
6.1 Temperature Sensor Check.....	32
6.2 Compressor Check.....	32
6.3 IPM Continuity Check.....	35
6.4 Indoor AC Fan Motor Check.....	36

1. Safety Caution

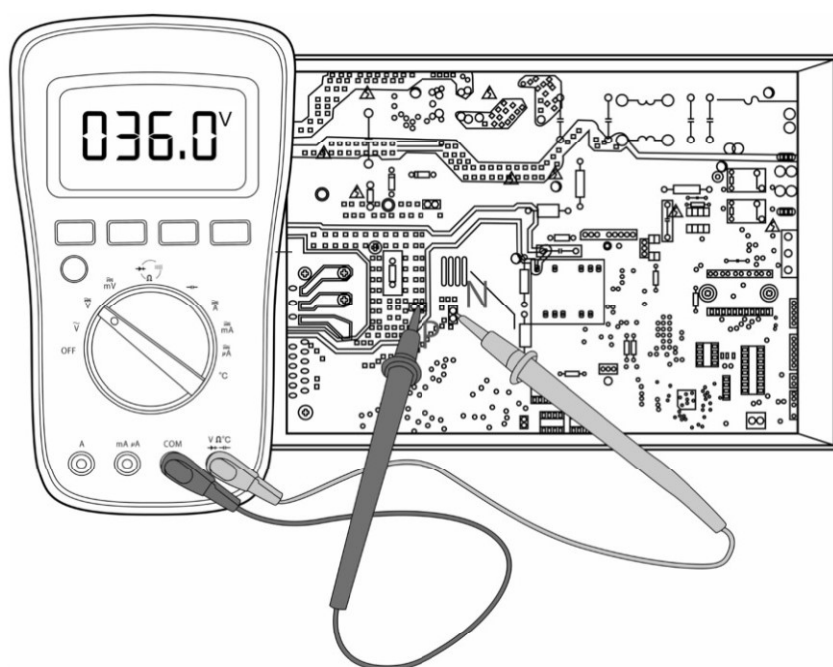
! WARNING

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	LED Display	Error Information	Solution
--	--	dF	Defrost	Normal Display, not error code
--	--			
--	--	CU	Active Clean	
--	--	rF	Filter replacement reminder(power on display for 15 seconds)	
--	--	FP	Heating in room temperature under 8°C	
--	--	FC	Forced cooling	
--	--	RP	AP mode of WIFI connection	
--	--	CP	Remote switched off	
1 time	OFF	EH00/EH0A	Indoor unit EEPROM parameter error	TS18
2 times	OFF	EL01	Indoor / outdoor unit communication error	TS19
3 times	OFF	EH02	Zero-crossing signal detection error(for some models)	TS21
4 times	OFF	EH03	The indoor fan speed is operating outside of the normal range	TS22
5 times	OFF	EC51	Outdoor unit EEPROM parameter error(for some models)	TS18
5 times	OFF	EC52	Condenser coil temperature sensor T3 is in open circuit or has short circuited	TS25
5 times	OFF	EC53	Outdoor room temperature sensor T4 is in open circuit or has short circuited	TS25
5 times	OFF	EC54	Compressor discharge temperature sensor TP is in open circuit or has short circuited	TS25
5 times	OFF	EC56	Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited(for free-match indoor units)	TS25
6 times	OFF	EH60	Indoor room temperature sensor T1 is in open circuit or has short circuited	TS25
6 times	OFF	EH61	Evaporator coil temperature sensor T2 is in open circuit or has short circuited	TS25
12 times	OFF	EC07	The outdoor fan speed is operating outside of the normal range(for some models)	TS22
9 times	OFF	EH0b	Indoor PCB / Display board communication error	TS26
8 times	OFF	EL0C	Refrigerant leak detected	TS27
7 times	FLASH	PC00	IPM malfunction or IGBT over-strong current protection	TS29
2 times	FLASH	PC01	Over voltage or over low voltage protection	TS30



3 times	FLASH	PC 02	High temperature protection of IPM module or High pressure protection(for some models)	TS31
5 times	FLASH	PC 04	Inverter compressor drive error	TS33
1 time	FLASH	PC 08	Current overload protection(for some models)	TS28
7 times	FLASH	PC 03	High pressure protection or low pressure protection(for some models)	TS34
1 times	ON	--	Indoor units mode conflict(match with multi outdoor unit)	--

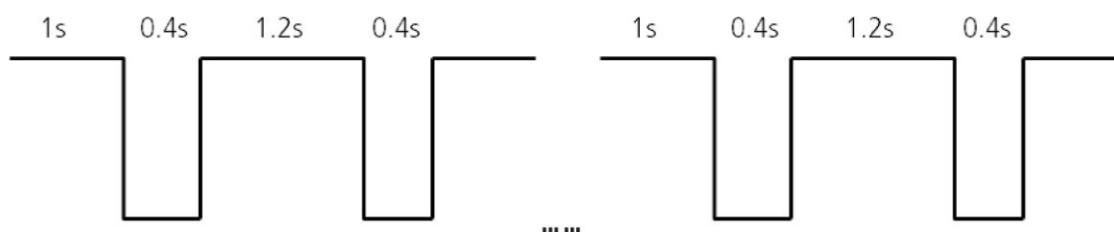
For other errors:

The display board may show a garbled code or a code undefined by the service manual. 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 (For Some Outdoor Units)

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

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



3. Error Diagnosis and Troubleshooting Without Error Code



WARNING

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

3.1 Remote maintenance

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

No.	Problem	Solution
1	Unit will not start	TS13 - TS14
2	The power switch is on but fans will not start	TS13 - TS14
3	The temperature on the display board cannot be set	TS13 - TS14
4	Unit is on but the wind is not cold(hot)	TS13 - TS14
5	Unit runs, but shortly stops	TS13 - TS14
6	The unit starts up and stops frequently	TS13 - TS14
7	Unit runs continuously but insufficient cooling(heating)	TS13 - TS14
8	Cool can not change to heat	TS13 - TS14
9	Unit is noisy	TS13 - TS14

3.2 Field maintenance

	Problem	Solution
1	Unit will not start	TS15 - TS16
2	Compressor will not start but fans run	TS15 - TS16
3	Compressor and condenser (outdoor) fan will not start	TS15 - TS16
4	Evaporator (indoor) fan will not start	TS15 - TS16
5	Condenser (Outdoor) fan will not start	TS15 - TS16
6	Unit runs, but shortly stops	TS15 - TS16
7	Compressor short-cycles due to overload	TS15 - TS16
8	High discharge pressure	TS15 - TS16
9	Low discharge pressure	TS15 - TS16
10	High suction pressure	TS15 - TS16
11	Low suction pressure	TS15 - TS16
12	Unit runs continuously but insufficient cooling	TS15 - TS16
13	Too cool	TS15 - TS16
14	Compressor is noisy	TS15 - TS16
15	Horizontal louver can not revolve	TS15 - TS16

1.Remote Maintenance		Electrical Circuit					Refrigerant Circuit								
Possible causes of trouble			Power failure												
			The main power tripped												
			Loose connections												
			Faulty transformer												
			The voltage too high or too low												
			The remote control is powered off												
			Broken the remote control												
			Dirty air filter												
			Dirty condenser fins												
			The setting temperature is higher/lower than the room's (cooling/heating)												
	The ambient temperature is too high/low when the mode is cooling/heating														
	Fan mode														
	SILENCE function is activated(Optional function)														
	Frosting and defrosting frequently														
Unit will not start		☆		☆		☆		☆							
The power switch is on but fans will not start					☆	☆									
The tempreture on the playboard cannot be setted							☆	☆							
Unit is on but the wind is not cold(hot)										☆	☆	☆			
Unit runs, but shortly stops						☆				☆	☆				
The unit startup and stop 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 on the AC later														
	Adjust to cool mode														
	Turn off the SILENCE function														
	Turn on the AC later														

1.Remote Maintenance	Others					
Possible causes of trouble	Heavy load condition	Loosen hold down bolts and / or screws	Bad airproof	The air inlet or outlet of either unit is blocked	Interference from cell phone towers and remote boosters	Shipping plates remain attached
Unit will not start						
The power switch is on but fans will not start					☆	
The temperature on the display board cannot be set						
Unit is on but the wind is not cold(hot)						
Unit runs, but shortly stops						
The unit starts up and stops frequently				☆		
Unit runs continuously but insufficient cooling(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	Electrical Circuit														
Possible causes of trouble															
	Power failure	Blown fuse or varistor	Loose connections	Shorted or broken wires	Safety device opens	Faulty thermostat / room temperature sensor	Wrong setting place of temperature sensor	Faulty transformer	Shorted or open capacitor	Faulty magnetic contactor for compressor	Faulty magnetic contactor for fan	Low voltage	Faulty stepping motor	Shorted or grounded compressor	Shorted or grounded fan motor
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	Test voltage														
	Inspect fuse type & size														
	Inspect connections - tighten			☆											
	Test circuits with tester			☆											
	Test continuity of safety device														
	Test continuity of thermostat / sensor & wiring														
	Place the temperature sensor at the central of the air inlet grille														
Check control circuit with tester															
Check capacitor with tester															
Test continuity of coil & contacts															
Test continuity of coil & contacts															
Test voltage															
Replace the stepping motor															
Check resistance with multimeter															
Check resistance with multimeter															

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																								
Rectify piping so as not to contact each other or with external plate																								

4. 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 the error code.

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

Part requiring replacement	Error Code								
	EH00/ EH0A	EL01	EH02	EH03	EH60	EH61	EH0b	EL0C	PC08
Indoor PCB	✓	✓	✓	✓	✓	✓	✓	✓	x
Outdoor PCB	x	✓	x	x	x	x	x	x	✓
Display board	x	x	x	x	x	x	✓	x	x
Indoor fan motor	x	x	x	✓	x	x	x	x	x
T1 sensor	x	x	x	x	✓	x	x	x	x
T2 Sensor	x	x	x	x	x	✓	x	✓	x
Reactor	x	✓	x	x	x	x	x	x	x
Compressor	x	x	x	x	x	x	x	x	✓
Additional refrigerant	x	x	x	x	x	x	x	✓	x

Part requiring replacement	EC 53	EC 52	EC 54	EC 56	EC 51	EC 07	PC 00	PC 01	PC 02	PC 03	PC 04
Indoor PCB	x	x	x	x	x	x	x	x	x	x	x
Outdoor PCB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Indoor fan motor	x	x	x	x	x	x	x	x	x	x	x
Outdoor fan motor	x	x	x	x	x	✓	✓	x	✓	x	✓
T3 Sensor	x	✓	x	x	x	x	x	x	x	x	x
T4 Sensor	✓	x	x	x	x	x	x	x	x	x	x
TP Sensor	x	x	✓	x	x	x	x	x	x	x	x
T2B Sensor	x	x	x	✓	x	x	x	x	x	x	x
Reactor	x	x	x	x	x	x	x	✓	x	x	x
Compressor	x	x	x	x	x	x	✓	x	x	x	✓
IPM module board	x	x	x	x	x	x	✓	✓	✓	x	✓
High pressure protector	x	x	x	x	x	x	x	x	✓	x	x
Low pressure protector	x	x	x	x	x	x	x	x	x	✓	x
Additional refrigerant	x	x	x	x	x	x	x	x	x	✓	x

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

5. Troubleshooting by Error Code

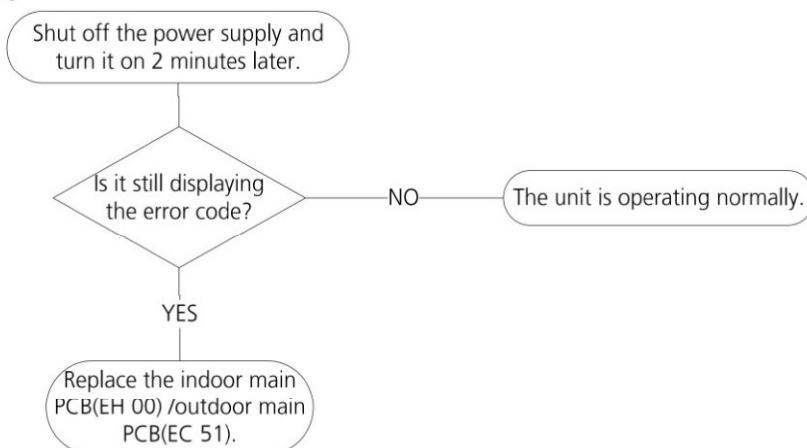
5.1 EH 00/ EH 0A / EC 51 (EEPROM parameter error diagnosis and solution)

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

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB

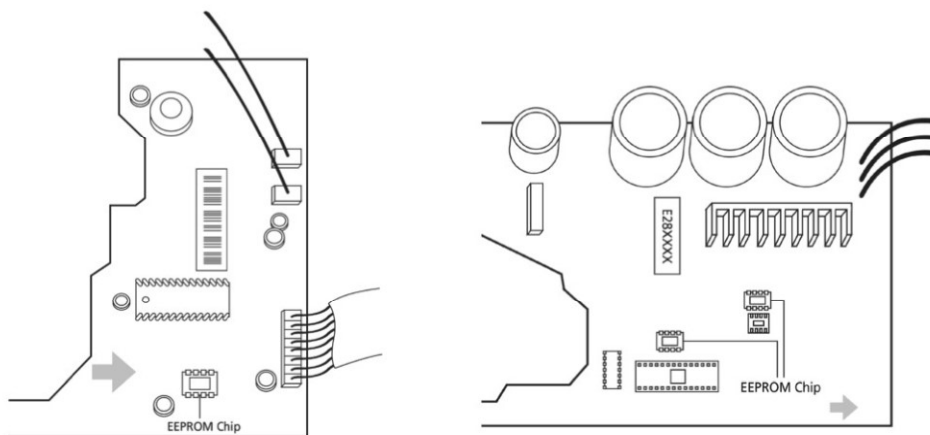
Troubleshooting and repair:



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.

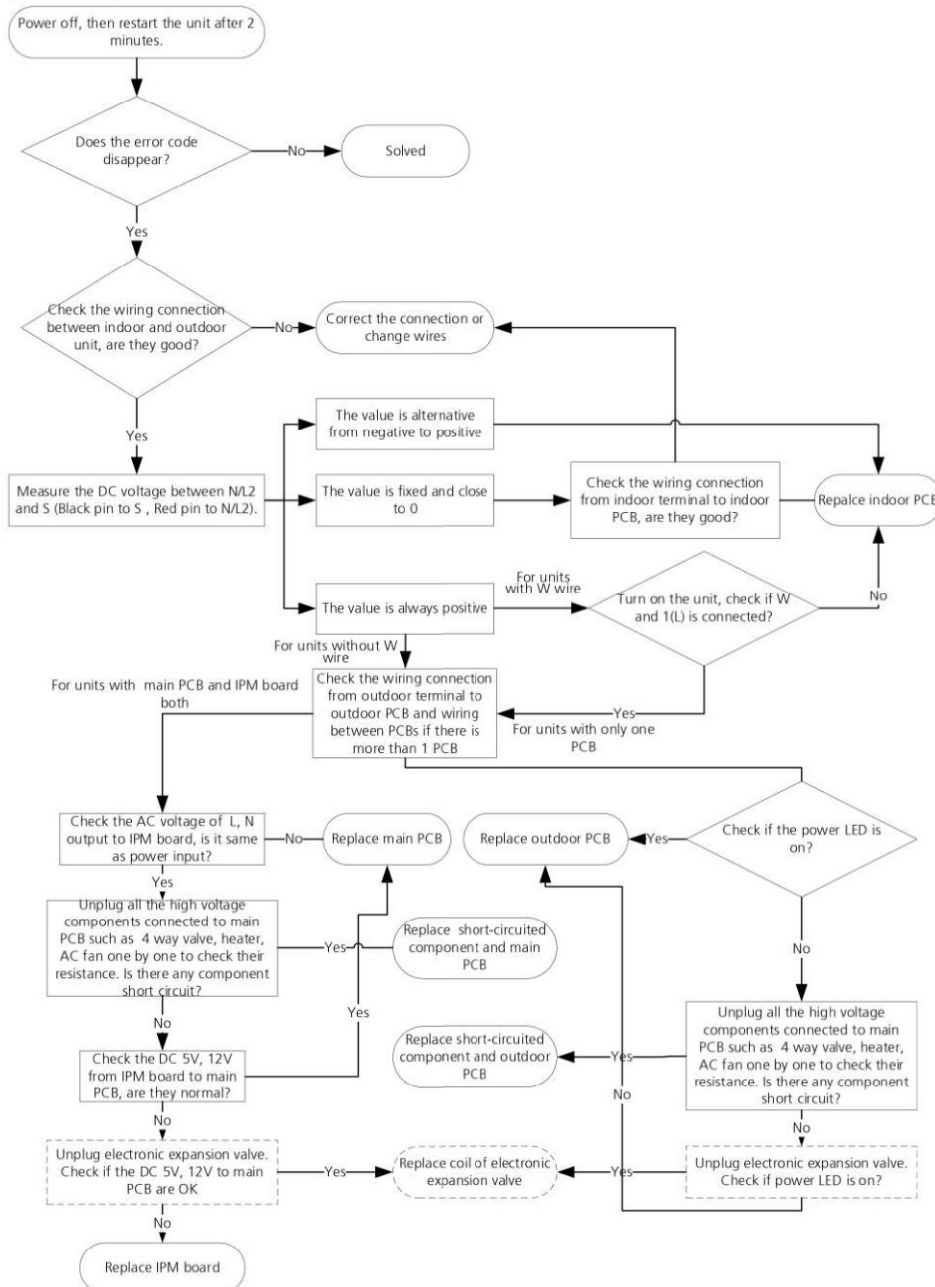
5.2 EL 01 (Indoor and outdoor unit communication error diagnosis and solution)

Description: Indoor unit can not communicate with outdoor unit

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB
- Short-circuited component

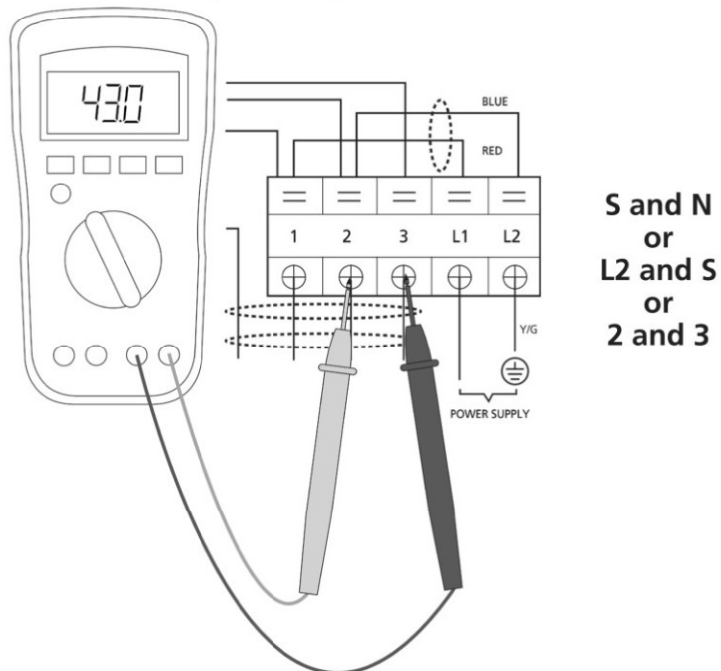
Troubleshooting and repair:



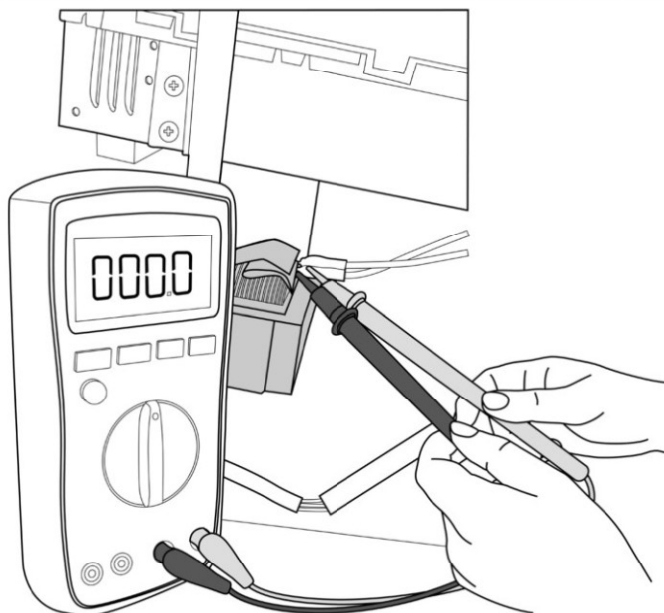
Note: For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

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 normal running, 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.

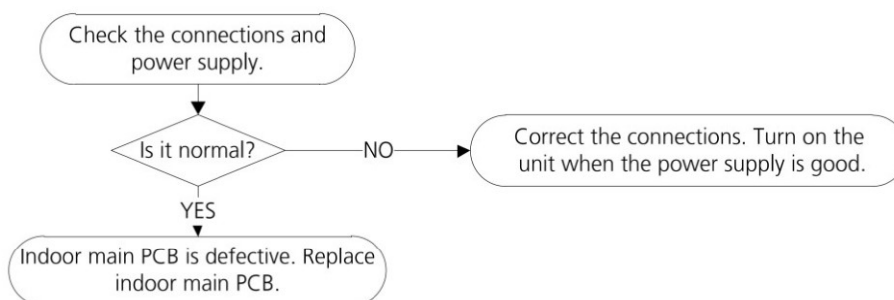
5.3 EH 02 (Zero crossing detection error diagnosis and solution)

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

Recommended parts to prepare:

- Connection wires
- PCB

Troubleshooting and repair:



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

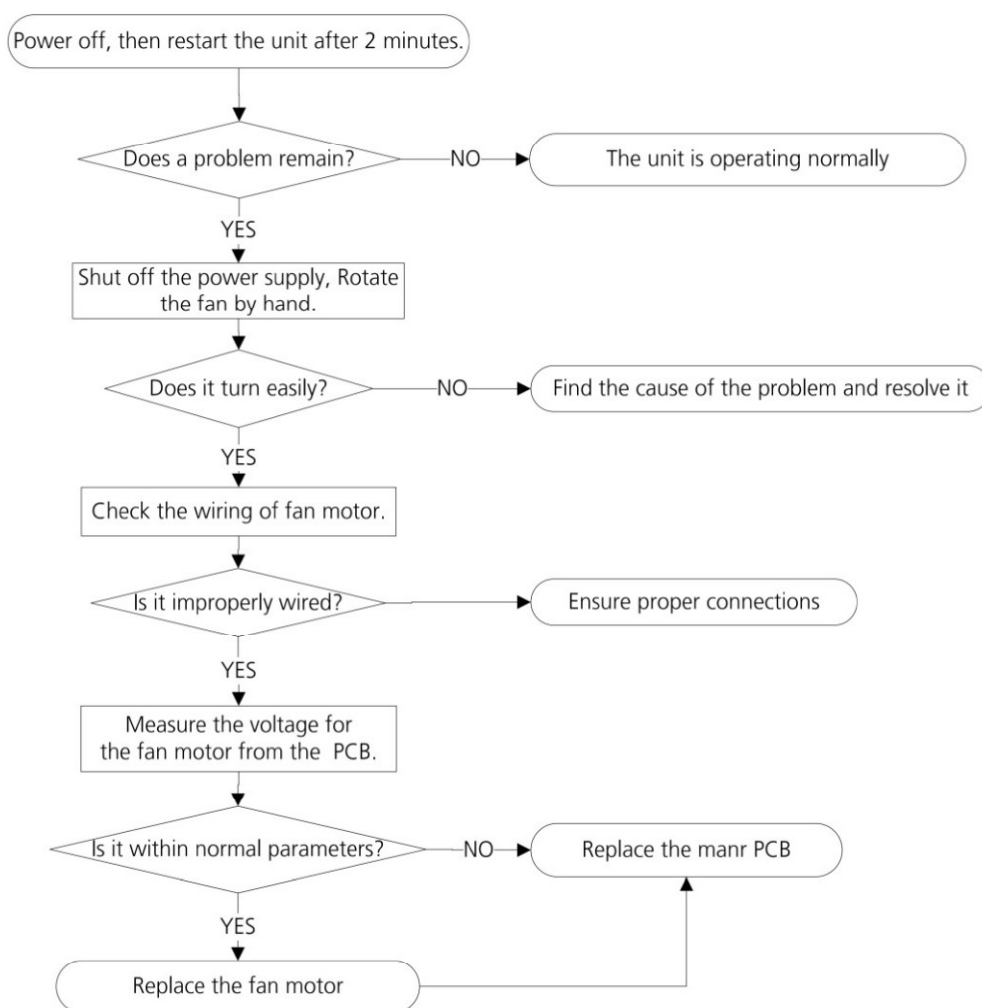
5.4 EH 03 / EC 07 (Fan speed is operating outside of normal range diagnosis and solution)

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

Recommended parts to prepare:

- Connection wires
- Fan assembly
- Fan motor
- PCB

Troubleshooting and repair:



Note: For certain models, outdoor PCB 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)

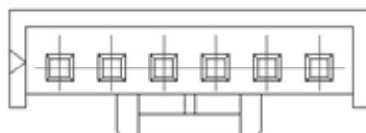
Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must has problems and need to be replaced.

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

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

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

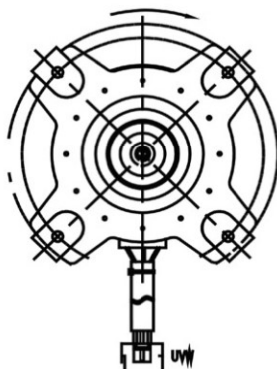
No.	Color	Signal	Voltage
1	Red	Vs/Vm	140V~190V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V



1 3 4 5 6
Red Black White Yellow Blue

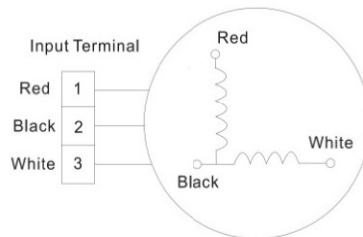
2. Outdoor DC Fan Motor (control chip is in outdoor PCB)

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



3. Indoor AC Fan Motor

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



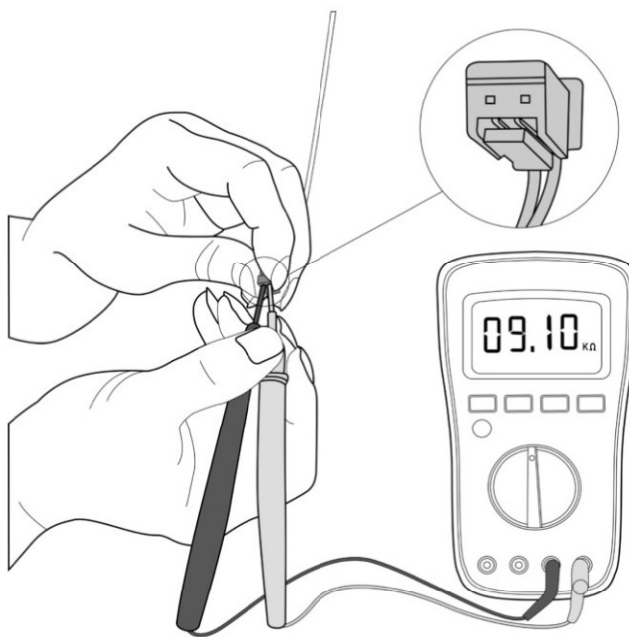
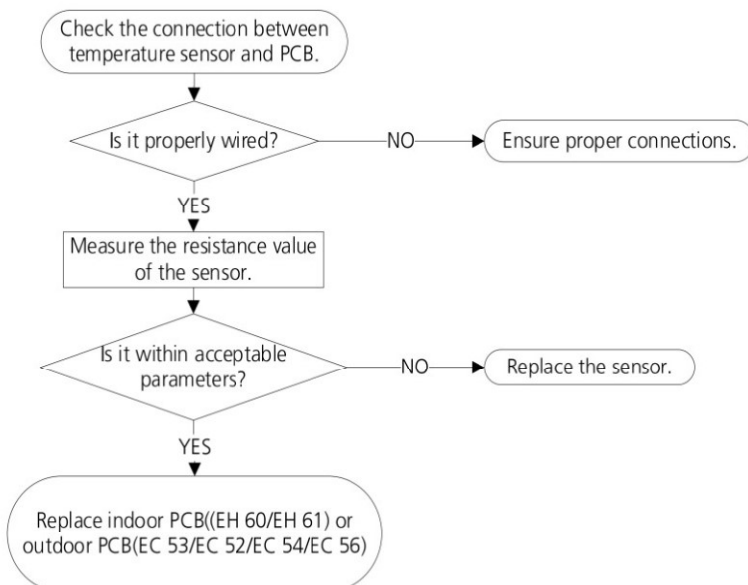
5.5 EH 60/EH 61/EC 53/EC 52/EC 54/EC 56 (Open circuit or short circuit of temperature sensor diagnosis and solution)

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

Recommended parts to prepare:

- Connection wires
- Sensors
- PCB

Troubleshooting and repair:



Note: For certain models, outdoor PCB 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

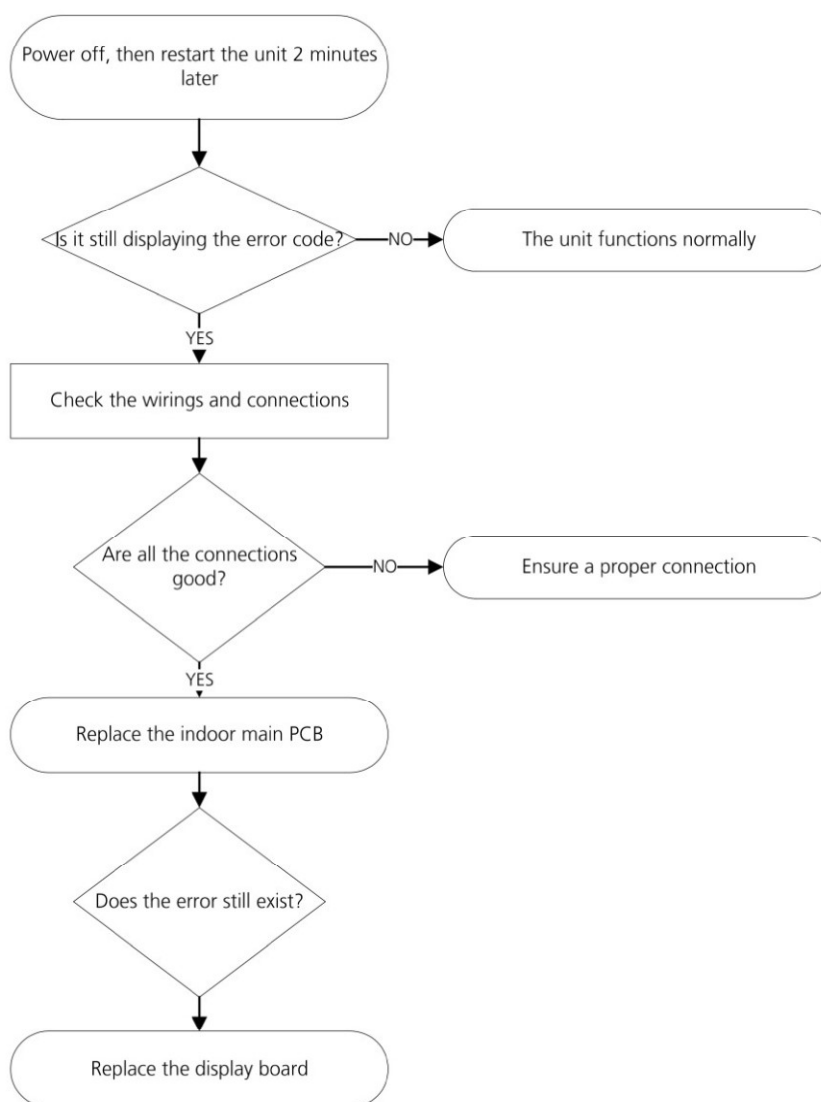
5.6 EH 0b (Indoor PCB / Display board communication error diagnosis and solution)

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

Recommended parts to prepare:

- Communication wire
- Indoor PCB
- Display board

Troubleshooting and repair:



5.7 EL 0C (Refrigerant Leakage Detection diagnosis and solution)

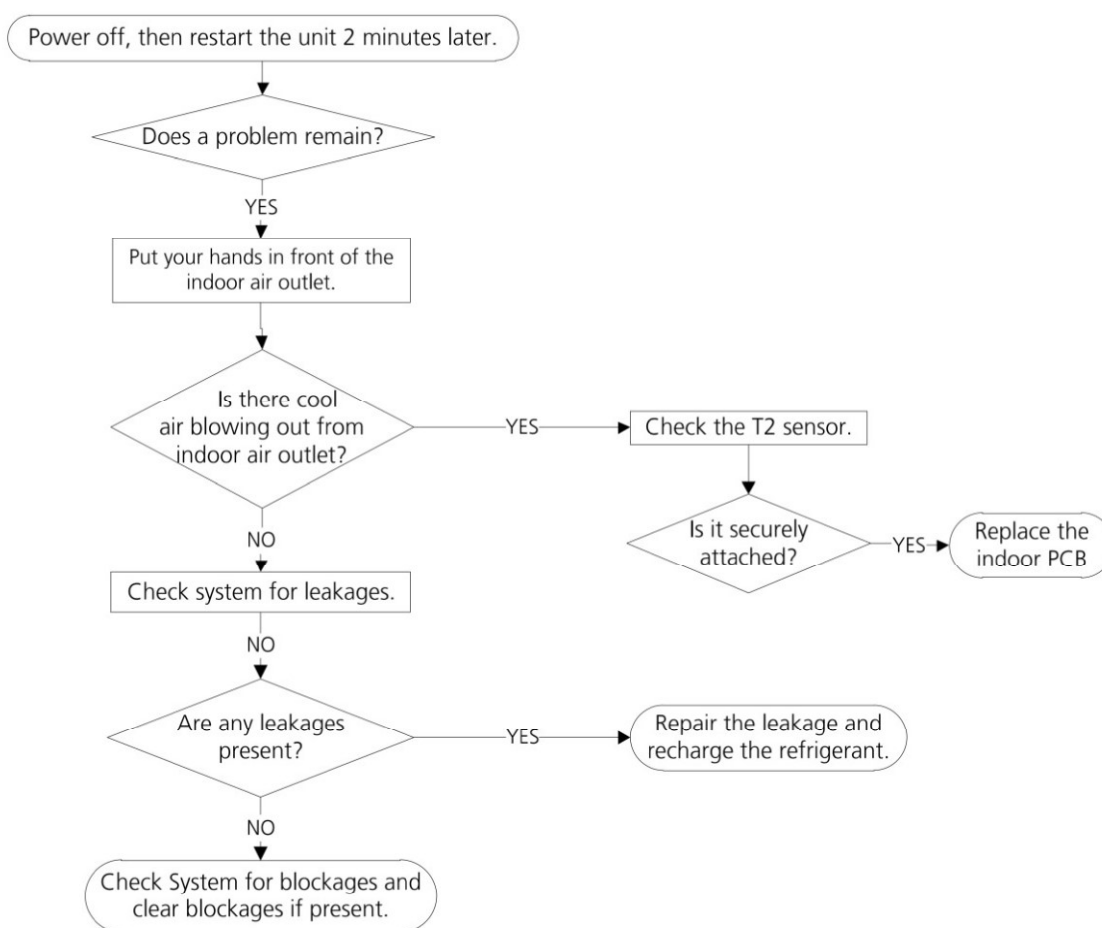
Description: Define the evaporator coil temperature T2 of the compressor just starts running as Tcool.

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

Recommended parts to prepare:

- T2 sensor
- Indoor PCB
- Additional refrigerant

Troubleshooting and repair:



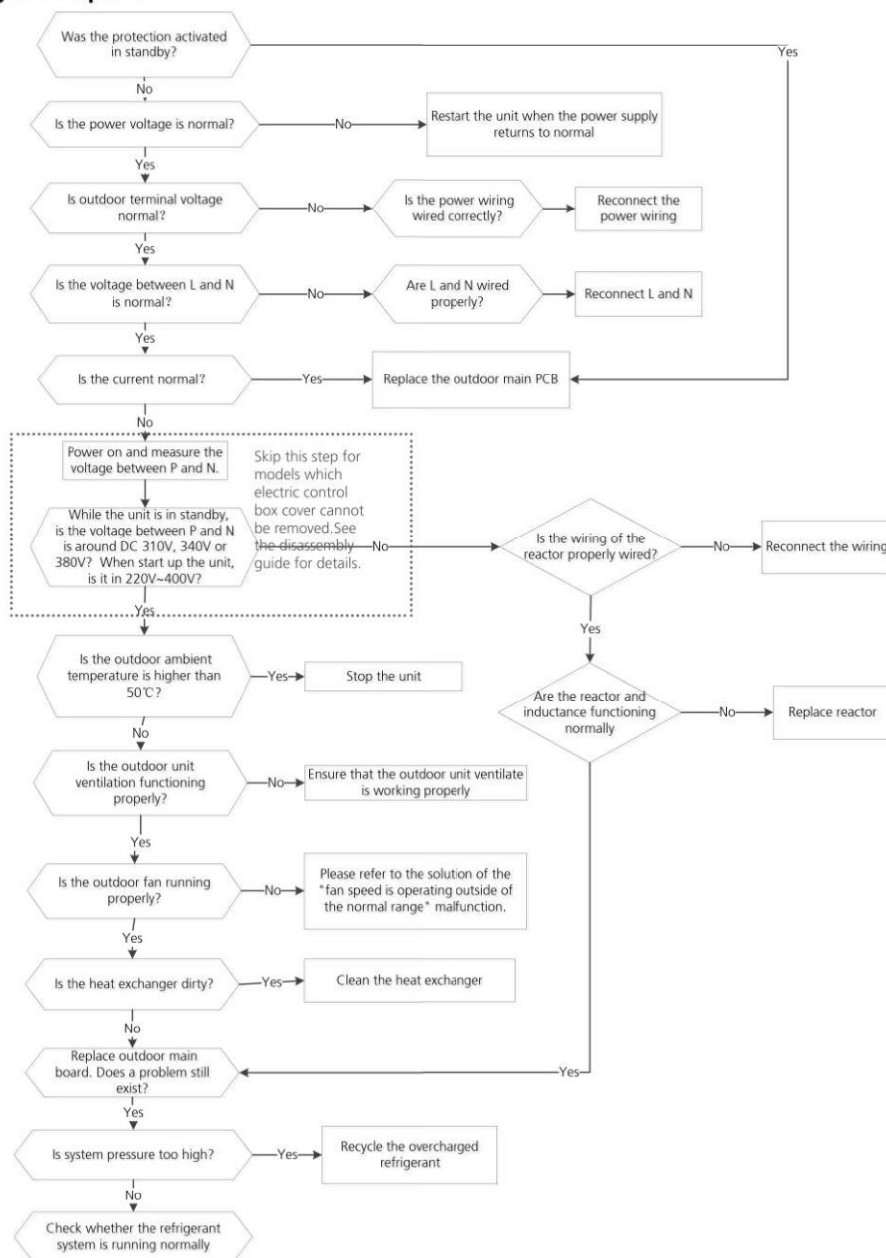
5.8 PC 08 (Current overload protection diagnosis and solution)

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

Recommended parts to prepare:

- Connection wires
- Reactor
- Outdoor fan
- Outdoor PCB

Troubleshooting and repair:



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

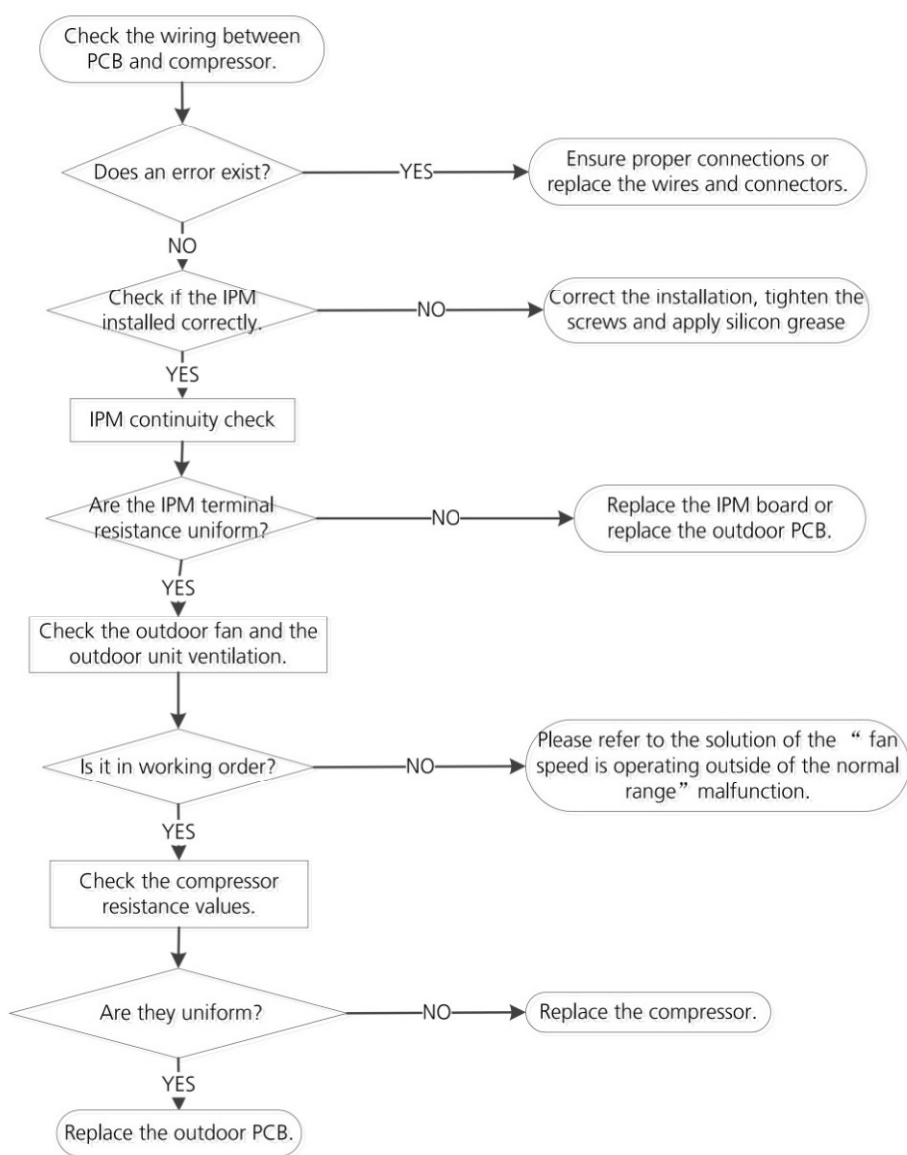
5.9 PC 00(IPM malfunction or IGBT over-strong current protection diagnosis and solution)

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

Recommended parts to prepare:

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

Troubleshooting and repair:



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

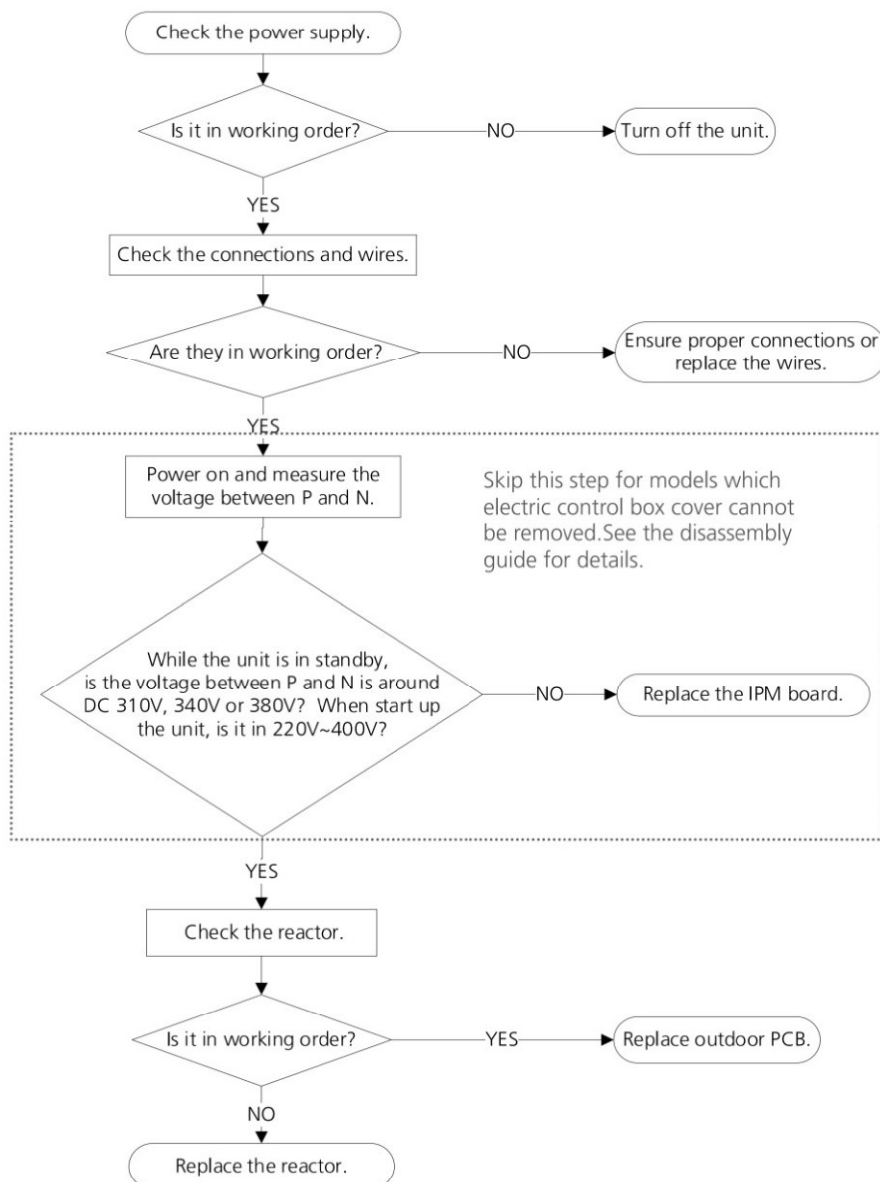
5.10 PC 01(Over voltage or too low voltage protection diagnosis and solution)

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.

5.11 PC 02(High temperature protection of IPM module or High pressure protection diagnosis and solution)

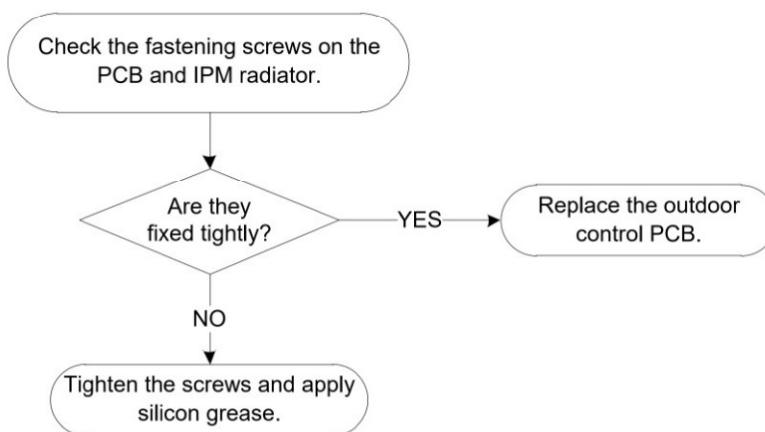
Description: If the temperature of IPM module is higher than a certain value, the LED displays the failure code.

For some models with high pressure switch, outdoor pressure switch cut off the system because high pressure is higher than 4.4 MPa, the LED displays the failure code.

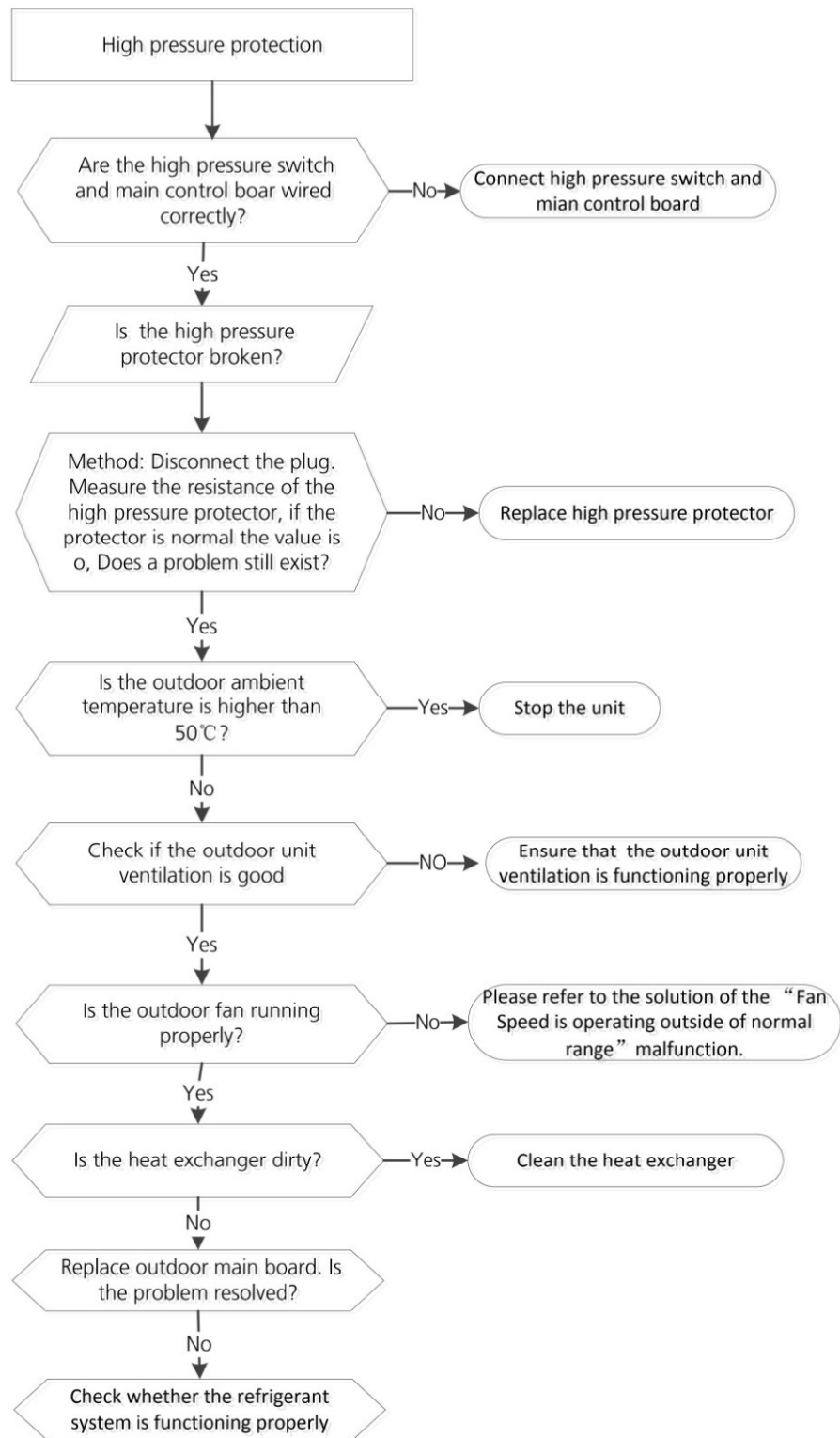
Recommended parts to prepare:

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

Troubleshooting and repair:



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.



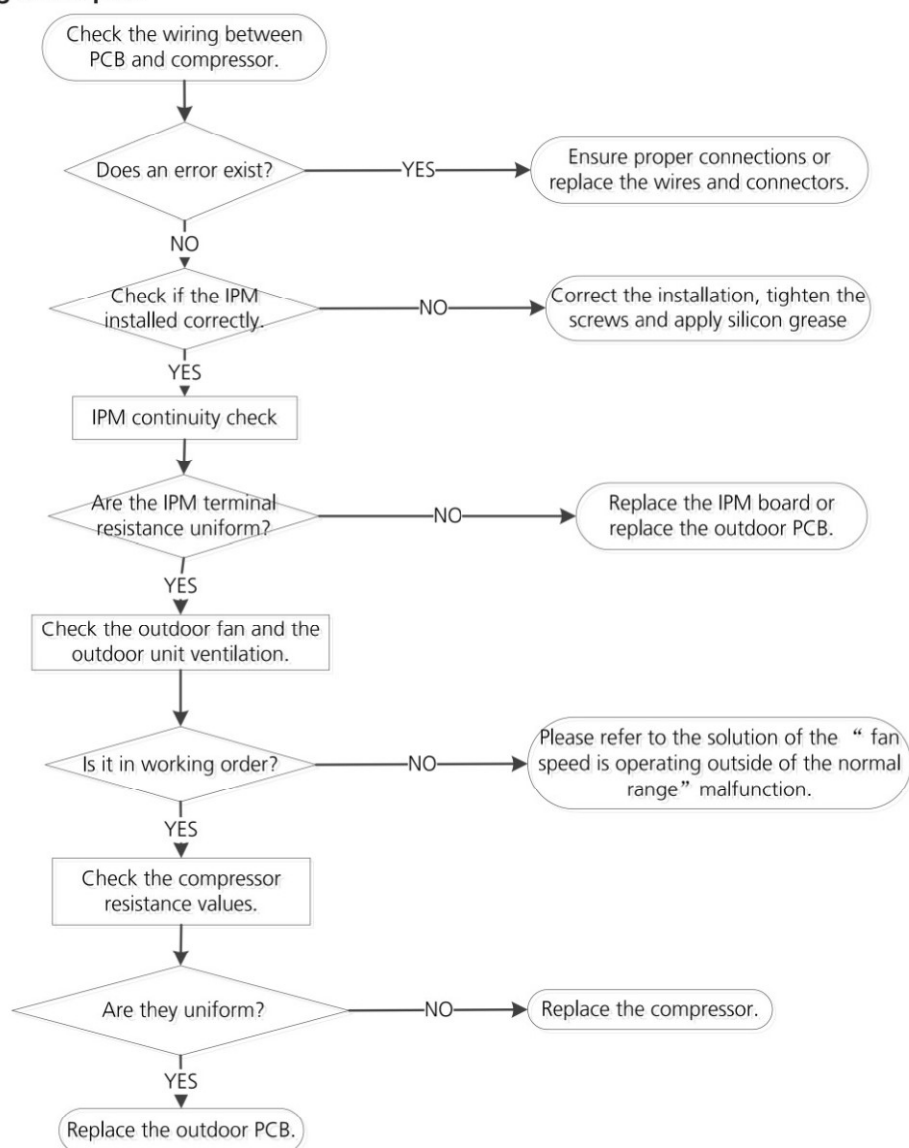
5.12 PC 04(Inverter compressor drive error diagnosis and solution)

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.



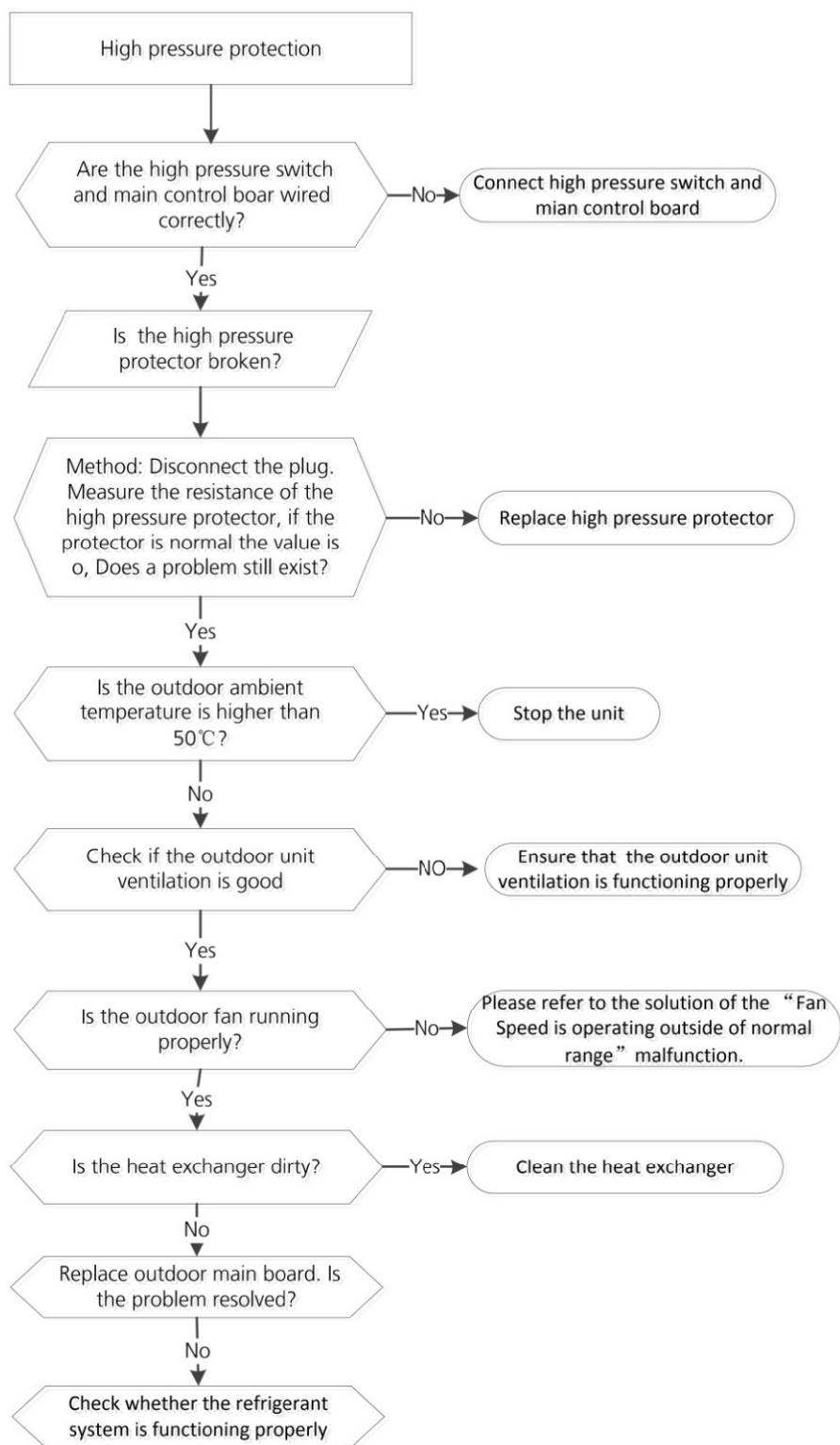
5.13 PC 03(High pressure protection or Low pressure protection diagnosis and solution)

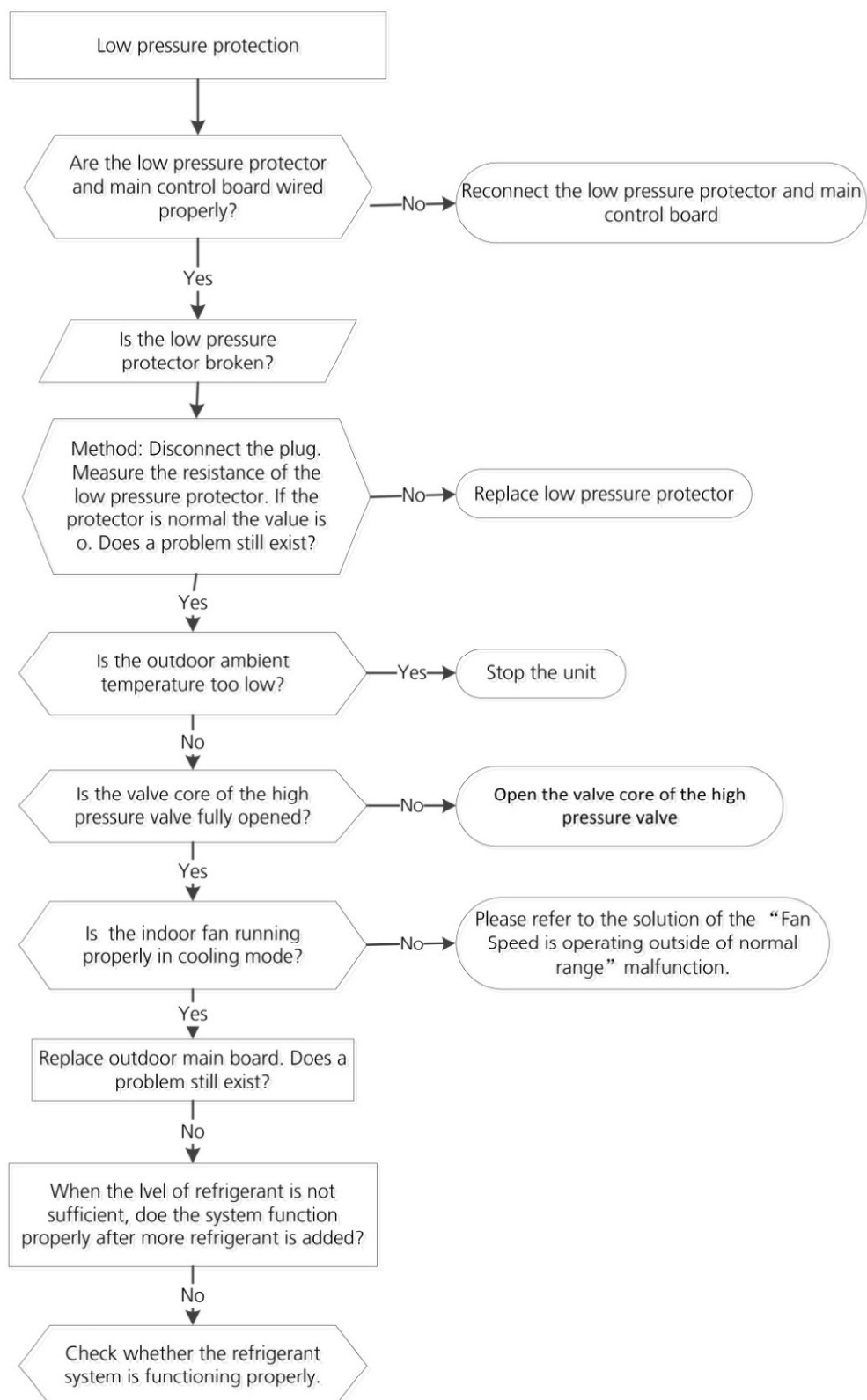
Description: Outdoor pressure switch cut off the system because high pressure is higher than 4.4 MPa or outdoor pressure switch cut off the system because low pressure is lower than 0.13 MPa, the LED displays the failure code.

Recommended parts to prepare:

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

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.

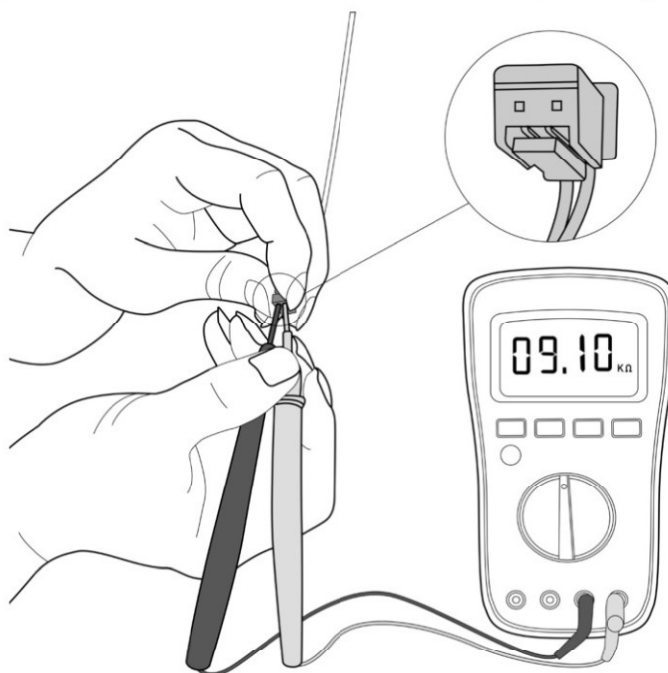
6. Check Procedures

6.1 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.

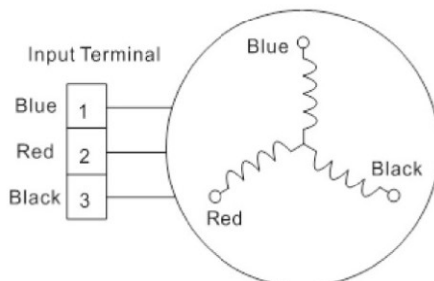
1. Disconnect the temperature sensor from PCB (Refer to Chapter 5&6. Indoor&Outdoor Unit Disassembly).
2. Measure the resistance value of the sensor using a multi-meter.
3. Check corresponding temperature sensor resistance value table (Refer to Chapter 8. Appendix).



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

6.2 Compressor Check

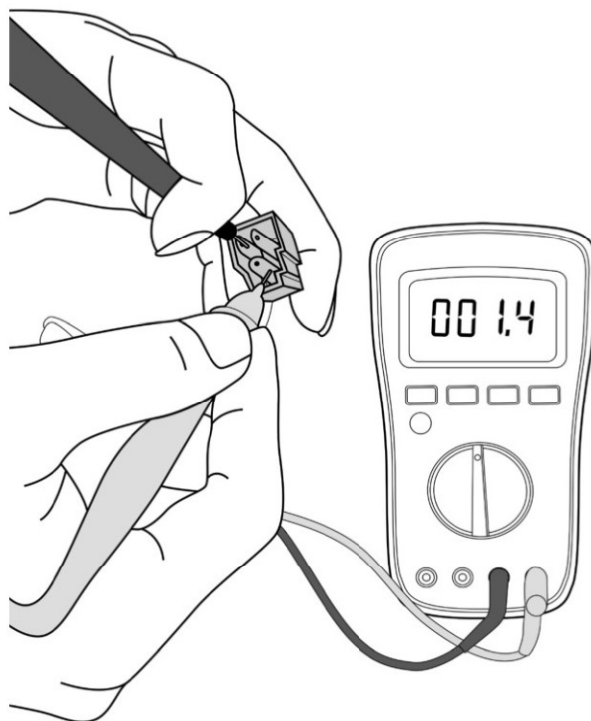
1. Disconnect the compressor power cord from outdoor PCB (Refer to Chapter 6. Outdoor Unit Disassembly)).
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.



Resistance Value	KSK89D53UEZ ASK89D53UEZ ASK103D53UFZ	KSK89D29UEZD ASK89D29UEZD	KSN98D22UFZ ASN98D22UEZ	KSK103D33UEZ3 KSK103D33UEZ3(YJ) KBK103D33UEZ3	KTN150D30UFZA
Blue-Red	2.35Ω	1.99Ω	1.57Ω	2.13Ω	1.02Ω
Blue-Black					
Red-Black					

Resistance Value	KSM135D23UFZ	KSN140D21UFZ ASN140D21UFZ	KTF235D22UMT ATF235D22UMT	ATM150D23UFZ	KTM240D57UMT
Blue-Red	1.72Ω	1.28Ω	0.75Ω	1.72Ω	0.62Ω
Blue-Black					
Red-Black					

Resistance Value	KSN140D58UFZ	KTM240D43UKT	KSN98D64UFZ3	ASM135D23UFZ	KSK89D33UEZD3 KSK75D33UEZD3
Blue-Red	1.86Ω	1.03Ω	2.7Ω	1.75Ω	2.14Ω
Blue-Black					
Red-Black					



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

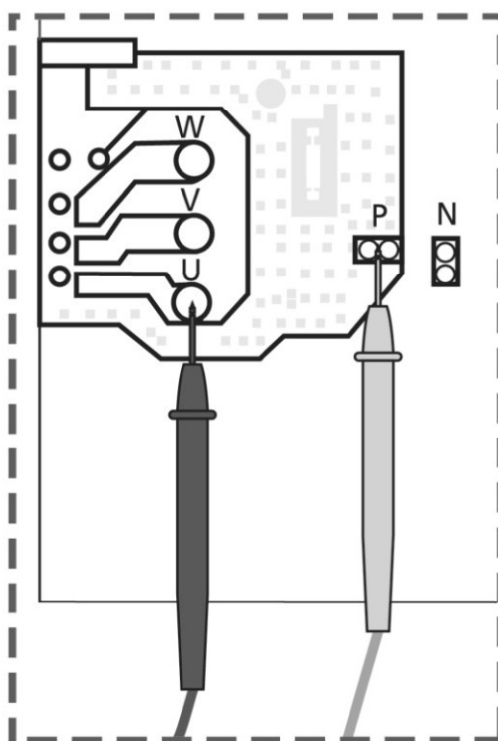
6.3 IPM Continuity Check

⚠ 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)
P	N		U	N	
	U		V		
	V		W		
	W		-		



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

6.4 Indoor AC Fan Motor Check

- 1) Power off and disconnect fan motor power cord from PCB. Measure the resistance value of each winding by using the multi-meter. The normal value show as follows .

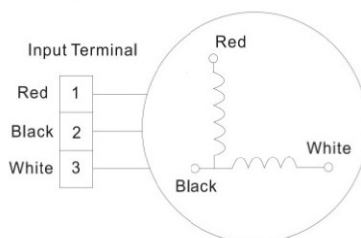
Model	YKFG-13-4-38L YKFG-13-4-38L-4	YKFG-15-4-28-1	YKFG-20-4-10L	YKFG-20-4-5-11
Brand	Welling	Welling	Welling	Welling
Black – Red Main	345Ω	75Ω	269Ω	388Ω
White – Black AUX	348Ω	150Ω	224Ω	360Ω

Model	YKFG-20-4-5-19	YKFG-25-4-6-14	YKFG-28-4-3-7 YKFG-28-4-3-14	YKFG-28-4-6-5
Brand	Welling	Welling	Welling	Welling
Black – Red Main	444Ω	287Ω	231Ω	183.6Ω
White – Black AUX	470Ω	409Ω	414Ω	206Ω

Model	YKFG-45-4-13	YKFG-45-4-22 YKFG-45-4-22-13	YKFG-60-4-2-6	YKFG-60-4-1
Brand	Dongfang	Welling	Welling	Welling
Black – Red Main	125.2Ω	168Ω	96Ω	68Ω
White – Black AUX	83.8Ω	141Ω	96Ω	53Ω

Model	YKFG-20-4-5-21	YKFG-20-4-123	YKFG-28-4-46
Brand	Welling	Welling	Welling
Black – Red Main	450Ω	267Ω	210Ω
White – Black AUX	442Ω	266Ω	288Ω

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



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)

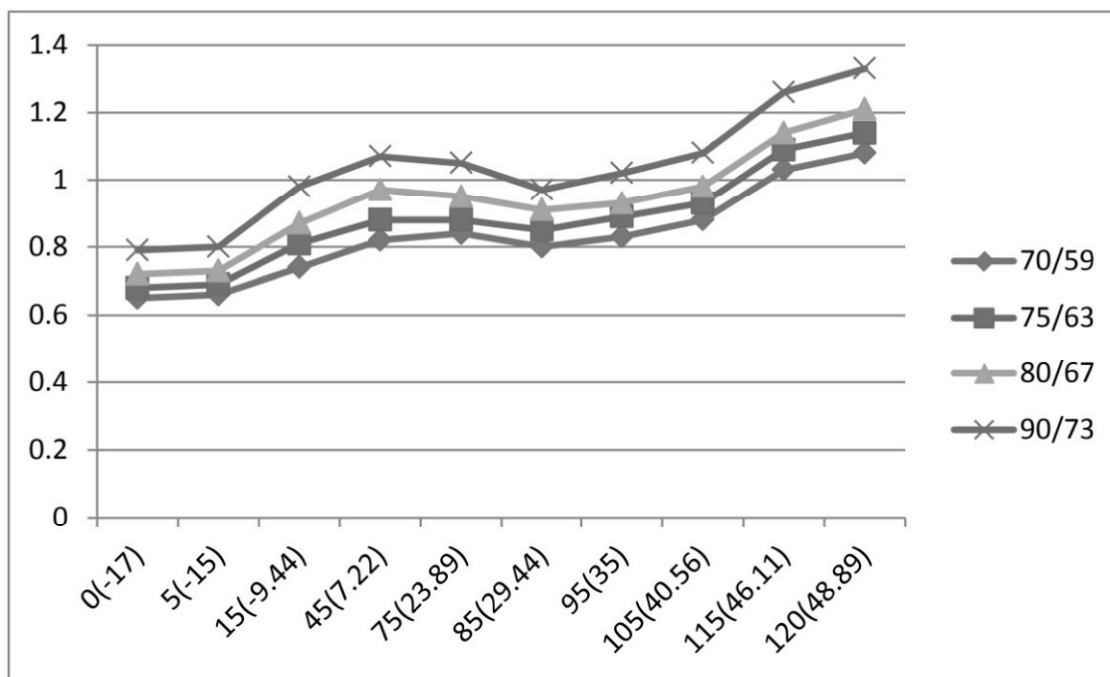
°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm	°C	°F	K Ohm
-20	-4	115.266	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.146	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.517	22	72	11.5	62	144	2.19073	102	216	0.59386
-17	1	96.3423	23	73	10.9731	63	145	2.11241	103	217	0.57683
-16	3	89.5865	24	75	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			

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



**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					