

AIR SOURCE DC+EVI INVERTER HEATING COOLING & DHW HEAT PUMP INSTALLATION MANUAL

Dear user:

Thank you for using our products!

You are using an air source heat pump unit. There are certain requirements for the installation, use and maintenance of the unit. Properly installed, used, and maintained, your hot water unit will have a reduced failure rate and a significant increase in service life.

At the same time, correct installation, use, and maintenance will reduce the failure rate of your hot water unit and increase its service life.

We are always committed to technical improvements, please do drain the water from the system to avoid freezing the system.



Foshan AIROSD Thermal Technology Co., Ltd

Please keep it well for further reference.

If there are mistakes and omissions, please criticize and correct them

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CHAPTER I OVERVIEW

This chapter mainly introduces the classification and model, naming rules, main components, working principle, transportation and storage environment requirements of air source heat pump heating and cooling units (hereinafter referred to as "units").

1.1 Safety Precautions

1. This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
2. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
3. The appliance shall be installed in accordance with national wiring regulations.
4. Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
5. The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)
6. Do not pierce or burn.
7. Be aware that refrigerants may not contain an odour.
8. Compliance with national gas regulations shall be observed.
9. A notice that servicing shall be performed only as recommended by the manufacturer.
10. A warning that the appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
11. The appliance shall be stored so as to prevent mechanical damage from occurring.
12. Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
13. Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
14. The manual shall contain specific information for service personnel who shall be instructed to undertake the following when servicing an appliance that employs a flammable refrigerant.

DD.4.1 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 minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

DD.4.2 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.

DD.4.3 General work area

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

DD.4.4 Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. nonsparking, adequately sealed or intrinsically safe.

DD.4.5 Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO₂ fire extinguisher adjacent to the charging area.

DD.4.6 No ignition sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that

contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

DD.4.7 Ventilated area

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

DD.4.8 Checks to the refrigeration equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:

- the charge size is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

DD.4.9 Checks to electrical devices

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

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

DD.5 Repairs to sealed components

DD.5.1 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.

DD.5.2 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 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.

DD.6 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.

DD.7 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 ageing or continual

vibration from sources such as compressors or fans.

DD.8 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.

DD.9 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/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.

DD.10 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 pipework are to take place.

Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

DD.11 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 minimise 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.

DD.12 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.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) 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.
- d) Pump down refrigerant system, if possible.
 - e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
 - f) Make sure that cylinder is situated on the scales before recovery takes place.
 - g) Start the recovery machine and operate in accordance with manufacturer's instructions.
 - h) Do not overfill cylinders. (No more than 80 % volume liquid charge).
 - i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
 - j) 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.
 - k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

DD.13 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.

DD.14 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 number 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.

1.2 Main Components

The unit includes compressors, finned tube heat exchangers, fans, controllers, expansion valves, plate heat exchangers and other components.

Compressor

Adopting high-efficiency double-rotor compressor, the compressor has the function of jet enthalpy (EVI); low vibration, low noise and high reliability.

Finned Tube Heat Exchanger

The finned tube heat exchanger with high heat dissipation efficiency is adopted. The distributor is designed and verified for specific models to ensure the uniformity of refrigerant distribution in each circuit, which greatly improves the utilization rate of the heat exchanger.

Plate Heat Exchanger

The brazed plate heat exchanger has the characteristics of compact structure and high heat exchange efficiency.

High Efficiency Tank Heat Exchanger

High-efficiency tank heat exchanger, high-efficiency heating.

Flow Switch

It adopts famous brand products with high reliability and can effectively protect the unit.

1.3 System Working Principle Diagram

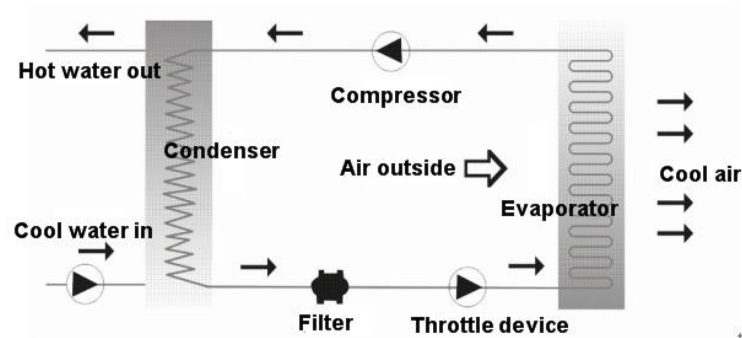


Figure 1-1 System working principle diagram

1.3.2 Cooling Operation

1. After being compressed by the compressor, the low-temperature and low-pressure gaseous refrigerant becomes high-temperature and high-pressure gaseous refrigerant. After being discharged from the compressor exhaust pipe, it enters the condenser (air-side heat exchanger) through the four-way reversing valve; the fan runs, To take away the heat so that the refrigerant is condensed and becomes a liquid refrigerant.
2. The high-pressure liquid refrigerant condensed by the condenser enters the expansion valve. The liquid refrigerant expands in volume after throttling, changes its state, and becomes a low-temperature, low-pressure liquid refrigerant and part of a gaseous refrigerant.
3. The gas-liquid mixture of the refrigerant flows into the evaporator (water-side heat exchanger) through the pipeline, the refrigerant expands and evaporates in the heat exchanger, absorbs the heat in the water, evaporates and absorbs heat and becomes a gaseous state. The refrigerant (water)) When the temperature becomes lower, the water pump continues to operate, continuously pumping the cooling capacity to the terminal equipment, and then dissipating the cooling capacity.
4. The gaseous refrigerant that has been expanded and evaporated enters the compressor through the four-way reversing valve and the compressor suction pipe, where it is compressed again and circulates continuously.

1.3.3 Heating Operation

1. After being compressed by the compressor, the low-temperature and low-pressure gaseous refrigerant becomes the high-temperature and high-pressure gaseous refrigerant. After being discharged by the compressor, it enters the water-side heat exchanger through the four-way reversing valve. The water is used to bring the heat of the refrigerant to the user, while the refrigerant is condensed into a high-pressure liquid.
2. The high-pressure liquid refrigerant condensed by the condenser enters the expansion valve. After throttling, the liquid refrigerant expands in volume and changes its state to become a low-temperature, low-pressure liquid refrigerant and part of a gaseous refrigerant.
3. After passing through the pipeline, it evaporates and absorbs the heat of the air in the air-side heat exchanger and becomes a gaseous refrigerant.

Finally, the gaseous refrigerant enters the compressor through the four-way reversing valve and the compressor suction pipe, and is compressed again and circulates continuously.

1.3.4 Defrosting Operation

1. When the unit is running in heating mode and the ambient temperature is low, the air-side heat exchanger may be frosted, which will affect the heating effect, so defrosting is required.
2. Defrosting control combines the temperature of the air side coil and a timer for long-term monitoring to determine whether defrosting is needed.
3. The unit uses the four-way reversing valve to change the heating operation to the cooling operation. At this time, the high-temperature and high-pressure gaseous refrigerant passes through the air-side heat exchanger for defrosting; the compressor does not operate during the defrosting time.
4. After the defrosting is over, the cooling operation returns to the normal heating operation by switching the four-way reversing valve.

1.4 Operating Environment

1.4.1 Operating Environment

The operating environment requirements of the unit are shown in Table 1-1.

Table 1-1 Operating environment requirements

Items	Requirements
Installation location	Installation method: horizontal installation
Ambient temperature	Outdoor: $-25^{\circ}\text{C} \sim +43^{\circ}\text{C}$,
environment humidity	Outdoor: 5%RH~95%RH
Operating power	220V \pm 10% ~/50Hz; 380V \pm 10%/3N~/50Hz;
Altitude	No more than 1000m, derating is required for use above 1000m
Protection level	IPX4

1.4.2 Storage Environment

The storage environment requirements of the unit are shown in Table 1-2.

Table 1-2 Storage environment requirements

Items	Requirements
Storage environment	Indoor, clean (no dust, etc.)
Environment humidity	5%~85%RH (no condensation)
Ambient temperature	$-30^{\circ}\text{C} \sim 54^{\circ}\text{C}$

1.4.3 Antifreeze Warning

When the ambient temperature of the unit is lower than 0°C , if antifreeze is not used as the cooling (heat) carrier, please make sure that the unit is in the power supply state;

If it cannot be ensured, please empty the water in the unit, otherwise the unit will be at risk of freezing and cracking. Each unit is equipped with a drain valve at the lowest part of the waterway of the unit

1.5 Performance parameter

The maximum water inlet temperature of the unit is 55 degrees, and the minimum water inlet temperature is 5 degrees.

Water inlet pressure 0-1.0MPa.

CHAPTER II MECHANICAL INSTALLATION

This chapter introduces the mechanical installation of the unit, including transportation, unpacking inspection, installation layout, and installation steps.

2.1 Equipment Handling, Unpacking And Inspection

2.1.1 Transportation & Handling

When transporting, choose roads with better road conditions to prevent excessive bumps.

During transportation, the inclination angle of the unit should be kept within the range of $75^{\circ} \sim 105^{\circ}$, and not excessively tilted, as shown in Figure 2-1.

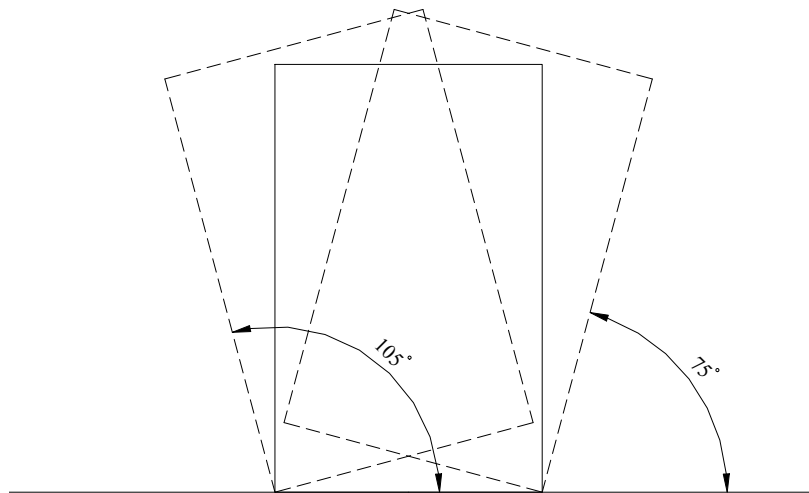


Figure 2-1 Handling inclination

Please use a forklift for transportation. If there is no forklift, you can use rolling transportation.

Rolling transportation: 6 rollers of the same size are placed under the base of the unit. Each roller must be a little longer than the outer frame of the base and suitable for the balance of the unit

2.1.2 Unpacking

Try to move the equipment to the place as close as possible to the installation site before unpacking it.

Unpacking steps:

1. Remove the side panel and top panel
2. Remove the carton
3. Remove the bottom tray

2.1.3 Inspection

When you receive the company's goods, pay attention to whether the outer packaging is damaged, please check whether the accessories are complete according to the packing list, and check whether all components are obviously damaged. If any part is found to be missing or damaged during the inspection, it should be reported to the carrier immediately. If you find any concealed damage, please also report it to the local office of the carrier and product supplier.

2.2 Installation Precautions

In order to achieve the design performance of the equipment and maximize its service life, please operate strictly in accordance with the installation instructions. The content of this section should be applied in conjunction with the current unit and electrical installation regulations.

The unit is installed on the ground as a whole, please install it outside the user or on the roof.

Before installing the equipment, confirm whether the installation environment meets the requirements (see 1.6 Environmental Requirements), and confirm whether the building needs to be modified to match the construction of pipe laying, wiring and ventilation ducts.

The installation must strictly follow the design drawings and reserve space for maintenance. Refer to the engineering dimension drawing provided by the manufacturer.

2.3 Safety Precautions

- Please entrust a professional to install, and the installer must have relevant professional knowledge. During installation, incorrect operation will cause fire, electric shock, injury, water leakage, etc.
- According to the law, a reliable grounding project must be carried out. If the grounding is not perfect, it may cause electric shock.
- Do not put fingers, sticks, etc. into the air outlet. The high-speed operation of the fan inside the unit may cause damage to the unit or personal injury.
- When an abnormality occurs (such as burnt odor), immediately turn off the manual power switch, stop the operation, and get in touch with the dealer. If it continues to run, it may cause electric shock or fire.
- When the unit needs to be moved or reinstalled, please entrust a professional to perform the operation. If the installation is not perfect, it may cause electric shock, fire, injury, water leakage, etc.
- Never modify or repair it by yourself, otherwise it is easy to cause electric shock or fire.
- If repairs are needed, please entrust professionals; if the repairs are not done properly, it may cause fire, electric shock, injury, water leakage, etc.
- Confirm whether a leakage protection switch is installed.

A leakage protection switch must be installed. Failure to install it may cause electric shock.

- Connect the cable correctly. If the cable connection is wrong, electrical components may be damaged.
- The unit should not be operated near combustible materials (paint, paint, gasoline, chemical reagents, etc.) to prevent fire or explosion. In the unfortunate event of a fire, immediately turn off the main power supply and extinguish it with a fire extinguisher.
- Regularly check whether the installation table is firm and intact.

If the installation platform is damaged and not firm, the unit may fall and cause casualties.

- When cleaning, the operation must be stopped and the manual power switch must be cut off.

If the operation is not stopped, the internal wind wheel is running at a high speed, which may cause damage to the unit or personal injury.

- Do not touch the refrigerant exhaust parts with your hands to prevent burns.
- Please use the corresponding fuse instead of copper wire or iron wire, otherwise it will cause serious damage to the unit or fire.
- Do not spray flammable sprays on the unit, otherwise it may cause a fire.

2.4 Selection Of Installation Site

1. The installation site of the outdoor unit of the unit needs to ensure sufficient ventilation and installation and maintenance space.
2. The installation position of the unit should avoid boiler flue or other air environment that will corrode the condensing coil and the metal parts of the unit.
3. If the unit is located in a place accessible by unauthorized personnel, isolation safety measures should be taken, such as setting up protective fences. This can prevent man-made sabotage and accidental damage.
4. The installation support surface of the unit is flat and can bear the weight of the unit. The unit can be installed horizontally without increasing noise and vibration.
5. The operating noise of the unit and the exhaust air do not affect neighbors.
6. There is no flammable gas leakage at the installation site of the unit.
7. It is convenient for piping and electrical connection.
8. For occasions with special installation requirements, please consult the construction contractor or architect or other professionals.



NOTE: Installation in the following places may cause machine failure (if it cannot be avoided, please consult)

- Places with mineral oil such as cutting oil.
- At the seaside and other places where the air contains a lot of salt.
- In hot spring areas and other places where corrosive gases such as sulfur gas exist.
- Places where the power supply voltage fluctuates severely.
- Cars or cabins, etc.
- Places full of oil and gas, such as kitchens.
- Places with strong electromagnetic waves.
- Places where flammable gases or materials exist.
- There is a place where acid or alkaline gas volatilizes.
- Other special environmental conditions.

2.5 Requirements For Unit Arrangement Spacing

Recommended spacing diagram for outdoor unit installation (unit: mm)

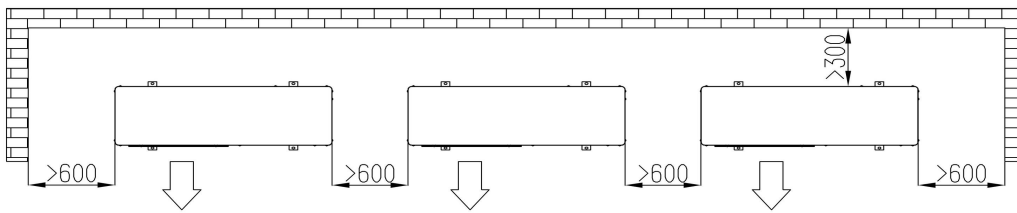


Figure 2-2 Recommended spacing diagram for unit installation



NOTE:

- When installing the unit, reserve space for maintenance and water pipe connection.
- If there is an obstacle at the air outlet of the unit, please ensure that the obstacle is more than 2000mm away from the air outlet of the unit.
- If there are stacked objects around the unit, please ensure that the height of the stacked objects is below 400mm on the top of the unit.
- The unit cannot be installed in basements, indoors or other confined spaces. If the project requires that the unit must be installed in such a space, please consult our company or the designated supplier.

2.6 System Installation Layout

2.6.1 Overall Layout Of Hydraulic System

The hydraulic system diagram of domestic unit application is shown in the figure below.

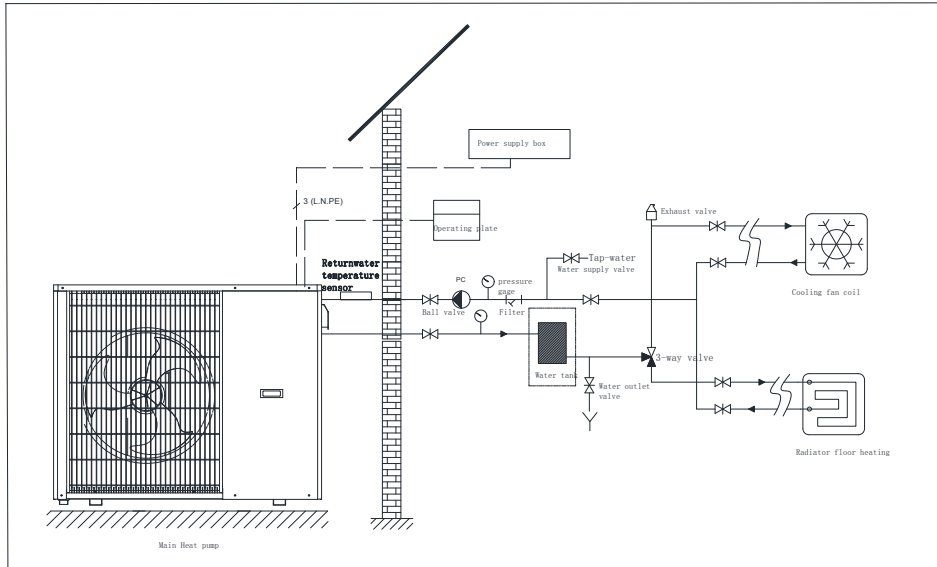


Figure 2-3 General layout diagram of single pump water system of household unit

- 📖 After the piping of the circulating water system is completed, the air in the water system must be exhausted before starting;
- 📖 In order to ensure that the resistance loss of the water system pipeline is not greater than the residual pressure outside the unit, please use a water pipe that is one size larger than the water inlet and outlet of the unit to lay the water system pipeline.
- 📖 In order to prevent the unit from starting frequently due to too small load during operation, users who use a fan coil at the end suggest that users install an energy storage tank to ensure that the system volume reaches the minimum volume requirement of the system. Please refer to Table 2-1 for the minimum volume of the water system
- 📖 In order to improve the cooling (heating) effect and save energy, the pipeline needs to be kept tightly insulated.

2.7 Install The Unit

2.7.1 Installation space

📖 NOTE:

Since the unit will produce condensed water, water leakage may cause damage to other equipment nearby, so drainage pipes must be provided at the installation site.

1. In order to ensure the normal operation of the unit, a spacious space should be selected as the installation site of the unit as much as possible;
2. Avoid placing multiple outdoor unit units close together to avoid cross air flow, unbalanced load and competitive operation;
3. When installing on the roof, pay attention to protecting the waterproof layer and comply with relevant local regulations.

2.7.2 Maintenance Space Requirements

1. There is no obstruction within 2m of the air outlet of the unit.
2. Both sides of the unit must ensure a maintenance space of more than 600mm.

2.7.3 Installation Steps

The installation steps of the outdoor unit are as follows:

1. Make the mounting base according to the requirements of the outline drawing. The mounting base can be made by the user.
2. Determine the installation location, and fix the installation base on the selected installation location according to the site conditions and user requirements.
3. Fix the unit on the installation base with nuts, spring washers, flat washers and bolts.
4. When installing, it can be slightly inclined to the drainage side to facilitate drainage.
5. Installed on a solid foundation.

2.8 The Unit Piping

Please refer to the water system layout drawing for connecting the water system piping of the unit.

2.9 Inspection items after the mechanical installation is completed

1. Leave a certain space around it for the convenience of equipment maintenance;
2. The unit is placed horizontally, and the installed fastening parts have been locked;
3. The pipeline connecting the unit has been installed, and all valves have been fully opened;
4. The drain pipe is connected;
5. All pipe joints have been tightened;
6. After the equipment is installed, the debris in or around the equipment has been removed (such as transportation materials, structural materials, tools, etc.);

After all the contents are checked and confirmed to be correct, please perform electrical installation operations.

CHAPTER III ELECTRICAL INSTALLATION

This chapter introduces the electrical installation of the unit, including task introduction, installation precautions, connecting power lines and installation inspection.

3.1 Task Introduction And Precautions

Lines that need to be connected at the installation site:

1. power cable;
2. Output control line.

Installation Precautions

- The unit should use a dedicated power supply, and the power supply voltage and frequency conform to the rated specifications.
- The power supply circuit of the unit must have a ground wire, and the power ground wire must be reliably connected to the external ground wire, and the external ground wire is effective.
- Wiring construction must be carried out by professional and technical personnel in accordance with the electrical control wiring diagram.
- Wiring work must meet the requirements of the relevant national electrical equipment technical standards, and set up a leakage protection device.
- The power supply needs to be installed with an extremely disconnected air switch, refer to Table 3-1 in the selection specifications
- The arrangement of power cables and signal cables should be neat and reasonable, and they should not interfere with each other, and they should not be in contact with connecting pipes or valve bodies.
- After all wiring construction is completed, it can be powered on after careful inspection and confirmation.

The wires that need to be installed and connected on site include external power cords, controller wires, and unit connection wires. After the unit is installed in place, you can connect the power cord and the connecting line. All the wires must be firmly connected and must not be in contact with any moving parts. All wires must meet the requirements of the country or relevant manual standards. The unit requires grounding measures. All electrical equipment and installation work must meet the requirements of national and local safety regulations.

NOTE:

The wiring of the communication line between the remote controller and the host control board should follow the principle of separate strong and weak currents, and avoid power lines and other sources of strong current interference. Do not bundle it with the power cord. Do not install it too close to TVs, stereos and other equipment to avoid interference and affect operation. Separate strong and weak wires at least 30cm.

3.1.1 Power Supply Specifications

Specification of main control board fuse

Name	Model	Rated voltage	Rated current	Installation dimensions
Fuse tube	T10AH250V	250V	10A	φ5×20mm

Power Specifications

It is recommended to use copper core wire not less than the following table for the unit input wire.

Model	BKFXFC-009SRI	BKFXFC-014SRI	BKFXFC-016SRI
Power Specifications	220-240V~/50Hz		
Main switch capacity/leakage protection device/fuse (A)	25	25	32
Power cord specification (mm2)	4	4	6
Ground wire specification (mm2)	2.5	2.5	4

Model	BKFXFC-024SR11	BKFXFC-030SR11	
Power Specifications	380-415V 3N~/50Hz		
Main switch capacity/leakage protection device/fuse (A)	25	32	
Power cord specification (mm2)	4	4	
Ground wire specification (mm2)	2.5	2.5	

Table 3-1

3.2 Unit Wiring


3.2.1 Wiring Requirements

1. Power and control lines that are not connected to the electric control box are not allowed to pass through the electric control box. Otherwise, electromagnetic interference may cause malfunctions or even damage to the unit and control devices, and invalidate the warranty.
2. In the electric control box, there are usually strong current lines passing through, and 220V alternating current is also passing through the control board. The principle of separating strong and weak currents should be followed when wiring. The operation panel cable cannot be bundled with the power cable.
3. All electrical wiring must comply with local wiring regulations. According to Chinese standards, the user is responsible for providing voltage and current protection for the input power supply of the unit.
4. All power supplies connected to the unit must pass through a manual switch, and ensure that when this switch is turned off, the voltage on the circuit nodes of the unit is all released.
5. Cables of correct specifications must be used to provide power to the unit. The unit should use an independent power supply. It is strictly forbidden for the unit to share the same power supply with other electrical appliances to avoid overloading. The fuse or manual switch of the power supply should match the working voltage and working current of the unit.
6. The unit must be installed with a grounding wire. Do not connect the grounding wire to the gas fuel pipeline, water pipe, lightning conductor or telephone grounding wire. Improper grounding may cause electric shock accidents. Please always check whether the grounding of the unit is reliable.
7. All lines connected to the unit should prevent rainwater from infiltrating into the unit to prevent leakage accidents.

3.3 Pay Attention To Installation & Inspection

After the electrical installation is completed, check to confirm:

1. The power supply voltage and frequency are the same as the rated voltage and frequency on the equipment nameplate.
2. There is no open circuit or short circuit in the electrical circuit of the system.
3. The power cable and grounding cable to the disconnect switch, the unit have been connected.
4. All cables and circuit connectors have been tightened, and the tightening screws are not loose.

 **NOTE:** The unit must be reliably grounded!

After all the above contents have been checked and confirmed to be correct, the debugging can be started.

CHAPTER IV SYSTEM TRIAL RUN

This chapter introduces the system commissioning of the unit, including the preparation of mechanical, water system, electrical and other parts before startup.

4.1 Precautions Before Commissioning

- Test operation can only be carried out after electrical safety inspection.
- Do not block the air inlet and outlet. Otherwise, it may cause the performance of the unit to decrease or start the protection device and fail to operate.
- Confirm that all valves are open to flush and drain the water system pipeline, and confirm that the cleanliness of the water meets the requirements.
- Fill and empty the water system to ensure that there is no air in the water system.
- Never perform forced operation. (The failure of the protection device may result in damage to the unit and invalidation of the warranty!).
- Whether the system is fully warmed up (more than 12 hours).

4.2 Check List After Installation

According to this manual, check the installation work with reference to the following table.

Check Item	Specific Description	Yes	No
Whether the installation location meets the requirements	The unit is firmly installed on the foundation and leveled		
	The air flow space of the air side heat exchanger meets the requirements		
	Maintenance work space meets requirements		
	Appearance meets the requirements		
Whether the water system meets the requirements	Water pipe size meets requirements		
	Pressure control meets requirements		
	Thermal insulation meets requirements		
	No air in the water system		
Whether the electrical system and wiring meet the requirements	Leakage protector is effective		
	The ground wire is connected correctly		
	Wire capacity meets requirements		
	Switching capacity meets requirements		
	The capacity of the safety device meets the requirements		
	Voltage and frequency meet the requirements		
	Tighten the connection position		
	Safety device meets requirements		
Operation panel connection meets requirements			

4.3 Trial Run

1. Use the operation panel to control the operation of the unit, and check the following items according to the operating instructions:
2. Whether the operation panel switch is normal.
3. Whether the function keys of the operation panel are normal.
4. Whether the indicator light is normal.
5. Whether the drainage is normal.
6. Whether the temperature difference between the inlet and outlet water is normal (4~7°C)
7. Whether the vibration and sound are normal during operation.
8. Whether the wind, noise and condensate generated during operation affect neighbors.
9. Whether there is refrigerant leakage.

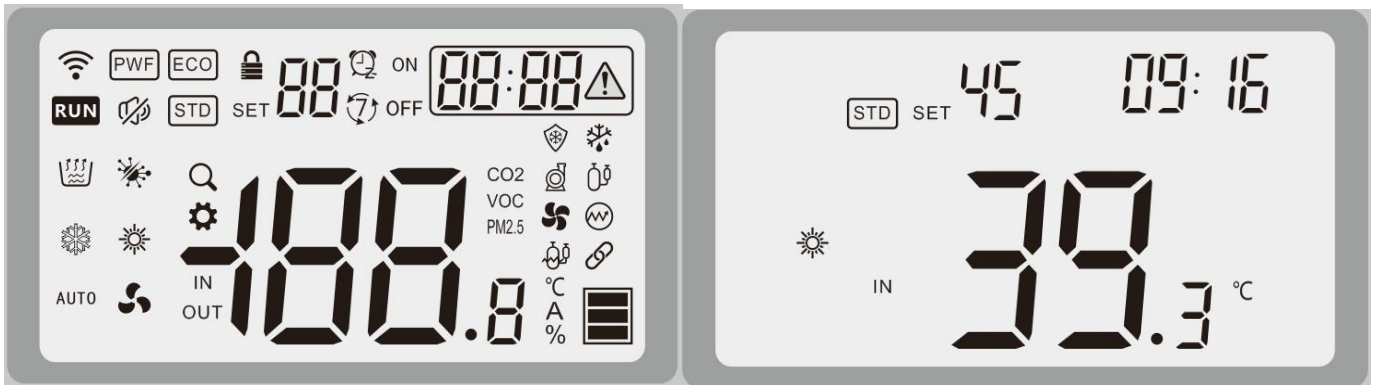


NOTE:

When restarting after shutdown, the unit is equipped with a protection function, and the compressor starts with a delay of 3 minutes.

CHAPTER V OPERATING INSTRUCTIONS

5.1 Display Panel


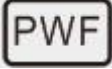





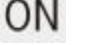




















5.2 Pressing Function Definition

Icon	Meaning	Name
	The on / off key, used for on / off.	[on/off]
	Page up and parameter increase can be realized.	[up]
	Page down and parameter reduction can be realized.	[down]
	Time icon to set the clock and timing. Note: used as the return key in the sub interface.	[clock]
	Used to set the mode. Note: Used as the confirmation key in the sub interface.	[model]



5.3 Main Interface



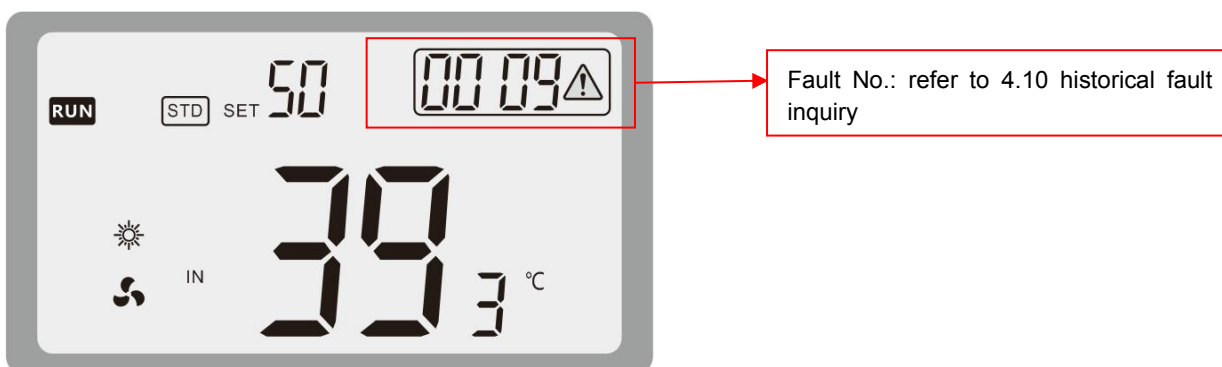
Icon	Meaning
	Light: operation Flash: warm -up No light: standby
	Power mode: strong
	Power mode: standard
	Power mode: silent
	Child lock
	Control temperature settings
	Timing
	Timed: on
	Timed: off
	Cycle timing
	Fault sign
	Anti -frozen is running
	The compressor is running defrost
	Control mode is cooling
	Control mode is heating
	Control mode is automatic
	Status query
	Parameter settings
	Control object: temperature of return water
	Control object: temperature of Outlet water
	The air conditioning pump is running
	The compressor is running
	The fan is running


	Auxiliary electric heating is running
	Two -way valve locking
	Flashing: Routing connection is unsuccessful (no signal) Light: Route has been connected successfully

List of key operations on the main interface:

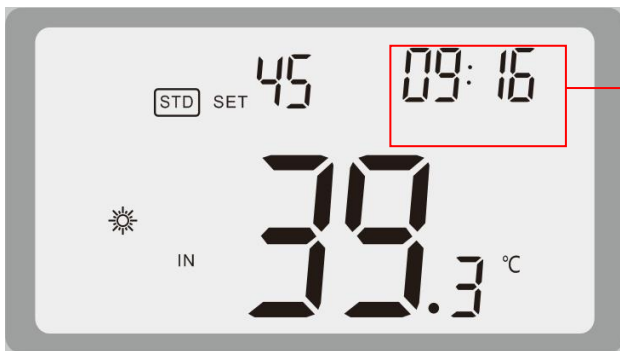
Key operation	Function
[on/off]	During standby, press [on/off] ----Start running During operation, press [on / off] ---- Stop running "RUN" flashes: the unit is preheating. At this time, press and hold the [on / off] key for 3 seconds to cancel the preheating function and keep the unit state unchanged. Press [on / off] to cancel antifreeze during antifreeze.
[mode]	Press [mode] to realize the cycle switching of "refrigeration", "heating", "automatic" and other modes Press and hold [mode] key for 3 seconds to enter the parameter setting interface.
[up] or [down]	Press the [up] and [down] keys to adjust the unit operation control temperature in the current mode. Press and hold [up] and [down] to quickly adjust the control temperature of the unit.
[clock]	Press and hold [clock] for 3 seconds to enter the clock setting when there is no fault Press [clock] to enter the timing setting when there is no fault. When a fault occurs and the error code is displayed in the clock area, you cannot enter the timing setting. press the [clock] key is to reset the fault.
[up] + [down]	Enter the simulation query interface
[mode] + [up]	Enter the user function interface
[down] + [on/off]	Press [down]+ [on/off] to enter the system maintenance settings interface when system indicate maintenance or system maintenance prompts
[clock]+ [down]	Press and hold for 3 seconds: the timing function is on / off The  will be displayed when the timing function is on The  will not be displayed when the timing function is off

5.4 Current Fault Query



The clock display area will display the error code and flash the "" icon when the unit fails. Error code will be displayed in turn when there are multiple faults. Press [clock] to reset when the fault is eliminated.

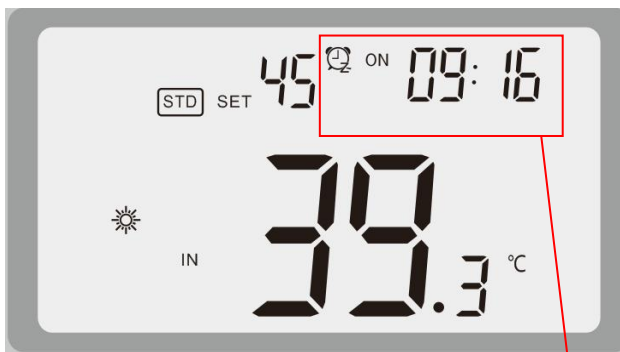
5.5 Clock Setting



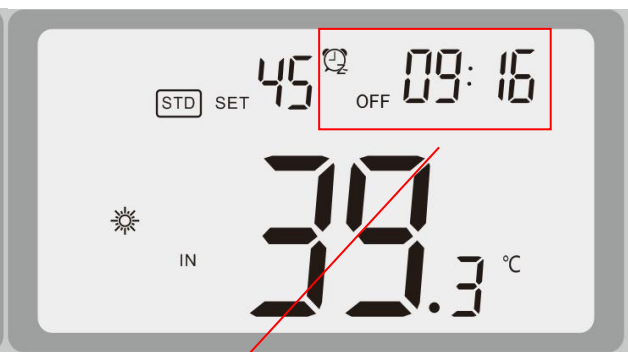
This part will flash after entering the clock setting.

Press and hold [clock] for 3 seconds to enter the clock setting. When the "hour" area flashes, press [up] or [down] to adjust the hour ; Press [clock] again, the "minute" area will flash, press [up] or [down] to adjust the minute, After setting, press [clock] to save the internal clock and exit the clock setting state.

5.1 Timing Setting

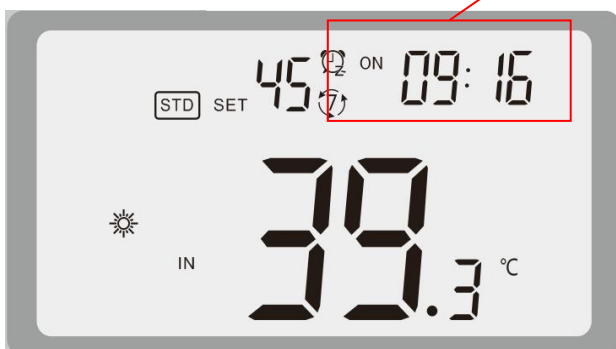


One-time timing on

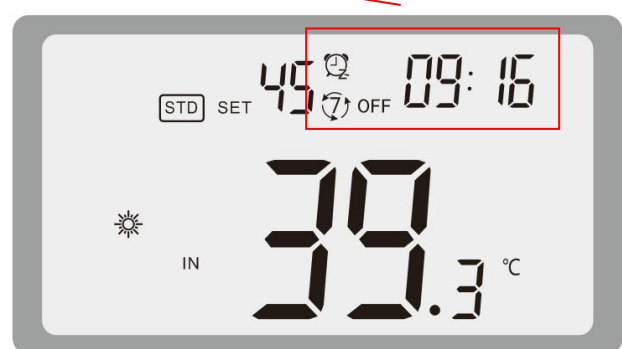


One-time timing off

This area will flash after entering the timing setting



Cycle timing on



Cycle timing off

Press [clock] to enter the timing setting interface.

Press [clock] to switch the timing setting item and the timing group.

After the last timing group item is set, press [clock] to automatically jump to the next timing group .

After setting all the timings, press [clock] to exit the timing setting.

There are three timing groups : one-time timing, cycle timing on and cycle timing off. When one of the time items displays "-", it indicates that the timing group is invalid.

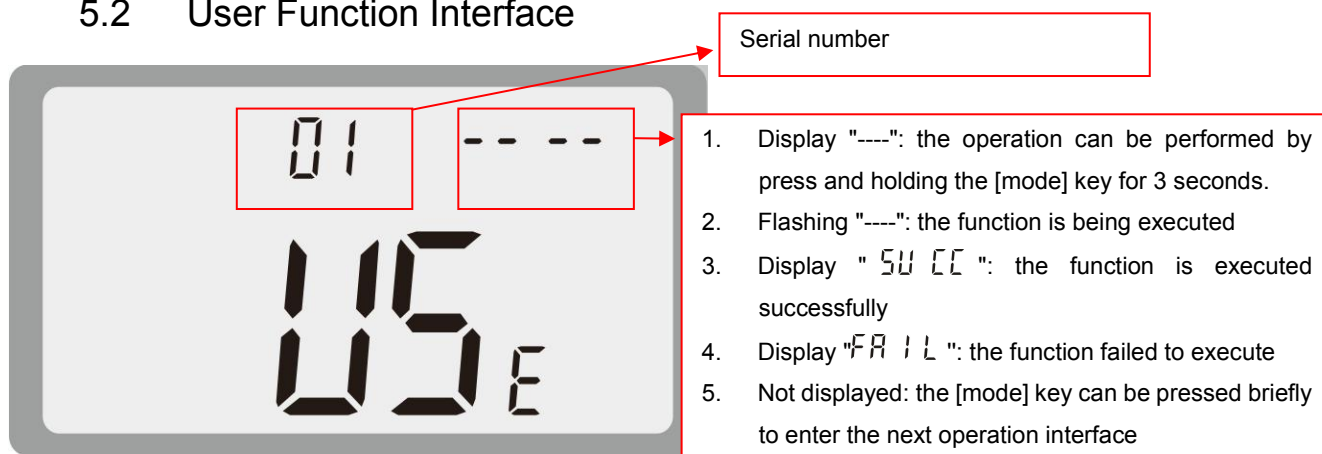
Press and hold [clock] + [down] for 3 seconds: on or off the timing function. When the timing function is enabled, "timing" will be displayed, but not when the timing function is disabled.

Key operation list on timing interface:

Key operation	Function
[on / off]	Exit or save the current timing value
[up]	Hour, minute and timing on / off can be adjusted
[down]	Hour, minute and timing on / off can be adjusted
[clock]	Switch setting group and item
[mode]	Exit and save the current timing

Timing classification	Function	Display
One -time timing on	The timing takes effect only once. After the timing is executed, it needs to be reset.	Display icons: "🕒" "ON"
One -time timing off		Display icons: "🕒" "OFF"
Cycle timing on	After the cycle timing is on, the timing will take effect every day.	Display icons: "🕒" "ON" "🗓️"
Cycle timing off		Display icons: "🕒" "OFF" "🗓️"

5.2 User Function Interface



Serial number

1. Display "----": the operation can be performed by press and holding the [mode] key for 3 seconds.
2. Flashing "----": the function is being executed
3. Display "SUCC": the function is executed successfully
4. Display "FAIL": the function failed to execute
5. Not displayed: the [mode] key can be pressed briefly to enter the next operation interface

Press the [mode] + [up] keys at the same time to enter the user function interface;

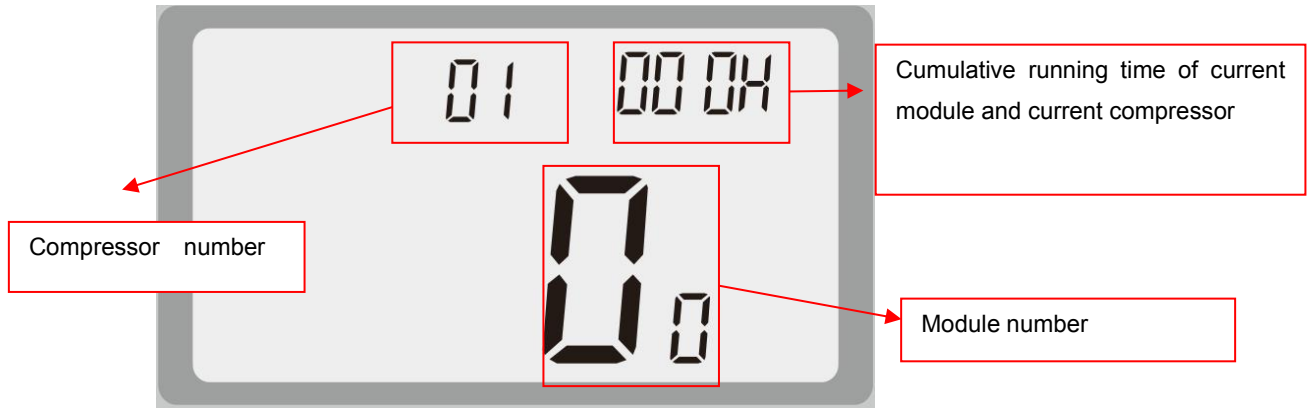
List of key operations on user function interface:

Key operation	Function
[mode]	<ul style="list-style-type: none"> ● When the upper right side of the interface is not displayed, press to enter the next function interface. ● When " --- " is displayed on the upper right side of the interface, press and hold for 3S to execute this function
[up] or [down]	Press [up] and [down] to switch the function serial number
[clock]	Press [clock] to return to the main interface

Serial Number	Describe	Operation
01	Query of cumulative running time of compressor	Press [mode] to jump to the query interface of the cumulative running time of the compressor
02	Query of historical faults	Press [mode] to jump to the historical fault query interface
03	Manual defrosting	Press and hold [mode] for 3 seconds for manually defrost.

		Note: the display of "SU LL" only indicates that the key operation is effective but does not mean that the unit has entered defrosting. The unit may not enter defrosting due to the influence of temperature and other factors.
04	Date setting	Press [mode] to jump to the date setting interface
05	Query of version number	Press [mode] to jump to the version number display interface
06	WiFi status display	press [mode] to jump to the WiFi status display interface

5.3 Query of Cumulative Running Time of Compressor

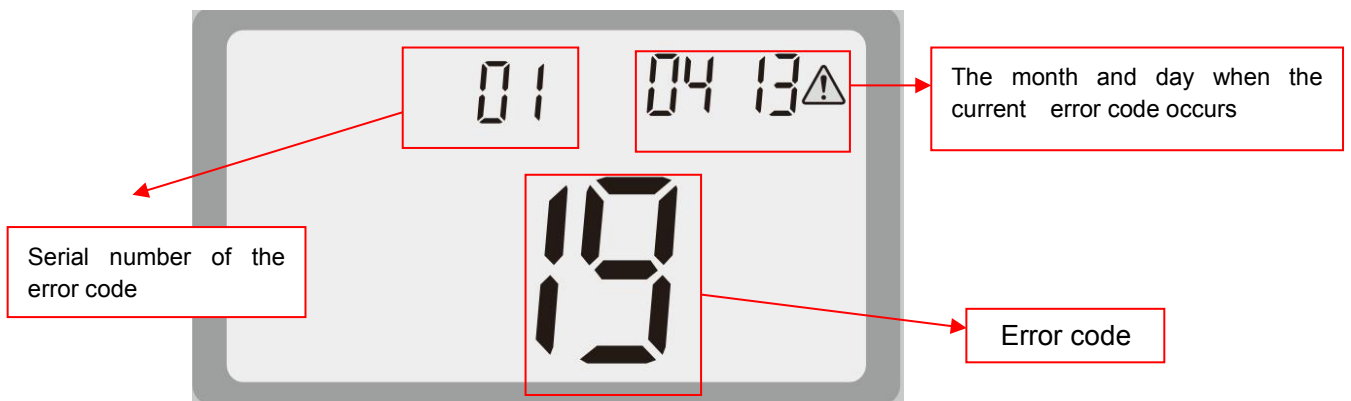


Press [Mode]+[up] key to enter the user function interface;

List of key operations on query of cumulative running time of compressor:

Key operation	Function
[up]	press to switch module number
[down]	press to switch the compressor number
[clock]	press to return to the user function interface

5.4 Query of historical faults



When there is no historical fault, the display is as follows:



From the user function interface, when the serial number is 02, press the [mode] key to enter.

Key operation list under historical fault query:

Key operation	Function
[up]	press to switch to the next fault
[down]	press to switch to the previous fault
[clock]	press to return to the user function interface
[mode]	press and hold to clear all historical faults

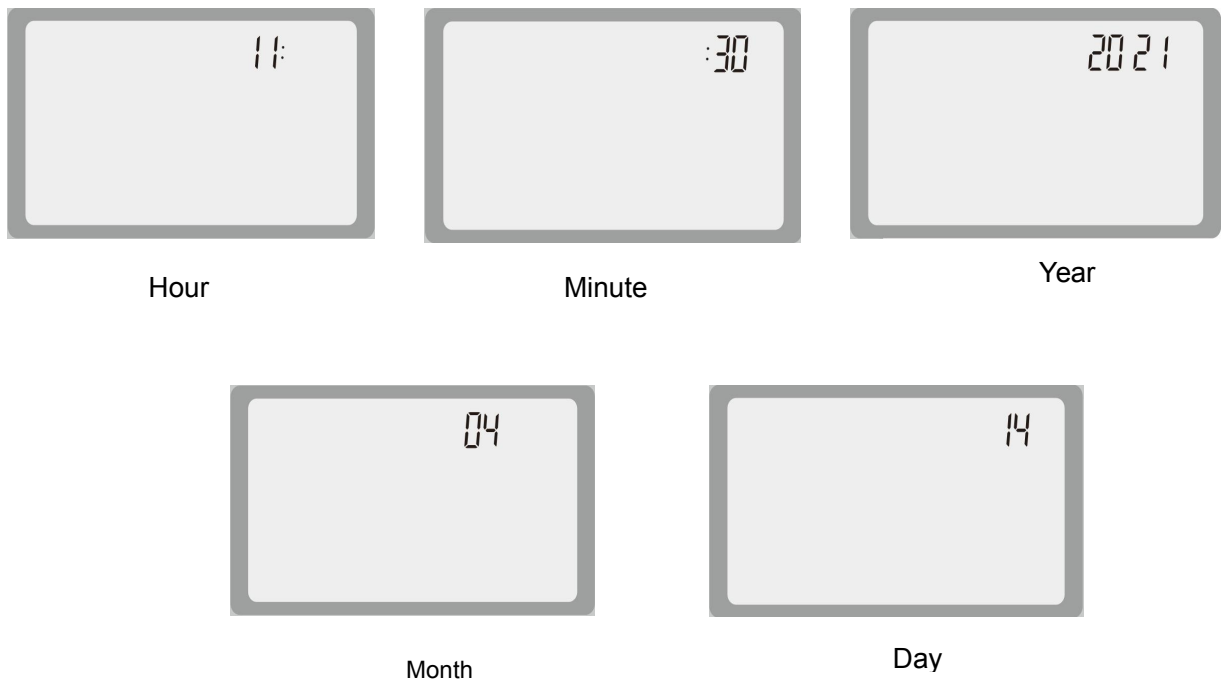
The error code is shown as follows:

Error code	Fault name	Notes
01	Phase staggering protection	system failure
02	EEPROM data error fault (host)	
03	Ring temperature probe failure	
04	Abnormal speed of fan 1	
05	Abnormal speed of fan 2	
06	System maintenance data error	
07	Phase failure protection	
08	Excessive temperature difference between outlet and return	
09	Abnormal communication between internal and external computers	
10	Internal and external communication failure	
11	EC1 communication failure	
12	EC1 fault	
13	EC2 communication failure	
14	EC2 fault	
15	Frequency conversion communication failure	
16	Frequency conversion fault	
17	Frequency conversion model setting	
18	Electric auxiliary thermal protection	
19	EX_ EC1 communication failure	
20	EX_ EC1 fault	
21	EX_ EC2 communication failure	
22	EX_ EC2 fault	
23	Abnormal temperature difference between outlet and return	
24	Press low pressure	
25	Press high pressure	
26	Press current is too large	

27	Press current too low		
28	Fin probe failure		
29	Exhaust probe failure		
30	Exhaust temperature too high		
31	Low voltage transmission fault		
32	High pressure transmission fault		
33	Low pressure of pressure transmission		
34	High pressure of pressure transmission		
35	Suction temperature fault		
36	Temperature fault behind valve		
37	Suction temperature too low		
38	Frequent emergency defrosting		
39	Abnormal suction and discharge temperature difference		
40	Refrigeration evaporation too low		
41	\		
42	\		
43	Return water temperature too low		
44	Return water temperature too high		
45	\		
46	\		
47	\		
48	\		
49	\		
50	\		
51	\		
52	\		
53	\		
54	\		
55	\		
56	Identification code error		Unit related fault
57	Communication failure		
58	EEPROM Data error (slave)		
59	Phase failure protection		
60	Reverse phase protection		
61	Air conditioning side outlet temperature is too low		
62	Air conditioning side outlet temperature too high		
63	Outlet water temperature fault		
64	Insufficient water flow		
65	Fan overload		
66	Return water temperature fault		
67	Anti icing temperature too low		
68	Anti icing probe failure		
69	Economizer inlet probe failure		
70	Probe failure of economizer		
71	Power failure		
433	Over current during variable frequency starting		Frequency
434	Frequency conversion accelerated operation overcurrent		conversion fault

435	Frequency conversion speed reduction operation overcurrent
436	Frequency conversion constant speed operation overcurrent
437	Frequency conversion accelerated operation overvoltage
438	Over voltage during variable frequency deceleration operation
439	Frequency conversion constant speed operation overvoltage
440	Overvoltage during frequency conversion standby
441	Undervoltage during variable frequency operation
442	Frequency conversion input phase loss
443	Inverter output phase loss
444	Variable frequency power device protection
445	Frequency converter overheating
446	Frequency converter overload
447	Overload of variable frequency motor
448	Variable frequency PFC startup failed
449	Overload of variable frequency motor
450	Excessive speed of variable frequency motor
451	Excessive current of variable frequency d-axis
452	Excessive current of variable frequency q-axis
453	Frequency conversion parameter storage failed
454	Abnormal frequency conversion communication
455	Frequency conversion current detection fault
456	Frequency conversion standby fault
457	Locked rotor of variable frequency starting motor
458	Locked rotor of variable frequency motor
459	Inverter cooling temperature fault
460	Frequency conversion stall fault
461	Frequency conversion interruption fault 1
462	Frequency conversion interruption fault 2
463	Excessive vibration of starting rotor
464	Excessive vibration of running rotor
465	Frequency conversion PFC overcurrent
466	Excessive PFC current
467	Excessive PFC effective current

5.5 Date Setting

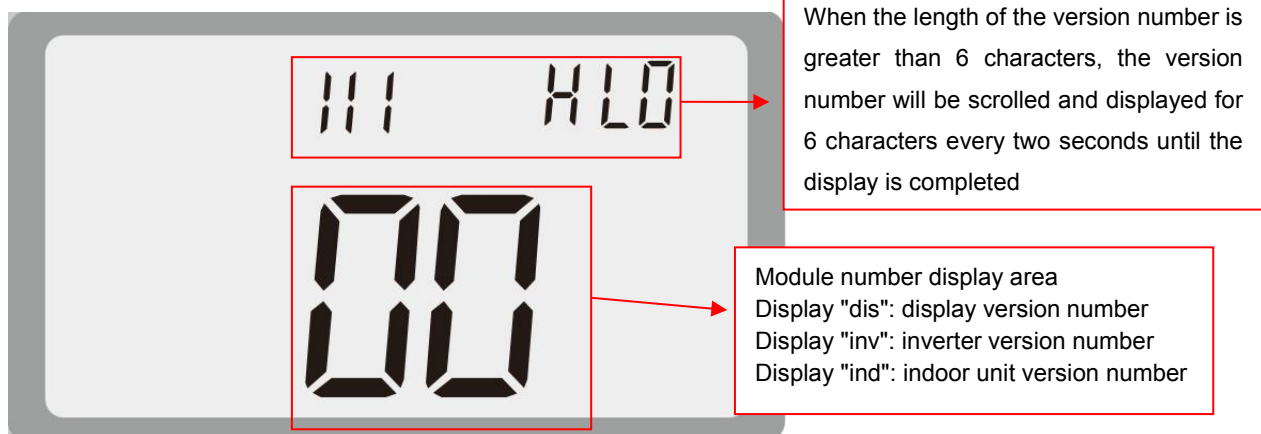


From the user function interface, when the serial number is 04, press [mode] to enter.

Key operation list under date setting:

Key operation	Function
[up]	Press to adjust the current time, press and hold to quickly adjust the current time
[down]	Press to adjust the current time, press and hold to quickly adjust the current time
[clock]	Press to save the current time and return to the user function interface
[mode]	Press to switch adjustment items (hour, minute, year, month and day cycle switching)

5.6 Query of Version Number

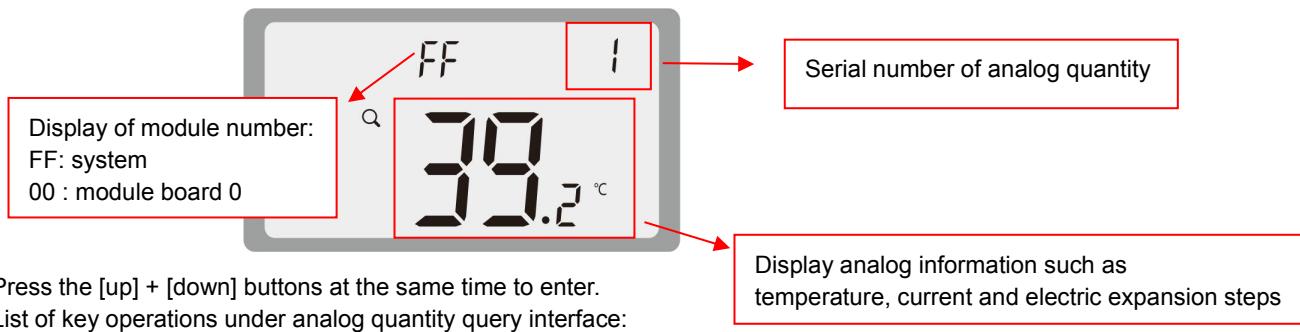


Press the [up] + [down] buttons at the same time to enter.

Key operation list under version number query:

Key operation	Function
[up]	Press to display the version number of the next item
[down]	Press to display the version number of the previous item
[clock]	Press to return to the user function interface
[mode]	Press to scroll the display again

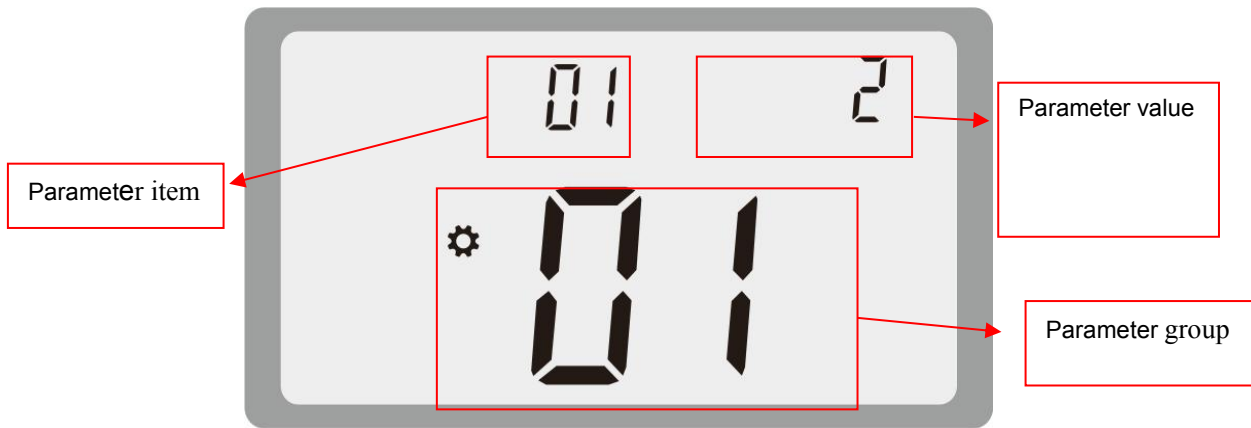
5.7 Query Interface of Analog Quantity



Key operation	Function
[up]	Press to the next analog quantity
[down]	Press to the previous analog quantity
[clock]	Press to return to the main interface

Modular	Serial Number	Describe
FF (system)	1	Return water temperature
	2	Outlet water temperature
	3	ambient temperature
	4	Variable frequency target speed
	5	Current speed of frequency conversion
	6	Variable frequency output voltage
	7	Variable frequency output current
	8	Temperature of frequency conversion module
	9	Frequency conversion and frequency limiting information
	10	Target operation of fan 1
	11	Current speed of fan 1
	12	Target operation of fan 2
	13	Current speed of fan 2
	14	Main valve target overheating
	15	The main valve is currently overheating
	16	Target overheating of auxiliary valve
	17	The auxiliary valve is currently overheating
	18	/
	19	Variable frequency input current
	20	Variable frequency output power
	21	EC fan 1 warning message
	22	EC fan 2 warning message
00	1	electric current
	2	Main electric expansion
	3	Auxiliary power expansion
	4	Fin temperature
	5	Exhaust temperature
	6	Suction temperature
	7	Temperature after valve
	8	Capping temperature
	9	Evaporation saturation temperature
	10	Condensation saturation temperature
	11	Low pressure
	12	High pressure
	25	Economizer inlet temperature
	26	Economizer outlet temperature
	27	Anti icing temperature
	28	Ring fin difference in frost free operation

5.8 Parameter Setting



Press and hold [mode] for 3 seconds to enter the password input interface.

After entering the correct password, press [mode] to enter the parameter setting interface.

Key operation list under parameter setting interface:

Key operation	Function
[up]	Select up
[down]	Select down
[clock]	Return to the previous sub item until returning to the main interface
[mode]	Enter the next sub item or confirm to save the parameter press and hold 3S to enter the interface of modifying the current level password
[mode] + [down]	Press [mode] + [down] at the same time to enter the initialization interface

5.9 Password Entry Instructions



Key operation list of password input interface:

Key operation	Function
[up]	Change password value
[down]	Mobile password bit
[clock]	Return to the previous interface
[mode]	Confirm the password. the password value will be displayed as "-" again if the password is wrong, and the password bit will jump to the starting bit

5.10 Password Modification Instructions



Enter new password



Enter the new password again



Displayed [successful input] after entering the password successfully.

Otherwise, return to the step of [entering a new password].

Key operation list of password modification interface

Key operation	Function
[up]	Change password
[down]	Mobile password bit
[clock]	In the interface of [new password input] or [successful input]: press to exit the password modification interface; In the [new password input again] interface: press to return to the new password input interface.
[mode]	Confirm the password. If the password is wrong, is displayed as "-----", then the password bit jumps to the starting.

CHAPTER VI SYSTEM OPERATION AND MAINTENANCE

This chapter mainly introduces the system operation and maintenance of the unit.

6.1 System Diagnostic Test

6.1.1 Electronic Control Part

Electrical maintenance

Perform visual inspection and processing of electrical connections according to the following items.

1. Electrical insulation test of the whole machine: find and deal with unqualified contacts. During the test, care should be taken to disconnect the control part fuse or air switch to avoid damage to the control panel due to high voltage;
2. Statically check whether each contactor is flexible and jammed;
3. Use a brush or dry compressed air to remove dust from electrical and control components;
4. Check whether the contacts of the contactor are drawn for arcing and burn marks. Replace the corresponding contactor in severe cases;
5. Fasten each electrical connection terminal;
6. Check whether the plug-in quick connector is in good contact, and if any looseness is found, the terminal should be replaced.

Control maintenance

Perform visual inspection, simple function inspection and processing of the control part according to the following items.

1. Check the appearance of the power transformer and isolation transformer, and check the output voltage;
2. Check whether the surface of the control interface board, display control board, sensor board, etc. is obviously aging;
3. Clean the dust and dirt on the electrical control components and control board, and clean it up with a brush and electronic dust remover;
4. Check and tighten the output and input plug interfaces of the control interface board, including the connection between the display control board and the control interface board, and the connection between the control interface board and the temperature and humidity sensor board;
5. Check the connection between the user wiring terminal and the control interface board;
6. Check the output connection of the control interface board to each contactor, etc., and the input connection to the fan overload protector, high and low voltage switch, etc. For high and low pressure switches, electronic expansion valves, etc., the plug-in terminals should be checked. If there is looseness, poor contact, etc., they should be replaced immediately;
7. Replace the control board and other electrical components that have been detected with problems;
8. Check the specifications and aging of the power connection, and replace the connection if necessary.

6.2 Cooling System

The components of the refrigeration system must be inspected monthly to see if the system is functioning properly and for signs of wear. As the device fails or is damaged, it is often accompanied by corresponding failures, so regular inspection is the main means to prevent most system failures.

When the refrigeration system fails, the fault can be judged according to some parameters of the system operation.

6.2.1 Plate Heat Exchanger

High-strength turbulence will be generated in the brazed plate heat exchanger channel to make it have a self-cleaning function. However, in some applications, the possibility of fouling is relatively high. Such as high temperature hard water. In this case, it is necessary to use a circulating flushing device to clean the heat exchanger. Use weak acid and 5% phosphoric acid in the tank. If the heat exchanger is cleaned frequently, use 5% oxalic acid. Use a pump to pump the liquid into the heat exchange. Clean in the container.

The cleaning of the board replacement is not included in the company's maintenance. If necessary, please consult local professionals.

6.2.2 Replacement Of Compressor

WARNING

When replacing the compressor, you must avoid skin contact or contact with refrigerant and lubricating oil. If touched, it can cause severe burns or frostbite to the skin. Wear long-sleeved gloves when handling contaminated parts.

The system uses a high-efficiency double-rotor compressor with high reliability. If the construction of the project strictly follows the correct procedures, the probability of failure during operation is very small.

Compressor motor is rarely burned out due to insulation failure. In the event that the motor is actually burned out, most of them are caused by poor mechanical or lubrication, that is, high temperature and overheating.

If the problems that may cause compressor failure can be detected and corrected early, most compressor failures can be avoided. Maintenance personnel regularly conduct maintenance and inspections for possible abnormal operation. Instead of replacing the compressor after failure, it is better to take the necessary steps to ensure the normal operation of the system. This is not only easier but also much cheaper.

When diagnosing the compressor, check whether all the electrical components of the compressor are operating normally:

1. Check all fuses and circuit breakers;
2. Check the operation of the high and low pressure switches;
3. If the compressor fails, find out whether the compressor failure is caused by an electrical failure or a mechanical failure.

Mechanical Failure

The mechanical failure of the compressor cannot be judged by smelling the burning smell. Try to rotate the motor. If a mechanical failure is confirmed, the compressor must be replaced. If the motor burns out, correct the factors that caused the motor burn out and clean the system. It should be noted that the burning of the compressor motor is usually caused by improper cleaning of the system.

Electrical Failure

Electrical failure can be judged by the obvious pungent smell. In the event of severe burns, the lubricating oil will turn black and become acidic. In the event of electrical failure and complete burnout of the refrigeration compressor motor, measures must be taken to clean the system to eliminate acidic substances in the system and prevent the system from recurring in the future. This type of failure has occurred.

NOTE

Damage to the compressor replacement parts caused by improper cleaning is included in the improper use mentioned in the warranty clause, and the warranty is not covered.

When the compressor is completely burnt out, replace the compressor, replace the filter at the same time, and check the throttling parts. In case of failure, replace it. Before replacement, it is necessary to clean the system. If the cleaning method is unclear, please consult the professional technicians of the company.

Procedure for replacing the compressor

1. Cut the power supply;
2. Connect the low pressure gauge head of the pressure gauge to the needle valve on the suction pipe to recover the refrigerant;

NOTE

The refrigerant must be recycled or disposed of in accordance with relevant laws and regulations. Releasing refrigerant into the atmosphere is harmful to the environment and illegal.

3. Remove the electrical connection with the compressor;
4. Loosen the connection pipes on the suction and discharge ports of the compressor;
5. Remove the faulty compressor;
6. If the compressor is completely burned out, clean the refrigeration system pipeline and replace the filter;

NOTE

For the new compressor to be replaced, do not remove the rubber plugs of the suction and exhaust ports prematurely. Do not remove the plugs and leave them naked in the air for no more than 15 minutes to prevent the refrigerant oil of the compressor from being brought into the system after it absorbs water.

7. Install the new compressor in place and connect the pipe joints. Connect electrical wiring;
8. Evacuate the system and add refrigerant; the evacuation time is more than 60 minutes, and the vacuum pressure is maintained for more than 10 minutes to ensure that the vacuum is normal before adding refrigerant, and charge the refrigerant according to the nameplate parameters.

9. Follow the normal startup and debugging process to power on the system and check whether the system operating parameters are normal.

CHAPTER VII DIAGNOSIS AND TREATMENT

This chapter introduces fault diagnosis and handling.

WARNING

Certain circuits have deadly high voltages, and only professional technicians are allowed to perform maintenance operations on the unit. Special care must be taken when troubleshooting when the power is on.

Refer to Table 7-1 to Table 7-2 for fault diagnosis and treatment of each component.

Table 7-1 Troubleshooting of compressors and refrigeration systems

Unit Status	Possible Reason	Detection & Elimination Methods
Lack of phase or reverse phase	Lack of phase; Inverse phase.	Check the three-phase power supply to ensure that the three-phase voltage is normally supplied; Intermodulate the two-phase power lines.
The water flow switch is off	Insufficient water flow; There is air in the circulating water inlet pipe; Circulating pump is damaged; Damaged flow switch.	Clean the Y-type filter and increase the water flow; Exhaust the air in the circulating water inlet pipe; Check and repair the circulating pump and capacitor; Replace the water flow switch.
High voltage switch failure	Insufficient flow; The system is blocked and the water inlet temperature sensor falls off; Damaged high voltage switch.	Increase water flow; Check and repair the system, correctly fix the water inlet temperature probe and replace the high voltage switch.
Low-voltage switch failure	Low-voltage switch is damaged; Insufficient refrigerant; The evaporator is clogged or the fin surface is dirty.	Replace low voltage switch; Leak detection and repair of the system and charge refrigerant according to the parameters; Remove the blockage or clean the evaporator fins.
Exhaust pipe overheated	Insufficient refrigerant; The system is clogged.	Leak detection and repair of the system and charge refrigerant according to the parameters; Check the system and troubleshoot.
Communication error	The interface between the operation panel & the motherboard is loose; Signal line is open.	Check the interface between the operation panel and the motherboard and reinforce it; Replace the signal line.
Sensor failure	The interface between the sensor & the motherboard is loose or falling off; The sensor probe falls off; The sensor connection wire is open or short-circuited;	Check the interface between the sensor and the motherboard and reinforce it; Re-fix the transmitter probe; Repair the sensor cable; Replace the sensor.

	The sensor is damaged.	
The unit is not running	Electricity failure; Loose power wiring of the unit; Unit power fuse blown.	Check the power supply to ensure that the power supply is qualified; Reinforce the power supply wiring; Replace the fuse.
The pump is running but the water is blocked	The relevant valve is not open; Air intake in the water system; Y-type filter is dirty and blocked.	Open the relevant valve; Exhaust air from the water system; Cleaning the Y filter.
The pump is noisy	Insufficient refrigerant; Poor water system insulation; The evaporator is clogged or the fin surface is dirty; Y-type filter is dirty and blocked.	Leak detection and repair of the system and charge refrigerant according to the parameters; Strengthen water system insulation; Remove the blockage or clean the evaporator fins Cleaning the Y filter.
Unit capacity is low	Electricity failure; Loose wiring; The compressor contactor is damaged; Compressor overheating and overload protection.	Check the power supply to ensure that the power supply is qualified; Reinforce the power supply wiring; Replace compressor contactor; Find out the cause of overheating and start the machine after troubleshooting.
The compressor does not run	Liquid refrigerant enters the compressor; The internal parts of the compressor are damaged.	Check whether the expansion valve fails; Replace compressor.
The compressor is noisy	Loose fan fixing screws; Fan motor burned out; Start capacitor failure; Damaged fan contactor.	Reinforced set screw; Replace the motor; Replace the capacitor; Replace the contactor.
The fan does not work	All refrigerant leaked; Compressor failure.	Leak detection and repair of the system and charge refrigerant according to the parameters; Replace compressor.

NOTE: When the product is to be discarded, it must be sent to an appropriate facility for recycling.

