Climate RENTAL SOLUTIONS

ACH 40
AIR COOLED CHILLER
SCROLL TYPE WATER CHILLER AND HEAT PUMP

OWNER'S MANUAL

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

CONTENTS

FOREWORD

Thank you for choosing us. Please read the manual carefully before you install and use our products. We preserve the rights to change the contents of this manual. We shall not be responsible for the loss and failure caused in the process of installation due to not conforming to this manual.

INTRODUCTION

Air cooled water chillers and heat pump unit, which is a new generation of modular units developed by our company. This unit is energy-saving and convenient in use, which has the function of reverse cycle automatic defrosting, two-stage automatic anti-freezing, built-in self-diagnose able system, and is controlled by microcomputer. It can be widely used to hotels, villas, hospitals, cinemas, stadiums, recreations, office blocks, factories and so on. It can also provide industrial cooled water and hypo thermal water for the technical manufacture.

The unit is suit for installing in out space such as roof, floor and porch, left off the boiler room and the special room, decreased the investment of building project. And without cooling water system such as cooling tower and cooling pump, this unit saves the water greatly. And the unit is easy to install, manage and maintain.

The units have completed a series of tasks in the factory, including assembly, piping, insulation, electrical control system and system leak detection, refrigerant filling, and commissioning.

APPEARANCE

The air cooled condenser can be placed in "V" or "U" type, which is ingenious, beautiful and compact. This unit looks clear and refinement by means of designing the components and tubs reasonably. The cover is coated by electrostatic powder, making the color even and unvarying. And the color can be chosen by the customer, who can also use the stainless steel plate. The unit is well in anti-corrosion, so that it can be placed in outdoor space without special room.

FULLY-AUTOMATIC CONTROL

The operation and management of this unit are controlled by microcomputer system. It is easy to operate so that the professional management personnel are unnecessary. The units turn on/off the compressor automatically according to the load, making the units operate on the point of the most economical, and saved the energy. And there are complete protect functions such as error self-detect system, balancing the compressor wear automatically, and anti-freezing automatically in winter. Touch controlled interface, simple keyboard operation and display screen, combined with various detection sensors, can fully control the operation status of the host, including high and low pressure, cold (hot) water inlet and outlet temperature, fin temperature, environmental temperature, compressor operation display, abnormal display, etc.

INTELLIGENT PROTECTION

1. Defrosting: According to the different climatic conditions (temperature and humidity) to set the parameters for automatic defrosting, defrosting is thoroughly and energy-saving, increasing the heating efficiency. And the de-frosting has no significant influence to the indoor air-conditioning temperature.
2. Anti-freezing: This unit adopts dual-class automatic anti-freezing protection, preventing the water system be damaged once the water froze at winter. The anti-freezing protection can be quite automatically when the water temperature is increased according to the operation of heating mode or water pump.
3. High and low pressure switches: switches that protect the compressor from damage caused by high or low

pressure.

4. Anti freezing temperature control: prevents the compressor from being damaged due to cold water freezing.
5. Power protector: prevents the compressor from being protected from overvoltage or under-voltage, as well as under phase and reverse phase protection.
6. Oil filling strip: Each compressor has an oil filling strip. When the compressor stops, the oil filling strip still maintains heating, protecting the system from poor bearing lubrication caused by dilution due to the mixing of oil and refrigerant.
7. Temperature sensor: It must be equipped with a microcomputer controller and installed in the cold (hot) water inlet and outlet pipes for capacity control and antifreeze control. Installed on finned heat exchangers for defrosting control, etc.

OTHER ACCESSORIES AND PROCESSES

1. Drying filter: Filter impurities, acids, and oil in the refrigerant system, and absorb moisture in the refrigerant system.
2. Thermal expansion valve: Control the refrigerant flow rate in accordance with load demand.
3. Four way electromagnetic directional valve: used for conversion between refrigeration cycle and heating cycle. When the electromagnetic coil is in a power off state, the refrigerant system is in a refrigeration cycle; When the electromagnetic coil is in an energized state, the refrigerant system is in a heating cycle.
4. Temperature control: Capacity adjustment control and automatic shutdown and startup control of the unit based on the cold water temperature.
5. Insulation: Both the sleeve type heat exchanger and the low-pressure side refrigerant pipe are insulated to prevent dripping and sweating.
6. Coating: High quality galvanized sheet is sprayed and suitable for outdoor units.
7. Test run: including unit leak detection, vacuum pumping, refrigerant filling, and operation test run.

MODULAR DESIGN (OPTIONAL)

This series of Air cooled water chiller and heat pump unit can offer modular design. The basic modular unit can operates alone, or 1-7 basic modular units can be assembled to an integrated unit according to the needed capacity, expending the selecting range of cooling capacity from 60kw to 3360kw. It is convenient for transporting and loading due to its compact structure, small size and light weight. Each modular unit is divided to two independent cooling systems, convenient to maintain. And with a high flexibility, it is convenient to adjust and control the energy and expand the capacity.

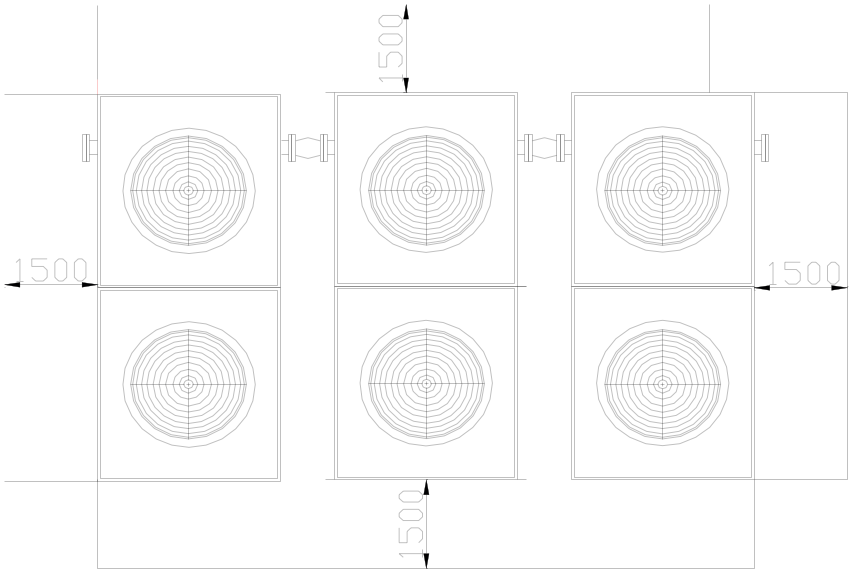
CONVENIENT OPERATION

Each unit is strictly detected before delivered. The refrigerant and cooing oil are injected. And the protective parameters are set. So you will just connect the power and the water pipes at installation, and operate the computer controller when you use it.

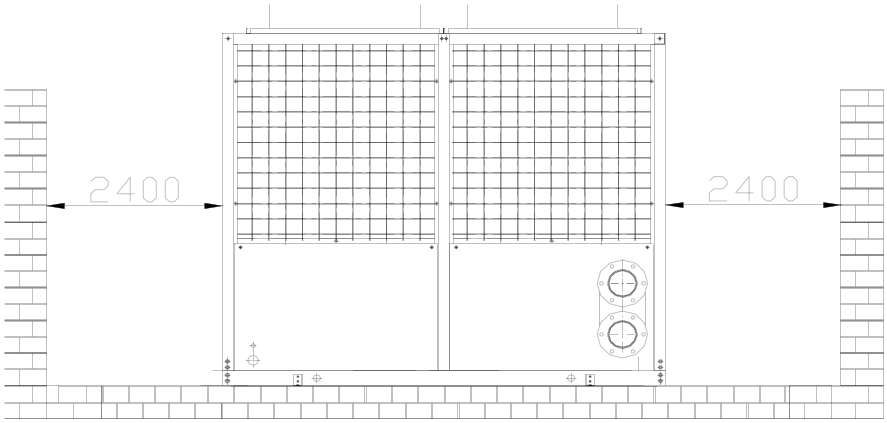
EQUIPMENT INSTALLATION

PREPARATION

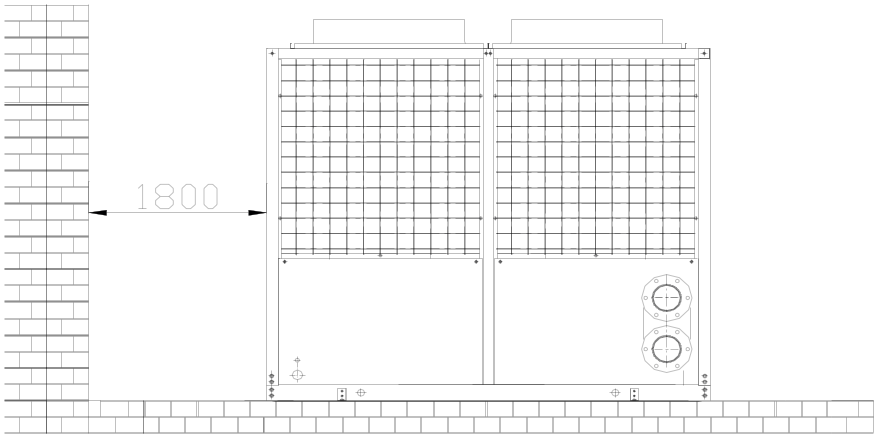
1. Check the units carefully referring to packing list after the units transported to installation site.Please inform the Sales Department if there is any damage to the unit in transportation.
2. Customers supply armor plate or concrete foundation, the size of foundation refers to the size of four orientation holes of unit, the foundation can adopt frame structure, with the frame on girder or pole, ensure that frame can support 150% times of weight of unit and a solid level foundation.
3. Installation site Chillers can be installed on the outside ground, ceiling and other proper site. Note the following factors:
   a. Keep unit from defoliation, insects or other places easy for accumulation, preventing obstruct heat exchanger.
   b. Adjust the direction of air-side heat exchanger in installation, in case of the strong sunlight.
   c. Leave barrel-drain surrounding heat pump, to discharge defrost condensation water.
   d. Leave 1.5m on each side for ventilation and maintenance.



   e. If there are wall around unit, the all should not higher than unit, and leave 2.4m from the wall. Leave 3-3.5m or above on the top, in case of air return.



f. If there is wall higher than unit at one side, leave1.8m from the wall.



4. Base

a. The foundation can be made of cement or steel plate, but it must be able to fully withstand the weight during operation, and the level should be within 3/1000.

b. In order to avoid the joint twisted or broken because of the distortion caused by earthquake, typhoon or long-term operation of the equipment , the unit should take proper fixing measures.

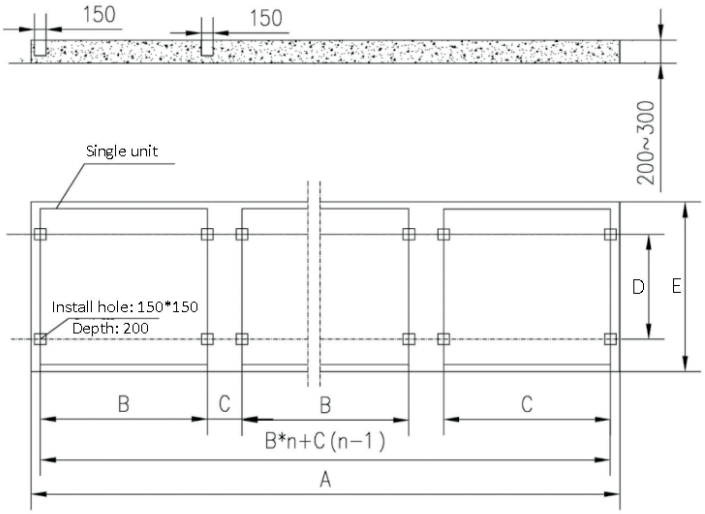
c. When the unit is installed on the roof or balcony, special attention should be paid to whether the floor strength can withstand the weight during operation.

d. The foundation of the unit must be solid to minimize vibration transmission.

e. The unit should be equipped with shock absorbers to prevent noise and vibration transmission and reduce vibration to the unit.

f. When setting the base, the floor must be preset with a drain pipe to drain the water in the water pipe or equipment.

g. Dimension for reference:

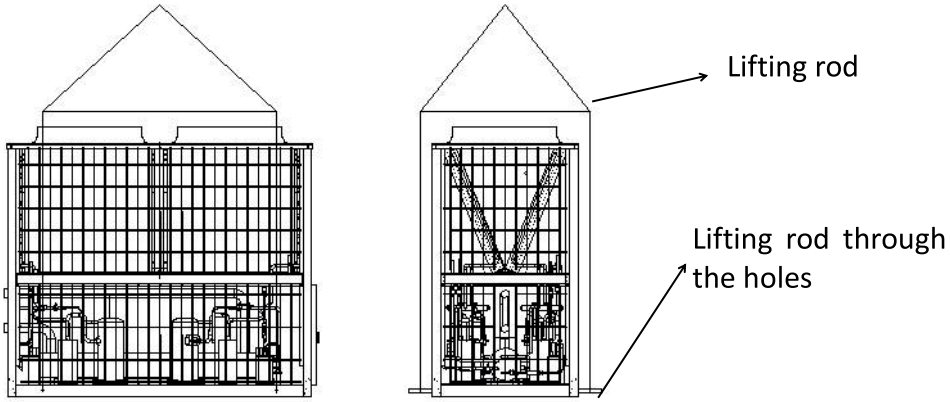


Model	Dimension (L*W)	A	B	C	D	E
60/68/75/90	2110*1080	B*n+C*(n-1)	1050	450	1360	2220
120/150	2280*1200		1150	450	1570	2430
136	2110*2160		2130	450	1360	2220
180/240	2330*2220		2112	450	1570	2400
360	4100*2250		3636	450	2165	2450
480	5100*2250		4546	450	2165	2450

Note: "n" represents the number of modules.

5. Lifting

The fewer times the machine is moved before installation, the fewer opportunities for damage. The customer uses a crane for convenient transportation, and the strength of the crane must be three times the unit weight. When lifting, be sure to use a lifting rod to penetrate the machine base and then lift it (as shown in the picture below). Maintain level during transportation. When lifting, the unit should be maintained in a vertical position, not tilted more than 300 degrees, and collision should be avoided to prevent sliding. Personnel should not stand under or near the unit, and should be handled with care and care.



INSTALLATION

1. Leak detection: A leak detector can be used to detect leaks and confirm that the system is leak free. It can also be directly judged by whether the gauge pressure is abnormal.
2. Water piping for the shell & tub heat exchanger
   a. The water pipe can be assembled only after the machine has been leveled. An automatic venting valve must be installed at the highest position of all lines. The water pipe should be kept warm to prevent sweating.
   b. Connect the piping of the inlet and outlet pipes according to the unit logo and do not connect them incorrectly.
   c. In order to facilitate the recording of the operation of the unit, a thermometer and a water pressure gauge should be installed on the inlet and outlet pipes.
   d. Filters should be installed on the inlet side of the water pipe. Because in the construction of the water system, there may be debris left inside the system and cannot be cleaned. These debris may enter the pump and the heat exchanger when the machine is running. Internal damage will be caused. So, it is necessary to clean the filter after the piping of the system is running. The water quality must be kept clean.
   e. The inlet and outlet water pipes need to be equipped with a shut-off valve so that the water valve can be closed during maintenance to eliminate the internal water storage.

f. Install flexible and shock-proof hoses at the inlet and outlet water pipes to reduce the vibration transmission and avoid the weight on the equipment from pipes.

g. The unit water system shall be equipped with a flow switch to ensure normal water volume during assembly and operation. If it is not installed, it may cause serious damage to the unit.

h. The cycle pump should be installed at the inlet of the casing-type heat exchanger. If it is limited by space, it can be installed on the outlet side. When selecting a pump, it must be considered that the suction end of the pump is positive.

i. The expansion tank should be installed at the highest position of the air-conditioning system to maintain the exhaust function and have the expansion and contraction of the water supply and cold water system.

j. The highest position of the water distribution pipeline protruding type should be equipped with automatic exhausting device. Before the chiller starts, it must be confirmed that the air in the pipeline has been removed to avoid damage caused by waterless operation.

k. When the unit is not used in the heating season in cold regions, the water in the shell&tube or plate heat exchanger must be completely discharged to avoid damage to the internal copper tube caused by water freezing.

3. Principles of the water system

In design and construction of the water supply system, please note that:

a. Water quality: it's must be the clean water or treated water that meets engineering requirements.

b. Water temperature: The water temperature of the water source should be moderate.

c. Water quantity: The water quantity of the water source should be sufficient to meet the needs of the user's heating load or cooling load.

d. Choose proper water pump for water supplying system to ensure the difference between actual water supply amount and unit acquiring water supply amount is less than 10%.

e. Please do add a water filter before the water inlet pipe, and please select filters have 40 holes/inch at least.

f. Install expansion tank on the water return pipe, in case of the water volume change due to temperature. The expansion tank should be 1-1.5m higher than the top of the system; the volume should be about 1/10 of the system volume; and there must have heat preservation measures for chilled water pipe and expansion valve.

g. Install water flow switch on water outlet pipe (paddle flow meter), avoid of damage to unit due to lack of water

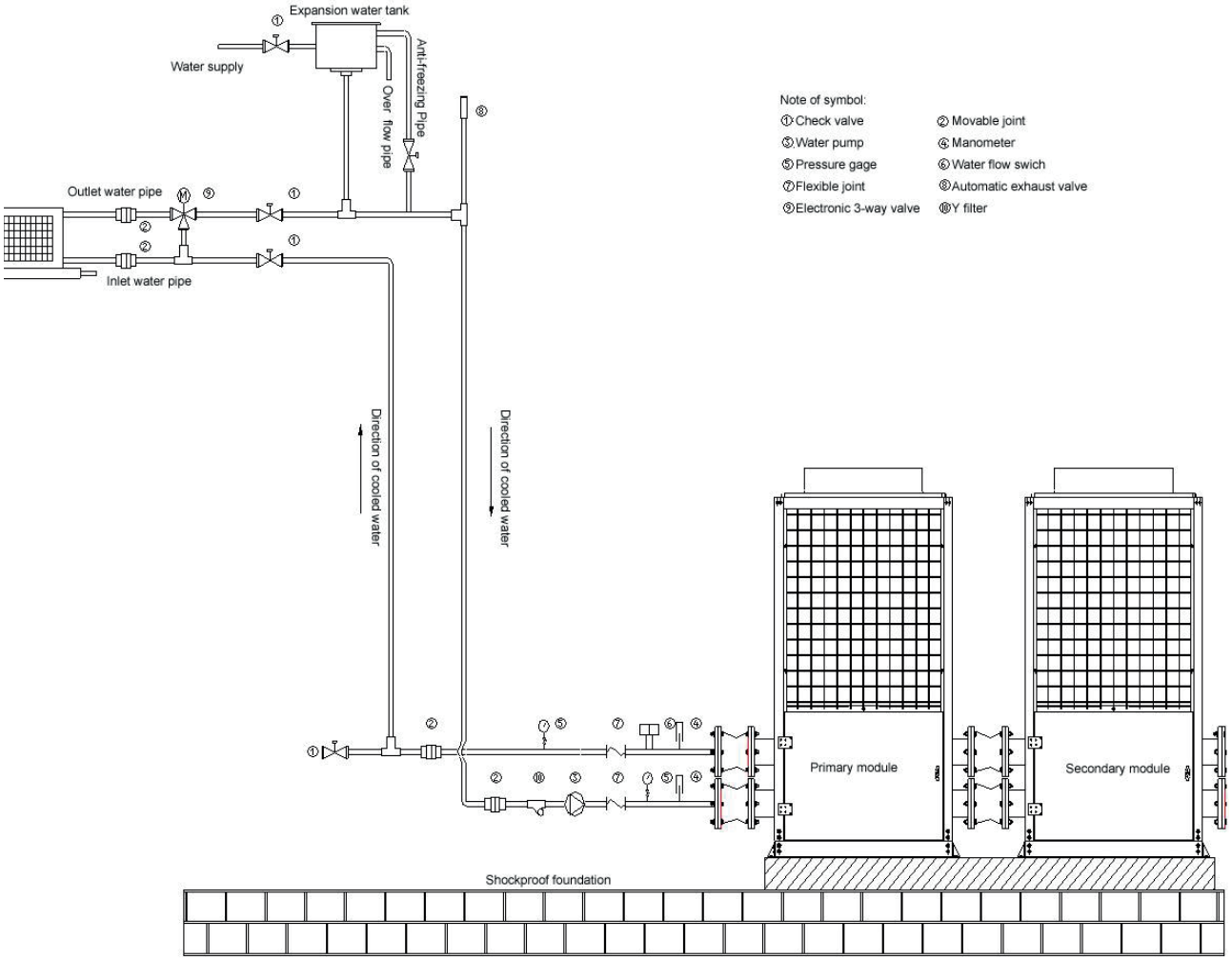
h. Air discharge valve tapis designed in the highest point of water system.

i. Install water discharge tap or valve in the lowest point of water system.

j. Water pipe must be heat preservation, preventing heat loss or condensation.

k. System pipe installation, according to country and local heat criterion. Adopting anti-shake flexible joint for unit and linking system, and place supporter for pipe and pump. Forbid turning on check valve of inlet and outlet opening before washing pipe clean .

l. Drawing of cooled water system:



4. Power distribution:
   a. Power engineering must comply with relevant regulations.
   b. Wire sizes, electromagnetic switches, non fused switches, and other specifications must comply with relevant regulations.
   c. The phase sequence of the power supply must comply with the rotation direction of the compressor.
   d. All wiring terminals should be uniform and appropriate, and screws should be tightened.
   e. After the circuit is connected properly, mark it for future maintenance.
   f. Connecting electric cable referring to the following table:(cooling only unit and heat pump are the same)

Model/Qty	1 unit	2 units	3 units	4 units	5 units	6 units	7 units
60	3150x1670x910	5760x1670x910	8370x1670x910	10980x1670x910	13590x1670x910	16200x1670x910	18810x1670x910
68	3150x1670x910	5760x1670x910	8370x1670x910	10980x1670x910	13590x1670x910	16200x1670x910	18810x1670x910
75	3150x1670x910	5760x1670x910	8370x1670x910	10980x1670x910	13590x1670x910	16200x1670x910	18810x1670x910
90	3150x1670x910	5760x1670x910	8370x1670x910	10980x1670x910	13590x1670x910	16200x1670x910	18810x1670x910
120	3500x1670x910	6400x1670x910	9300x1670x910	12200x1670x910	15100x1670x910	18000x1670x910	20900x1670x910

136	3500x1670x910	6400x1670x910	9300x1670x910	12200x1670x910	15100x1670x910	18000x1670x910	20900x1670x910
150	3750x1670x910	6850x1670x910	9950x1670x910	13050x1670x910	16150x1670x910	19250x1670x910	22350x1670x910
180	3750x1670x910	6850x1670x910	9950x1670x910	13050x1670x910	16150x1670x910	19250x1670x910	22350x1670x910
240	3750x1670x910	6850x1670x910	9950x1670x910	13050x1670x910	16150x1670x910	19250x1670x910	22350x1670x910
360	3750x1670x910	6850x1670x910	9950x1670x910	13050x1670x910	16150x1670x910	19250x1670x910	22350x1670x910
480	3750x1670x910	6850x1670x910	9950x1670x910	13050x1670x910	16150x1670x910	19250x1670x910	22350x1670x910

Note:

a. Data is based on distance less than 20 meters;

b. For standard units only, if there is a built-in water pump, it will be calculated according to the specific situation of the order;

c. The cables in the table refer to national standard copper cables;

d. The controller is along with chiller. During installation, it can be put in the main module, or in customer's controller room, controller connecting line is 1000m at most (need specified transformer).

5. Control circuit

The external interlocking circuit in the control circuit should indeed connect the contacts properly to prevent the compressor from starting before the cold water pump and other devices are running.

6. Auxiliary electric heating (optional):

a. Working principle of auxiliary electric heater When the outdoor ambient temperature drops in winter, the evaporating temperature of the air-cooled heat pump unit operating in the heating mode decreases, and the heating capacity & energy efficiency ratio also decrease. On the contrary, the heat load in the air-conditioning area will increase. That is, there is a dynamic balance between thermal capacity and room heat load. The room heat load at the equilibrium point is equal to the unit's heating capacity, and when the outdoor temperature is lower than the equilibrium point temperature, the room heat load will be greater than the unit's heating capacity. At this time, if the main mechanism heat capacity is matched with the heating load in the building, the capacity of the host device may be designed too large and uneconomical. Therefore, the use of auxiliary heating facilities should be considered to increase the heating capacity of the unit and ensure that the room temperature can reach the design temperature.

b. It can be controlled interlocked with the microcomputer controller, and the operation is safe and reliable. Its main functions are as below:

- It can automatically compensate for the lack of heat supply capacity of the air-cooled heat pump unit in low temperature environment, so that the working state of the main engine is closer to the nominal design working condition, which improves the operating efficiency and service life of the unit.
- Due to the low temperature of the circulating water in winter, the compressor is difficult to start, and it often needs to go through a relatively bad working condition for a considerable period of time. When the auxiliary electric heater is configured, the temperature of the water can be pre-heated to enable the compressor to start normally and avoid unnecessary troubles.
- If the surface temperature of the coil fin is lower than 0 °C during winter heating operation, the surface will be frosted, which reduces the heat transfer efficiency of the coil and the heating capacity of the unit. When the frost layer is thick, the system has a low pressure and therefore must be defrosted. The auxiliary electric heater can be used to compensate for part of the heat loss during the defrost process, so that the water temperature is relatively stable, not to affect the indoor temperature stability.
- During the winter nighttime shutdown period, due to the low temperature, if the insulation measures are improper, the water system is easy to freeze, which will cause the copper tube in the casing heat exchanger to squash, thus causing damage to the system. At this point, the microcomputer controller will perform anti-freeze monitoring, using the auxiliary electric heater to maintain the normal water

temperature, while the hot water continuously circulates in the pipeline system without freezing.

c. Features of auxiliary electric heater

- Temperature control is not only safe and reliable, but also achieves energy saving.
- As long as the wiring is required according to the circuit diagram configured at the time of shipment from the factory, it can work interlocked with the host and automatically play its auxiliary electric heating function.
- With the water flow switch control, the heater can only be turned on when the waterway is unblocked, thus eliminating the possibility of burning the electric heating tube without water heating.

d. Small volume, small footprint, can be installed at any angle.

e. No need for any other auxiliary equipment, compared with other equipment such as small boilers, it has obvious advantages in installation, operation, maintenance and so on.

f. It can improve the operating efficiency of the equipment, therefore, the power consumption of the auxiliary electric heater itself can get some compensation.

g. It can be used as a protection function for circulating water to prevent freezing when it is not used overnight or for a long time.

7. Built-in hydraulic kit (optional):

The Built-in hydraulic kit only includes the expansion tank and the pump. Before use, customers should install water filters, automatic water supply valves, safety valves, globe valves, differential pressure flow switches, automatic exhaust valves, and plate flow switches on the inlet and outlet pipes according to their own usage.

a. Function of expansion water tank

It is used in the system to buffer the pressure fluctuation and part of the water supply. In the thermal system, it is mainly used to absorb the increased volume of the working medium due to the temperature change; in the water supply system, it is mainly used to absorb the water impact due to the on/off of valves, pumps, etc. As well as it can offer a small amount of water supply at night, then the water pump can sleep to reduce the power consumption and prolong the service life of the pump.

b. Expansion tank structure

It consists of four parts: the tank, the balloon, the inlet/outlet and the air fill port. The tank body is made of carbon steel rust-proof paint layer or stainless steel; the balloon is EPDM or butyl rubber; the pre-inflated body between the balloon and the tank is filled at the factory, and there is no need to refill on site.

c. Working principle of expansion tank

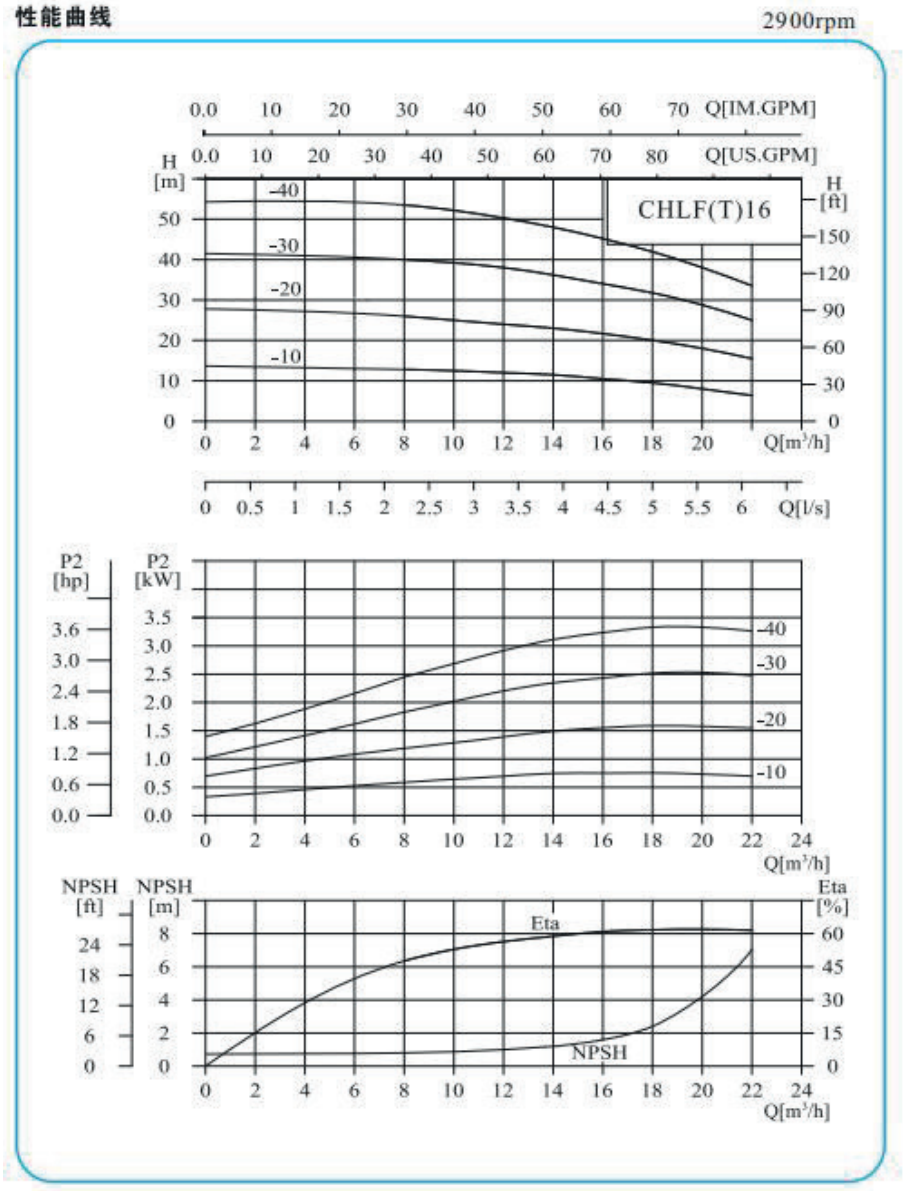
When the pressurized water from outside enters the balloon of the expansion tank, the nitrogen sealed in the tank is compressed. According to the law of Boyle gas, the volume of the gas is compressed and the pressure is increased until the gas pressure and water in the expansion tank are increased. Stop the water when the pressure is consistent. When the water loss pressure is reduced, the gas pressure in the expansion tank is greater than the water pressure. At this time, the gas expansion squeezes out the water in the balloon to the system until the gas pressure and the water pressure reach the same again, and the drainage is stopped.

d. Pump operation instructions

The water pump is only suitable for conveying soft water or purified water from -15 degrees Celsius to 70 degrees Celsius. The maximum operating temperature of the pump must not exceed 40 degrees Celsius. The maximum working pressure is less than 10 bar. Please attach the pump performance parameter curve to the limit. Pump model CHLF (T) 16-20.

e. Curve of water pump

PERFORMANCE CURVE



EQUIPMENT MAINTENANCE

DAILY MAINTENANCE

1. Keep the equipment clean.
2. Check every component for loose or damage.
3. Check the leaks of refrigerant, check if the value of refrigerant gauge is 0 or less than normal value. Check if there is leaks of refrigerant or oil on the pipe or component connection with the suds or refrigerant leakage detector.
4. Check external chain circuit, water flow switch as well as water temperature, water pressure and water flow is normal or not, already exhaust completely or not.
5. Check the power supply is normal or not before power on and power off.
6. Check if there is any abnormal shake or noise.
7. Check the high/low pressure whether normal after power on.
8. Check the equipment start, stop and temperature control whether normal after power on.
9. Record the running condition, voltage, electric current, high/low pressure, inlet/outlet water temperature and so on.
10. Inform professionals to maintain if there is any abnormal condition.

SEASON MAINTENANCE

1. Check the insulation resistance of compressor with tramegger or Electrical safety performance testing instrument.
2. Cut off power supply, clean power circuit and switch and contacts of control system.
3. Check the water, water pipe whether normal, clean water pipe in necessity.
4. Check and clean shell and tube heat exchanger, check whether there is dust or sundries on the fins exchanger, ensure good heat dissipation.

ANNUAL MAINTENANCE

1. Check the protection switch of equipment and running situation, adjust in necessity.
2. Clean heat exchanger and controlling parts in control box.
3. In cold area, discharge all water in the shell and tube exchanger, avoid damage caused by frozen.

EQUIPMENT REPAIR

FAILURE OF REFRIGERANT SYSTEM.

1. Recover refrigerant: Cannot discharge refrigerant in fins or tube-tube heat exchanger too rapidly, if too rapidly, it will absorb heat and make the water temperature decline and appear freeze, shall keep water pump running and water flowing when discharge, to avoid the damage of copper tube caused by water frozen.
2. Dismount
   a. Shall avoid sundries and dust enter the pipe and part after dismounted, cannot place in air long time, otherwise will be oxidized, so shall seal or cover; if need to place for long time, shall seal the opening of relevant pipe,compressor, vacuumize and charging nitrogen.
   b. Shall keep clean when repair, avoid sundries and dust enter refrigerant system.
   c. Clean the parts with the same refrigerant oil with used for compressor.
3. Gas-tight test: After reassembled unit after repaired.
   a. Pressure test
      - Add little refrigerant into refrigerant pipe, then charging nitrogen (Pressure shall less than 20kg/cml).
      - Cannot use oxygen or acetylene as pressurized gas,to avoid bomb, shall use pressure regulating valve when charging nitrogen, adjust to the needed pressure and then pressurized, must move away the nitrogen cylinder after pressurized.
      - Pressure test time shall be depend on the real situation, check whether the pressure decline, then check the leak preliminary.
   b. Leak detection: use leak detector or soapy water.
4. Vacuumize
   a. The purpose of vacuumize is to eliminate the water in the system.
   b. Discharge the air in the system firstly before vacuumize.
   c. Higher vacuum degree is better, system vacuum degree shall ≤5mmHg.
5. Charging refrigerant
   a. Supplement system refrigerant.
      - Start compressor
      - Charging gaseous refrigerant at low pressure side, not charging too much one time, shall gradually charging with little quantity.
      - Check the running situation, check the high/low pressure, superheat/supercool degree and high pressure exhaust temperature.
      - Stop refrigerant charging when unit running normally.
   b. Re-supplement system refrigerant.
      - Charging gaseous refrigerant at high pressure side.
      - Charging quantity shall near to the quantity of original system.
      - Check refrigerant pressure is normal or not.
      - Start compressor.
      - Charging gaseous refrigerant at low pressure side, not charging too much one time, shall gradually

- Check the running situation, check the high/low pressure, superheat/supercool degree and high pressure exhaust temperature.
- Stop refrigerant charging when unit running normally.

  How to judge whether the refrigerant is excess or insufficient: Usually, high pressure will be rise when excess, super cool degree will be bigger, super heat degree will be smaller, split out temperature will be low; high pressure will be lower when insufficient, super cool degree wil be smaller, super heat degree will be bigger, split out temperature will be rise.

FAILURE OF ELECTRICAL CONTROL SYSTEM.

1. Inspect according to electric diagram.
2. Shut off power supply, meanwhile, connect the control power supply and check the control circuit.
3. Pay attention to safety and avoid electrical shock

CHECK WATER SYSTEM

1. When there is failure at water system, shall stop compressor.
2. Avoid water hammer when stop water pump, especially when there is no check valve on water system, shall slowly close stop valve at outlet side of water pump, then stop water pump.
3. Close valves after water pump stopped.
4. Repair after water draining.
5. After repaired, open relevant valves, open discharge valve first after start water pump,discharge the air in the water pipe.

FAILURE AND COUNTERMEASURE

Failure	Confirm	Reason	Countermeasure
Compressor not start	Fuse is normal in safe box	The main power switch cutoff. Incorrect voltage. Incorrect phase.	Check and confirm normal.
	Fuse is burn in safe box	Control wiring is short out or ground connect	Clear failure and change fuse.
	Electromagnetic contactor not work	1. Electromagnetic contactor breakdown. 2. Water flow switch not work. 3. Water temp. is too low. 4. Protection switch act.	1. Repair and change. 2. Check water pump and water flow switch. 3. Unit back to normal when water temp. up. 4. Clear fault.
Shut stop once start	Electromagnetic contactor is normal.	1. Bad wiring connection. 2. Compressor lock screw. 3. Motor burn up.	1. Check connection and lock screw. 2. Change compressor.
	Cold water control act	Cold water temp. was set too high or loading too low.	Adjust setting or increase loading.
	Overload relay act	1. Cold water temp. is too high. 2. Over-current was set too low.	1. Adjust water temperature higher. 2. Adjust over-current set.

Shut down after start	High pressure switch act	1. Condenser air flow insufficient. 2. Condenser coil is too dirty. 3. Refrigerant was charged too much. 4. Inlet cold water is too hot.	1. Increase air flow or check the fan. 2. Clean condenser coil. 3. Adjust refrigerant. 4. Reduce load.
	Low pressure switch act	1. Cooling water temperature was set too low. 2. Cooling water is too low. 3. Expansion valve is bad. 4. Filter was blocked. 5. Refrigerant is leak.	1. Adjust setting or increase load. 2. Add water. 3. Change expansion valve. 4. Clear fault. 5. Clear fault and charging refrigerant.
	Overheat protection switch act	1. Refrigerant is leak. 2. Motor bearing or coil is bad.	1. Insufficient refrigerant adjust overheat. 2. Clear fault and charging refrigerant. 3. Change compressor.
	Anti-freezing control act	Cooling water is too little.	Increase water flow.
Not cooling	Cooling temperature is high	1. Loading is too much. 2. Chiller capacity is not enough.	1. Add chiller quantity. 2. Clear fault.
	Cooling water temperature is too low	1. Cooling water flow is insufficient. 2. Terminal unit is bad.	1. Add water flow. 2. Repair terminal units.
	–	1. Compressor is not good. 2. Expansion valve is bad. 3. Base is not strong enough. 4. Pipe shock together.	1. Check and repair compressor. 2. Adjust expansion valve. 3. Reinforce the base. 4. Enhance the quake-proof.

ELECTRICAL CONTROL INSTRUCTIONS

INTERFACE TO PANEL

1. Technical specifications

Display specification	
Power supply	Directly from the communication line
Working environment	0°C~50°C, ≤85%RH non-condensing
Storage environment	-10°C ~ 60°C, ≤ 85% RH non-condensing
Communication port	DM603A adopts EASYBUS communication/DM606A adopts 485 communication

2. Product cable specifications

DM603A wiring specifications: HT508 connector cable: single wire diameter (0.20-2.5 mm2) wire gauge (24-12AWG) stripping length (7mm) fixed thread (M2.5) thread torque (0.4-0.50NM)		
DM606A wiring specifications: Communication line: 200cm telephone line standard pressure method	Communication line pressure method: Top view 1 4 Front view 1 4	Pressure line sequence: 1-----Black 2-----Red 3-----Green 4-----Yellow

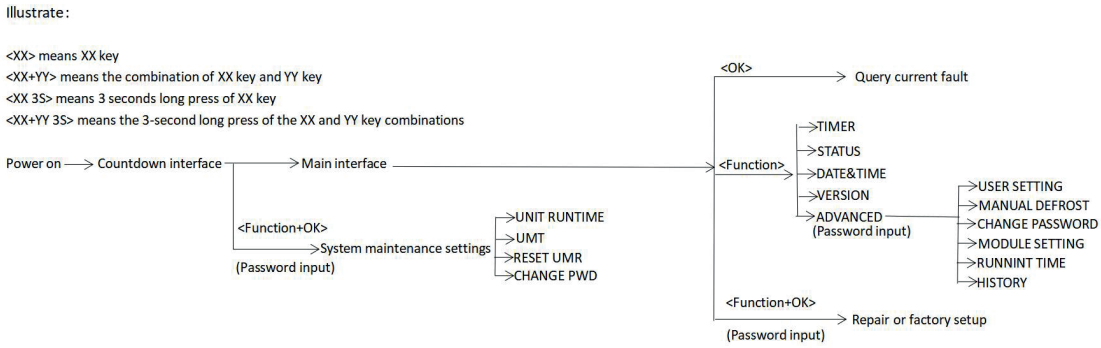
3. Introduction to panel

DM603A

4. Overview of interface

Key switching

Five physical keys: ON/OFF, function, up, down, enter



Note:

a. in branch interface (excluded count down interface and main interface), if no key action within one minute, the system will return to the main interface automatically.

b. When "▲" is displayed on the right of the interface, it indicates that the <up> can be pressed under the page to perform page up.

c. When "▼" is displayed on the right of the interface, it indicates that the <down> can be pressed under the page to perform page down.

d. When the interface prompts "no operation now, operate after XX seconds", it indicates that operation is performed on other interfaces. Please wait for.

Operation may be made on the screen after XX seconds.

5. Word and icon

a. Explanation to word

- Operation status: Indicate the current operation status of the unit including operation and shutdown.
- Operation mode: Indicate the current operation mode of the unit including refrigeration, heating and automatic, etc.
- Unit status: Indicate the current operation state of the unit including anti-freezing, defrosting and preheating, etc.
- One Chinese character position: indicate occupying 16*16 dot matrix of position on LCD display.
- One character position: Indicate occupying 8*16 dot matrix of position on LCD display.
- Physical keys: indicate the actual keys corresponding on hardware.
- Key function: indicate the actual meaning of physical keys. A physical key may corresponding to many key functions.

b. Description of icon

Icon	Meaning	Remark
SET °C	Indicating temperature setting	
	Indicating page up, parameter selection, increasing value.	
	Indicating page down, parameter selection, decreasing value.	

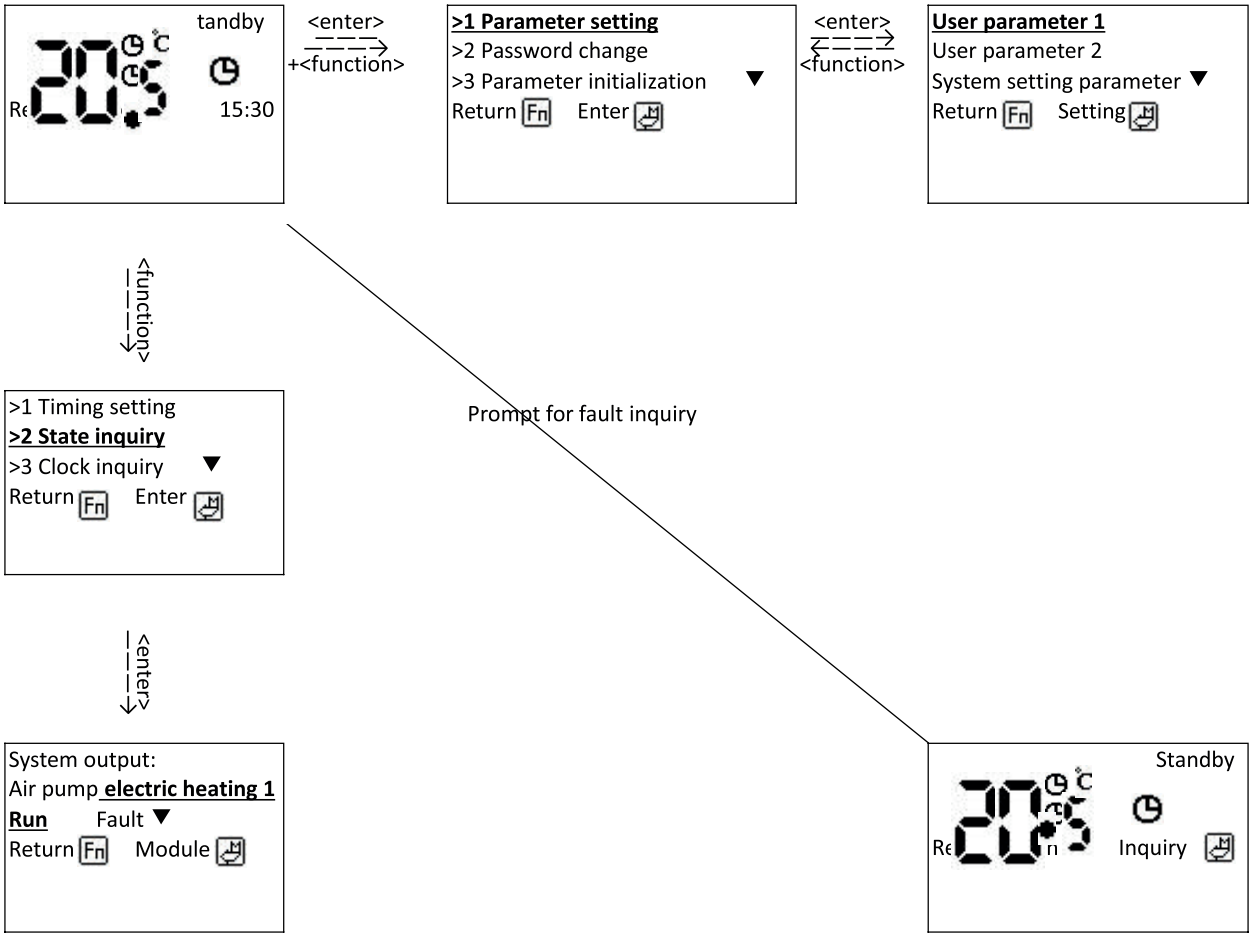
	Indicating that whether the unit uses timing function.	
Fn	Indicating the icon of functional keys and only used for menu, cancellation, return and shift.	
	Indicating the icon of confirming keys and only used for enter, confirmation, noise reduction, reset and switching module.	
	Indicating the icon of ON/OFF and only used for starting/shutting down the unit.	
Fn	Indicating to slide from left to right to unlock keys.	

6. Breakdown of interface

a. Overview

DM603A products have five keys, one 128*64 LCD display without indicator light in the front, According to the actual use process, it is divided into: main interface, state inquiry interface, parameter setting interface and fault inquiry interface.

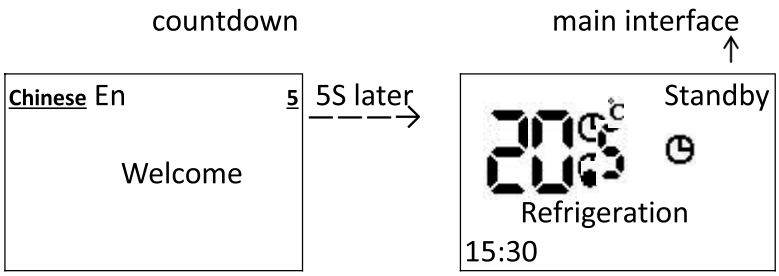
b. Interface switching



7. Starting-up interface

The starting up interface includes count down interface and main interface after completion of count down.

a. Countdown interface

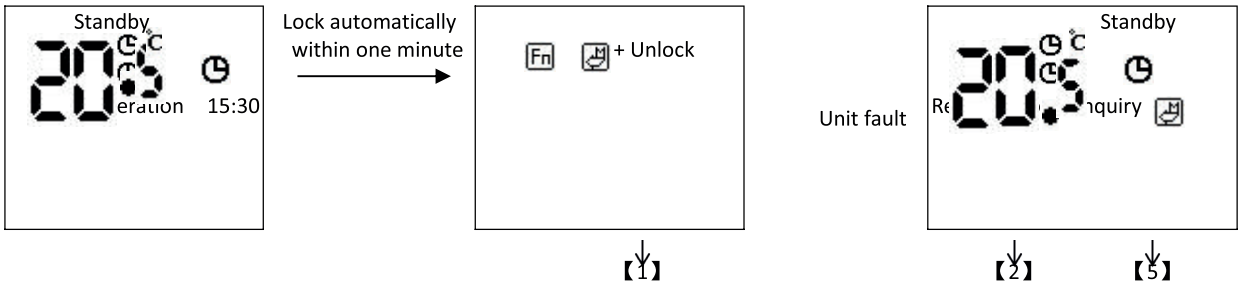


The above interface is normal starting-up interface of the unit when there is no fault. If other interfaces appear when starting up, please refer to 8. Troubleshooting

Note:

- In the countdown interface at starting up, press <up> or <down> to switch language directly.
- The concrete function code and version number should be subject to actual product.

b. Main interface



Description:

Represent prompt of interface with locked keys and mean that the current interface is locked.

- Current operation mode of the unit: if "operation mode" = refrigeration,, then display refrigeration,
- When "operation mode" = heating, then display heating

  When "operation mode" = automatic, then display automatic

  Press the <up> or <down> keys or press <enter> key to switch to change the value of the mode.
- The current control temperature of the unit: When "control object"= return temperature, then display the return temperature of the system.

  When "operation mode" = outlet temperature, then display outlet temperature of the system.

  When—is displayed, it indicates probe fault or the measurement value exceeds the range.

  Press the <up> or <down> keys to change the temperature value directly.
- Indicates the current status on the unit: display that the unit is at anti-freezing, defrosting or preheating state or the operation status of the unit.

  The timing status of the unit: if there is timing icon, it indicates the timing function.

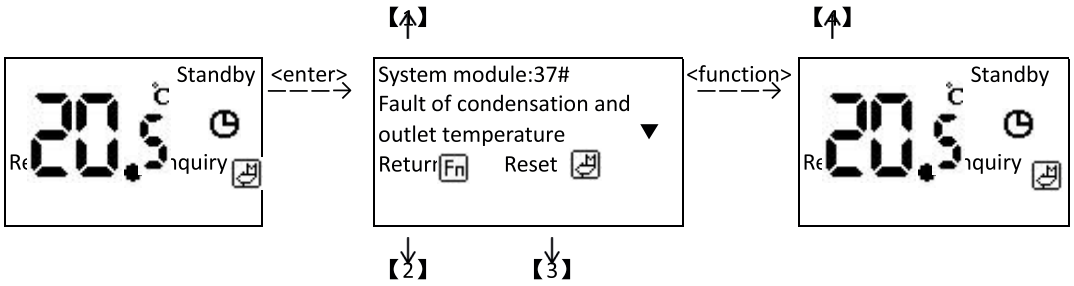
  If there is no timing icon, it indicates no timing function.
- fault inquiry of the unit: When the unit has fault, it will prompts <enter> key to enter fault inquiry.

  When the unit does not have fault, it will display the system clock directly.

8. Status inquiry

a. Fault inquiry

When fault occurs to the main interface, press <enter> key to enter current fault inquiry.



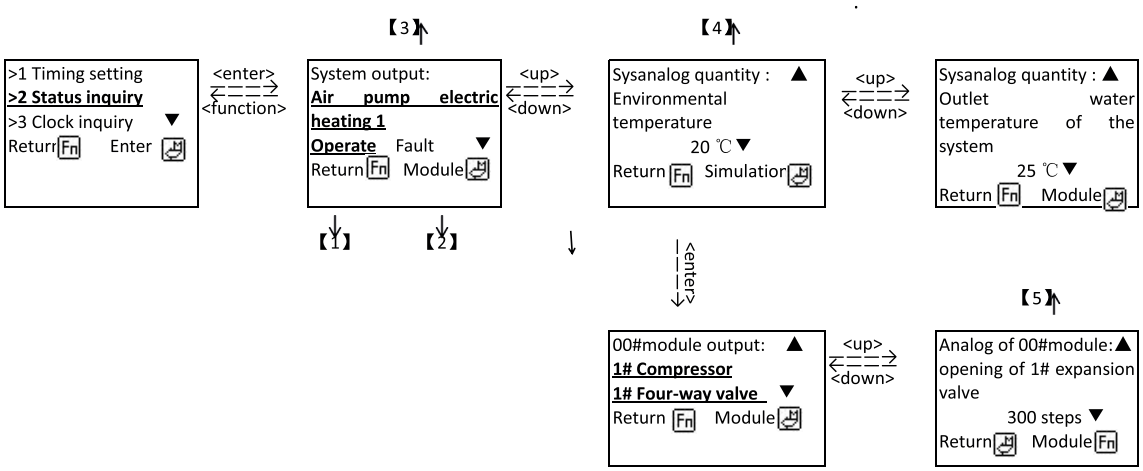
Description:

- Indicate the fault code of the current fault inquired in fault type and the corresponding fault information, please refer to the instruction book of control panel for concrete fault code. Press <up> or <down> key to switch display of fault module or fault number: FF#□ system fault; 00#~15#□ module fault; the module number 00~15 corresponds to the module address setting of 0 to F of SR1 on control panel.
- Indicates to press <Function> key to return to menu of previous level.
- Indicates to press <Enter> key to reset fault. Indicate to return to the main interface if there is no fault at present.

  If there is any fault, it continues to display the current fault.
- Indicate there is no fault after pressing <enter> key. Then it returns to the main interface.

b. Status inquiry

After entering the status inquiry interface, press <enter> key to switch module status inquiry.

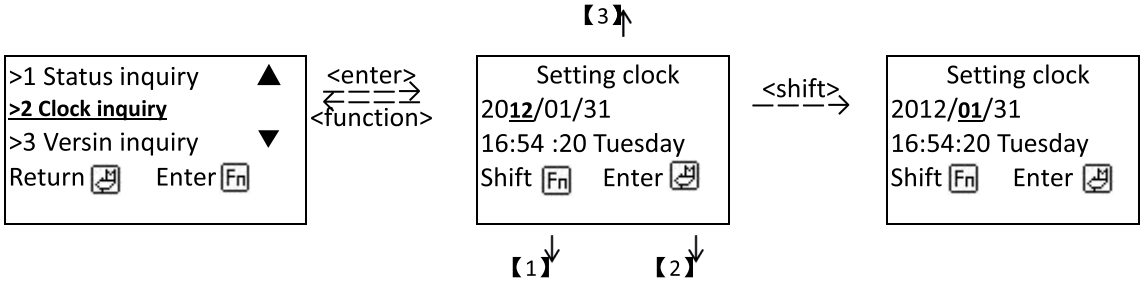


Description:

- Press <enter> key to switch among different module interfaces. In the interface, the status of all modules of the unit may be inquired. The module number is subject to the actual number of modules. The last item is the system module and indicates the system status. Others correspond to 00~15 # modules and indicate the module status.
- Indicates to return to the interface of previous level by pressing <function> key.
- Display the operation status of output equipment corresponding to modules. Inverse display: indicate that the equipment is outputting at present. As shown in the figure, 1# compressor, 1# four-way valve and 2# compressor of 00# module have output. Normal display indicates no output such as 2# four-way valve.
- Display the analog quantity signal of corresponding system module.
- Display the analog quantity information of corresponding 00# module.

c. Clock inquiry

After entering the status inquiry interface, press <down>or<up> to select clock inquiry.



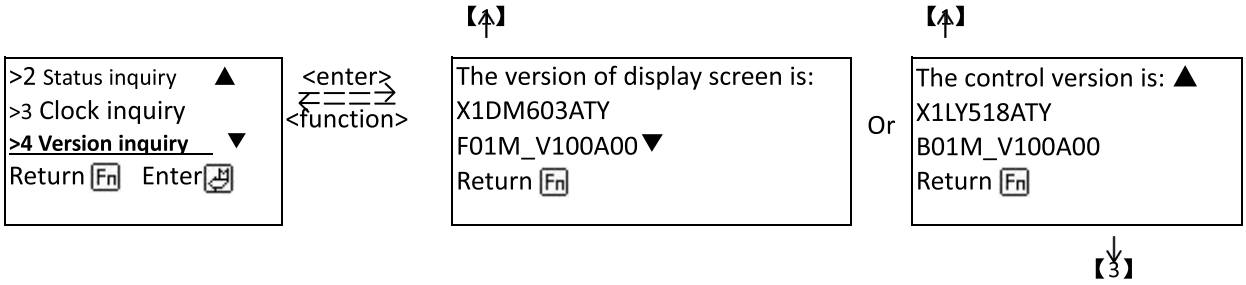
Description:

- Press <function> key to select year, month, day, hour, minute and seconds in order.
- Indicates to return to the interface of previous level by pressing <enter> key.
- In the interface, press <function> key to select year, month, day, hour, minute and seconds in order. And press <+> or <-> to set the value.

Press <enter> key to save the setting and exit from the setting.

d. Version inquiry

After entering the status inquiry interface, press <down>or<up> to select version inquiry.

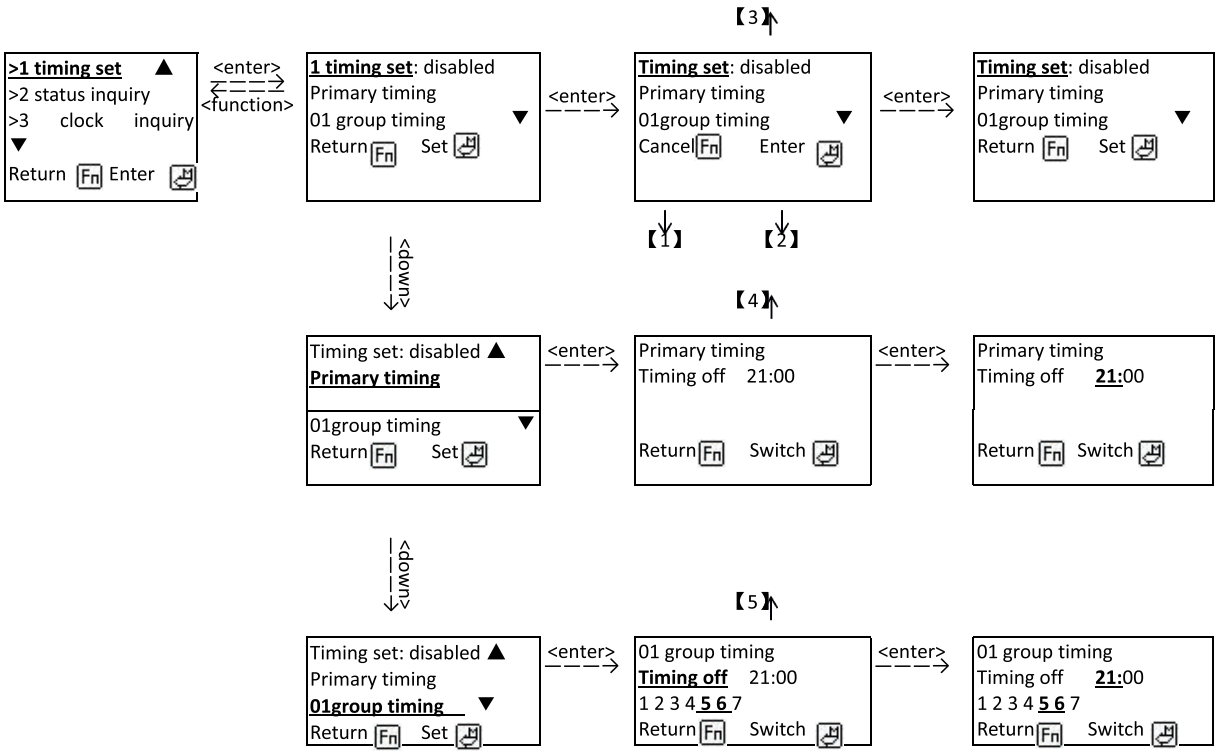


Description:

- Indicate the version and function code corresponding to display screen. Press <down> to continue the inquiry.
- Indicate the version and function code corresponding to control. Press <up> to continue the inquiry.
- Indicates to press <function> key to return to menu of previous level.

e. Timing set

Press <down> or <up> to select timing set.



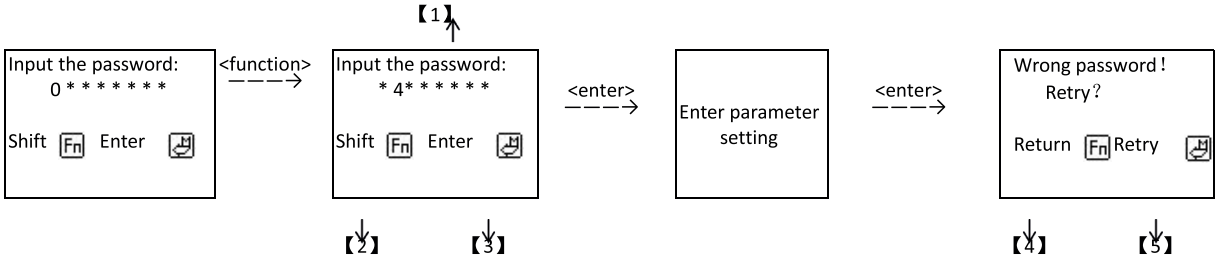
Description:

- indicates to change the timing item by pressing <enter> key.
- indicates to confirm the changed timing value by pressing <function> key
- indicate the selection of setting of timing
- indicate the selection of primary timing
- indicate to select 01 group timing. Press <up> or <down> to switch among use of timing, primary timing and setting from 01 group to 10# group. After entering the selected timing item, press <enter> key to change the set timing on/off, hour and minute, week (1, 2…7; when week is selected, the corresponding will flask); Press <up> or <down> key to change the selected value. Inverse display of week (1, 2…7) indicates that timing is effective on the day. As shown in the figure, shutdown will be performed at 23:00 on Friday and Saturday.

Note: if the time of timing is 00:00, it indicates the function is not used.

9. Password operation

a. Password input

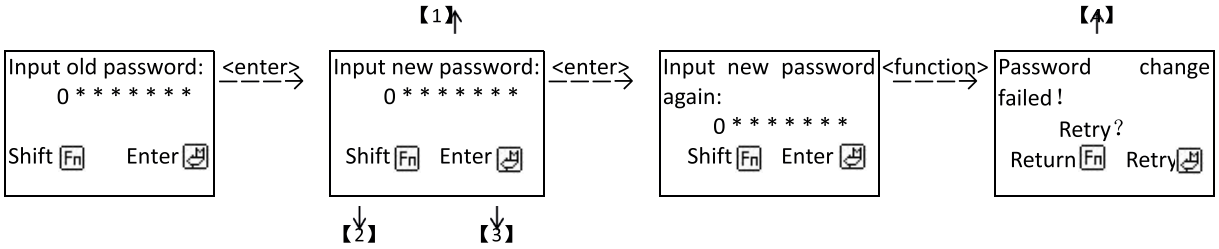


Description:

- Remind the users to input password including repair and manufacturer password.
- Press <enter> key to confirm the input password and enter parameter setting.
- Indicates to press <function> key to shift the input password at present. Press up or down to input the current password value.

- Indicates to press <enter> key to input password again.
- Indicates to return to the interface of previous level by pressing <function> key.

b. Password change



Description:

- Remind the users to input the old password including repair and manufacturer password respectively. Different passwords may be changed at different levels.
- Press <enter> key to confirm the input to change the password. If change is correct, successful change is prompted. Failure is prompted for wrong change.
- Indicates to return to the interface of previous level by pressing <function> key.

Note: if the old password is input wrong, then it prompt wrong input of old password. if the new password is input wrong, then it prompt wrong input of new password.

10. Parameter setting

a. Operation of the section is suitable for setting of all parameters.

b. For parameter setting of repair setting and manufacturer setting, the parameters visible are different only due to password levels. But the setting method is the same.

c. All settings have corresponding password change. Please refer to 4.2 password change.

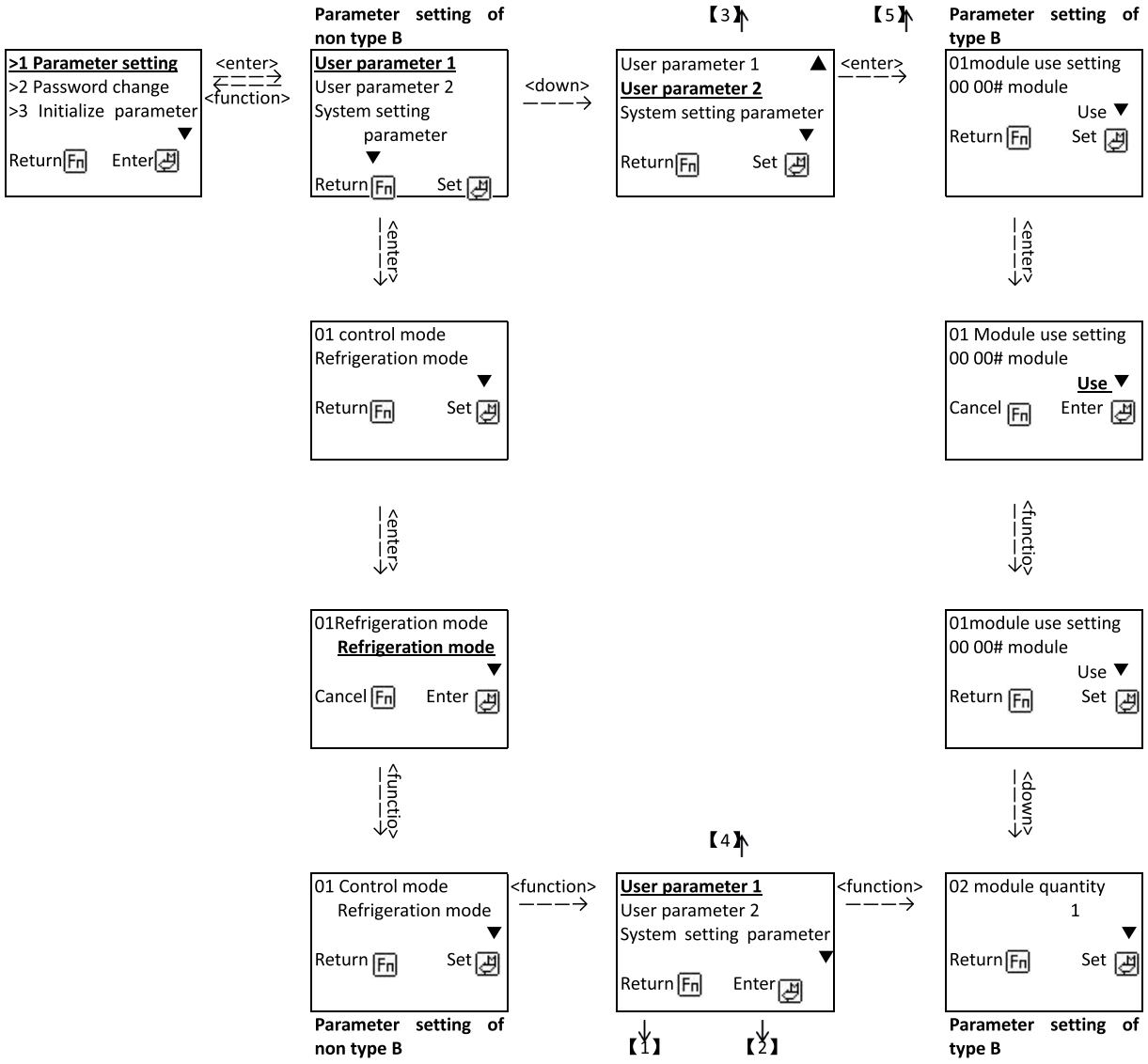
d. The initialization of parameter and initialization of operation time of compressor are only provided in manufacturer parameter setting and are not set in other settings.

Parameter level

Please refer to 4.1 password input operation for input of password.

Function	Key	Effective Interface of Key	Password
Advanced function		–	User password
Repair setting	<Enter + Function>	Main interface	Repair password
Manufacturer setting	<Enter + Function>	–	Manufacturer password
Maintenance setting	<Enter + Function>	Countdown interface	Maintenance password

Parameter setting



Description:

- Indicates to enter the parameter setting item and determine the content of changed parameter by pressing <enter> key.
- Indicates to press <function> key to cancel the changed parameter value and return to the interface of previous level.
- Indicate the name of parameter group. The major item "PL01 user parameter 1" is displayed by prompt here. "01 control mode" represents character string corresponding to the sub item; press <up> or <down> key to switch among sub-item of parameters in the parameter group circularly. Press <up> or <down> key to make change directly and press <enter> to save the value of current parameter. If the parameter value is not accessible.
- Indicates that the selected parameter is bit variable. It means that all sub-items of the parameter is operated according to bit. If the parameter is variable, it will be divided into 16 sub-items for operation. In addition, "PL02-01 module use" indicates the character string of sub-item of 01 switching value that corresponds to the PL02 major item.
- Indicate to switch all corresponding sub-items in the major item of parameter by pressing <enter> key. If it is bit variable, switch the corresponding bit item.

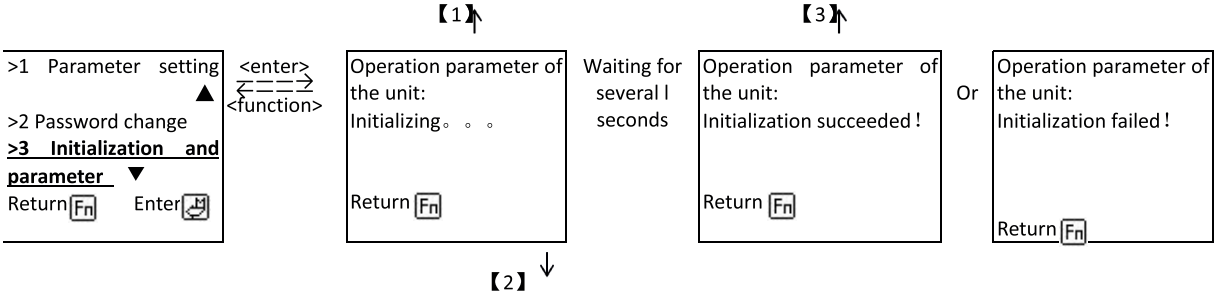
Initialization

After entering manufacturer setting, press <down> or <up> to select the corresponding content for initialization.

Initialize parameter: the parameters are restored to default value.

Initialize compressor: the operation time of compressor and accumulate operation time of the unit is 0.

The operation of initialization of parameter and compressor is the same. The initialization process is introduced with initialization of parameter as an example.



Description:

□1□Initialize the operation parameter of the unit, with the operation character of initialization is prompted.

□2□When the prompt of "initialization failed" appears, If it failed, initialization may be performed according to above operation until success is prompted.

□3□Indicate to return to the interface of previous level by pressing <function> key.

▲ Attention:

If the unit is at the operation or alarm state, parameter cannot be initialized or parameter initialization failed may be prompted.

After parameter initialization of the unit is successful, ensure to power on the unit again and use after confirm that the parameters are in effective.

11. Advanced function

Advanced functions include: user setting---mode setting and temperature setting

Manual defrost---module defrosting setting

Password change---user password setting

Module use setting---use setting for all modules of the unit

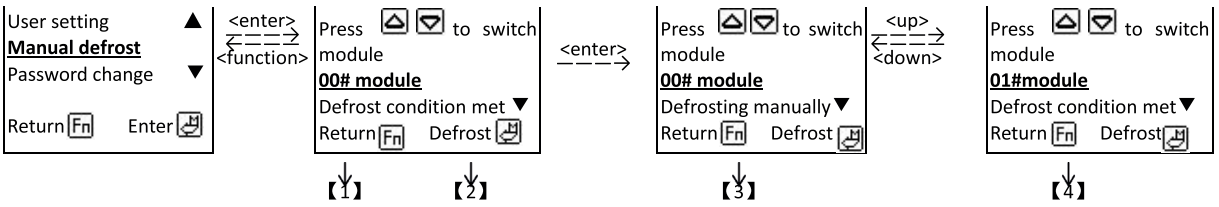
Inquiry of operation time---inquiry of operation time

Inquiry of historical fault--- Inquiry of historical fault

The following provides detailed description for all operation. Please refer to parameter setting and password operation for operation of other interfaces.

Manual defrost

Enter general setting and press <down> or <up> and select manual defrost.



Description:

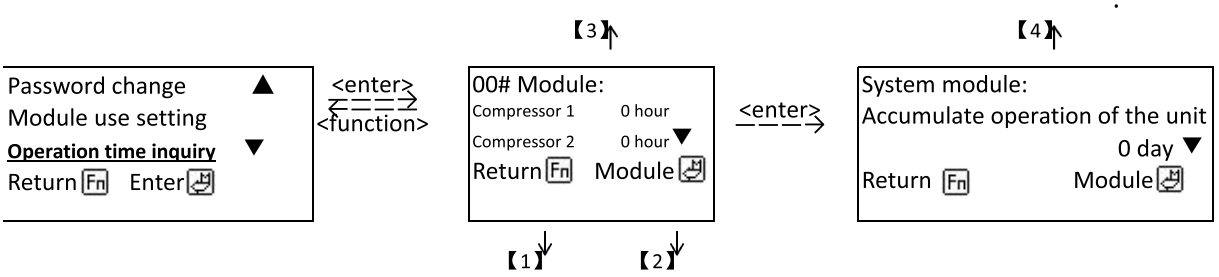
- In the interface, press <up> or <down> to select the module in the unit that needs defrosting. Then press

<enter> to send order of manual defrost.

- Indicate to save and return to the interface of previous level by pressing <function> key.
- Indicate that the current mode is under forced defrosting.
- Indicate to press <up> or <down> to switch among modules under forced defrosting.

Inquiry of operation time

After entering the status inquiry interface, press <down>or<up> to select operation time inquiry.



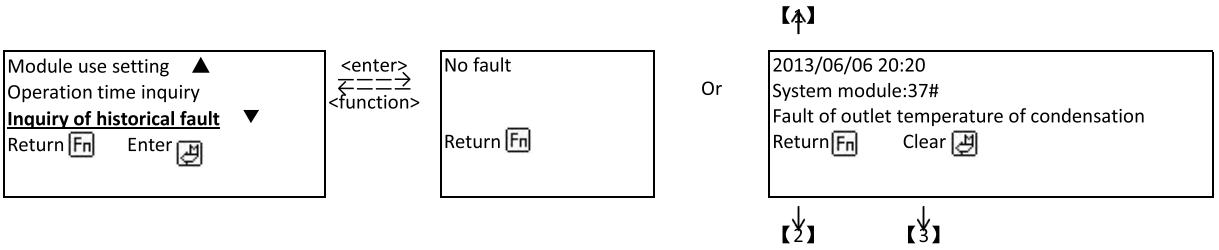
Description:

- Press <enter> key to select different module interfaces. In the interface, you can inquire the operation time of all modules of the unit. The module number is subject to the actual number of modules. The last item is the system module and indicates the system status. Others correspond to 00~15 # modules and indicate the module status.
- Indicate to return to the interface of previous level by pressing <function> key.
- In the interface, the operation time of all compressor in use may be inquired. The above figure indicates that the operation time of 1# and 2# compressors of 00# module in the unit is 0 hour.

Display the accumulated operation time of the unit.

Inquiry of historical fault

After entering the status inquiry interface, press <down>or<up> to select inquiry of historical fault.

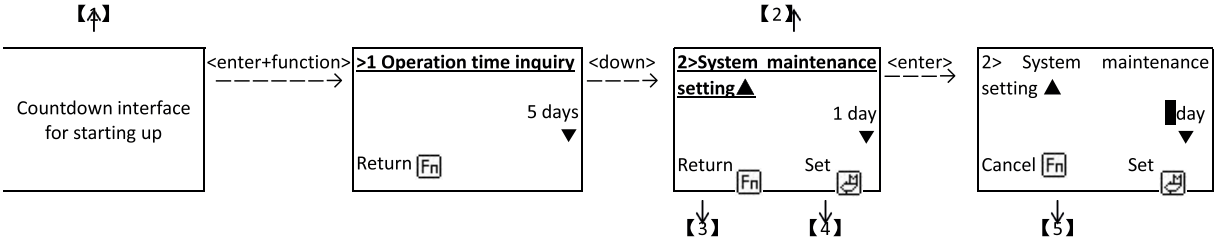


Description:

- Time of fault occurrence: Indicate the time of fault occurrence. Press <enter> key to clear all historical faults.
- Indicate the fault type displayed currently: press <module> to switch the display of module with fault; FF#→ system fault; 00#~15#→ module fault, the module number 00~15 corresponds to the module address setting of 0 to F of SR1 on control panel.
- Indicate to return to the menu of previous level by pressing <function> key.

12. System maintenance setting

During the process of countdown for starting up, after pressing <enter + function> to input the password for system maintenance setting, enter the interface of system maintenance setting.



Description:

- Press <enter>+<function> to enter system maintenance interface in the interface of countdown for starting up.
- Indicate to inquire the current operation time of the unit. It is used for reference of users and cannot be changed. System maintenance days setting can be set. 0 days indicates that system maintenance setting is not enabled. X days indicates that system maintenance will be performed in X days after setting is made. The scope of X is: 0~1365 days.
- Press <enter> key to select the parameter to be changed.
- Return to the interface of previous level by pressing <function> key.
- Press <down> key to select system initialization, accumulated operation time and system maintenance setting. After initialization, the accumulated operation time of the system is cleared to zero. The system maintenance setting is restored to the default value 0 day.

13. Troubleshooting

Name	Problem Interface	Description	Solution
System maintenance prompt: unable to start normally if maintenance is not made in time. Please contact the manufacturer as soon as possible.	Maintenance is made after 168 hours. The machine cannot start without timely maintenance	If the interface appears, please refer to description of "system maintenance prompt" in instruction book for control panel.	Return to the main interface pressing key. Refer to relevant content of instruction book for control panel for disposal.
In maintenance: Maintenance of category A. Please contact with the manufacturer.	In maintenance of category A. Please contact with the manufacturer.	After the completion of countdown of starting up, if the maintenance time of the system is due, the system will stay at the interface and other normal operation cannot be performed.	Refer to relevant content of instruction book for control panel for disposal.
Module or system malfunctions.	O0F: 37# malfunctionsPower fault	If fault occurs after starting, the monitor gives out alarm.	Refer to relevant description for troubleshooting of control panel.
Maintenance setting	<Enter + Function>	Countdown interface	Maintenance password

OPERATING DESCRIPTION

1. Start and shutdown

   There are three methods to start and shut down the unit:

   - ON/OFF key (start key and stop key) on display screen
   - Remote switch

     [Remote switch type PL03-09]=toggle switch: the unit starts when the remote switch is connected. Stop the unit when it is disconnected.

     [Remote switch type PL03-09]=pulse switch: effective when the remote switch is connected->disconnected (pulse width >300ms).

     If it is under the shutdown state, start the unit. Stop the unit if it is under operation.
   - Start/shutdown by alarm: start or shut down the machine according to the set time. Refer to [time alarm set] in instruction for use

   The priority is the same for three modes.

2. Description of fault reset

   4 types of reset method for fault:

   a. Power on reset
      - After the fault is removed, the reset cannot be performed unless powering on again.
      - Fault requiring for power on reset: wrong EEPROM data.

   b. Limited automatic reset
      - Alarm after removal of fault, time delay [fault reset time PL08-03]; the same fault doesn't occur within the time. Reset automatically.
      - Within the set time [permissible time for automatic reset PL08-04], it may reset twice automatically. If the accumulated alarm time is >2, manual reset is required. After manual reset, the alarm times may be accumulated again.
      - Limited fault: refer to the fault table.

   c. Automatic reset:
      - Alarm after removal of fault, time delay [fault reset time PL08-03]; the same fault doesn't occur within the time. Reset automatically.
      - No limit for times of automatic reset:;
      - Fault with automatic reset: refer to the fault table.

   d. Manual reset:
      - If alarm is given after fault is removed, manual reset is conducted only through the controller.
      - Manual reset may also be made for fault of category 1), 2) and 3).

3. Various protections

   a. Power protection

      There are 2 ways to protect the power supply
      - "Power failure" digital input
      - J2 three-phase electrical fault phase loss detection (SW1.4 is set to OFF, this function is not used;

      SW1.4 state is judged only once when the main module is powered on)

      When the module has power protection, only the corresponding module is stopped.

b. Insufficient water flow protection (take the "air conditioning water flow insufficient" switch setting = "normally closed" as an example)

After the pump starts for a period of time [open pump delay PL05-04], it starts to detect insufficient water flow; when the switch is continuously disconnected [water flow shortage detection delay PL08-02], it alarms "air conditioning water flow insufficient".

- When the main module has an insufficient water flow alarm, it shutdowns the group;
- In case of set [open pump PL08-19 when water flow insufficient], when the main module has insufficient water flow, the air conditioner pump will be turned on all the time;
- When other sub-modules have an insufficient water flow alarm, only the corresponding module is stopped.

c. Anti-ice temperature protection In case of cooling mode and non-antifreeze, while anti-ice temperature probe is used and the anti-ice temperature probe is faultless, the unit detects the anti-icing temperature after power-on:

- When the anti-ice temperature probe is faulty, report the anti-ice temperature fault and stop all compressors of the corresponding module.
- When the anti-icing temperature ≤ -5 ° C [anti-icing protection temperature PL08-14], when it exceeds [general fault delay PL08-01], report the anti-ice temperature protection fault and stop all compressors of the corresponding module;
- When the anti-icing temperature is >0 ° C ([Anti-icing protection temperature PL08-14] - [Exit temperature protection temperature difference PL08-09]), the anti-icing temperature protection is exited.
- Reset mode: manual reset

d. Compressor operation protection

- Delay when the compressor starts again [Compressor anti-frequent start PL07-01].
- The running time of the compressor unloading should meet [compressor minimum running time PL07-02] (this condition is not required when shutting down).

e. High voltage / overload protection (take "Com. high voltage / overload" switch setting = "normally closed" as an example) During the operation of the compressor, it's disconnected for 300ms continuously when the "press high voltage / overload" switch was detected:

- If the press is defrost, exit the defrost and turn off the corresponding compressor and fan without alarm.
- If the press is not defrosting, the alarm "press high pressure/overload" and close the corresponding compressor and fan.
- Reset mode: manual reset

f. Low-voltage protection (take "press low-voltage" switch setting = "normally closed" as an example) After the compressor starts for a period of time [low-voltage fault detection delay PL08-05], it starts to detect the "press low-voltage" switch, when the switch is continuously disconnected for a certain time:

- If the press is defrosting, no alarm; after exiting the defrost delay [removing frost to restore low pressure detection PL08-06], retest the low voltage switch;
- If the press is not defrosting, the alarm " press low pressure " and close the corresponding compressor and fan.
- Reset mode: limited automatic reset
- When the low pressure alarm is determined, the low voltage switch is continuously disconnected:
- Use for cooling [refrigeration low-voltage debounce delay PL08-07]
- Use [heating low voltage debounce delay PL08-08] when heating

g. Wing temperature protection is too high In the cooling mode and the fin temperature probe is faultless, the fin temperature is detected after the unit is powered up:

- When the fin temperature is >65 ° C [the wing temperature is too high to protect PL08-12], the temperature of the alarm fin is too high, and the corresponding compressor is stopped;
- When the fin temperature is ≤ 55 ° C ([War temperature is too high protection PL08-12] - [Rewinding temperature protection temperature difference PL08-13]), the fin temperature is too high to protect.
- Reset mode: limited automatic reset

h. Water temperature over-high / over-low protection After the module is selected to run, it starts to detect. In the following description, "n" indicates the compressor number.

Cooling mode:

- Unit temperature protection:

  Low temperature protection on the air conditioning side:

  When n# evaporation temperature ≤ [refrigeration air conditioning side temperature is too low PL08-10], report "n# air conditioning side temperature is too low" fault, stop n# press refrigeration; When n# evaporation temperature> [refrigeration air conditioning side temperature is too low PL08-10] + [exit temperature protection backlash PL08-09], the fault is automatically reset, and the n# press cooling is resumed.

- System temperature protection:

  System temperature protection is only used when there is no cell temperature in the system, as detailed

  below:

  When the single module single press is used, the above air conditioner side protection uses the system to evaporate and exit the temperature.

Heating mode:

- Unit temperature protection:

  High temperature protection on the air conditioning side When the n# evaporation temperature ≥ [heating air conditioning side temperature is too high PL08-11], report "n# air conditioning side temperature is too high" fault, stop n# pressure mechanism heat;

  When n# evaporates out temperature <[heating air conditioner side out temperature is too high PL08-11]-[exit temperature protection backlash PL08-09], the fault is automatically reset, and the n# pressure mechanism heat is restored.

- System temperature protection:

  System temperature protection is only used when there is no cell temperature in the system, as detailed

  below:

  When the single module single press is used, the above air conditioner side protection uses the system to evaporate and exit the temperature.

  - After the [general fault delay PL08-01] debounces the alarm;
  - The reset mode is: automatic reset.
  - Above, when the condenser is shared, stop the corresponding group of presses after the fault alarm.

i. Current protection

I real: measured current;

I amount: set rated current, see parameter [press rated current PL08-16];

Motor protection inverse time curve table:

I real / I amount	≥1.2	≥1.3	≥1.5	≥1.6	≥2.0	≥3.0
Running time (s)	60	48	24	8	5	1

The current is delayed after the press is running [current detection delay PL08-18], and the current alarm is judged according to the following logic:

- I real ≤ [pressor current is too low PL08-17], alarm "press current is too low";
- [The press current is too low PL08-17]<I real <I amount*1.2, it is judged that the current is normal;
- I amount*1.2≤I real ≤I amount*3.9, according to the overload characteristics shown in the above table, do delay processing, the alarm "pressor current is too large";
- Example: When I = I amount * 2.0 and lasts for 5 seconds, the alarm "pressor current is too large" and stop the machine;
- I ≥I amount*4.0, immediately alarm "pressor current is too high".
- [Current use setting PL08-19] Set to 0 or 2 or [Press rated current PL08-16] = 0, indicating that the current protection alarm is not used.

SYSTEM MAINTENANCE

1. Introduction to function

The controller is provided with function of system maintenance. It is used to limit the operation time of the unit. When the maintenance time of the system is due, the unit is stopped forcedly. It should not start again before system maintenance is canceled. The anti-freezing function is not affected during the period of system maintenance. "System

maintenance" function is disabled at default.

"Accumulated operation time of the unit" is calculated with hour as unit. It is converted into "day" at the time of calculating "maintenance time of the system" (note: it is operation time/24 hours and not the actual days).

The system maintenance and setting interface permits operation of 3 items, as shown in the following table (please refer to instruction book of display for description of concrete operation and interface).

Item Number	Name	Setting Range	Default Value	Unit	Remark
00	Inquiry of accumulated operation time of the unit	/	/	Day	
01	System maintenance time setting	0…1365	0	Day	Setting as 0 indicates that the function is disabled.
02	Initialization of system maintenance time	/	/	/	Initialize "accumulated operation time of the unit" and the set value of "system maintenance time".

2. System maintenance prompt

   When the "system maintenance" function is set as enabled, the function of system maintenance prompt is provided to avoid inconvenience brought to users caused by sudden forced shutdown.

   When the remaining operation time of the unit is > 168 hours (7 days), the unit operates normally and no reminding is given. When the remaining operation time of the unit is ≤168 hours (7 days), the prompt rule is as follows.

   - The unit is powered on again;
   - The time of timed prompt is due. (The time of timed prompt is different due to different monitors. Please refer to the instruction book of monitor for details.)

   When one of two above conditions is met, the remaining operation time is reminded. Please refer to the instruction book for prompt interface.

3. Examples

   For example: if [system maintenance time setting 01] is three days, [Inquiry of accumulated operation time of the unit 00] is 0 day. .

   "Accumulated operation time of the unit" starts timing after the unit operates and stops timing after the units stops.

   When the accumulated operation time of the unit is < 24 hours, the result of [Inquiry of accumulated operation time of the unit 00] is 0 (day).

   When 24 hours ≤the accumulated operation time of the unit< 48 hours, the result of [Inquiry of accumulated operation time of the unit 00] is 1 (day).

   When 48 hours ≤the accumulated operation time of the unit< 72 hours, the result of [Inquiry of accumulated operation time of the unit 00] is 2 (day).

   And so on.

   When the accumulated operation time of the unit is ≥72 hours, [Inquiry of accumulated operation time of the unit 00] reaches 3 days, the system maintenance time is due. The unit stops forcedly and cannot operate unless system maintenance is canceled.

PASSWORD MANAGEMENT

The controller is provided with two types of password at present. They are independent from each other.

1. Use of deadline password: used to enter setting of service life.

   The initial value at factory: 66666666.

2. Parameter setting password: used to enter setting of all parameters:

   Parameter setting password is divided into four levels, including:

   - Manufacturer password: initial value of factory:****** (Operate all parameters)
   - Repair password: initial value of factory: 12345.
   - User password: initial value of factory:123.

Refer to the parameter setting table of machine for parameters operated by passwords at all levels.

Wherein, the manufacturer password has highest priority, the user password has lowest priority. The priority is arranged according to sequence. The password at high priority can enter the operation level at low priority and change the password.

Note:

1. Re-download of program or parameter initialization will not change or initialize the original password.
2. Password may be set again, but cannot be initialized.
3. When the password is set, at the step of "input of old password", the password at the current level may be input and the password at higher level may also be input.

PARAMETER MANAGEMENT

1. After parameter initialization is made for main module, the slave module will be initialized synchronously.
2. Parameters may be set for slave module separately, but it is only effective at the state without power down. After powering on again, the parameter of slave module will update to be identical with those of the main module.

APPENDIX 1: FAULT TABLE

APPENDIX 1.1 DESCRIPTION OF FAULT DETECTION

- Reset mode: A = automatic reset; M=manual reset; AM=limited automatic reset; refer to [description of fault reset].
- For fault of the following switching values, if there is no special description, alarm is given after [time delay for general fault PL08-01] elimination of shaking
- For fault of the following sensors, if there is no special description, alarm is given after elimination of shaking of 4 seconds.

Failure	Reset Mode	Detection Condition	Alarm Operation	Troubleshooting
Fault of controller				
Wrong EEPROM data	Power on reset	Detection after powering on	If the fault is serious, stop the unit	1. Initialize all parameters 2. If the fault is not removed after initialization, please contact us!
Fault of the unit				
Overload of air conditioner water pump	M	Detect after the air conditioner water pump starts	If the fault is serious, stop the unit	Check the state of input J11-7 and see whether it is consistent with the setting of [Overload of air conditioner water pump PL13-01.01]
Insufficient flowrate of air conditioner water	M	Detect after time delay after the air conditioner pump startsRefer to description of [protection of insufficient water flow]	The main module gives alarm and stops the unit.The sub module gives alarm and stop the corresponding module	Check the state of input J11-8 and see whether it is consistent with the setting of [Insufficient water flow of air conditioner PL13-01.01]
Overload of hot water pump	M	Detection after powering on	Stop operation of hot water pump	Check the state of input J12-3 and see whether it is consistent with the setting of [Overload of hot water pump PL14-01.15]
Insufficient hot water flow	M	Detect after time delay after the hot water pump startsRefer to description of [protection of insufficient water flow]		Check the state of input J12-9 and see whether it is consistent with the setting of [Insufficient hot water flow PL14-01.09]
Power fault	M	Detect after powering on;Refer to description of [power protection]	Refer to description of [power protection]	• Check detection J2 for phase error and phase default of three-phase power supply • Check whether the power fault input is consist with setting of switching values.
Communication fault	M	Detection after powering on	Stop corresponding module	1. Check communication lines among main modules behind monitor are normal 2. Check communication lines among modules are connected normally

High pressure / overload of compressor	M	Detect after time delay after compressor startsRefer to description of [high pressure protection]	Stop corresponding compressors and fans	Check whether overload input of compressor is consistent with setting of switching values
Low pressure of compressor	A/M	Detect after time delay after compressor startsRefer to description of [low pressure protection]		Check whether low pressure input of fan is consistent with switching values
Overload of condensate fan	M	Detection after powering on		Check whether fan overload input is consistent with switching values
Low outlet temperature of air conditioner	A	1. Refer to description of [outlet water temperature protection of the system] 2. Refer to description of [outlet water temperature protection of module]	1. Outlet water protection of the system 2. Stop operation of all modules, only keep water pump started 3. Outlet water protection of moduleStop operation of the module	Check outlet water temperature meets [parameter of air conditioner outlet water PL08-09] / [PL08-11]
High outlet temperature of air conditioner	A			Check whether value of outlet water temperature meets [high outlet temperature of air conditioner of heating PL08-11]
High fin temperature	A/M	Refer to description of [outlet water temperature protection of module]	Stop corresponding compressors and fans	Check fin temperature value meets [Protection of high fin temperature PL08-12]
Anti-icing protection	A	Detect when refrigeration operates and at non-anti-freezing state	Stop all compressors of the unit	Check value of anti-freezing temperature meets [Protection of high fin temperature PL08-18]
Fault of sensor				
Fault of probe for outlet water temperature of the system	M	Detection after powering on	Stop the unit(Anti-freezing handled separately; refer to [anti-freezing logic])	1. Check whether probe is connected normally 2. Check [PL15 use setting of temperature probe] and see whether probe not connected is out of use
Fault of probe for return water temperature of the system				
Environmental temperature probe fault				
Fault of probe for outlet water temperature			Stop operation of the module (if evaporator independent, stop corresponding compressor)	
Temperature probe fault of fin			Stop corresponding compressors and fans	
Fault of anti-icing probe			Stop all compressors of the unit	

APPENDIX 1.2 INQUIRY OF FAULT CODE

FF system fault

Decimal System	Fault Name	Remark
0	Communication fault	
1	Power fault	Power fault on main module
2	Wrong EEPROM data	
8	Overload of air conditioner pump	
9	Insufficient flow rate of air condition water	Insufficient water flow of main module
10	Overload of hot water pump	
11	Insufficient hot water flow	
14	Overload of air supply fan	
15	Pressure drop of air supply	Primary module
33	Environmental temperature probe fault	
34	Fault of probe for outlet temperature of the system	
35	Fault of probe for return temperature of the system	
36	Fault of probe for hot water temperature of the system	
40	High outlet water temperature of the system	
41	Low outlet water temperature of the system	

Fault of 00~15# modules

Decimal	Fault Name	Remark
48	Low pressure of #1 compressor	Relevant fault of compressor 1
49	High pressure/overload of #1 compressor	
55	Temperature probe fault of #1 fin	
57	Low current of #1 compressor	
58	High temperature of #1 fin	
60	High current of #1 compressor	
61	Anti-freezing high pressure protection of #1 compressor	
80	Low pressure of #2 compressor	Relevant fault of compressor 2
81	High pressure/overload of #2 compressor	
87	Temperature probe fault of #2 fin	
89	Low current of #2 compressor	
90	High temperature of #2 fin	
92	High current of #2 compressor	
93	Anti-freezing high pressure protection of #2 compressor	
112	Low pressure of #3 compressor	Relevant fault of compressor 3
113	High pressure/overload of #3 compressor	
119	Temperature probe fault of #3 fin	
121	Low current of #3 compressor	
122	High temperature of #3 fin	
124	High current of #3 compressor	
125	Anti-freezing high pressure protection of #3 compressor	

144	Low pressure of #4 compressor	Relevant fault of compressor 4
145	High pressure/overload of #4 compressor	
151	Temperature probe fault of #4 fin	
153	Low current of #4 compressor	
154	High temperature of #4 fin	
156	High current of #4 compressor	
157	Anti-freezing high pressure protection of #4 compressor	
177	Power fault	Unit fault
178	Wrong EEPROM data of module	
182	Fault of insufficient water flow of the unit	
185	Overload of fan 1	
186	Overload of fan 2	
187	Overload of fan 3	
192	Fault of 1# probe for evaporation and outlet temperature	
194	Fault of 3# probe for evaporation and outlet temperature	
196	High outlet temperature of #1 air conditioner	
200	Low outlet temperature of #1 air conditioner	
244	Fault of anti-icing probe	
245	Anti-icing protection	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