Water Source Heat Pump

USER MANUAL

Attention

Thank you for choosing our product, we shall be more than glad to service you. For you to better operate this product and to prevent accidents due to misoperation, please read carefully this user manual before carring out any installation or operation, also please pay special attention to the warning, prohibition and attention instructions. We are continuously supplementing and upgrading this user manual to better service for you!

1. Introduction

Features and Advantages

Summary

The water to water heating technology heat pumps are ideally designed to provide the users with energy savings, comfort, safety, environmental-cleanliness, reliability and quiet operation. Each unit is equipped with a micro-computer for efficient intelligent control. . They are commonly installed in office buildings, hotels, health care facilities, banks, schools, houses, condominiums and apartments.

Excellent performance

heat pump systems utilize global standards in advanced technology. Our heat pumps are equipped with recognized quality brand name parts and are strictly tested for quality assurance and performance. The high efficiency compressors run smoothly and quietly. By using top quality parts, noise and vibration are significantly reduced.

Simple operation

The units are equipped with a micro-computer controller. Water temperatures are continually monitored and design operating parameters are set at the factory.

The user's only need to press the on/off button and the heat pump will run and adjust itself automatically. The design of the the heat pump allows for a trouble-free installation. The Heat pump is factory charged with refrigerant and needs no adjustments. The water connections are clearly identified for proper field connections.

Safety controls

The units are equipped with high and low pressure switches as well as compressor overload protection to ensure that the heat pump system will work perfectly.

Excellent environmental adaptability

The unit cabinet is made with quality steel and has a premium powder coat paint finish. The cabinet will resist corrosion and has an excellent environmental adaptability. The design and quality of the heat pump system makes it ideally suitable to a wide range of entering water temperatures.

Note: Closed Loop Systems must be freeze protected to a minimum of -10℃ (14℉) with an anti-freeze solution approved by the authority having jurisdiction in your area. Typically, methanol, ethanol or propylene glycol are used.

Easy service and troubleshooting

Service Technicians have easy access to all working components by simply removing the control access panel. Fault codes are easily accessed at the unit with a quick connection of a room controller (carried as a service tool) to the micro-computer to determine what is wrong.

2. Thermostat Operation

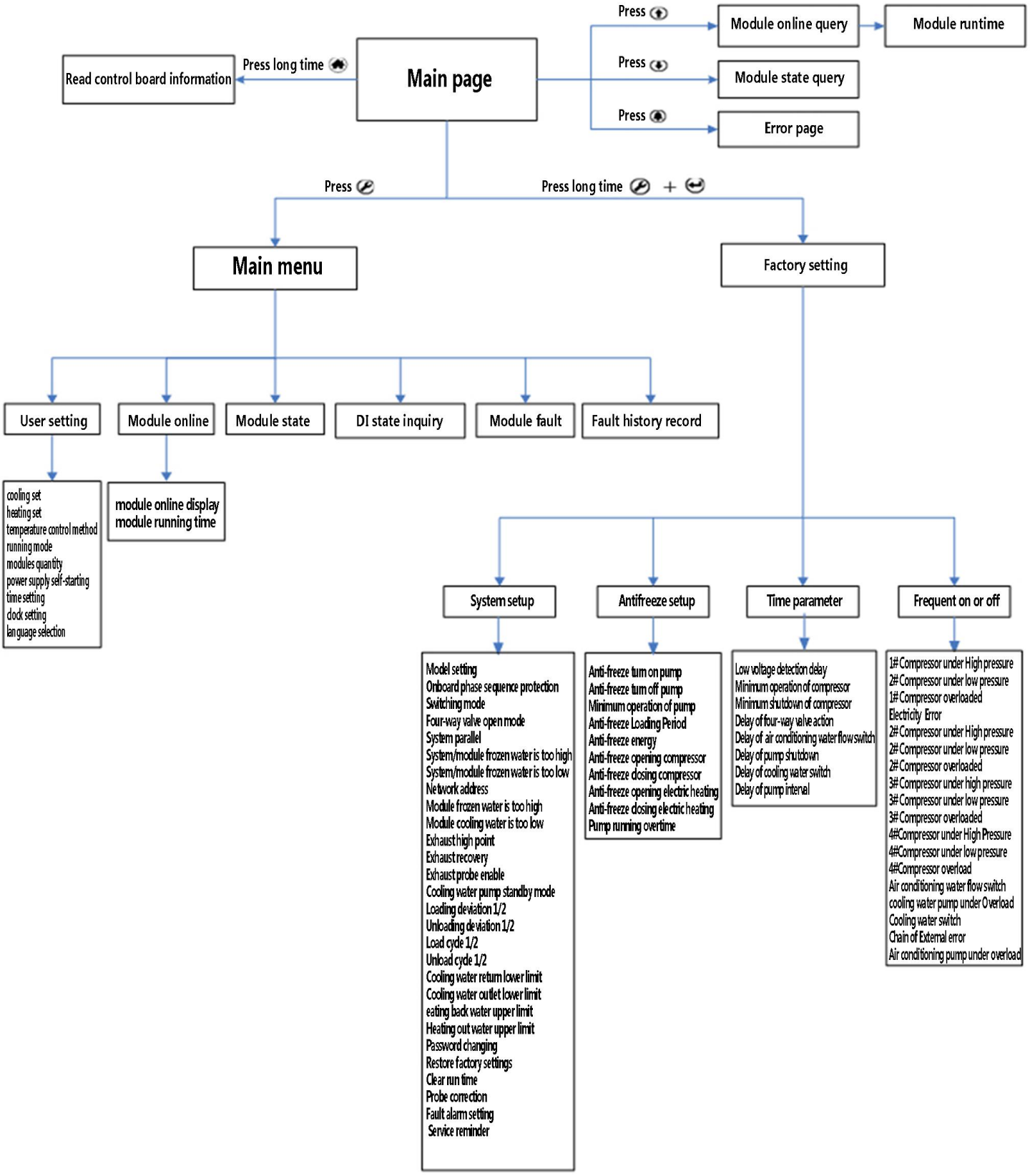
2.1 Interface description

1.1. Button description

Button	Meaning	Function description
	**HOME**	1) On the View or Settings page, short press this button to return to the previous page; 2) On the View or Settings page, long press this button to return to the main page; 3) Press and hold this button on the main page to display the current control board information. 4) When setting parameters, press this button to abandon the data settings and return to the main page
	**UP**	1) On the main page, short press this button to enter the module online display page; 2) In the parameter setting state, short press this button to add the setting parameter, long press this button to add the setting parameter rapidly; 3) On the viewing page, press this button to view the previous page;
	**DOWN**	1) On the main page, short press this button to enter the output & input status of selection module page; 2) In the parameter setting state, short press this button to add the setting parameter, long press this button to add the setting parameter rapidly; 3) On the viewing page, press this button to view the previous page;
	**ENT**	1) On the main page, faults that have been excluded from this button can be reset by fault;

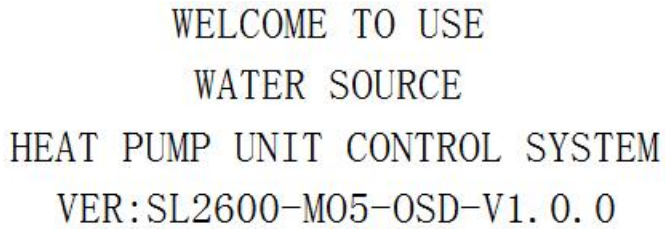
		2) When setting parameters, press this key to confirm the setting parameters； 3) At the same time, press “ENT” and “SET” on the main page to enter the password page. Enter the correct password and enter the factory setting page； 4) Press this button on the fault page to enter the historical fault query page；
	**SET**	1) On the main page, press here to enter the user settings page； 2) On the setting parameter page, press this button to set the parameter to enter the setting state (reverse); if the current screen has no parameters to set, perform a blank operation； 3) At the same time, press “ENT” and “SET” on the main page to enter the password page. Enter the correct password and enter the factory setting page； 4) Press this button on the historical fault query page to clear the historical fault record；
	**ALARM**	1) On the main page, press this button to enter the fault query page；
	**POWER**	1) Press this button on any page to turn the machine on and off；

1.2. Display navigation map



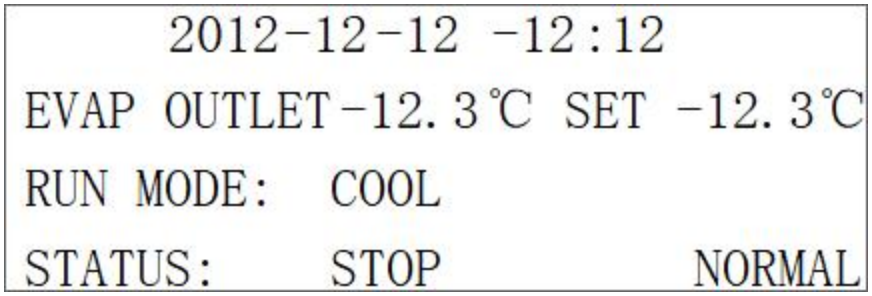
1.3. Power on display

The display power-on will display the 10-second welcome page. This welcome page displays the current unit information and screen file information. Press any key on the welcome page to exit the welcome page and enter the main page.



1.4. Main page display

10 seconds after power-on, the display switches to the main page display, as shown below



The first line shows the current time;

The second line shows that the return water temperature or the outlet water temperature and the set temperature are currently detected;

The third line shows the current operating mode, cooling or heating;

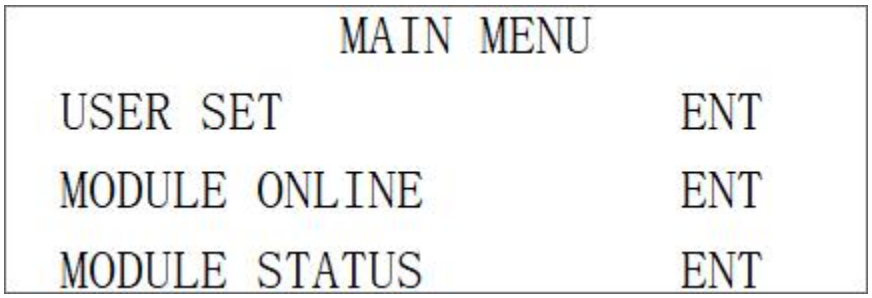
The fourth line shows the current unit status. If the unit is on, it will display “Run”. If the unit is powered on, it will display “Stop”. If it is in the shutdown delay, it will display “Outage”; if the unit is faulty, “No” The fault "changes to "faulty" and re-displays "no fault" when the fault is removed.

1.5. ON/OFF

Press the “⏻ ” button on the main page to enter the running state. The unit status display changes from “Stop” to “Run” on the interface. When the unit is running, the status is displayed on the main page. Press “⏻” again to shut down the unit and “Run” becomes “ stop".

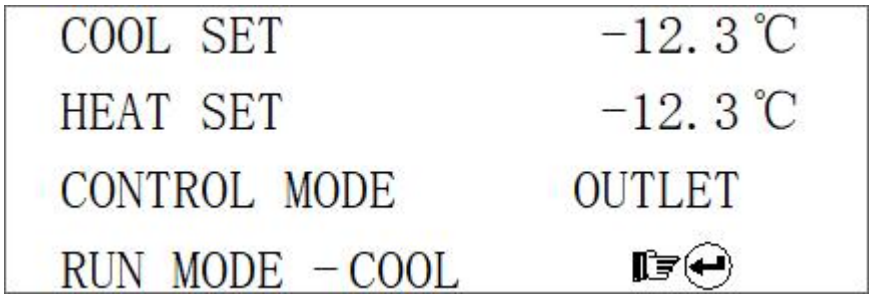
1.6. User Menu

Press the “ ” button on the main page to enter the user parameter setting page. On the user menu page, you can choose to enter the corresponding user settings or query page, as shown below:



1.7. User Parameter Settings

Enter the user menu page, select and enter the user parameter setting page, press the “” button to enter the next user parameter setting page, and the user parameters can be set on the user setting page. User parameter settings are as follows:



In the setting page, press “ ” to enter the setting parameter setting state. At this time, the first setting parameter is reversed, press “ ”, “ ” key to adjust the set value, long press “”, “ ” key to quickly “ Increase or decrease " the set value. After the setting is completed, press the " " button to confirm the set value and switch to the next setting parameter. If you do not press " " and press the " " button, a blank operation is performed. that means the current setting parameters are not saved and the next setting parameter is automatically switched. When finished, press " " to return to the main page. The specific user settings are as follows:

Name	Value	Unit	Default	Meaning
Cooling setting	-15.0～60.0	℃	7.0	Cooling mode, water temperature control temperature
Heating setting	20.0～80.0	℃	70.0	Heating mode, water temperature control temperature
Temperature control mode	water/back water	--	water	Select the temperature control mode of the unit

Mode switching	Cooling/heating	--	Cooling	Switching the operating mode in the off state
Number of modules	1～16	piece	1	Set the total number of system modules
Call self-start	OFF/ON	--	OFF	ON = call self-start, OFF = no call self-start
time setting	--	--	--	--
Timing setting	--	--	--	--

1.8. Time setting

Enter the user settings, press the "↓" button to turn to the following settings page, as shown below:

On this page, press " " to select "Time Setting" to enter the time setting page. The time setting page displays the current time. Press "" to locate the cursor, select the parameter to display in reverse, press "↑ ↓" to adjust the parameter value. After the parameter adjustment is completed, press the " " key to confirm and switch to the next parameter.

1.9. Timing settings

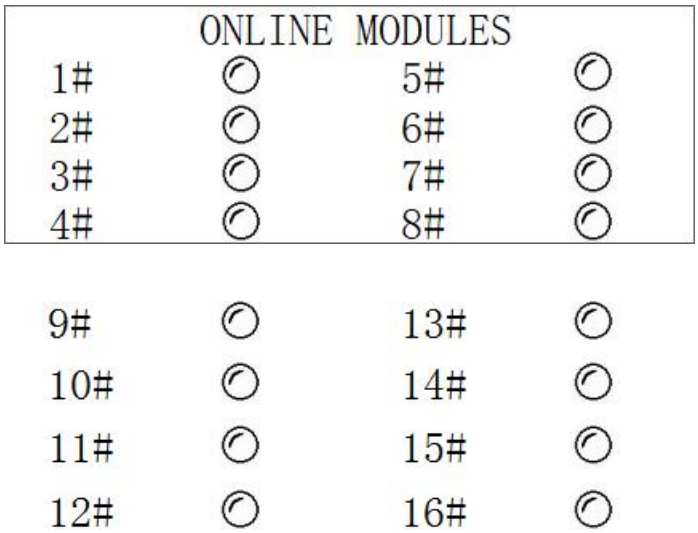
Enter the user setting interface, press the "↓ " button to scroll to the "Timer Settings" menu page, press the " " button to select and press the "↵ " button to enter the "Timer Settings" setting page.

On the timing setting page, press " " to switch between the timed hour setting—>timed minute setting—>timed hour setting—>timed minute setting—>enabled date. When setting the timing time, press "↑ ", "↓ " key to adjust the value of the cursor position, press " " key to confirm the current setting; when setting the activation date, the current setting date flashes, press "↑ " to set the current activation date, current date Highlighted to indicate that this date is enabled. To cancel, press "↓ "; after setting, press "↵ " to confirm the modification, and press "" to return to the main page.

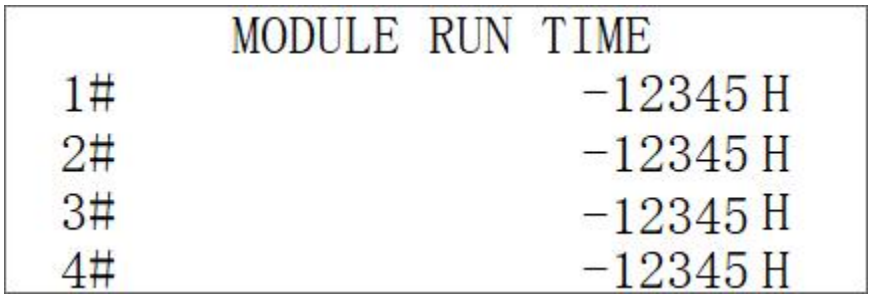
If the timer is set to 00:00, it means that the timer on/off function is not enabled.

1.10. Module online inquiry

On the main page, press the "↑" button to enter the "Module Online" query page, which can query the module online status and module running time.
As shown below:



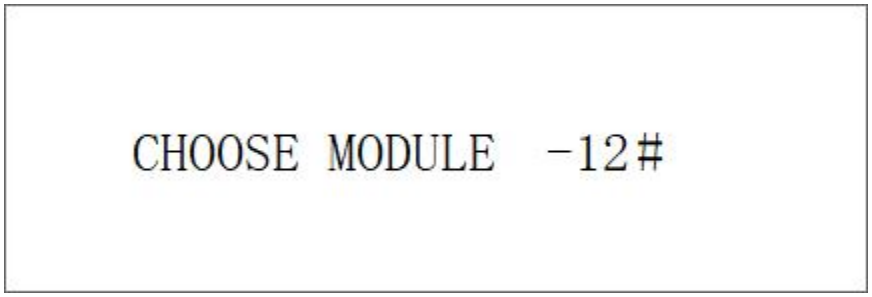
"●" is displayed when the current module is online, and "○" is displayed if the current mode is not online. Press "↓" to switch to the "Module Run Time" query page:



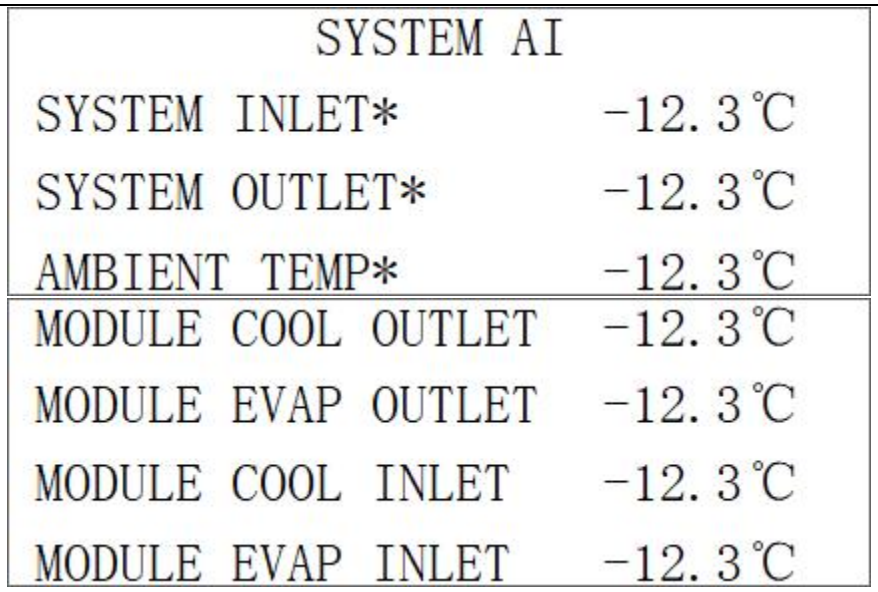
Press the "↓" button to switch to the other module runtime page. Press the "⌂" button to return to the main page.

1.11. Module Status Query

On the main page, press the "↓" button to enter the "Select Query Module Status" page, as shown below:



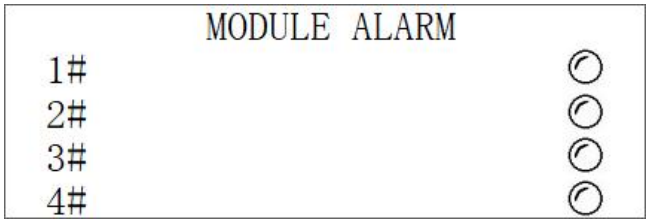
On this page, select the module to be queried, and then press the "↓" key to enter the "temperature status" query page of the selected module, as shown below:



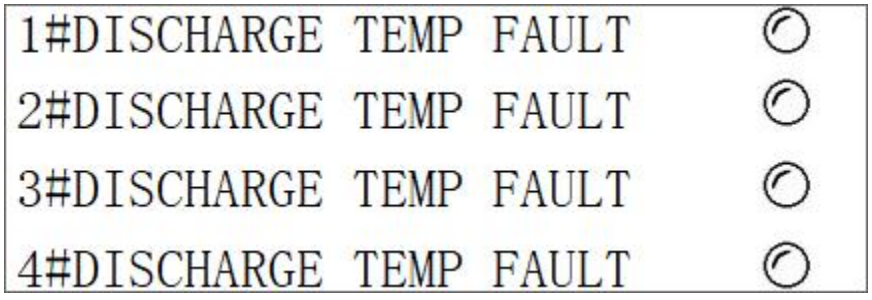
The "*" sign indicates status information at the system level.

1.12. Module Fault Query

When a fault occurs, the fault list is automatically popped up. Press the "🔔" button directly on the fault list page to enter the "Module Fault Query" page, as shown below:



On this page, you can query whether a module has a fault. "●" indicates that the current module is faulty, and "○" indicates that the current module is fault free. Press "↑" "↓" to switch to query other module fault information. When a module has a fault, press the "🔧" key to select the faulty module, the selected module is highlighted, and press the "↵" key to enter the module fault details query page. As shown below:

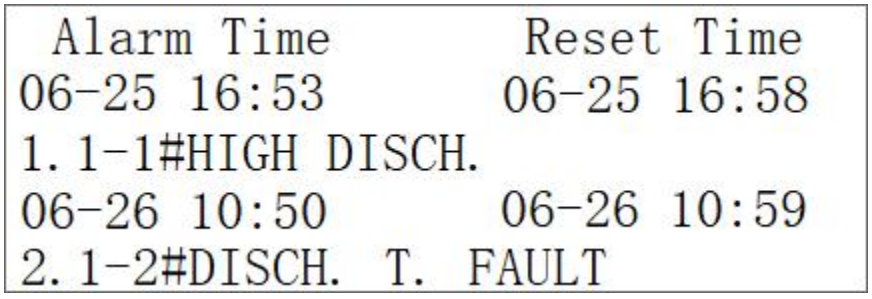


Press the "↑" "↓" button to query other fault information. On the fault inquiry page, press the "↵" button to reset

the fault.

1.13. Historical Fault Record Query

In the “User Menu”, select “Historical Fault Query” and press “↵” to enter the historical fault record page as shown below:



The first/third line shows the month, date, hour, minute, month of failure recovery, date, hour, minute;

The second/fourth line is displayed as the serial number of the fault and the name of the fault.

⚠ The display can store up to 99 fault records. If the fault record is greater than 99, the last fault record is automatically deleted.

1.14. Password input

Since the setting from is not open to the user, the system provides a password protection function, which can be set under the condition that the password input is correct, otherwise the setting state cannot be entered.

On the main page, long press “🔧” + “↵” to pop up the password page, as below picture:

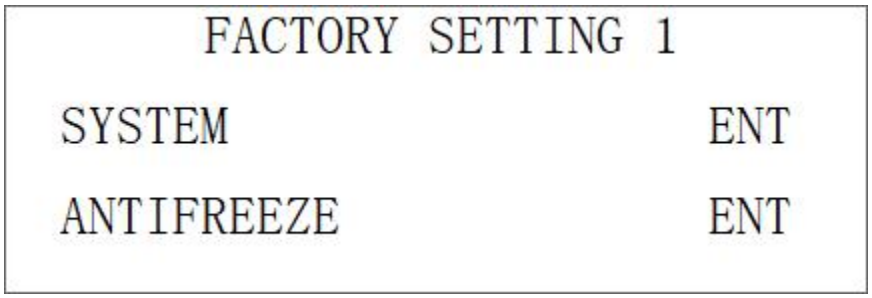
Press “🔧” to enter the password input state, press “↑” “↓” to increase or decrease the setting value. If you press “↑” “↓” to increase or decrease the setting value quickly, press “🔧” to confirm and move to the next digit, after entering the correct password. Press “↵” to confirm. If the password is correct, go directly to the manufacturer setting menu page. If the password is incorrect, it will prompt “Password failed” and return to the password page after 2 seconds. On the password page, press “🏠” to return to the main page.

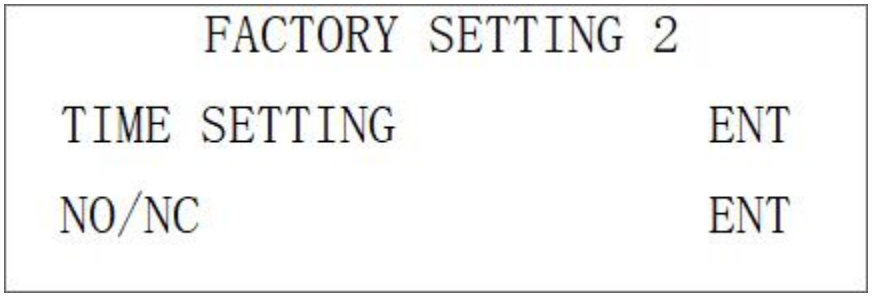
1. The system password is 120000 by default. Please modify this password for the first time and keep the password properly.

2. If there is no operation after the password is turned on, turn off the backlight after 120 seconds and automatically turn off the password.

1.15. Factory Parameter Settings

Press and hold the button “🔧” and “↵” for 3 seconds to pop up the password page at the same time. After entering the password correctly, enter the manufacturer setting page, as shown below.





Press the “🔧” button on the factory setting menu page to select the corresponding menu item to enter the relevant parameter value settings. Press “🔧” to select system setting, then press “🔧” to enter the system setting menu.

When setting parameters, press the “🔧” button to display the first setting parameters reflected with white color. Press the “↑” and “↓” buttons to adjust the setting values. If pressing the “↑” and “↓” long, then can quickly adjust "increase and decrease" to the set values. After setting, press the “↵” key to confirm the set value and switch to the next setting parameter. If the “🔧” button is pressed instead of “↵”, an empty operation is performed, that is, the current setting parameter is not saved and the next setting parameter is switched.

1、The default password is 12000. Please change this password and keep it properly when you first use it.

2、If there is no operation after the password is opened, the backlight and the password will be turned off after 120 seconds.

3、Please re-energize after setting the manufacturer's parameters.

After setting the manufacturer parameters, please wait for 5 seconds before re-energizing.

Module	Definition	Range of setting	Unit	Default	Meaning
System Setup	Type setting	Single Cooling/Single Heating/Heat Pump	--	Heat pump-refrigerant	--
	On-board phase sequence protection	Disable/Enable		Disable	Enabled with sequence protection function, disabled without phase sequence protection function
	Switching mode	Refrigerant/waterway	--	Refrigerant	This setting is invalid for single colding/single heating
	Opening mode of four-way valve	Refrigeration/heating	--	heating	Choose the mode of four-way opening
	Parallel control	No / yes	--	no	Compressor is Parallel Control or not
	Excessive frozen effluent of system/module	4.0～90.0	℃	90.0	The alarm point of air conditioning effluent is too high/too low. When the system has only one host machine, the detection point is the system outlet temperature. When the system is a group module, the detection points of the main module and the slave module are the module outlet temperature.
	Low frozen effluent of system/module	-15.0～20.0	℃	10.0	
	Network address	1～32	--	1	Setting up networking address
	Excessive cooling effluent of module	40～80.0	℃	40.0	The alarm point of cooling effluent is too high/too low. The cooling effluent of the module is used as the detection point.
	Low cooling effluent of module	0～20.0	℃	5.0	
	Exhaust high point	80.0～130.0	℃	125.0	Exhaust temperature above this value, alarm and suspend compressor

	Exhaust recovery	80.0～120.0	℃	90.0	When the exhaust temperature is below this value, the exhaust high temperature alarm will be restored.
	Exhaust Probe Enablation	Disable/Enable	--	Enable	Failure to report excessive exhaust temperature probe and exhaust temperature when disabled
	Standby mode of cooling water pump	Normal start-up/Routine	--	Normal start-up	Normal start-up ：output when unit is in standby and start-up state, stop output when shutdown
	Loading deviation 1	0.0～9.9	℃	1.0	Loading area 1 deviation, check the logic section specifically
	Loading deviation 2	0.0～9.9	℃	2.0	Loading area 1 deviation, check the logic section specifically
	Uploading deviation 1	0.0～9.9	℃	1.0	Uploading area 1 deviation, check the logic section specifically
	Uploading deviation 2	0.0～9.9	℃	2.0	Uploading area 1 deviation, check the logic section specifically
	Loading period 1	2～255	S	60	Loading Zone 1 Energy Regulating Period, check the logic section specifically
	Loading period 2	2～255	S	6	Loading Zone 2 Energy Regulating Period, check the logic section specifically
	Unloading period 1	2～255	S	30	Unloading Zone 1 Energy Regulating Period, check the logic section specifically
	Unloading period 2	2～255	S	6	Unloading Zone 2 Energy Regulating Period, check the logic section specifically
	Lower Limit of Refrigeration Backwater	-10.0～15.0	℃	-10.0	Setting the lower limit of temperature of Refrigeration mode under backwater control
	Lower Limit of Refrigeration Outlet	-15.0～10.0	℃	-15.0	Setting the lower limit of temperature of Refrigeration mode under effluent control
	Upper Limit of Heating Backwater	45.0～90.0	℃	75.0	Setting the upper limit of temperature of heating mode under backwater control

	Upper Limit of Heating Outlet Limit	45.0～90.0	℃	80.0	Setting the upper limit of temperature of heating mode under effluent control
	Password modification	--	--	--	Modify the factory 's password
	Restore factory settings	--	--	--	Restore all parameters to factory default
	Clear run time	--	--	--	Clear up the runtime of all modules
	Fault alarm settings	Silence/Long voice/Short voice	--	Long voice	Setting up the sound of fault alarm
	Service reminder	--	--	--	--
Probe calibration	Backwater temperature of system	-20.0～20.0	℃	0.0	Calibration probe
	Effluent temperature of system	-20.0～20.0	℃	0.0	
	Ambient temperature	-20.0～20.0	℃	0.0	
Anti-freezing setting	Frost-proof open pump	-15.0～25.0	℃	6.0	Turn on the pump when the freeze-proof temperature is below this value
	Antifreeze Shut-off Pump	-15.0～25.0	℃	8.0	Turn off the pump when the freeze-proof temperature is below this value
	Minimum operation of pump	10～250	S	60	The anti-freezing level can be judged after the delay of the anti-freezing pump opening
	Antifreeze Loading Period	0～250	S	60	Loading Cycle of Compressor during Antifreezing
	Antifreeze Function Enabling	Disable/Enable	--	Disable	Whether this function is enabled or not
	Frost-proof open compressor	-15.0～25.0	℃	3.0	Turn on the compressor when the freeze-proof temperature is below this value

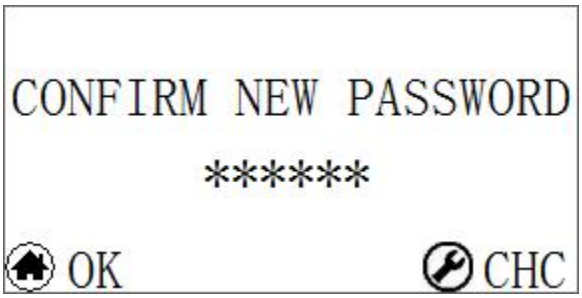
	Freeze-proof shut-off compressor	-15.0～25.0	℃	15.0	Turn off compressor when antifreeze temperature is below this value
	Freeze-proof power-on heating	-15.0～25.0	℃	4.0	Turn on electric heating when freeze-proof temperature is below this value
	Antifreeze Turn-off Electric Heating	-15.0～25.0	℃	8.0	Turn off electric heating when freeze-proof temperature is below this value
	Overtime of pump running	0～250	M	10	When the pump runs beyond this time, start the compressor to prevent freezing.
Time parameter	Detect Delay in low voltage	1～255	S	120	Delay Detection of Low Voltage Faults after Compressor Opening
	Minimum Operation of Compressor	60～600	S	180	The compressor can not start again until the shutdown time is satisfied.
	Minimum shutdown of compressor	60～600	S	180	Compressor start-up time can not be stopped until it meets, except for faults.
	Action delay of four-way valve	-240～240	S	-5	When the value is negative, the four-way valve opens before the compressor, when the value is positive, it opens after the compressor.
	Delay of Water Flow Switch in A/C	1～255	S	60	Delay Detection of Water Flow Switch after Pump Opening
	Delay pmup's shutdown time	1～255	S	30	Delayed closing time of pump during shutdown
	Delay of cooling water switch	1～255	S	60	Delay Detection of Water Flow Switch after Pump Opening
	Pump Interval Delay	1~255	S	30	Shut off the pump, delay the opening time of the pump
Constant opening and closing	DI-1 ～ DI 19	0～1	--	0	0 denotes closure and 1 denotes opening.
DI condition	DI-1 ～ DI 19	--	--	--	Short circuit, show "●", Disconnect, show "○"

1.16. Password modification

In the factory settings menu, enter the system settings page, press the "↓" button to turn to the following page:

On this page, select "Password Modification" to enter the password modification page, as shown below:

After entering the password to be modified (operation steps such as password input), press "↵" to confirm, the system will jump to the password confirmation page, as shown below:



Enter the password again. If the two passwords are the same, the message "New Password Successful" will be displayed, and the new password will take effect immediately. If the two inputs are inconsistent, the "New Password Failed" will be displayed. Press "⌂" to return to the main page.

1.17. Alarm Service

In the interface of " System Setting" , press button "↓" to enter to " Alarm Service" as below :

In this interface, press " Alarm Service" for setting , the button functions as below :

"🔧": Enter to setting mode

" ↑" "↓" :adjust the days , a quick setting by pressing for a few seconds.

"↵" :confirm after setting the days.

Tips :The presetted alarm Day will reduced automatically day by day.

The system will close and inform " Alarm day is due" when the alarm day came to" 000", then press "↵"can enter to puzzle entrance interface. The System can reoperate after resetting the alarm service days .

⚠ The alarm service will block if sett the alarm day to 999.

1.18. Remote control

By default, the control board (terminal NO. 43) forms a loop with the DCOM (common end) of the row of sockets, enabling the remote control function. the system is turned on according to the control logic, and the display switch key is invalid; when the point is disconnected, the system is Enter the shutdown program, the switch button returns to normal.

1.19. Fault chain

Fault chain input point for detecting external alarm signals such as fire.

2. Control description

The following control logic, if it is specific to some special models, will be specifically pointed out. If not specified, the control logic is shared for all models.

2.1. DIP Setting

There are 2 four-digit DIP codes on the main board which are used to set the module address and enabled compressor respectively. The specific settings are as follows:

DIP 4	DIP 3	DIP 2	DIP 1	Numerical value	Model
OFF	OFF	OFF	OFF	0	Motherboard(1#Module board)
OFF	OFF	OFF	ON	1	2#Module board
OFF	OFF	ON	OFF	2	3#Module board
OFF	OFF	ON	ON	3	4#Module board
OFF	ON	OFF	OFF	4	5#Module board
OFF	ON	OFF	ON	5	6#Module board
OFF	ON	ON	OFF	6	7#Module board
OFF	ON	ON	ON	7	8#Module board
ON	OFF	OFF	OFF	8	9#Module board

ON	OFF	OFF	ON	9	10#Module board
ON	OFF	ON	OFF	10	11#Module board
ON	OFF	ON	ON	11	12#Module board
ON	ON	OFF	OFF	12	13#Module board
ON	ON	OFF	ON	13	14#Module board
ON	ON	ON	OFF	14	15#Module board
ON	ON	ON	ON	15	16#Module board

DIP switch 2 is the enabling setting of module compressor

Non parallel connection:

DIP	Enabled compressor	Remark
DIP 1	Compressor 1 enable	ON = Enabled OFF = Disabled
DIP 2	Compressor 2 enable	
DIP 3	Compressor 3 enable	
DIP 4	Compressor 4 enable	

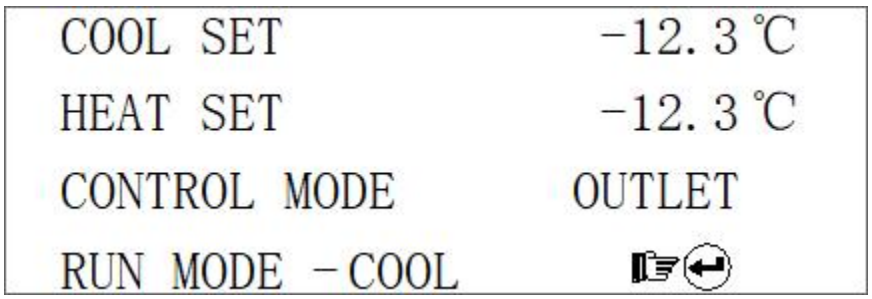
Parallel connection:

DIP	Enabled compressor	Remark
DIP 1	Compressor 1、2 enable	ON = Enabled OFF = Disabled
DIP 2	Backup	
DIP 3	Compressor 3、4 enable	
DIP 4	Backup	

When the DIP changes, it need to re-power up before it can be effective.

2.2. Mode switching

In the power off state, enter “User Settings” and press the “↵” button according to the prompt to switch the mode. As shown below:



2.3. Module switch machine

When the unit is started and the system is in the loading area, the system first opens half of the unit, and then performs loading and unloading control according to the specific temperature; when adjusting, the energy is automatically adjusted according to the loading period.

If the system is selected as parallel control, the compressor 1 and compressor 2 in the module are controlled in parallel, the compressor 3 and the compressor 4 are controlled in parallel, and the parallel compressors are synchronously loaded and unloaded. The interval between the two compressors start and stop is 4 seconds. Parallel systems share a four-way valve and

share the high pressure, low pressure, and overload protection points of the compressor. For example, the compressor 1 and the compressor 2 share the same four-way valve 1, and the common compressor high pressure 1, the compressor low pressure 1, and the compressor overload 1 protection input point. The compressor 3 and the compressor 4 share a four-way valve 3, and share common compressor high pressure 3, compressor low pressure 3, and compressor overload 3 protection input point.

2.4. Logical control

Cooling energy regulation：

After the pump starts, [start delay] time to start the compressor. Then press the loading and unloading cycle for energy adjustment.

Heating energy regulation：

After the pump is started, the [start delay] time is up to start the four-way valve, and the interval [four-way valve action delay] starts the compressor.To make energy adjustment according to the loading and unloading cycle.

2.5. Parameter Description:

SET: Setting temperature；

LOAD1: Loading deviation 1　　LOAD2:Loading deviation 2；

ULOAD1:Unloading deviation 1　　ULOAD2:Unloading deviation 2；

SET-LOAD1：Load one compressor per load cycle 1，Load a parallel system when selected as parallel；

SET-LOAD2：Load one compressor per load cycle 2，Load a parallel system when selected as parallel；

SET：Do not load or uload；

SET+ULOAD1：Unload one compressor per unloading cycle 1 and unload one parallel system when paralleling；

SET+ULOAD2：Unload one compressor per unloading cycle 2 and unload one parallel system when paralleling；

Attention： The loading deviation 2 is required to be greater than the loading deviation 1; the unloading deviation 2 is greater than the unloading deviation 1; the loading period 1 time is greater than the loading period 2 time；

2.6. Cooling water pump

The cooling water pump shall be opened before the compressor starting, and the water flow switch shall be checked. The compressor shall not be started until the water flow switch is normal. The cooling water pump will be closed after the compressor is closed, the flow switch will not detected after closing.

2.7. Switching control by waterway

When it selected to switch by waterway, the system uses cooling and heating mode to output and controlling waterway to switch automatics.

When cooling:

Cooling mode output turn on, heating mode output turn off. System outlet/return water temperature as the control temperature, for loading and unloading regulate control.

When heating:

The output of cool mode is off, and the output of heating mode is on.

2.8. Refrigerant switching control

When select refrigerant to switch, the system use four-way valve to switch the cold and hot modes, and the control temperature is the outlet/return water temperature of the system.

2.9. Auxiliary electric heater control

1) Antifreezing:

Refer to antifreezing logic for auxiliary electric heating control during antifreeze.

2) Normal heating operation:

Loading side: After the compressor is loaded, the auxiliary heat is put into operation.

Unloading side: Auxiliary heater takes closing precedence over compressor.

2.10. Antifreeze control

Anti-freezing logic is effective while antifreeze function is enabled and in the thermal shutdown state.

The choice of antifreeze temperature: the lowest temperature of the evaporating water in the whole system as the antifreeze temperature.

1)． Enter the antifreeze

When the antifreeze temperature ≤ [opening pump antifreeze temperature], start the pump.

After the pump is running [the shortest operation of the antifreeze pump], the water temperature is detected and the antifreeze is based on the antifreeze temperature:

A. Antifreeze temperature ≤ [antifreeze open pump temperature] enter the first level of antifreeze： The pump keeps running, and the system does not exit the antifreeze after the pump ran [antifreeze pump running time expires], and enters the compressor antifreeze or electric heating to prevent freezing.

B. Antifreeze temperature ≤ [antifreeze open electric heating temperature] enter the second level of antifreeze, and start

auxiliary electric heating.

C. Antifreeze temperature ≤ [antifreeze open compressor temperature] enter the third level of antifreeze：Start a press with the lowest effluent temperature of the system, and then load one compressor for each [antifreeze loading cycle] until it exits antifreeze.After the compressors are loaded all, the electric heating is turned on at intervals.

Before the press is turned on, the following conditions should be met: the pump is turned on and the water flow has been detected.

2)． Exit antifreeze

A. Pump antifreeze exit

Only when the pump is running, and the press and electric heating do not enter the antifreeze operation, the antifreeze is exited according to the following conditions:

When the antifreeze temperature > [antifreeze off pump temperature], the pump stops running and exits the antifreeze.

B. Electric antifreeze exit

When the antifreeze temperature > [antifreeze off electric heating temperature], the auxiliary electric heating operation is stopped.

C. Compressor antifreeze exit

When the antifreeze temperature > [antifreeze off compressor temperature], the press stops running and the pump stops. Exit the antifreeze.

Note: When the antifreeze exits, the pump stops after all the presses stop running [pump off delay] .

During antifreeze, The error is detected, such as the cooling water temperature is too low, or the module cooling water temperature is too low.

2.11. Compressor operation protection

The compressor cannot be stopped during the minimum running time. (The minimum running time of the compressor is 180 seconds, which means it can be stopped at least 3 minutes after starting the compressor.) The compressor cannot be restarted during the running time.

2.12. Module equalization control

The cumulative running time of each module for compressor is automatically recorded at star up. The module's running time is judged before each module is put into operation, and the module with short running time is given priority to operate.

2.13. Communication Protocol

The controller adopts RS485 communication mode, and the communication protocol is Modbus RTU. The parameters are as follows:

Communication method: serial asynchronous half-duplex;

Baud rate: 9600BPS;

Data bit length: 8 bits (LSB first);

Parity bit: none;

Start bit: 1 bit;

Stop bit: 1 bit.

2.14. Module Networking Description

1. The module controller determines its own address through the DIP switch. The damage of a module does not affect the operation of the entire system.

2. The number of modules can be detected automatically or by software.

3. The main controller and the enabled module controller can be plug and play in the network and automatically recognized.

4. The first 4 digits of the DIP switch of the module controller are turned OFF to the main module.

5. Automatically pass commands to the next module for module communication failure or compressor failure.

3. Fault input and protection alarm

3.1. Fault List

According to the system, each fault point is a normally closed point. If the fault point forms a loop with the COM (common end) of the row of sockets, it indicates normal. If it is disconnected, it indicates a fault. If you need to shield the fault of this digital input, simply short the corresponding input and common. When a fault occurs, the system automatically pops up the fault information.

Fault	Trigger condition	Postponed time	Duration	corresponding action	Reset	Note
COMPR PH	any time	0S	2S	Turn off the corresponding compressor	Manual	If the fault already exists when the machine is turned on, the compressor will not be started, the system will alarm and the fault indicator will be on.
COMPR PL	Compressor starts	*120S	10S	Turn off the corresponding compressor	Manual	If the fault already exists when the machine is turned on, the compressor will not be started, the system will alarm and the fault indicator will be on.
EVAP PUMP OL	any time	0S	2S	Stop machine	Manual	If the fault occurs in the main module when the machine is turned on, the whole machine stops, the system

						alarms and the fault indicator lights up;
EVAP FLOW SWITCH	Freezering pump starts	*60S	10S	Stop machine	Manual	If the fault already exists when the machine is turned on, it will not be turned on, the system will alarm and the fault indicator will be on.
COOL PUMP OL	any time	0S	2S	Stop machine	Manual	If the fault already exists when the machine is turned on, the unit will not be started, the system will alarm and the fault indicator will be on.
COOL FLOW SWITCH	Cooling pump starts	*60S	10S	Stop machine	Manual	If the fault already exists when the machine is turned on, it will not be turned on, the system will alarm and the fault indicator will be on.
HIGH/LOW SYS OUTLET	System starts	0S	10S	Turn off all module compressors	Auto	The temperature is too low during cooling, and the +2 degree difference is automatically reset. When the heating is detected, the temperature is too high, and the -5 degree hysteresis is automatically reset.
HIGH/ LOW MOD EVAP OUTLET	System starts	0S	10S	Stop module	Auto	The temperature is too low during cooling, and the +5 degree difference is automatically reset. When the heating is detected, the temperature is too high, and the -5 degree hysteresis is automatically reset. Note: The master-slave module detects that the module's frozen water temperature is too high or too low.
HIGH/LOW MOD COOL OUTLET	System starts	0S	10S	Stop module	Auto	The temperature is too high during cooling, and the +5 degree return is automatically reset. When the heating is detected, the temperature is too low, and the -5 degree hysteresis is automatically reset.
HIGH DISCH.	Compressor starts	0S	10S	Stop compressor	Auto	Recover when exhaust is below recovery point

SYS INLET FAULT	any time	0S	5S	Stop machine	Manual	--
SYS OUTLET FAULT	any time	0S	5S	Stop machine	Manual	--
DISCH. T. FAULT	any time	0S	5S	Stop compressor	Auto	--
AMB TEMP FAULT	any time	0S	5S	Alarm, no downtime	Manual	--
MOD EVAP OUTLET FAU	any time	0S	5S	Alarm, no downtime	Auto	Do not report this fault when single module
MOD COOL OUTLET FAU	any time	0S	5S	Alarm, no downtime	Auto	
MOD COOL INLET FAU	any time	0S	5S	Alarm	Auto	
MOD EVAP INLET FAU	any time	0S	5S	Alarm	Auto	Do not report this fault when single module
POWER FAILURE	any time	0S	2S	Stop module	Manual	Stop corresponding module
PHASE PROTECT	any time	0S	2S	Stop module	Power on	Stop corresponding module
EXTERNAL LINKAGE	any time	0S	2S	Stop machine	Manual	--
MOD COM FAULT	any time	0S	30S	Stop module	Auto	The module of the broken network is stopped and alarmed. The module can be used to query whether the module is online through the online function of the module, or the module fault inquiry page can be used to query whether the module is faulty.

1. * indicates that the time can be set.

2. The fault indication of the main module is the total alarm output. If any module has fault, it will be closed; the fault indication of the slave module indicates the fault indication of this module.

3. When connected in parallel, any compressor in the system will stop and stop the two compressors of the system.

4. Waterway switching control, when the cooling mode is switched to the heating mode, the system evaporates back to the temperature/outlet temperature and the system cools out the temperature/return temperature related faults, the fault name does not switch, the fault action switches to each other; the module cools out the temperature The fault related to the evaporation temperature of the module, the fault name and action are switched.

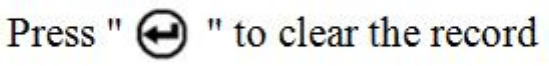
3.2. Fault check

The fault message will pop up automatically when a fault occurs. When re-query the current fault, press the "🔔" key on the homepage to query the fault information that has not been reset. The specific module fault details query can be queried as described in Section 3.13.

For historical fault record query, please refer to Section 3.14.

3.3. Historical fault record clearing

Press the "🔧" button on the fault history page to display the following page:



3.4. Fault reset

- If the unit is running, you can reset the fault by pressing the "↵" button on the current fault inquiry page.
- All faults can be reset by power off.

⚠ Please reset the fault after external trouble

3.5 Other problems and repairing

No	Error	Possible reason	Method
1	Heat pump doesn't run	1. Power supply cable is loose 2. The fuse of power supply is fused.	1. Cut off the power supply to check and repair. 2. Change the fuse.
2	Heating capacity is too small	1. Refrigerant is not enough 2. Water system insulating is not good 3. Air heat exchanger is dirty 4. Water heat exchanger scaled	1. Check leakage and repair and refill gas 2. Improve the insulation 3. Clean air heat exchanger 4. Clean water heat exchanger
3	Compressor doesn't run	1. Power supply has error 2. Cable connecting is loose 3. Compressor is overheat	1. Check reason and solve 2. Check loose and repair 3. Check reason and repair
4	Compressor noise is loud	1. Expansion valve damaged lead to liquid entering compressor 2. The internal parts of compressor damaged 3. Compressor lack of oil	1. Change expansion valve 2. Change compressor 3. Compensate oil for compressor
5	Fan motor doesn't run	1. Fan blade fixing screw is loose 2. Fan motor damaged 3. Fan motor capacitance damaged	1. Tight the screw 2. Change fan motor 3. Change the capacitance
6	Compressor run, but not heat	1. There is not refrigerant at all 2. Compressor damaged	1. Check leakage and repair 2. Change compressor

Warranty card

Product model：　　Bar code：

Buyer		Address	
Invoice No.		Date	

Repair date	Repair record	Repairer

Items of warranty:

1.Warranty terms:

Within warranty, any problem because of quality, please contact us for support.

2. When repair needed, please show the warranty card and invoice of order or other proof.

3. We don’t afford the problem that is caused by re-fitment or adding other function by user.

4. Warranty card and invoice or other purchasing proof will be invalid if alerted.

5. Please keep the warranty card and invoice or other purchasing proofs well, we will need these for service purpose.

6. We will not provide free warranty for below conditions:

(1) without proof;

(2) errors caused by re-fitment or not correct operating;

(3) damage caused by not professional people operating;

(4) faulty by moving or falling;

(5) faulty caused by natural disas

CERTIFICATE

Product Model: _____

_____

_____

Bar code:_____

_____

Checking result:_____

_____