GREE
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Owner's Manual

Original Instructions

Commercial Air Conditioners

D Series Modular Air-cooled Scroll Chillers

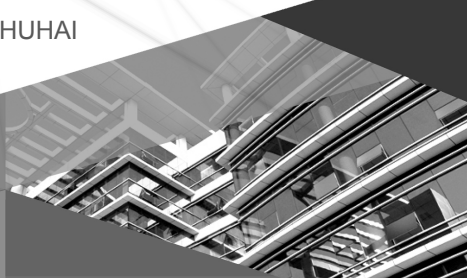
Applicable Models :

LSQWRF65M/D-M	LSQWRF80M/D-M
LSQWRF65M/NaD-M	LSQWRF80M/NaD-M
LSQWRF130M/D-M	LSQWRF130M/NaD-M
LSQWRF160M/D-M	LSQWRF160M/NaD-M

Thank you for choosing commercial air conditioners. Please read this Owner’ s Manual carefully before operation and retain it for future reference.

If you have lost the Owner's Manual,please contact the local agent or visit www.gree.com or send an email to global@gree.com.cn for the electronic version.

GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI



To Users

Thank you for selecting Gree's product. Please read this instruction manual carefully before installing and using the product, so as to master and correctly use the product. In order to guide you to correctly install and use our product and achieve expected operating effect, we hereby instruct as below:

(1) This equipment should be installed, operated or maintained by the qualified servicemen who have had specific training. During operation, all safety issues covered in the labels, User's Manual and other literature should be followed strictly. This equipment is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsibility for their safety. Children should be supervised to ensure that they do not play with the appliance.

(2) This product has gone through strict inspection and operational test before leaving the factory. In order to avoid damage due to improper disassembly and inspection, which may impact the normal operation of unit, please do not disassemble the unit by yourself. You can contact with the special maintenance center of our company if necessary.

(3) For personal injury or property loss and damage caused by improper operation such as improper installation and debugging, unnecessary maintenance, violation of related national laws and rules and industrial standard, and violation of this instruction manual, etc., we will bear no liability.

(4) When the product is faulted and cannot be operated, please contact with our maintenance center as soon as possible by providing the following information.

- Contents of nameplate of product (model, cooling/heating capacity, product No., ex-factory date).
- Malfunction status (specify the situations before and after the error occurs).

(5) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation. We have the right to make necessary revision to the product from time to time due to the reason of sales or production, and reserve the right to revise the contents without further notice.

(6) The final right to interpret for this instruction manual belongs to Gree Electric Appliances Inc. of Zhuhai.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.Children should be supervised to ensure that they do not play with the appliance.

This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.

DISPOSAL: Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

Contents

Safety Notices (Please be sure to abide)

⚠ **WARNING**: If not abide strictly, it may cause severe damage to the unit or the people.

⚠ **NOTE**: If not abide strictly, it may cause slight or medium damage to the unit or the people.

This sign indicates that the operation must be prohibited. Improper operation may cause severe damage or death to people.

This sign indicates that the items must be observed. Improper operation may cause damage to people or property.

◆ Safety Notices for On-site Installation

⚠WARNING

- Installation should be performed by qualified servicemen who have taken specialized training and acquired corresponding certificates in accordance with relative laws, regulations and this manual, otherwise it would lead to damage to the unit, water leakage, electrocution, or fire hazards etc.
- The unit should be installed on the smooth foundation capable of supporting the unit and fixed with screw bolts. The foundation with inadequate strength would lead to leakage, turn-over or personal injury or death.
- Special lines should be used for electric installation by qualified electricians. Lines with inadequate capacity would lead to electrocution or fire hazards.
- Make sure each connector is properly tightened; otherwise it would lead to over-temperature or fire hazards etc.
- When installation is finished, please check for the drainage lines, pipelines, and electric lines to prevent water leakage, electrocution or fire hazards.
- This equipment should be installed where the drainage system can work well. Never block the drain hole. Improper drainage system would lead to drainage difficulty and make the unit suffer from malfunctions.
- When there is something unusual (like stinky smell) during installation or commissioning, please cut off the main power at once and then contact the after-sales service center. This ongoing unusual condition will damage the air conditioning unit and lead to electrocution or fire hazards.
- When refrigerant leaks, take corrective measures as soon as possible to prevent oxygen depletion by increased refrigerant concentration.

⚠CAUTION

- Do not install the unit where there is high-intensity magnetic field or it is highly basic or acid or the voltage is quietly unstable.
- Do not install the unit where there would be leaked inflammable gas, as it would lead to fire hazards.
- The outer casing of the unit should be grounded. Do not connect the grounding line to the gas line, water line, lightning rod or communication line, otherwise it would lead to .
- Do not stand on the unit or place other object on it.
- Do not insert fingers or other objects into the outlet grill to prevent damage to the unit or personal injury or death.
- Do not start or stop the unit by inserting or drawing out the power plug.
- Do not let children play with this unit.
- The unit should be equipped with the leakage protector which should be installed in accordance with electric technical standards. Uninstallation or incorrect installation would lead to electrocution. Do electric leakage detection after electric installation is finished.
- Volatile liquid like thinner or gasoline would damage appearance of the unit. (Only clean the outer casing with of the unit with soft dry cloth or wet cloth with neutral detergent.)

- Do not install the unit where conditions are severe, where it is close to the hot spring, coast or oil field, as it would lead to corrosion, electrocution or fire hazards. Besides, do not install the unit where there are corrosive, inflammable substances or smog, otherwise it would lead to normal operation failure, shortened service life, fire hazard, or severe injury.
- Do not start the compressor by manually closing the AC contactor, otherwise it would lead to electrocution or fire hazard.
- Do not misuse refrigerant, as it would lead to normal operation failure, unsatisfactory performance, fire hazards or even explosion etc.

- Installation should be done in accordance with this manual. Please read it manually prior to startup or troubleshooting.
- Installation should be done by qualified servicemen, as incorrect installation would lead to water leakage, electrocution or fire hazards etc.
- Before installation, check for all power supplies with the nameplate and check for its safety.
- The unit should be grounded and there should be specialized grounding line for the power socket to avoid of electrocution. Do not connect the groundling line to the gas tank, water line, lightning rod, or telephone line.
- Only specialized accessories and parts are allowed for installation, otherwise it would lead to water leakage, electrocution or fire hazards etc.
- Size of the power lines should be large enough. Only specialized power lines are allowed for replacing the damaged ones.
- When power lines have been connected, install the electric box as well to avoid of any safety problems.
- After all installation has been finished, take an overall check to the unit before powering it on.

◆ Safety Precautions for Usage and Maintenance

⚠WARNING

- When there is something unusual (like burnt smell), cut off the power supply at once and contact the sales agent. The ongoing unusual condition would lead to malfunctions, electrocution or fire hazards.
- When refrigerant leaks, take corrective measures to prevent oxygen depletion by increasing refrigerant concentration.
- Do not use or place inflammable or explosive substances near the unit.
- Do not do troubleshooting personally, as incorrect troubleshooting would lead to electrocution or fire hazards. Instead, please contact GREE after-sales service center.
- When the unit is charged with refrigerant, do not solder or cut any pipeline, fined heat exchanger, shell-and-tube heat exchanger or other containers.

⚠CAUTION

- Do not let the unit out of the designed application range; otherwise it would cause the heat exchanging tube cracking, refrigerant leakage or even explosion.
- Do not let the cold/heat source directly act on the stored foods, plants, animals, precision instruments, and curiosities, otherwise their quality would be degraded.
- Only circulating water with satisfactory water qualify are allowed for the unit, as unsatisfactory water quality would shorten the service life of the unit or even malfunctions.
- When the unit has been put into use for some time, check for security of the installation foundation. Unstable foundation would lead to deformation or even safety accident.
- Once the unit is started up, stop it at least 6 minutes later, otherwise it would shorten the service life of the unit. Never deliberately start or stop the unit frequently.
- Under subzero climatic conditions, pay attention to freeze protection. When the unit is out of use in short time, do not cut off the power supply, as freeze protection will not act normally. When the unit is out of used in quite long time, add anti-freezing agent to water or drain the water system, otherwise it would make the shell and tube crack and then leak.

⃠

- Do not use the fuse out of the normal range or replace it with
- Do not start or stop the unit directly by the power switch, as it would be likely to cause electrocution or fire hazards.
- Do not change settings of safety devices; otherwise it would lead to fire hazards and explosion.
- Do not operate the unit with wet hands.
- Do not clean the unit without cutting off the power supply, as it would lead to electrocution or personal injury.
- Do not let children pull power lines or climb the unit to prevent of electrocution or other dangers.
- Do not touch high-temperature parts of the compressor and refrigerant lines, as it would lead to burns.
- Do not touch sharp edges and fins of the heat exchanger; otherwise it would lead to personal injury.
- Do not touch any moving part; otherwise it would lead to accidental injury.
- Do not stand on the unit or replace objects on it.
- Do not bend pipeline and retrofit the unit, otherwise it would lead to refrigerant leakage, explosion, fire hazards or personal injury.

❗

- Do operate the unit in accordance with this manual and read it carefully before startup or troubleshooting.
- Do turn on or off the unit with the controller.

◆ Safety Precaution for Handling of the Unit

(1) Precautions for Handling of the Unit

⚠WARNING

- Please contact the contractor for handling and installation. Improper installation would lead to electrocution or fire hazard.
- During installation or handling, do not let foreign matters mixed with refrigerant and do not air trapped inside the pipe, as it would lead to increased system pressure or explosion of the compressor.
- Only specialized power lines are allowed. Wiring terminals should suffer no any external force and are fixed properly; otherwise it would lead to fire hazards. Besides, make sure insulation of power lines always in good condition.
- Connection between two ends of the power lines is not allowed. When its length is not enough, please contact the after-sales service center for customizing another one long enough.

⚠CAUTION

- Treatment of water, cleaning solution, refrigerant or other waste liquid or gas should comply with local laws and regulations; otherwise it would lead to adverse effect to health and environment.
- Do not misuse refrigerant, as it is one of the causes of fire hazard and explosion.

(2) Precautions for Refrigerant Charging

⚠WARNING

- When charging is interrupted or finished, reinspect the unit but do not let the compressor run into operation.

⚠CAUTION

- Do not use mixture of refrigerant vapor and air or oxygen for pressurizing for fear of explosion.

1 General Introduction

Main technical data of D series modular air-cooled scroll chillers are listed on the nameplate.

D series modular air-cooled scroll chillers are developed based on the B series modular air-cooled scroll chillers. However, it has higher reliability, efficiency and more reasonable design and can be widely used at newly built or retrofitted industrial and civil buildings in various sizes, such as, hotels, apartments, restaurants, office buildings, shopping malls, theaters, gyms, workshops, hospitals and other places where there are high requirements on noise level and air but the cooling tower is going to be installed troublesomely.

The applicable refrigerant for D series modular air-cooled scroll chillers is R22 or R410A.

D series modular air-cooled chillers work outstandingly by virtue of their major features stated below.

◆ Excellent compatibility:

Each D series modular air-cooled scroll chillers is constructed of up to 16 single units of 65D, 80D or up to 8 single units of 130D,160D which may vary in structure and in capacity.

◆ Free master module design:

Any single unit can operate as the master once connected with the wired controller. It overcomes the problem which would occur to the product of other manufacturer that the whole system would fail to work properly when the fixed master unit malfunctions.

◆ Compact structure:

The modular design enables the compact structure, reduced volume, light weight, easy handling and shipping and flexible installation.

◆ Powerful self-protection:

It is equipped with the top-end microcomputer control system which is capable of providing well-rounded protection and self-diagnosis.

◆ High reliability:

It is constructed of well-designed refrigeration parts for multiple refrigeration cycles, adequately guaranteeing the reliable operation.

◆ Hermetic scroll compressor:

Compared with other type of compressor under the same cooling load, it has few movable components, smaller rotating torque, lower noise and vibration and higher reliability and efficiency.

◆ Equilibrium running:

It indicates each compressor will run alternately so as to extend their service life.

◆ Humanized operation designing:

When the unit runs out of the allowable temperature range, an alert will rise on the display.

◆ Low maintenance cost:

The especially design structure allows easy access and service and low maintenance cost.

◆ Hi-precision electronic expansion valve:

The hi-precision electronic expansion valve is used as the throttling device, providing high reliable, sensitive and precise service.

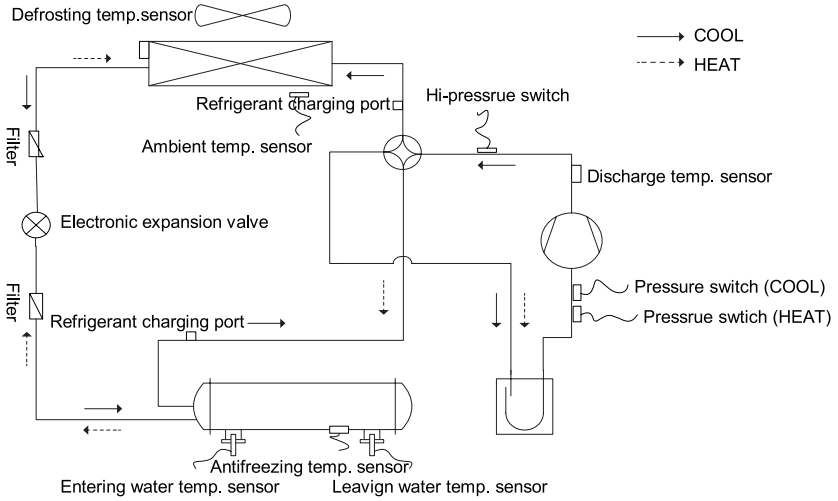


Fig.1-1 Schematic Diagram

2 Product Data and Operating Range

(1) See the Data Sheet for detailed product data. Data on the product nameplate always takes precedence. If there is any special requirement, consult the local sales office for model selection.

(2) Maximum and minimum water operating pressures.

- The maximum inlet water pressure is 1.0×10^6 Pa.
- The minimum inlet water pressure is 0.2×10^6 Pa.

(3) Operating Range

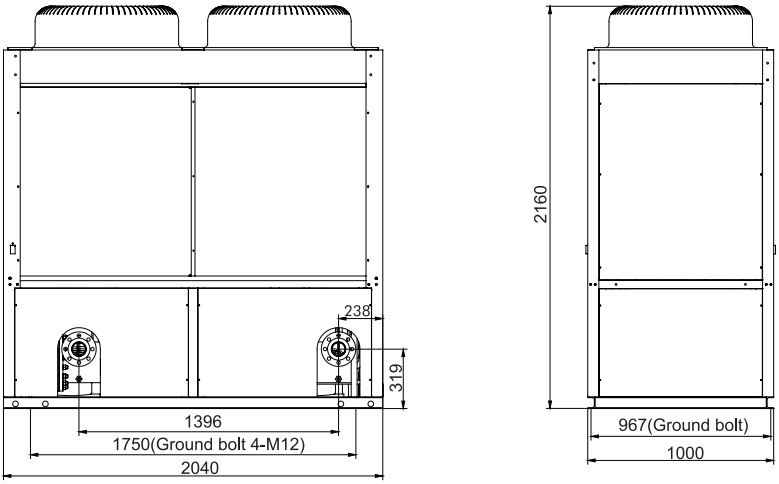
Item	Water Side		Air Side	
	Water Flow m^3/ (h·kW)	Leaving Water Temperature (℃)	DB Temperature (℃)	WB Temperature (℃)
Cooling	0.172	7	35	—
Heating (Heat Pump)		45	7	6

Item	Water Side		Air Side
	Leaving Water Temperature (℃)	Chilled Water Temperature Difference (℃)	Ambient DB Temperature (℃)
Cooling	5 ～ 15	2.5 ～ 6	15 ～ 48(R22) 15 ～ 45(R410A)
Heating (Heat Pump)	40 ～ 50	2.5 ～ 6	-15 ～ 24

3 Outline Dimension

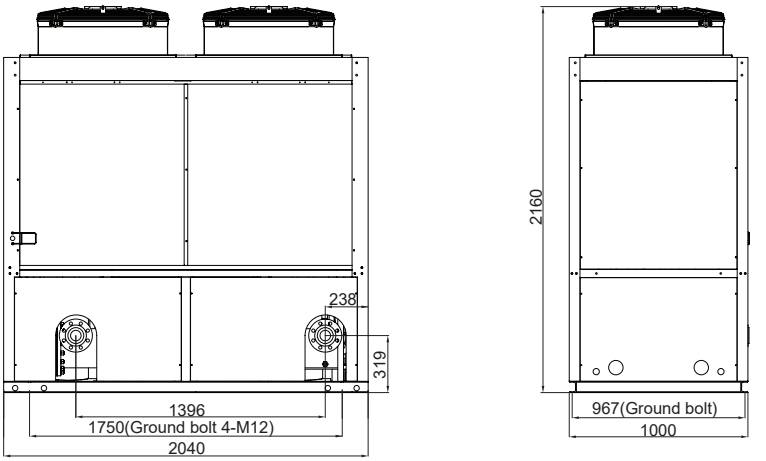
(1) Graph for the shape and dimensions for LSQWRF65M/D-M, LSQWRF80M/D-M

(Unit:mm)



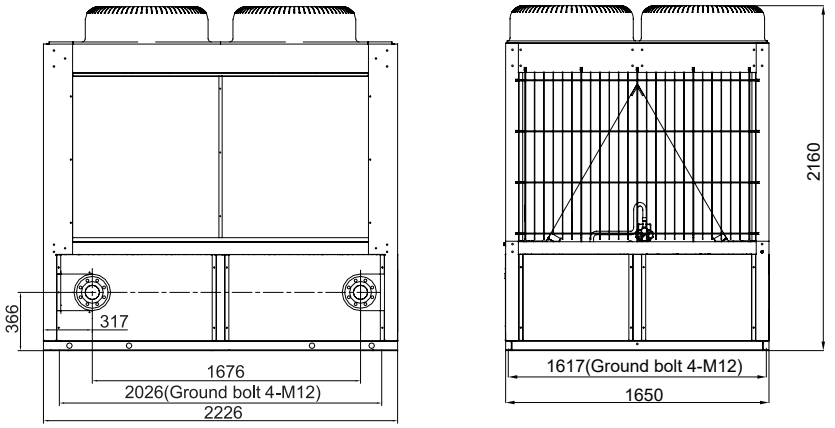
(2) Graph for the shape and dimensions for LSQWRF65M/NaD-M, LSQWRF80M/NaD-M

(Unit:mm)



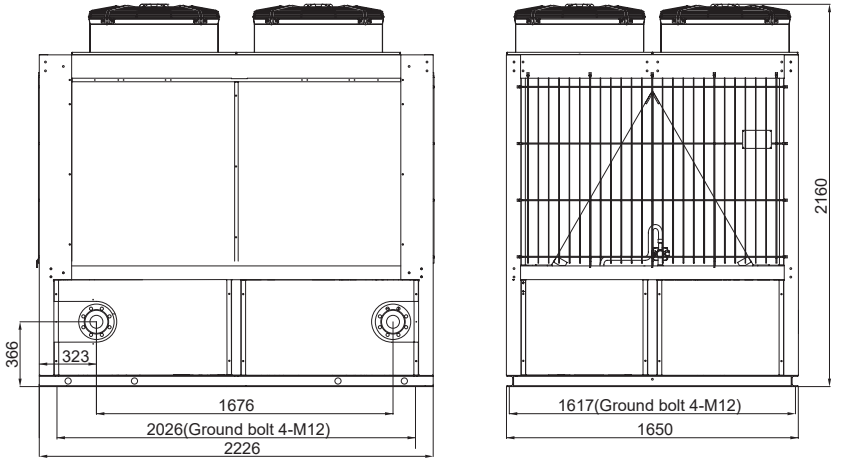
(3) Graph for the shape and dimensions for LSQWRF130M/D-M

(Unit:mm)



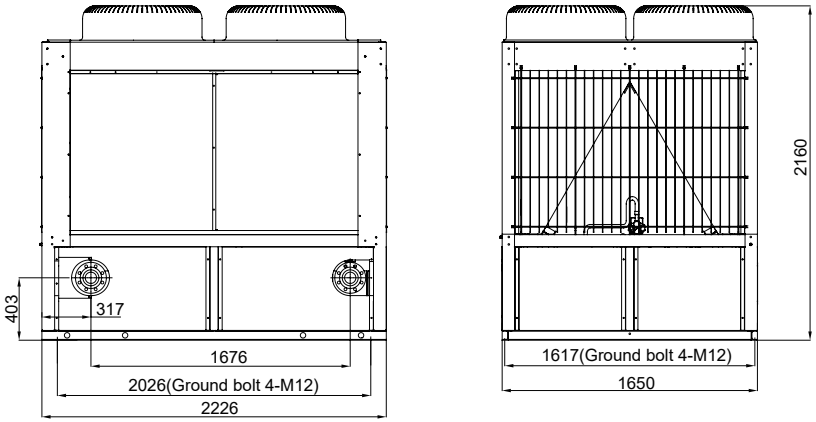
(4) Graph for the shape and dimensions for LSQWRF130M/NaD-M

(Unit:mm)



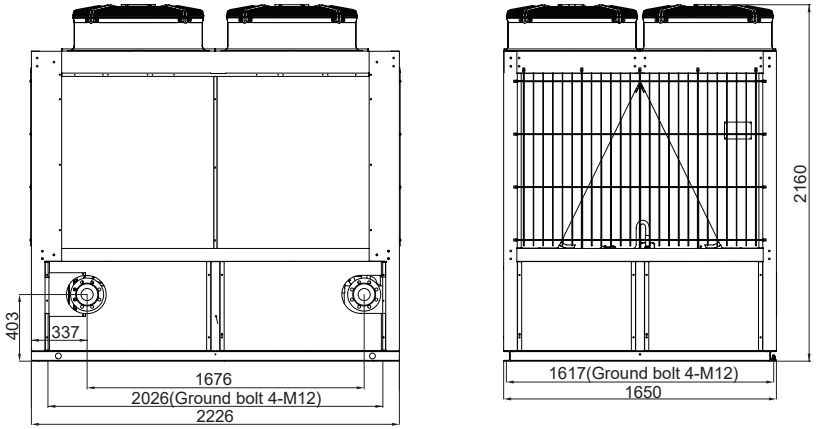
(5) Graph for the shape and dimensions for LSQWRF160M/D-M

(Unit:mm)



(6) Graph for the shape and dimensions for LSQWRF160M/NaD-M

(Unit:mm)



4 Installation Instructions

4.1 General

Installation should be performed by the skilled technician to guarantee the normal operation and prevent malfunctions and please read this manual carefully prior to installation.

The chiller is manufactured, inspected and tested strictly in accordance with the quality control program and it will work properly within the expected service life as long as its installation, operation and service follow the instructions covered in this manual, otherwise, it would lead to potential risks.

4.2 Acceptance Check

The user is responsible for organizing personnel to perform the acceptance check at the regulated plate of delivery. Checks listed below should be taken as a minimum.

(1) If all required documents and accessories are provided as per the packing list.

(2) Check the equipment model.

(3) If the equipment is damaged and all parts are provided.

(4) If refrigerant leaks.

(5) Do not remove the protective cover on the flagon of the shell-and-tube heat exchanger before connecting the water tube and check if the water pipe is clean.

(6) Check if the installation and operation are within the allowable conditions.

When there is damager or any other question, contact the local sales representative for applicable solutions.

⚠NOTE

- After the acceptance check, take necessary protection to the unpacked equipment. Note that it is not recommended to unpack the equipment too early to avoid any unexpected damage.

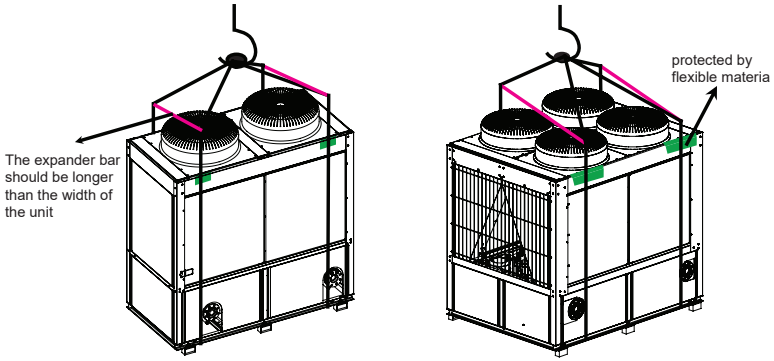
4.3 Handling and Lifting

Each unit will undergo a series of strict factory inspections and tests to guarantee the expected performance and quality. However, special attention should be paid during handling and shipping to prevent the control system and the piping system from being damaged.

It is best to unpack the chiller at the installation location and keep the chiller upward. When the chiller is unpacked during handing, please follow the lifting instructions stated below.

(1) Move the chiller by placing three levers 1/5 wider than the width of the chiller under the base and meanwhile always keep the chiller in balance.

(2) See the figure below for more details.



4.4 Installation Foundation

(1) Installation foundation shall be designed by the qualified designer in accordance with the actual condition.

(2) A rubber pad shall be placed under the base of each single unit and then secured on the ground or the roof. Alternatively, each single unit can be placed side by side on the parallel channel steel with enough strength which then shall be secured with anchor bolts. Distance between each single unit shall be keep 1m as a minimal.

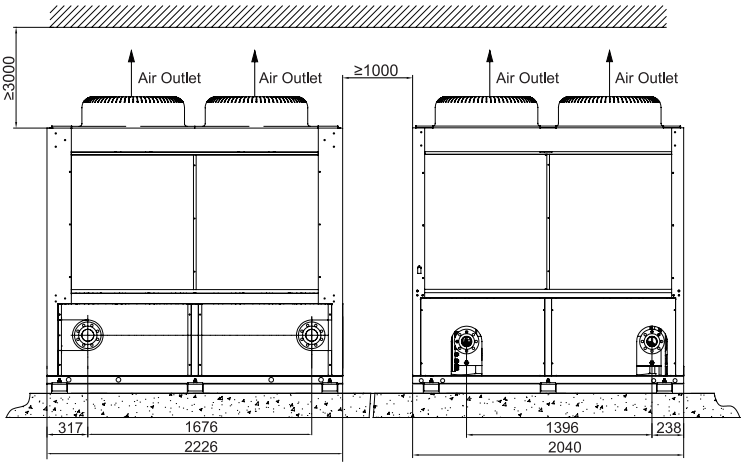
(3) Enough space shall be left for service and ventilation. Be sure there is at least 2m between the equipment and any barrier and it is better to set up a sun cover 3m ahead of the equipment.

(4) The unit shall be installed where it will not be affected by fire, corrosive, inflammable or waste gas, and proper measures shall be taken to minimize the vibration and noise.

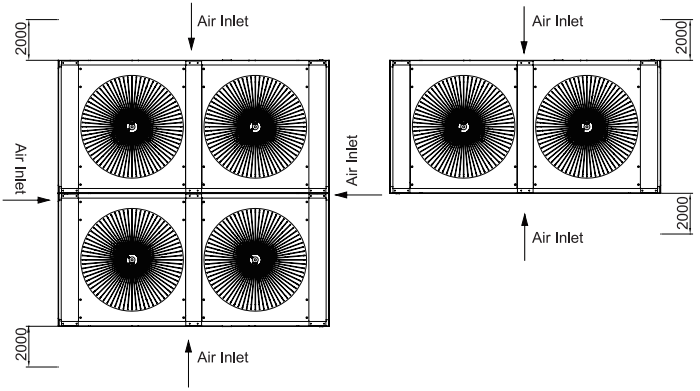
(5) The unit shall be installed where the defrosting water can be drained out favorably.

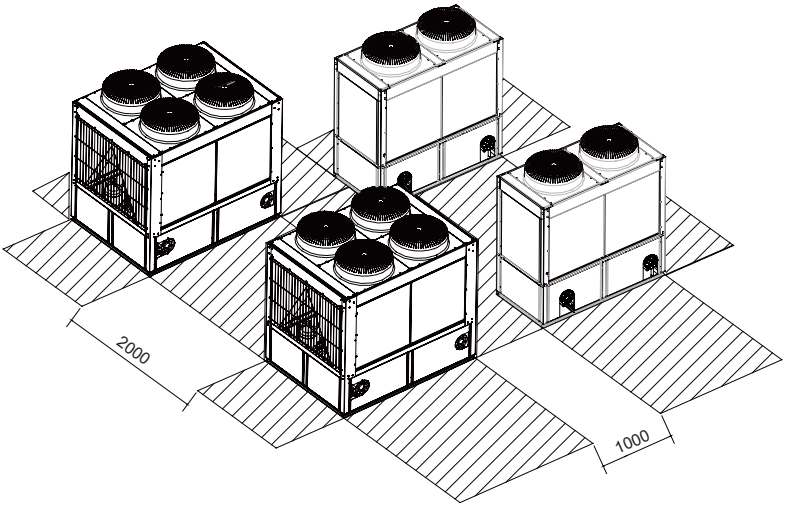
(6) Do not install the unit where there is heavy snow. If inevitable, build a foundation at least 300mm higher than the ground.

(Unit:mm)



Rubber cushion pad shall be attached under the unit base which shall be fixed on the foundation with bolts.





4.5 Vibration Reduction

The unit shall be securely attached to the foundation through the mounting hole by following the steps below.

(1) Be sure the planeness of the concrete foundation is within ±3mm and the foundation shall be covered by a rubber pad.

(2) Lift the unit until to the height where it is available to install the spring shock absorber.

(3) Remove screws fixing the spring shock absorber.

(4) Place the unit on the spring shock absorber and align the bolt holes of the spring shock absorber with the mounting holes on the base of the unit.

(5) Tighten screws removed in step 2.

(6) Adjust the height of the spring shock absorber and make sure the deflection is equal all round the spring shock absorber.

(7) Tighten the locking screws.

4.6 Water System

Considerations stated below shall be taken carfelly for the water system.

(1) Each water inlet and outlet should be labeled properly to avoid misconnection.

(2) A flexible connector should be used at the chilled water outlet to reduce vibration transmission.

(3) A manometer, a thermometer and a gate valve shall be installed at the chilled water inlet /outlet. Moreover, a drain valve shall be installed at the outlet and an air release valve shall be installed at the inlet. At the highest point of the water system, another release valve shall be installed, while at the lowest point of the water system, another drain valve shall be installed to facilitate drainage.

(4) The water inlet/outlet pipe should be tightly insulated to reduce heat loss and dewing. When pipes are exposed under 0℃ , a electric heater shall be installed.

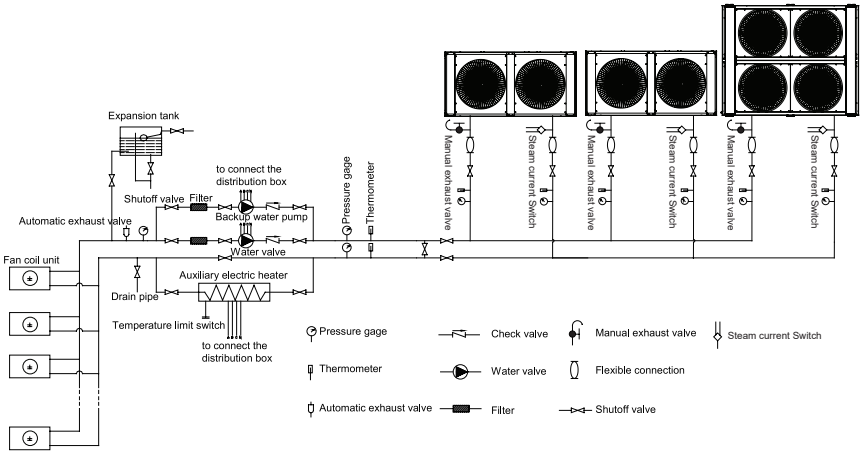
(5) There surely be some foreign matters in the water system which would generate scale on the surface of the heat exchanger, so a filter shall be installed upstream of the water pump.

(6) The unit shall be bypassed during flushing to prevent drain out from entering the system.

(7) Under ultra-low temperature in winter, showdown at night will cause the evaporator and pipeline frozen up, so it is highly recommended to add alcohol and propanol mixture in chilled water. Do not cut off the power supply when the unit is turned off, otherwise the freeze protection does not work. Alternatively, cut off the power supply and drain the water system thoroughly.

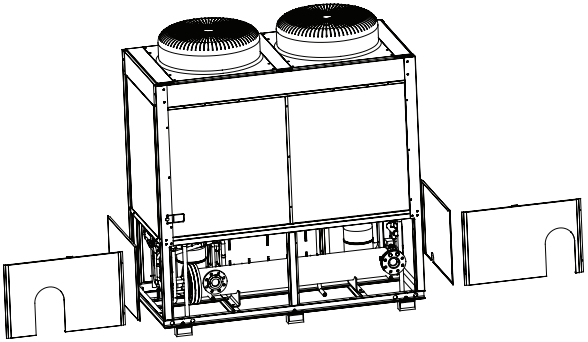
(8) When the unit runs under the low load requirement, in order to avoid low load protection which would affect the service life of the unit, make sure the water capacity is more than 1/6 of total rated flow rate per hour of each module. If necessary, a water tank will be installed.

(9) Note: never use salt mixture to prevent the unit from being corroded.

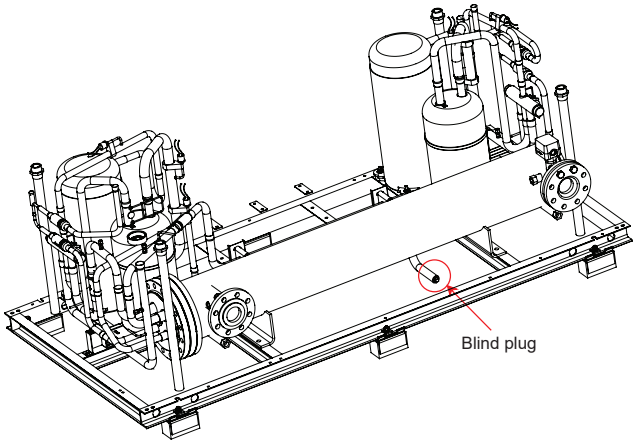


How to drain the water system

(1) Loosen screws around the panel and then take down it.



(2) Remove anticlockwise the blind plug located at the bottom of the heat exchanger to let the chilled water flow out, after that, tighten the blind plug and reinstall the panel. (Note: place the drainage equipment beneath the drain pipe to prevent pollution caused by the drain water.)



⚠NOTE

- Keep the purge valve of the water system open in order to drain the evaporator and condenser completely.

Diameters of Entering/Leaving Water Pipes

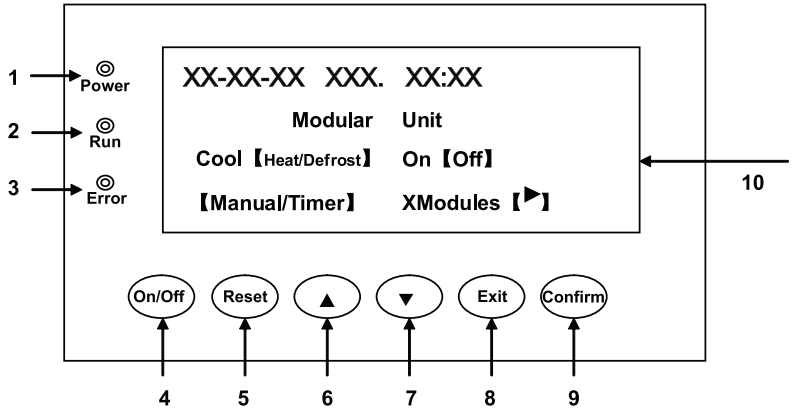
Diamter (mm)	Cooling load (kW)
DN15	0~3
DN20	3~7
DN25	5~13
DN32	10~25
DN40	15~38
DN50	29~75
DN65	46~126
DN80	84~230
DN100	167~461
DN125	314~586
DN150	523~1151
DN200	1068~2094

5 Guidance to Controller Operation

5.1 Overview on Wired Controller

In a 1~16 module network control system, only one Wired Controller is arranged for displaying the control menu, receiving and displaying parameters from the mainboard controller, setting adjustable parameters and transmitting set parameters to the mainboard controller.

5.2 Control Panel of the Wired Controller



1. **Power indicator(red):** the indicator is on when the Wired Controller is powered on, or otherwise it is off.
2. **Run indicator(green):** the indicator is on when the Wired Controller is started, or otherwise it is off.
3. **Error indicator(red):** The indicator is on when the unit is at fault, or otherwise it is off.
4. **On/Off button:** For controlling unit conversion between start and stop, press the button (for 3 seconds) in stop state to start the unit and press the button (for 3 seconds) in operation state to stop the unit.
5. **Reset button:** Press the button to clear fault and relieve the air discharge temperature sensor locking.
6. **Up selection button:** in menu selection, press the button to move the cursor upward or leftward; and in data modification mode, press the button to increase the value.
7. **Down selection button:** In menu selection, press the button to move the cursor downward or rightward; and in data modification mode, press the button to decrease the value.
8. **Exit button:** Press the button to go back to the previous menu.
9. **Confirm button:** In menu selection, press the button to confirm the selected item; and in data modification mode, press the button to confirm the parameter and move the cursor.
10. **LCD:** Information display zone.

5.3 Wired Controller Operation Instructions

5.3.1 Turning on/off of the Unit

The unit under non-commissioning state can be turned on/off via the manual mode or the timing mode. The manual mode is given priority to the timing mode.

- Manual mode

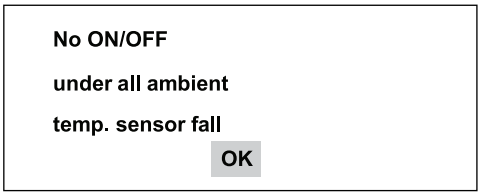
(1) Manual start: in the unit stop state, press the **on/off** button for 3 seconds and start the unit, and at that time the operation indicator is on. When the compressor begins to run after a delay, the manual starting process is finished.

(2) Manual stop: in the unit operation state, press the **on/off** button for 3 seconds and stop the unit, and at that time the operation indicator is off.

When ambient temperature is lower than -16 ℃ , and Run Mode is Heat ,pressing On/Off button, the following prompt window comes up on the manual operator.

Press the **Confirm** button for acknowledgement.

If ambient temperature sensors of all linked units are at fault, and Run Mode is Heat, pressing on/off button, the following prompt window comes up on the manual operator.



Press the **Confirm** button for acknowledgement.

In the manual defrosting mode, pressing the on/off button, the following prompt window comes up on the manual operator.

Press the **Confirm** button for acknowledgement.

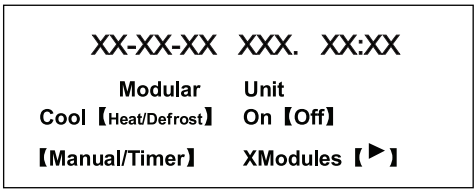
- Timer mode

After the unit is energized or reset, press the **Manual Mode** to turn on/off the unit.

5.3.2 Menu Operation Instructions

◆ Home page

When the controller is powered on, the microcomputer will make a 3-second automatic detection and the LCD on the wired controller will display the following content.



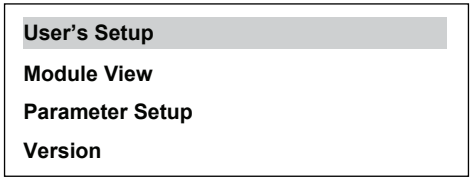
The content of **default home page menu** is dependent on system state. XX stands for year, month, day, hour and minute. Only one item or none is displayed in the "【】", representing the start/stop state of the system, starting method and quantity of linked modules. Presence of the "▶" at the end means the system is at fault.

After entering into a menu item, if no operation is made on the Wired Controller within 10 minutes, the system will automatically go back to the above **default home page menu (Home Page)**.

Press the **Exit button** on the wired controller at any time for enough times, you can go back the default home page menu as shown above.

◆ Main Menu

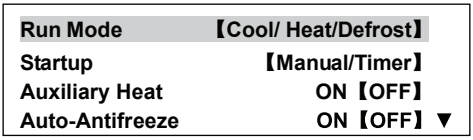
When home page is present on the screen as shown in the above drawing, press the **Confirm** to enter into the **Main Menu** and the following items is displayed on the screen.



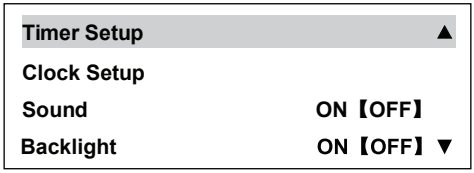
Press the **up or down selection button** to choose required function and press the **Confirm** button to go to the page.

(1) User's Setup

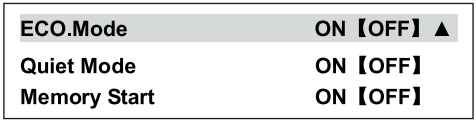
The following is basic settings most common for users. On the Main menu, select the **User's Setup** and press the **Confirm** to go to the sub-menu, as shown in the following.



Page 1



Page 2



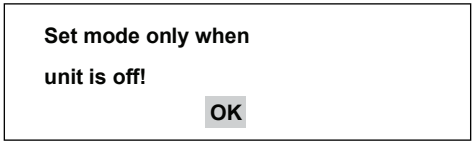
Page 3

Press the **Up or Down selection button** to choose a needed function and press the **Confirm** to go to or confirm the selection. The subsequent "**ON**" or "**OFF**", which means the function is selected or not.

- Run Mode Set

Select the **Run Mode** and press the **Confirm** button, and the display on the screen is as follows:

Press the **Confirm** button to acknowledge a selected object, press the **Up or Down selection button** to change a selected object, and press the **Exit** button to cancel the model set. Different models have different display modes.If you is setting a mode in the startup state, the following prompt will appear:



Press the **Confirm** button for acknowledgement.

- Startup mode set

Select the **Startup** and press the **Confirm** button. The start/stop mode can be converted between the manual mode and the timing mode.

- Auxiliary Heater Function Set

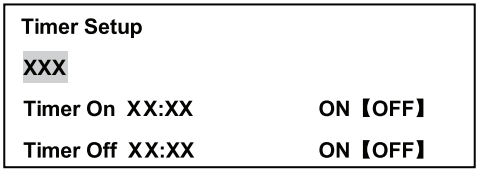
Select **Auxiliary Heat** and press the **Confirm** button, and the subsequent **"ON" or "OFF"**, which means the function is selected or not.

- Auto-Antifreeze Protection Set

Select **Auto-Antifreeze**, press Confirm, and the subsequent **"ON" or "OFF"**, which means the function is selected or not.

• Timer Setup

Select **Timer Setup** and press **Confirm** to go to the page as shown in the following drawing:



Press **Confirm** to change a selected object. Press **Up or Down** to change value or state of a selected object. This is timing on/off time and effective status each week. **"OFF"** represents the time set is invalid and **"ON"** means a valid time set. Press the **Exit** button to quit the page and go back to the previous menu and save set values.

• Clock Setup

Select **Clock Setup** and press the **Confirm** button to go to the page. The following display is present on the screen.

Press the **Confirm** button to change a selected object. Press the **Up or Down** button to change value or state of a selected object. Press the **Exit** button to quit the page and go back to the previous menu and save set values.

• Sound On set

Select **Sound**, press the **Confirm** button, and the subsequent **"ON" or "OFF"**, which means the function is selected or not.

• Backlight On Set

Select **Backlight,** press the **Confirm** button, and the subsequent **"ON" or "OFF"**, which means the function is selected or not.

• ECO.Mode Set

Select **ECO.Mode**, press the **Confirm** button, and the subsequent **"ON" or "OFF"**, which means the function is selected or not.

• Quiet Mode Set

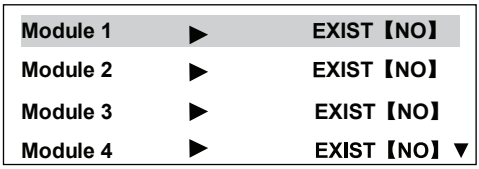
Select **Quiet Mode**, press the **Confirm** button, and the subsequent **"ON" or "OFF"**, which means the function is selected or not.

• Memory Start Set

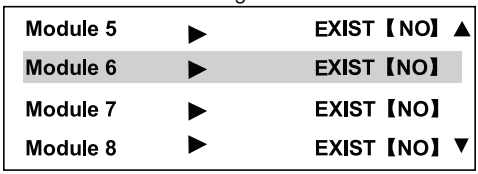
Select **Memory Start**, press the **Confirm** button, and the subsequent **"ON" or "OFF"**, which means the function is selected or not. The function is for selecting whether the unit will memorize its operation state if power supply is shut down.

(2) Module View

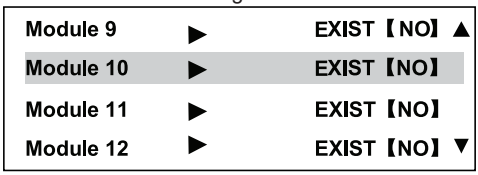
When the **Main Menu** is present on the screen, select **Module View**, press the **Confirm** to go to the pages as shown in the following drawing.



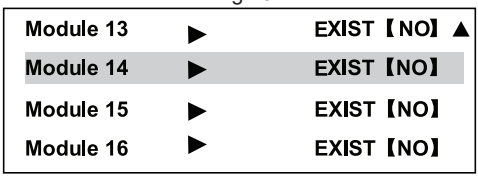
Page 1



Page 2



Page 3



Page 4

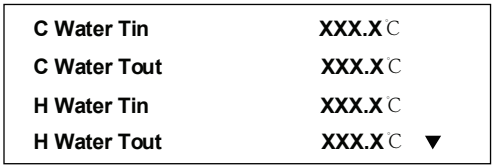
Press the **Exit** to quit the page and go back to the previous menu. Press the **Up or Down** button to select a needed module and press the **Confirm** button to go to corresponding page.

A module followed with " ▶" means having a failure. The following menu will display after going to the module.

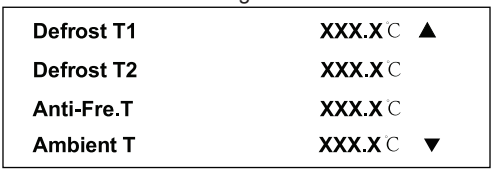
Press the **Exit** button to quit the page and go back to the previous menu. Press the **Up or Down** selection button to select a needed function and press the **Confirm** to go to corresponding page. "**X**" stands for one number of "1~16", meaning number of the selected module. The " ▶" following the **State View** represents the module provides auto freeze protection operation or defrosting operation. The " ▶" following the **Error View** represents the module is at fault.

• Temperature View

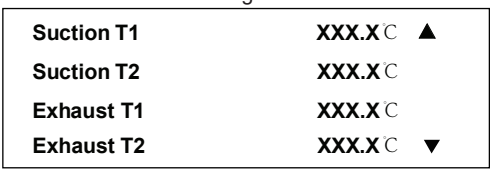
The function is for checking temperature at various temperature points. Select **Temp. View** and press the **Confirm** button to go to the pages as shown in the following drawings.



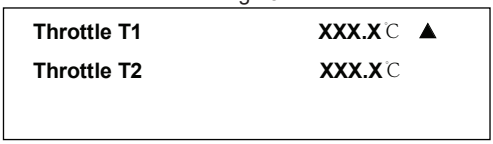
Page 1



Page 2



Page 3



Page 4

Press the **Up or Down** selection button to convert among the above four pages. Press the Exit button to quit the menu page and go back to the previous menu.

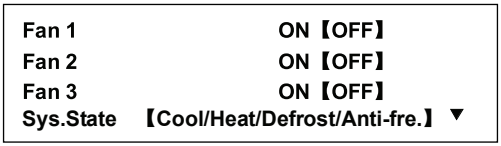
When **page 1** is present on the screen, press the **Reset** button and the **Exit** button simultaneously for 3 seconds, and **C Water Tin** and H Water Tin, as displayed previously, will be converted to **C AVER.Tin** and **H AVER.Tin**. And press again the **Reset** button and the Exit button simultaneously for 3 seconds, and **C Water Tin** and **H Water Tin** will be displayed again. As such, display can be converted between water inlet temperature and water inlet average temperature.

⚠NOTE

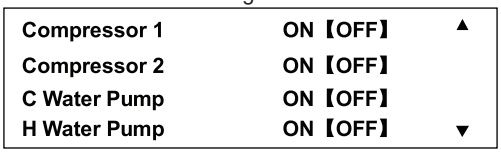
• Above temperature display is dependent on unit model. If the temperature sensor is not existent for a certain model, “NA” would be present on the display zone for corresponding temperature point.

- State View

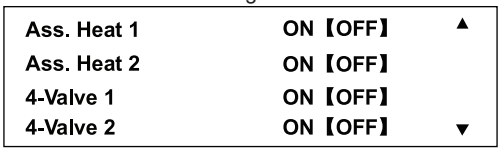
Used for checking the on/off status of motors. Select the **State View** and press the **Confirm** to go to the pages as shown in the following drawings.



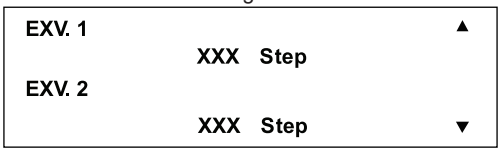
Page 1



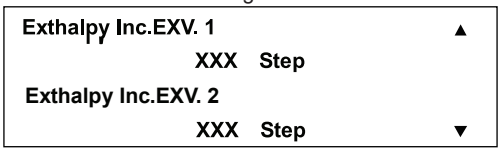
Page 2



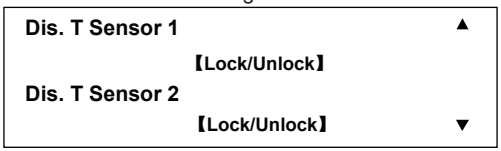
Page 3



Page 4



Page 5



Page 6

Page 7

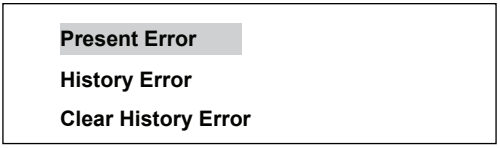
Press the Up or Down selection button to convert among the above pages. Press the **Exit** button to quit the menu page and go back to the previous menu.

⚠NOTE

- Above Items display is dependent on unit model. If this Item is not existent for a certain model, "NA" would be present on the display zone for corresponding Item.

• Error View

Used for checking the failure status of the system. Select the **Error View** and press the **Confirm** to go to the pages as shown in the following drawings.



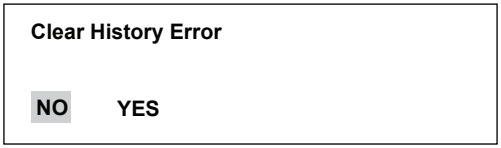
Press the **Exit** button to quit the page and go back to the previous menu. Press the **Up or Down** selectionbutton to choose a needed module. When **Present Error** or **History Error** is selected, press the Confirm to go to the following interface.

"**XXXXXX**" are possible failures as listed in the following:

Comp.1 HP Pro	**Dis.T Sensor2 Mal.**
Comp.1 OverLoad Pro	**C Water-in Sensor**
Fan1 OverLoad Pro	**C Water-out Sensor**
Sys.1 Dis.HighTemp.	**Anti-Frozen Sensor**
C Water Flow Switch	**Defrost T Sensor1**
Fan3 OverLoad Pro	**Defrost T Sensor2**
Jumper Error	**Ambient T Sensor**
Comp.2 HP Pro	**Dis.T Sensor1**
Comp.2 OverLoad Pro	**Dis.T Sensor2**
Fan2 OverLoad Pro	**Thr. Valve1 Sensor**
Sys.2 Dis.HighTemp.	**Thr. Valve2 Sensor**
H Water Flow Switch	**Suction T Sensor1**
Comp.1 LP Pro	**Suction T Sensor2**
Comp.2 LP Pro	**LP Sensor1 Error**
User Anti-Fire Pro	**LP Sensor2 Error**
Dis.T Sensor1 Mal.	**H Water-in Sensor**
	H Water-out Sensor

If the last line on the menu is followed with a "▼", more failures are available below. You can press the **Down** selection button for reading more failures. If the first line is followed with a "▲", more failures are available above. You can press the **Up** selection button for reading more failures. Press the **Exit** button to go back to the previous menu. Only the lasted four failures are remained even if quantity of history failures is more than 4.

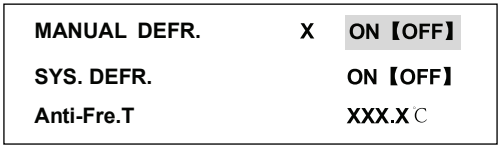
When the display is in **Error View**, select **Clear History Error** and press the **Confirm** button to go to the following interface.



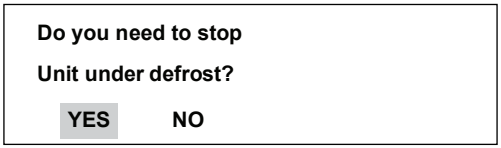
Press the Up or Down selection button to convert between **NO** and **YES**. Press **YES** to confirm and press **NO** to quit the menu and go back to the previous menu.

- Manual Defrost

Used for starting or stopping manual defrosting. Select **Manal Defrost** and press **Confirm** to go to the following page.



Press **Confirm** to start or stop manual defrost and press **Exit** to quit the interface and go back to the previous menu.When manual defrost is on and the two systems do not stop defrosting completely, the following prompt will come up.



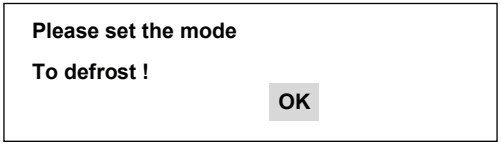
Press **Up or Down** button to convert between **YES** and **NO**, press Confirm for acknowledgement, press Exit to quit the menu and go back to the previous menu.

⚠NOTE

- Manual defrost is not allowed for two modules simultaneously. If manual defrost is started for one module and such function is started for another module, the following prompt will appear:

Press **YES** for acknowledgement.

If manual defrost is initiated for a certain module under non-manual defrost mode, the following prompt will be present:



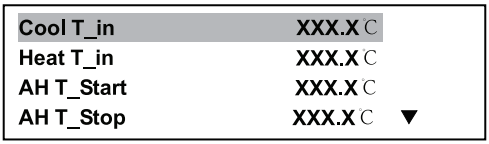
(3) Parameter Setup

On the **Main Menu** on the screen, select **Parameter Setup** and press **Confirm** to go to the page as shown in the following drawing.

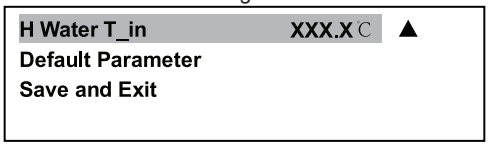
Press **Exit** to quit the page and go back to the previous menu. Press **Up or Down** selection button to select a needed setting interface.

- User-level Parameter Set

Select the menu and confirm the selection for going to **User Para. Setup** menu. Press the **Up or Down** selection button to select the parameter to be modified and press **Confirm** to go to the modification page. Press the **Up or Down** selection button for entering parameters and press **Confirm** or **Exit** to go back to the parameter set menu. Other parameters can be modified in the same way. After entered Default Parameter option, System will inquire whether use **Default Value**, if **YES** is choosed, then the parameters will be modified to Factory Default Value。After modification, press the **Up or Down** selection button to save parameter and quit the item. A prompt for asking whether to save the modification comes up again on the screen. Select Confirm to save it and go back to the Main menu. Please note that only in the above exit way can modifications be saved.



Page 1



Page 2

⚠NOTE

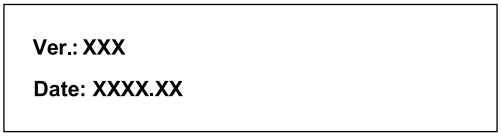
- Above Items display is dependent on unit model. If this Item is not existent for a certain model, “NA” would be present on the display zone for corresponding Item.

- System-level Parameter Set

User shall not use the function unless under instruction of debug personnel if necessary, to prevent an accident. Code entry is essential for operating the function. Button points on how to operate: select the menu and confirm the selection, and a prompt of code entry appears on the screen; press the **Up and Down** selection buttons to enter correct password, press **Confirm** to confirm it, and go to Parameter Set Menu; press the **Up and Down** selection buttons to select parameters to be modified, press **Confirm** to go to modification interface, press the **Up and Down** selection buttons to enter parameter value, and press **Confirm** or **Exit** to go back to the Parameter Set menu; other parameters can be modified in the same way; After entered Default Parameter option, System will inquire whether use **Default Value,** if **YES** is chosen, then the parameters will be modified to **Factory Default Value**. after modification, press the **Up and Down** selection buttons to select **Save and Exit** item under the Parameter Set menu, and a prompt whether to save the modified values comes up again on the screen, and if you need to save them, you can select **OK** and then press **Confirm** to save modifications and go back to the Main menu. Please note that only in the above exit way can modifications be saved.

(4) Version Information

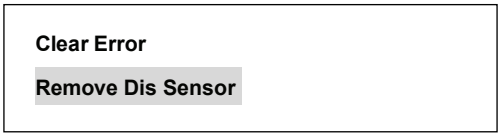
Used for checking version number of software and hardware of the wired controller. On the **Main menu** on the screen, select **Version** and press **Confirm** to go to the page as shown in the following drawing.



Press **Exit** to quit the page and go back to the previous menu.

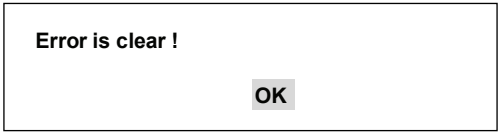
5.4 Reset (for erasing error)

On any interface, press **Reset**, the following page appears:



Press **Exit** to go back to the previous interface and press **Confirm** to select function as shown in the following:

5.4.1 Erasing Error



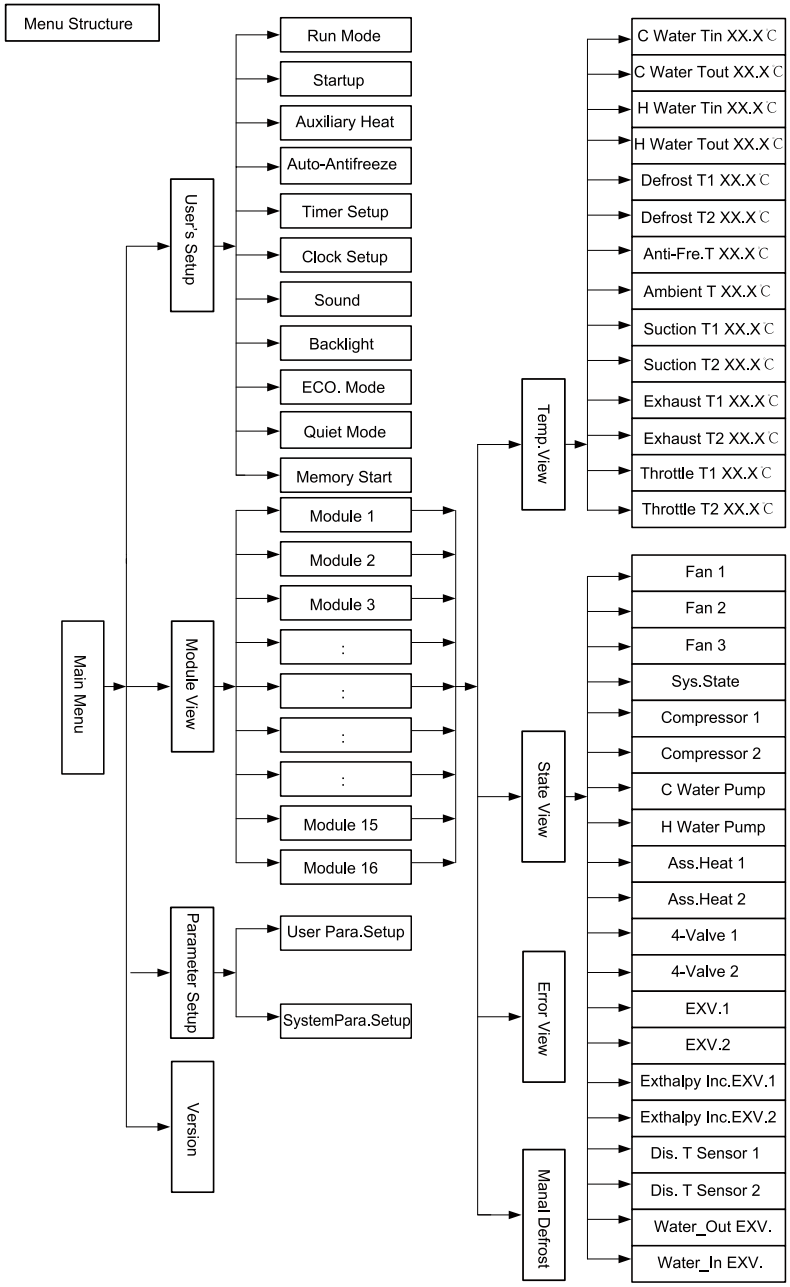
Press **Confirm** to confirm it and go back to the previous page.

5.4.2 Relieve Discharge Temp. Sensor locking

Press **Confirm** to go to Code Entry page and enter correct password to go to the following page.

Press Confirm to confirm it and go back to previous page.

5.5 Menu Structure



Menu Structure Explanation

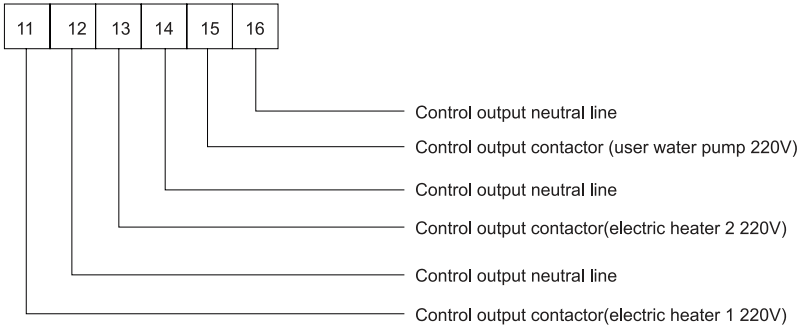
Menu Structure	Explanation
User's Setup	Function setting
Run Mode	Running modes selection
Startup	Startup and stop selection
Auxiliary Heat	Auxiliary heat function selection
Auto-Antifreeze	Auto anti-freezing function selection
Timer setup	Timer setting
Clock Setup	Time setting
Sound	Buttons sound setting
Backlight	Backlight turn on setting
ECO. Mode	Energy saving mode setting
Quiet Mode	Quiet mode setting
Memory Start	Memory function setting when power on/off
Module View	Corresponding modular's parameters/status checking
Temp. View	Corresponding modular's temperatures checking
C Water Tin	Water inlet temperature checking
C Water Tout	Water outlet temperature checking
H Water Tin	Hot water inlet temperature checking
H Water Tout	Hot water outlet temperature checking
C AVER. Tout	Water inlet modular average temperature checking
H AVER. Tout	water inlet modular average temperature checking
Defrost T1	Defrosting temperature 1 checking
Defrost T2	Defrosting temperature 2 checking
Anti-Fre.T	Anti-Freeze temperature checking
Ambient T	Ambient temperature checking
Suction T1	Suction temperature 1 checking
Suction T2	Suction temperature 2 checking
Exhaust T1	Exhaust temperature 1 checking
Exhaust T2	Exhaust temperature 2 checking
Throttle T1	Throttle temperature 1 checking
Throttle T2	Throttle temperature 2 checking
State View	Corresponding modular status checking
Fan 1	Fan motor 1 status checking
Fan 2	Fan motor 2 status checking

Fan 3	Fan motor 3 status checking
Sys.State	Units system status checking
Compressor1	Compressor 1 status checking
Compressor2	Compressor 2 status checking
C Water Pump	Water pump status checking
H Water Pump	Hot water pump status checking
Ass. Heat 1	Auxiliary electric heating 1 status checking
Ass. Heat 2	Auxiliary electric heating 2 status checking
4-Valve 1	Four-way valve 1 status checking
4-Valve 2	Four-way valve 2 status checking
EXV. 1	Electric Expansion valve 1 number of steps checking
EXV. 2	Electric Expansion valve 2 number of steps checking
Exthalpy Inc.EXV. 1	Exthalpy electric expansion valve 1 number of steps checking
Exthalpy Inc.EXV. 2	Exthalpy electric expansion valve 2 number of steps checking
Dis. T Sensor 1	Exhaust sensor 1 status checking
Dis. T Sensor 2	Exhaust sensor 2 status checking
Water_Out EXV.	Water-out electromagnetic valve status checking
Water_In EXV.	Water-in electromagnetic valve status checking
Error View	Error checking
Comp.1 HP Pro	Compressor 1 high pressure protection
Comp.1 OverLoad Pro	Compressor 1 over current protection
Fan1 OverLoad Pro	Fan motor 1 over current protection
Sys.1 Dis.HighTemp.	System 1 air exhaust high temp. protection
C Water Flow Switch	Water flow switch protection
Fan3 OverLoad Pro	Fan motor 3 over current protection
Jumper Error	Jumper error
Com.2 HP Pro	Compressor 2 high pressure protection
Comp.2 OverLoad Pro	Compressor 2 over current protection
Fan2 OverLoad Pro	Fan motor 2 over current protection
Sys.2 Dis.HighTemp.	System 2 exhaust high temperature protection
H Water Flow Switch	Hot water flow switch
Comp.1 LP Pro	Compressor 1 low pressure protection
Comp.2 LP Pro	Compressor 2 low pressure protection
User Anti-Fire Pro	User side anti-freezing protection
Dis.T Sensor 1 Mal.	Exhaust sensor 1 fail

Dis.T Sensor 2 Mal.	Exhaust sensor 2 fail
C Water-in Sensor	Water in sensor malfunction
C Water-out sensor	Water out sensor malfunction
Anti-Frozen Sensor	Anti-freezing sensor malfunction
Defrost T Sensor1	Defrosting sensor 1 malfunction
Defrost T Sensor2	Defrosting sensor 2 malfunction
Ambient T Sensor	Ambient sensor malfunction
Dis.T Sensor1	Air exhaust sensor 1 malfunction
Dis.T Sensor2	Air exhaust sensor 2 malfunction
Thr. Valve1 Sensor	Throttle valve 1 sensor malfunction
Thr. Valve2 Sensor	Throttle valve 2 sensor malfunction
Suction T Sensor1	Suction sensor 1 malfunction
Suction T Sensor2	Suction sensor 2 malfunction
LP Sensor1 Error	Low voltage sensor 1 malfunction
LP Sensor2 Error	Low voltage sensor 2 malfunction
H Water-in Sensor	Hot water in sensor malfunction
H Water-out Sensor	Hot water out sensor malfunction
Parameter Setup	Parameters setting
User Para.Setup	Parameters setting for users
Cool T_in	Water inlet temperature setting
Heat T_in	Heating water inlet temperature setting
AH T_Start	Auxiliary Heat startup temperature setting
AH T_Stop	Auxiliary Heat stop temperature setting
H Water T_in	Hot water inlet temperature setting
System Para.Setup	System parameters setting
DEF.T_Start	Defrosting startup temperature
DEF.T_Stop	Defrosting stop temperature
DEF.Space	Defrosting interval
DEF.Time	Defrosting time
Anti-Freeze	Anti-freezing temperature
Anti-Heat	Anti-overheat temperature
Temp.Rate	Water inlet temperature change rate
Com.Space	Compressor interval

6 Electric Control Cabinet

6.1 Wiring for Output Control Lines



Note:

The output control lines of the auxiliary electric heater 1, auxiliary electric heater 2 and the water pump AC contactor are allowed to the terminal boards 11/12/13/14/15/16 of any module.

6.2 Specification of Power Cord and Air Switch

Model	Power Supply	Min. sectional area of the power cable (mm^2)			Capability of the Air Switch (A)
		Live Line	Neutral Line	Earth Line	
LSQWRF65M/D-M LSQWRF65M/NaD-M	380-415V 3N 50Hz	16	16	16	63
LSQWRF80M/D-M LSQWRF80M/NaD-M		25	16	16	80
LSQWRF130M/D-M LSQWRF130M/NaD-M		50	25	25	125
LSQWRF160M/D-M LSQWRF160M/NaD-M		70	35	35	160

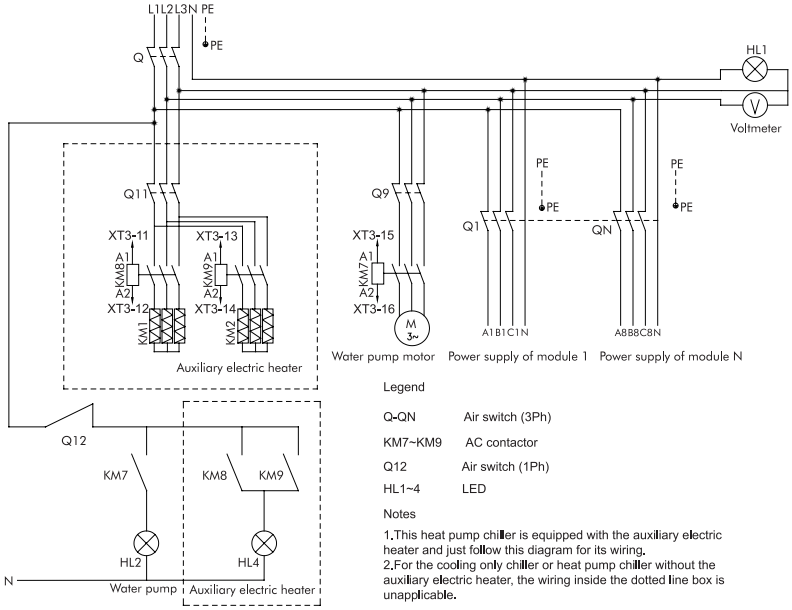
Notes:

(a) The specifications of the breaker and power cable listed in the table above are determined based on the maximum power (maximum amps) of the unit.

(b) The specifications of the power cable listed in the table above are applied to the conduit-guarded multi-wire copper cable (like, JYV copper cable, consisting of PV insulated wires and a PVC cable jacket) used at 40℃ and resistible to 90℃ (see IEC60364-5-523:1999). If the working condition changes, they should be modified according to the related national standard.

(c) The specifications of the breaker listed in the table above are applied to the breaker with the working temperature at 40℃ . If the working condition changes, they should be modified according to the related national standard.

6.3 Wiring of the Electric Control Cabinet



6.4 Filed Wiring

◆ Safety Code

(1) All wiring shall comply with applicable codes and engineering requirements.

(2) All field wiring shall be performed by the qualified electrician.

(3) Never perform wiring before the power supply is cut off.

(4) Any damage caused by the improper external wiring shall be at the installer's expense.

⚠WARNING

• Only copper conductor is allowed.

◆ The power cord is wired into the internal electric box

(1) The power cord must be routed inside the conduit.

(2) The power cord must enter the electric box through a rubber or plastic ring to avoid any damaged caused by the sharp edge of the metal sheet.

(3) The power cord close to the electric box must be attached securely to prevent the terminal block of the electric box affected by the outside force.

(4) The unit shall be grounded reliably and never connect the ground wire with the gas fuel pipe, water pipe, lightening rod or telephone line.

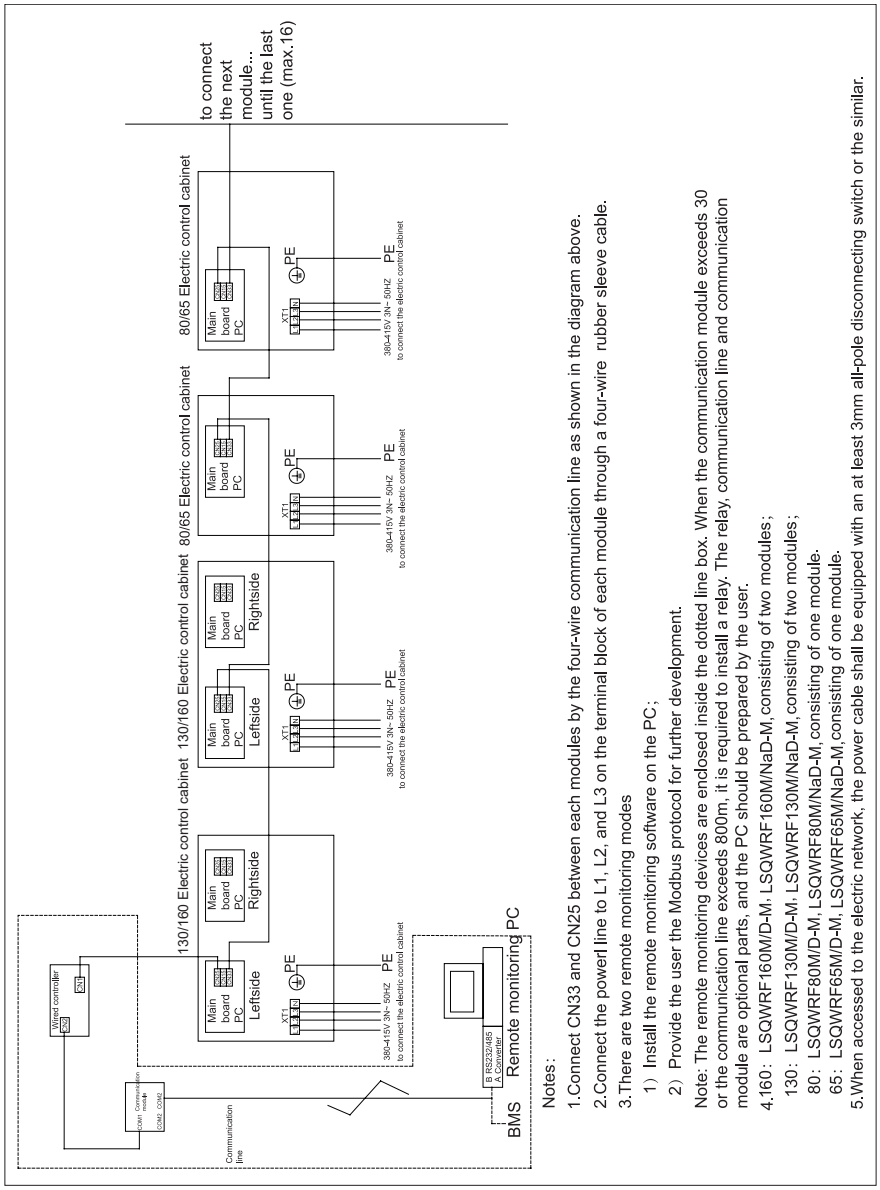
◆ Control Line

(1) The field supplied control line shall be at a minimum 1mm^2.

(2) The electric box will send the control signal (220 AC, 5A) to control the chilled water pump and auxiliary electric heater, however, never do not drive them directly through the control signal but through their AC contactors.

(3) A reasonable length of the control line should be left outside the unit and the rest should be bundled and fed into the electric box.

6.5 Wiring betwween Chilled Modules



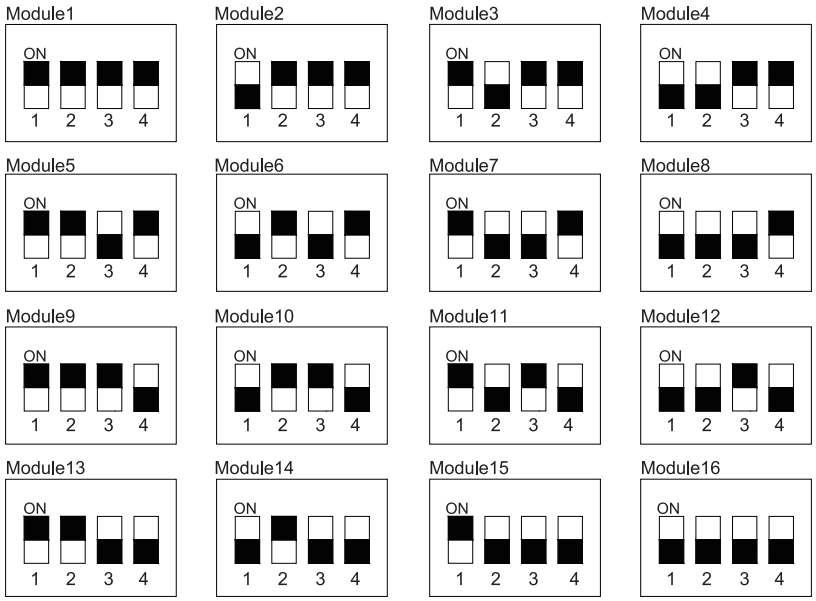
Notes:

1. Connect CN33 and CN25 between each modules by the four-wire communication line as shown in the diagram above.
2. Connect the powerl line to L1, L2, and L3 on the terminal block of each module through a four-wire rubber sleeve cable.
3. There are two remote monitoring modes
   1) Install the remote monitoring software on the PC;
   2) Provide the user the Modbus protocol for further development.

   Note: The remote monitoring devices are enclosed inside the dotted line box. When the communication module exceeds 30 or the communication line exceeds 800m, it is required to install a relay. The relay, communication line and communication module are optional parts, and the PC should be prepared by the user.
4. 160: LSQWRF160M/D-M: LSQWRF160M/NaD-M, consisting of two modules;
   130: LSQWRF130M/D-M: LSQWRF130M/NaD-M, consisting of two modules;
   80: LSQWRF80M/D-M, LSQWRF80M/NaD-M, consisting of one module.
   65: LSQWRF65M/D-M, LSQWRF65M/NaD-M, consisting of one module.
5. When accessed to the electric network, the power cable shall be equipped with an at least 3mm all-pole disconnecting switch or the similar.

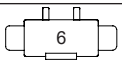
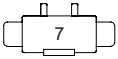
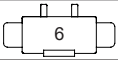
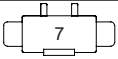
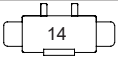
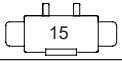
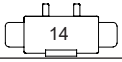
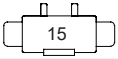
6.6 Setup of Toggle Switches on the Motherboard

Four bit toggle switches are used for indicating hardware address (1~16) of modules, with module No. displayed in turn on the panel as Module 1, Module 2, ……, Module 16. Toggle switches 1, 2, 3 and 4 are binary code, with 1 for the lowest bit and 4 for the highest bit. Comparison drawings are as follows (Caution: only in the condition of power supply shutoff can toggle switches be set):



6.7 Jumpers

When it is required to replace the main board, be sure the main board can match with the applicable jumpers.

LSQWRF65M/D-M	6	4202300106	
LSQWRF80M/D-M	7	4202300107	
LSQWRF130M/D-M	6	4202300106	
LSQWRF160M/D-M	7	4202300107	
LSQWRF65M/NaD-M	14	4202300114	
LSQWRF80M/NaD-M	15	4202300115	
LSQWRF130M/NaD-M	14	4202300114	
LSQWRF160M/NaD-M	15	4202300115	

7 Commissioning and Maintenance

The unit shall be maintained periodically by the skilled servicemen from Gree or a designed person under our professional guide to guarantee the unit operates reliably in a long term.

7.1 Check before Startup

Please finish the following steps before staring the system.

(1) Before energization, be sure the insulation resistance between the wiring terminal and ground complies with the local codes and regulations and check if the motor meets the insulation requirement with a resistance meter.

(2) Check if all connenctions are in good condition and clean.

(3) Close the main power switch.

(4) Check if the voltage between terminals keeps balance within deviation of 2%.

(5) Check if the power consumption of the unit complies with the rated value on the nameplate.

(6) Be sure the power cord is capable of carrying the rated current on the nameplate.

(7) Be sure all valves of water and refrigerant pipeline are placed properly.

(8) Reset all hand reset control elements.

(9) Be sure all sensor are placed installed properly.

7.2 Requirements on Water System and Water Quality

Be sure to open the water pump after the water system has been flushed times and the water quality has met the requirements and meanwhile be sure the water flow rate and pressure are within the allowable range.

The industrial water generates little scale when used as the refrigeration medium while the well or river water will generate much more scale and sands which would reduce the flow rate of the evaporate and cause freezing. Therefore, the well or river water must be firstly treated with the water softening equipment and analyze the PH, heat conductivity, Cl ion, and S ion before use.

Water Quality Requirement				
Items	Chilled water		Potential effect	
	Circulating water (<20℃)	Supply water	Corrosion	Scale
PH	6.5~8.0	6.5~8.0	○	○
Heat Conductivity	<200uV/cm(25℃)	<200uV/cm(25℃)		
Cl ion	<50ppm	<50ppm	○	
SO_4 ion	<50ppm	<50ppm	○	
Fe	<1ppm	<0.3ppm	○	○
Basic ion	<50ppm	<50ppm		
Hardness	<50ppm	<50ppm		○
S ion	/	/		
Amonia ion	/	/		
Si	<30ppm	<30ppm		○
Na ion	/	/		

NOTE: “○” indicate possible corrosion or scale.

Even if the water qualify is under the strict control, calcium dioxide or other minerals will still form on the surface of the heat exchanger which will affect the heat exchange efficiency and be eliminated by formic acid, lemon acid, acetic acid or other organic acid.

7.3 Trial Run

See the operation manual of the applicable controller for more details.

(1) When the unit has not been used for a long period or the ambient temperature is quiet low, keep the unit energized 8 hours before startup to preheat the crankcase of the compressor so as evaporate the liquid refrigerant inside the compressor which otherwise would cause adverse effect on the compressor.

(2) Be sure valves are opened properly to prevent the compressor from being damaged by the abnormal high pressure.

(3) Carefully adjust the flow control valve and the shutoff valve of the chilled water system to make the flow rate meet the rated value on the nameplate.

(4) Turn on the wired controller to check the error record. If any error exists, eliminated it before restarting the unit.

(5) When the trial run takes 30 minutes and the entering/leaving water temperature approaches the regulated range, It is able to set the entering/leaving water temperature based on the actual load. The unit should be restarted at least 10 later after the shutdown. Then, check the set points of the controls in accordance with the instructions of the control system.

⚠WARNING

- During flushing, be sure the control panel on the main unit is disabled to start/stop the water pump.
- Do not start up the unit before the water system has not yet been drained up.
- Do not restart the unit when the unit has been stopped less than for 6 minutes.

7.4 Routine Startup/Shutdown

It is recommended to start the system through the wired controller in the sequence of the water pump first and then the main unit, and stop the system in a reverse sequence. Remember to keep the unit energized 8 hours before startup to preheat the crankcase of the compressor so as evaporate the liquid refrigerant inside the compressor which otherwise would cause adverse effect on the compressor.

⚠NOTE

- When the water temperature is lower than 15~20℃ , do not start the terminal equipment until the water temperature reaches higher than 35℃ for guaranteeing a sound and reliable operation.

7.5 Maintenance during Long-term Downtime

When the chiller is going to be stopped for a long period, maintenance listed below shall be performed:

(1) Take the leakage test for the refrigerant tube. If leakage occurs, eliminate it.

(2) Maintain the water pump and air conditioning divides in accordance with the suggestions provided by the manufacturer.

(3) Drain the water system by opening the discharge valve (especially in winter) to avoid frostbite on the shell and tube.

(4) Switch off the power supply of the chiller and the water pump.

(5) Clean and dry the inside and outside surface of the chiller. Then, cover it against dust.

7.6 Startup after Long-term Shutdown

Preparations shall be taken when starting up the chiller which has not been used for a long period.

(1) Completely check and clean up the chiller.

(2) Clean the water piping system.

(3) Check the water pump.

(4) Tighten all connectors.

(5) Take the leakage test for all piping. If leakage occurs, eliminate it.

(6) Regulate the water flow through the balance valve and check the water pressure.

(7) Check if the oil circulation goes properly through the sight glass located on the compressor.

(8) Check if the fan rotates properly.

(9) Check if the system vibration and noise are acceptable.

7.7 Parts Replacement

Only parts supplied by Gree can be replaced instead of similar parts supplied by others.

7.8 Refrigerant Charging

Refrigerant charging should be done based on the discharge and suction pressure. An air tight test must be taken on the condition refrigerant leaks or some part is required to be replaced. Refrigerant charging comes into two cases stated below.

◆ Complete charging

In this case, take a leakage test by charging hi-pressure nitrogen (15~20kg) or refrigerant into the system. If soldering is required, note that gas inside the system must be expelled firstly. The whole system must be dried and vacuumed prior to charging.

(1) Connect the manifold gauge.

(2) Vacuum the system with the vacuum pump.

(3) After the system pressure reaches the required value (<80Pa) for more than 30 minutes and keeps below 100Pa, charge refrigerant at the low pressure side as per the rated specification on the nameplate.

(4) Refrigerant charge will be affected by the ambient temperature. When charged refrigerant is under the required amount, add in accordance with the other charging case stated below.

◆ Adding

Connect the refrigerant charging port at the lower pressure side to the refrigerant tank and install a manifold gage.

(1) Circuit the chilled water and start up the unit.

(2) Charge refrigerant vapor into the system slowly and check the suction and discharge pressure.

⚠WARNING

- When performing the leakage and air tight test, never charge oxygen, acetylene and other flammable and toxic gases but only hi-pressure air, nitrogen or refrigerant.
- Mineral scale on the surface of the heat exchanger will affect the heat exchanging efficiency and increase the water resistance and lower the refrigeration capacity. Therefore, it should be cleared away through dilute acid. Note that contents of different water quality vary and should be treated with different type of acid by the qualified chemical company.

7.9 Removal of the Compressor

Please take the steps below when the compressor is required to be removed.

(1) Cut off the power supply.

(2) Recover the refrigerant in a reasonable speed to prevent oil from being drawn out.

(3) Remove the power cord and the temperature sensor.

(4) Unsolder the soldering spots of the suction and discharge lines.

(5) Remove the screw bolts of the compressor and check the oil quality and accumulator.

(6) Remove the compressor.

(7) Clean up the pipeline.

7.10 Freeze Protection

When the flow passage of the shell-and-tube heat exchanger is frozen up, it would cause serious damage to the heat exchanger, such as cracking and leakage which are out of warranty, therefore, the user should take measures stated below for freeze protection.

(1) Under subzero conditions, it is necessary to shut down the chiller installed outdoor and then drain the evaporator completely.

(2) Failure of the chilled water flow switch and the anti-freezing temperature sensor will cause the tube frozen up, so the flow switch shall be interlocked with the chiller.

(3) When charging or recovering the refrigerant, the evaporator would crack because of frostbite provided the refrigerant pressure inside the evaporator is under 0.4MPa. Therefore, be sure to keep the water flow continually inside the evaporator or drain it completely.

7.11 Routine Maintenance

Routine maintenance shall be performed periodically by the qualified technician so as to extend the service life of the unit and lower the possibility of occurrence of faults.

Record and keep the running status of the unit to facilitate troubleshooting for the servicemen.

◆ Daily Maintenance

(1) Check the circulating water pump and the flow rate.

(2) Check the voltage and power supply.

◆ Weekly Maintenance

(1) Check if the oil level keeps more than half of the sight glass, however the oil shall not be overcharged.

(2) Check the main unit, like if the compressor runs with abnormal noise, if the distribution box is attached securely and if the pipeline generates abnormal vibration or leakage.

(3) Record key parameters, like pressure, pressure etc.

◆ Quarterly Maintenance

(1) Check the electric wiring and electric insulation.

(2) Check and adjust the set point of the temperature.

◆ Yearly Maintenance

(1) Check valves and pipeline of the water system. If necessary, clean the filter and analyze the water quality. If the water circuit needs to be cleaned, please consult the assistance of the qualified personnel.

(2) Clean the corrosive surface and paint it again, and check if the door of the electric control cabinet is tightly closed.

(3) Check if the pipeline is secured and so the water pump and fittings. Additionally, check if the refrigerant charge is sufficient, if not, add some.

(4) Perform the items for weekly maintenance.

(5) Check if the control device is set and acts properly.

(6) Check if the refrigerant pipe is attached securely.

(7) Check if the motor coil is insulated.

7.12 Precautions

(1) Take periodic maintenance to the unit to guarantee normal operation.

(2) Once refrigerant leaks, shut down the unit immediately and contact the serviceman. No open fire is allowed in that refrigerant will decompose into toxic gas.

(3) Switch off the main power supply in case of a fire hazard and extinguish it with effective measures.

(4) The working environment shall be far away from the inflammable substance, such as petroleum and alcoholic etc. to avoid explosion.

(5) The unit is allowed restarted only after any malfunction is eliminated, otherwise refrigerant or chilled water would leak, in which case, it is imperative to turn off all switches or the main power supply.

(6) Do not short-circuit the protection device, otherwise it would cause some malfunction.

8 Troubleshooting

8.1 Error Lists and Troubleshooting Measures

Error	Possible Causes	Troubleshooting Measures
Too high discharge pressure	• There is air or other incondensable gas inside the system • Fins of the condenser are dirty or clogged • The air flow for condensing is insufficient or the fan of the condenser runs improperly • The suction pressure is too high • Refrigerant is charged too much • Ambient temperature is too high	• Expel incondensable air and vacuum the system if necessary • Clean fins • Repair the fan of the condenser • See “Too high suction pressure” • Let part of refrigerant out
Too low discharge pressure	• The suction pressure is too low • Refrigerant leaks or is charged insufficiently	• See “Too low suction pressure” • Take leakage test and add refrigerant
Too high suction pressure	• The discharge pressure is too high • Refrigerant is charged exceedingly • Liquid refrigerant flows from the evaporator to the compressosr • The entering chilled water temperature is higher than the allowable value	• See “Too high discharge pressure” • Let the exceedance of refrigerant out • Check and regulate the expansion valve and be sure the temperature sensor of the expansion valve is attached with the suction line closely and tightly insulated
Too low suction pressure	• The ambient temperature is too low • The check valve or the drier-filter is clogged • The expansion valve works improperly • Refrigerant is insufficient • The entering chilled water is lower than the setpoint • The chilled water flow is insufficient	• Replace the check valve or the drier-filter • Regulate the expansion valve properly or take a leakage test to the expansion valve • Take a leakage test and add refrigerant • Check the intallaiton • Check the entering/leaving water pressure and regulate the water flowrate
High pressure protection	• The ambient temperature is too high • The air flow for condensing is insufficient or the fan of the condenser malfunctions • The high-pressure swtichs malfunctions • Refrigerant is charged exceedingly	• Repair the fan of the condenser • Check the high pressure switch • Check the refrigeration charge and let the exceedance out

Overload protection	• The voltage is too high or too low • The discharge pressrue is too high or too low • The backwater temperature is too high • The overloaded elment malfunctions • The ambient temperateure is too high • The motor and wiring terminal is short-circuited	• Check the voltage which is required to be within the rated value ±20V and the exceedance of the phase difference to be within ±30% • Check the discharge pressure and figure out why • Check the backwater temperature and figure out why • Check the electric current of the compressor • Improve the ventilation • Check the corresponding resistance of the motor and the terminal
Internal over-temperature protection	• The voltage is too high or too low • The discharge pressure is too high • The entering chilled water temperature is too high • The internal overtemperature protection device malfunctions • Refrigerant is charged insufficiently	• Check the voltage which is required to be within the allowable range • Check the discharge pressure and figure out why • Check the entering chilled water and figure out why • Take the leakage test
Low pressure protection	• The check valve or the drier-filter is clogged • The expanson valve malfunctions • The low pressure switch malfunctions • Refrigerant is charged insufficiently	• Replace the check valve or the drier-filter • Adjust or replace the expansion valve • Check the low presure switch • Add refrigerant
Failure to startup	• The circuit breaker trips or the fuse is blown out • The control circuit fails to get through • There is no electric currrent • High or low pressure protection acts • The contact coil is blown out. • Power phase is wired improperly • The water system malfunctions and the flow switch is opened • An alarm is raised on the wired controller • The ON/OFF Timer is improperly set • The temperature sensor is set out of the set point	• Replace the damaged element • Check the wiring of the control system • Check the power supply • See “Too high discharge pressure”, “Too low discharge pressure”, “Too high discharge pressure”, and “Too low discharge pressure” • Replace the damaged element • Rewire the power phase • Check the water system • Check the alarm type and take countermeasures • Check and adjust the set point

⚠WARNING

Without commissioning, warranty will turned invalid under the following conditions:

- Refrigerant leaks in that the user personally opens some valve or pipe connector.
- The user personally dismantles the unit without Gree’s approval.
- The user personally powers the control cabinet or the compressor motor.
- The user personally charges oil or refrigerant to the unit.
- The user personally starts up the system.
- The user personally passes directly hot water or steam to the evaporator.
- The user fails to operate the unit following the instructions covered in this manual.

8.2 After-sales Service

When the unit in warranty has a quality issue or fails to operate properly under the allowable operation condition, please contact the local sales representative for free service.

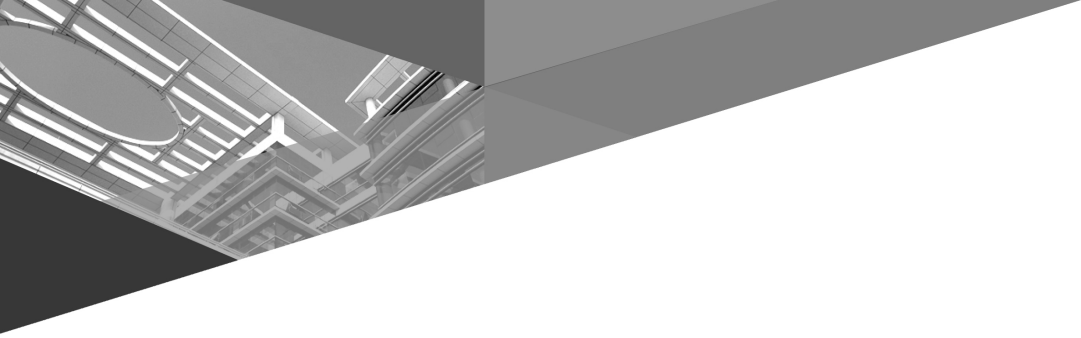
The user is required to designate personnel to take charge of the unit following the instructions covered in this manual, otherwise any maintenance cost caused by the improper operation will be at the user’s expense.

Appendix A: Inspection Records Prior to Commissioning

<table>
<tr><td rowspan="3">Installation</td><td colspan="5">Location</td><td colspan="3">Min. distance from barriers</td><td></td><td>>2m (Ref.)</td></tr>
<tr><td colspan="5">Foundation(Concrete/Steel frame)</td><td colspan="3">Shock absorber</td><td></td><td></td></tr>
<tr><td colspan="5">Arrangement</td><td colspan="3">Highest point and lowest point</td><td></td><td>>2m (Ref.)</td></tr>
<tr><td rowspan="23">Routine Check</td><td rowspan="6">Chilled water pipeline</td><td colspan="2">Water pump flow</td><td colspan="2">Shutoff valve (On/Off)</td><td colspan="2">Drain valve (On/Off)</td><td>Filter (On/Off)</td><td colspan="2">Air release valve (On/Off)</td></tr>
<tr><td colspan="2" rowspan="2"></td><td>Inlet</td><td>Outlet</td><td colspan="2" rowspan="2"></td><td rowspan="2"></td><td colspan="2" rowspan="2"></td></tr>
<tr><td></td><td></td></tr>
<tr><td colspan="2">Pressure gauge</td><td colspan="2">Thermometer</td><td rowspan="2">Flow switch state</td><td rowspan="2">Insulation state</td><td rowspan="2">Shutoff valve state</td><td>Flushing times</td><td>Water quality</td></tr>
<tr><td>Inlet</td><td>Outlet</td><td>Inlet</td><td>Outlet</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Load</td><td colspan="2">FCU</td><td>Air supply outlet</td><td>Air discharge state</td><td colspan="2">Air conditioning space insulation state</td><td>Refrigeration load state</td><td colspan="2"></td></tr>
<tr><td rowspan="4">Power supply</td><td colspan="2">Supply voltage (V)</td><td></td><td colspan="3">Allowable range 380~415V</td><td>Voltage fluctuation</td><td>%</td><td>Allowable value <5%</td></tr>
<tr><td colspan="5">Interphase insulation resistance MΩ</td><td colspan="4">Phase-ground insulation resistance MΩ</td></tr>
<tr><td>Rab</td><td>Rbc</td><td>Rac</td><td colspan="2">Min. allowable value</td><td>Rag</td><td>Rbg</td><td>Rcg</td><td>Min. allowable value</td></tr>
<tr><td></td><td></td><td></td><td colspan="2">1MΩ</td><td></td><td></td><td></td><td>1MΩ</td></tr>
<tr><td rowspan="3">Insulation of the whole unit (main air switch)</td><td colspan="5">Interphase insulation resistance MΩ</td><td colspan="4">Phase-ground insulation resistance MΩ</td></tr>
<tr><td>R12</td><td>R23</td><td>R13</td><td colspan="2">Min. allowable value</td><td>R1g</td><td>R2g</td><td>R3g</td><td>Min. allowable value</td></tr>
<tr><td></td><td></td><td></td><td colspan="2">1MΩ</td><td></td><td></td><td></td><td>1MΩ</td></tr>
<tr><td rowspan="3">Insulation of the compressor (terminal block)</td><td colspan="5">Interphase insulation resistance MΩ</td><td colspan="4">Phase-ground insulation resistance MΩ</td></tr>
<tr><td>R12</td><td>R23</td><td>R13</td><td colspan="2">Min. allowable value</td><td>R1g</td><td>R2g</td><td>R3g</td><td>Min. allowable value</td></tr>
<tr><td></td><td></td><td></td><td colspan="2">1MΩ</td><td></td><td></td><td></td><td>1MΩ</td></tr>
<tr><td rowspan="2">Refrigeration system</td><td>Repair brazing</td><td></td><td>Vacuuming (MPa)</td><td></td><td>Max. allowable value</td><td>0.0080MPa</td><td>Duration (min)</td><td></td><td>>30min</td></tr>
<tr><td colspan="2">System I balance pressure(Mpa)</td><td colspan="2"></td><td colspan="2">System Ⅱ balance pressure (MPa)</td><td></td><td>Ambient temp (℃)</td><td></td></tr>
<tr><td rowspan="3">Control and protection devices</td><td colspan="2">Power supply monitor (3Ph)</td><td colspan="2">Leaving water temp (℃)</td><td colspan="3">Vacuuming stop time</td><td colspan="2"></td></tr>
<tr><td colspan="2">Setpoint</td><td>Setpoint</td><td>Deviation</td><td colspan="3">Setpoint</td><td colspan="2"></td></tr>
<tr><td colspan="2">380~415V</td><td colspan="2"></td><td colspan="3">5s</td><td colspan="2"></td></tr>
</table>

Appendix B: Trial Run and Commissioning Records

Trial Run	Pre-start	Water system	Direction		Water temp		Sufficient air discharge (Y/N)		
			Flow rate (T/h)				Full load (Y/N)		
			90% flow rate				Ambient temp (℃)		
	Startup	Start current (A)					Startup state (Normal/Abnormal)		
	10min after startup	System Ⅰ	Hi-pressure		Low-pressure		Chilled water (℃)	Entering	
								Leaving	
		System Ⅱ					Entering air temp.		
	30min after startup	System Ⅰ	Hi-pressure		Low-pressure		Chilled water (℃)	Entering	
								Leaving	
		System Ⅱ							
	Running state								
	Troubleshooting								
Commissioning	Flow control	Final flow rate (T/h)				Entering water temp (℃)		Nominal value: 12/7℃	
	Unloading state	System Ⅰ leaving water temp at shutdown (℃)		1st downtime (min)		Leaving water temp at 2nd startup (℃)		2nd downtime (s)	
		System Ⅱ leaving water temp at shutdown (℃)		Runtime (s)			Vacuuming time (s)		5s
	Unloading state	System Ⅰ leaving water temp at shutdown (℃)		1st downtime (min)		Leaving water temp at 2nd startup (℃)		2nd downtime (s)	
		System Ⅱ leaving water temp at shutdown (℃)		Runtime (s)			Vacuuming time (s)		5s
	Delivery	Operation training	Precautions			Emergency stop	Special service		
	Conclusion								



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