YORK®	YCWE Modular Water-Cooled Chiller
Installation, Operation and Maintenance Manual	FORM NO.: 6U6W-A01C-NB-EN

YCWE Modular
Water-Cooled Chiller
21RT-47RT

R410A Refrigerant

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Foreword

The production of the water-cooled water chiller unit shall strictly follow the design and production standards to ensure that the unit provides high-quality operation, high reliability and excellent adaptability.

This manual contains the information necessary for proper installation, commissioning, start-up and maintenance. For the best use of this equipment, please read this manual and various labels posted on units and components carefully before installing, starting or overhauling the machine.

Do not operate the machine if you do not fully understand the working principle of the unit, or don't have sufficient safety knowledge, and fail to take the relevant safety protection measures, so as to avoid personal danger and unit failure.

Therefore, we recommend that the installation and commissioning of the machine should be done by specially trained personnel.

The warranty coverage must meet the following conditions:
The installation must be carried out by trained professionals. The start-up of the machine must be carried out by professional maintenance personnel of the professional York Company Maintenance Service Center or designated special company personnel. Only use the various spare parts provided by York Company. All machine operation and maintenance items specified in this manual must be carried out in strict accordance with the specified time and frequency. The warranty shall automatically become invalid in case of violation of any of the above conditions.

The personnel responsible for the installation of the machine shall ensure the installation process is carried out safely and he/she shall also be responsible for the installation of all refrigerant pipelines, conduits, electrical installations and other necessary ancillary equipment.

York Company shall not be liable for any personal injury or machine damage caused by improper installation and commissioning, unnecessary maintenance, or non-compliance with the provisions and instructions in this manual.

Should you have any questions during the installation, please contact York Company and its various local offices.

Other Precautions

Inspection

Upon the receipt of the unit, it shall be inspected immediately for the damage that may occur during transportation. If there is any obvious damage, it shall be written on the carrier's transport documents, and then claim according to the instructions of the notice. In case of damage of any parts other than the surface, please inform the maintenance personnel of the local York Company immediately.

Storage

- If the unit is to be stored for a period of time before installation, some protective measures shall be taken to prevent damage, corrosion or wear.
- All joints such as water pipe joints shall be sealed in good condition.
- The temperature of storage environment shall not exceed the range of -30 ~ 48 ℃, and the relative humidity shall be less than 90%. The direct sunlight shall be avoided.
- Do not use hot water or steam to clean it for fear of inadvertently actuating the safety mechanism of the unit.
- In order to reduce the possibility of accidental damage (such as being broken and collided, etc.), the unit should be stored as much as possible at the place at which various activities are least likely to happen.
- Take the key of the electric control cabinet down and keep it properly.
- Periodic visual inspection shall be conducted during the storage.

Symbols Used in This Manual

⚠ **Warning:** The warning must be observed to avoid physical injury to the user

⚠ **Caution:** This attention must be followed in order not to cause damage to the machine parts

Part 1: Introduction of Unit

YCWE series modular water-cooled water chiller unit, whose refrigerant is R410A, provides cold water/hot water for the centralized air treatment equipment or terminal device of the central air-conditioning project, including three basic module models - YCWE021/023, YCWE032/034 and YCWE042/047, each module can be run and installed separately, and several modules can also be run and assembled together. A maximum of eight modules are allowed to be assembled together. YCWE series units can be applied to refrigeration, heating and heat recovery.

The unit can be installed indoors or outdoors (for the outdoor installation, only the unit with shell is applicable). Each module includes the scroll compressor, condenser, evaporator, expansion valve and microcomputer control center, etc.

1.1. Description of Unit Model

Name	Y	C	W	E	0	3	2	X	S	M	E	5	0
Code Position	1	2	3	4	5	6	7	8	9	10	11	12	13
Code 1:	Y–York												
Code 2:	C– Chillers												
Code 3:	W – Water-cooled Type												
Code 4:	E–Scroll Compressor												
Code 5, 6 and 7	Nominal Refrigeration Capacity, ton												
Code 8:	Unit series; X - high-efficient and single-cooling												
Code 9:	Unit type, R- heat pump, S- single cooling												
Code 10:	Unit type; M-module machine												
Code 11:	Refrigerant; E-R410A												
Code 12 and 13:	Power type/50 38 380V-3N-50Hz ; 53 54 400V-3N-50Hz												

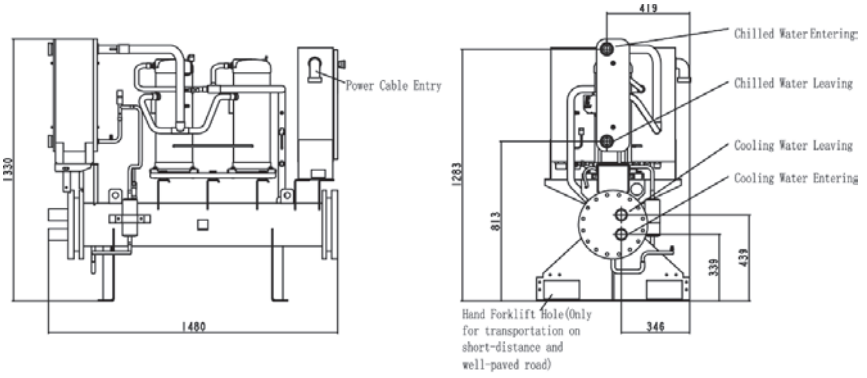
1.2. Parameter Table of High-efficient Single-cooling Unit

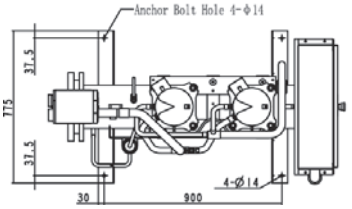
Model			YCWE021XSME	YCWE032XSME	YCWE042XSME
Refrigerant			R410A	R410A	R410A
Refrigeration	Nominal Refrigeration Capacity	kW	76.2	114.2	151.9
	Nominal Input Power	kW	14.4	21.6	28.7
	COP	kW/kW	5.29	5.29	5.29
Heat Recovery	Heat Recovery Volume	kW	90.6	135.8	180.6
	Nominal Input Power	kW	14.4	21.6	28.7
IPLV		kW/kW	6.85	6.85	6.85
Power Supply		V/Ph/Hz	380(400)/3/50	380(400)/3/50	380(400)/3/50
Rated Current		A	29.4	44.1	58.8
Maximum Continuous Running Current		A	46.4	69.6	92.8
Compressor	Model	/	Hermetic Scroll	Hermetic Scroll	Hermetic Scroll
	Quantity	Set	2	3	4
Condenser	Diameter of Water Pipe	inch	2	3	3
	Connection Type	/	Clamp	Clamp	Clamp
	Nominal Water Flow	m^3/h	16.4	24.6	32.7
	Water Pressure Drop	kPa	72	63	62
Evaporator	Diameter of Water Pipe	inch	2	3	3
	Connection Type	/	Clamp	Clamp	Clamp
	Nominal Water Flow	m^3/h	13.1	19.6	26.1
	Water Pressure Drop	kPa	73	28	30
Outline Dimension	Height	mm	1330	1330	1330
	Length	mm	1480	1480	1480
	Width	mm	775	775	775
Weight	Transport Weight	kg	380	540	690
	Operating Weight	kg	430	620	770
Outline Dimension (With Shell)	Height	mm	1560	1560	1560
	Length	mm	1550	1550	1550
	Width	mm	910	910	910
Weight (With Shell)	Transport Weight	kg	530	655	840
	Operating Weight	kg	580	735	920

Note: The above data is designed based on the national standard of GB / T18430
Rated working condition of refrigeration capacity: water inlet temperature of cooling water (condenser): 30°C; water outlet temperature of chilled water (evaporator): 7°C
Rated working condition of heat recovery: water outlet temperature of cooling water (condenser): 35°C; water outlet temperature of chilled water (evaporator): 7°C
Evaporator's fouling factor for the unit under rated flow: 0.018m2K/kW
Condenser's fouling factor for the unit under rated flow: 0.044m2K/kW
The parameters in the table will vary along with the design change of the manufacturer's product without prior notice

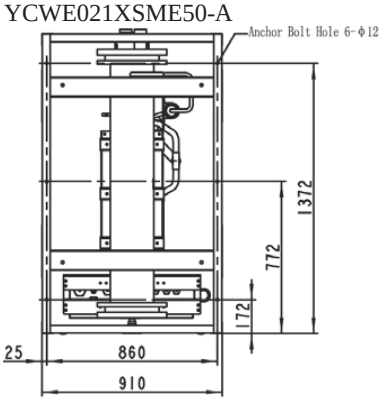
1.3. Outline Dimensions of the Unit

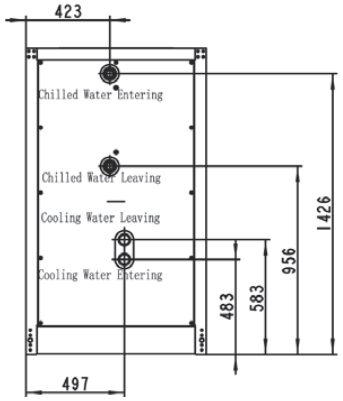
YCWE021XSME50

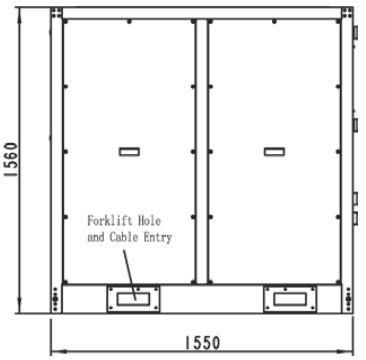




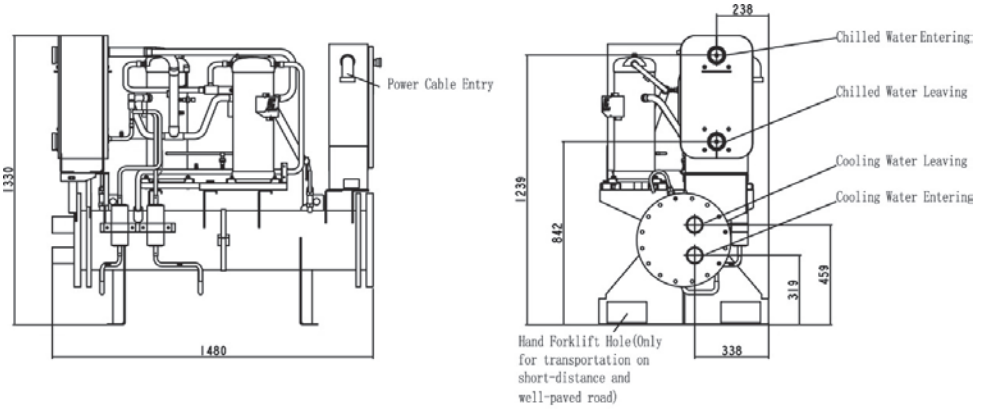
YCWE021XSME50-A

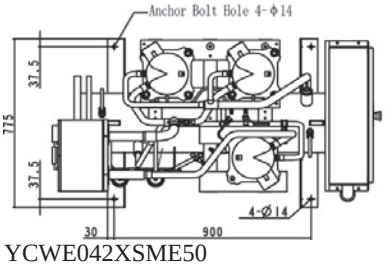




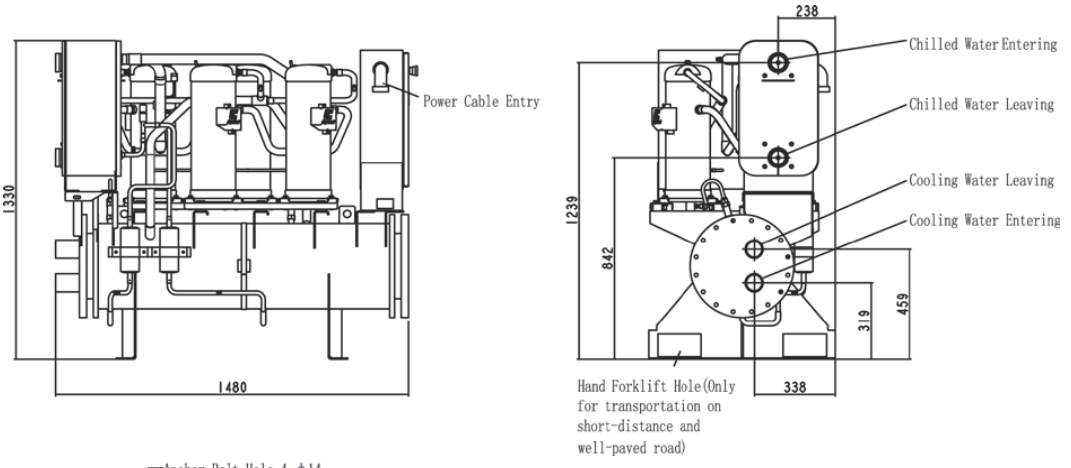


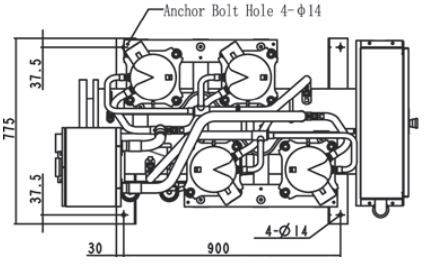
YCWE032XSME50



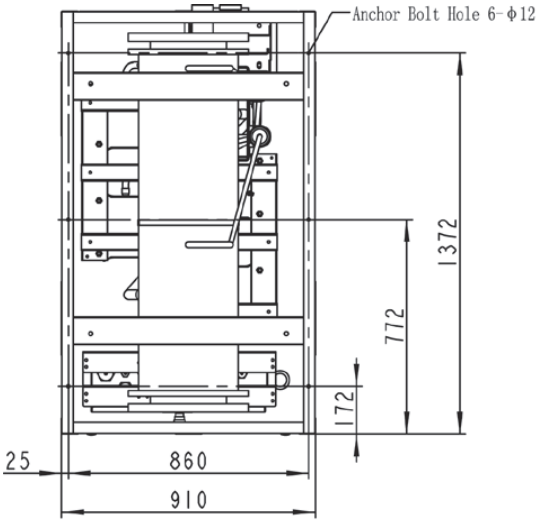


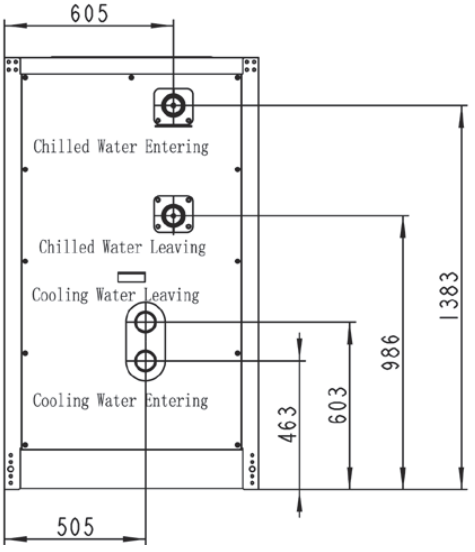
YCWE042XSME50

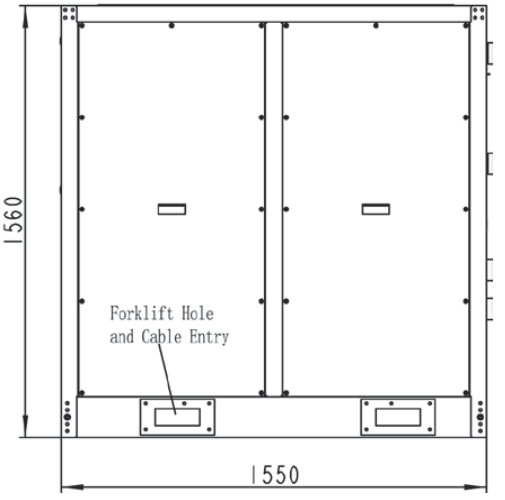




YCWE032XSME50-A
YCWE042XSME50-A







Note:

- The picture is the schematic diagram, and the internal structure shall be subject to the real object.
- Connection mode of water inlet-outlet pipe is the clamp connection

1.4. Operating Range

Voltage Range

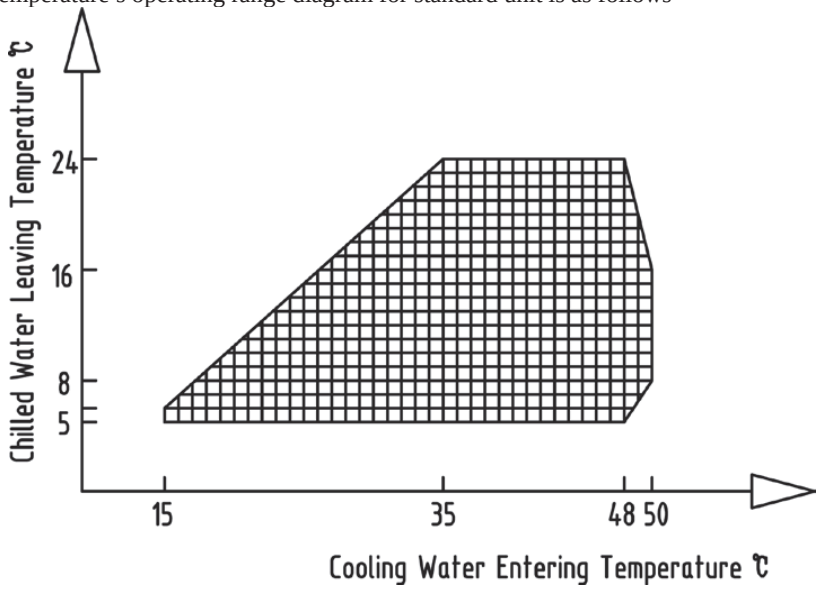
Standard of Power Supply: 380VAC-3N-50Hz / 400VAC-3N-50Hz
Maximum allowable fluctuation range of the power supply voltage shall be ±10%
Unbalance rate of the three-phase voltage shall be less than 2%

Temperature Range

Items	Range
Usage environment for 7-inch screen controller	-20 - 60°C; RH≤95%; Noncondensing
Usage environment for wire controller	0-50°C, RH-95%; Noncondensing
Temperature range of unit's operating environment	-10°C -48°C
Operation of Cooling	Using-side water inflow 10°C (-5°C*) - 30°C Using-side water outflow 5°C (-10°C*) - 24°C Heat-source-side water inflow 15°C - 50°C
Operation of Heating	Using-side water inflow 15°C - 50°C Using-side water outflow 20°C - 55°C Heat-source-side water inflow 10°C - 30°C
Operation of Heat Recovery	Using-side water inflow 10°C - 30°C Using-side water outflow 5°C - 24°C Returning hot water 30°C - 50°C

Note:

- Returning water temperature control is set as default and recommended
- The above data is obtained in the laboratory. In actual use, it will be biased by the influence factors, such as installation location, etc.
- * Saline-water Mode (for ethylene glycol aqueous solution only), and the set value shall be selected in accordance with ethylene glycol's concentration
- Water temperature's operating range diagram for standard unit is as follows



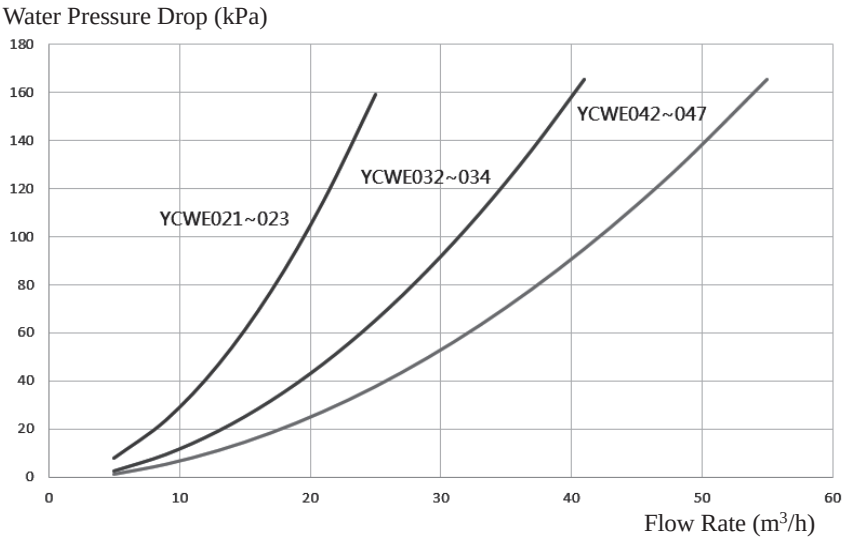
Note: The above diagram is standard unit operating range diagram. For the operation range of saline-water mode, please consult Johnson Controls

Other Requirements:

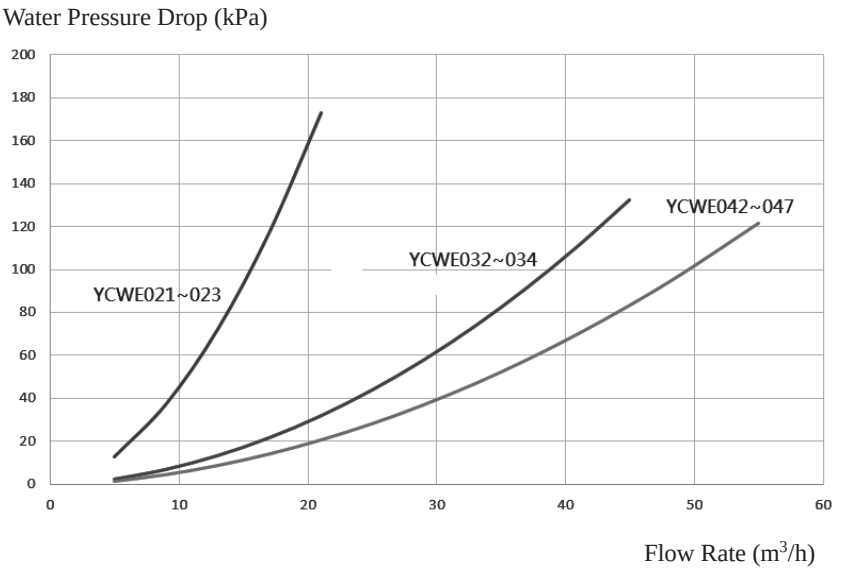
Altitude: ≤2000m
Water flow: 70-130% rated water flow
Water side pressure: ≤10bar
Installation Site: see the Chapter of “Selection for Installation Position”
Water Quality: see the Chapter of “Water Treatment”

1.5. Water Pressure Drop Curve for the Unit

Water Pressure Drop Curve for Condenser (Shell-tube Type Heat Exchanger):



Water Pressure Drop Curve for Evaporator (Plate-type Heat Exchanger):



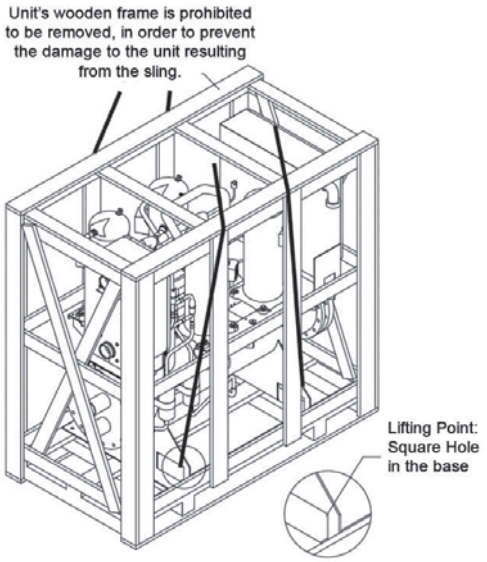
Part 2: Installation Requirements

2.1. Inspection Items Before Installation

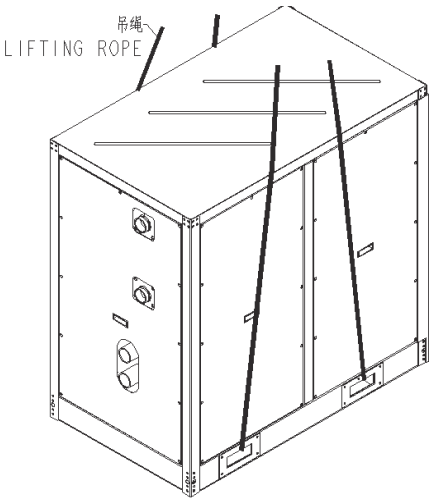
- Whether the nameplate information of the unit is the same as the order
- Whether the unit's attached files are complete
- Whether the unit's attached accessories are consistent with the items listed on the packing list (The controller is ordered separately without being placed in the unit)
- Whether the unit has any transportation damage. If there is any obvious damage, it shall be indicated on the shipping list of the transportation company, and written request shall be delivered to the transportation agent in order to carry out the inspection immediately.

2.2. Requirements for Unit's Loading & Unloading and Hoisting

- The unit is shipped in the form of complete machine. Refrigerant charging has been performed for normal operation. Care should be taken during the shipment to avoid damage to the unit due to the reckless operations
- The unit is shipped with the wooden base and plastic bag. The unit can be moved or hoisted with the forklift or the hoisting equipment
- When perform hoisting for the unit without shell by the hoisting equipment, unit's wooden frame is prohibited to be removed, in order to prevent the damage to the unit resulting from the sling. The hoisting hook and the unit must be matched and fastened, and the damage to the unit resulting from the sling should be avoided. Ensure that the hoisting equipment, rope and the hoisting hook can bear the weight of the unit; Make sure that the unit will not turn over during hoisting, and the inclination angle shall not be greater than 10 degrees.
  Indicating diagrams of hoisting are as follows:



Unit Without Shell



Unit with Shell

⚠ **Warning: During the lifting process, special care shall be taken to ensure the smooth lifting of the outdoor unit, especially the problems such as uneven weight distribution of the unit and biased center of gravity to the compressor side. Please try lifting once before lifting to observe whether the strap is fastened tightly and whether the unit is in danger of tipping over. During the lifting process, the unit shall be slowly raised at a constant speed to prevent tipping over and pay attention to the safety of surrounding personnel. BE CAUTIOUS!!!**

⚠ **Caution:**

- **During the hoisting process, please be sure to comply with the applicable laws and regulations and safety measures.**
- **Prepare and follow the written hoisting plan.**
- **The hoisting must be carried out under the guidance of the professional hoisting personnel who has undergone the professional training.**

- **It is necessary to use the sufficiently long stay bar so that the hoisting strap or chain will not touch the unit, otherwise they may cause damage to the unit.**
- **According to the instructions of the unit manual, please use all specified hoisting points to perform hoisting.**
- **As the unit's structure may change, unit's center of gravity shall be determined by the trial hoisting.**
- **Use hoisting technique to keep the unit stable and horizontal.**
- **During hoisting process, it is strictly forbidden to stand under the unit. Please keep away from the position directly below the unit.**

2.3. Selection for the Installation Position of the Unit

- It cannot be installed in places with polluted air, such as the place which has flammable and explosive articles, corrosive gases, salt fog and severe dust (such as coal ash and metal dust, etc.), etc.
- The unit shall be installed in the area whose altitude is below 2000m. If it is more than this range, it may cause damage to the unit or injury to the personnel. Please contact York's Special Maintenance Center if it is unavoidable
  - The unit can be installed on the ground or the suitable roof (unit without shell is forbidden to be installed in the open air), or it can also be installed in the machine room. The ground surface is required to be flat, and it shall have sufficient strength to support the operation weight of the unit.
- Don't install the unit at the place which is relatively sensitive to the noise & vibration, or which has high requirement for noise & vibration, in order to avoid the generation of resonance and echo between the unit and the house.
- For the installation position of the unit, please avoid the direct sunlight as far as possible, shall keep away from the boiler flue and shall keep away from the air environment which may corrode the unit's components
- The unit cannot be installed in the place which is easy to be blown by the strong wind
- The unit cannot be installed in the place where the snow is easy to accumulate and off which the sundries can easily fall.
- The unit cannot be installed under the drainage pipeline
- If the unit is located in a place accessible to unauthorized personnel, then the isolation safety measures, such as setting guard rails, shall be taken. This can prevent man-made damage and accidental damage, and prevent the control box from being opened and making the running electrical components exposed.
- Unit's height shall not be the highest point of the building, and if so, it is necessary to install the lightning protection device at the place higher than the unit
- Adequate space shall be left around and above the unit for conducting routine maintenance work
- The installation space shall be provided with sufficient natural ventilation hole to prevent the personnel's suffocation caused by the leakage of the refrigerant

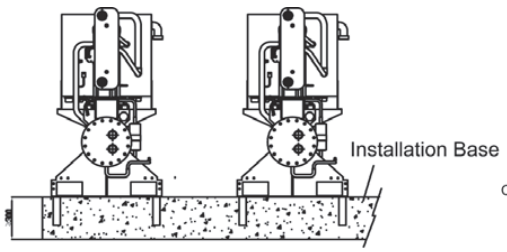
⚠ **Caution: For special installation requirements, please consult with the construction contractor or architect or other professionals.**

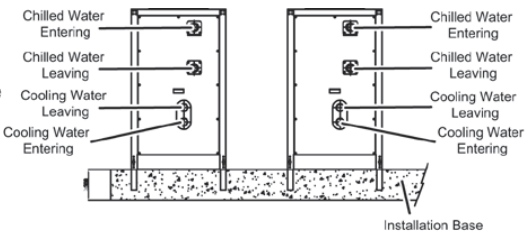
2.4. Requirements for Unit's Installation Foundation/Installation Space

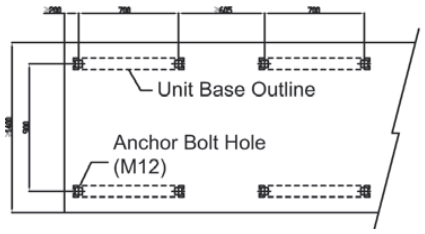
Installation Foundation

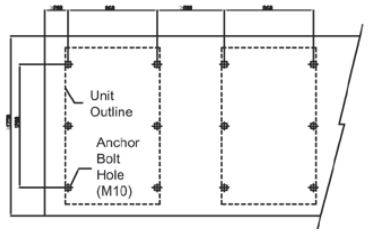
The unit shall be installed on the solid concrete or channel steel whose surface is flat and which is enough to support its weight, and the concrete must be solid. Bolt's fixing hole shall be pre-buried, and it shall be fixed by the bolt. In addition, the following requirements shall also be met:

- The horizontal concrete foundation or steel frame shall be able to withstand the operation weight of the whole equipment set and the weight of the maintenance personnel
- When combining multiple modules, the concrete foundation of each module must have the same height, in order to facilitate the laying of the water pipe path among the modules
- Do not connect the unit's foundation to the building's foundation in order not to transfer the noise and vibration
- Installing hole shall be arranged on unit's base, and it can be used for fixedly connecting the unit with the foundation; The specification of the foundation bolt is shown in the unit's foundation drawing
- The foundation shall be able to facilitate the operations, such as the maintenance for the unit
- In order to ensure that the outdoor unit can be placed flat on the foundation, it must make sure that the flat surface in which the outdoor unit locates is flat firstly, and then the outdoor unit can be placed, and you should check whether the outdoor unit is horizontal or not after installation of the outdoor unit. The inclination angle shall be less than 10°; for the one with shock absorbers, the level shall be checked after the shock absorber is installed
- Drainage channels shall be provided around the unit to ensure the smooth discharge of the rainwater or condensed water; If there is no discharge channel, add a water tray at the bottom of the unit and lead it to the appropriate place through pipeline; The drainage pipeline shall be capable of timely discharging rainwater and the condensed water generated by the unit.





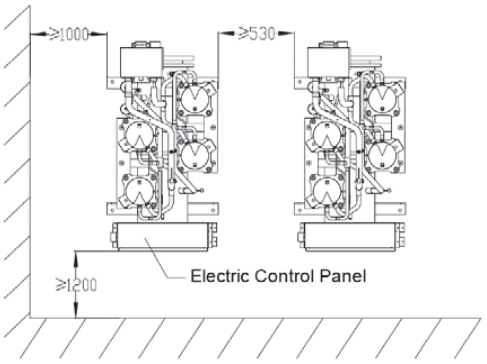




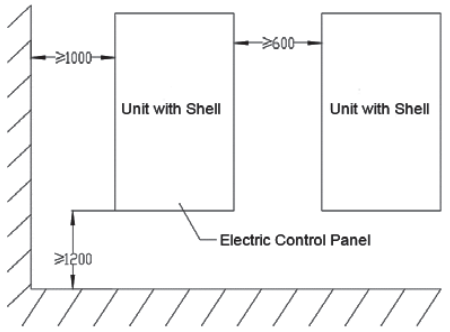
Installation Space

In order to ensure the daily maintenance and service of the unit, enough space shall be reserved between the units.

Unit without Shell:

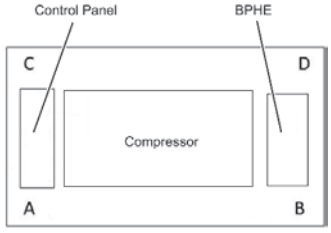


Unit with Shell:



Vibration Reduction:

It is recommended to install the shock absorber between the foundation and the unit supporting leg. If the rubber damping pad is selected, its thickness shall be over 20 mm; If the damped-type spring shock absorber is selected, it is necessary to make selection according to the unit's weight and the vibration source. It is recommended to install the damped-type spring shock absorber between the foundation and the outdoor unit base (especially for place whose unit adopts the rack stent installation and the roof installation). The vibration isolation device shall be selected and installed correctly according to the design requirements, so as to meet the requirements of vibration isolation and avoid the phenomena of solid-borne sound transmission and resonance. For the model and the construction of the damped-type spring shock absorber, they shall be determined by the professionals. The proximal shock absorber can be selected near the optimum load which is given in the following table.



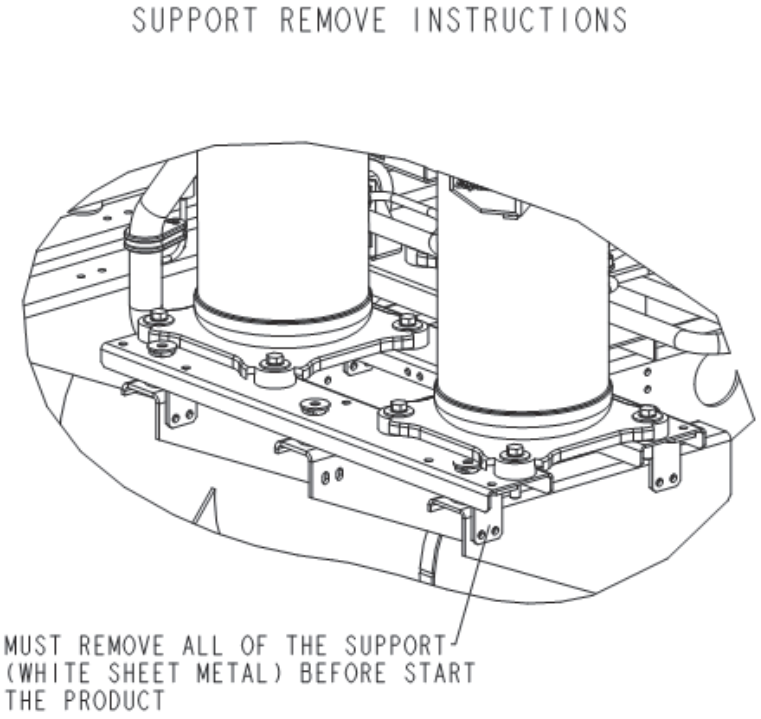
Standard Unit	Shock Absorber Total	Optimal Load for Point A (kg)	Optimal Load for Point B (kg)	Optimal Load for Point C (kg)	Optimal Load for Point D (kg)
YCWE021~023	4	113	104	108	105
YCWE032~034	4	169	154	145	153
YCWE042~047	4	191	195	188	196

Unit (With Shell)	Shock Absorber Total	Optimal Load for Point A (kg)	Optimal Load for Point B (kg)	Optimal Load for Point C (kg)	Optimal Load for Point D (kg)
YCWE021~023	4	151	142	146	143
YCWE032~034	4	198	183	174	182
YCWE042~047	4	229	233	226	234

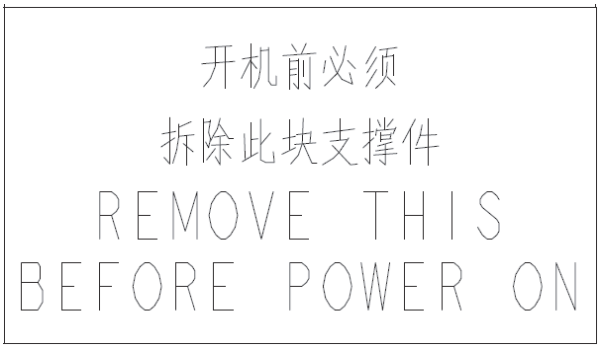
Note: Generally, the safety factor of shock-absorber is selected as 1.3, and the anti-shear type shock absorber shall be selected, and the horizontal state of the unit shall be guaranteed after the shock absorber is installed (the inclination angle shall not be greater than 10°).

2.5. Remove Compressor's Transport Fixed-Parts

On account of that the connection between the parallel compressor and the condenser is the soft connection, if the transport condition is poor, it is possible to cause the vibration of the compressor during the transportation process and further cause breakage of the system pipeline connecting with the compressor. Therefore, before the delivery, the unit will increase 4 pieces of compressor's vibration-reduction bracing-component between the base slide of each group of the compressor and the condenser. The bracing-component must be removed before the start-up of the unit. Otherwise, the compressor or the unit may be damaged:



Compressor's vibration-reduction bracing-component is a white sheet metal part, and the following marks are pasted on the bracing-component.



Quantity of compressor's vibration-reduction bracing-component:
YCWE021~023 - 4 pcs
YCWE032~034 - 4 pcs
YCWE042~047 - 8 pcs

2.6. Installation of Water System

Pipe's Prefabrication Requirements

- The pipe diameter of unit's water inlet and outlet pipe shall not be less than that of the heat exchanger's water inlet and outlet pipe.
- The connection between the water pipe and the unit pipe shall adopt the clamp type
- For the welding parts in the pipeline, the welding slag and the impurities shall be cleaned after the welding, and the welding seam and the surface of the heat-affected area shall be conducted with preservative treatment (first rust removal, and then brush painting).

⚠ **Caution:**

- The enterprise engaged in the welding of the metal pipeline shall have the welding process qualification of corresponding item, and the welder shall hold welder's qualification certificate of corresponding welding type.
- Pipeline's installation shall comply with the provisions of the national standard GB 50242 Code for Acceptance of Construction Quality of Water Supply Drainage

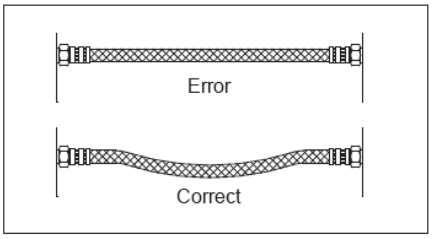
Requirements for Pipeline Installation

- Water pipe's connection shall comply with relevant installation procedures. There shall be no foreign matters in the pipeline, and all water pipes shall meet the local regulations and regulations on the pipeline project.
- During the splicing of the modules, if use wire controller/centralized controller, each group can splice 8 modules at most; 1 to 8 modules can form a communication network. Conduct control with one controller. The units within one communication network must be equipped with a unique mixed water-outlet-pipe section and the mixed backwater-pipe section, and they shall be used for installing system's temperature sensor of inflow & outflow water and the water flow switch.
- When multiple modules are combined, the connected water pipe path must be designed as the same-program type, in order to facilitate each module to obtain a balanced flow of water.
- The water inlet pipe and outlet pipe of each module need to be provided with the stop valve and pressure gauge, so as to regulate the water flow and to ensure that the water flow entering each module meets the operation requirement of the unit (after all the modules are in stable operation, the temperature difference between the inflow water and outflow water of the chilled water among each modules and the temperature difference between the inflow water and outflow water of the cooling water shall be balanced), and they can be used for cutting off the water flow during the maintenance.
- If the module's chilled water (evaporator) and the cooling water (condenser) need to be installed with electric water valve, it is required that the operation time cannot be more than 20 seconds, and they shall be connected to the DO15 and DO16 of each module's mainboard.
- The bypass line and the bypass valve must be installed between the water inlet pipe and outlet pipe of the unit, so as to let the unit carry out the external waterway system's cleaning before the commissioning. Caution: Do not flush any foreign matter into the evaporator. Close the bypass and open the water valve on unit's water inlet pipe and outlet pipe after the flushing. The heat exchanger waterway of one unit (one or more modules)

can also be cut off during maintenance without affecting the normal operation of other units. Caution: Before the cut-off, it is necessary to confirm that the corresponding unit is in shutdown state, and when it is cut-off for a long time in the winter, the cut-off unit must drain the water completely, in order to prevent the heat exchanger from the frost damage.

- The water flow direction shall be connected according to the water inlet pipe and outlet pipe indicated on the unit, otherwise the performance of the unit will be affected.
- The connection among the pipeline, the water pump and the air-conditioner main machine must adopt flexible connecting pipe, and the flexible connecting pipe shall not be forcibly connected. The purpose is to reduce the transmission of vibration.

The length of flexible connection pipe may change by 2% to 4% due to high pressure. Enough space shall be reserved for flexible pipe installation to allow the hose expansion and contraction. Otherwise, the pipe may be damaged. The installation method is shown in the figure.



- The unit itself does not have water pump, hence the water pump must be installed separately. The unit only gives a 220V starting signal for the contactor of the control water pump, and the system's chilled water (evaporator) pump can be connected to the main board DO5 of the master unit (1 # module). System's cooling water's (condenser) water pump can be connected to the main board DO6 of the master unit (1 # module).
- In addition to the main pump, there also need to install a backup water pump, so that the water pump will not affect the use of the unit when it fails.
- The outlet of the water pump shall be installed with a check valve.
- If multiple stand-alone modules share one water system, each water pump's outlet shall also be installed with a check valve.
- Water pump's water inlet pipe requires the users to provide a water filter which is not less than 30 meshes by themselves, in order to ensure the reliable operation of the water pump.
- The water flow switch must be installed on each module's cooling-water and chilled-water outlet pipe. See Chapter 2.9 for installation mode.
- All water system's lowest points shall be provided with drainage valves, so that the water in the evaporator, condenser and system can be completely drained when not in use in winter.
- All water system's high points shall be provided with automatic exhaust valves to exhaust the air from the pipeline.
- For completely closed water system (without open expansion tank), the automatic water supply valve can automatically replenish the water supply system to prevent the unit operation Fault due to water shortage of the system. It is recommended that the outlet pressure of the automatic water supply valve shall be set 0.3 bar higher than the system static pressure, but the set value shall be lower than the water replenishing pressure (the pressure of the water replenishing source), otherwise the normal water replenishment cannot be conducted. In order to ensure normal water replenishment, the automatic water make-up valve is usually installed at the water return end of the system (water inlet of the water pump). Please make sure the glycol concentration will not be diluted, when its water system is conducting water replenishing.
- A heat-insulating water tank with certain volume shall be installed in water system to prevent the unit from frequent startup.
- The pipe must have independent supporting, and it cannot be supported on the unit.
- All water pipes in the system shall be protected with thermal insulation, except for the exhaust valves and drain outlets so as to facilitate maintenance.
- If the refrigerating medium is water, when the ambient temperature is low and if the unit will not be used for a long period of time, please drain the water inside the unit. If it is only the short shut-down, the water may not be drained. However, do not cut off unit's power. If the water pump is not connected to unit's main board, please ensure the operation of the water pump. The fan coil in the water system must be installed with three-way valve, in order to ensure that the water system can circulate smoothly after the anti-freezing water pump is opened in winter.
- If the unit has multiple modules, for the total water inlet and outlet pipe of the water system, each of them must be provided with a position which is used for installing the temperature sensor, so as to install the water inlet & outlet temperature sensor of the system. If the auxiliary electrical heating is required to be installed for

the water system, the total water outlet temperature sensor of the water system must be installed after the installation of the auxiliary electrical heating.

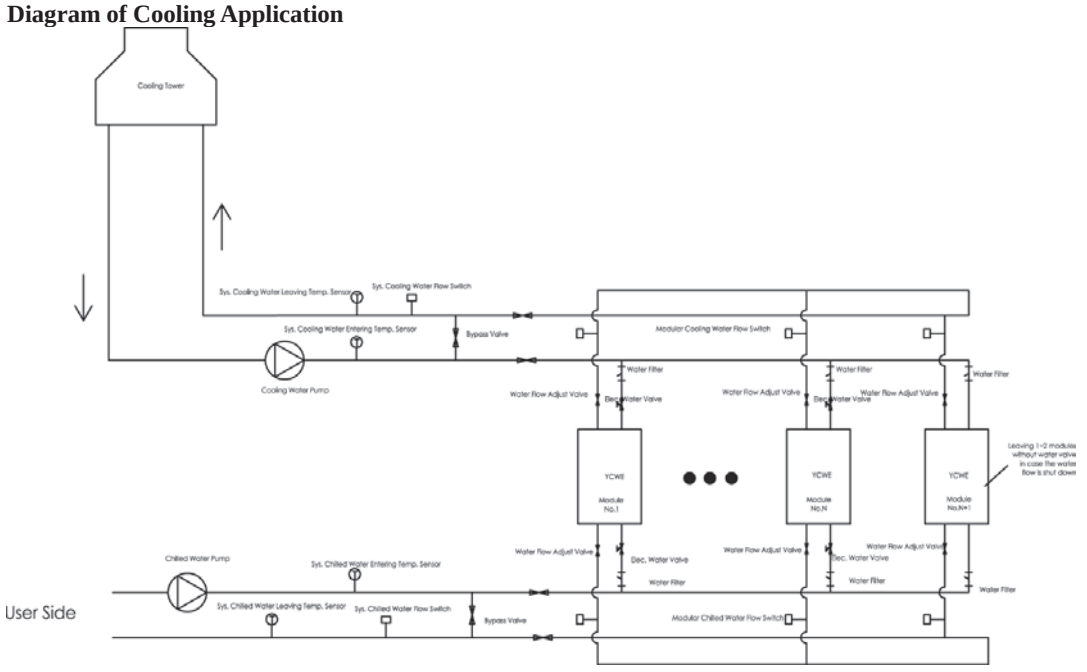
- The minimum flow of the unit shall not be less than 70% of the rated flow of the unit at any time, and its maximum flow shall not exceed 130% of the rated flow of the unit at any time.
- For the pipe diameter and water resistance of the total water pipe, please refer to the “Design Manual of the Heating Ventilation Air Conditioning System”.
- The minimum pressure at the pump inlet shall reach 20kPa, thus avoiding cavitation noise and damage to the water pump caused by cavitation.
- For the electric three-way valve of chilled water and cooling water of the system, it is required that the actuation time of the three-way valve shall not exceed 1 minute, and they can be connected to the main board DO8 and DO9 of the master unit (1# module), respectively. The system’s cooling tower fan and water pump can be connected to the master unit’s (1# module) main board DO10.

⚠ **Caution:**

- The built-in water pump unit is designed according to the constant flow system. Attention shall be paid to the number of two-way valves when installing two-way valves at the end. It is suggested that the number of two-way valves shall not exceed 1/3 of the number of terminals, and the rest shall be replaced by three-way valves. If 1/3 is exceeded, the differential pressure bypass valve shall be added.
- The dregs and dirt in the conduit network will degrade the heat exchange performance of the heat exchanger and, in serious cases, will damage the heat exchanger and the water pipe.
- The installer/user must ensure the quality of chilled water (see "Water Treatment") and air must not be allowed to enter the water system.
- The waterway’s by-pass pipe and the by-pass valve must be installed so as to conduct flushing for the waterway before the commissioning for the unit; After the pollution discharge is qualified (visual inspection: the color and transparency of the water at the discharge port are close to that at the water inlet without visible sundries), conduct trial operation circularly for more than 2 hours. After the water quality is normal, the water can be connected to the refrigerating unit and air-conditioning equipment.
- If the quality of the water which enters the unit cannot meet the requirements of Article 2.11, an intermediate heat exchanger must be arranged between the unit and the user's water side, in order to ensure that the heat exchanger of the unit will not be fouled and dirtied due to the water quality, which may result in the performance degradation and unit’s serious damage.
- At the lowest point of unit’s water pipe, a drain valve should be installed. When the ambient temperature is relatively low and if the unit will not be used for a long period of time, and when the water temperature is likely to be lower than 0°C, it is necessary to drain off the water inside the unit (the bottom of the water chamber located at the unit’s condenser shall be installed with a drain valve, and this water valve must be opened when the water is discharged, in order to drain off the residual water at the bottom end of the condenser). If the water freezes, it will cause the breakdown of the unit’s heat exchanger.

- If the electric water valve is required to be installed on the water inlet and outlet pipe of each module, it is necessary to ensure that the electric water valve will not be installed in each module from module 1-2, in order to avoid the disconnection of the waterway after all the modules are shut down, which may cause damage to the water pump, and in the meantime, to avoid the condition that the waterway cannot operate properly due to the inability to correctly judge the water temperature of the system on account of that the waterway is disconnected with the unit.
- In order to ensure that the water flow of each module is balanced, the water flow regulating valve must be installed on the cooling water/chilled water side, and the opening degree of the water flow regulating valve shall be adjusted during the commissioning of the unit, in order to make the temperature difference between the water inflow and water inflow of each module's heat exchanger be the same as much as possible

Installation Diagram of Water System (For Reference Only):
Diagram of Cooling Application



At the system's chilled water's (using side) and cooling water's (heat-source side) three-way valve default state, the main board only provides control points

Cooling: if the chilled water's (using side) three-way valve is de-energized, the cooling water's (heat source side) three-way valve will be de-energized

Heating: if the chilled water's (using side) three-way valve is energized, the cooling water's (heat source side) three-way valve will be energized

The following valves and temperature sensors are attached to the unit's accessories and control package, and they must be installed as required:

1. System's chilled-water flow switch (Total: 1 piece. It shall be installed on chilled water's total water outlet pipe. See Article 2. 9 for the installation mode)
2. System's cooling-water flow switch (Total: 1 piece. It shall be installed on cooling water's total water outlet pipe. See Article 2.9 for the installation mode)
3. Module's chilled-water flow switch (Total: 1 piece. It shall be installed on the outlet pipe of each module's evaporator. See Article 2. 9 for the installation mode)
4. Module's chilled-water filter (1 piece per module. It shall be installed on each module's evaporator's water inlet pipe)
5. System's inflow-water temperature sensor of the cooling water (Total: 1 piece. It shall be installed on cooling water's total water inlet pipe. See Article 2.10 for the installation mode)
6. System's inflow-water temperature sensor of the chilled water (Total: 1 piece. It shall be installed on cooling water's total water inlet pipe. See Article 2.10 for the installation mode)
7. System's outflow-water temperature sensor of the cooling water (Total: 1 piece. It shall be installed on cooling water's total water outlet pipe. See Article 2.10 for the installation mode)
8. System's outflow-water temperature sensor of the chilled water (Total: 1 piece. It shall be installed on chilled water's total water outlet pipe. See Article 2.10 for the installation mode)

Note: The water flow switch and the water filter on module's cooling-water (condenser) side shall be purchased by the customer.

2.7. Buffer tank

The water system does not force the use of the buffer tank, but in the following cases, the system shall set additional buffer tank to prevent the unit from frequent starting and stopping and to prevent the damage to the compressor and the increase of the running cost, and at the same time, it will solve the problem of severe temperature fluctuation of the water system, which may obtain good stability of the air-conditioning system.

a. When the capacity of the water system is less than the minimum water capacity
b. When the control accuracy of the water temperature is high
c. When load between the main machine and the terminal does not match

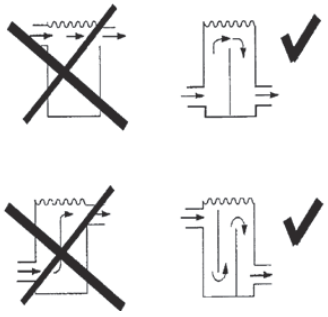
The volume of the buffer tank is the minimum water capacity (required capacity) – pipeline's water capacity – terminal's water capacity.

The recommended values for minimum water capacity or required capacity are:

Application Scenario	Minimum capacity (L/kW)	Recommended capacity (L/kW)
Air Conditioner	3.5	5.5~8.5
Process	6.5	7.5~12

Note: The above calculation method is applicable to the case whose requirements for the water's temperature fluctuation is not high. If the site's requirements for the water's temperature fluctuation is high, please contact the personnel of the York office.

The recommended installation position of the buffer tank is the backwater side of the unit. Please refer to the following installation method.



2.8. Expansion tank

The air-conditioning water system must be installed with the expansion tank, which has certain volume, in order to adapt to the volume change of system's water (expanding with heat and contracting with cold) caused by the change of the water temperature, for purpose of preventing the water system's frost crack and the phenomenon that the pressure of water pump's suction inlet is not stable; at the same time, it can be used as system's water supply and gas exhaust.

In mechanical circulation system, the expansion pipe of the expansion tank shall be connected to the pipeline in front of the water pump's inlet, in order to be treated as the constant pressure point of the system; The circulating pipe shall be connected to the horizontal backwater pipe whose distance to the system's constant pressure point is not less than 1.5~3m.

For the volume calculation of the expansion pot/expansion tank, it shall refer to the following formula.

$Vp=\alpha\times\Delta t\times Vs$

Vp---the effective volume of the expansion tank (the volume of water in the height difference between the signal pipe and the overflow pipe), m^3

α----the volume expansion coefficient of water, α =0.0006/°C

Δt ----maximum change value of the water temperature,°C

Vs----the water capacity within the system (including the total water storage capacity of the system's pipeline and equipment), m^3

Caution:

Considering that it shall perform anti-freezing measures in winter, the expansion tank needs to be insulated.

2.9. Water flow switch

The water flow switch shall be installed in the mixed water outlet pipe section of the same communication network (see "Installation Diagram of Water System") , in order to realize shut-off protection for the unit. The plant equips the cooling-water & chilled-water flow switch for the water system's main pipe in the control module package, and, on the site, the selection shall be made according to the pipe diameter and flow rate of the main water pipe, and the

disconnection action value of the water flow switch shall be set to 60% of the rated water flow; In each module's attached accessories package, there will be attached with one chilled-water flow switch. The module's water flow switch is required to be installed on the evaporator's outlet pipe of each module (installed by the user), and its turn-off value has been set before delivery.

- The flow switch can be installed in a vertical pipe whose direction of the horizontal pipe or the liquid flow is upward, however it cannot be installed in a pipe whose direction of the liquid flow is downward. When it is installed in the pipe whose direction of the liquid flow is upward, the problem of gravity shall be considered.
- The flow switch must be installed on a section of straight pipeline with at least five times of the pipe diameter at both sides, and at the same time, it must be noted that the liquid flow's direction in the pipe must be in line with the direction of the arrow on the controller
- Make sure the terminals of the flow switch are easy to wire. The wiring of the water flow switch shall adopt the connection mode of normally open contact. Please do not misconnect it to the normally closed contact. The signal line of the water flow switch shall be connected to the 1 # module by using the shield cable, and it shall be linked with the unit
- It is important to select the right paddle according to the unit's rated flow, outlet pipe's diameter and paddle's adjustment range of the flow switch (please refer to the instruction manual), and the paddle should not touch the inner wall of the pipe and the other components in the pipe, otherwise it can easily cause the flow switch to fail to conduct protection or reset normally
- For the temperature sensor of system's outflow-water & backwater and the water flow switch, see "Installation Diagram of Water System" for their installation position

Caution:

- It is forbidden to set the system's water flow switch on the branch pipe inside the module or the main pipe combined by multiple modules.
- Connect the total water flow switch signals of the system's evaporator and condenser to the main machine's (1# module) main boards - DI12 and DI13
- Connect the water flow switch signals of each module's evaporator and condenser to each module's main boards - DI1 and DI2
- The water flow switch is only a safety switch and it cannot be used to start and stop the unit
- The paddle shall be selected and cut on site, in order to make sure the paddle is located at the center of the pipeline
- **If each module in the water system is equipped with an electric two-way valve, the total water flow switch of this water system is required to be short-circuited**.

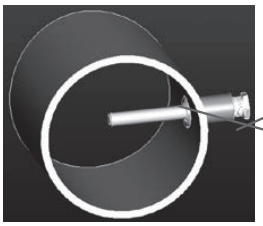
2.10. System outlet/return water temperature sensor

The installation position for water system's outflow-water and backwater temperature sensor is shown in "Installation Diagram of Water System" , and they shall be installed to the pipe section of the total mixed outflow-water and backwater pipe respectively, and they shall refer to the following installation instructions:

Caution: When there are two or more modules in the system, each module's inflow-water and backwater temperature sensor must be installed on the inflow-water and backwater pipe of the corresponding module; The system's inflow-water and backwater temperature sensor must be installed on water system's total inflow-water and backwater pipe; For the heat recovery unit, **the system backwater temperature** sensor can be installed in the hot water tank; The system's water-temperature control signal must be connected to the main machine (1# module).

Installation method of temperature sensor

- Punch a round hole on the backwater and outflow-water pipe, and the steel base which is attached along with the unit shall be welded
- Install the copper water-temperature-sensor casing pipe (NPT threaded connection)
- Certain amount of heat transfer oil shall be injected into the casing pipe, and the temperature sensor shall be installed. It is noted that no air and water are allowed in the casing pipe
- Screw and seal it with the threaded lock tightly
- Perform appropriate anti-rust surface treatment for the welding position and installation base



Piece 1: the sensor shall be installed with the casing pipe. Its inside and outside are the 3/8-18 and 1/2-14 NPT threads respectively

Piece 2: 1/2-14 NPT internal thread base. It shall be welded to the main water pipe

Note: 3/8-18 NPT external thread lock shall be screwed on the sensor's casing pipe tightly. This is not marked on the figure

2.11 Water Treatment

The cooling performance of the unit given in the manual is based on the case where the fouling coefficient is 0.018m²°C/kW. Dirt, filth, grease and other impurities will adversely affect the heat exchange effect of the heat exchanger and the performance of the unit. Foreign matters in chilled water will increase the water pressure drop of the heat exchanger, reduce the water flow, and cause mechanical damage to the heat exchanger tube bundles, and even block the water passage.

Please check the water quality of the water system in strict accordance with the water quality requirements of the unit, so as to ensure that the water quality in the unit meets the requirements in the table.

Items	Unit	Permitted Values	Tendency	
			Corrosion	Scaling
PH Value（25°C）		7.5-8.0	○	
SO4--	ppm	<100	○	
HCO3-/ SO4--	ppm	＞1.0	○	
Cl-	ppm	<50	○	
PO4	ppm	<2.0	○	
NH3	ppm	<0.5	○	
Free Chlorine	ppm	<0.5	○	
Fe+++	ppm	<0.5	○	
Mn++	ppm	<0.05	○	
CO2	ppm	<10	○	
H2S	ppb	<50	○	
Temperature	°C	<65	○	○
Oxygen content	ppm	<0.1	○	
Total hardness	dH	4.8-8.5		○

⚠ **Caution:**

- **Users shall regularly check the water quality before installation and during operation of the unit. Please ensure that the water quality meets the requirements in the above table. Once the water quality exceeds the allowable value for a long time, the heat exchanger may have the problem of corrosion leakage and serious scaling.**
- **Items with corrosion tendency show that when the water quality exceeds the allowable value for a long time, it can cause corrosion and leakage of heat exchange tubes, and the failure of unit operation and affection of normal use;**
- **Items with scaling tendency show that when the water quality exceeds the allowable value for a long time, it will lead to serious scaling of heat exchanger, affection of heat exchange and direct reduction of cooling (heating) effect of the unit.**
- **The loss caused by the water quality problem of the user shall be borne by the user.**

Part 3: Electrical Connection

3.1 Safety Precautions

It is earnestly requested to be strictly observe the various safety-related important matters listed in the "Safety Precautions".

Symbols Used in This Manual

⚠ **Warning**: The warning must be observed to avoid physical injury to the user.

⚠ **Caution**: The warning must be observed to avoid damage to parts.

⚠ **Caution**: Please read this manual and various labels posted on units and components carefully

⚠ **Warning**: Only use the accessories designated by our company and request the installation and technical services from manufacturers or authorized dealers. The improper installation of control accessories may result in controller failure or electric shock. Users must not attempt to repair by themselves. The improper controller repair may result in electric shock or damage. Please contact the manufacturer if there is any repair need by the user.

⚠ **Warning**: Ground wire must be installed for unit power supply and set controller. Do not connect the ground wire of the unit power supply to the ground wires of gas fuel pipe, water pipe, lightning conductor or telephone. The improper grounding may cause an electric shock accident. Please check frequently whether the grounding wire is firmly connected to the grounding terminal and grounding electrode of the unit.

⚠ **Warning:** As there is strong current in the control cabinet, do not touch other control elements and terminal components except the control panel before cutting off the power supply of the unit, so as to avoid personal injury.

⚠ **Caution:** The strong and weak electric wires shall be separated for wiring of the unit, so as not to affect the communication and operation of the unit.

⚠ **Caution:** The user wiring must avoid the high-temperature pipe of the unit or the high-temperature casing of the compressor, etc., so as to avoid damage to the lead.

⚠ **Caution:** The wire controller must be installed firmly. Otherwise, it may cause body injury or damage to the controller due to the drop

⚠ **Warning**: Do not use sharp objects to operate keys, so as to avoid damage to controller. Do not twist or pull the wires in the control cabinet to avoid loose wiring and control Fault. Do not wipe the controller or control element with benzene, diluent or chemical reagent, otherwise it may cause discoloration or mechanical Fault. To remove dirt, first immerse the cloth in water containing neutral detergent, wipe after wringing out the water, and then wipe clean the controller or control element with a dry cloth. Do not apply excessive force to the display or joints, so as not to cause tonal variation.

⚠ **Warning:** User's power supply incoming wire and other wiring of the unit shall be sealed, in order to ensure that its electric cabinet body's protection level is not lower than IP54. The excessively low protection level may result in the entry of moist air or dust, which may accelerate the invalidation of the functions of the low-pressure device in the box, or even the burning.

⚠ **Warning:** Except for the period of maintenance, the door of the control box must be closed to prevent the entering of the water

⚠ **Warning:** When the control box is in maintenance, it is necessary to ensure that the rainwater cannot enter the box body

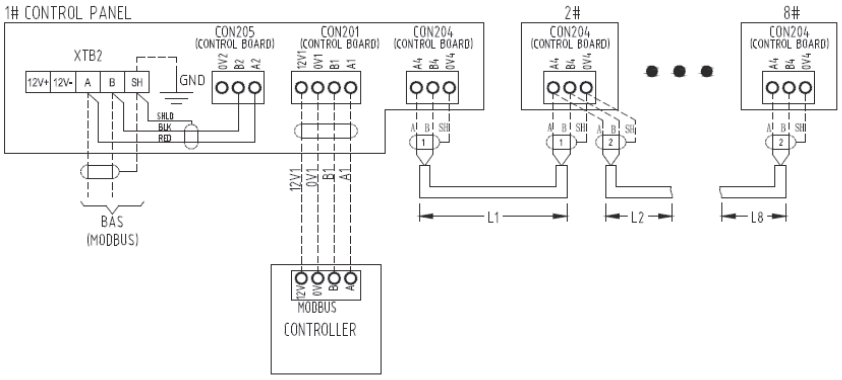
⚠ **Warning:** For the unit's wire incoming, it adopts the mode of line pipe. It is necessary to ensure that the water cannot enter the line pipe, otherwise it is necessary to disconnect the pipe before entering the unit, in order to drain the water off

⚠ **Warning:** Before the wire incoming, the unit is required to have certain margin and cannot be too tight, in order to prevent the wire from being pulled loose when the unit is in operation.

3.2. Communication wiring and address setting

3.2.1 Wiring for the modular application

- Wiring for the wire controller:
  The whole system can be composed of 1-8 units, and the control quantity of the wire controller cannot be more than 8 units.



COMMUNICATION WIRING DIAGRAM FOR MULTIPLE MODULES CONNECTION

TABLE 1 THE REQUIREMENT OF COMMUNICATION CABLES

TOTAL LENGTH	L = L1+L2+...+L8 (M)		
	L<100M	100M<L<500M	L>500M
CABLE TYPE	RVVPS 2X0.75mm^2	RVVPS 2X1mm^2	CONTACT JCI SERVICE

- Wiring of the 7-inch touch screen controller (option):
  The whole system can be combined of 1-8 units, and the 7-inch touch screen's control quantity cannot be more than 8 units, and the specific operation of the 7-inch touch screen controller is shown in "Operating Instructions for 7-inch Touch Screen Controller".

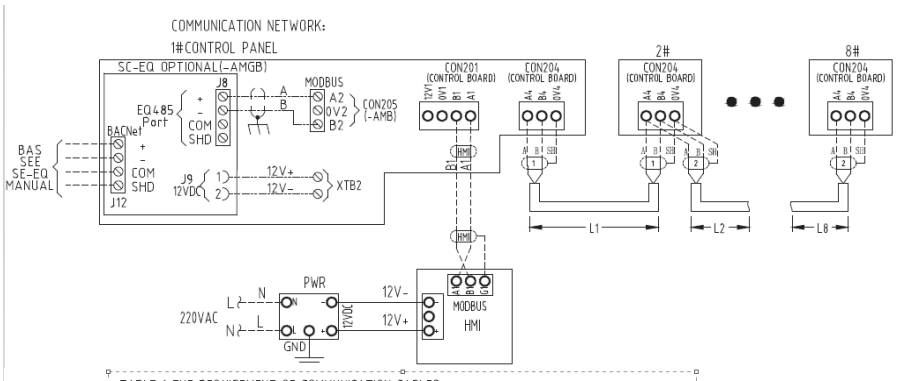


TABLE 1 THE REQUIREMENT OF COMMUNICATION CABLES

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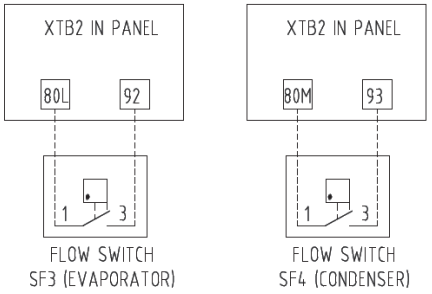
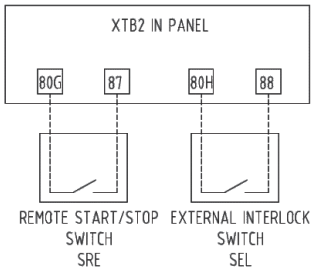
	L<100M	100M<L<500M	L>500M
CABLE TYPE	RVVPS 2X0.75mm^2	RVVPS 2X1mm^2	CONTACT JCI SERVICE

3.2.2 Wiring of the master unit (1 # module)

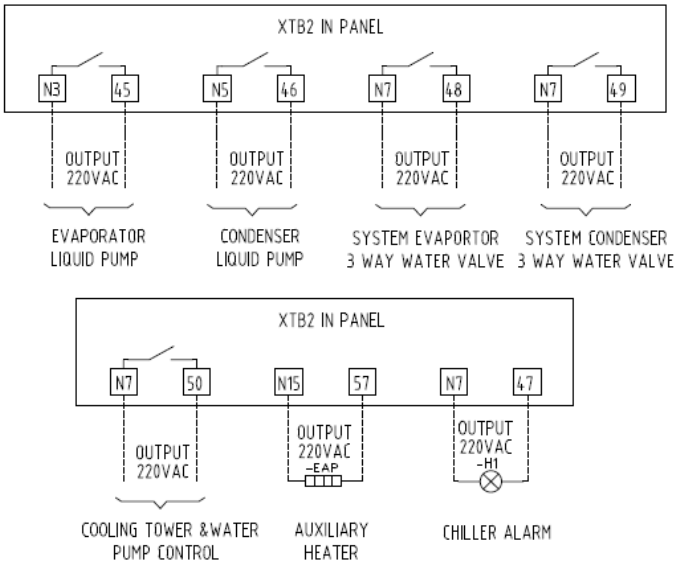
- System evaporator water flow switch / System condenser water flow switch



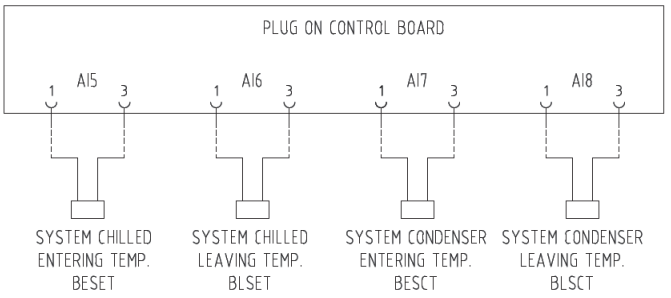
- Remote switch / External interlock



- System chilled water pump / System condenser water pump / System evaporator three-way valve / System condenser three-way valve / Cooling tower fan and water pump / Auxiliary electric heater / Unit alarm

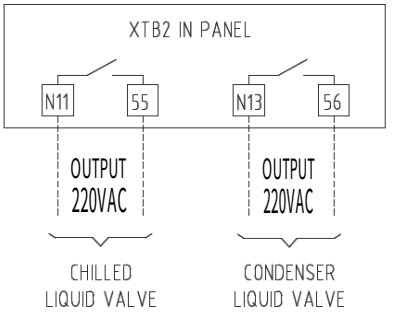


- System chilled water returning temperature / System chilled leaving water temperature / System condenser returning water temperature / System condenser leaving water temperature



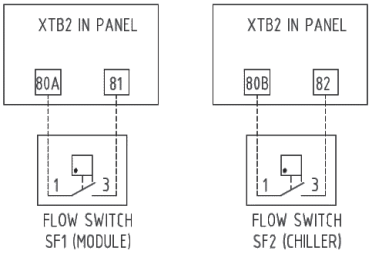
3.2.3 Module's water flow switch and water valve's wiring (all modules)

- Water side's shut-off valve for module's evaporator and condenser



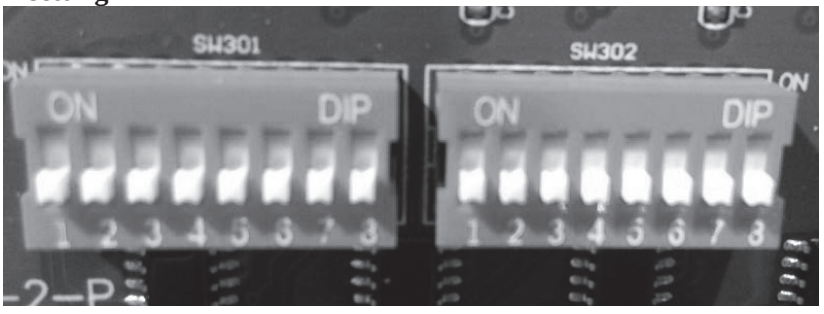
Caution: It must correspond to the module, for example, the water valve on the 2# module water pipe must be connected to the 2# module machine.

- Water flow switch for module's evaporator and condenser



Caution: It must correspond to the module, for example, the water flow switch on 2# module's water pipe must be connected to the 2# module machine.

3.2.4 Module DIP setting



Module No.:

The setting of the DIP address has been set at the delivery of the unit. If module's centralized control shall be adopted on the site, it is required to reset the address of each module (the addresses set at the delivery are all the 1 #). See specifics in the followings:

Model Address	DIP301-1	DIP301-2	DIP301-3	DIP301-4
1#	ON	OFF	OFF	OFF
2#	OFF	ON	OFF	OFF
3#	ON	ON	OFF	OFF
4#	OFF	OFF	ON	OFF
5#	ON	OFF	ON	OFF
6#	OFF	ON	ON	OFF
7#	ON	ON	ON	OFF
8#	OFF	OFF	OFF6	ON

DIP301's dialing code 5/6/7/8 shall be reserved.

Note:

- ✧ When the main board is energized, the dialing switch is prohibited to be set.
- ✧ The wire controller and the 7-inch touch screen shall be used as the controller, and only 8 modules can be controlled at most

Model setting:

Model	DIP302-1	DIP302-2	DIP302-3
20TR	ON	OFF	
30TR	OFF	ON	
40/50TR	ON	ON	
China			OFF
North America			ON

DIP302's dialing code 4/5/6/7/8 shall be reserved.

Settings for Mode:

- ✧ 0-refrigeration; 1-heating; 2-heat recovery; 8-water pump cycle
- ✧ Only 1# module is valid, which is set by HMI
- ✧ If the condition of unmatched setting occurs, the fault of unmatched setting will be reported.

3.3. Recommendation for the power cable of the unit

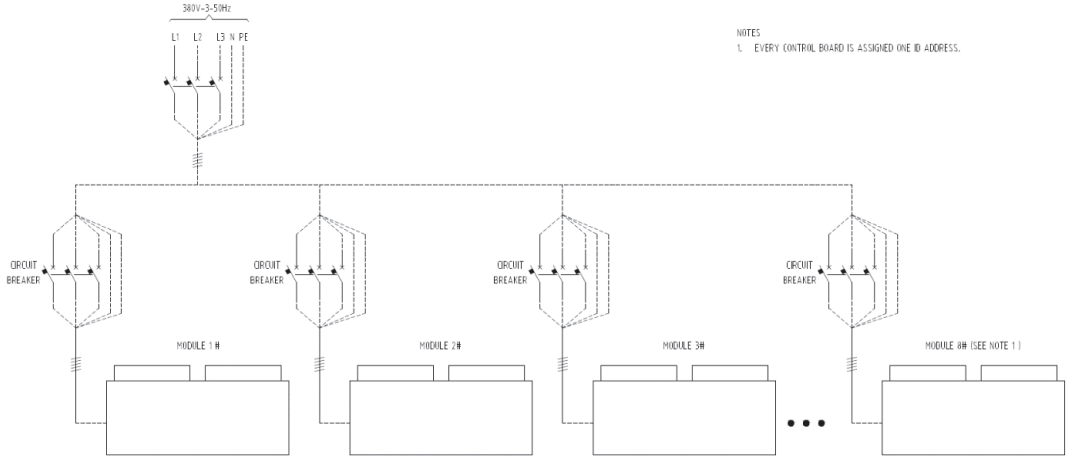
Unit Model	YCWE020	YCWE030	YCWE040
Unit power supply	380/400V 3N~ 50Hz	380/400V 3N~ 50Hz	380/400V 3N~ 50Hz
Permitted voltage range	342V~418V	342V~418V	342V~418V
Maximum operating current of unit	53A	79A	104A
Circuit breaker	75A	100A	150A
Cable	16 MM^2	25MM^2	35MM^2

Note:

- ✧ The above-mentioned cable selection is based on "wiring requirements at ambient temperature of 40°C", and the relevant local specifications shall be referred to specifically;
- ✧ The site must be equipped with a leakage protector and the unit must be grounded securely.
- ✧ In case there are differences in the site conditions (if there are derating conditions), please refer to the IEC standard and cable manufacturer requirements for model selection;
- ✧ Only use the copper wire for the power cord.
- ✧ The above wire diameter and the specification for the circuit breaker are only for each single module, and for the total circuit breaker and the power line's specification, their selection shall be determined according to the total load, and you can contact York's after-sales personnel

3.4. Installation and wiring of the unit

3.4.1 Power distribution diagram of system



Caution: The circuit breaker shall be provided by the user. The whole system is composed of 1-8 modules.

3.4.2. See the diagram of electrical principle for power supply's connection mode of single module

Caution:

- ➢ For all the user's cable termination, it must be connected after the pressure welding of the copper terminal, and it is strictly prohibited to directly coil the cable on the binding post;
- ➢ After the wiring of the power line of the unit is completed, the construction personnel need to lock the cable locks, which is on the side of the electric cabinet, tightly, in order to prevent water leakage.
- ➢ Wire inlet and outlet hole of the unit electric cabinet: wire incoming should be performed according to the label on the electric cabinet.

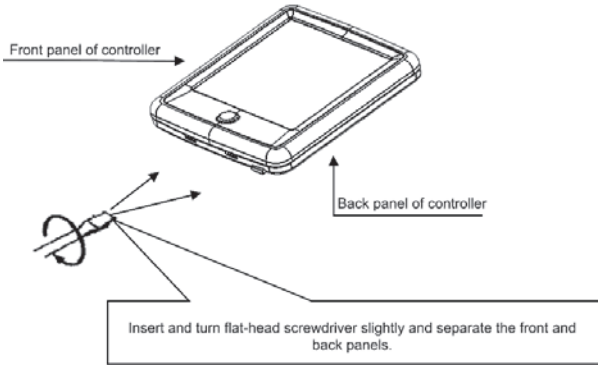
Emphasis: After the wire connection is completed, the operator must lock the cable lock on the lower part of the electric cabinet to prevent water from entering the electric cabinet. At the same time, in order to prevent water from entering the electric cabinet directly through the sheath, it is necessary to prevent the sheath from forming the U-shaped bend.

3.5. Installation of wire controller

3.5.1 Working environment of control system and related standards

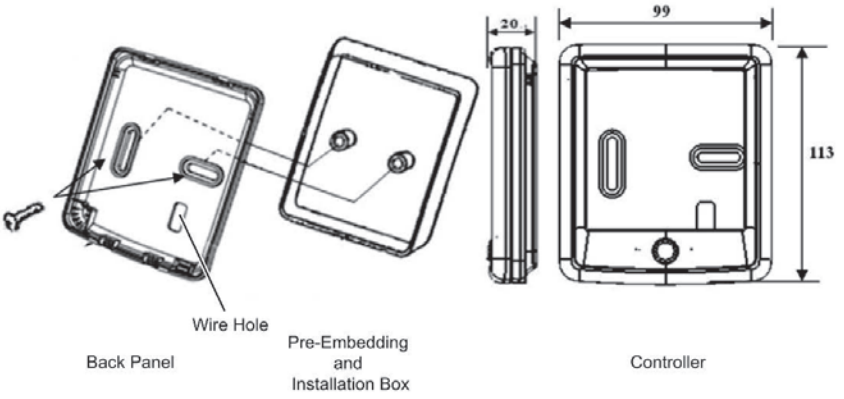
No.	Items	Parameter
1	Working environment:	-20°C～60°C RH＜93% Non-condensing
2	Storage environment	-30°C～70°C
3	Vibration environment	10Hz£ f< 57Hz, 0.15mm 57Hz ≤f≤200 Hz, 20m/s^2 10 times for 1 octave per minute

3.5.2 Split for front panel



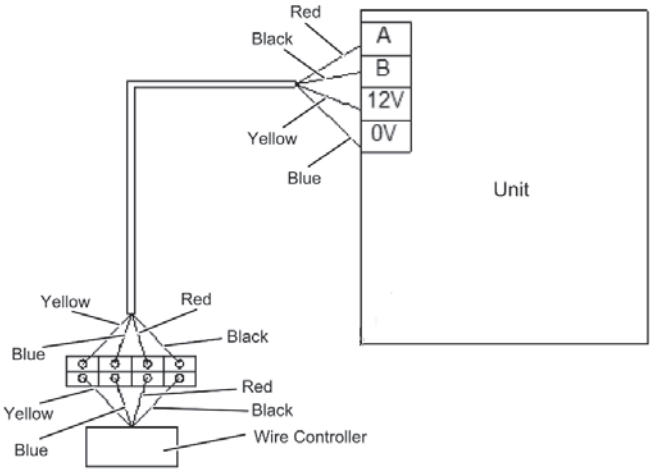
⚠ **Caution:** As printed circuit board is on the front pnael of controller, be cautious when using flat-head screwdriver.

3.5.3 Fixation for rear panel

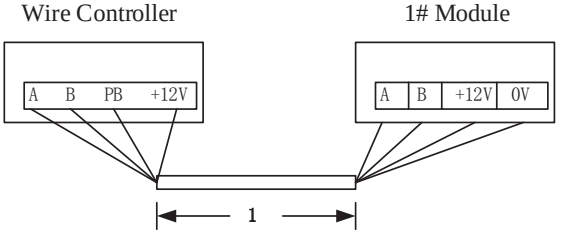


3.5.4 Wiring description for wire controller

3.5.4.1 The connection between the wire controller and the unit is shown in the following figure



Note: One controller can only control one unit.



1. Communication cables between host and wire controller should be 85% net type shielded wire of four-core, which length is within 15m.

3.5.4.2 Wire controller's power supply and communication port:

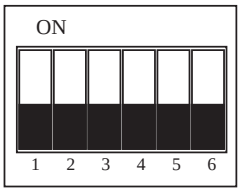
JP4_1	JP4_2	JP4_3	JP4_4
RS485-B	RS485-A	+12V	GND

Note:

1） A buzzer is arranged on the wire controller and it is used for prompting the effective operation.

2） The wire controller requires clock and battery.

3.5.5 Dialing plate (SW1)



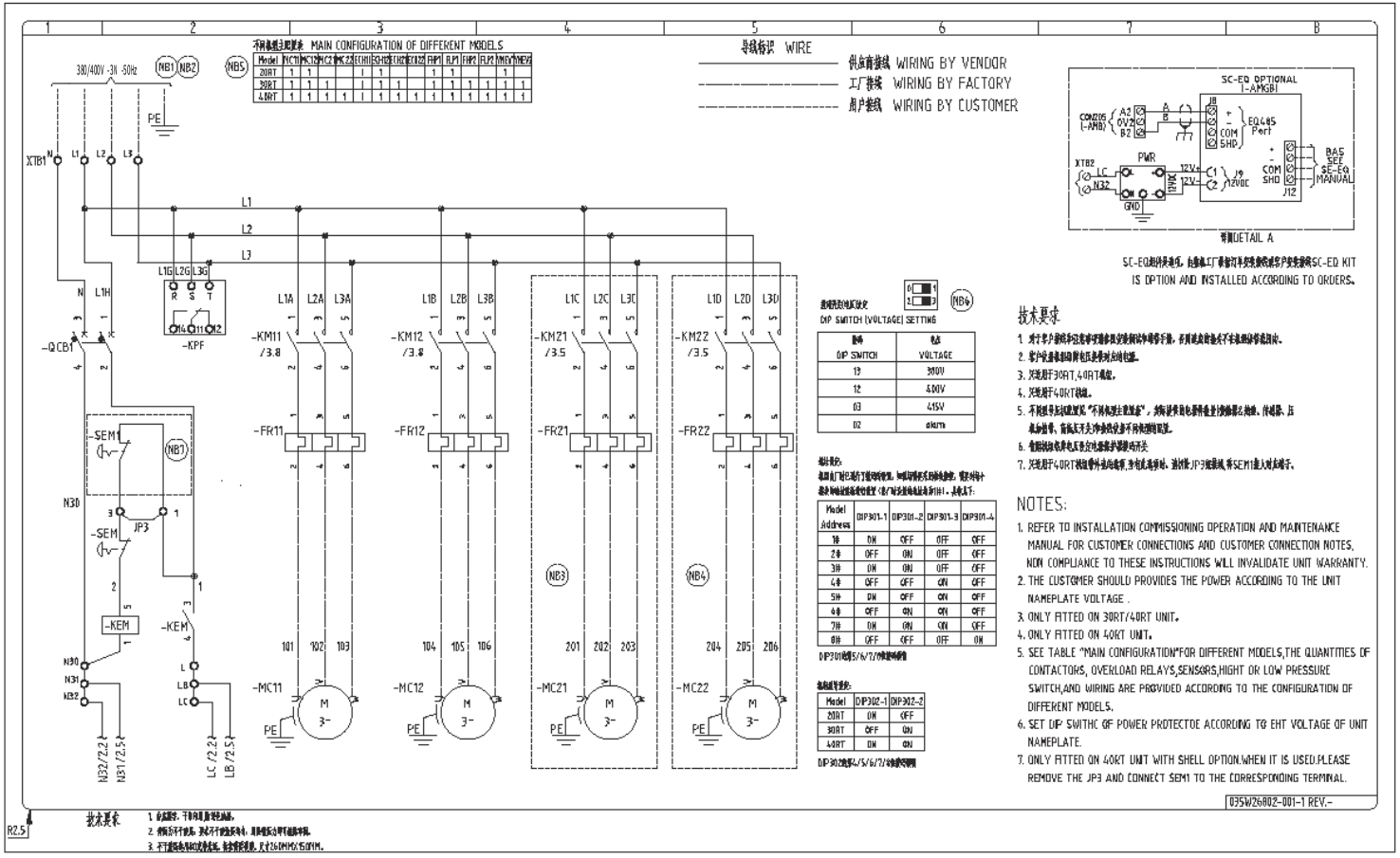
Dialing code for wire controller					
SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6
OFF	OFF	OFF	OFF	OFF	OFF

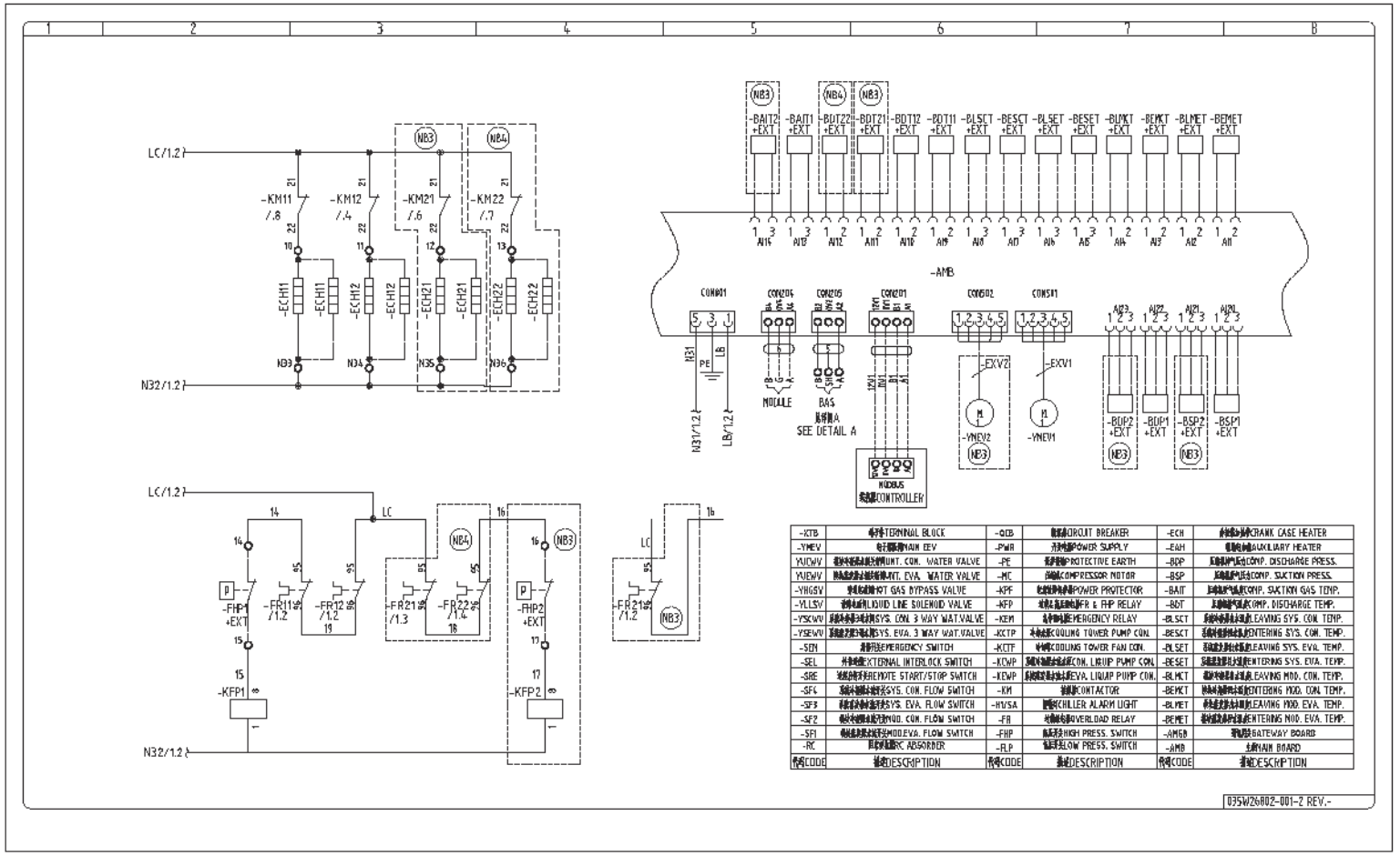
After the Installation and setting, pull out the battery isolating bar and snap the front and back panels together

3.5.6 Precautions for installation of wire controller

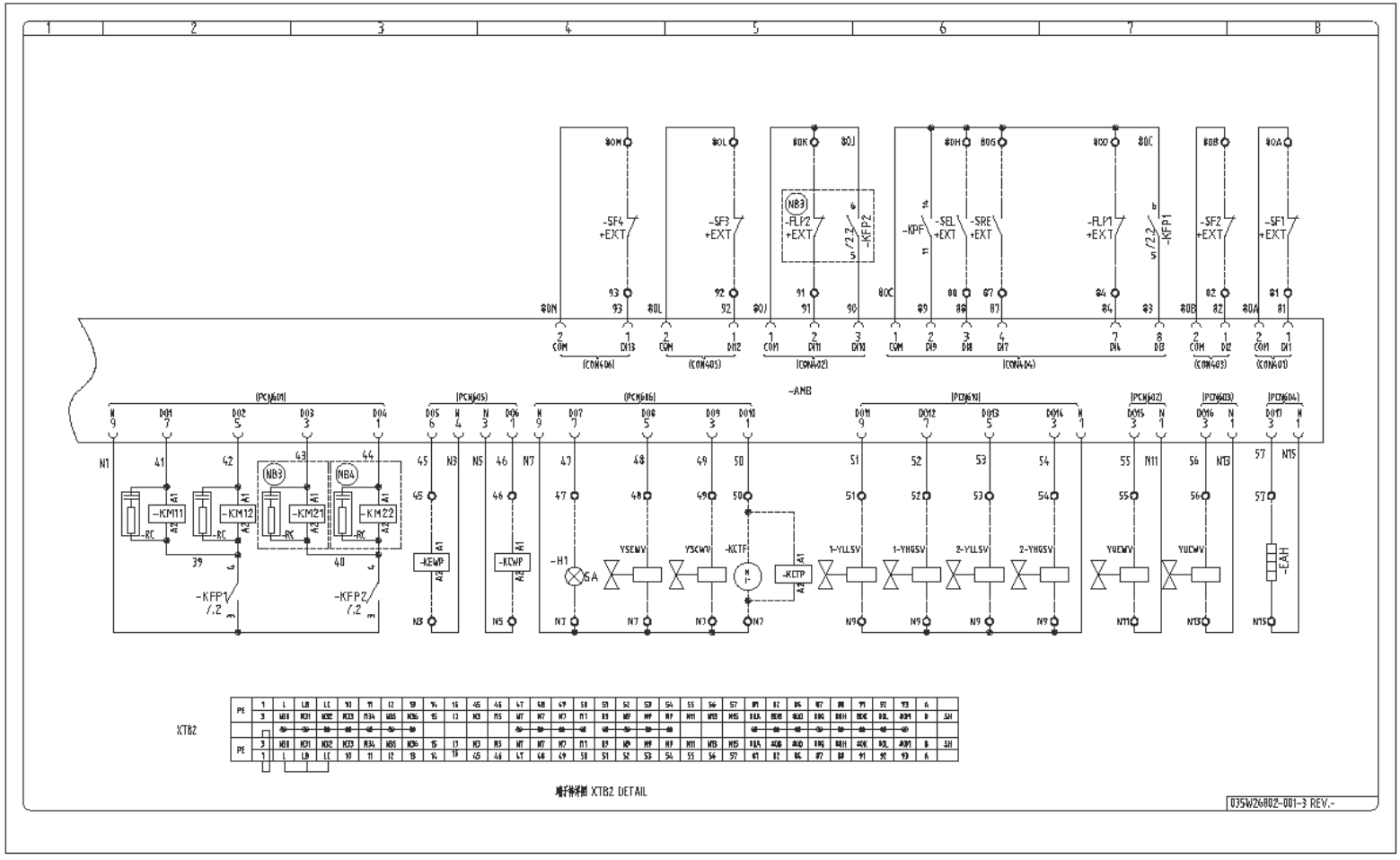
- If the isolating bar is not pulled out, the time will be lost when the power is cut off, which will affect the time-related functions and protection. The time-related functions and protection may also be affected by the time confusion due to static electricity when it is powered on.
- Be sure to slowly remove the screen protective film so as not to damage the display screen.
- During installation, do not touch the printed circuit board with your hand and do not energize it when it is installed, in order to avoid the damage to the controller
- The wire controller must be installed in the indoor dry and ventilated place
- Before installation, please pre-embed 86mm*86mm wire box and communication conduit (prepared by user)
- Requirements for communication interface: RS485 communication interface
- Requirements for power: DC12V DC power supply shall be provided on the indoor unit's control board

3.6. Unit electrical schematic diagram





-KTB	TERMINAL BLOCK	-QCB	CIRCUIT BREAKER	-ECH	CRANK CASE HEATER
-YMEV	MAIN EEV	-PWR	POWER SUPPLY	-EAH	AUXILIARY HEATER
YUCWV	UNT. CON. WATER VALVE	-PE	PROTECTIVE EARTH	-BDP	COMP. DISCHARGE PRESS.
YUEWV	NT. EVA. WATER VALVE	-MC	COMPRESSOR MOTOR	-BSP	COMP. SUCTION PRESS.
-YHGSV	HOT GAS BYPASS VALVE	-KPF	POWER PROTECTOR	-BAIT	COMP. SUCTION GAS TEMP.
-YLLSV	LIQUID LINE SOLENOID VALVE	-KFP	FR & FHP RELAY	-BDT	COMP. DISCHARGE TEMP.
-YSCWV	SYS. CON. 3 WAY WAT.VALVE	-KEM	EMERGENCY RELAY	-BLSCT	LEAVING SYS. CON. TEMP.
-YSEWV	SYS. EVA. 3 WAY WAT.VALVE	-KCTP	COOLING TOWER PUMP CON.	-BESCT	ENTERING SYS. CON. TEMP.
-SEM	EMERGENCY SWITCH	-KCTF	COOLING TOWER FAN CON.	-BLSET	LEAVING SYS. EVA. TEMP.
-SEL	EXTERNAL INTERLOCK SWITCH	-KCWP	CON. LIQUID PUMP CON.	-BESET	ENTERING SYS. EVA. TEMP.
-SRE	REMOTE START/STOP SWITCH	-KEWP	EVA. LIQUID PUMP CON.	-BLMKT	LEAVING MOD. CON. TEMP.
-SF4	SYS. CON. FLOW SWITCH	-KM	CONTACTOR	-BEMKT	ENTERING MOD. CON. TEMP.
-SF3	SYS. EVA. FLOW SWITCH	-HVSA	CHILLER ALARM LIGHT	-BLMET	LEAVING MOD. EVA. TEMP.
-SF2	MOD. CON. FLOW SWITCH	-FR	OVERLOAD RELAY	-BEMET	ENTERING MOD. EVA. TEMP.
-SF1	MOD.EVA. FLOW SWITCH	-FHP	HIGH PRESS. SWITCH	-AMGB	GATEWAY BOARD
-RC	DESICC ABSORBER	-FLP	LOW PRESS. SWITCH	-AMB	MAIN BOARD
CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION



Part 4: Operation instructions of wire controller

4.1 Appearance Description

1) The wire controller can be used for performing on-off control by the on-off key, and the key is in the form of a button (mechanical-type);
2) The rest of the control keys are in the form of touch-screen, and the touch screen and the display part compose the entire screen, therefore they are indivisible.
3) The LCD screen display area can be divided into: time indication area, temperature indication area, special mode indication area, timing on/off indication area, operation mode indication area and other status indication area, etc., which are listed as follows:

Appearance Description:

Type of LCD:

(1)--Date and time display and setting area

(2)--Timing setting area

(3)--Air-conditioning temperature and tank temperature display area as well as the set value display area
(4)--Number of display code
(5)--Operation mode display area
(6)--Status display areas such as screen lock, communication, etc.
(7)--Key area

4.2 Power-on initialization

Entry conditions: power up

Exit condition:

1） Exit it after 1 unit is searched

2） If the unit cannot be searched, wait for 60 seconds and then report the communication Fault

Execute:

1) Turn off the buzzer after it is turned on for 100 mS
2) Turn the backlight off within 40 seconds after it is turned on
3) Shield the operation of the wire controller
4) Read the setting value of the dial switch and handle with it (refer to the setting for the dial switch)
5) Read the stored value and process it
6) Find the unit
   If the unit is found out, exit the initialization.

4.3 Restore the Default Value

At the daily display state, press and hold  for 5 seconds to enter the parameter setting state for the system level; firstly enter the setting item 01, which is the item of restoring the default value; at the same time, display the character of 01 at the display area of temperature; flash the current parameter value at the display area of time; 00 means not restoring the default value, and 01 means confirming the default value; If you want to restore the default value, set the display area of time to 01; then press the key  to confirm the current operation, or press the key  to exit the parameter setting, or automatically exit the state if there is no operation in 10s.

4.4 Displaystatus

4.4.1 Initialization state

1) Display of wire-controller lock: the wire controller is in the locked state and the control operation cannot be performed, with the display of icon 

2) Display of keypad lock: the key is in locked state, and the control operation cannot be carried out, with the display of icon 

3) Communication flashing display: display of flashing icon 

4) Others will not be shown

4.4.2 Screen saver status

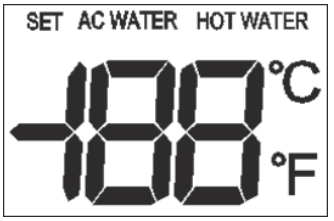
Backlight off

4.4.3 Daily display status

Serial Number	Display Area	Display content (daily display)	
		Power Off	Power On
1	Time display area	The current date and time of the system can be modified by wire controller, and the default value is 2000-1-1 0:00.	
2	Timing display area	If there is a timing setting: the clock flag will be displayed, otherwise it will not be displayed; If there is timing ON or OFF settings, the timing mode will be displayed.	
3	Temperature display area	No Display	When there is no occurrence of fault, the current actual controlled water temperature shall be displayed. When there occurs any fault,  will flash; Otherwise, the icon  will not be displayed; The fault code for that fault will be displayed in the form of flashing digit. When there are multiple faults, the code of the last fault will be displayed.
4	Code number display area	No Display	When there is any fault, the second digit will display the module No. In fault's inquiry interface, the first digit will display the module No. of the fault, and the second digit will display the serial No. of the fault. For the daily display interface, when there is no fault, it will show the loading rate, for example, if it displays 50, it indicates that the loading rate is 50%; if it displays FC (Full Capacity), it indicates that the loading rate is 100%.
5	Operation mode display area	No Display	Display the current user setting modes of the unit connected by wire controller.
6	Status display area	From the left to the right, the order shall be as follows: Sign of low sound  : this will display during the mute mode or when there is a low sound mode in the night; otherwise, this will not be displayed. Sign of communication  : this indicates the current communication status of the display wire controller and the unit. Sign of wire-controller lock's status  : this will be displayed according to current wire-controller lock's status. Sign of keypad lock's status  : this will be displayed according to current keypad lock's status. Sign of compressor's status  : When the compressor is warm-up, this will flash; when the compressor is started, this will display, and this will not display at other time. Sign of water pump's status  : When the water pump is in operation, this will display; otherwise, this will not display.	
7	Touch screen key display area	Display all keys	

Description of displaying temperature

Diagram of temperature display



Schematic for the display of negative temperature (the display should be as compact as the diagram, and the numerical value shall be right-justified)

4.4.4 Alarm status

1) Display of communication fault between the wire controller and the unit

When a communication fault occurs between the wire controller and the unit,  will flash, and there will be flashing display of the fault code in temperature display area; otherwise,  will be hidden.

2) If there is any fault,  will flash, and there will be flashing display of the fault code in temperature display area; otherwise,  will be hidden.

3) When the fault code is in flashing display state, press  or do not operate it for 1 minute and returned to the daily display interface, but  will flash until the fault is eliminated.

4) In daily display state, long press  +  for more than 5 seconds, and then enter the fault inquiry interface.

4.4.5 Inquiry and setting states

(Please refer to the inquiry function and setting function)

4.5 Keys

1） The key operation comprises the following steps: be effectively pressed and then be effectively released. Its effective operation shall be marked by the effective release of the key.

2） The precondition for the execution of the key is that the backlight is on. If the backlight is off, the first keypress can only illuminate the backlight.

3） Only when the backlight is on, the second keypress can be valid

4） If the backlight is on, under daily display state, when press the running key, such as the mode/temperature key, etc., the first press will not trigger the operation, and this will only transfer the state from the daily display state to the operation interface, and the saved setting value will be displayed, and then the second keypress will change the setting value.

4.6 Mechanical switch key

Referenced basic function

4.7 Buzzer

When it is energized for power-on, it shall be operated for 100 mS

When release the key after pressing (including the switch key) it, it shall be operated for 100mS

Until Auto-Off

4.8 Backlight

Two indication states of the backlight

Bright: it should be this state when the screen protection is not operated

Dim bright: it should be this state when the screen protection is operated

4.9 Functions

4.9.1 Basic Functions

No.	Main Function	Function Key	Operation Instructions
1	Unit Power ON/OFF		Short press this key to switch unit's on and off status. When the status of the unit is on, if you short press this key, it will turn off the unit; When the status of the unit is off, if you short press this key, it will turn on the unit. The precondition for the execution of the key is that the backlight is on. If the backlight is off, the first keypress can only illuminate the backlight.
2	Selection key for cooling mode		Precondition: under daily display state or mode setting state: 1） Press any mode setting key to enter the mode setting state; 2） Display the "SET" icon  of the temperature display area; 3） Short press the  key and the cooling icon  will flash; 4） Do not input anything within 10 seconds or short press the  key to confirm the current operation and return to the daily display state; 5） Short press the  key to cancel the current operation and return to the daily display status.
3	Selection key for heating mode		Precondition: under daily display state or mode setting state: 1） Press any mode setting key to enter the mode setting state; 2） Display the "SET" icon  of the temperature display area; 3） Short press the  key and the heating icon  will flash; 4） Do not input anything within 10 seconds or short press the  key to confirm the current operation and return to the daily display state; 5） Short press the  key to cancel the current operation and return to the daily display status.

4	Selection key for heat recovery mode		Precondition: under daily display state or mode setting state: 1） Press any mode setting key to enter the mode setting state; 2） Display the “SET” icon  of the temperature display area; 3） Short press the  key and the heat recovery  icon will flash; 4） Do not input anything within 10 seconds or short press the  key to confirm the current operation and return to the daily display state; Short press the  key to cancel the current operation and return to the daily display status.
5	Temperature setting key	 	Prerequisites: In the daily display status, mode setting status or target water temperature setting status: 1） Press the temperature setting key to enter the target water-temperature setting state, and the temperature value will flash; 2） Display the “SET” icon  in the temperature display area and display the current setting temperature; 3） Short press the  key to increase 1 degree of the temperature, and the maximum value shall not exceed the maximum limit value; 4） Short press the  key to decrease 1 degree of the temperature, and the minimum value shall not exceed the minimum limit value; 5） Short press the  key to switch between AC WATER (target temperature for system’s chilled water) and HOT WATER (system’s cooling water temperature); 6） Backwater control for refrigeration water; setting range: 10.0～30.0°C; 7） Backwater control for heating water; setting range: 20～50°C; 8） Outflow water control for refrigeration water; setting range: 5.0～24.0°C; 9） Outflow water control for heating water; setting range: 25～55°C; 10） Backwater control for refrigeration water - saline water; setting range: -5.0～20.0°C; 11） Outflow water control for refrigeration water - saline water; setting range: -10.0～15.0°C; 12） Temperature of the hot water tank; setting range: 30.0～55.0°C; 13） Do not input anything within 10 seconds or short press the  key to confirm the current operation and return to the daily display state; 14） Short press the  key to cancel the current operation and return to the daily display status.

4.9.2 Setting function

4.9.2.1 System time and date setting function

Function keys: 

Operation steps:

a) Conditions for entry time and date settings

When it is in the daily display state, long pressed  for 5 seconds to enter the system clock setting, and the  sign and “SET” will display, and the year start will falsh in the timing display area.

Select setting item

b) Press the  key to select the time position to be modified.

The cycle order is year -> month -> day -> hour -> minute -> year

The selected position starts flashing.

If the unselected one has already been set, the newly set value will be displayed.

If the unselected one has not been set, the system clock value before entering this setting will be displayed.

c) Press  or  key to modify the time and date to be modified.

Short press key, increase or decrease 1 each time,

and long press to automatically increase or decrease 5 every second.

The initial value and adjustment range of each parameter are as follows:

Time or date	Initial value	Adjustment range
Hour	Current value	0～23
Minute		0～59
Year		2000～2099
Month		1～12
Day		1～31 (in the month of Jan., Mar., May., Jul., Aug., Oct., and Dec.), 1～30 (in the month of Apr., Jun., Sep., and Nov.) and 1～29 (in the month of Feb)

When setting the system time, the current system time when entering the setting is taken as the reference.

Press the  key to save the new settings and automatically transfer to the next setting object.

Press the  key to cancel the new setting value and automatically transfer to the next setting object.

d) Exit operation for time setting

Do not perform effective operation within 10 seconds or short  press to exit the time setting.

Note: During the operation, pressing other irrelevant keys shall be invalid.

4.9.2.2 Timing setting function

Function keys: 

Operation steps:

a) Conditions for entering the timing setting

In the daily display state, long press  key for 5 senconds, then it enters the timed setting state to read the timing setting value into the register.

At this time, the  and “SET” icon will display in clock display area, and “ON” icon starts flashing.

The hour area displays the hour value that was originally set on at the scheduled time. If there is no set value, the default value is 00.

The minute area displays the minute value that was originally set on at the scheduled time. If there is no set value, the default value is 00.

b) Timing setup process

The timing setting process is as follows:

Timing ON Settings -> Timing OFF Settings -> Timing Mode Settings -> (Weekly Settings for Air Conditioning Timing) -> Timed ON Settings

When the timing setting is on,  and the “SET” icon will display in the clock display area, and the ON starts flashing;

When the timing setting is off,  and the “SET” icon will display in the clock display area, and OFF will falsh;

When the timing mode is set, the original timing mode setting shall be flashed. The default value shall be ONCE.

c) Time setting for timing ON and OFF

Press  to select the hour or minute, and the selected object will flash (can be cycled)

Press  or  to modify the time required modification.

Short press key, increase or decrease 1 each time,

Long press : automatically increase or decrease 5 in every second

Press  to save the new settings and automatically transfer to the next setting object.

Press  to restore the default value and transfer to the next setting object.

If the timing ON and OFF are not set, the timing mode setting can be skipped.

d) Timing mode setting

Enter the timing mode setting and flickeringly display the original timing mode setting.

If it is empty in previous time, the default value shall be ONCE.

Press  to select ONCE /DAILY /WEEKLY, and the selected object will flash;

Press  to save the new settings and automatically transfer to the next setting object;

Press  to restore the default value and transfer to the next setting object.

If the timing mode is WEEKLY, save the settings and transfer to the timing weekly setting; otherwise, skip the timing weekly setting.

e) Timing weekly setting

When entering the timing weekly setting, Monday shall be activated and it will flash, which indicates that you can make operation on Monday.

From Tuesday to Sunday, the original set value will be displayed.

Press  to activate from Monday to Sunday, and then to the Monday for cycle. The week which is not activated shall be displayed according to the originally set value. The activated week will flash regardless of whether it was confirmed or not.

Press  to confirm the week which is activated at this time and automatically activate the next week.

Press  to cancel the week which is activated at this time and automatically activate the next week.

f) Exit condition for timing setting

Do not perform effective operation within 5 seconds or short press  key to exit the time setting.

g) Logic for timing output

When the timing ON time expires, the wire controller will send a power on command to the main machine;

When the timing OFF time expires, the wire controller will send a shutdown command to the main machine;

Caution:

If the timing ON or OFF time is set, and the timing mode is WEEKLY, but the specific week is not set, then if the setting timing is saved, it will not be performed because there is no specific day.

Note: During the operation, pressing other irrelevant keys shall be invalid.

4.9.2.3 Function of parameter setting

Function keys: 

Operation steps:

a) Conditions for entering parameter settings

In daily display state or the module-level setting state, long press  for over 5 seconds to enter the system-level parameter setting state;

In system-level setting state, long press  for over 5 seconds to enter the module level parameter setting state.

b) Description for parameter setting interface

 Timing and operation mode, etc. will not be displayed

 If the sign will display, it indicates that the current operation is the parameter setting interface;

The temperature display area displays the parameter instruction word, and the hour area flashes to display the set parameter value; When switching to the module-machine parameter setting, the number display area will display the module number.

Press  to select the parameter items that you want to set (at this time, the parameter value originally saved by each parameter's instruction word will display). Press it for once, and it will automatically skip to the next parameter item, and the current setting value of the parameter item will display, and the circular order shall be: 01—>02—>03—>04—>…—>45—>46—>01.

Press  or  to select the setting value;

Press  to save the current settings and automatically skip to the next item;

Press  or do not perform efficient operation for 10 seconds to exit the setting mode.

Note: During the operation, pressing other irrelevant keys shall be invalid.

System level

Parameter item	Name	Set range	Note
1	Restore the default value	0~1	1-Reset
2	Selection for cooling control	0~1	0 - backwater constant-water-temperature control; 1 - outflow-water constant-water-temperature control
3	Selection for heating control	0~1	0 - backwater constant-water-temperature control; 1 - outflow-water constant-water-temperature control
4	Selection for brine chiller	Un-settable	0-standard; 1-brine chiller
5	Temperature control period	Un-settable	Seconds
6	Action return difference of chilled water	1.0~3.0	°C
7	Action return difference of cooling water	1.0~3.0	°C
8	Action return difference of hot-water	5.0~20.0	°C
9	Number of combined modules	1~8	
10	BAS Modbus address	1~255	
11	Compensation for system's chilled backwater sensor	Un-settable	°C
12	Compensation for system's chilled outflow-water sensor	Un-settable	°C
13	Compensation for system's cooling backwater sensor	Un-settable	°C
14	Compensation for system's cooling outflow-water sensor	Un-settable	°C
15	Adjustable multiplying power	Un-settable	0, 1, 2, 3, 4, 5, 6
16	Power-on heating water return difference	0.0~10.0	°C
17	Power-off heating water return difference	0.0~5.0	°C
18	Alarm for excessively low chilled outflow-water temperature	Un-settable	°C
19	Alarm for excessively low chilled outflow water temperature - saline water	Un-settable	°C
20	Alarm for excessively high cooling outflow-water temperature	Un-settable	°C
21	Limit value for excessively low suction pressure	Un-settable	kPa
22	Limit value for excessively low suction pressure - saline water	Un-settable	kPa
23	Maximum limit value for exhaust pressure	Un-settable	kPa

24	Limit value for low exhaust pressure	Un-settable	kPa
25	Protection factor for excessively low exhaust pressure	Un-settable	Represent 1. 0~2.5
26	Shielding time for water flow switch detection	Un-settable	Seconds
27	Delay for water flow switch detection	Un-settable	Seconds
28	Selection for hot and cold mode	0~1	0-HMI, 1-BAS
29	ON-OFF selection	0 ~ 2	0-HMI, 1-Remote, 2-BAS
30	Power-down memory	0~1	1-Start using
31	Clear cumulative running time	Un-settable	1-Clear
32	Clear historical fault	Un-settable	1-Clear
33	EXV refrigeration initial steps	Un-settable	
34	EXV heating/heat recovery initial steps	Un-settable	
35	EXV refrigeration minimum steps	Un-settable	
36	EXV heating/heat recovery minimum steps	Un-settable	
37	Delay for oil heating (power-on warm-up)	0-600	Minute
38	Superheat degree for refrigeration target	Un-settable	°C
39	Superheat degree for heating target	Un-settable	°C
40	Minimum operating time of compressor	Un-settable	Seconds
41	Start interval for compressor	Un-settable	Seconds
42	Hours for operation limit time (0 - enabled; otherwise it shall be enabled)	Un-settable	Hour, 0 - enabled; otherwise it shall be enabled
43	Configuration for hot gas bypass valve	Un-settable	0-None, 1-System 1, 2-System 2, 3-System 1 & 2
44	EXV adjustment cycle	Un-settable	Seconds
45	EXV hold time	Un-settable	Seconds
46	Operating time for waterway three-way valve	Un-settable	Seconds

4.9.3 Inquiry function

4.9.3.1 Fault inquiry function

Function keys: 

Operation steps:

a) Conditions to enter the fault inquiry

In daily display state, long press  for more than 5 seconds to enter the fault inquiry state

b) Display description for fault inquiry

Daily fault display:

 flashes,

Display the latest fault code at the temperature display place

Display of the fault inquiry:

 long bright indicates that the current operation is the unit's fault inquiry; the temperature display area will flash and display the fault code, and the temperature value and temperature unit will no longer be displayed.

The time display area flashes the time when the fault occurred.

The code number display area will display the module number by tens digits, and the single digit will display the fault number (0~9, A(10), b(11), c(12), d(13), E(14), F (15).

If there is no fault record:

Code number display area will flash the display of "FF"

c) It can only store up to 16 alarm messages, the time of fault and the operating status

d) Operation

Press  or  to inquiry the fault information that occurred.

Press  to inquiry the fault from the latest to the earliest order

Press  to inquiry the fault from the earliest to the latest order.

Code number display area	Display fault number
Temperature display area	Display fault code
Clock display area	Display the system time when the alarm occurred
Status display area	State when the fault occurred
Operation mode display area	Mode when the fault occurred

e) Exit condition for fault inquiry

Short press  to exit the fault inquiry and return to the daily display status.

Or do not perform keypad operation for 10 seconds to exit the fault inquiry and return to the daily display state.

Note: During the operation, pressing other irrelevant keys shall be invalid.

f) Information table for fault

Fault information displayed by the wire controller:

Fault code:

Fault name	Fault code
AI1	1A
AI2	2A
AI3	3A
AI4	4A
AI5	5A
AI6	6A
AI7	7A
AI8	8A
AI9	9A
AI10	10A
AI11	11A
AI12	12A
AI13	13A
AI14	14A
AI15	15A
AI16	16A
AI17	1b
AI18	2b
AI19	3b
AI20	4b
AI21	5b
AI22	6b
AI23	7b
AI24	8b
AI25	9b
AI26	10b
AI27	11b
AI28	12b
AI29	13b
AI30	14b
AI31	15b
AI32	16b
DI1	1d
DI2	2d
DI3	3d
DI4	4d
DI5	5d
DI6	6d

DI7	7d
DI8	8d
DI9	9d
DI10	10d
DI11	11d
DI12	12d
DI13	13d
DI14	14d
DI15	15d
DI16	16d
DI17	1C
DI18	2C
DI19	3C
DI20	4C
DI21	5C
DI22	6C
DI23	7C
DI24	8C
DI25	9C
DI26	10C
DI27	11C
DI28	12C
DI29	13C
DI30	14C
DI31	15C
DI32	16C

Fault name	Fault code
Communication fault	1E
Fault of the communication with the HMI	1F
Water temperature sensor fault of the controlled system	2F
System’s chilled water flow fault	3F
System’s cooling water flow fault	4F
External interlock Fault	5F
Operation time limit protection	6F
System’s cooling water outlet temperature is too high	7F
System’s chilled water outlet temperature is too low	8F
System’s cooling water outlet temperature is too low	9F
Module’s chilled water outlet temperature is too low	1p
Module’s cooling water outlet temperature is too high	2p
1# Low suction pressure	3p
1 # Low exhaust pressure	4p
1# High exhaust pressure	5p
2# Low suction pressure	6p
2# Low exhaust pressure	7p
2# High exhaust pressure	8p
The exhaust gas temperature is too high 1_1	9p
The exhaust gas temperature is too high 1_2	10p
The exhaust gas temperature is too high 2_1	11p

The exhaust gas temperature is too high 2_2	12p
Deviation of exhaust gas temperature is too high 1	13p
Deviation of exhaust gas temperature is too high 2	14p
Low suction gas superheat 1	15p
Low suction gas superheat 2	16p
Low discharge superheat 1_1	1q
Low discharge superheat 1_2	2q
Low discharge superheat 2_1	3q
Low discharge superheat 2_2	4q
The cooling water outlet temperature of the heating module is too low	5q
Sudden drop of suction pressure 1	6q
Sudden drop of suction pressure 2	7q
BPHE anti-freeze pressure 1	8q
BPHE anti-freeze pressure 2	9q

Caution:

Only up to 16 fault records can be saved

4.9.3.2 Unit operation status inquiry function

Function keys: 

Operation steps:

a) Conditions for entering unit operation status inquiry

In the daily display state, press  for 5 seconds or more to enter the operation status inquiry state, and press the  key to switch between the modules 1-8.

b) Description of unit operation status inquiry display

The code number display area displays the module number.

The temperature display area displays the parameter status word.

The hour minute display area displays the status value.

Parameter status word	State parameter value
A1	Chilled backwater temperature of AI1 module
A2	Chilled outflow-water temperature of AI2 module
A3	Cooling backwater temperature of AI3 module
A4	Cooling outflow-water temperature of AI4 module
A5	Chilled backwater temperature of AI5 system★
A6	Chilled outflow-water temperature of AI6 system★
A7	Cooling backwater temperature of AI7 system★
A8	Cooling outflow-water temperature of AI8 system★
A9	AI9 1-1 exhaust temperature
10	AI10 1-2 exhaust temperature
11	AI11 2-1 exhaust temperature
12	AI12 2-2 exhaust temperature
13	AI13 1 # suction temperature
14	AI14 2 # suction temperature
15	AI20 1 # suction pressure
16	AI21 2 # suction pressure
17	AI22 1 # exhaust pressure

18	AI23 2 # exhaust pressure
19	EVE1
20	EEV2
21	1# suction gas superheat
22	2# suction gas superheat
23	N/A
24	Software version for module A
25	Software version for wire controller

c) Operation

Press  or  to display the previous and next parameter status words

d) Conditions for exiting the inquiry of unit's operation status

Short press  to exit and return to the daily display status

Or donot perform keyboard operation for 10 seconds to exit and return to the daily display status

Note: During the operation, pressing other irrelevant keys shall be invalid.

4.9.4 Function of fault reset

Function keys:  , 

In daily display state, long press  +  for 5 seconds to reset the fault manually.

4.9.5 Function of key lock

Function keys:  , 

Operation steps:

a) Entry condition

In daily display state, long press  +  for over 5 seconds to start the wire controller's key lock function,

b) Display description

 will display

c) Function description

Any keypress operations which are locked at the ON-OFF key or at the key area of the touch screen shall be invalid (except for the functional grouping key of the key lock)

d) Exit condition

Short press  +  to cancel wire controller's key lock function. The ON-OFF key of wire controller and the key area of touch screen will lock the operability of the recovery, and the display interface  will disappear.

4.9.6 Water pump's cycle function

Function key: 

Operation steps:

a) Entry condition

Under daily display state, long press  for more than 5 seconds to start water pump's cycle mode.

b) Display description

In wire controller's status display area,  will display.

c) Function description

Make the air-conditioning water pump run separately.

Part 5: Operation description for HMI 7-inch touch screen

5.1. Overview

The 7-inch touch screen controller is developed for modular water-cooled chiller and heat pump, and the user can configure and modify the unit's parameters through the human-machine interface and can see the running data and the program data through the touch screen. The data is displayed in a metric unit, Chinese or English. The human-machine interface of the touch screen is connected with unit's control board for communication through the RS485 port.

There is a switch in the upper right corner of the touch-screen panel, which is used for inputting password to enter different access configuration permissions.

5.2. Key and function display

The operator can control the whole unit through the touch screen to obtain running data, program's setting value and system's command. The liquid crystal display adopts the graphic display module with the backlight, and the corresponding action can be triggered by clicking on corresponding image or button on the touch screen. The touch key is divided into function key and programming key.

Function key:

In order to allow the user to see as much data as possible on the display screen, the programmer has designed a multi-interface way to describe the operation condition of the unit. The function keys are used for interface switching. You can switch to the corresponding interface by pressing the function key.

Programming key:

In the modifiable interface, you can click the corresponding item to modify the parameters. For example, if you click the numeric parameter, the numeric keypad will jump out, and you can select the number and click OK; For the selecting class parameters, it will only need to select the correct option in the pop-up dialog box; For the switch class variable, the OK prompt box will pop up when the item is clicked, and the status can be switched after clicking OK. If the input value is within the allowed range, the value will be accepted by the system. If the cancel-key is pressed, the modification to the current setting value will be cancelled, and it can also be used as the option key to select the setting value to be modified.

The followings are the arrangement and interrelation of all interfaces.

Main interface	System state
	System configuration
	Module status
	Fault
	Diagnosis
	Schedule
	Human-machine interface

5.3. Key and function display

5.3.1 Main interface

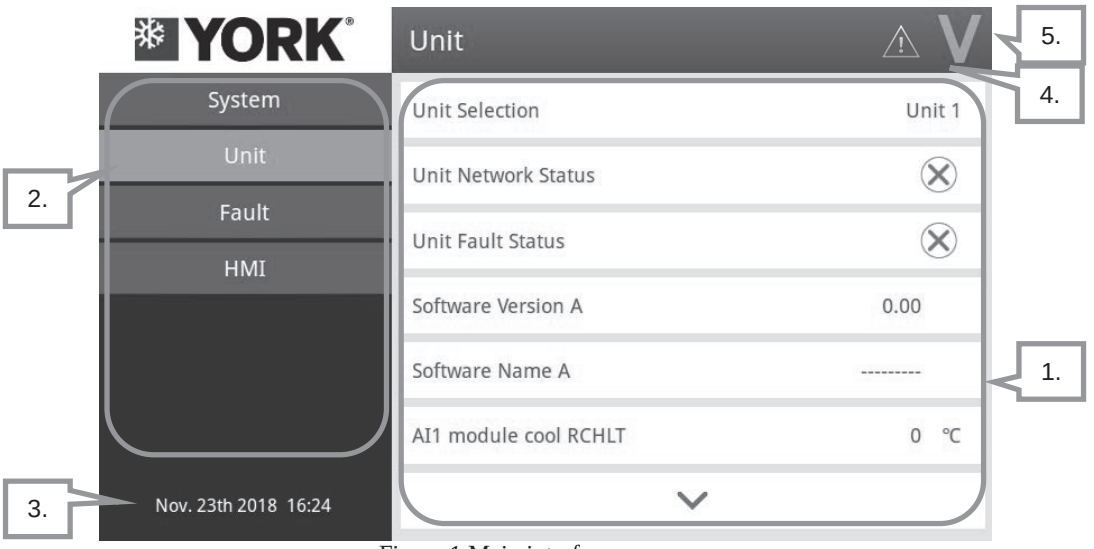


Figure 1 Main interface

This default window interface will appear after the HMI controller is energized for one-minute start-up. At the start, system's default access level is the observer, and the user of this level can turn over the data for display only, as shown in Figure 1.

5.3.2 List for system's operation status (read-only)

Operating state:
Display unit's start/stop status.

System's chilled outlet water temperature :
Display unit's chilled outlet water sensor temperature; unit:℃

Operating mode:
Display unit's operating mode. The modes include refrigeration, heating and water pump circulation.

System's cooling backwater temperature :
Display the temperature of unit's cooling backwater sensor; unit:℃

System's chilled backwater temperature
Display the temperature of unit's chilled backwater sensor; unit:℃

System's outflow water temperature
Display the temperature of unit's cooling outflow water sensor; unit:℃

5.3.3 Function area

The unit contains various parts information and it needs to classify and process different information, therefore each function in the left function area shall respectively correspond to one class of information area. The display content in the function area is related to the access level. The higher the level is, the more the content will be.

The function area displayed under observer level shall include:
System status, module status, fault and man-machine interface.

The function area displayed under operator level shall include:
Systemconfiguration, system status, module status, fault, schedule and human-machine interface

The function areas displayed under maintenance level include:
System configuration, system status, module status, fault, diagnosis, schedule, human-machine interface

5.3.4 Date and time

Display the current date and time of the system and it will be accurate to the minute.

5.3.5 Fault flag

Display whether the system has any fault at present. If yes, it will display the fault. Otherwise, it will be hidden.

5.3.6 Display of level

In order to change the system's setting value, the user must make register by using appropriate access level. When the unit powers on the power supply, at the start, the system's default access level shall be the observer, and the user of this level can turn over the data for display only which is on monitoring page, but the user cannot change and view the setting data. If the user wants to view the interfaces and parameters allowed for higher level, the user must first switch the system's level by clicking the level ID icon on the upper right corner of the page. When the system is higher than the observing access level, the user can return to the observing access level by choosing the logout

The character V represents that the current level is the observation; the character O represents that the current level is the operation; The character S represents that the current level is the maintenance. Click this icon, and the confirmation dialog box (as shown in Figure 2 below) will pop up. Click the cancel button, and it will exit the current level and return to the observation level, while if click the button of changing the user, the password input box (as shown in Figure 3 below) will pop up. Input the password of different level and click the Enter to enter the corresponding level. If the input password is correct, the user will be granted the corresponding access level. If the input password is wrong, the access level will not be changed.

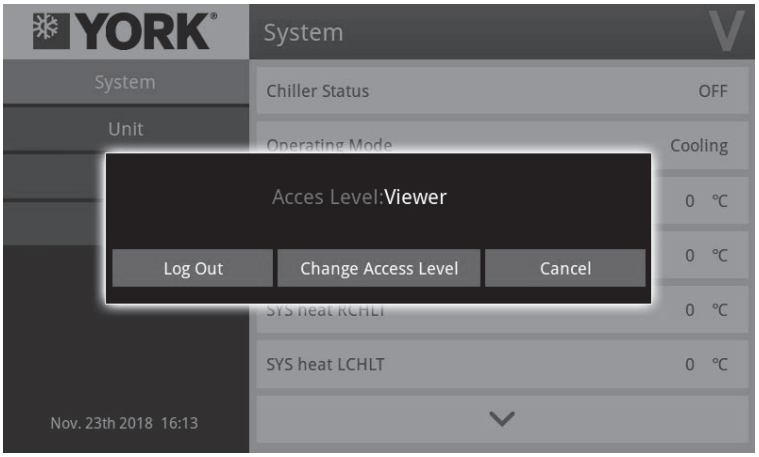


Figure 2 Confirmation dialog box of level switch

Figure 3. Password input box

If the inputting password is wrong, the dialog box will pop up to indicate that inputting password is wrong, as shown in Figure 4 below. If 5 times of incorrect password is input continuously, the input ofpassword will be prohibited within 15 minutes, as shown in Figure 5 below.

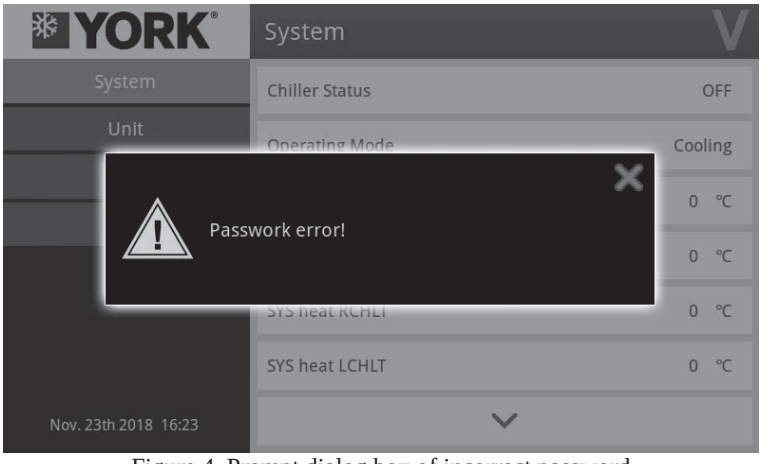


Figure 4. Prompt dialog box of incorrect password

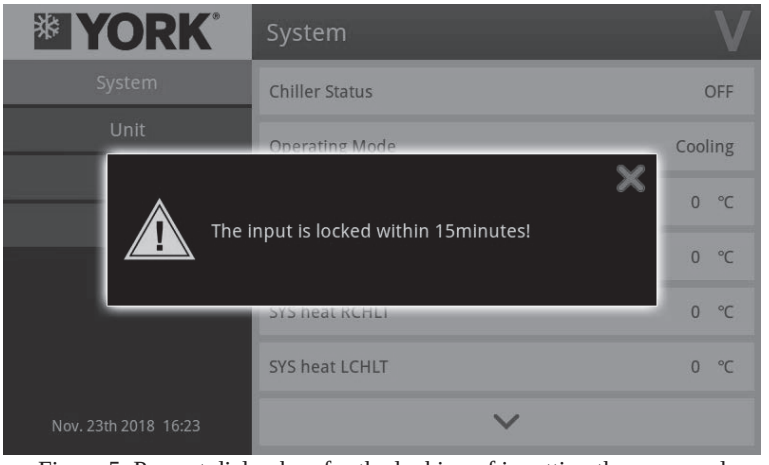


Figure 5. Prompt dialog box for the locking of inputting the password

5.4. Module status interface

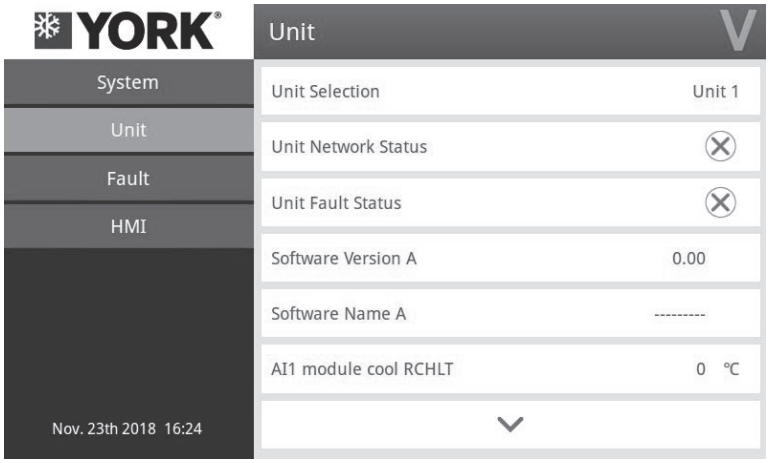


Figure1.1. Module status Interface

Under module status interface, the right display area will display various information related to the module. In order to display the information of the corresponding module, the user firstly needs to select the corresponding module number through the “Unit Selection” menu, and the module number selected by default is the Unit 1. The detailed menu items under module status are shown in the following table.

Module status	Module sequence selection
	Module networking status
	Module fault status
	Software version of module board A
	Software name of module board A
	Chilled backwater temperature of AI1 module
	Chilled outflow-water temperature of AI2 module
	Cooling backwater temperature of AI3 module
	Cooling outflow-water temperature of AI4 module
	1-1# compressor’s exhaust gas temperature
	1-2# compressor’s exhaust gas temperature
	2-1# compressor’s exhaust gas temperature
	2-2# compressor’s exhaust gas temperature
	AI13 1 # suction temperature
	AI14 2 # suction temperature
	AI16 loading status
	AI17 de-loading status
	AI18 1# suction saturation temperature
	AI19 2# suction saturation temperature
	AI20 1 # suction pressure
	AI21 2 # suction pressure
	AI22 1 # exhaust pressure
	AI23 2 # exhaust pressure
	AI24 1#exhaust gas saturation temperature
	AI25 2#exhaust gas saturation temperature

	DI1 module's chilled water flow switch
	DI2 module's cooling water flow switch
	DI3 1# high-voltage switch
	DI4 1# low-voltage switch
	DI5 1-1 compressor overload
	DI6 1-2 compressor overload
	DI7 Remote switch
	DI8 external interlock
	DI9 Power supply protection
	DI10 2#high-voltage switch
	DI11 2# low-voltage switch
	DI12 system's chilled water flow switch
	DI13 system's cooling water flow switch
	DI14 2-1 compressor overload
	DI15 2-2 compressor overload
	DO17 auxiliary electric heating
	DO1 1-1 compressor
	DO2 1-2 compressor
	DO3 2-1compressor
	DO4 2-2 compressor
	DO5 system's chilled water pump
	DO6 system's cooling water pump
	DO7 Alarm
	DO8 system's chilled water three-way valve
	DO9system's cooling water three-way valve
	DO10cooling tower's fan and water pump
	DO15 module's chilled water valve
	DO16 module's cooling water valve
	1#EEV
	2#EEV
	1 # suction gas superheat
	2 # suction gas superheat
	Dialing status 1
	Dialing status 2

In right display area, you can view all the information by clicking  or  for paging up and down.

5.5. Module status interface

The fault interface will display the fault information obtained from the unit communication, and each fault information will include the date, time, module number and fault description. It will have a buffer time of 6 seconds when entering the fault interface, on account of that it is necessary to read the fault information from the control panel.

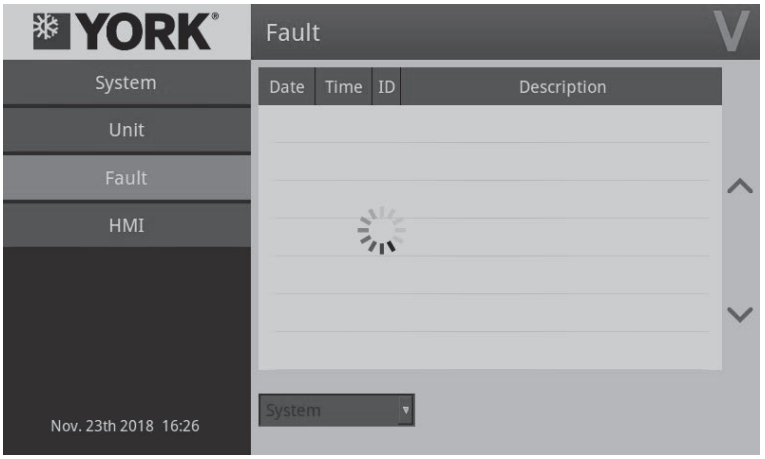


Figure 7. Fault interface

In Figure 7, there is a selection box shown as the “System” under the Fault page. This selection box also includes all the modules of the unit. The user can select objects to load corresponding fault information according to the requirement. If the user selects “System”, the page will load the system’s fault information; If the “Unit 1” is selected, the fault information of unit 1 will be loaded.

What needs illustration is that, for the current fault, the display color of its fault information is blue, and the display color of the history fault is black; when there occurs communication fault between the human-machine interface HMI and the control board, the module number in fault information will display 0; and if it is the other fault information, it will display corresponding module number of that module, as shown in Figure 8a. For example, if it is the system’s fault, the module number will display 0; if it is the fault of module 1, the module number will display 1, and the rest can be done in the same manner. The list of all fault information shall be shown in the Chapter of the fault information.

Click the corresponding fault item (except for the communication fault between the HMI and the module) to enterthe details display interface of that fault item, as shown in Figure 8b. The record value of various variables at the time of the fault occurrence can be viewed in the page. For the fault of the system, 8 kinds of record values can be viewed, while for the module fault, 16 kinds of record values can be viewed, as shown in the following two tables.

Recorded value at the time of the system fault	
Status of chilled water pump	Status of cooling water pump
Operating mode:	System’s chilled backwater temperature
System’s chilled outflow water temperature	System’s cooling backwater temperature
System’s cooling outflow water temperature	Operating state:

Recorded value at the time of the module fault	
Chilled backwater temperature of AI1 module	Chilled outflow-water temperature of AI2 module
Cooling backwater temperature of AI3 module	Cooling outflow-water temperature of AI4 module
AI9 1-1 exhaust temperature	AI10 1-2 exhaust temperature
AI11 2-1 exhaust temperature	AI12 2-2 exhaust temperature
AI13 1 # suction temperature	AI14 2 # suction temperature
AI20 1 # suction pressure	AI21 2 # suction pressure
AI22 1 # exhaust pressure	AI23 2 # exhaust pressure
EXV1	EXV2
DO16-1	DO32-17

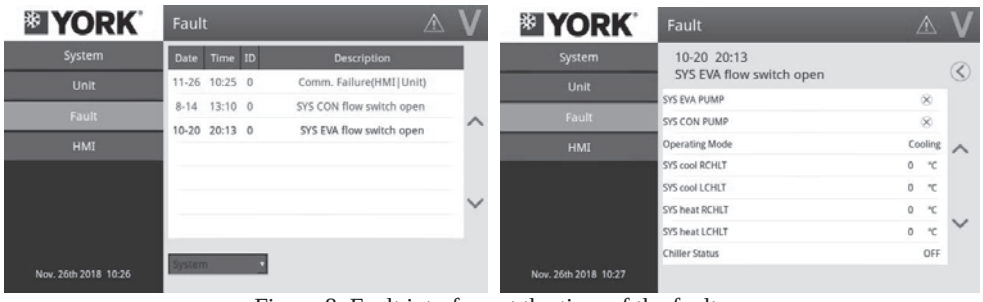


Figure 8. Fault interface at the time of the fault

When entering the operator level, there will appear a button of clearing the fault in fault interface, as shown in Figure 9. Click this button, and then you can send a command of clearing fault to unit's main module through communication.

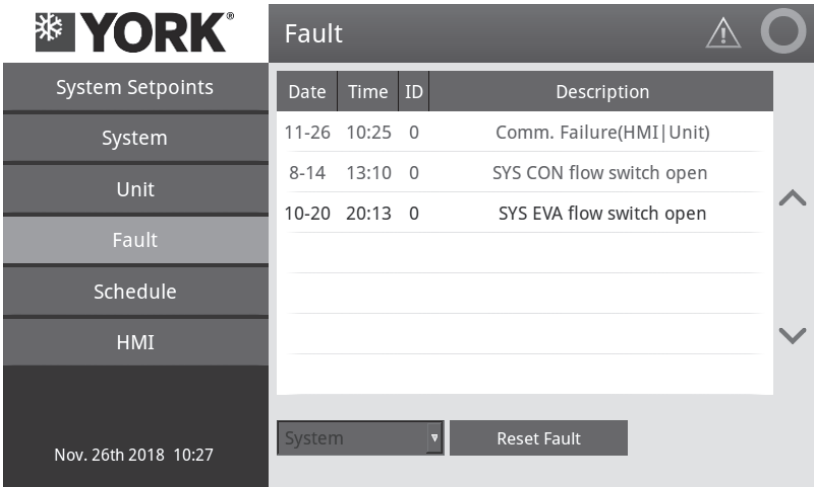


Figure 9. Fault interface under operator level

When entering the maintenance level, there will appear the buttons of clearing the fault and clearing the history in interface, as shown in Figure 10. If you click the button of clearing the history, it will clear all saved historical faults.

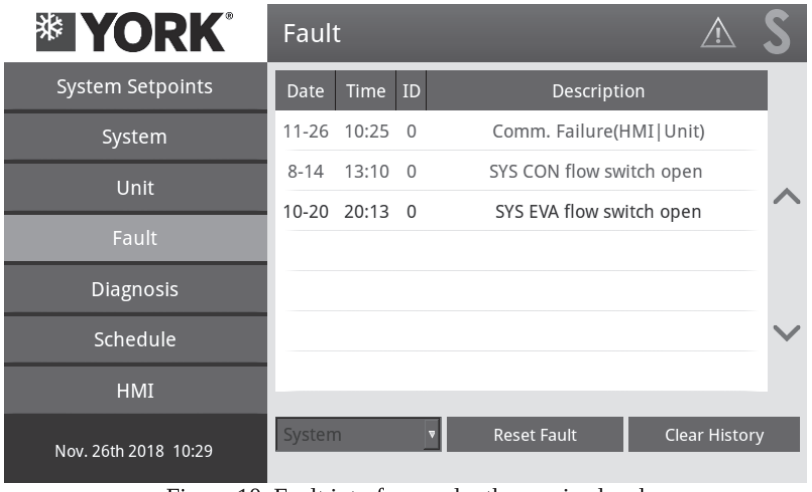


Figure 10. Fault interface under the service level

5.6. Human-machine interface

The settings and information related to human-machine interface controller will be displayed in human-machine interface. There will be different display contents under different levels, as shown in the following table.

Region	Item	Access level
Human-machine interface	HMI software version	Observer
	Brightness setting	Operator
	Standby time setting	Operator
	Language setting	Operator
	Date and time setting	Operator
	Safety	Operator
	Software upgrade	Maintenance
	Brand Settings	Maintenance

The display content under observer level are shown in Figure 11.

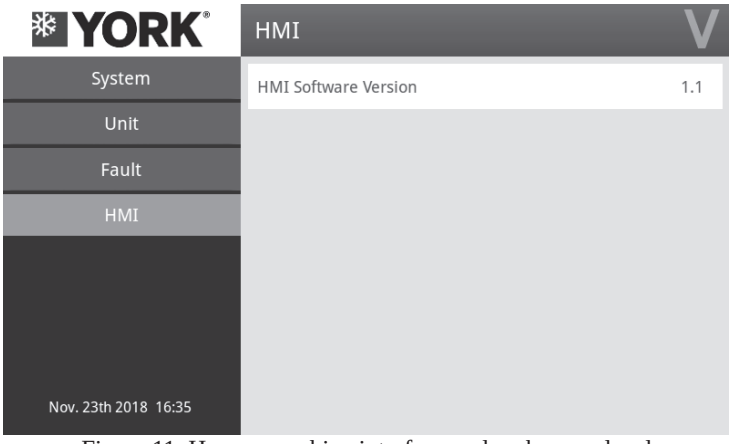


Figure 11. Human-machine interface under observer level

HMI software version

Display the software's version information of the human-machine interface HMI.

The display content of the human-machine interface under operator level is shown in Figure12.

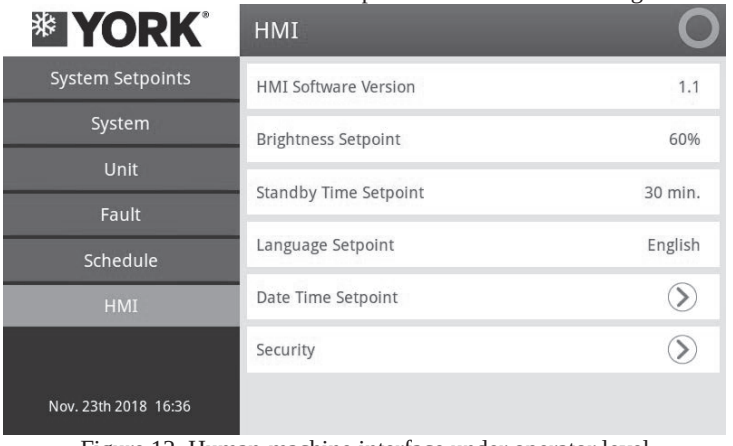


Figure 12. Human-machine interface under operator level

Setting for brightness

Set backlight's brightness for the screen of human-machine interface controller.

Standby time setting

Under the condition of not touching the touch screen, set the time required for the closing of the screen and the required time that the touch screen returns to the standby status

Language setting

Setting the display language of the human-machine interface

Date and time settings

It is used to set the YTD, time zone, hour and minute displayed on human-machine interface. After clicking the key, it will display the following interface:

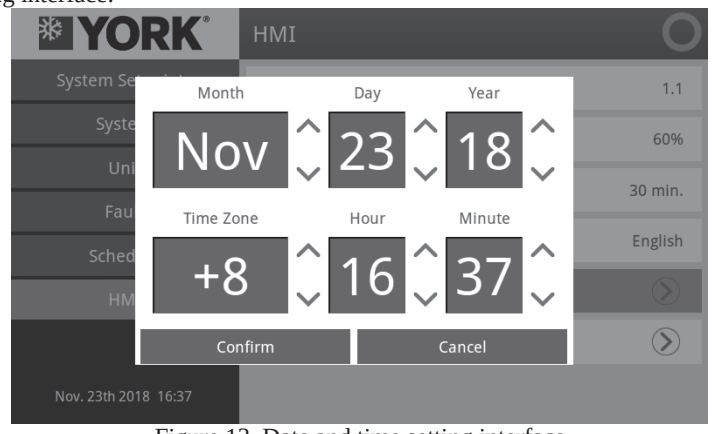


Figure 13. Date and time setting interface

Safety

It is used to modify operator's password. After inputting the correct current password, in the New Password Box and the Confirm Password Box, please input the new password and then click OK. After clicking this key, the display interface is as follows:

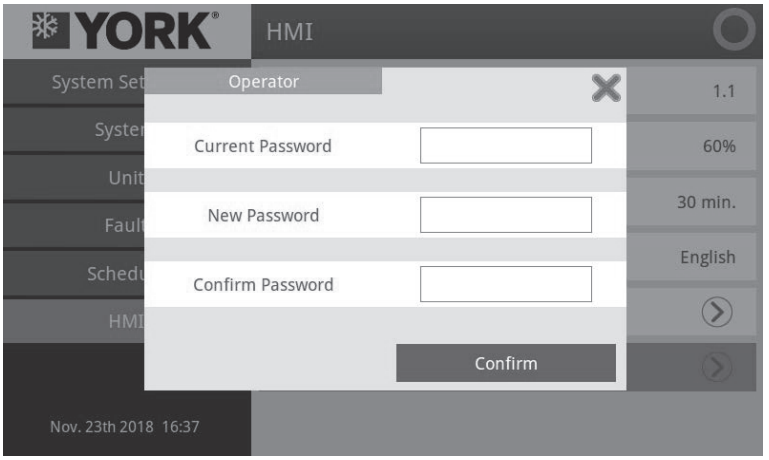


Figure 14. Interface of security settings

The display of human-machine interface under maintenance level is shown in Figure 15.

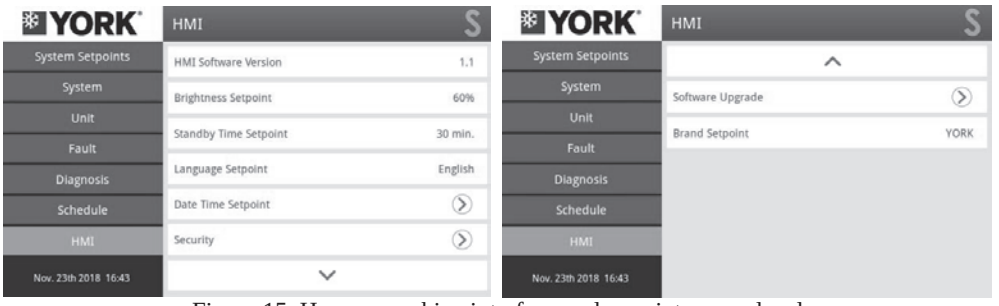


Figure 15. Human-machine interface under maintenance level

Safety

Under maintenance level the security interface will display “Restore Password” button, and the current level password can be restored to the default by clicking the “Restore Password” button. Other functions shall be the same as those of the operator level.

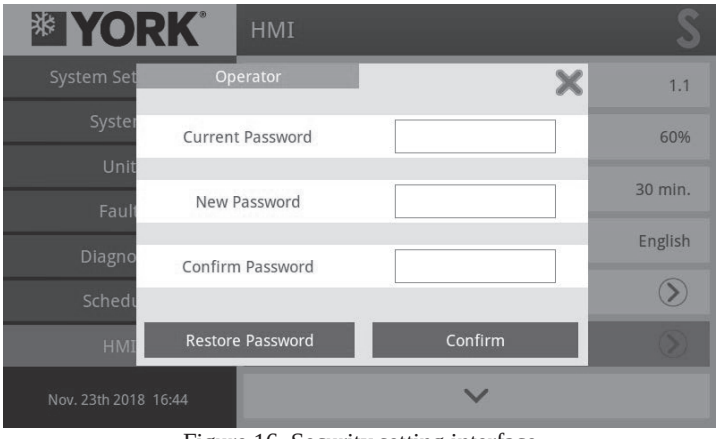


Figure 16. Security setting interface

Software upgrade

This setting is used to upgrade the human-machine interface controller software. Before using this function, the USB flash disk storing the program shall be inserted into the human-machine interface controller, and then the program will be updated after clicking the confirmation. After the update is successful, the human-machine interface controller will be restarted. If the update is in error, various error prompt dialogs will pop up.

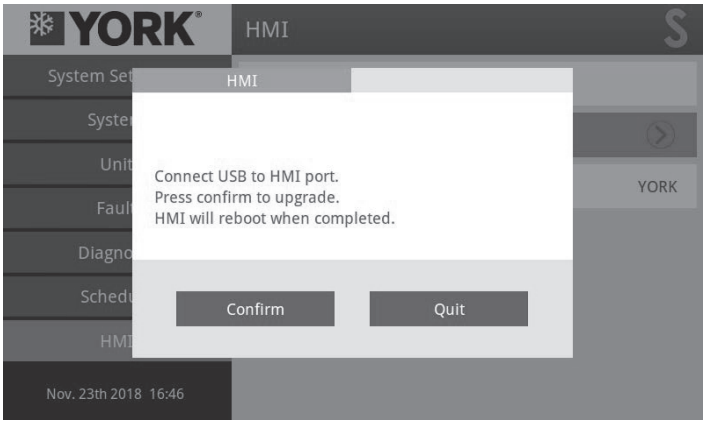


Figure17. Software upgrade interface

Brand Settings

This setting can be used to change the display of the brand image on the upper left corner, and the change value should be set before the delivery.

5.7. System's configuration interface

System's configuration interface is accessible only for the operator level or maintenance level, as shown in Figure 18. The system's configuration interface can help user to modify various system parameters. The parameters that can be configured on this interface are as follows.

	Name	Operation authority
System configuration	ON-OFF command of the unit	Operator
	HMI mode command	Operator
	Set value for refrigeration backwater temperature	Operator
	Set value for heating backwater temperature	Operator
	Set value for refrigeration outflow water temperature	Operator
	Set value for heating outflow water temperature	Operator
	Set value for hot water tank temperature	Operator
	Set value for refrigeration backwater temperature - saline water	Operator
	Set value for refrigeration outflow water temperature - saline water	Operator
	Restore the default value	Operator
	Selection for refrigeration control	Operator
	Selection for heating control	Operator
	Selection for saline water's work condition	Maintenance
	Temperature control period	Maintenance
	Action return difference of chilled water	Operator
	Action return difference of cooling water	Operator
	Action return difference of hot-water	Operator
	Number of combined modules	Operator
	BAS Modbus address	Operator
	Compensation for system's chilled backwater sensor	Maintenance
	Compensation for system's chilled outflow-water sensor	Maintenance
	Compensation for system's cooling backwater sensor	Maintenance
	Compensation for system's cooling outflow-water sensor	Maintenance
	Power-on heating water return difference	Operator
	Power-off heating water return difference	Operator
	Alarm for excessively low chilled outflow-water temperature	Maintenance
	Alarm for excessively low chilled outflow water temperature - saline water	Maintenance
	Alarm for excessively high cooling outflow-water temperature	Maintenance
	Limit value for excessively low suction pressure	Maintenance
	Limit value for excessively low suction pressure - saline water	Maintenance
	Limit value for high exhaust pressure	Maintenance
	Limit value for low exhaust pressure	Maintenance
	Protection factor for excessively low exhaust pressure	Maintenance
	Shielding time for water flow switch detection	Maintenance
	Delay for water flow switch detection	Maintenance

	Selection for running mode	Operator
	ON-OFF selection	Operator
	Power-down memory	Operator
	Clear cumulative running time	Maintenance
	EXV refrigeration initial steps	Maintenance
	EXV heating/heat recovery initial steps	Maintenance
	EXV refrigeration minimum steps	Maintenance
	EXV heating/heat recovery minimum steps	Maintenance
	Oil warm-up time	Operator
	Superheat degree for refrigeration target	Maintenance
	Superheat degree for heating target	Maintenance
	Minimum downtime of compressor	Maintenance
	Operation time limit	Maintenance
	Configuration for hot gas bypass valve	Maintenance
	EXV adjustment cycle	Maintenance
	EXV hold time	Maintenance
	Operating time for waterway three-way valve	Maintenance

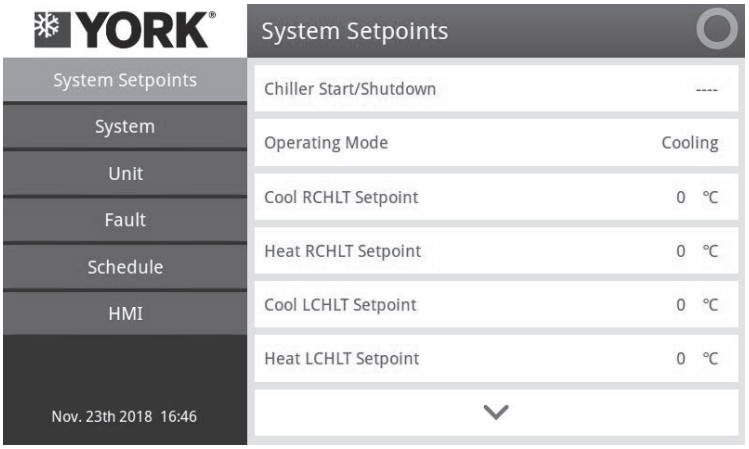


Figure 18. System's configuration interface

For all configuration items, they are mainly the following types: option type, ON or OFF type and digital filling type, and the followings are the examples of their typical operations.

Option type:

For the modification content of the configuration item in this type, it can only be selected from the contents listed in the pop-up dialog box. The following are the examples:

Click the item of "HMI mode command", and then the Options Dialog Box will pop up, as shown in the following figure.

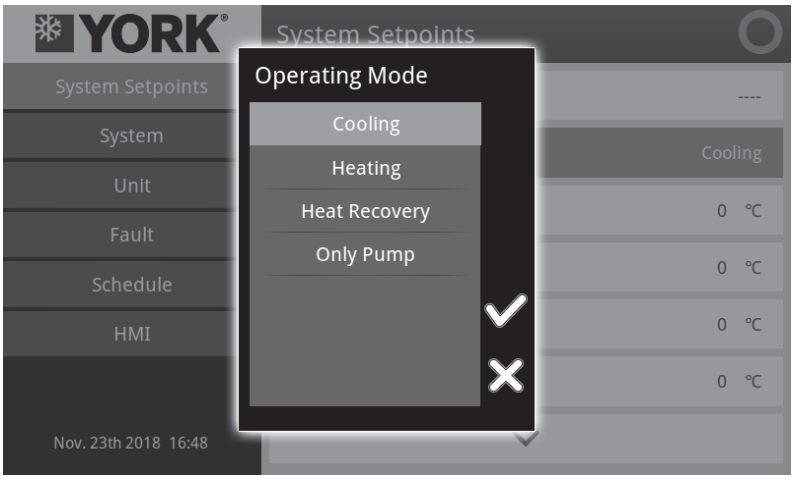


Figure 19. Options dialog box

In the dialog box, there are three options - Cooling, heating and heat recovery. For water pump circulation, select corresponding options as needed, and then click OK ✔ to confirm the option. If you want to change this modification, you can click EXIT ✘.

ON or OFF type:

The configuration item in this type has only two options: ON and OFF, therefore you can click the target item directly, and then the confirmation dialog box will pop up. If click OK, it will turn from ON to OFF or from OFF to ON. The following are the examples, as shown in Figure 20. Click the item named “Restore the Default Value”, and the dialog box will pop up after you click it.

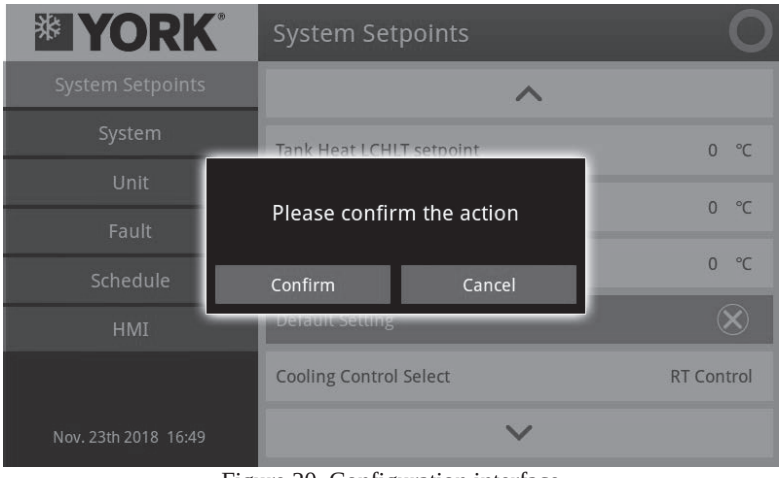


Figure 20. Configuration interface

Digital filling type:

The configuration item in this type needs to fill in numbers, therefore the digital input dialog box will pop up after clicking on the configuration item in this type. The user can input the reasonable number and then click OK to confirm the modification. For example, click the item named “Set value for refrigeration backwater temperature”, and the Options Dialog Box will pop up, as shown in the following figure, and then input the appropriate number and click the OK to confirm the modification.

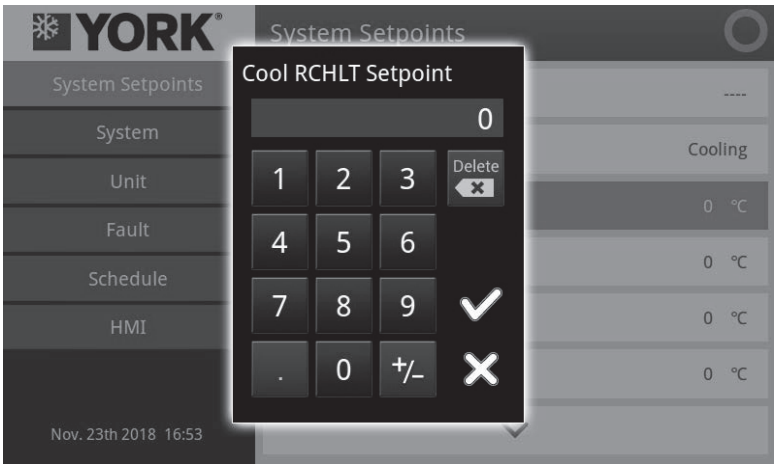


Figure 21. Digital input box

5.8. Schedule interface

The schedule interface is accessible only for operator level or maintenance level, as shown in Figure 22. The schedule interface can help the user to set various timing ON-OFF actions, as shown below.

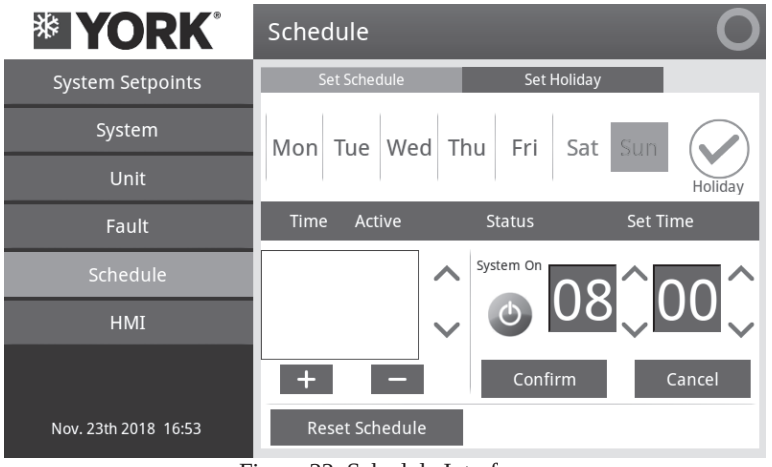


Figure 22. Schedule Interface

There are two options on the upper left of the schedule home page - the schedule setting and the holiday setting. Click corresponding option, and then you can enter corresponding setting page.

Schedule Settings

The schedule setting refers to set ON-OFF time within selected date (that is, from Monday to Sunday. It shall be 8 kinds of date in total by adding the holiday). For each date, it allows you to set up to 4 ON-OFF timing.

The method for adding one ON-OFF timing is as follows: click + and one default item can be added; click the item to select it; and then there will be state selection and time setting box on its right side, it can switch ON-OFF timing by clicking the in the status box; and the hour and the minute of the time can be set by clicking the up or down key in time setting box; and finally click OK to confirm the setting value.

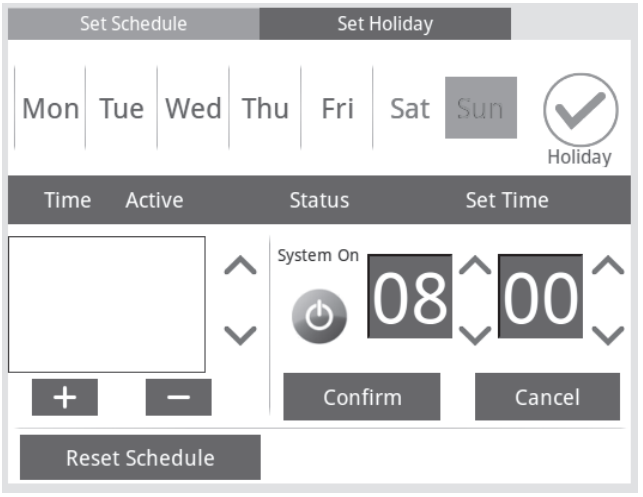


Figure 23. Schedule settings page

The method for deleting ON-OFF timing is as follows: select the ON-OFF item which is expected to be deleted by clicking — it, and then click it to delete this selected item.

The "Reset Schedule" button can clear all schedules and special day settings. Click this button, and then the confirmation dialog box will pop up. After clicking OK, it can reset the schedule setting and the holiday setting.

Holiday setting

The holiday setting refers to the specific date specified for the holiday. Click the holiday setting on the schedule home page to enter the holiday setting page, as shown in the following figure.

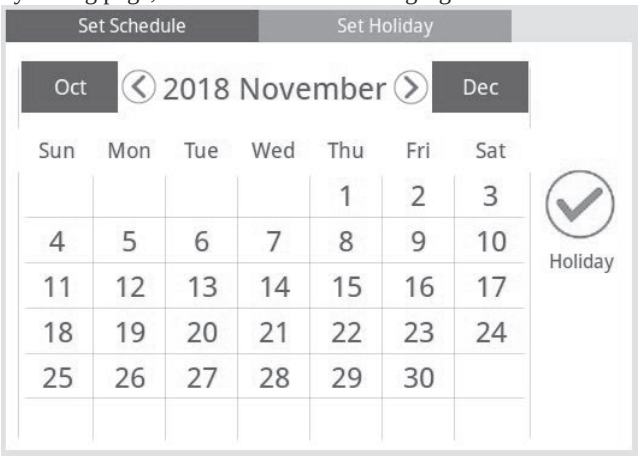


Figure 24. Holiday setting page

The year and month of the calendar can be changed backwards and forwards by the left and right markers (,) on the year and month display column. At this time, you can select the date in the calendar, and then click the holiday button on the right setting box , and this date will be set to the holiday. At this time, this date will also be changed to a color that is in line with the right button, therefore it is possible to determine that this date is a holiday by the color of the highlight date, as shown in the following figure. What calls for special attention is that the total number of all the selected dates regarding the holidays shall be 30.

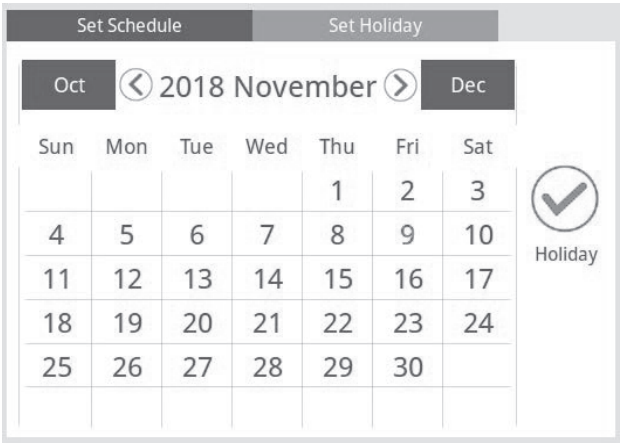


Figure 2. The holiday page that has been set

5.9. Diagnosis interface

The Diagnosis interface is accessible only for the maintenance level, as shown in Figure 26. The Diagnosis interface can help the test and maintenance personnel to directly perform hardware function diagnosis and control for the unit's control board, and the configurable parameters of this interface are as follows.

Diagnosis	EXV mandatory action module
	EXV selection
	EXV mandatory action reset
	EXV mandatory output steps
	DO mandatory command
	DO1
	DO2
	DO3
	DO4
	DO5
	DO6
	DO7
	DO8
	DO9
	DO10
	DO11
	DO12
	DO13
	DO14
	DO15
	DO16
	DO17
	DO18
	DO19
	DO20
	DO21

Diagram 26. Diagnosis interface

If you intend to perform diagnosis control, firstly you must configure corresponding module for the item of "EXV mandatory action module" and configure the "Mandatory command options" at the same time, and then control corresponding item.

5.10. Fault information

System's fault information is as follows

Communication fault of HMI and module
Water temperature sensor fault of the controlled system
System's chilled water flow fault
System's cooling water flow fault
External interlock Fault
Operation time limit protection
System's cooling water outlet temperature is too high
System's chilled water outlet temperature is too low
System's cooling water outlet temperature is too low
High heating environment temperature
Module 1 Fault
Module 2 Fault
Module 3 Fault
Module 4 Fault
Module 5 Fault
Module 6 Fault
Module 7 Fault
Module 8 Fault

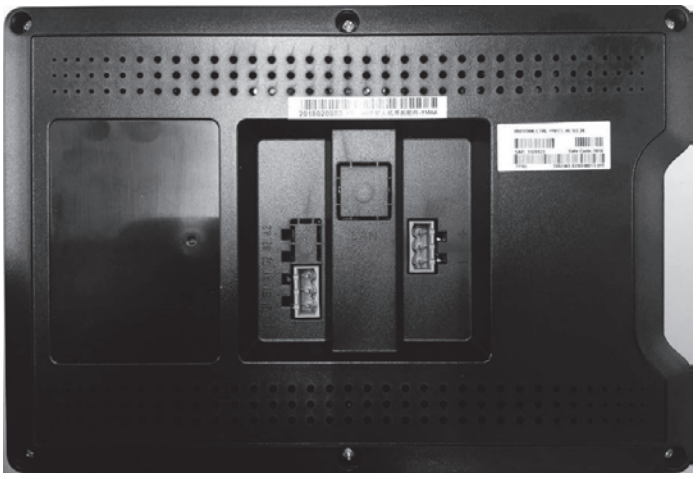
Module fault status messages are as follows

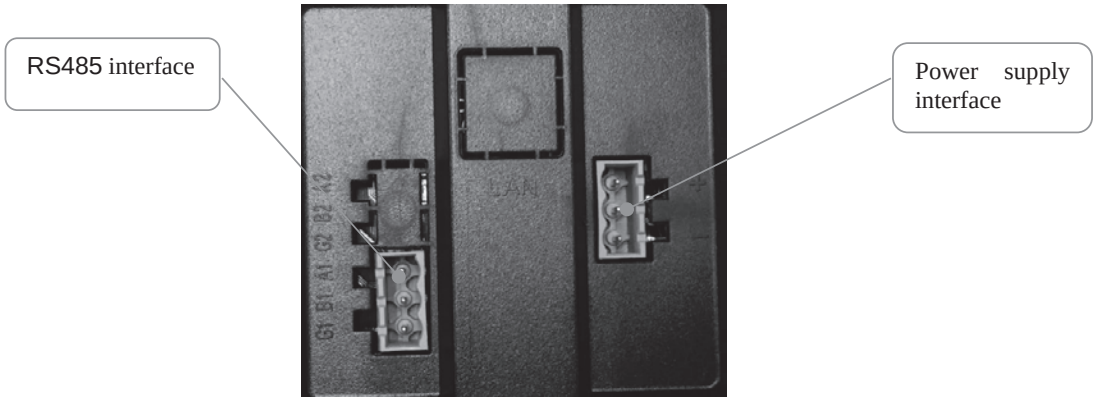
Fault of module's chilled backwater temperature sensor
Fault of module's chilled outflow water temperature sensor
Fault of module's cooling outflow water temperature sensor
Fault of module's cooling outflow water temperature sensor
Fault of system's chilled backwater temperature sensor
Fault of system's chilled outflow water temperature sensor
Fault of system's cooling backwater temperature sensor
Fault of system's cooling outflow water temperature sensor
Exhaust temperature 1-1# sensor fault
Exhaust temperature 1-2# sensor fault

Exhaust temperature 2-1# sensor fault
Exhaust temperature 2-2# sensor fault
1# suction temperature sensor fault
2# suction temperature sensor fault
1# low-pressure sensor
2# low-pressure sensor
1# high-pressure sensor
2# high-pressure sensor
Module's chilled water flow fault
Module's cooling water flow fault
1# high-voltage switch fault
1# low-voltage switch fault
compressor 1-1 overload
compressor 1-2 overload
2# high-voltage switch fault
2# low-voltage switch fault
compressor 2-1 overload
compressor 2-2 overload
Communication fault
Module's chilled water outlet temperature is too low
Module's cooling water outlet temperature is too high
1# excessive low suction pressure
1# excessive low exhaust pressure
1# excessive high exhaust pressure
2# excessive low suction pressure
2# excessive low exhaust pressure
2# excessive high exhaust pressure
Excessive high exhaust temperature 1_1
Excessive high exhaust temperature 1_2
Excessive high exhaust temperature 2_1
Excessive high exhaust temperature 2_2
Exhaust high exhaust temperature deviation 1
Exhaust high exhaust temperature deviation 2
Low suction gas superheat 1
Low suction gas superheat 2
Low exhaust superheat 1_1
Low exhaust superheat 1_2
Low exhaust superheat 2_1
Low exhaust superheat 2_2
The cooling water outlet temperature of the heating module is too low
Sudden drop of suction pressure 1
Sudden drop of suction pressure 2

5.11 Interface definition

The liquid-crystal display touch screen has a power interface, and the power supply adopts DC12V. The "+" shall be connected to the DC power supply 12V, and the "-" shall be connected to the earthed power supply. A RS485 communication interface is connected with unit's control board for communication, A1 is connected with A of unit control board 485 interface, and B1 is connected with B of unit control board 485 interface, as shown in the following figure:





HMI wiring terminal

Part 6: Maintenance

6.1. Unit's operation process

- Check whether the external packing of the unit is in good condition
- Check whether the attached accessories and the files are complete
- Carefully read this IOM
- Hoisting and unpacking
- The unit shall be installed in specified position
- Install the main machine (including the stop valve, filter, water pressure meter, water flow switch, expansion tank and temperature gauge etc.)
- Connect the power line, communication line, total waterway system's water flow switch, module's water flow switch, system's outflow water/backwater temperature sensor, etc., which are required to be connected.
- Clean the water pipeline through bypassing inlet and outlet pipes of main unit conduit (close the water inlet and outlet stop valve);
- Drain the air from the water system and fill it with water;
- Pre-check before operation for the following items:

  A. Power voltage

  B. Power supply connection, especially check the section of power supply wire, and fastening of ground connection and connection terminal;

  C. Water pipes must be kept clean and protected from any pollutant or impurity. At last, rinse the water pipe three times (with the unit bypassed) to guarantee all impurities and oxides in the circulation system have been removed.

  D. Confirm that the water source is connected correctly;

  E. Check if the water circulation system works effectively, if the water system is filled with water, and make sure there are no leakage or bubble problems.
- When there is no problem with the above contents, power up the unit, complete the initialization and parameter setting of the controller, and let the oil heating band of the compressor be heated for at least 12 hours
- If it is the module machine, set one unit as the main machine (1# module), and connect system's inlet and outlet water temperature sensor, water flow switch and external interlock to this machine; If the main machine (1# module) is replaced, you must reset another one.
- Operate the unit according to the "Description of operation" in Chapter 4 and Chapter 5 of this manual; Check the following items after the unit's operation is stable in the first time:

  A. Inlet and outlet water temperature of the heat exchanger

  B. Water flow at the outlet of the heat exchanger

  C. Compressor's operating current when the unit is in operation

  D. Please use the needle valve installed inside the machine to check the operating temperature of system's refrigerant (related to the pressure)

Please refer to the following requirements when conducting inspection:

----High-pressure side: the saturation condensing temperature should be about 3-8 degrees higher than the air conditioner's cooling inlet and outlet water temperature;

----Low-pressure side: The saturation evaporation temperature should be about 3-8 degrees lower than the air conditioner's freezing inlet and outlet water temperature.

6.2. Periodic Care and Maintenance

Prior to shipment, all machines have been strictly tested and inspected to ensure that all products are in good performance and remain in perfect working condition when leaving the factory. However, in order to ensure that the machine can be operated well for a long time, it is necessary to strictly implement the following periodic maintenance items:

The following instructions are for users only. All items shall be strictly implemented on a regular basis to avoid paying expensive maintenance costs.

Regular maintenance does not require special training.

Inspection and cleaning of water-side heat exchanger

If you want to determine whether the water-side heat exchanger is clean or not, please check the water temperature at heat exchanger's water inlet and outlet and compare them with the saturation temperature. For the heat exchanger of the efficient operation, after the mean value of the water temperature at the water inlet and outlet of the heat exchanger is subtracted by the saturation evaporation temperature of the refrigerant on the evaporation side or the saturation

condensation temperature of the refrigerant on the condensation side, its absolute value of the difference value should be among 3-8°C. If the temperature difference exceeds this value range, it indicates that the work efficiency of the heat exchanger has been reduced.

Since certain chemical treatments shall be required during the cleaning process, the cleaning work must be done by the professionals.

Filling of the refrigerant and lubricating oil

Each unit shall be filled with appropriate refrigerant R410A and corresponding lubricating oil.

Before maintaining the air conditioner unit, it needs to recover the refrigerant in the system. Please do not release the refrigerant into the atmosphere, and the appropriate recycling equipment must be used. If the recycled refrigerant cannot be used again, it must be processed by being returned to the commercial agent's place though the delivery of the authorized agent.

Please do not dump the used compressor oil, since that the compressor oil contains the refrigerant dissolved therein, and the lubricating oil will cause environmental pollution. Please recycle these compressor oil through the authorized agent, or handle it in accordance with local environmental policies.

Under normal conditions, the refrigerant and the lubricating oil in the machine can be used all the time along with the machine.

If the refrigerant must be refilled due to the leakage, please refer to the unit's specifications.

Before refilling the refrigerant, please vacuumize the refrigeration cycle system to below 67Pa.

Inspection and cleaning for water flow switch

On account of that the impurities in the water cannot be avoided, and as the usage time increases, there will be impurity accumulation in water flow switch, and the reliable operation of the water flow switch can be affected. It is recommended that the customer shall clean or replace the water flow switch once every two years. If the water quality of the water-side system is poor, it shall shorten the cleaning cycle or replace the water flow switch.

⚠ **Caution:**

Anti-freezing of unit

When the unit is low in ambient temperature and will not be used for a long period of time, the water in the system must be drained completely, otherwise, the water system of the unit (including heat exchanger and water pump, etc.) will be frozen and damaged; If the unit still needs to be operated when the ambient temperature is low, please energize the unit, and ensure the control for the system's water pump and the unit's interlock, in order to make the unit can automatically enter the anti-freezing operation when necessary. Where the ethylene glycol solution and inhibitors are used, specific requirements shall be confirmed by the water pump's supplier.

6.3. Fault and troubleshooting

Fault within the module

Code	Description	Fault judgment	Fault's shutdown mode	Reset mode
0	Fault-free			
1	Fault of module's chilled backwater temperature sensor	If the detected temperature exceeds the selected temperature range (-30~70°C) for 5s	Module's emergency stop	Manual operation
2	Fault of module's chilled outflow water temperature sensor	If the detected temperature exceeds the selected temperature range (-30~70°C) for 5s	Module's emergency stop	Manual operation
3	Fault of module's cooling outflow water temperature sensor	If the detected temperature exceeds the selected temperature range (-30~70°C) for 5s	Module's emergency stop	Manual operation
4	Fault of module's cooling outflow water temperature sensor	If the detected temperature exceeds the selected temperature range (-30~70°C) for 5s	Module's emergency stop	Manual operation
9	Exhaust temperature 1-1# sensor fault	If the detected temperature exceeds the selected temperature range (-30~130°C) for 5s	Circuit's emergency stop	Manual operation
10	Exhaust temperature 1-2# sensor fault	If the detected temperature exceeds the selected temperature range (-30~130°C) for 5s	Circuit's emergency stop	Manual operation
11	Exhaust temperature 2-1# sensor fault	If the detected temperature exceeds the selected temperature range (-30~130°C) for 5s	Circuit's emergency stop	Manual operation
12	Exhaust temperature 2-2# sensor fault	If the detected temperature exceeds the selected temperature range (-30~130°C) for 5s	Circuit's emergency stop	Manual operation
13	1# suction temperature sensor fault	If the detected temperature exceeds the selected temperature range (-30~70°C) for 5s	Circuit's emergency stop	Manual operation
14	2# suction temperature sensor fault	If the detected temperature exceeds the selected temperature range (-30~70°C) for 5s	Circuit's emergency stop	Manual operation
20	1# low-pressure sensor	If the pressure sensor's output exceeds the range (0~2200kpa) for 5s	Circuit's emergency stop	Manual operation

21	2# low-pressure sensor	If the pressure sensor's output exceeds the range (0~2200kpa) for 5s	Circuit's emergency stop	Manual operation
22	1# high-pressure sensor	If the pressure sensor's output exceeds the range (0~4800kpa) for 5s	Circuit's emergency stop	Manual operation
23	2# high-pressure sensor	If the pressure sensor's output exceeds the range (0~4800kpa) for 5s	Circuit's emergency stop	Manual operation
33	Module's chilled water flow fault	If there is continuous broken circuit for 2s	Module's emergency stop	Automatically; If it occurs for three times within 1 hour, the module will be locked
34	Module's cooling water flow fault	If there is continuous broken circuit for 2s	Module's emergency stop	Automatically; If it occurs for three times within 1 hour, the module will be locked
35	1# Fault of high-pressure switch/compressor overload	If there is continuous broken circuit for 2s	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
36	1# low-voltage switch fault	If there is continuous broken circuit for 2s	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
41	Power supply protection	If there is continuous broken circuit for 2s	Module's emergency stop	Manual operation
42	2 # Fault of high-pressure switch/compressor overload	If there is continuous broken circuit for 2s	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
43	2# low-voltage switch fault	If there is continuous broken circuit for 2s	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
65	Communication fault	If it is interrupted for 20 s	Module's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
[97]	Module's chilled water outlet temperature is too low	When module's chilled outflow water temperature ≤ the low setpoint of the chilled outflow water temperature for 3s, there will be fault alarm; When module's chilled outflow water temperature ≥ +6°C of the low setpoint of the chilled outflow water temperature, the fault will be released and reset automatically	Module's emergency stop	Automatically; If it occurs for three times within 1 hour, the module will be locked
98	Module's cooling water outlet temperature is too high	When module's cooling outflow water temperature ≥ the high setpoint of the cooling outflow water temperature for 3s, there will be fault alarm; When module's cooling outflow water temperature ≥ -6°C of the high setpoint of the cooling outflow water temperature, the fault will be released and reset automatically	Module's emergency stop	Automatically; If it occurs for three times within 1 hour, the module will be locked
99	1# Low suction pressure	If the suction pressure < suction pressure's low setpoint +100kPa, the circuit's load shall be restricted; circuit operation within 300s; If the suction pressure < the limit value for 60s, the suction pressure shall be <300kPa for 10s; circuit operation >=300s, If the suction pressure < the limit value for 30 s, the suction pressure shall be <300kPa for 10s. If the circuit operates two compressors, it shall de-load a compressor in accordance with circuit's de-loading process. If the circuit only operates one compressor, it shall run in accordance with the circuit's emergency stop process, with alarm. If the suction pressure >= limit value +200kPa, it will be reset automatically	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
100	1 # Low exhaust pressure	After the circuit operation (if any compressor is turned on) for 300s: if the suction pressure is ≤ 650KPa, and if the exhaust pressure is lower than 1080Kpa (the low setpoints of exhaust pressure) for 10s; if the suction pressure is >650KPa and if the exhaust pressure is ≤1.8 (low protection factor of exhaust pressure) * suction pressure -90kPa for 10s;	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked

101	1# High exhaust pressure	When the circuit's exhaust pressure > high limit setpoint -300kPa, the circuit's loading shall be limited; When 1150 <= suction pressure < 1550kPa, the limit value = maximum limit value of exhaust pressure + (1150-suction pressure) * 1.85; When the suction pressure is > 1550kPa, the limit value = the maximum limit value of the exhaust pressure + (1150-1550) * 1.85; When 580 <= suction pressure <1150KPa, the limit value = the maximum limit value of the excessive high exhaust pressure; When 170 <= suction pressure <580 KPa, limit value = 4.78 * suction pressure + 1227.6. When the suction pressure < 170 kPa, the limit value = 4.78*170+1227.6. If the circuit operates two compressors, then de-load one compressor according to the circuit's de-loading process, and it shall shield the excessive high protection of exhaust pressure for 3s. If the circuit only operates one compressor, it shall be operated according to the circuit's emergency stop process, with alarm. When the exhaust pressure drops below the maximum limit of the excessive high exhaust pressure -500 kPa, the fault shall be reset automatically	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
102	2# Low suction pressure	If the suction pressure < suction pressure's low setpoint +100kPa, the circuit's load circuit shall be restricted; circuit operation within 300s; If the suction pressure < the limit value for 60s, the suction pressure shall be <300kPa for 10s; circuit operation >=300s; If the suction pressure < the limit value for 30 s, the suction pressure shall be <300kPa for 10s; If the circuit operates two compressors, it shall de-load a compressor in accordance with circuit's de-loading process. If the circuit only operates one compressor, it shall run in accordance with the circuit's emergency stop process, with alarm. If the suction pressure >= limit value +200kPa, it will be reset automatically	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
103	2# excessive low exhaust pressure	After the circuit operation (if any compressor is turned on) for 300s: if the suction pressure is ≤650KPa, and if the exhaust pressure is lower than 1080Kpa (the low setpoints of exhaust pressure) for 10s; if the suction pressure is >650KPa and if the exhaust pressure is ≤1.8 (low protection factor of exhaust pressure) * suction pressure -90kPa for 10s;	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
104	2# excessive high exhaust pressure	When the circuit's exhaust pressure > high limit setpoint -300kPa, the circuit's loading shall be limited; When 1150 <= suction pressure < 1550kPa, the limit value = maximum limit value of exhaust pressure + (1150-suction pressure) * 1.85; When the suction pressure is > 1550kPa, the limit value = the maximum limit value of the exhaust pressure + (1150-1550) * 1.85; When 580 <= suction pressure <1150KPa, the limit value = the maximum limit value of the excessive high exhaust pressure; When 170 <= suction pressure <580 KPa, limit value = 4.78 * suction pressure + 1227.6. When the suction pressure < 170 kPa, the limit value = 4.78*170+1227.6. If the circuit operates two compressors, then de-load one compressor according to the circuit's de-loading process, and it shall shield the excessive high protection of exhaust pressure for 3s. If the circuit only operates one compressor, it shall be operated according to the circuit's emergency stop process, with alarm. When the exhaust pressure drops below the maximum limit of the excessive high exhaust pressure -500 kPa, the fault shall be reset automatically	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
105	Excessive high exhaust temperature 1_1	The fault will automatically reset when the compressor's exhaust temperature ≥ 110°C for 3s and when all the exhaust temperatures within the circuit drop to 70°C	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked

106	Excessive high exhaust temperature 1_2	The fault will automatically reset when the compressor's exhaust temperature ≥ 110°C for 3s and when all the exhaust temperatures within the circuit drop to 70°C	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
107	Excessive high exhaust temperature 2_1	The fault will automatically reset when the compressor's exhaust temperature ≥ 110°C for 3s and when all the exhaust temperatures within the circuit drop to 70°C	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
108	Excessive high exhaust temperature 2_2	The fault will automatically reset when the compressor's exhaust temperature ≥ 110°C for 3s and when all the exhaust temperatures within the circuit drop to 70°C	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
109	Exhaust high exhaust temperature deviation 1	When the two parallel compressors within the same circuit are in operation, and after they operate for 180s, if it continuously detects the condition that the ABS(Tdis1-Tdis2)>20°C for 10s.	Circuit's emergency stop	Power-Fault reset,
110	Exhaust high exhaust temperature deviation 2	When the two parallel compressors within the same circuit are in operation, and after they operate for 180s, if it continuously detects the condition that the ABS(Tdis1-Tdis2)>20°C for 10s.	Circuit's emergency stop	Discharge reset
111	Low suction gas superheat 1	After the circuit is started (the start for the first compressor) for 15s, if the suction gas superheat of the circuit is lower than 1°C for 30s,	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
112	Low suction gas superheat 2	After the circuit is started (the start for the first compressor) for 15s, if the suction gas superheat of the circuit is lower than 1°C for 30s,	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
113	Low exhaust superheat 1_1	After the compressor is started for 60s, the corresponding exhaust superheat degree is lower than 5°C for 180 seconds,	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
114	Low exhaust superheat 1_2	After the compressor is started for 60s, the corresponding exhaust superheat degree is lower than 5°C for 180 seconds,	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
115	Low exhaust superheat 2_1	After the compressor is started for 60s, the corresponding exhaust superheat degree is lower than 5°C for 180 seconds,	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
116	Low exhaust superheat 2_2	After the compressor is started for 60s, the corresponding exhaust superheat degree is lower than 5°C for 180 seconds,	Circuit's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
117	Excessive low heating module's cooling outflow water temperature	Under unit's heating/heat recovery mode, after the module is powered on for 3 minutes, if module's cooling outflow water temperature ≤ 10°C	Module shutdown	Automatically; If it occurs for three times within 1 hour, the circuit will be locked

System-level fault

Code	Description	Fault judgment	Fault's shutdown mode	Reset mode
0	Fault-free			
81	Communicate fault with HMI	If the HMI is continuously disconnected with the main machine for 60 seconds	Main machine's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
82	Water temperature sensor fault of the controlled system	If the detected temperature exceeds the selected temperature range (-30~70°C) for 5s	Main machine's emergency stop	Manual operation
83	System's chilled water flow fault	If there is continuous broken circuit for 2s	Main machine's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
84	System's cooling water flow fault	If there is continuous broken circuit for 2s	Main machine's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
85	External interlock Fault	If there is continuous broken circuit for 2s	Main machine's emergency stop	Manual operation
86	Operation time limit protection	The unit's operation time limit protection is enabled, and if the unit's operation time reaches the set value	Main machine will shutdown	Manual operation

87	System's cooling water outlet temperature is too high	When the system's cooling outflow water temperature ≥ the high setpoint of the cooling outflow water temperature for 3s, there will be fault alarm; when the system's cooling outflow water temperature ≥ the high setpoint of the cooling outflow water temperature -6°C, the fault will be released,	Main machine's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked
88	System's chilled water outlet temperature is too low	When the system's chilled outflow water temperature ≤ the low setpoint of the chilled outflow water temperature for 3s, there will be fault alarm; when the system's shilled outflow water temperature ≥ the low setpoint of the chilled outflow water temperature +6°C, the fault will be released	Main machine's emergency stop	Automatically; If it occurs for three times within 1 hour, the circuit will be locked

6.4. Fault Analysis

Fault	Causes	Maintenance method
A No display on controller	1. No power supply to the main machine 2. Wiring error 3. Fault itself	1. Check power circuit breaker, fuse status and power supply wiring 2. Contact professional service center 3. Contact professional service center
B compressor stopped working without obvious reasons	1. Electronic control system fault 2. Fault of compressor itself	1. Contact professional service center 2. Contact professional service center
C Noise and excessive vibration	1. Noise from the compressor 2. Vibration echo caused by floor and wall	1. Contact professional service center 2. Check whether the base is in proper installation
D Low suction pressure alarm	1. Insufficient chilled water flow 2. Evaporator's filth blockage 3. Excessive low chilled water temperature 4. Electronic expansion valve fault	1. Check whether the system water flow meets the operation requirements of the unit 2. Clean the evaporator 3. Up-regulate the chilled water temperature's set point 4. Contact professional service center
E reduction of refrigeration/heating capacity	1. Compressor fault 2. There is filth in water circulation system of the heat exchanger 3. Insufficient refrigerant charge volume	1. Contact professional service center 2. Clean heat exchanger's water circulation system by chemical method 3. Fill correct amount of refrigerant

F High exhaust pressure alarm	1. Insufficient cooling water flow 2. Excessive high cooling water temperature 3. Condenser's filth blockage	1. Check whether the system water flow meets the operation requirements of the unit 2. Reduce the inflow water temperature of cooling water 3. Clean the condenser
G Excessive low exhaust pressure alarm	1. Low inflow water temperature of cooling water 2. Low inflow cooling water/chilled water temperature difference	1. Adjust the cooling water flow to increase the condensation temperature within allowable flow range 2. Adjust the water flow of the cooling water or the chilled water within allowable flow range to increase the condensation temperature, or reduce the evaporation temperature
H Water temperature is difficult to control or cannot be controlled	1. Thermostat setting is not accurate 2. The temperature difference between the inflow and outflow water of the heat exchanger is not correct 3. There is fault in electronic control system	1. Check the temperature setting on the control panel 2. Check water flow and water injection condition of water circulation system 3. Contact professional service center
I. The air-conditioner water cycle is difficult	1. There is gas in the circulation system 2. There is precipitate or impurity in heat exchanger	1. Extract the gas from the exhaust valve 2 Flush the heat exchanger with adverse current
J The unit can't start, with flow alarm	1. The water circulation stops 2. No water flow or the water flow is small	1. Check the water pump and pipeline valve 2. Check the water filter

Note: If there are other problems or technical problems that need help, please call our York Service Center. Only professional York Maintenance Service Center can provide trained professional maintenance personnel and necessary equipment to carry out correct machine maintenance and ensure the ideal operation conditions of machine.

Part 7: Description for Modbus protocol interface

7.1. Device connection

Unit's electric control cabinet provides the RS485 communication interface convenient for the user's monitoring the operation condition of the unit and system integrating. As long as the users follow the standard MODBUS protocol and comply with the protocol point table provided by us, they can monitor the unit easily.

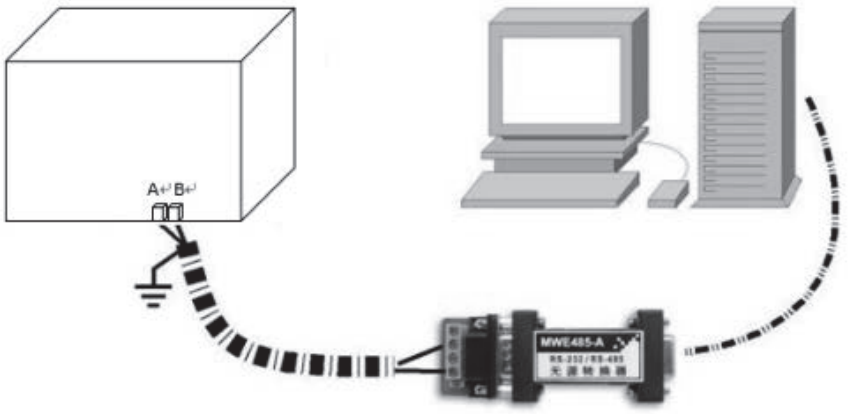
7.1.1. Communication Cable

1. The A and B of the XTB2 terminal in 1# unit's electrical cabinet are the communication interfaces between the unit and the computer. There must be a RS232/485 active or passive converter in the middle of them. The communication line has polarity. A is connected to converter A (or +). B is connected to converter B (or-). Do not connect them in a wrong way for fear of the occurrence of the Fault.

2 Communication distance shall be within 100 meters by using the 2×0.75mm^2 shielded twisted pair; Communication distance shall be within 100-500 meters by using the 2×1.0mm^2 shielded twisted pair;

7.1.2. Connection Mode

Schematic Diagram of Connection Mode



7.2. Modbus Protocol

Basic Description of the Protocol	
1	MODBUS RTU Protocol; CRC Check;
2	9600bps; 1-Bit Start Bit; 1-Bit Stop Bit; No Check Bit; 8-Bit Data Bit;
3	Definition of Temperature Data: 16-Bit Signed Digital (-32768 ~ + 32767); Actual Temperature = Temperature Data/10; Unit:°C;
4	Buffer Size: 256 Bytes

System Content/Chiller Setpoint				
HMI ON/OFF Command	3, 6, 16	0	0-Invalid; 1-On; 2-Off	Setting Range Shall Be the Same as Unit's Set Value
HMI mode command	3, 6, 16	1	0-refrigeration; 1-heating; 2-heat recovery; 8-water pump cycle	Setting Range Shall Be the Same as Unit's Set Value
Set value for refrigeration backwater temperature	3, 6, 16	2	°C, ×10	Setting Range Shall Be the Same as Unit's Set Value
Set value for heating backwater temperature	3, 6, 16	3	°C, ×10	Setting Range Shall Be the Same as Unit's Set Value
Set value for refrigeration outflow water temperature	3, 6, 16	4	°C, ×10	Setting Range Shall Be the Same as Unit's Set Value
Set value for heating outflow water temperature	3, 6, 16	5	°C, ×10	Setting Range Shall Be the Same as Unit's Set Value

Set value for hot water tank temperature	3, 6, 16	6	°C, ×10	Setting Range Shall Be the Same as Unit's Set Value
Set value for refrigeration backwater temperature - saline water	3, 6, 16	7	°C, ×10	
Set value for refrigeration outflow water temperature - saline water	3, 6, 16	8	°C, ×10	
Fault Reset	3, 6, 16	9	1-Reset	Setting Range Shall Be the Same as Unit's Set Value
Selection for refrigeration control	3, 6, 16	10	0 - backwater constant-water-temperature control; 1 - outflow-water constant-water-temperature control	Setting Range Shall Be the Same as Unit's Set Value
Selection for heating control	3, 6, 16	11	0 - backwater constant-water-temperature control; 1 - outflow-water constant-water-temperature control	Setting Range Shall Be the Same as Unit's Set Value
Selection for saline water's work condition	3, 6, 16	12	0-standard; 1-saline water	Setting Range Shall Be the Same as Unit's Set Value
Action return difference of chilled water	3, 6, 16	13	°C, ×10	Setting Range Shall Be the Same as Unit's Set Value
Action return difference of cooling water	3, 6, 17	14	°C, ×10	Setting Range Shall Be the Same as Unit's Set Value
Action return difference of hot-water	3, 6, 18	15	°C, ×10	Setting Range Shall Be the Same as Unit's Set Value
BAS Reading Module	3, 6, 16	16	1-8	
Reserve	3, 6, 16	17 To 99		

System State/Chiller Status			
On/Off State	3	100	0-Off, 1-Power On
Status of Running Mode	3	101	0-refrigeration; 1-heating; 2-heat recovery; 8-water pump cycle
Status o Other Units	3	102	bit0: 1-anti-freeze; bit1: 1-power-on warm-up bit2: main machine's compressor status; ON-running; OFF-stop; bit3: main machine's water pump status; ON- running; OFF-stop
HMI Communication Status	3	103	1-On，0-Off
Module's Communication Status	3	104	bit0-7：Module 1-8，1-ON，0-OFF
Module fault status	3	105	bit0-7: Module 1-8, 1-Fault, 0-Normal
System's Chilled Backwater	3	106	°C, ×10
System's Chilled Outflow Water	3	107	°C, ×10
System's Cooling Backwater	3	108	°C, ×10

System's Cooling Outflow Water	3	109	°C, ×10
System's Chilled Water Pump Status	3	110	1-On，0-Off
System's Cooling Water Pump Status	3	111	1-On，0-Off
System's Chilled Water Three-Way Valve	3	112	1-On，0-Off
System's Cooling Water Three-Way Valve	3	113	1-On，0-Off
Cooling Tower's Fan and Water Pump	3	114	1-On，0-Off
Load		115	0-100: 0-100%
Cumulative Operating Time of the Unit	3	116	Hour
Total Number of Modules	3	117	
Reserve	3	118-999	

Information Within Module/Unit Status			
Software version of module board A	3	1000	
Software name of module board A		1001-1009	
Module Main Board B Software Version	3	1010	
Software name of module board A		1011-1019	
AI1	3	1020	
AI2	3	1021	
AI3	3	1022	
AI4	3	1023	
AI5	3	1024	
AI6	3	1025	
AI7	3	1026	
AI8	3	1027	
AI9	3	1028	
AI10	3	1029	
AI11	3	1030	
AI12	3	1031	
AI13	3	1032	
AI14	3	1033	
AI15	3	1034	
AI16	3	1035	
AI17	3	1036	
AI18	3	1037	
AI19	3	1038	
AI20	3	1039	
AI21	3	1040	
AI22	3	1041	
AI23	3	1042	
AI24	3	1043	

AI25	3	1044	
AI26	3	1045	
AI27	3	1046	
AI28	3	1047	
AI29	3	1048	
AI30	3	1049	
AI31	3	1050	
AI32	3	1051	
DI17-32	3	1052	bit0-15:DI17-31,1-ON,0-OFF
DI1-16	3	1053	bit0-15:DI1-16,1-ON,0-OFF
DO17-32	3	1054	bit0-15:DO17-32,1-ON,0-OFF
DO1-16	3	1055	bit0-15:DO1-16,1-ON,0-OFF
EXV1 Steps	3	1056	
EXV2 Steps	3	1057	
EXV3 Steps	3	1058	
EXV4 Steps	3	1059	
Modify Target's Superheat Degree 1	3	1060	
Modify Target's Superheat Degree 2	3	1061	
Modify Target's Superheat Degree 3	3	1062	
Modify Target's Superheat Degree 4	3	1063	
Dial State 1	3	1064	
Dial State 2	3	1065	
Fault Word 1	3	1066	Defective Word Within Module, 128 bit
Fault Word 2	3	1067	
Fault Word 3	3	1068	
Fault Word 4	3	1069	
Fault Word 5	3	1070	
Fault Word 6	3	1071	
Fault Word 7	3	1072	
Fault Word 8	3	1073	
Corresponding Module of the Current Data	3	1074	
Reserve	3	1075-1199	

Fault Information Table

Fault Location			Fault name	Fault code
1	Fault Word 1	Bit0	Fault of module's chilled backwater temperature sensor	1A
2		Bit1	Fault of module's chilled outflow water temperature sensor	2A
3		Bit2	Fault of module's cooling outflow water temperature sensor	3A
4		Bit3	Fault of module's cooling outflow water temperature sensor	4A
5		Bit4	Fault of Backwater Temperature Sensor of System Chilled Water★	5A

6		Bit5	Fault of Outflow Temperature Sensor of System Chilled Water★	6A
7		Bit6	Fault of Backwater Temperature Sensor of System Cooling Water★	7A
8		Bit7	Fault of Outflow Temperature Sensor of System Cooling Water★	8A
9		Bit8	Exhaust temperature 1-1# sensor fault	9A
10		Bit9	Exhaust temperature 1-2# sensor fault	10A
11		Bit10	Exhaust temperature 2-1# sensor fault	11A
12		Bit11	Exhaust temperature 2-2# sensor fault	12A
13		Bit12	1# suction temperature sensor fault	13A
14		Bit13	2# suction temperature sensor fault	14A
4		Bit3	1# low-pressure sensor	4b
5		Bit4	2# low-pressure sensor	5b
6		Bit5	1# high-pressure sensor	6b
7		Bit6	2# high-pressure sensor	7b
1	Fault Word 3	Bit0	Module's chilled water flow fault	1d
2		Bit1	Module's cooling water flow fault	2d
3		Bit2	1# high-voltage switch fault	3d
4		Bit3	1# low-voltage switch fault	4d
5		Bit4	compressor 1-1 overload	5d
6		Bit5	compressor 1-2 overload	6d
9		Bit8	Power supply protection	9d
10		Bit9	2# high-voltage switch fault	10d
11		Bit10	2# low-voltage switch fault	11d
14		Bit13	compressor 2-1 overload	14d
15		Bit14	compressor 2-2 overload	15d
1	Fault Word 5	Bit0	Communication Fault ★	1E
1	Fault Word 6	Bit0	Fault of the communication with the HMI	1F
2		Bit1	Water temperature sensor fault of the controlled system	2F
3		Bit2	System's chilled water flow fault	3F
4		Bit3	System's cooling water flow fault	4F
5		Bit4	External interlock Fault	5F
6		Bit5	Operation time limit protection	6F
7		Bit6	System's cooling water outlet temperature is too high	7F
8		Bit7	System's chilled water outlet temperature is too low	8F
9		Bit8	System's cooling water outlet temperature is too low	9F
1	Fault Word 7	Bit0	Module's chilled water outlet temperature is too low	1p
2		Bit1	Module's cooling water outlet temperature is too high	2p
3		Bit2	1# Low suction pressure	3p
4		Bit3	1 # Low exhaust pressure	4p
5		Bit4	1# High exhaust pressure	5p
6		Bit5	2# Low suction pressure	6p
7		Bit6	2# Low exhaust pressure	7p
8		Bit7	2# High exhaust pressure	8p
9		Bit8	The exhaust gas temperature is too high 1_1	9p
10		Bit9	The exhaust gas temperature is too high 1_2	10p
11		Bit10	The exhaust gas temperature is too high 2_1	11p

12		Bit11	The exhaust gas temperature is too high 2_2	12p
13		Bit12	Deviation of exhaust gas temperature is too high 1	13p
14		Bit13	Deviation of exhaust gas temperature is too high 2	14p
15		Bit14	Low suction gas superheat 1	15p
16		Bit15	Low suction gas superheat 2	16p
1	Fault Word 8	Bit0	Low discharge superheat 1_1	1q
2		Bit1	Low discharge superheat 1_2	2q
3		Bit2	Low discharge superheat 2_1	3q
4		Bit3	Low discharge superheat 2_2	4q
5		Bit4	The cooling water outlet temperature of the heating module is too low	5q
6		Bit5	Sudden drop of suction pressure 1	6q
7		Bit6	Sudden drop of suction pressure 2	7q
8		Bit7	BPHE anti-freeze pressure 1	8q
9		Bit8	BPHE anti-freeze pressure 2	9q

Content of Toxic and Harmful Substances

Component Name	Toxic or Hazardous Substance or Element					
	Lead (Pb)	Mercury (Hg)	Cadmium （Cd）	Hexavalent Chromium (Cr (VI))	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Compressor and Its Accessories	×	○	○	○	○	○
Sheet Metal Parts	○	○	○	×	○	○
Valve	×	○	○	○	○	○
Crankcase's Heating Belt	○	○	○	○	○	○
Fasteners Such as Screws and Bolts	×	○	○	×	○	○
Controller and Electrical Components	×	○	○	○	○	○
Water Side Heat Exchanger	○	○	○	○	○	○
Pipeline Component	○	○	○	○	○	○
Rubber Parts	○	○	○	○	○	○
Refrigerant	○	○	○	○	○	○
Heat Preservation Cotton	○	○	○	○	○	○
Plastic Parts	○	○	○	○	○	○
Foam	○	○	○	○	○	○
Printing Parts	○	○	○	○	○	○

This table is prepared in accordance with the provisions of SJ/T11364

○: It indicates that the content of the toxic and harmful substance in all homogeneous materials of the component is below the limit specified in GB/T26572.

×: It is indicated that the content of the toxic and harmful substance exceeds the limit specified in GB/T26572 at least in one homogeneous material of the component. The components marked with "×" in the table cannot be replaced at present due to the technical reasons, and it will be gradually improved as the development of the technology subsequently .

1. After the product is scrapped, please separate it from the domestic garbage, and the consumer has the responsibility to send it to the qualified recovery station;
2. The recovery and treatment center will recover and reuse the material in the product through appropriate method;
3. Please consult the local government, scrap disposal center or the local distributor for the details of this product's recovery processing;
4. The environmental protection period of the product is not equivalent to the product's safety service life.

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FORM NO: 6U6W-A01C-NB-EN
SUPERSEDES: 6U6W-A01C-NA-EN

Printed on recycled paper

* Johnson Controls is committed to the continuous product improvement.
Please note the product design may change without notification.

**This manual is for reference only. For the specific product specifications and performance,
Please refer to the purchase agreement.

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