INTENSITY®
AIR CONDITIONING

AIR COOLED SCROLL CHILLER UNIT

RCAE115HA22, RCAE150HA22,
RCAE230HA22, RCAE265HA22, RCAE300HA22.

INSTALLATION OPERATION AND MAINTENANCE MANUAL

Please keep this manual carefully for future reference and read it carefully before operation.

MAN-I-ACSC/HC-0420

intensity.mx

Safety Precautions

To gain full advantage of the chiller's functions and to avoid malfunction due to mishandling, we recommend that you read this instruction manual carefully before use.
This chiller is classified under "appliances not accessible to the general public".
The precautions described herein are classified as **WARNING** and **CAUTION**. They both contain important information regarding safety. Be sure to observe all precautions without fail.

SAFETY SYMBOLS

WARNING!

Failure to follow these instructions properly may result in personal injury or loss of life.

CAUTION!

Failure to observe these instructions properly may result in property damage or personal injury, which may be serious depending on the circumstances.

After reading, keep this manual in a convenient place so that you can refer to it whenever necessary. If the equipment is transferred to a new user, be sure also to hand over the manual.

Precautions during installation

Check the following items in order to use the chiller at the maximum potential. If any of the items are not in proper working order, be sure to take the necessary measure before attempting operation.

WARNING!

When the chiller is malfunctioning (giving off a burning odour, etc.) turn off power to the unit and contact your local dealer.
Continued operation under such circumstances may result in a failure, electric shocks or fire hazards.
Consult your local dealer about installation work.
Doing the work yourself may result in water leakage electric shocks or fire hazards.
Installation should be done following the installation manual.
Incorrect installation may cause leaking, electric shock, or fire. Injuries may result if the unit falls.
Consult your local dealer regarding modification, repair and maintenance of the chiller.
Improper workmanship may result in water leakage, electric shocks or fire hazards.
Do not place objects, including rods, your fingers, etc., in the air inlet or outlet.
Injury may result due to contact with the chiller's high speed fan blades.
Beware of fire in case of refrigerant leakage.
If the chiller is not operating correctly, i.e. not generating cool or warm air, refrigerant leakage could be the cause.
Consult your dealer for assistance. The refrigerant within the chiller is safe and normally does not leak. However, in the event of a leakage, contact with a naked burner, heater
or cooker may result in generation of noxious gas. Do not longer use the chiller until a qualified service person confirms that the leakage has been repaired.
Consult your local dealer regarding what to do in case of refrigerant leakage.

When the chiller is to be installed in a small room, it is necessary to take proper measures so that the amount of any leaked refrigerant does not exceed the concentration limit in the event of a leakage. Otherwise, this may lead to an accident due to oxygen depletion.

Contact professional personnel about attachment of accessories and be sure to use only accessories specified by the manufacturer.

If a defect results from your own workmanship, it may result in water leaks, electric shock or fire.

Consult your local dealer regarding relocation and reinstallation of the chiller.

Improper installation work may result in leakage, electric shocks or fire hazards.

Be sure to use fuses with the correct ampere reading.

Do not use improper fuses, copper or other wires as a substitute, as this may result in electric shock, fire, injury or damage to the unit.

Be sure to earth the unit.

Do not earth the unit to a utility pipe, lightning conductor or telephone earth lead.

Imperfect earthing may result in electric shocks or fire. A high surge current from lightning or other sources may cause damage to the chiller.

Be sure to install an earth leakage breaker.

Failure to install an earth leakage breaker may result in electric shocks or fire.

Consult the dealer if the chiller submerges owing to a natural disaster, such as a flood or typhoon.

Do not operate the chiller in that case, or otherwise a malfunction, electric shock, or fire may result.

Do not start or stop operating the chiller with the power supply breaker turned ON or OFF.

This may cause electric shock or fire.

Do not use flammable materials (e.g., hairspray or insecticide) near the product.

Do not clean the product with organic solvents such as paint thinner.

The use of organic solvents may cause crack damage to the product, electric shocks, or fire.

Be sure to use a dedicated power supply for the chiller.

The use of any other power supply may cause heat generation, fire, or product failures.

All wiring must be performed by an authorized electrician.

To do wiring, ask your dealer. Never do it yourself.

Make sure that a separate power supply circuit is provided for this unit and that all electrical work is carried out by qualified personnel according to local laws and regulations.

Insufficient power circuit capacity or incorrect work may cause electric shock of fire.

Install the unit on a foundation strong enough to withstand the weight of the unit.

A foundation of in sufficient strength may result in the unit falling and causing injuries.

Do not modify unit.

This may cause electric shock or fire.

Be sure to install as prescribed to prepare for strong winds, earthquakes, etc.

Improper installation could result in the unit overturning or falling.

Use the prescribed cable for wiring, and make sure that connections are secure.

Be sure to securely fasten cables to their terminals so that external force is not conveyed. Improper connections and fastening could produce heat or could result in fire.

Do not use any heating medium other than water for chilled (hot) water.

Doing so could result in fire or explosion.

CAUTION!

Do not use the chiller for purposes other than those for which it is intended.
Do not use the chiller for cooling precision instruments, food, plants, animals or works of art as this may adversely affect the performance, quality and/or longevity of the object concerned.
Do not remove the chiller's fan guard.
The guard protects against the unit's high speed fan, which may cause injury.
After prolonged use, check the unit stand and its mounts for damage.
If left in a damaged condition, the unit may fall and cause injury.
Don't place flammable sprays or operate spray containers near the unit as this may result in fire.
Before cleaning, be sure to stop unit operation, turn the breaker off or remove the power cord.
Otherwise, an electric shock and injury may result.
To avoid electric shocks, do not operate with wet hands.
Do not allow a child to mount on the chiller or avoid placing any object on it.
Falling or tumbling may result in injury.
Be sure that children, plants or animals are not exposed directly to airflow from the unit, as adverse effects may ensue.
Do not wash the chiller with water, as this may result in electric shocks or fire.
Do not place water containers (flower vases, etc.) on the unit, as this may result in electric shocks or fire.
Do not install the chiller at any place where there is a danger of flammable gas leakage.
In the event of a gas leakage, build-up of gas near the chiller may result in fire hazards.
Arrange the drain to ensure complete drainage.
If proper drainage from the outdoor drain pipe does not occur during chiller operation, there could be a blockage due to dirt and debris build-up in the pipe.
This may result in a water leakage from the indoor unit. Under these circumstances, stop chiller operation and consult your dealer for assistance.
The appliance is not intended for use by unattended young children or infirm persons.
Impairment of bodily functions and harm to health may result.
Children should be supervised to ensure that they do not play with the unit or its remote controller.
Accidental operation by a child may result in impairment of bodily functions and harm health.
To avoid injury, do not touch the aluminium fin of the cross fincoil.
Do not place objects in direct proximity of the chiller and do not let leaves and other debris accumulate around the unit.
Leaves are a hotbed for small animals which can enter the unit.
Once in the chiller, such animals can cause malfunction smoke or fire when making contact with electrical parts.
Do not block air inlets nor outlets.
Impaired air flow may result in insufficient performance or trouble.
Do not let children play on or around the unit. If they touch the unit carelessly, injury may be caused.
Never touch the internal parts of the control panel.
Do not remove the front panel. Touching certain internal parts will cause electric shocks and damage to the unit. Please consult your dealer about checking and adjustment of internal parts.

Do not leave the control panel wherever there is a risk of wetting.
If water gets into the remote controller there is a risk of electrical leakage and damage to electronic components.
Use chilled (hot) water that conforms to water quality standards.
Poor quality water could result in water leaks.
Do not attempt to run the compressor by pushing the magnetic contactor with your finger.
Doing so could result in electrical shock or fire.
Do not mistake the types of refrigerant and refrigeration oil.
Doing so could result in fire or explosion.
Do not expose the chiller to harsh environments.
The chiller should not be installed near hot water springs, the seashore or areas exposed to oil. Corrosion caused by such elements can result in electrical shock or fire.
Never touch parts which tend to become hot such as compressors and refrigerant piping.
Doing so could result in skin burning.
Be sure to dispose of brine and cleansing solutions as stipulated by law.
Illegal disposal is not only against the law, but can harm health and the environment.
Be sure to provide each chiller with a circuit breaker.
Using a single circuit breaker for more than one chiller could result in electrical shock or fire.
Do not run power supply wiring between chillers.
Doing so could result in fire.
Do not operate the chiller with the cabinet or electrical parts box cover open.
Doing so could result in electrical shock or fire.
Do not attempt to force-operate the chiller by short circuiting safety devices, etc.
Doing so could result in fire or explosion.
Do not change settings of safety devices. Doing so could result in fire, etc.
Do not used chilled (hot) water for drinking or hot water supply.
Doing so could be harmful to health.
Do not mistake the types of refrigerant and refrigeration oil.
Doing so could result in fire or explosion.
Do not allow water to remain in the water piping during prolonged idle periods.
For prolonged idle periods you should fill the water pipes with antifreeze or drain all the water from the pipes. Failure to do so could result in leaking.
Be sure to dispose of brine and cleansing solutions as stipulated by law.
Illegal disposal is not only against the law, but can harm health and the environment.
Pay attention to ventilation when repairing indoors.
If refrigerant leaks and the room is not sufficiently ventilated, it could result in accidents caused by lack of oxygen.
Do not solder the refrigerant fusible plug.
Using a fusible plug that does not conform to specifications could result in explosion.
Check open-closed state of all valves before usage.
Check valves in accordance with instructions given in the operation manual and on the nameplate.
In particular, be sure stop valve for safety valves are opened while the equipment is running. If valves are opened or closed when they shouldn't be, water may leak and in worse cases, the equipment may catch fire or explode.

Refrigerant

1. The refrigerant R410A used by the RCAE***HA22 series units from INTENSITY is a new type of environmentally friendly refrigerant that does not destroy the ozone layer. The operating pressure is about 1.6 times higher than the common R22. The new refrigerant R410A consists of two quasi azeotropic mixtures, R32 and R125, each of which accounts for 50%. Its saturated vapor pressure is corresponding to its temperature, namely, the corresponding saturated vapor pressure increases along with the temperature. When the unit contains refrigerant, do not flame cut or weld the shell-and-tube heat exchanger, fin heat exchanger, liquid receiver or unit pipeline. Do not fasten a bolt or nut when the unit is operating or under pressure. If there is a leak on the connecting surface, fasten the bolt or nut after relieving the pressure. Avoid refrigerant leaks when commissioning and using the unit. The acceptable R410A vapor concentration (AEL) in the air is 1000 ppm, and there are no adverse health effects at this concentration. If a severe spill or leak occurs, R410A vapor will concentrate close to the ground, which can cause hypoxia. Increase ventilation if this happens. A fan can be used to circulate the air near the ground. Do not enter the affected area before the refrigerant vapor is eliminated to avoid health hazard. Do not allow liquid refrigerant to come into contact with your skin and eyes, because it is harmful.

2. A special refrigerant pumping and injection device should be used to fill the refrigerant (R410A) in the unit or draw. The refrigerant (R410A) drawn from the unit must be injected into a liquid storage tank that complies with the unit design pressure and is designed and made to the standards of pressure vessels. Do not directly discharge refrigerant (R410A) to the air or a sewer.

Contents

1 Introduction

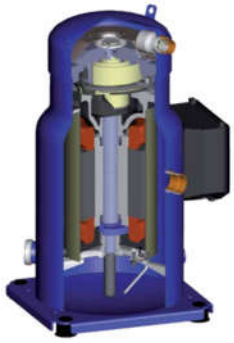
1.1 Operation Range

Content	Operating range
	Cooling
Ambient temperature	0°C to 48°C
Water outlet temperature	5°C to 15°C
Water flow rate	Rated flow rate from 50% to 130%
Max. water inlet/outlet temperature difference	10°C
Voltage	Rated voltage ±10%
Difference between voltage phases	±2%
Power frequency	Rated frequency ±2%
Max. operating pressure on the water side of the heat exchanger	1.0 MPa
Ambient air quality	Cannot be used in corrosive air or environments with extremely high humidity.
Water drainage system	Water accumulation height at the installation place cannot exceed the base of the unit.
Altitude height for operating	Not higher than 2000m

1.2 The Unit

1.2.1 Compressor

The unit has suction-cooled, hermetic scroll compressors. High efficiency is achieved through a controlled orbit and the use of advanced scroll geometry. All rotating parts are statically and dynamically balanced. The compressor motors have integral protection against overloads that will automatically reset. The compressors are switched On and Off by the unit microprocessor to provide capacity control. Each compressor is fitted with a crankcase strap heater. All compressors are mounted on isolator pads to reduce transmission of vibration to the rest of the unit. The motor terminal boxes have IP54 weather protection.



1.2.2 Evaporator

The 2-pass dual circuit shell and tube type direct expansion (DX) heat exchanger has refrigerant in the tubes and liquid flowing through the baffled shell. The waterside (shell) design working pressure is 1.0MPa. The refrigerant side is protected by pressure relief valve(s). The Victaulic connection is used.

1.2.3 Condenser

The coils are seamless copper tubes, arranged in staggered rows, mechanically expanded into coated aluminium fins.

1.2.4 Fan Motor

The IP54 fan motors are the totally enclosed air-over type with permanently lubricated double-sealed ball bearings.

1.2.5 Intelligent Control

The unit adopts a micro-controller to implement control, and provides many automatic control functions such as fault diagnosis, energy management and anti-freezing monitoring, ensuring efficient operations and convenient operations. The unit is provided with a RS485 communication interface. Multiple units can be networked to implement control. The unit can be controlled by the upper computer through the RS485/RS232 conversion interface program. The start and stop of each unit can be controlled by the upper computer according to load requirements and operation time.

Multiple self-protection functions ensure safe and reliable operations.

2 Specifications

2.1 Water Flow Rate

To ensure the normal operation of the unit, the water flow rate of the shell-and-tube heat exchanger must be within the rated flow from 50% to 130%. If the water flow rate is too low, the internal copper tube for heat exchange of the shell-and-tube heat exchanger may crack and refrigerant may leak. If the water flow rate is too high, parts such as the copper tube for heat exchange and baffle plate may break or bend. It will also damage the shell-and-tube heat exchanger. Even when the unit is stopped, the water flow rate of the shell-and-tube heat exchanger cannot exceed 150% of the rated water flow rate.

To reduce corrosion of the shell-and-tube heat exchanger by circulating water and prolong the service life of the unit, the circulating water pump of the waterway needs to be turned off when the unit will be stopped for a long time. Water should be drained from the shell-and-tube heat exchanger and pipeline.

2.2 Variable Flow of Evaporator

The water flow rate of the evaporator for the standard unit can be variable. Under all water flow conditions, the unit can be maintained at a steady outlet water temperature. The water flow rate must be greater than the specified min. water flow rate, and its variation cannot exceed 30% per minute.

If the water flow changes too fast, the system water capacity 4.7L/kW is replaced by the min. value 7.1L/kW.

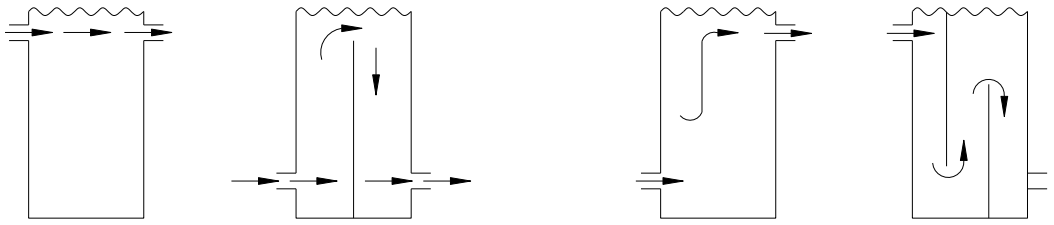
The min. water capacity of the water circulating system is obtained from the following formula:

Volume = Q (kW) * N (L)

Application type	N (L)
Air conditioning conditions	4.7
Process conditions	7.1

Q (kW): Nominal cooling capacity under standard operating conditions.

Water capacity is necessary for unit operating temperature and precision control. Usually a baffle tank needs to be added to ensure the required water capacity. A baffle plate is built in the water tank to ensure thorough mixing. See the examples below:



3 Accessories

3.1 Standard Accessory Table

No.	Name	Unit	Accessory Qty	Remarks
1	Chiller	Unit	1	
2	Certificate of Approval	Copy	1	
3	Installation, operation and maintenance manual	Copy	1	
4	Pipe Temperature Sensor	PCS	1 for a single unit 2 for dual units	Used on the general water outlet pipe when multiple units are under joint control

3.2 Optional Accessories List

No.	Option Name	Unit	Qty
1	Water flow switch	Pcs	As required by the customer
2	Spring isolator	Pcs	See the base diagram
3	Flange connection of water pipe	Set	Matched with the unit
4	Compressor noise reduction box	Set	Matched with the unit

4 Unit Installation

WARNING!

The installation work must be completed by a qualified professional installation company.
In consideration of factors such as the relative pressure inside the equipment, electrical components and the installation position, follow the safety instructions during operations, and carefully read the instructions and safety precautions on all labels beforehand. Manufacturer is not liable for injury or damage to the unit caused by a failure to comply with the procedures or instructions provided in this manual.

Using the following check column, re-check the installation related items:

(1) Check to see if the air diffuser side is not affected by a monsoon. (Place exceeding the wind velocity 10 m)

□ Affected □Not affected

→ Study to provide a windbreak plate and windbreak wall(take action for windbreak).

✧ A place where no trouble is given to the house next door

✧ A safe place which can endure machine weight and vibration, and where the chiller can be installed horizontally

✧ A place where combustible gas may not leak

(2) Check to see if any action is taken for vibration-proof work

□Yes □No

Vibration is transmitted not only from the chiller main body foundation but from water piping, and noise may be generated from the floor and wall surface.

Where the chiller is installed on the rooftop in particular:

✧ The installation position (building beam position) is also important.

✧ Check also during test run.

(3) Check to see if the drain works and drain path are satisfactory.

□Provided □Not provided

For this machine, drain water is generated, depending on the operation condition. As needed, provide a drain ditch around the chiller for draining.

(4) Check to see if the service & maintenance space is taken into consideration.

□Water piping □Electrical equipment □Pump □Chiller maintenance □Strainer cleaning

4.1 Equipment Entry Inspection

(1) Check the unit for any damage or missing parts. If you find damage or if any parts are missing, contact the freight company immediately.

(2) Confirm that the received unit matches the order. Compare the nameplate data as required.

(3) The unit must include the following information:

- Unit name and model
- Factory No.
- Ex-factory date
- Nominal cooling capacity/heating capacity
- Rated unit power (cooling/heating)
- Water flow rate
- Power supply matched with the unit
- Air supply volume of the unit
- Rated current
- Refrigerant
- Filling amount of refrigerant
- Unit length, width and height
- Unit weight

Confirm that all accessories have been delivered to the installation site and are undamaged.

4.2 Transportation, Unloading and Lifting Requirements

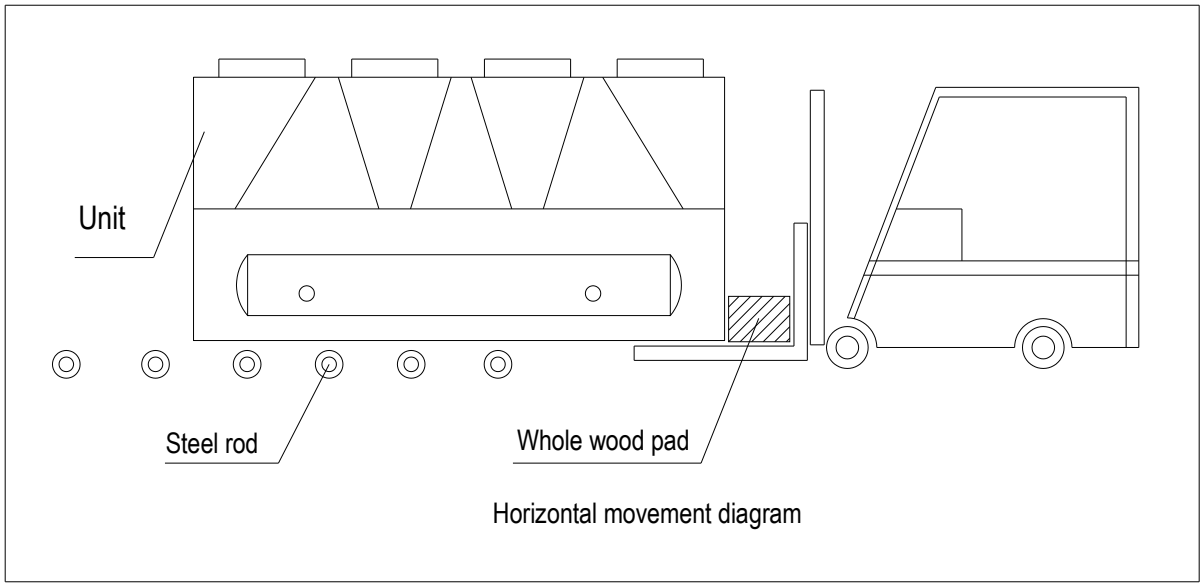
(1) Precautions for transportation

- Comply with national and local laws and regulations when transporting the unit.
- Avoid collisions between the unit and other objects during transportation.
- Do not place other goods on or inside the unit.
- Do not turn the unit on its side.
- Temperature range during transportation and storage: -25 to 55°C.

Check the unit according to the following table after transportation.

No.	Check items and requirements	Handling methods of inconsistency with requirements
1	The unit must not be damaged during transportation.	If damage occurs during transportation, mark it on the packing list of the transport company, and immediately request in writing that the shipping agent conducts an inspection.
2	The specifications and quantities of the unit accessories must be consistent with the packing list attached to the machine.	Please contact the distributor.
3	The water inlet and outlet sealing covers of the shell-and-tube heat exchanger for the unit should be kept intact. Do not open the sealing cover before the unit is connected to the water pipe.	Please contact the distributor.

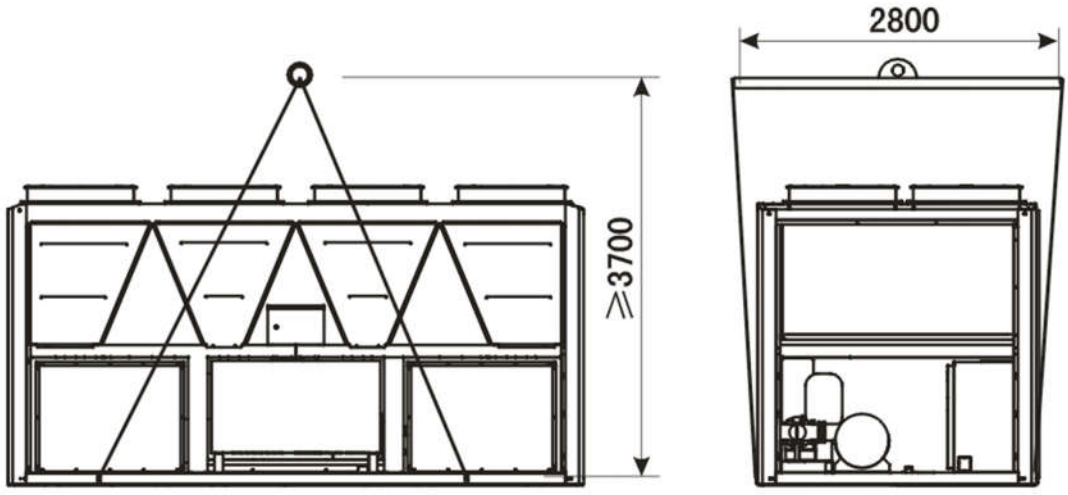
(2) Load/unload the unit with cautions without damaging any unit components. Use a crane to load/unload the unit. In case of short distance transport, a mechanical carrier can be used, and a whole wood pad is conducive to uniform stress along the horizontal base of the unit. Insert 3 to 6 steel rods that are easy to roll under the unit base to move the unit slowly, as shown below:



Horizontal movement diagram

(3) Lifting the unit

- Select a crane according to the unit weight (advised to buy insurance).
- Lift the unit according to the following method strictly. Use a wire rope to wind the hook by one circle, lest the wire rope would slide and lead to a danger in case of a weight imbalance.
- A spreader bar must be used to prevent damages to the unit by the sling.
- Comply with local safety laws and regulations when lifting the unit, and define a safety protection circle. Prevent non-workers from entering it. No person can stay under the crane and the lifted unit.



4.3 Installation Base Requirements and Unit Appearance

4.3.1 Installation Base Requirements

The unit is designed for outdoor installation and can be installed on a roof or floor or beside a building. The unit must be installed on a solid foundation. A whole concrete slab is recommended, and its bearing capacity must be sufficient to withstand the total weight of the unit and the maintenance personnel.

When installing the unit, install a spring isolator to isolate the unit base and the foundation to avoid unit vibration and noise spreading. The spring isolator is optional for the unit, and its compression deformation is 15mm to 25mm. See the diagram below for the installation method. To install a spring isolator for the unit and configure each point, see the base diagram.

Spring isolator installation instructions:

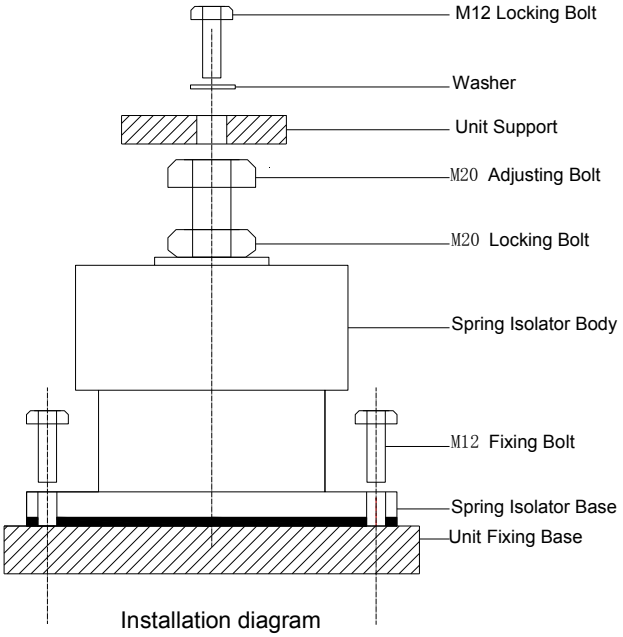
1. Check the printing code model on the spring isolator, and verify the model to be configured for each point before starting installation.
2. Screw out the M12 locking bolt on the spring isolator, and place the spring isolator under the unit support.
3. Align the center hole on the M20 adjusting bolt on the spring isolator with the mounting hole on the unit support (as shown below). Screw the M12 locking bolt. Do not tighten the M12 locking bolt.
4. After ensuring the verticality of the spring isolator, use the M12 fixing bolt to lock the spring isolator on the base. After installation, use a ruler to measure the heights of the unit support and the base. If the unit support is not level, adjust the free height of the spring isolator according to requirements.

Adjustment method:

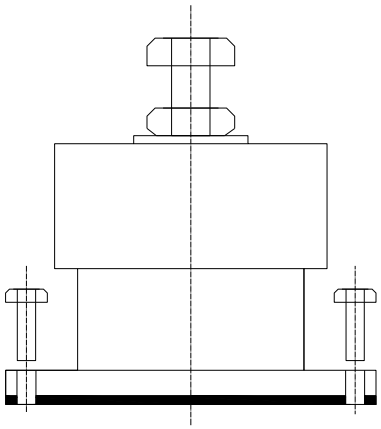
4.1 Use a spanner to loosen the M20 locking nut anticlockwise (up).

4.2 Then, turn the M20 adjusting bolt anticlockwise. The required free height can be adjusted according to requirements to ensure the horizontal operating status of the unit.

5. After installation, lock the M20 locking nut, and then tighten the M12 locking bolt on the unit support.
6. Ensure that the spring isolator is vertical. Do not use a hard object to knock or impact the spring isolator.



Installation diagram

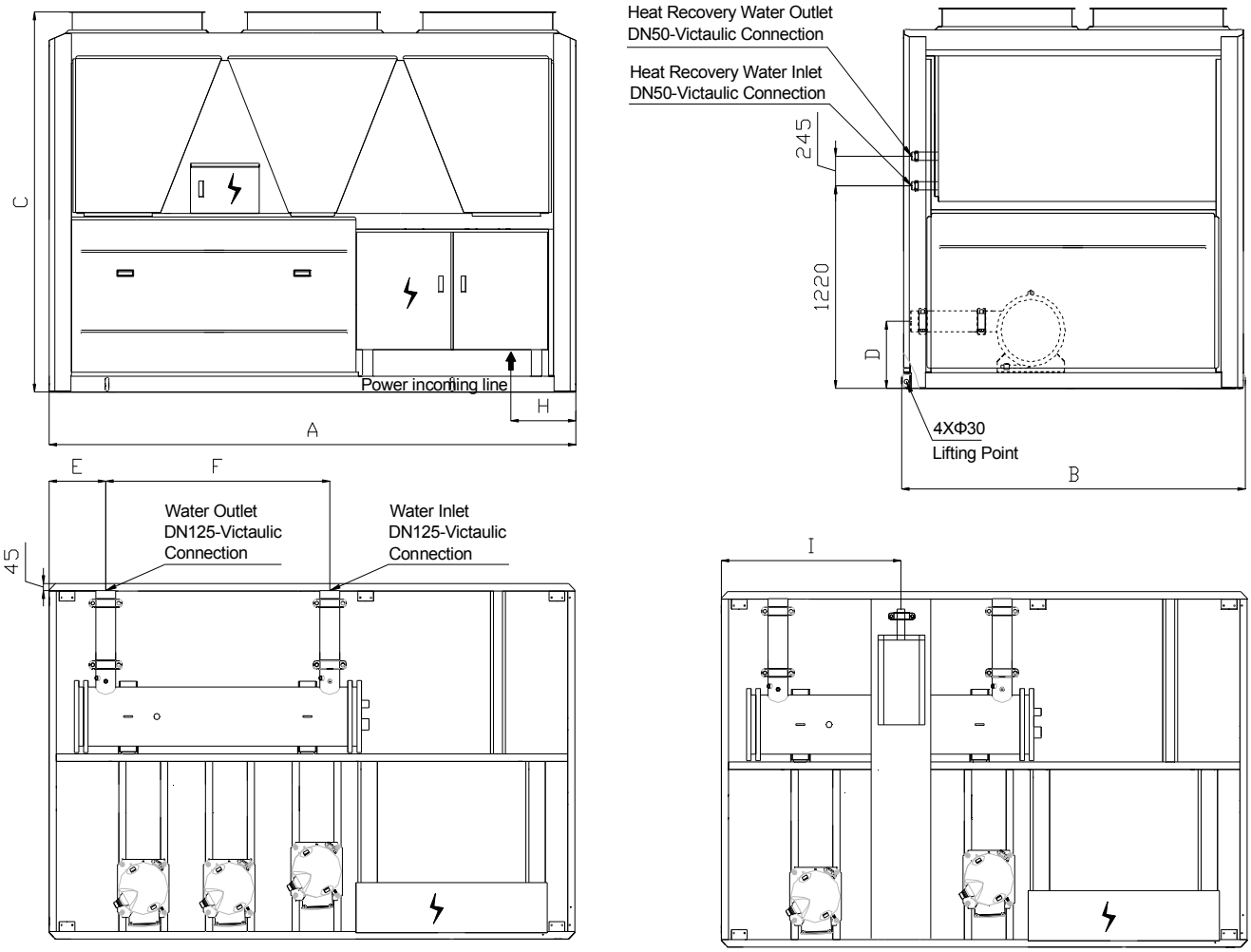


Appearance diagram

4.3.2 Unit Appearance and Base Diagram

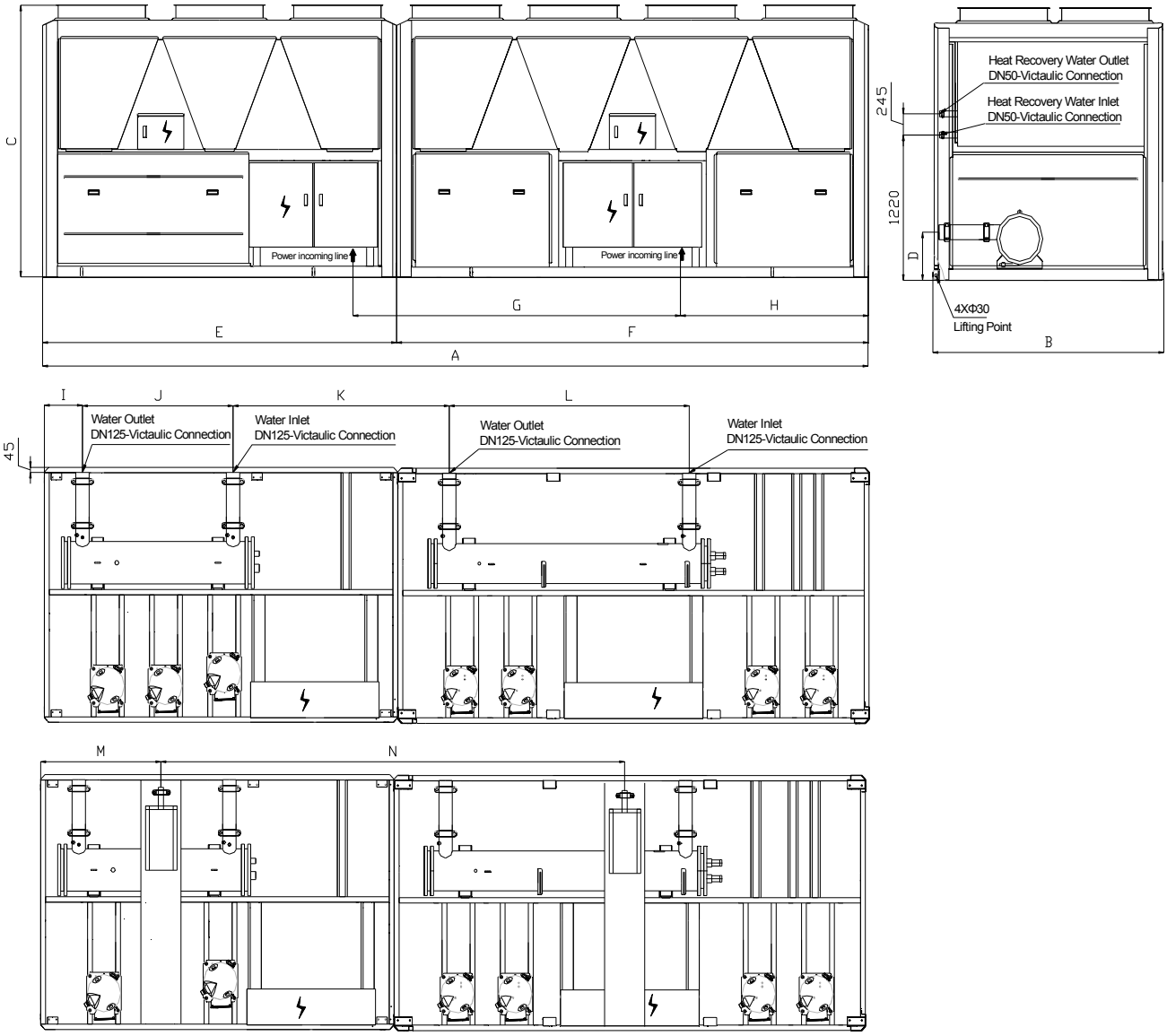
1. External dimensions

Model: RCAE115HA22, RCAE150HA22



Model	External unit dimensions (unit: mm)								
	A	B	C	D	E	F	G	H	I
RCAE115HA22	3530	2300	2500	430	380	1860	/	365	1230
RCAE150HA22	4700	2300	2500	430	515	2390	/	1825	2400

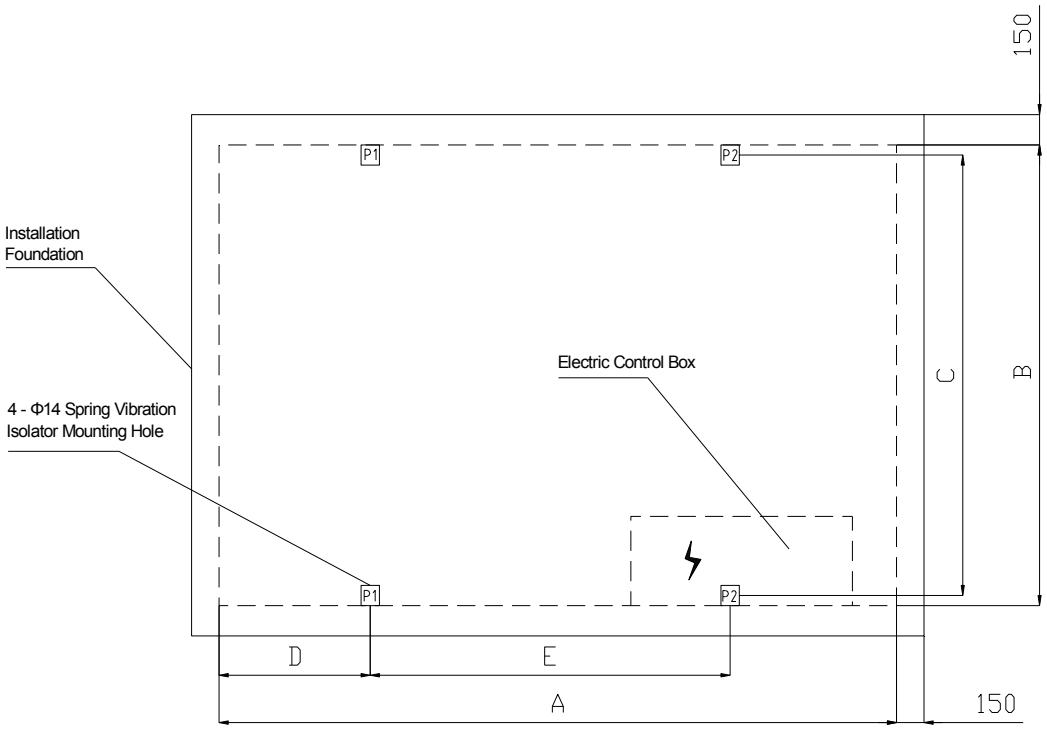
Model: RCAE230HA22, RCAE265HA22 and RCAE300HA22



Model	External unit dimensions (unit: mm)													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
RCAE230HA22	7060	2300	2500	430	3530	3530	3530	365	380	1860	1670	1860	1230	3530
RCAE265HA22	8230	2300	2500	430	3530	4700	3240	1825	380	1860	1805	2390	1230	4700
RCAE300HA22	9400	2300	2500	430	4700	4700	4700	1825	515	2390	2310	2390	2400	4700

2. Base diagram

Model: RCAE115HA22



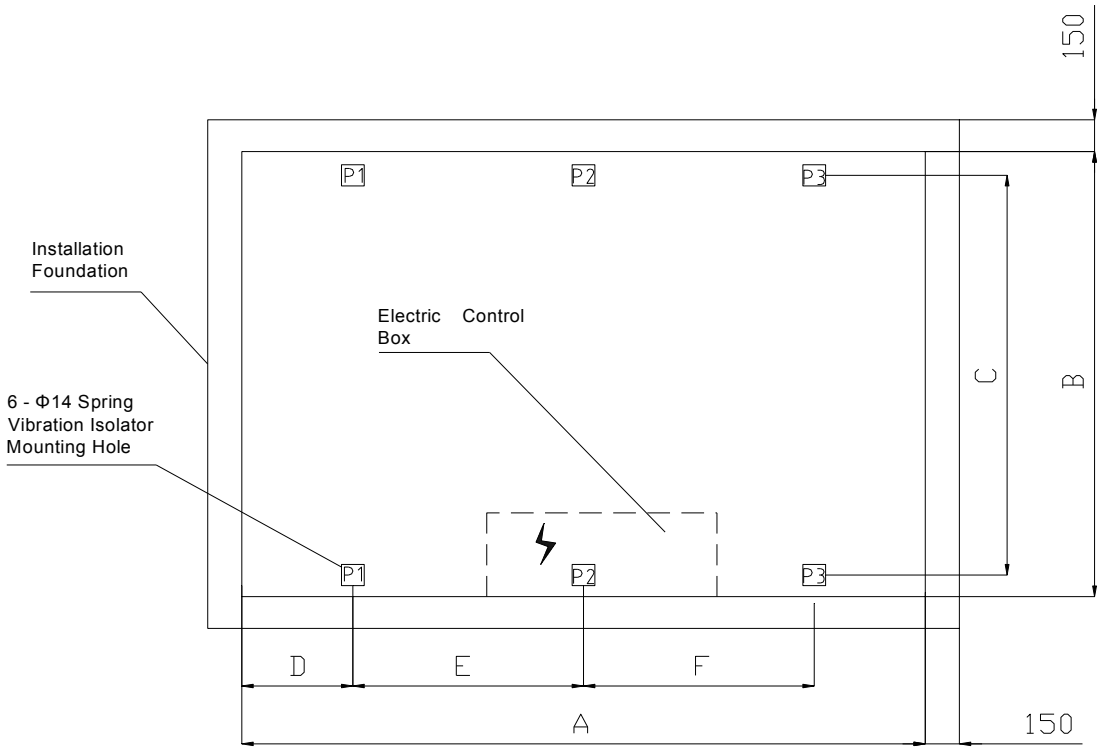
Model	Unit base dimensions (unit: mm)				
	A	B	C	D	E
RCAE115HA22	3530	2300	2220	644	2200

Model	Spring vibration isolator model at each point	
	P1	P2
RCAE115HA22	MHD-1050	MHD-1050

Notes: 1. The spring vibration isolator is optional.

2. The value of the spring vibration isolator model indicates the bearable weight (unit: kg). For example, "1050" in "MHD-1050" indicates 1050kg.

Model: RCAE150HA22



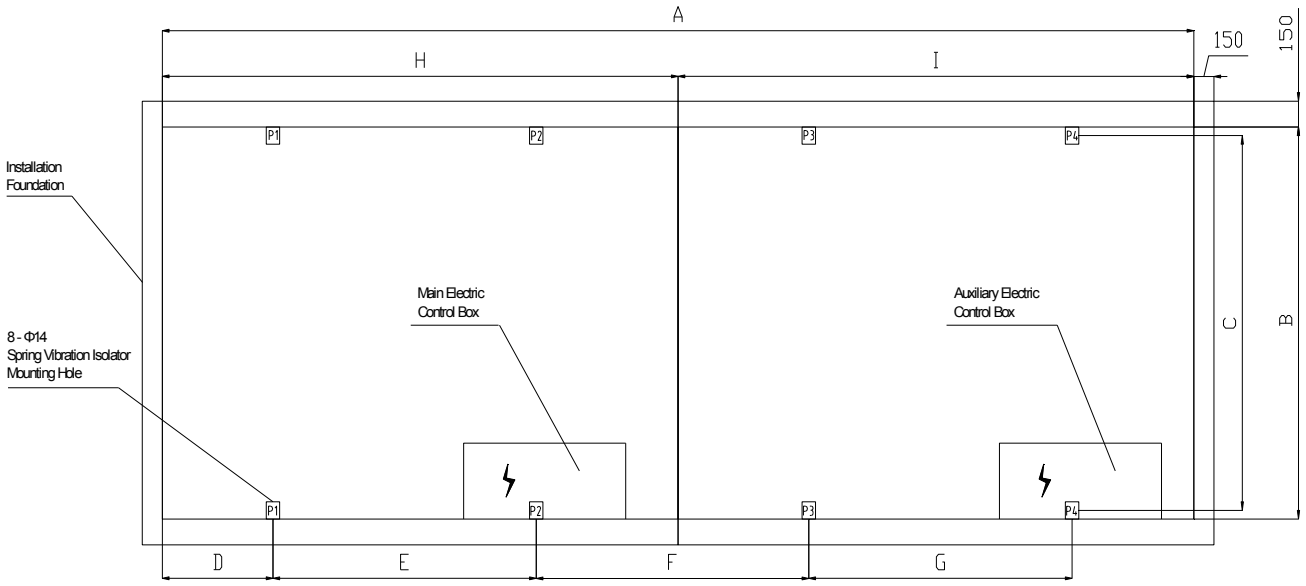
Model	Unit base dimensions (unit: mm)					
	A	B	C	D	E	F
RCAE150HA22	4700	2300	2220	844	1412	1600

Model	Spring vibration isolator model at each point		
	P1	P2	P3
RCAE150HA22	MHD-850	MHD-850	MHD-850

Notes: 1. The spring vibration isolator is optional.

2. The value of the spring vibration isolator model indicates the bearable weight (unit: kg). For example, "1050" in "MHD-1050" indicates 1050kg.

Model: RCAE230HA22



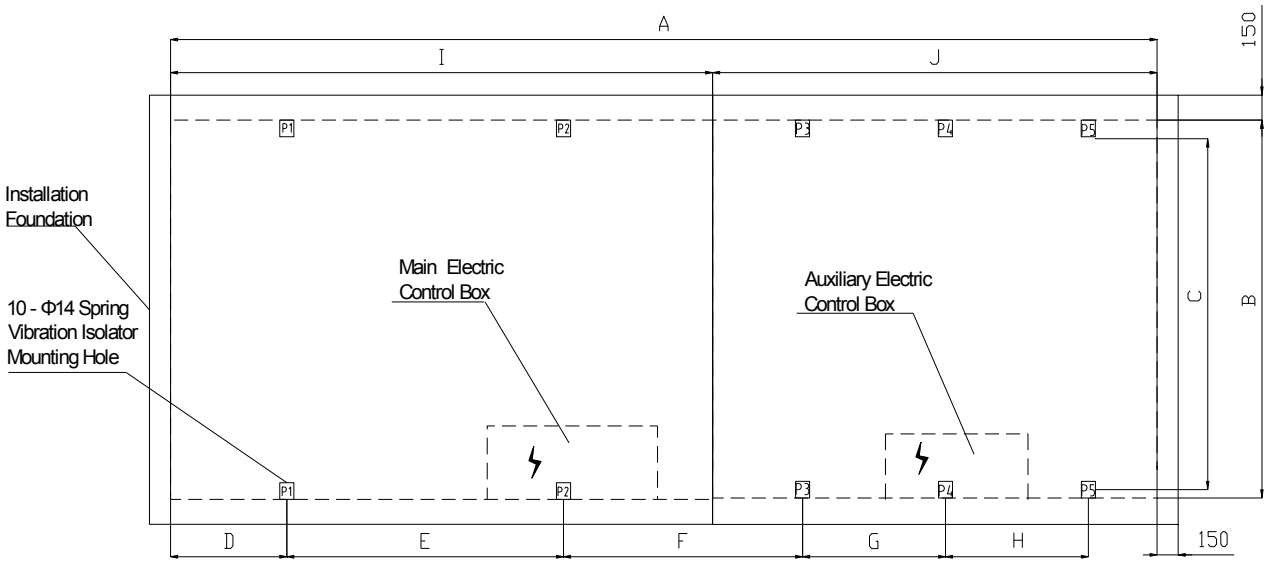
Model	Unit base dimensions (unit: mm)								
	A	B	C	D	E	F	G	H	I
RCAE230HA22	7060	2300	2220	644	2200	1330	2200	3530	3530

Model	Spring vibration isolator model at each point			
	P1	P2	P3	P4
RCAE230HA22	MHD-1050	MHD-1050	MHD-1050	MHD-1050

Notes: 1. The spring vibration isolator is optional.

2. The value of the spring vibration isolator model indicates the bearable weight (unit: kg). For example, "1050" in "MHD-1050" indicates 1050kg.

Model: RCAE265HA22



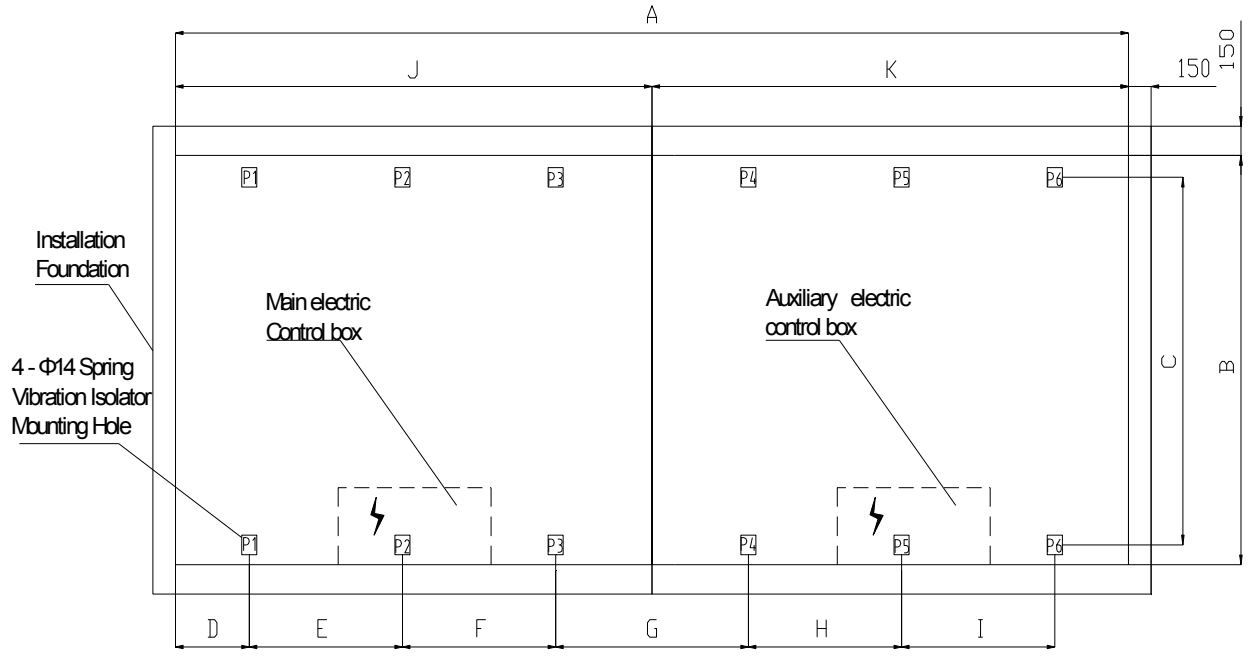
Model	Unit base dimensions (unit: mm)									
	A	B	C	D	E	F	G	H	I	J
RCAE265HA22	8230	2300	2220	644	2200	1530	1412	1600	3530	4700

Model	Spring vibration isolator model at each point				
	P1	P2	P3	P4	P5
RCAE265HA22	MHD-1050	MHD-1050	MHD-850	MHD-850	MHD-850

Notes: 1. The spring vibration isolator is optional.

2. The value of the spring vibration isolator model indicates the bearable weight (unit: kg). For example, "1050" in "MHD-1050" indicates 1050kg.

Model: RCAE300HA22



Model	Unit base dimensions (unit: mm)										
	A	B	C	D	E	F	G	H	I	J	K
RCAE300HA22	9400	2300	2220	844	1412	1600	1688	1412	1600	4700	4700

Model	Spring isolator model at each point					
	P1	P2	P3	P4	P5	P6
RCAE300HA22	MHD-850	MHD-850	MHD-850	MHD-850	MHD-850	MHD-850

Notes: 1. The spring vibration isolator is optional.

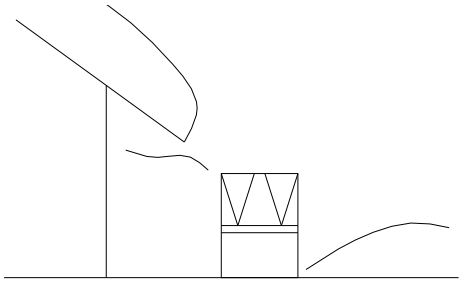
2. The value of the spring vibration isolator model indicates the bearable weight (unit: kg). For example, "1050" in "MHD-1050" indicates 1050kg.

4.4 Installation Space Requirements

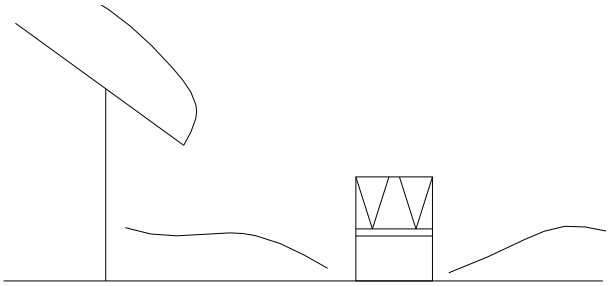
The unit requires enough fresh air for heat exchange through the air side heat exchanger; therefore, be sure to reserve sufficient space around and between units. To enable maintenance and repairs, do not store materials around the unit.

Note the following points when installing the unit in areas affected by snow.

(1) Do not install the unit under an eave.

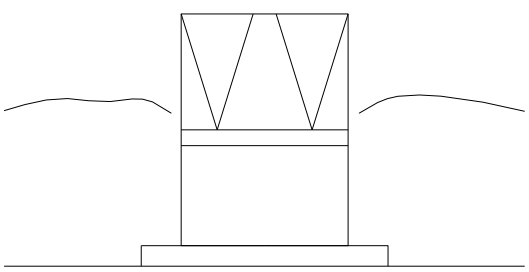


× Incorrect installation

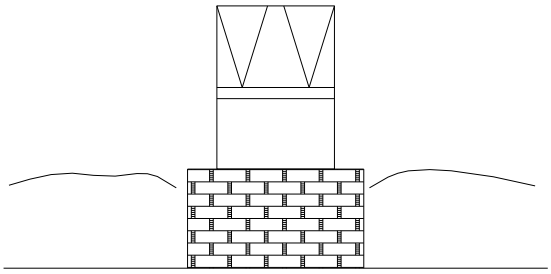


√ Correct installation

(2) Raise the installation height of the unit according to snow accumulation. (Foundation height of the unit must be 1m above the local maximum snow accumulation height.)

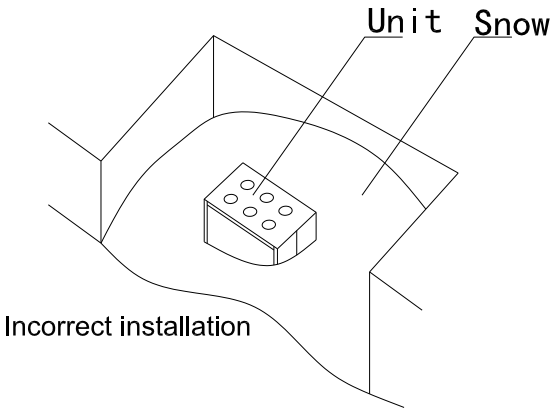


× Incorrect installation



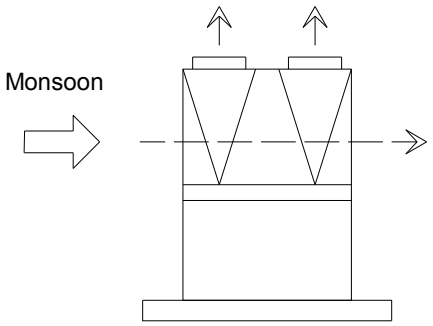
√ Correct installation

(3) Do not install the unit where snow might pile up.



In monsoon regions where the air heat exchanger faces the monsoon, air flow is like the broken line in the

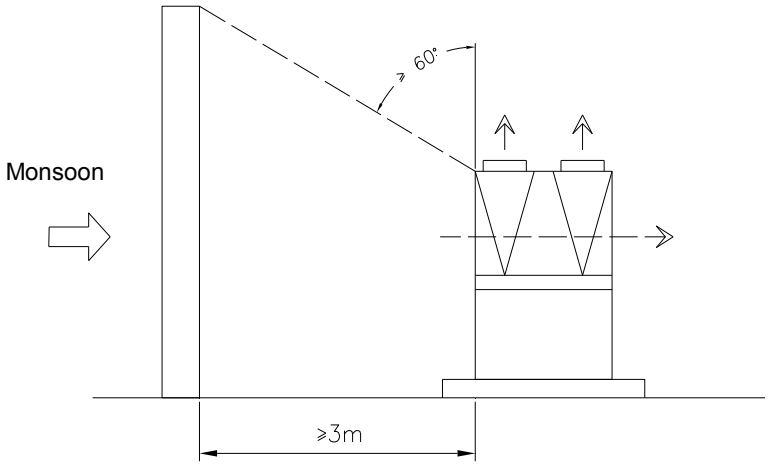
following figure because the air speed is higher than the air inlet speed of the fan.



In this case, air that has undergone heat exchange will undergo it again in another heat exchanger, reducing cooling capacity and possibly causing a fault. Although unit designers have considered this problem, do not install the unit facing a monsoon to avoid unnecessary faults.

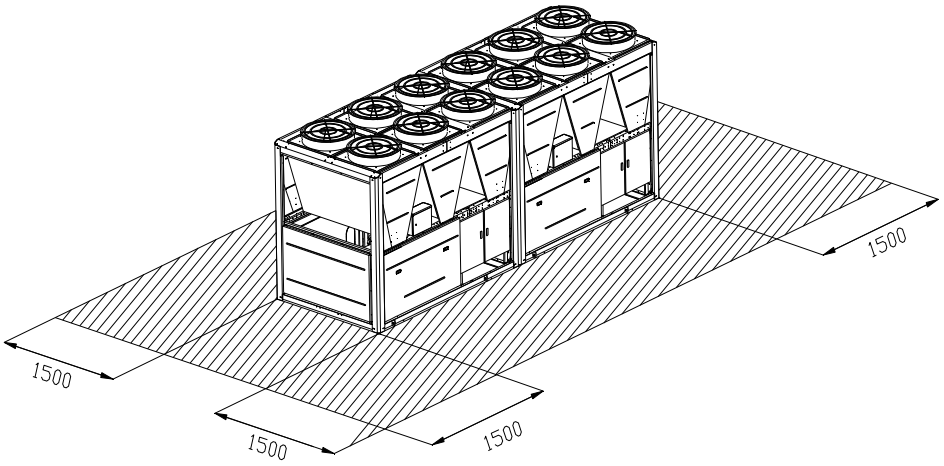
If a unit has to be installed facing a monsoon, take the following measures:

Install a windproof wall:

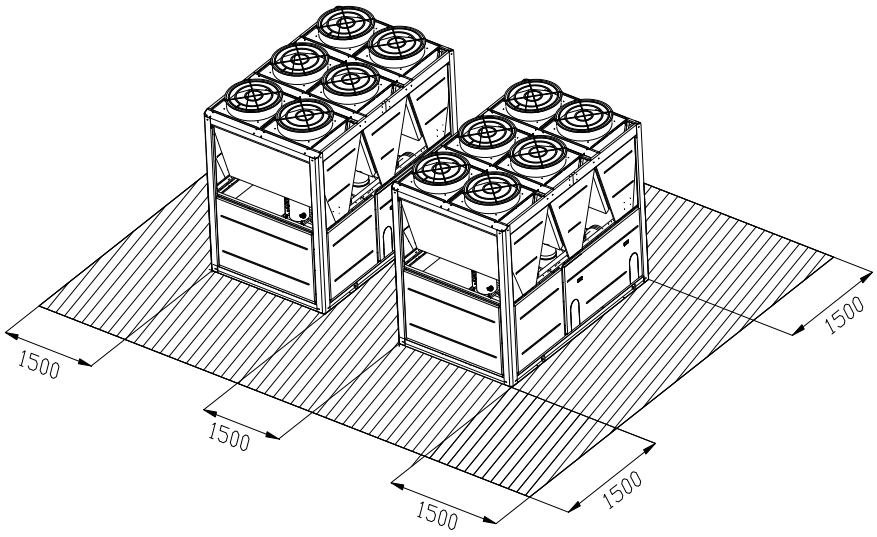


If restricted by the installation site, multiple units can be installed in the following way and the space between units for overhaul must comply with the following figures:

Series connection:



Parallel connection:



4.5 Water System Installation and Recommended Water System Diagram

4.5.1 Installation Requirements of the Water System

Installation of the water system must comply with conventional installation criteria to achieve the best operating efficiency. Ensure that no foreign material exists in the pipes. All cooling water pipes must comply with the local rules and regulations.

- Install a safety valve with an opening pressure no higher than 1.0MPa.
- The chilled water pipeline must be bypassed for cleaning. Do not connect the evaporator to the water pipeline system before the pipeline is cleaned. Install a bypass cleaning pipeline as shown in the water system installation figure. Do not use the evaporator in the unit to clean the system's pipes.

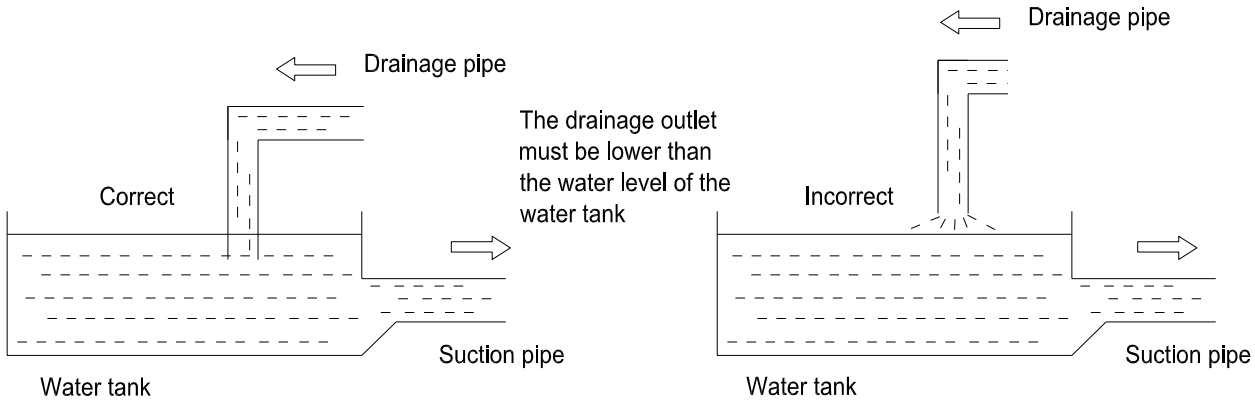
CAUTION!

Do not connect the pipeline to the unit before the pipeline is cleaned.

- Ensure that sufficient maintenance space is left during pipe construction. Ensure that water discharge valve installation and maintenance can be performed on the water system pipeline.
- The unit does not come with a water pump. Install a water pump where the flow and lift match the resistance of the water system and unit pipelines. The water pump must be installed on the water inlet side of the unit evaporator.
- Since the elbow, tee joint, and valve reduce the pump capacity, all pipes should be kept as straight and simple as possible.
- Use a manual stop valve on all the pipes to facilitate maintenance.
- Install drain pipes in all the low positions so that water can completely drain from the water heat exchanger and system pipeline.
- Install an air release valve at the highest point of the chilled water pipeline to eliminate air from the water system, thus maximizing the capability of the unit and air discharge from the pipes. Thermal insulation measures are not required for the air release and drain pipe joints for convenient maintenance.
- When the unit is in idle status in winter or is not operating at night, apply natural freezing prevention measures (such as water drainage, water circulating pump, heating) on the water loop where the ambient temperature is below freezing levels. Freezing in the water loop will damage the dry evaporator. Adopt measures according to use conditions.
- Take measures for cold insulation, thermal insulation, and preventing outdoor humidity. Wrap the chilled water pipeline using heat insulation cotton at least 10mm thick. If heat insulation measures are incomplete, heat loss may occur and the unit may be damaged by freezing in harsh winters.
- The chilled water quality standard is the standard of the circulating water. Water leaks may lead to corrosion.
- Water quality must conform with the water quality standards of the chilled water system stipulated in JRA-GL-02.
- The amount of water kept in the system should be within the operating range. Insufficient water will

cause scale deposits, which may degrade performance or cause pitting corrosion and refrigerant gas leaks. Excessive water will lead to corrosion.

- Do not expose water in the circulating system to air, as shown in the following figure. Water exposure to air may increase dissolved oxygen. Pollutants in the air are condensed in the water and thus the water will become corrosive.



Do not ground any electrical device to the water pipe of the unit, because this may lead to electrolytic corrosion of the water pipe.

- Take anti-rust measures on buried pipes.
- Pay attention to the water flow rate, location of the expansion water tank, and discharge location to avoid cavitation.
- If the PH value exceeds the standard, copper corrosion may increase. Therefore, change the water before the PH value reaches the standard value. If the heat storage water tank is still used after the expiration period, cracks in the heat storage water tank may lead to water spattering and leaks. Water leaks may not result in a serious problem with the water quality control, but spattering of sea water or polluted ground water may lead to micro-organisms growing in the heat storage water tank. In this case, residue is generated in the system and calcium carbonate will conglutinate.
- Install hoses on both the inlet and outlet water pipes of the unit and water pump to prevent vibrations in water pipes reaching the building.
- Install drainage pipes on all drainage outlets. Pay attention to the layout before and after the water inlet/outlet of the unit. Observe unit identification.
- Based on engineering needs, the water inlet and outlet pipes for the evaporator must comply with the following criteria:
    a) The outlet of the circulating water pump in the pipeline connects to the inlet of the evaporator, and the water return pipeline of the system connects to the inlet of the circulating water pump. Do not connect the evaporator to the inlet of the water pump.
    b) A stainless steel filter with no less than 40 meshes must be installed on the inlet pipeline of the evaporator.
    c) All the chilled water pipelines must be rinsed thoroughly to remove foreign matter before being put into operation. Do not rinse any foreign matter into the evaporator.
    d) For convenient maintenance, install a thermometer and a pressure gauge respectively on

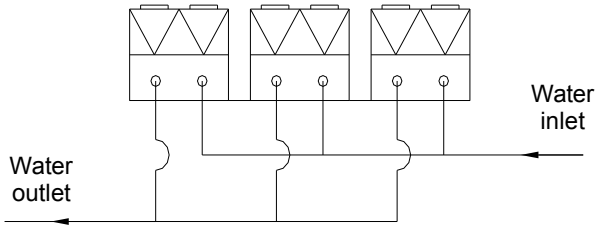
the inlet and outlet water pipes.

e) Install a water flow switch on the water outlet pipe of each evaporator. There must be a horizontal straight pipe section above five times the pipe diameter at two ends of the switch. Adjust the water flow switch blade according to the water pipe specifications. Refer to the manual provided by the water flow switch manufacturer. This switch connects to the terminal on the control panel. For the specific connection details, see the electrical wiring diagram.

CAUTION!

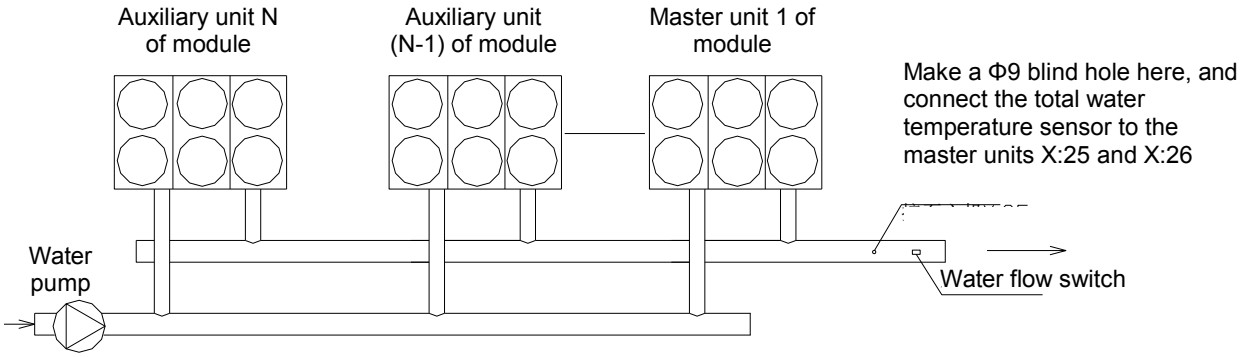
Confirm the water flow direction when installing the water flow switch. The water flow switch cannot be used to turn on or turn off the unit. It is only a safety switch.

When multiple modular water chillers share the same water system, the reversed return mode, as shown below, should be adopted for the water pipe connection of the unit to avoid a serious imbalance in the unit water flow.



When several modular units are combined for use, the total water outlet temperature sensor must be added to the general water outlet pipe. The specific operations are as follows:

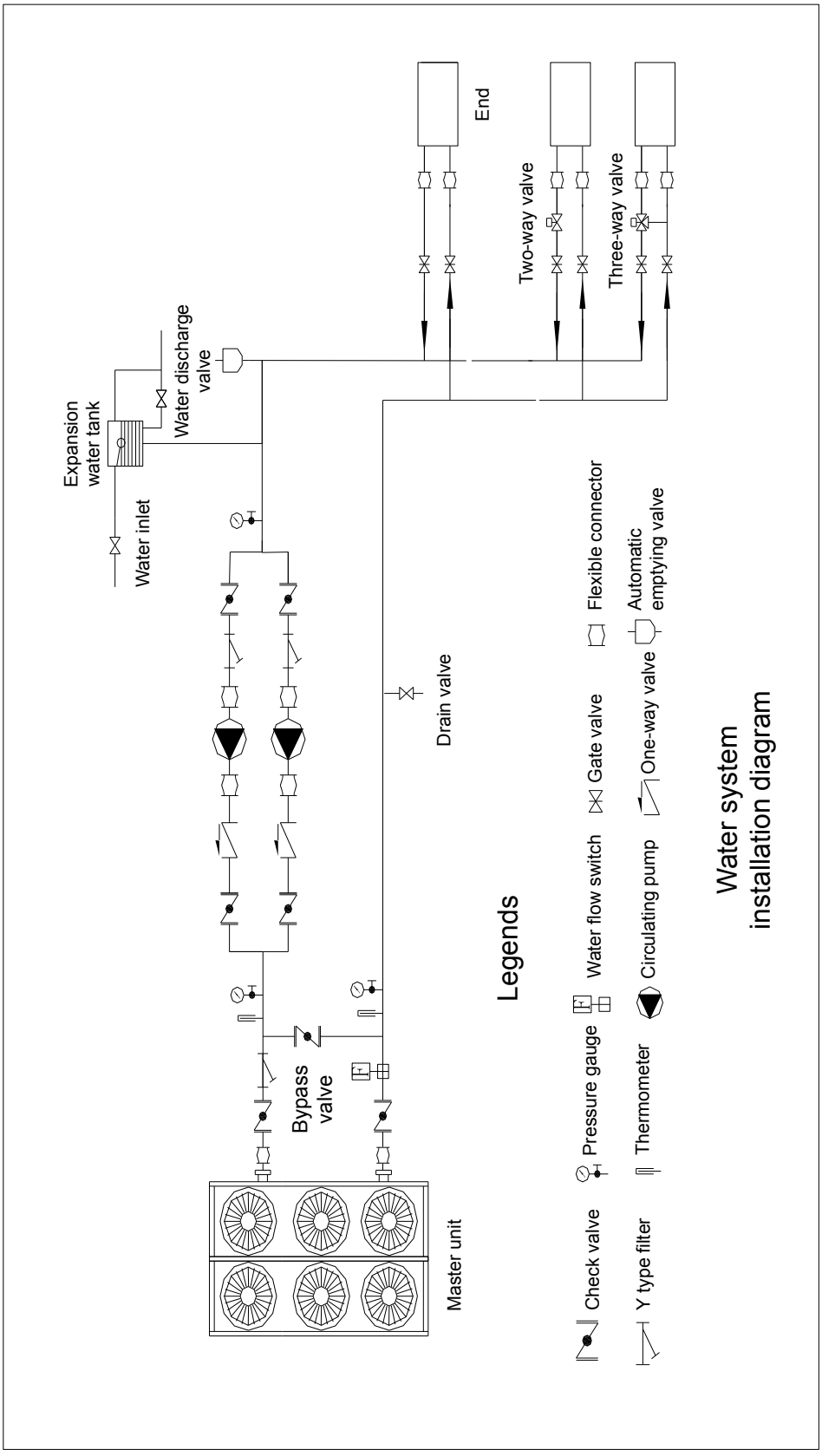
(Remarks: The total water temperature sensor is a unit accessory.)



4.5.2 Relationship Between the Water Quality/Scale and Corrosion

No.	Water quality	Scale	Corrosion	Remarks
1	Acidic water with PH ≤ 6	Hard	High	Easily accumulates insoluble $CaSO_4$
2	Alkaline water with PH ≥ 8	Soft	——	Soft liquid sediment generated by iron or aluminum ions
3	Water containing more Ca^{2+} and Mg^{2+}	Hard	——	Hard scale easily formed
4	Water containing more Cl^-	Dirt formation	Especially strong	Strong corrosion of copper and iron
5	Water containing more SO_4^{2-} and $SiO2^{2-}$	Hard	High	Hard $CaSO_4$ and $CaSiO_2$ accumulates easily
6	Water containing more Fe^{3+}	More scale generated, hard	High	$Fe(OH)_3$ and Fe_2O_3 sediment
7	Water with foreign odor	Dirt	Especially strong	Easily generates sulphide; copper is significantly corroded by ammonia and methane gas, especially H_2S
8	Contains organic compounds	Dirt	——	Scale easily accumulated
9	Exhaust gas discharged from automobiles, chemical plants, electroplating plants, sewage treatment plants, ammonia refrigeration plants, fiber plants, etc.		High	Poor water quality easily perforates the copper tube in the heat exchanger due to corrosion
10	Powder, e.g., from a plastic plant	Dirt		
11	Sulfite gas in the air		Especially strong	

4.5.3 Diagram of the Recommended Water System



4.5.4 Water Treatment Requirements

Using untreated or improper water may reduce the operating efficiency of the unit and damage the heat exchanger. If scale, corrosion, rust, algae, or stagnation occurs due to improper water use, ask a specialist for help.

The following table lists the recommended water quality criteria for reference:

	Item	Unit	Supplemented water	Chilled water	Tendency	
					Corrosion	Scale
Basic items	pH value (25°C)		6.5-8.0	6.5-8.0	0	0
	Conductivity (25°C)	μS/cm	<200	<800	0	0
	Chloride ion (Cl^-)	mg Cl^-/L	<50	<200	0	
	Sulfate ion (SO_4^{-2})	mg SO_4^{-2}/L	<50	<200	0	
	Acid consumption (pH = 4.8)	mg$CaCO_3$/L	<50	<100		0
	Total hardness	mg$CaCO_3$/L	<50	<200		0
Reference items	Iron (Fe)	mg Fe/L	<0.3	<1.0	0	0
	Sulfide ion (S^{2-})	mgS^{2-}/L	Not found	Not found	0	
	Ammonium (NH_4^+)	mgNH_4^+/L	<0.2	<1.0	0	
	Silicon dioxide (SiO_2)	mgSiO_2/L	<30	<50		0

INTENSITY is not responsible for the corrosion, flushing, or unit performance deterioration caused by untreated water or improper water treatment.

5 Configuring the Electrics

5.1 Electrical Wiring

■ Grounding

Check to see if the grounding is provided.

To prevent possible electric shocks, the machine is mandatory for grounding.

Grounding work must be performed by a qualified electrician.

The grounding terminal is located inside the switch box.

WARNING!

■ Electrical Work

The nominal output of the chiller differs from that of a conventional electric motor. Be sure to select the size of the power supply cable in accordance with local and national cords by checking the electric characteristics of the unit. For details, contact your dealer.

Be sure to provide a power supply with an earth leakage breaker.

The chiller can be operated by either local or remote control.

WARNING!

1) A special power supply must be used for air-conditioners. The power voltage should be in line with the rated voltage.

2) Only trained technicians can complete the wiring according to the labels on the circuit diagram.

3) Use the correct tool to apply torque to the power cable and grounding cable to fasten them.

4) The power cable and grounding cable must be crimped firmly. Check them regularly for looseness.

5) Only electrical devices designated by INTENSITY can be used. Users can apply for installation services or technical support from the manufacturer or authorized dealer. The controller may malfunction or cause electric shock if the unit is not wired according to electrical installation standards.

6) The connected fixed line must be configured with a circuit breaker at the cable inlet.

7) Leakage protection devices must be configured according to national electrical equipment technical standards.

8) Power the system on only after the wiring work has been completed and checked.

9) Read the labels attached to the electric control box carefully.

10) To avoid damage or injury, do not repair by yourself. Improper repairs to the controller may damage it or cause electric shocks. Contact INTENSITY after-sales.

Table of electrical properties:

Model	Power supply		Voltage range	Unit data			Fan data			Compressor data		
				Start current	Max. operating current	Rated current for cooling	Number of fans	Fan speed	Fan current	Start current	Max. operating current	Rated current
	V	Hz	±%	A	A	A	Pcs	RPM	A	A	A	A
RCAE115HA22	460	60	±10	589	252.0	195.0	6	840	4	413	76	57.0
RCAE150HA22	460	60		673	336.0	265.0	8	840	4			
RCAE230HA22	460	60		841	504.0	390.0	12	840	4			
RCAE265HA22	460	60		925	588.0	460.0	14	840	4			
RCAE300HA22	460	60		1009	672.0	530.0	16	840	4			

Unit cable criteria:

Model		Recommended power cable	Recommended capacity of breaker device	
RCAE115HA22	-	BVR120*4+BVR70*1	320A	**Notes: Only copper-core cables are used in this unit. The recommended values are based on the ambient temperature of 40°C in aerial cabling mode. In regions with high temperatures, temperature derating of the breaker device should be considered; that is, the capacity of the breaker device should be increased properly.**
RCAE150HA22	-	BVR150*4+BVR95*1	400A	
RCAE230HA22	RCAE115HA22	BVR120*4+BVR70*1	320A	
	RCAE115HA22	BVR120*4+BVR70*1	320A	
RCAE265HA22	RCAE115HA22	BVR120*4+BVR70*1	320A	
	RCAE150HA22	BVR150*4+BVR95*1	400A	
RCAE300HA22	RCAE150HA22	BVR150*4+BVR95*1	400A	
	RCAE150HA22	BVR150*4+BVR95*1	400A	

5.2 Power Specifications and Application

Standard operating range of the unit:

Altitude: ≤ 2000m

Installation mode: outdoors

Power frequency: 60Hz ±2%

Voltage: 460V ±10%

5.3 Power Requirements

The power parameters must conform to the parameter values on the nameplate of the unit.

WARNING!

Improper voltage may lead to an alarm. If the three-phase imbalance of the unit voltage exceeds 2% or the current imbalance exceeds 10%, immediately contact the local electricity department and shut down the unit.

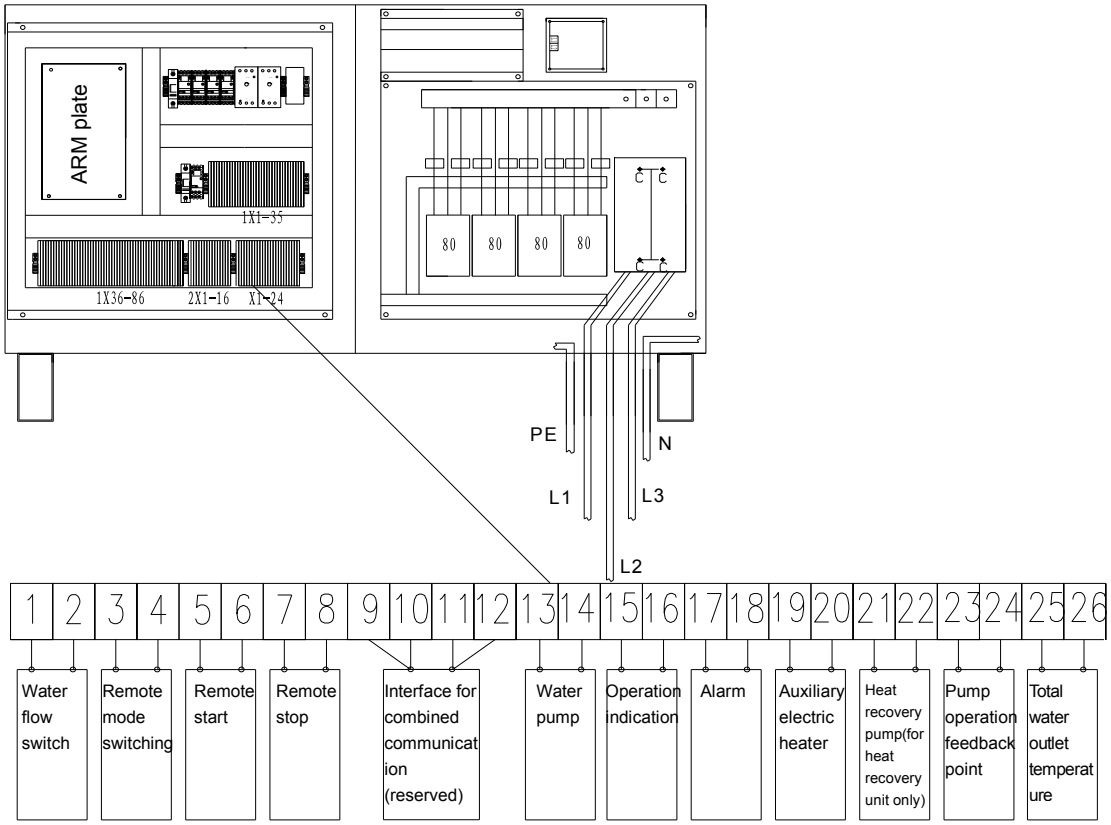
$$\text{Voltage imbalance ratio} = \frac{\text{Difference between the average voltage and maximum voltage in the three-phase voltage}}{\text{Average voltage}} \text{ X } 100\%$$

Unbalanced voltage will cause imbalance in the inter-phase current at the motor terminal. In a full load motor, a current imbalance will change within 6 to 10 times of the voltage imbalance percent, which will cause excessive compressor current and lead to overheating, thus shortening the compressor service life and even burning the motor. If the voltage imbalance is high, torque will be reduced and operating requirements will not be met. In this case, the rotating speed of the motor will not reach the required level. Keep the minimum start voltage of the unit to more than 90% of the rated value.

5.4 Wiring Requirements

(1) General power wiring diagram

Specifications of the general power line: Refer to national standards. To prevent dust from entering the power distribution box, the customer must install a dustproof cover at the general power line entrance or use a trough to directly seal the wire inlet after the wiring is completed. The general power wiring scheme is shown in the following figure:



External wiring diagram

Note: All inputs are passive dry contacts. The output must be switched using an intermediate relay.

(2) No-fuse air switch wiring

Configure a no-fuse air switch with sufficient capacity for each group of power input wires to the unit to avoid damaging the transformer, wiring, and other electrical appliances and allow manual control of start and shutdown for the compressor if a short circuit occurs in the line. **Note: A no-fuse air switch is provided for each unit. Do not provide a single no-fuse air switch for several units.**

(3) Wiring diagram for unit control wiring between the unit and the start magnetic switch of the water pump is controlled in an interlocking manner. The main power is connected to the power terminal. The wiring of the unit control is as shown in the figure.

(4) Notes of unit cabling

Only professional electricians can assume cabling construction work for the unit. The following items must be noted during cabling:

a) The power voltage must be stable when the unit is running and all voltage drop factors need to be considered. Keep the operating voltage of the unit to within ±10% of the rated value. Excessively high or low voltage will negatively affect the unit.

b) The voltage difference between phases shall not exceed 2% of the rated value. The difference between the maximum phase current and the minimum phase current is less than 3% of the rated value to avoid overheating the compressor.

c) Keep the power frequency within ±2% of the rated value.

d) Keep the minimum start voltage of the unit above 90% of the rated value.

e) An excessively long power cable may prevent the compressor from starting up. Therefore, the length of the power cable must be such that the voltage drop at the end and tail of the power cable is less than 2% of the rated value. If the power cable cannot be shortened, use a cable that has a larger diameter.

f) Wiring from the power supply to the unit must be conducted strictly according to national standards, and insulation must be adequate. After the unit is wired, use a 500V megger to measure insulation between terminals and the unit body of the electrical accessories. Insulation resistance must be more than 5MΩ.

g) To ensure user safety, the unit housing must be reliably and properly grounded to avoid electric shocks in line with national standards.

h) Parameters, such as operating current and input power indicated on the unit nameplate, are values derived from tests under standard conditions. These may differ significantly from actual values due to changes in system loads and ambient temperature during actual operations. Therefore, select the power supply, transformer, no-fuse switch, cabling capacity and other devices based on extreme operating conditions.

i) The electromagnetic switch used in the water circulating pump must interlock with the operating circuit of the unit body. All the above electromagnetic switches are assembled on the construction site, but not attached inside the unit’s power distribution box.

6 Trial Operation

6.1 Check before Trial Operation

6.1.1 Water Part

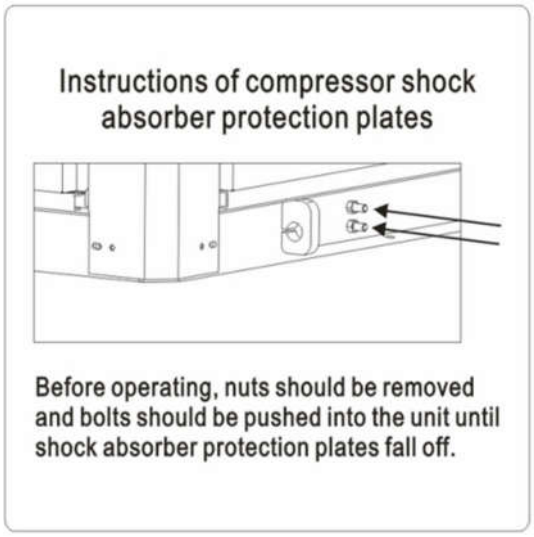
- Keep all the water system pipelines clean, and make sure that the waterway is connected properly and the water flow direction is correct.
- Check whether the inlet and outlet pipes are well connected.
- Open the water valve.
- Start the water pump.
- Check all the water pipes and joints for leaks.
- Open the air release valve to discharge the air from the water system, and then close the air release valve.
- Check the resistance loss at the frozen water side and check that the water flow is correct.
- Check whether the inlet and outlet water temperatures in the control panel are consistent with the thermometer temperatures.

6.1.2 Circuit Part

- The power supply is properly connected.
- The grounding has been provided
- The power supply should be turned "ON" 8 hours prior to operation to ensure the compressor operate smoothly
- Disconnect the main power switch and check all the starting circuits and control circuits of the electric control box.
- Check whether the power supply to the unit is consistent with that on the unit nameplate. The range of voltage fluctuation should not exceed ±10% of the rated voltage, and the phase voltage unbalance should not exceed 2%. The phase sequence of the power supply must be consistent with that shown on the unit.
- Check whether there is sufficient power supply capacity, which should satisfy the startup and full load operation requirements of the unit.
- Check if the unit is grounded.
- Make sure that the specifications of all the wires and fuses match the operations of the unit. Complete all the interlocking control lines and DIP settings according to the electrical control drawings.
- Make sure that all the air conditioning auxiliary facilities and control devices operate properly.

6.1.3 Unit Part

- Check whether the unit pressure and the oil level of the unit are normal.
- Check whether all the safety control devices are in the original status and that their settings are correct.
- Check whether the bolts on the vibration isolator protection plates have been removed. (RCAE150HA22, number of protection plates:4. RCAE115HA22, number of protection plates:2)



- Check whether the unit valve is in the correct position and if the unit sends an alert for fluorine leakage.
- Check whether the compressor coil winding is normal (including the phase resistance, inter-phase resistance and resistance relative to the ground).
- Check the unit for phase loss (the voltage of each phase relative to the ground should be 220V).
- Check whether the field setting items configured through the control panel have been set strictly according to the requirements.
- Check whether the expansion valve can be properly opened and closed (listen to check if the operating sound of the expansion valve stepper motor is normal).
- Determine whether the solenoid valve operates properly.
- Check whether the compressor oil heater is in normal status and whether it has conducted heating for 8 hours.
- After making sure that all the above items are normal, start the air conditioning auxiliary facilities and chilled water pump.
- After the main power supply is connected again, the unit can be started.

6.2 Trial Operation Instructions

- Connect the fluorine manometer to the unit and start a compressor after placing the temperature probe. Check the voltage of the connection position at the bottom of each contactor.
- Check the compressor current.
- Check whether the turning direction of the fan is correct and whether its operation is normal, and check the operating current.
- Observe whether the oil level is normal and whether the solenoid valve for energy regulation on the compressor acts properly. (Judge magnetic performance of the valve using a no-magnetic blade.)
- Run the compressor for at least 20 minutes, check and monitor all the parameters, and observe the suction/discharge pressure of the unit.
- Check the discharge temperature of the discharge pipe to ensure a good oil separation effect. Observe the refrigerant flow through the sight glass on the liquid supply tube.
- Observe the opening degree of the electronic expansion valve through the superheat degree of return air to see whether it is in a reasonable range.

- After the system enters the operating condition, check whether the superheat degree of return air is between 5 and 7, and check whether the superheat degree of the discharge and the supercooling degree of the condensation are normal.
- When the discharge temperature is relatively high, observe whether the solenoid valve and expansion valve on the liquid injection pipe work. (Detect magnetic performance of the valve using a no-magnetic blade and judge whether the solenoid valve works properly.)
- Stop the unit, and check whether the oil level of the compressor is normal.
- An adequate air conditioning load is required to keep the unit operating continuously. Therefore, all the terminal devices should be turned on.
- When the work has been completed, check and tighten all the valve caps, clean the unit, and keep all the fluorine system joints clean.

6.3 Trial Operation Records

To keep the machine in optimal operating status, record the unit status according to the following table during trial operation of the unit.

Trial Operation Record Table			
No.	Check Item	Unit	Data Record
1	Discharge pressure	MPa	
2	Suction pressure	MPa	
3	Three-phase supply voltage	V	
		V	
		V	
4	Three-phase current of the compressor	A	
		A	
		A	
5	Three-phase current of the fan and motor	A	
		A	
		A	
6	Inlet water temperature of the unit	°C	
7	Outlet water temperature of the unit	°C	
8	Oil surface		
9	Ambient temperature	°C	
10	Suction temperature	°C	
11	Discharge temperature	°C	
12	Whether abnormal vibration or noise exists		
13	Whether there is a refrigerant leak sound		
14	Compress oil color		

6.4 Instructions after Trial Operation

After trial operation is completed, perform operations and conduct regular maintenance strictly according to the Installation, Operation and Maintenance Manual.

7 Unit Use and Controller Operation Instructions

Note: The unit is equipped with Remote Service Module, which could realize the information transmission and global positioning. The Remote Service Module would collect some information of the unit including temperature, pressure and running frequency, etc. while private information is not in the list.

7.1 Check before Use

(1) Judge whether the compressor refrigerant oil has been heated for enough time. If the unit needs to be started for the first time after it has been powered off for 72 hours, it must usually be preheated for 6 hours. (The compressor refrigerant oil heating time depends on the ambient temperature. The lower the ambient temperature is, the longer the heating time would be.) The specific oil heating time can be queried from the status information on the touch screen.

(2) Check whether the water flow meets the unit requirements.

(3) Check the control switches and components on the power distribution cabinet for abnormalities.

(4) Check whether the power supply and voltage are normal.

(5) Check whether the pressure gauge of main unit is normal. Under normal circumstances, the low/high pressure is 16 to 18kgf/cm^2 when the outdoor ambient temperature is 25°C to 28°C.

7.2 Unit Start Procedure

(1) Start the circulating water pump.

(2) Start the compressor.

(3) Start the fan motor (the fan starts according to the discharge pressure of the compressor).

7.3 Unit Shutdown Procedure

(1) Stop the compressor.

(2) Stop the fan motor (the fan is stopped according to the discharge pressure of the compressor).

(3) Turn off the water circulating pump.

7.4 Controller Operation Instructions

Before powering on the unit for the first time, make sure that the user end air switch is firmly connected to the control box, the insulation resistance between five lines meets the requirements, and the unit is grounded.

Because the connection in the control box may get loose during transportation, check the connection of each wiring terminal and confirm that they are connected firmly. First ensure that the power supply is disconnected.

Check whether there is sufficient power supply capacity, which should satisfy the startup and full load operation requirements of the unit.

Check whether the red emergency stop button on the control box is in the status of natural release.

Note: The following figures show example operations only. A part of the figure may be modified without prior notice. The actual figure should prevail.

7.4.1 Welcome Interface

Figure 1 shows the first welcome interface.

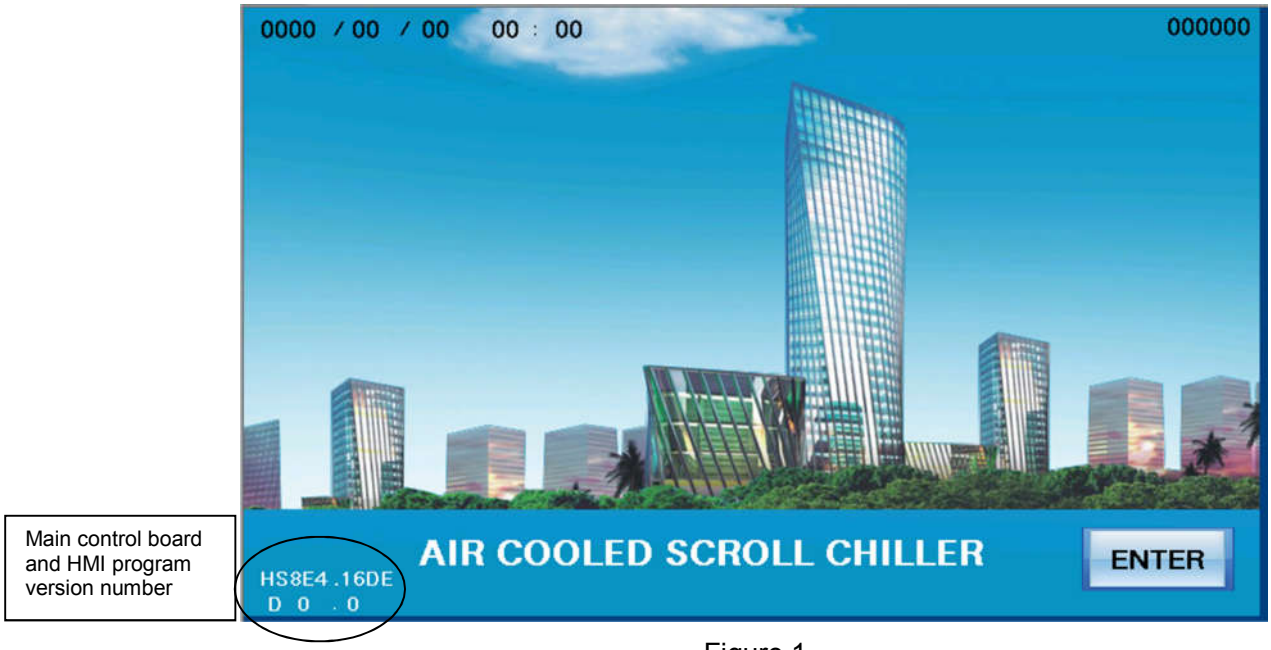


Figure 1

Press ENTER to display the password keyboard. Enter 58806/40828, and press Enter on the keyboard for confirmation and enter the home interface.

7.4.2 Home Interface

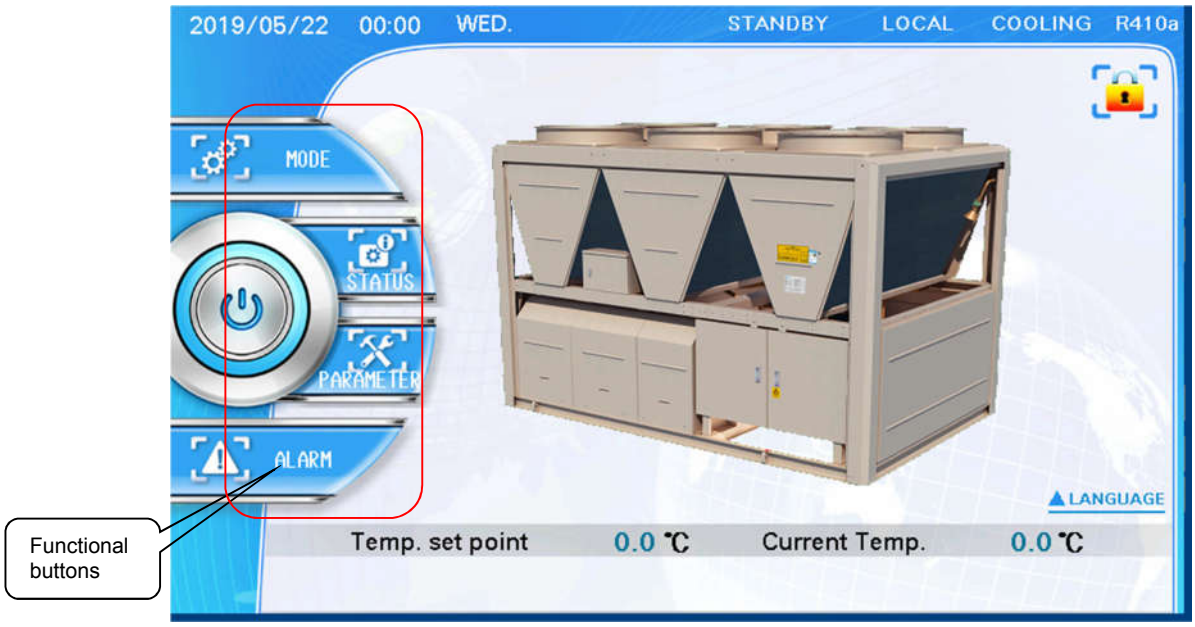


Figure 2

The home interface displays the current unit status, unit control mode, unit operating mode and refrigerant on the top.

Tap  in the upper right part of the interface to enter the initial power-up interface. The password must be entered again before accessing the interface.

For the current status display and status explanation of the unit, see the table below:

Standby	The unit is not running, but can be started normally.
Fault	The unit will not start. Refer to the fault query page, and acknowledge and eliminate the fault.
Operating	The unit is running normally.
Mode switching	The four-way valve does not conform with the actual operating mode during the operation of the unit.
STARTUP	The status after a unit is started and before the unit enters normal operation.
SHUTDOWN	The unit is being stopped. Three processes including uninstall, compressor stopping, and pump stopping are required. If the unit does not meet the minimum operating time requirement, wait until the unit runs for the minimum required operating time before the unit can be stopped. Check whether the requirement for the minimum operating time is met on the first page of status information. After the requirement for the minimum operating time is met, the system automatically continues the shutdown process.
PAUSE	The compressor does not meet the start conditions. Compressor start conditions: 1. The water temperature does not meet the compressor start conditions. 2. The water temperature must be higher than the compressor start temperature in cooling status. The water temperature must be lower than the compressor start temperature in heating status. This temperature can be modified on the parameter settings interface. 3. The compressor lubricating oil temperature does not meet start conditions. 4. The shutdown duration is too short, failing to meet compressor start interval requirements. The preceding information can be viewed on the first page of status information. After the start conditions are met, the unit automatically starts up.
Defrosting	The unit is in defrosting status

1) Mode setting

Tap the "MODE" functional button to display the mode setting window, as shown below:

Figure 3

Set the control mode (LOCAL, REMOTE, or TIMED) and the operating mode (COOLING, HEATING, or PUMP) in the displayed window, and then tap "×" in the upper right corner to close the mode setting window.

(1) The control mode (LOCAL, REMOTE, or TIMED) can be switched during operation.

(2) The control mode is used to select a power-on/off mode. In the case of local control mode, the unit can be powered on/off through the "ON/OFF" button on the touch screen only. In the case of remote control mode, the unit can be powered on/off through the remote start/stop hardware interface only. In the case of timed-on/off control mode, the unit can be powered on/off by setting the timer only.

(3) "HEATING" is available for the heat pump unit only.

Note: The remote control and timed-on/off functions are invalid in local control mode. The local control and timed-on/off functions are invalid in remote control mode. Local and remote power-on/off operations are invalid in timed-on/off mode.

2) Power-on operations

Confirm the following items before powering on the unit:

(1) The unit mode is set correctly. The operating mode (COOLING, HEATING, PUMP) cannot be set after the unit starts.

(2) Currently the unit is in standby status. A faulty unit cannot be started.

(3) Confirm whether oil heating is completed. If not, the unit may be suspended for a long time after starting, and the compressor does not start.

To start the unit, press the "ON" button in the lower left corner. Then, the interface for power-on confirmation is displayed, as shown in the following figure. Press "OK" to start the unit; or press "×" in the upper right corner to cancel startup.

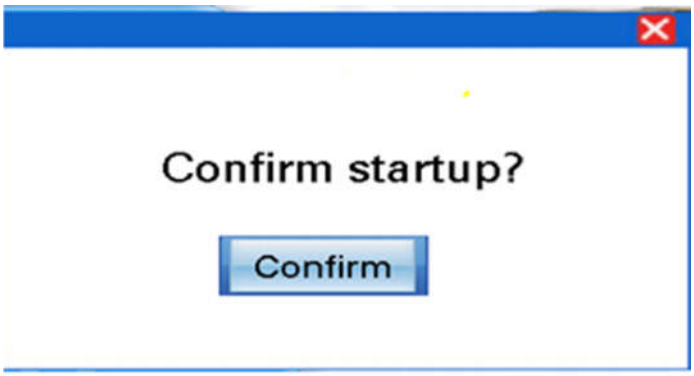


Figure 4

If the "ON" button is pressed when the startup conditions are not met, the following message is displayed on the top of the displayed power-on interface: "Failure to start, please check the status." Compressor startup conditions include oil heating time not coming, time interval for re-startup, compressor startup temperature, etc. In this case, the page for confirming the startup can still be displayed. However, the compressor will only start after the compressor startup conditions are met; otherwise, the message is always displayed on the home interface: "Failure to start, please check the status." For the detailed description, see the section about status information.

Power-on operation: Tapping "ON" is invalid only when the unit fails.

Press  to display the power-on confirmation window. Tap OK for confirmation and start the unit.

If the compressor startup conditions are not met, the unit will access suspended status after starting the pump, and the interface displays this message: "Failure to start, please check the status."

Power-off operation:

Press the  button to display the power-off confirmation interface. Touch OK. "Stopping" is displayed in the unit status. After the unit meets stopping conditions, it implements the power-off procedure.

Standby: "Standby" is displayed normally after the unit is powered on.

Operating: The unit has started.

Suspending the unit: When the controlled water temperature is lower than the water temperature for suspending the unit, the unit enters suspended status and the compressor stops. When the controlled water temperature is higher than the water temperature for starting the unit, the compressor starts and the unit enters operating status.

Stopping: The unit accesses stopping status after the stopping operation is performed. The unit enters standby status after the stopping process.

Unit protection: The unit enters unit protection when a fault alarm is reported for the unit, and the upper part of the screen will prompt the user that there is an error.

Note: Cooling: When the unit is suspended, the controlled temperature is higher than the compressor startup temperature, and the compressor starts.

Heating: When the unit is suspended, the controlled temperature is lower than the compressor start temperature, and the compressor starts.

7.4.3 Status Information - Operation Query

In the home interface shown in Figure 2, tap the status information to access Figure 6.

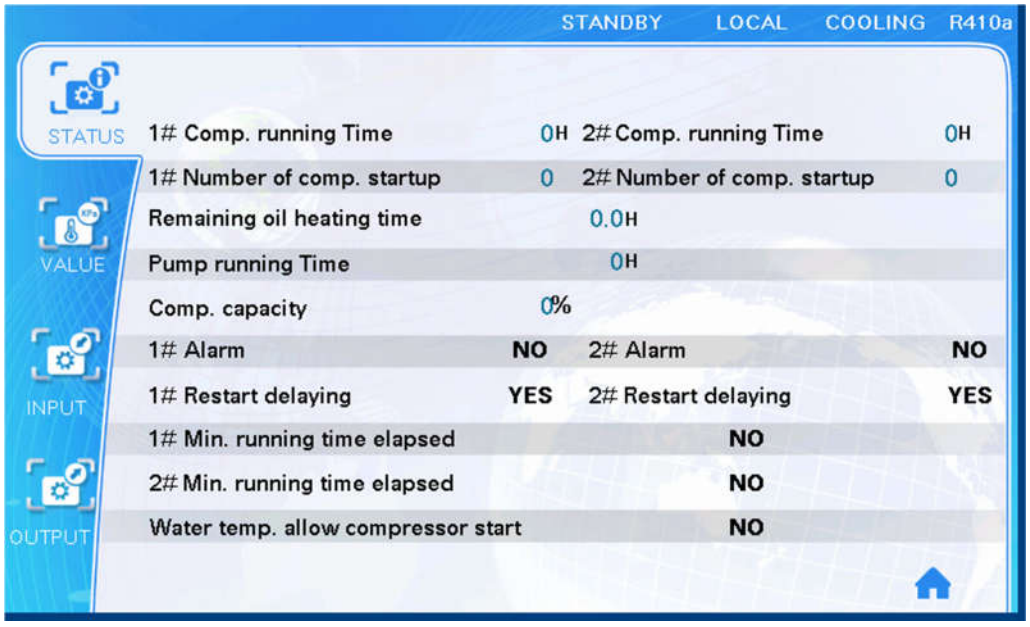


Figure 6

The displayed content of status information:

(1) Operating time of the compressor and pump

(2) Compressor start count

(3) Unit load

(4) Unit alarm

(5) Displays whether the water temperature meets the compressor startup condition; to start the compressor, "Water Temp. Allow Compressor Start" must be set to "YES".

(6) Displays whether the restart delay condition is satisfied; to start the compressor, "Restart Delaying" must be set to "NO".

(7) Displays whether the minimum operating time of the unit is satisfied; to stop the compressor, "Min. Running Time Elapsed" must be set to "YES".

Start must meet the following conditions:

(1) "Restart Delaying" must be set to "NO". If it is set to "YES", the delay for start to wait for is not up.

(2) "Water Temp. Allow Compressor Start" must be set to "YES". If it is set to "NO", the current water temperature does not meet the compressor start condition.

Shutdown needs to satisfy the following condition:

"Min. Running Time Elapsed" must be set to "YES". If it is set to "NO", the delay for shutdown occurs to wait for is not up.

7.4.4 Status Information - Temperature and Pressure Display

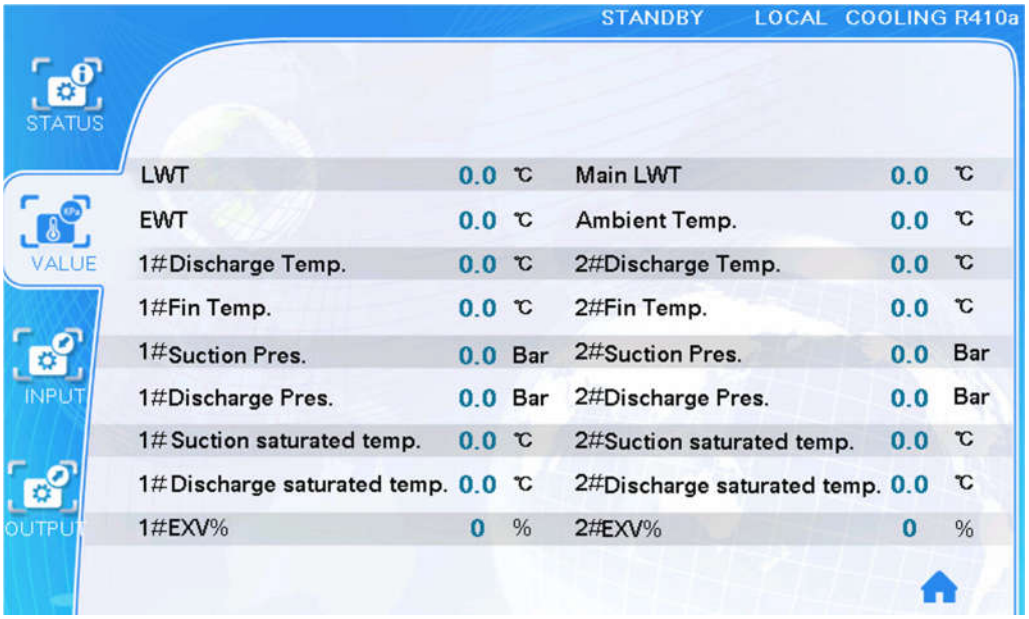


Figure 7

7.4.5 Status Information - Input Status

Input status page: ON indicates that this input point is closed. OFF indicates that this input point is disconnected. The normal status of the compressor overload protection switch is OFF, and the normal status of other protection switches is ON. (When the unit is overloaded, the input status of the compressor overload protection switch is switched to ON, and the unit enters fault protection status.)

Figure 8 (Note: The actually displayed content of the unit should prevail)

(1) "Remote start/stop": Displays the remote start and remote stop point status of the user. The user needs to install a jog control switch.

(2) "Chilled/cooling water switch": The switch is OFF when the water flow fails to meet the startup condition. ON is output when the startup condition is satisfied.

7.4.6 Status Information - Output Status

Output status page: ON indicates that this output point is connected to the power supply; OFF indicates that this input point is disconnected from the power supply.

When the unit is stopped, all the displayed statuses are OFF. The corresponding control signal starts to function according to the power-on/off command.

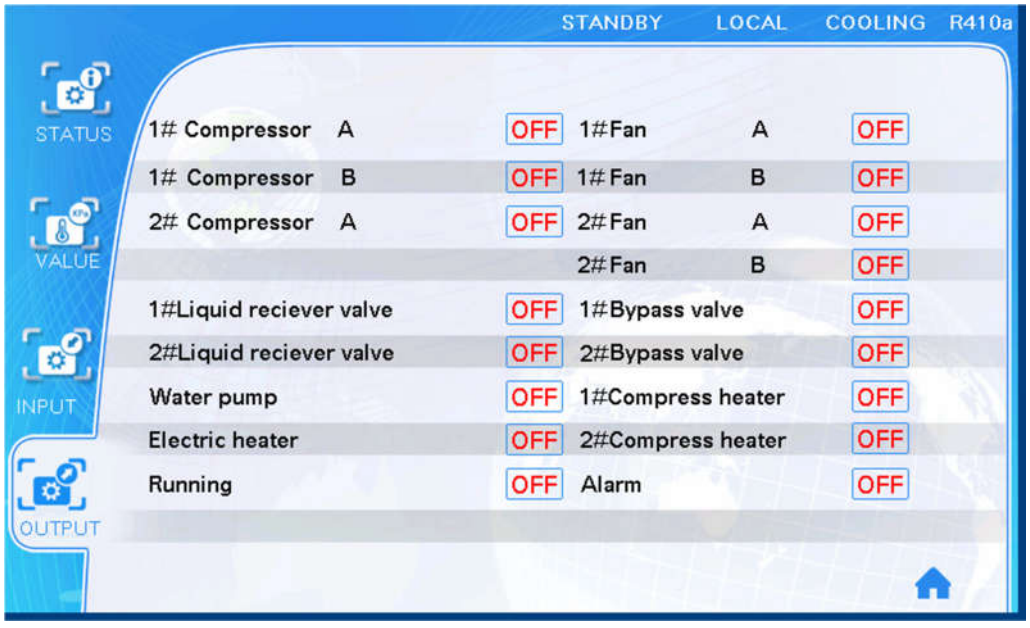


Figure 9 (Note: The actual schematic diagram should prevail)

7.4.7 User Parameter Setting - Password Interface

Press parameter setting on the home interface 2 to display the password input interface. Enter the password (40828) to access the user parameter settings interface. Figure 10 shows the password input

interface.

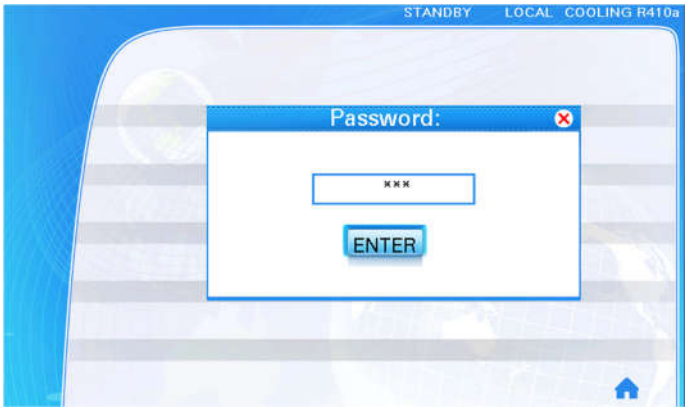


Figure 10

If the entered password is wrong, the prompt in the dialog box shown in Figure 11 is displayed. Press confirm to go back to the input interface, and enter the password again to access the interface.

Figure 11

7.4.8 User Parameter Settings - Temperature Settings

Figure 12 shows the interface accessed after the password (40828) is entered:

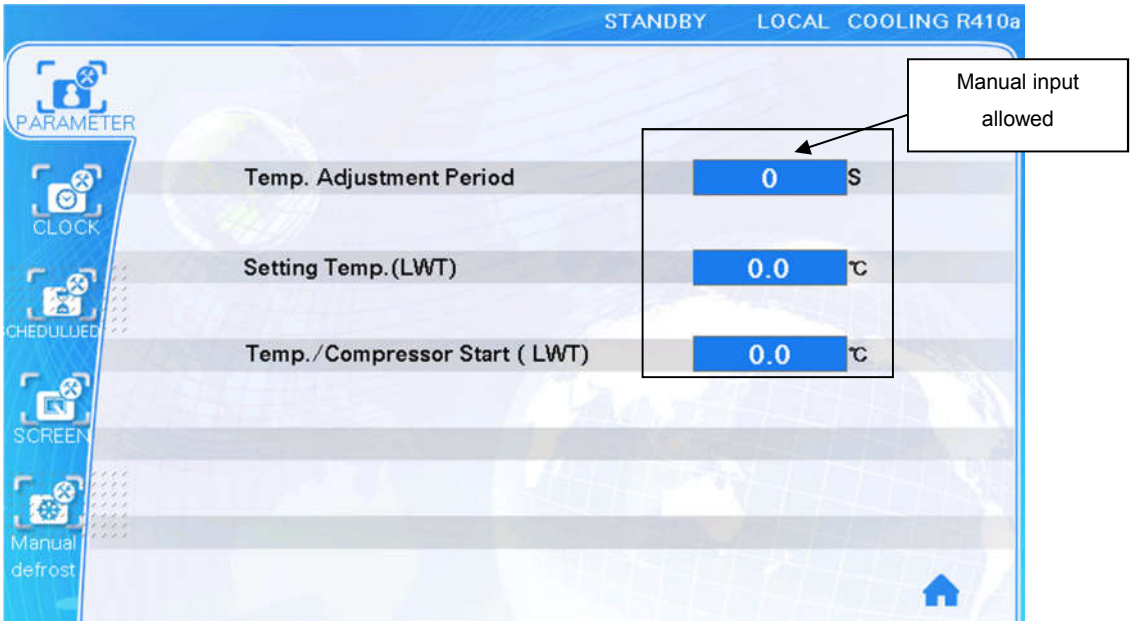


Figure 12

Tap the value box to be set. The numeric input keyboard will appear. MAX in the upper left corner of the

setting interface is the upper limit of the set parameter, and MIN is the lower limit of the set parameter (the value exceeding the range is not accepted). Press "ENT" to confirm the input, or CLR key to cancel the input. The numeric value input keyboard disappears.

Term explanation:

(1) Target control temperature: refers to the target value of water temperature control.

(2) Compressor start temperature: refers to the condition that needs to be met by water temperature control when the compressor starts.

(3) In the case of cooling, the compressor can start when the controlled water temperature is higher than the start temperature. In the case of heating, the compressor can start when the controlled water temperature is lower than the start temperature.

7.4.9 User Parameter Setting - Time Setting

Tap "Time Setting" to access the time setting interface shown in Figure 13.

Tap the value box to be set. The numeric input keyboard will appear. Enter the corresponding time and tap "ENT" to save the setting or tap "ESC" to cancel the input.

Tap "OK" after setting. Confirm whether the current time is consistent with the set time. If they are different, tap "OK" again.

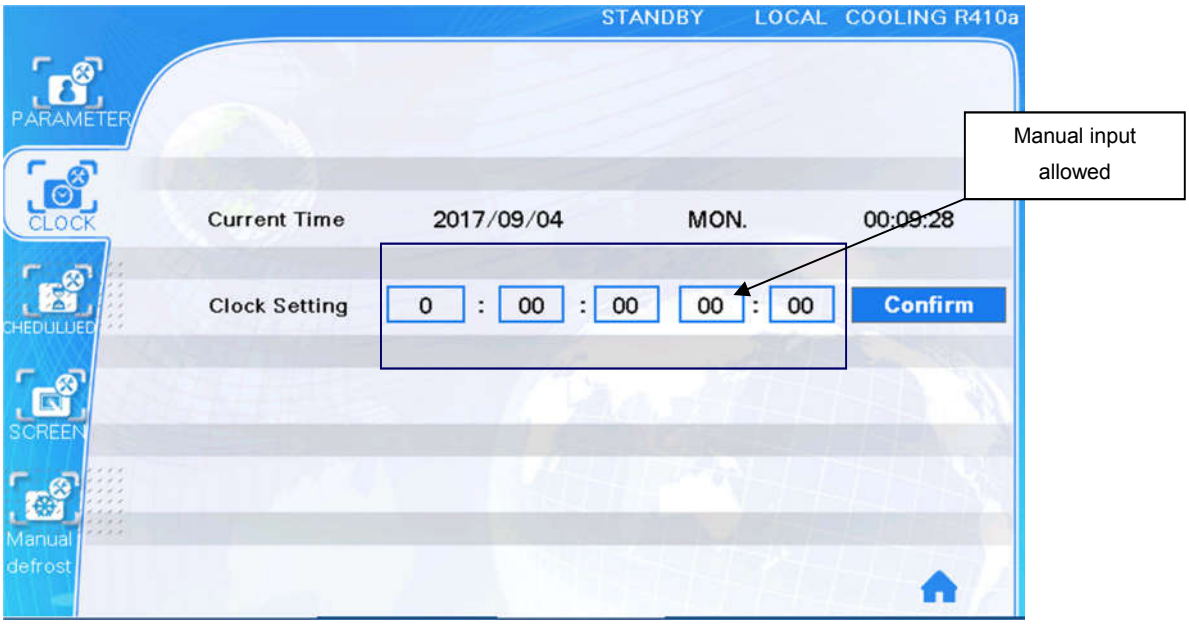


Figure 13

Note: The set date and time must be reasonable. For any consequence resulting from an unreasonable date/time setting, INTENSITY is not liable.

7.4.10 User Parameter Settings - Touch Screen Settings

Tap "Screen Settings" in User Settings-Mode Selection interface. The interface shown in Figure 14 will be displayed.

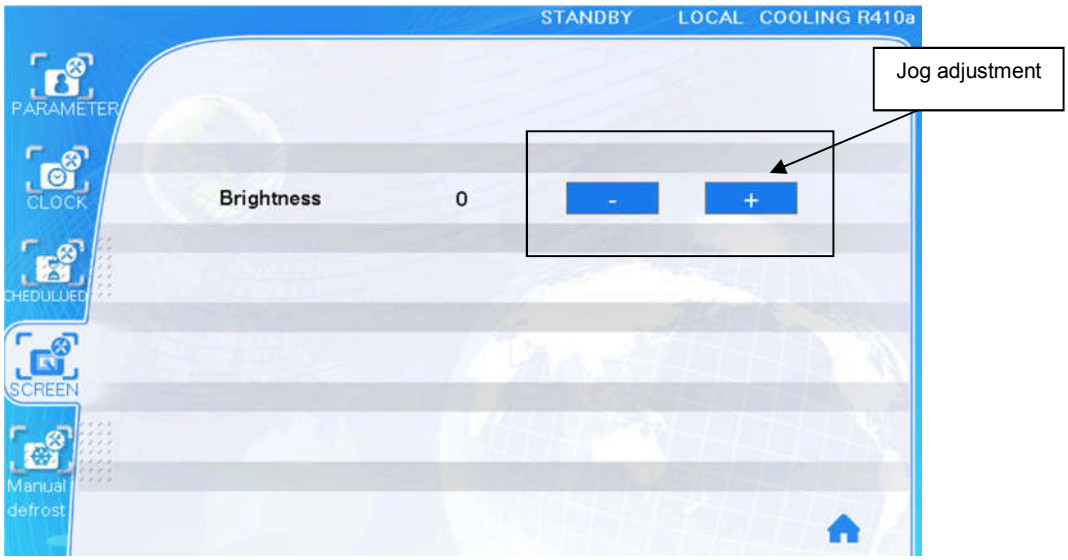


Figure 14

7.4.11 User Parameter Setting - Timed-on/off

To use the timed-on/off function, enter "User Setting" when "TIMED" is selected for the control mode in Figure 2, and tap "Timed Setting" to access the interface shown in Figure 15:

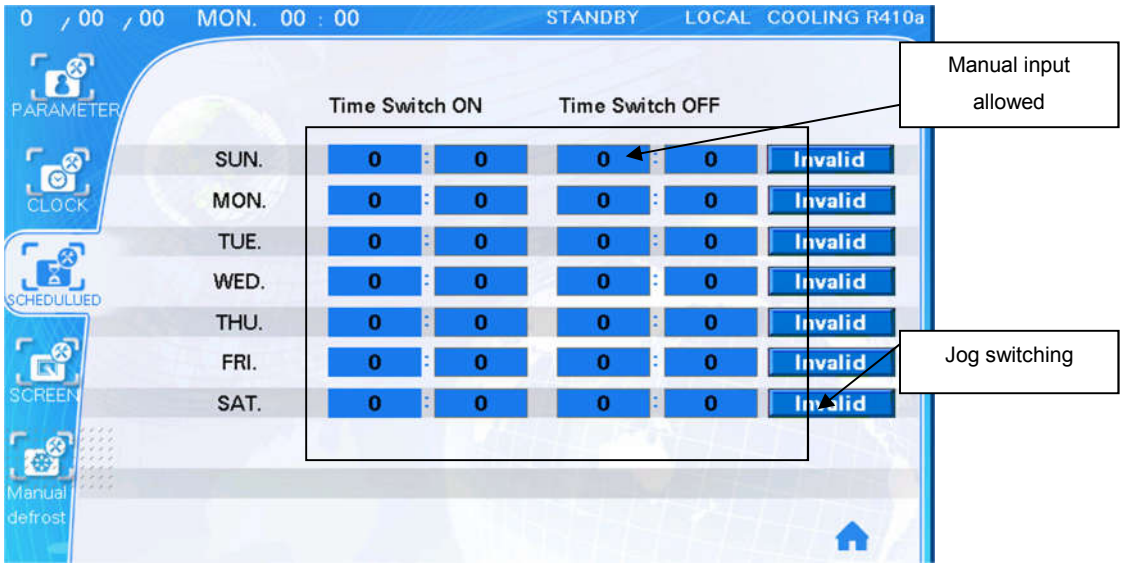


Figure 15

The user can set the time for timed-on/off on a per-week basis. The unit will automatically start and stop at the specified time points. If the unit is expected to operate continuously, e.g., from 10:00 on Tuesday to 16:00 on Thursday, set the timed-on time to 10:00 for Tuesday, switch the INVALID button to VALID, set the timed-off time to 16:00 for Thursday, switch the INVALID button to VALID, and set all the other time buttons to INVALID.

The timed on/off is set based on the system time of the unit. Check the system time before the setting.

7.4.12 Alarm Interface

Tap the alarm information button on the home interface to access the real-time alarm interface, as shown in Figure 16:

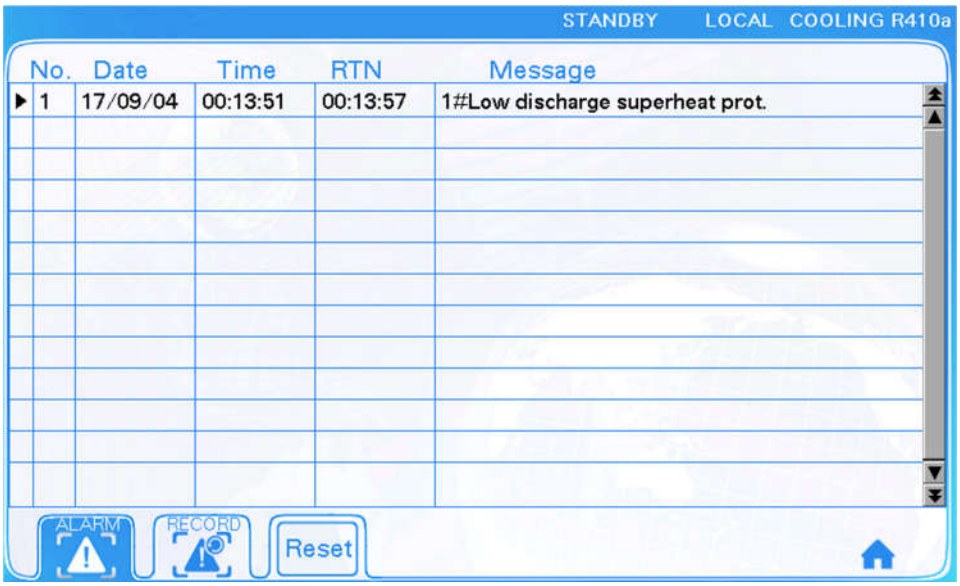


Figure 16

If an alarm is generated, the unit will act according to the fault procedure. After the fault is recovered, the system will be restored to its normal status by pressing the reset button. When there are many fault records, tap the slider bar or the up and down buttons to view the faults. Red indicates that the fault is not eliminated. Green indicates that the fault has been eliminated.

7.4.13 Historical Alarm Records

Tap historical alarm information on the alarm screen to enter the record interface, which records alarms generated when the compressor is operating. See Figure 17: A maximum number of alarm records can be recorded. The content will be automatically updated if there are more than four records. View the real-time status of the unit when the alarm is generated, including the temperature, pressure, and the input and output point statuses.

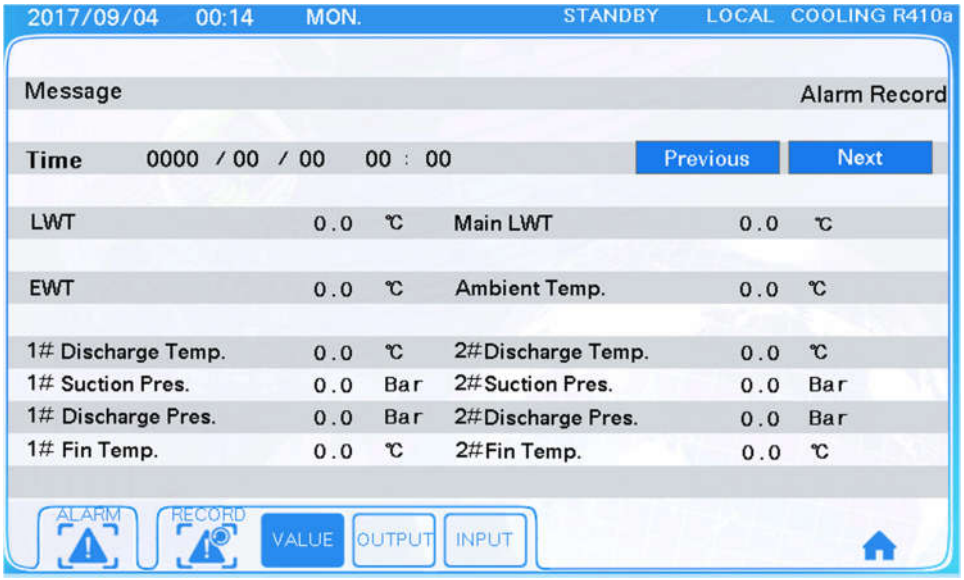


Figure 17

7.4.14 Multi-status Query

Tap the  button on the home interface to display the dialog box shown in Figure 18. Tap Muti-status to view the information.

Figure 18

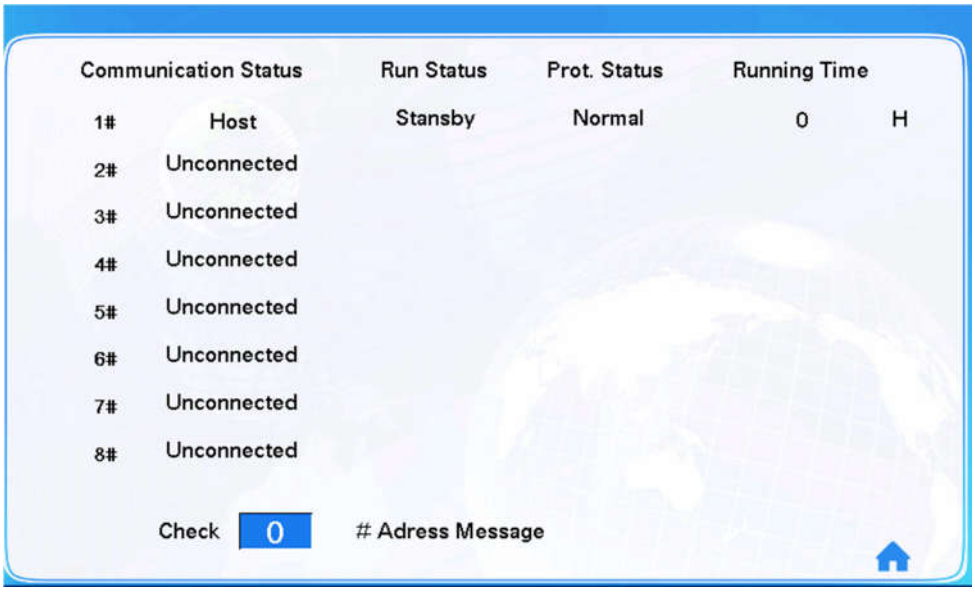


Figure 19

After the unit has been corrected and communication is normal, the communication status is connected. The connected unit protection status, unit operating status, and accumulated unit operating time are displayed. The above content is not displayed for units without communication or with communication errors.

Notes:

(1) Unit 1 is the master unit.

(2) A maximum of eight units are supported for combined control. Units that are not connected can be powered on at any time or connected to the communication cables to access the combined control system.

(3) After the unit completes the start process and enters energy regulation, operating status changes to "RUNNING". Otherwise, the displayed status is "SHUTDOWN".

(4) Operations on a slave unit are basically the same as those on the master unit. The difference is that the start/shutdown operation cannot be performed on the slave unit. Uploading and unloading processes are implemented according to the temperature detected by the master unit.

(5) There is a lag in the detection of the slave unit's status by the master unit.

Note: The addresses of units connected to the system cannot be duplicated; otherwise, a communication exception may occur, and combined control cannot be performed.

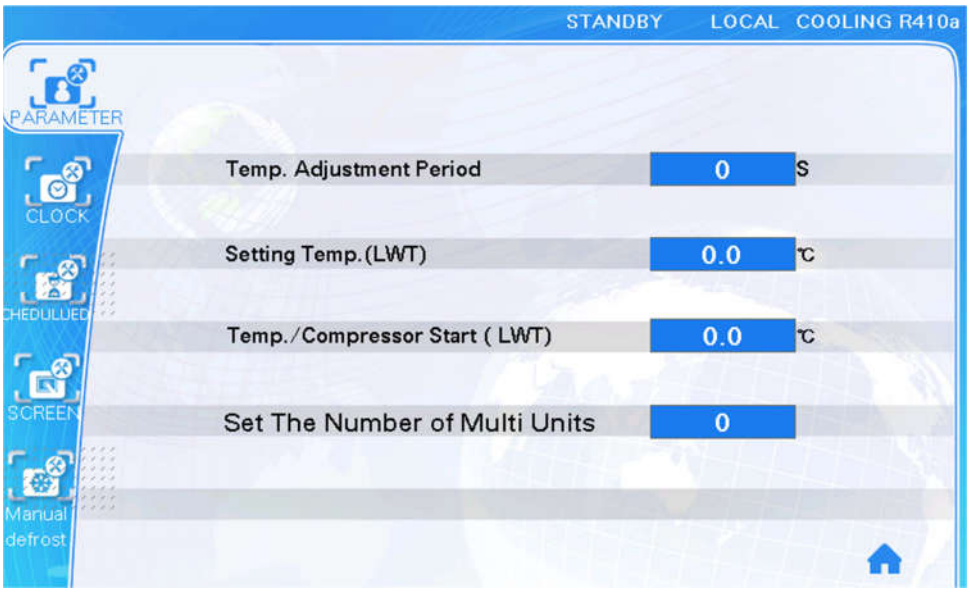


Figure 20

The number of connected units is set in user parameters. Note that the number of set slave unit addresses cannot exceed the number of connected units.

DIP settings are shown below:

S1: one bit, ON 440, OFF 330

S2: one bit ON for combined control; OFF for a single unit

Two bits, ON for the master unit, OFF for the slave unit

S3: local unit address

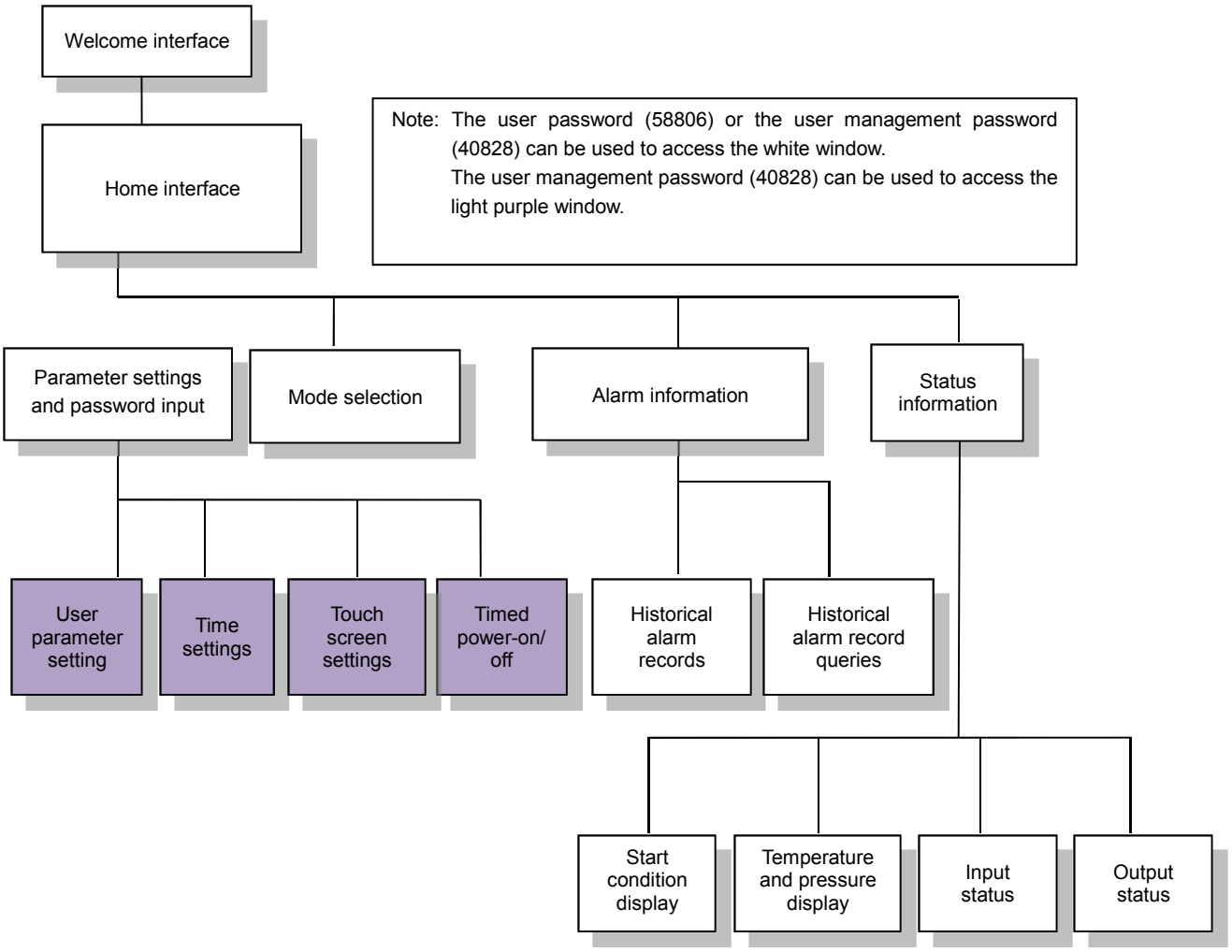
Unit Connection Method	Model	S1		S2		S3
		1	2	1	2	
Master unit (connected)	330	OFF	OFF	ON	ON	0
	440	ON	OFF	ON	ON	0
Slave unit (connected)	330	OFF	OFF	ON	OFF	Corresponding address (2-8)
	440	ON	OFF	ON	OFF	Corresponding address (2-8)
Single-compressor	330	OFF	OFF	OFF	OFF	Local unit address (1-8)
	440	ON	OFF	OFF	OFF	Local unit address (1-8)

Notes:

1. When the remote control mode is selected to power on/off the unit, a holding switch must be selected; otherwise, the unit may operate in one status only.

2. Do not implement remote control by disassembling the screen and extending the communication cables without permission. A unit failure may occur due to signal interference caused in this mode. We assume no liability or responsibility for any damage or consequence arising from this operation. Customers with the requirement for remote control can apply for a customized configuration to us.

7.5 Unit Operation Flowchart



7.6 Unit Operation Precautions

WARNING!

To prevent injuries from moving parts or live parts, disconnect the main power supply before maintenance inspection, and fix a visible sign forbidding switching-on at the switch position.

(1) Before powering on the unit for the first time, connect the power supply for at least eight hours and ensure the refrigerant oil does not foam during start. When the ambient temperature is low, the oil heating time must be prolonged accordingly. The reason is that problems with difficult start and poor compressor loading will occur due to high oil viscosity if the unit starts at a low temperature. Therefore, when the ambient temperature is low, the heating time of the refrigerant oil heater must be longer. The refrigerant oil heater must usually be heated continuously when the system stops. Do not turn off the power supply, unless the unit will not be used for a long time.

(2) Never mix different brands of refrigerant oil. Confirm the brand and specifications before adding new oil. If the refrigerant oil needs to be replaced, clean the residual oil completely from the compressor and system before adding new oil and replacing the dry filter. Some synthetic oils are compatible with mineral oils, leading to qualitative changes. Therefore, after adding new oil, clear all residual oil.

(3) If any unexpected situation takes place when the compressor starts, stop it using the emergency stop button on the panel.

(4) The electronic expansion valve controller parameters cannot be adjusted without the authorization of INTENSITY after-sales personnel; otherwise, the unit cannot operate normally.

(5) If the safety valve on the liquid reservoir is opened, ensure good ventilation in the environment around the unit. Freon will produce harmful phosgene when meeting fire. Therefore, open fires are prohibited around the unit.

8 Troubleshooting

Faults	Causes and Troubleshooting Methods
The water flow is cut off.	Confirm whether the system pump is operating and whether the water flow rate meets system requirements.
	Check whether the flow switch is properly installed and whether the set value of the water switch is correct.
	Make sure that the water flow switch is properly connected according to the requirements of the schematic.
Anti-freezing protection	Confirm that the outlet water temperature of the system is lower than 3°C.
	Confirm that the outlet water temperature is lower than 3°C before the system stops.
High pressure protection	Make sure that the sampling stop valve of the high pressure switch has been opened.
	Confirm whether the high pressure value is higher than the value set for high pressure protection when high pressure protection occurs.
	Confirm whether the high pressure switch is properly connected according to the requirements of the schematic.
Low pressure protection	Make sure that the sampling stop valve of the low-pressure switch has been opened.
	Confirm whether the low pressure value is lower than the value set as low pressure protection when low pressure protection occurs.
	Confirm whether the low pressure switch is properly connected according to the requirements of the schematic.
Intra-compressor protection	Confirm whether the three-phase power supply of the compressor is normal (including phase sequence, voltage, phase lack, imbalance rate of three-phase voltage), and whether the values are within the set ranges.
	Confirm whether the wires of the intra-compressor protection module are properly connected according to the requirements of the schematic.
	Faults may arise if the compressor discharge temperature or motor winding temperature are too high.
High/low pressure difference protection	Confirm that the sampling stop valve for high/low pressure difference switch has been opened.
	Confirm whether the pressure difference value is lower than the value set as high/low pressure difference protection when high/low pressure difference protection occurs.
	Confirm whether the high/low pressure difference switch is properly connected according to the requirements of the schematic.
Compressor overloading	Check that the value set for compressor overload protection is consistent with the factory parameters.
	Once startup conditions are satisfied, power on the unit again, and then check whether the compressor current exceeds the maximum allowable operating current of the compressor.

	Check whether the current operating condition of the unit exceeds the allowable limit range.
Fan overload	Check that the value set for fan overload protection is consistent with the factory parameters.
	Check whether the fin heat exchanger is blocked by dirt and whether the fan motor or blade is twisted with sundries.
	Check whether the current operating condition of the unit exceeds the allowable limit range.
Contactor fault	Check whether the relay setting time is 5s to 7s.
	Make sure the contactor can be pulled in normally and the thermal relay operates properly.
	Confirm whether the contactor is properly connected according to the requirements of the schematic.
Fin temperature too high	Check whether the fan turns in reverse or stops.
	Check whether the fin heat exchanger is blocked by dirt and whether the air flow rate is insufficient because the fan blade is twisted with foreign matter.
	Check whether the fin temperature sensor is properly connected or whether it is damaged.
	Check whether the current operating condition of the unit exceeds the allowable limit range.
Discharge temperature too high	Check whether the current operating condition of the unit exceeds the allowable limit range.
	Check whether the liquid injection valve functions properly.
	Check whether all the pipe valves have been opened and whether the pipeline is blocked.
	Check through the oil mirror of compressor to see whether the compressor is short of oil.
	Check whether the electronic expansion valve functions properly.
	Check whether the refrigerant leaks.
Power fault	Check the set power protection value for the phase sequence protector to see whether it is consistent with factory parameters.
	Measure the quality of the power supply the customer uses.
	Confirm whether the unit power supply is properly connected according to the requirements of the schematic.
Outlet water temperature sensor disconnected	Check whether the temperature sensor is properly connected or whether it is damaged.
Outlet water temperature not displayed or displayed as 0	Check whether the temperature sensor line is shorted or whether the sensor is damaged.
Inlet water temperature sensor disconnected	Check whether the temperature sensor is properly connected or whether it is damaged.
Inlet water temperature not displayed or displayed as 0	Check whether the temperature sensor line is shorted or whether the sensor is damaged.
Fin temperature sensor	Check whether the temperature sensor is properly connected or whether it

disconnected	is damaged.
Fin temperature not displayed or displayed as 0	Check whether the temperature sensor line is shorted or whether the sensor is damaged.
Ambient temperature sensor disconnected	Check whether the temperature sensor is properly connected or whether it is damaged.
Ambient temperature not displayed or displayed as 0	Check whether the temperature sensor line is shorted or whether the sensor is damaged.
Discharge air temperature sensor disconnected	Check whether the temperature sensor is properly connected or whether it is damaged.
Discharge temperature not displayed or displayed as 0	Check whether the temperature sensor line is shorted or whether the sensor is damaged.
Compressor running failure	Check whether the power supply is connected (power interruption).
	Check whether the mould case circuit breaker acts (current overload).
	The startup switch has failed.
	The fuse for the power supply in the control circuit is burnt.
	The interlocking part does not operate.
	The low/high pressure switch acts.
Stops soon after starting	The low/high pressure switch acts.
Discharge pressure too low (cooling condition)	The ambient temperature is too low.
	Check whether the superheat degree of the electronic expansion valve module is too large.
	Check whether refrigerant leaks in the system.
	Suction pressure too low
Discharge pressure too high (cooling condition)	Check whether the ambient temperature is too high.
	Check whether the fan turns in reverse or stops.
	Check whether the fin heat exchanger is blocked by dirt and whether the fan motor or blade is twisted with foreign matter.
	Check whether there is excessive refrigerant in the system.
	Check whether any non-condensable gas enters the system.
	Check whether the discharge pressure sensor is consistent with the test value of the high pressure gauge.
Suction pressure too high (cooling condition)	Confirm whether the water temperature is too high and whether the water flow rate is too large.
	Check whether the superheat degree of the expansion valve is too small.
Suction pressure too low (cooling condition)	Confirm whether the water temperature is too low and whether the water flow rate is insufficient.
	The chilled water filter is choked.
	The dry filter is choked.
	Check whether the refrigerant in the system is insufficient.
Discharge pressure too low (heating condition)	Check whether refrigerant leaks in the system.
	Check whether the superheat degree of the electronic expansion valve module is too large.
	Check whether the hot water flow is too large or the water temperature is too low.

	Check whether suction pressure is too low.
Discharge pressure too high (heating condition)	Confirm whether the high pressure gauge is accurate.
	Check the water pump for damage.
	Check whether the hot water flow is insufficient or the water temperature is too high.
	Check whether the water filter is clogged.
	Excessive refrigerant has been added.
	Check whether any non-condensable gas enters the system.
	Scaling is found outside the heat exchange tube of shell-and-tube heat exchanger.
Suction pressure too high (heating condition)	The inlet air temperature of the fin heat exchanger is too high.
	Confirm whether the superheat degree of the expansion valve is too small.
	Excessive refrigerant has been added.
Suction pressure too low (heating condition)	The filled refrigerant is insufficient.
	Check whether the air flow of the fin heat exchanger is insufficient.
	Check whether the fin heat exchanger is blocked by dirt.
The automatic capacity regulating device fails.	Check whether the outlet water temperature sensor is properly connected or whether it is damaged.
	Check whether the power cord of the solenoid valve is disconnected.
	Check whether the electronic expansion valve capillary is clogged.
Compressor overheating	The motor is overheated. Check whether the liquid injection valve functions properly.
	The compressor bearing lubrication is poor. Check through the oil mirror of compressor to see whether the oil level is normal.
	The pressure at the high pressure side is too high.
	The refrigerant pressure and temperature at the low pressure side are too high.
NFB tripping	Check the wiring for a short circuit.
	Check whether the connection line is grounded.
	The compressor motor fails.
The motor overload relay for the compressor acts.	Check whether the compressor operates in single phase.
	Check whether the voltage is too high, too low, or unbalanced.
	Check whether the temperature in the power distribution box is too high.
	The operating pressure is too high.
	Check if the compressor has started too frequently.
	Check if there is not enough compressor refrigerant oil.
Multi-connection communication fault	Check if the communication line is disconnected.
	Check if the auxiliary unit has been powered on.

9 Maintenance

Standard maintenance

The air conditioning equipment must be installed by professional technician. Routine sampling should be conducted by local professionals. Simple preventive maintenance is conductive to the optimal operation of equipment:

- Improving the cooling performance
- Reducing power consumption
- Preventing unexpected events
- Prolonging the service life of equipment
- Protecting the environment

Maintenance A

The user only needs to perform simple operations:

- Observe oil stains (from refrigerant leakage).
- Clean the coil.
- Check the protection devices to ensure they are in good condition and make sure that the door cover is closed properly.
- Check the alarm report when the unit cannot operate.
- Keep the control box clean.

Note: Regularly check for traces of oil.

Maintenance B

This maintenance grade requires professional technician who understands the electronics, hydraulics and mechanics.

The following steps are recommended:

Carry out maintenance A first, and then:

- Tighten the power line at least once a year.
- Make sure that no connectors get loose.
- Check the conditions of the electric protection device.
- Check to ensure that all heaters operate normally.
- Check water pipe connections.
- Drain the water pipe (especially when it is used for the first time).

- Clean the water filter.
- Replace the pump box after it has been used for 10,000 hours.
- Check the unit operating parameters and compare them with previous values.
- Keep maintenance records for each heating and ventilation unit.

All of the above operations must performed safely in accordance with local regulations to protect personal safety.

Maintenance C

This maintenance grade requires specialized skills and special tools, and maintenance operations can only be performed by the manufacturer or its representatives or authorized persons, including:

- Replace main parts (compressors and evaporators).
- Handle refrigerant circulation circuit faults (recover the refrigerant).
- Change factory settings (when the working environment changes and the set values need to be changed).
- Move or disassemble the unit.
- Handle operation interruption due to improper maintenance.
- Handle other faults specified in the policy.

Note: INTENSITY is not liable for faults due to negligence during use.

Maintenance Items

Maintenance Item		Maintenance Frequency	Qualification Benchmark (Handling Method)	Remarks
I. Common items	Noise	Anytime	Listen for abnormal sound	Observe the unit from 1m away in a central position
	Vibration	Anytime	Observe the unit body pipes and parts for excessive amplitude	
	Power voltage	Anytime	The power voltage is within the rated voltage ±10%.	
II. Unit appearance	Cleanness	Anytime	Keep clean all the time	
	Rust	Anytime	Use an iron brush to remove rust, and then coat with anti-rust paint	
	Stability	Anytime	Tighten all the screws	
	Peeling of the thermal insulation material	Anytime	Paste it with bonding agent	
	Water leaks	Once/month	Check whether the drainage pipe is blocked	
III. Compressor	Noise	Anytime	There is no abnormal sound at the moment of starting or stopping or	

Maintenance Item		Maintenance Frequency	Qualification Benchmark (Handling Method)	Remarks
			during operation	
	Insulation resistance	Once/year	Use a DV500V high resistance meter to test it (must be above 5MΩ).	
	Aging of shockproof rubber	Once/year	Qualified if found to be elastic when pressed with a hand	
	Interim inspection	Once/ 3,000 hours	Pay attention to the noise vibration, oil level, etc.	
	Interim inspection	Once/ 6,000 hours	Confirm actions of the safety device and protection device	
IV. Fin heat exchanger	Fan	Anytime	Air flow is normal and the high pressure is in the normal range.	
	Cleanliness	Once/month	The wind resistance is normal and the high pressure is in the normal range.	
V. Shell-and-tube heat exchanger	Water flow at the user side	Anytime	Within ±5% of the benchmark	
	Temperature	Anytime	Within the benchmark	
	Anti-freezing fluid concentration	Once/month	Ensure the concentration above the set value	
	Water quality	Once/month	Within the benchmark	Refer to the water quality and scale relationship table
	Cleanliness	Anytime	Ensure the low pressure within the benchmark during cooling	
	Drainage	Anytime	Drain the water from the shell-and-tube heat exchanger if the unit will not be used for a long time	Also drain the water from the pipe
VI. High/low-pressure switch	Action	Once/month	Check the switch according to the action value of each protection device	Check whether the contact mechanism is good when it is in use
VII. Pressure gauge	Pointer	Once/six months	Compare it to a proper pressure gauge	
VIII. Check valve	Action	Once/month	The check valve switch works smoothly	
IX. Chilled water circulation	Refrigerant leakage	Once/month	Use a leak detector to detect refrigerant leaks at the unit body and pipe joints Drain the water from the shell-and-tube heat exchanger, and check the water inlet/outlet for leakage	Use an electronic leak detector or a blowtorch leak detector or soap water

Maintenance Item		Maintenance Frequency	Qualification Benchmark (Handling Method)	Remarks
X. Electrical control	Insulation resistance	Once/month	Use a 500 VDC high-resistance meter to test it, which must be above 1MΩ	
	Contact property of wire	Once/month	The wire insulation layer cannot be broken, contact is good, and the bolt is fastened	
	Subsidy relay	Once/month	No action exception	
	Time limit relay	Once/month	It works according to the set time	

Torques of main fasteners

Fastening at electrical connections

Part	Unit identification	Set value (N.m)
Mould case circuit breaker, user connection point		
M8		18
M10	L1/L2/L3	36
Welding bolt PE, user connection point (M8)	PE	18
Terminal bolt, AC contactor		
JCQ-80A-30-220VAC-D		18
JCQ-9A-31-220VAC-CO-L		18
Compressor ground wire Compressor junction box terminal (M6)	PE	18
Compressor junction box		
M6		18
M6	U/V/W/	18

Fastening of main bolts

Fastening position	Bolt specification	Torque (N.m)
Dry filter flange	M10	35
	M8	35
Connecting bolt between the water chamber and tube plate	M16	300
Connecting bolt between tube plates	M16	300

10 Field Acceptance List and Trial Operation Parameter List

10.1 Field Installation Checklist of Unit (Commissioning Application Form)

Unit Model: Compressor model: Product code: (If there are a lot of units, list the unit models and product codes on attached tables.)
Location: Country Province City Owner name: Contact/Tel: Installation company: Contact/Tel: Distributor: Contact/Tel:
Required commissioning date: Before Month Date, Year
Fill in the following items and fax the table to INTENSITY after-sales service department for confirmation and to arrange commissioning by engineers and their schedule. If conditions do not comply with the following table, the customer will bear the related labor and traveling expenses on commissioning.
1. Pre-installation Check ● The unit is damaged during transportation. Yes ( ) No ( ) ● Damage location (if the unit is damaged): ● Unit startup is influenced (if the unit is damaged). Yes ( ) No ( ) 2. Confirmation on Installation Location ● The unit is installed on a foundation and shock-absorbing measures are taken. Yes ( ) No ( ) ● The unit is horizontally installed. Yes ( ) No ( ) ● The unit is installed with sufficient maintenance space that meets the requirement in the instructions. Yes ( ) No ( ) ● The unit meets requirements for heat dissipation, ventilation, and drainage. Yes ( ) No ( ) 3. Confirmation on Unit Appearance ● The unit appearance is damaged. Yes ( ) No ( ) ● The unit refrigerant is leaked. Yes ( ) No ( ) 4. Confirmation of the electrical system ● The power standard, circuit breaker capacity, and power cable diameter meet the unit requirement. Yes ( ) No ( ) ● The electrical connection is correct, with all wiring terminals tightened. Yes ( ) No ( )

- The unit is grounded. Yes ( ) No ( )
- Wiring of weak-current part and power cable distribution meet the anti-interference specification. Yes ( ) No ( )

5. Confirmation of the chilled water system of the unit
   - The model of the chilled water pump is correct. Yes ( ) No ( )
   - The water capacity of the chilled water system meets requirements. Yes ( ) No ( )
   - Water capacity of the chilled water system. _ _ L
   - The filter is installed at the water return side. Yes ( ) No ( )
   - The water flow switch is correctly installed and interlocked with the unit. Yes ( ) No ( )
   - Accessories such as the shockproof hose, thermometer, and pressure gauge are installed. Yes ( ) No ( )
   - The refilling and constant pressure systems are properly installed. Yes ( ) No ( )
   - The water processing device is installed. Yes ( ) No ( )
   - The chilled water system is cleaned and drained by separating it from the unit. Yes ( ) No ( )
   - The chilled water system passed the pressure test without water leakage. Yes ( ) No ( )
   - The chilled water system is fully filled with water and evacuated. Yes ( ) No ( )
   - The local temperature is lower than 0°C in winter. Yes ( ) No ( )
   - Freezing protection measures are taken if the local temperature is lower than 0°C. Yes ( ) No ( )
   - The side equipment is correctly installed. Yes ( ) No ( )
   - Unit purposes: _ _ _ _ _ _
   - Two-way valves are installed at the side equipment. Yes ( ) No ( )
   - Percentage of two-way valves to side equipment: _ _ %
6. Pre-commissioning Preparations
   - The power supply is temporarily used. Yes ( ) No ( )
   - The power voltage is within the normal range. Yes ( ) No ( )
     L1 __ L2 __ L3 __
   - The voltage imbalance rate is less than 2%. Yes ( ) No ( )
   - The customer and its acceptance personnel arrive on site timely. Yes ( ) No ( )
7. Other Description:

Customer's signature: Company: Date:	INTENSITY´S signature: Company: Date:

10.2 Unit Commissioning Record Table

Unit Model: Compressor model: Product code:					
The user's power supply system: V--3PH-- HZ					
Location: Country Province City Owner name: Contact/Tel: Installation company: Contact/Tel: Distributor: Contact/Tel:					
Commissioning date: Month/Date/Year					
The parameters of the following items are the basis for confirming that the unit has passed the acceptance check. Carefully fill them in and check the content.					
General power supply	Voltage	L1L2 phase/V			
		L1L3 phase/V			
		L2L3 phase/V			
	Current	L1 phase/A			
		L2 phase/A			
		L3 phase/A			
Compressor	1#	L1 phase current/A			
		L2 phase current/A			
		L3 phase current/A			
		Discharge temperature/°C			
		Discharge pressure/MPa			
		Suction temperature/°C			
		Suction pressure/MPa			
	2#	L1 phase current/A			
		L2 phase current/A			

		L3 phase current/A			
		Discharge temperature/°C			
		Discharge pressure/MPa			
		Suction temperature/°C			
		Suction pressure/MPa			
Evaporator		Inlet water temperature/°C			
		Inlet water pressure//MPa			
		Outlet water temperature/°C			
		Outlet water pressure//MPa			
Time of recording					
Maintenance performed or not:					
Notes:					
Signature of the supervisor/consultant: Company: Date:		Signature of the distributor: Company: Date:	Signature of the debugger: Company: Date:		Customer Signature: Company: Date

11 Precautions for Prolonged Stop Period

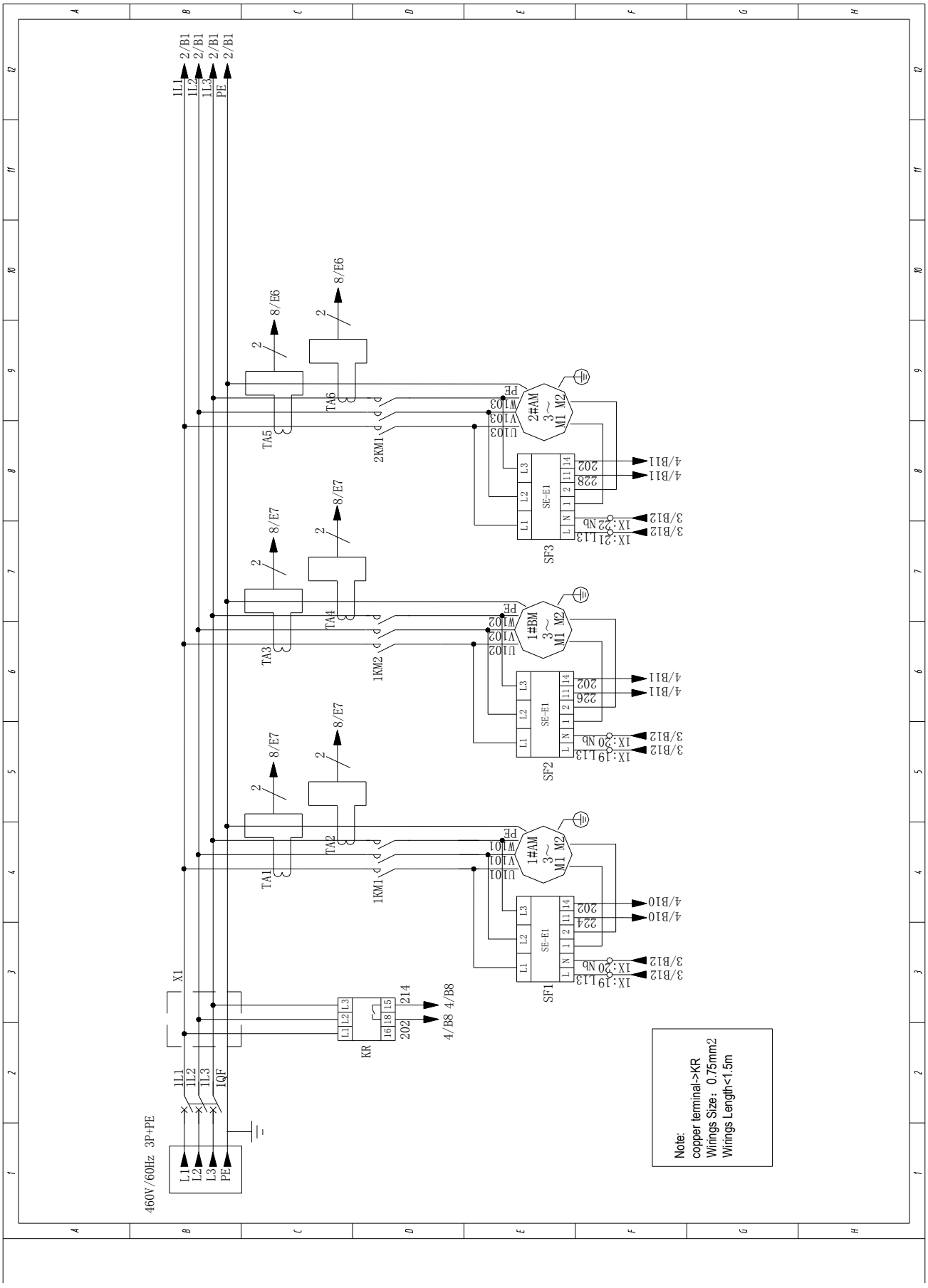
WARNING!

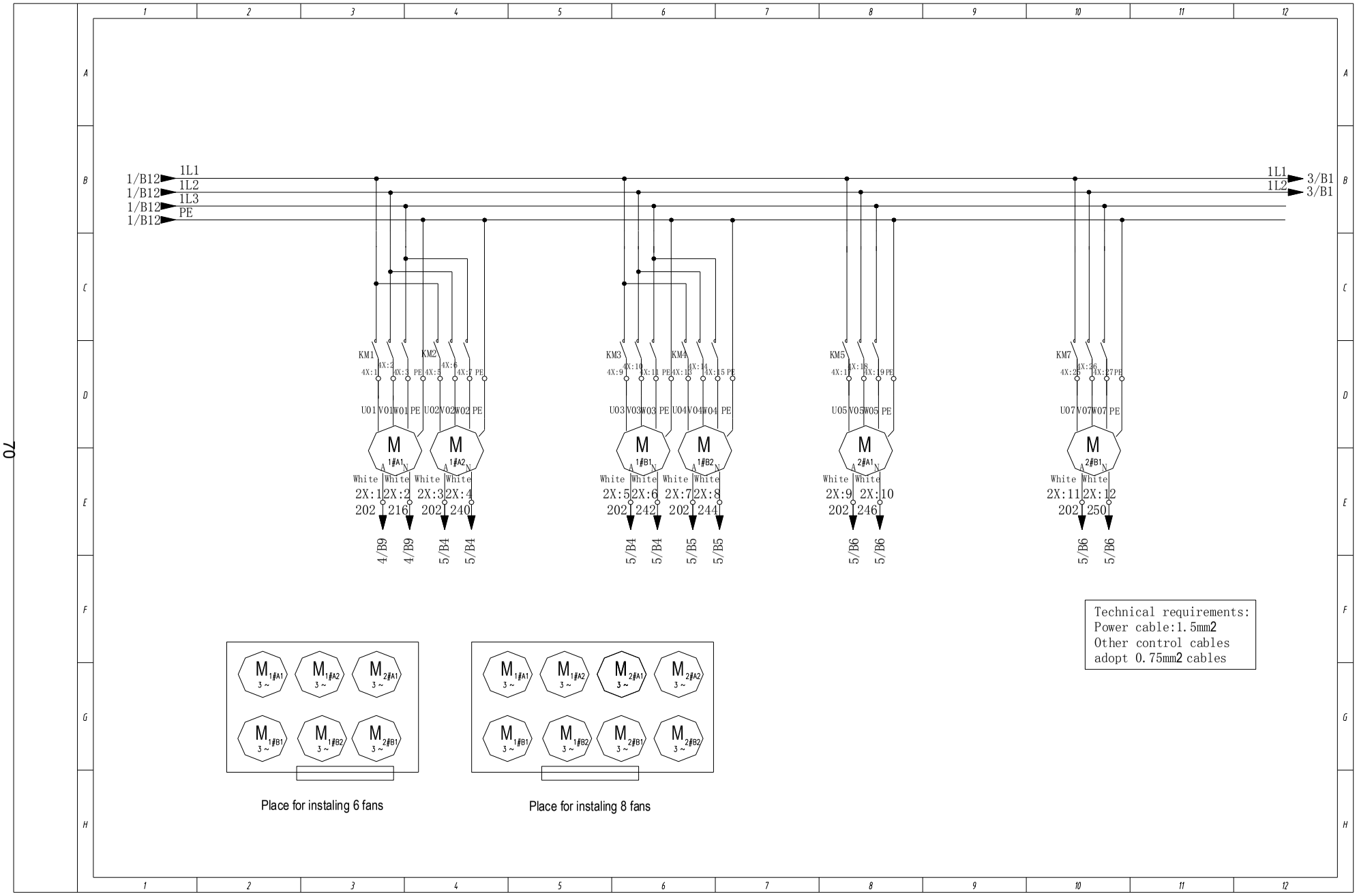
Do not allow water to remain in the water piping during prolonged stop periods.
For prolonged idle periods you should fill the water pipes with antifreeze or drain all the water from the pipes. Failure to do so could result in leaking.

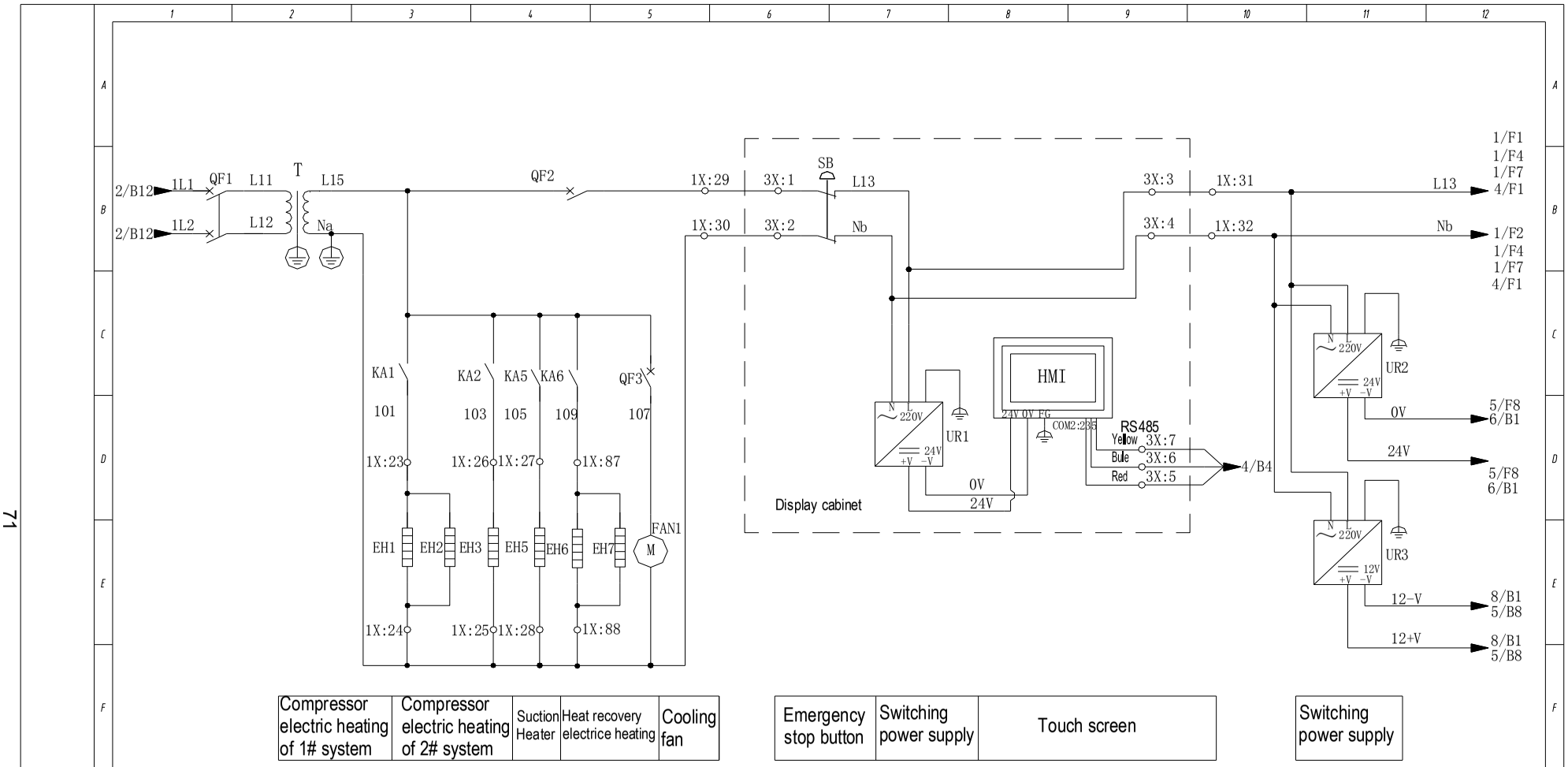
• Be sure to turn off the power supply switch. If you forget to turn off the power supply switch, electricity is still supplied to the crank case, consuming several watts of power. In order to conserve electricity, be sure to turn off the power supply switch.
• Drain water out from the water piping.
In winter, water in the piping may freeze causing equipment damage. Also, keep the water piping interior dry to prevent rusting by blowing, for example. (For details, contact the dealer.) For the water drain plug position, refer to "Names of Parts" in pages 5.
• In case of any abnormality (such as burning smell due to a fire), immediately cut off the power, contact the dealer and seek for solutions.
• The dealer is responsible for installing the air conditioning unit.
• Improper installation may cause power leakage, water leakage or fire.
• For any need of removing and re-installing the air conditioning unit, contact the dealer.
• Switch on/off the air conditioning unit by using the controller
• Do not switch on/off the air conditioning unit by plugging out the power plug, since large current may burn the plug and cause short circuit, resulting in personal injury.
• Power is connected firmly and the insulation layer of cables is in good conditions. Over-loose cables and damaged cables may cause electrical shock, short cut or fire.
• Do not put fingers, sticks or other sundries into the unit outlet; otherwise, it may damage the air conditioning unit and cause serious injuries.
• In the operating process of the air conditioning unit, keep frequently venting indoor air since poor ventilation may cause hypoxia.
• Combustible spraying objects (such as insecticides and paint and the like) may cause fire. Do not spray them directly to the air conditioning unit.
• Do not stand or place objects on the air conditioning unit.
• Do not operate the air conditioning unit with a damp hand; otherwise, it may cause electrical shock.
• Use fuses of correct specifications and do not replace fuses with cables or any other connector; otherwise, it may cause errors or fire.
• Perform maintenance and repair on the unit only when the unit is switched off and the power is cut off; otherwise, it may cause electrical shock or serious injuries.
• The air conditioning unit must be grounded well.
Ground wires cannot be connected to gas pipes, water pipes, and telephone lines, because poor grounding may result in electrical shock.
• Install protection devices for power leakage. No installing of protection devices for power leakage may cause electrical shock.
• After a prolonged stop period, you should turn the power supply switch on at least six hours before running the chiller again. This is done in order to provide electricity to the crank case heater.

Appendix

Wiring diagram of RCAE115HA22



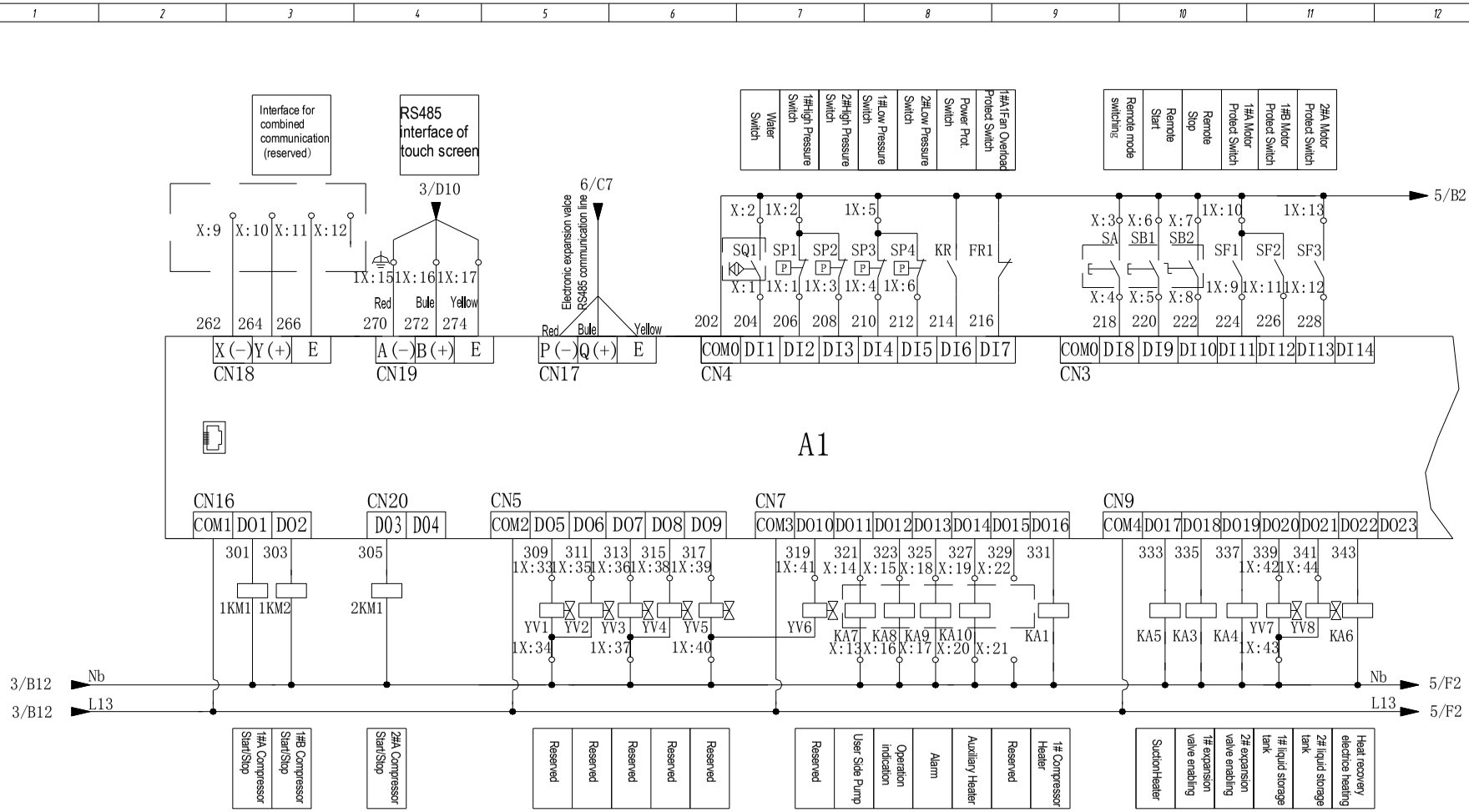

1/B12 1L1
1/B12 1L2
1/B12 1L3
1/B12 PE
1/B12
1L1 3/B1
1L2 3/B1
KM1
KM2
KM3
KM4
KM5
KM7
U01 V01 W01 PE
U02 V02 W02 PE
U03 V03 W03 PE
U04 V04 W04 PE
U05 V05 W05 PE
U07 V07 W07 PE
M 1#A1
M 1#A2
M 1#B1
M 1#B2
M 2#A1
M 2#B1
White White
2X:1 2X:2
202 216
2X:3 2X:4
202 240
2X:5 2X:6
202 242
2X:7 2X:8
202 244
2X:9 2X:10
202 246
2X:11 2X:12
202 250
4/B9 4/B9 5/B4 5/B4
5/B4 5/B4 5/B5 5/B5
5/B6 5/B6
5/B6 5/B6
Technical requirements:
Power cable:1.5mm2
Other control cables
adopt 0.75mm2 cables
Place for instaling 6 fans
Place for instaling 8 fans



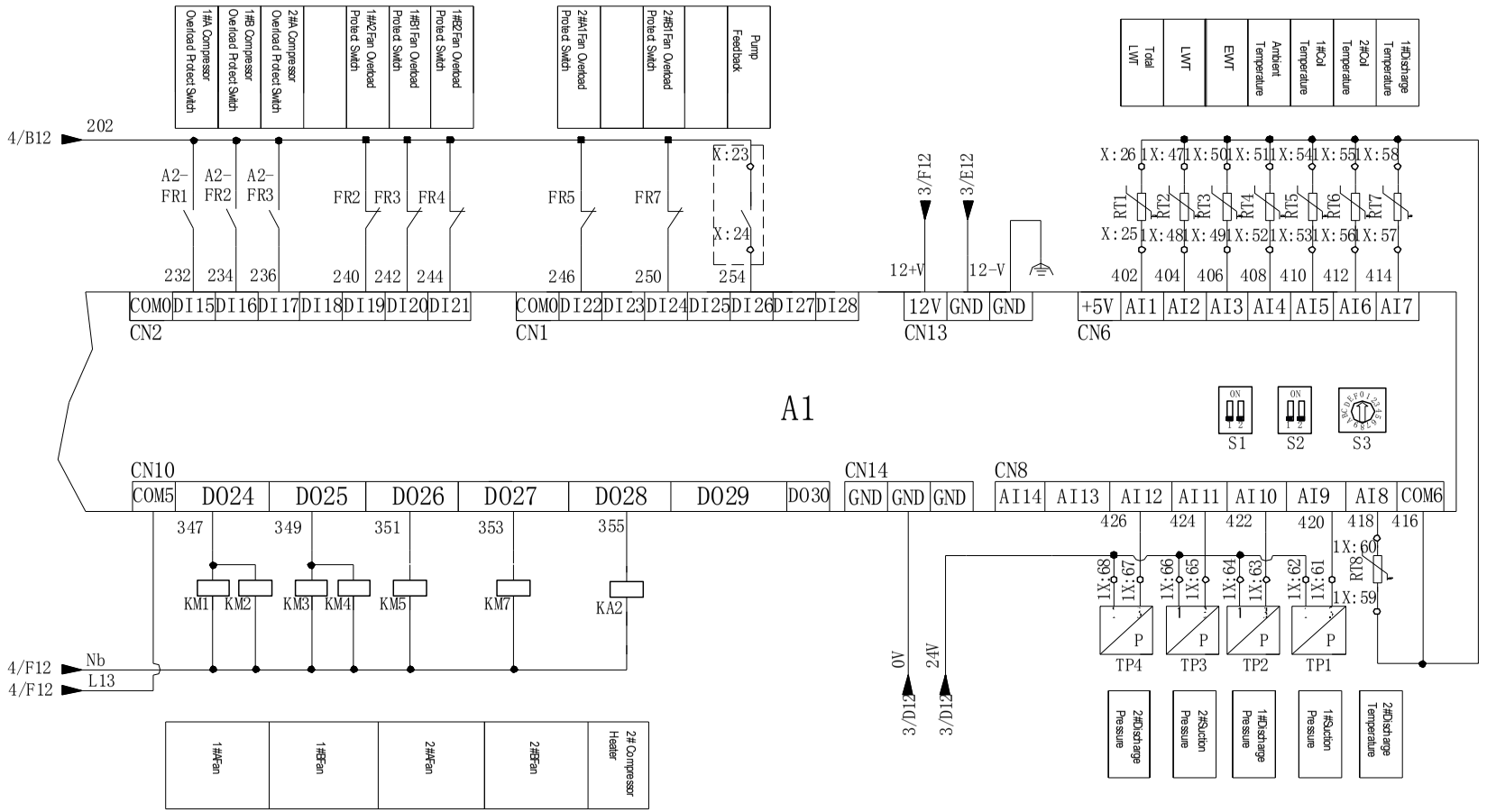
Compressor electric heating of 1# system	Compressor electric heating of 2# system	Suction Heater	Heat recovery electrice heating	Cooling fan

Emergency stop button	Switching power supply	Touch screen

Switching power supply

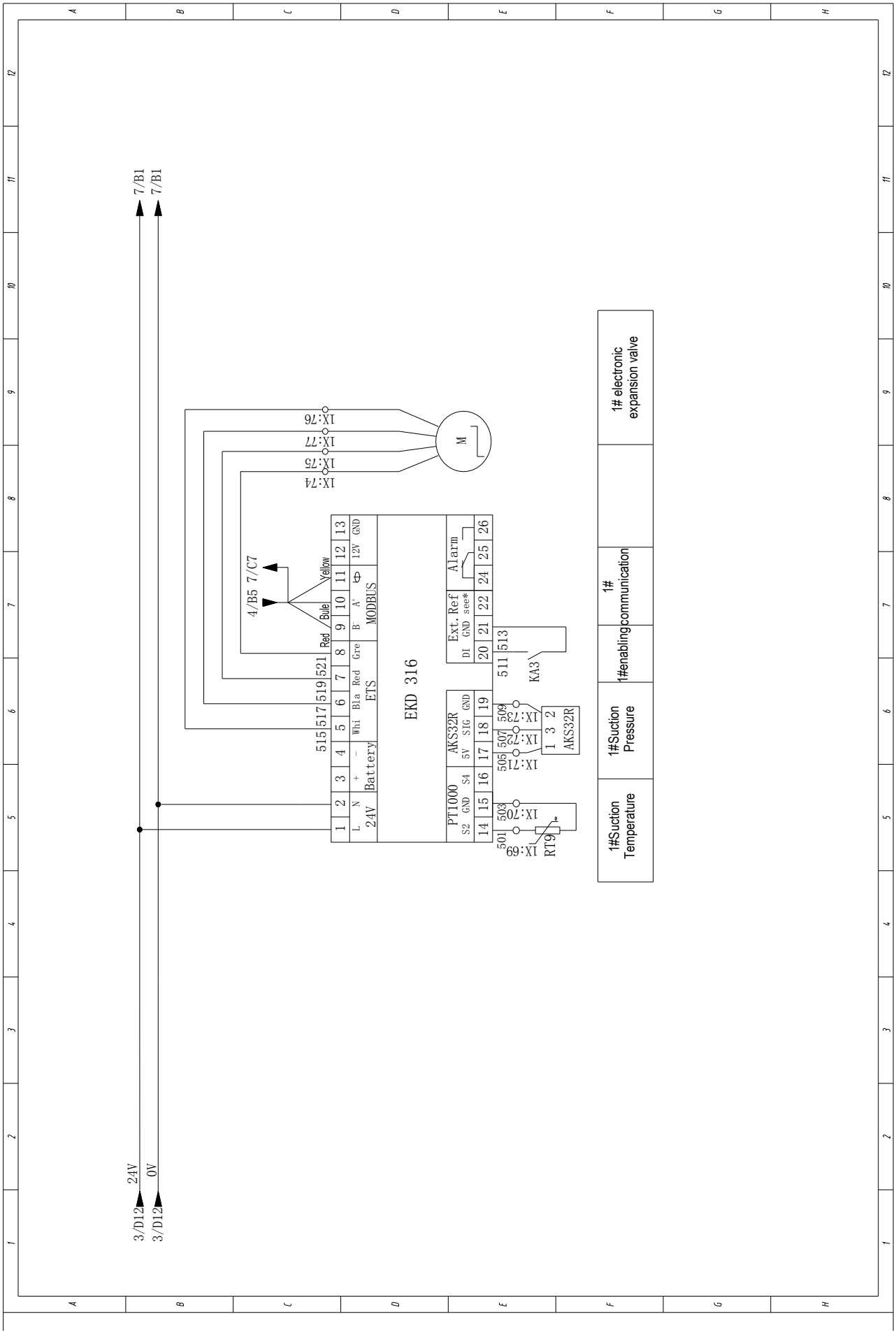


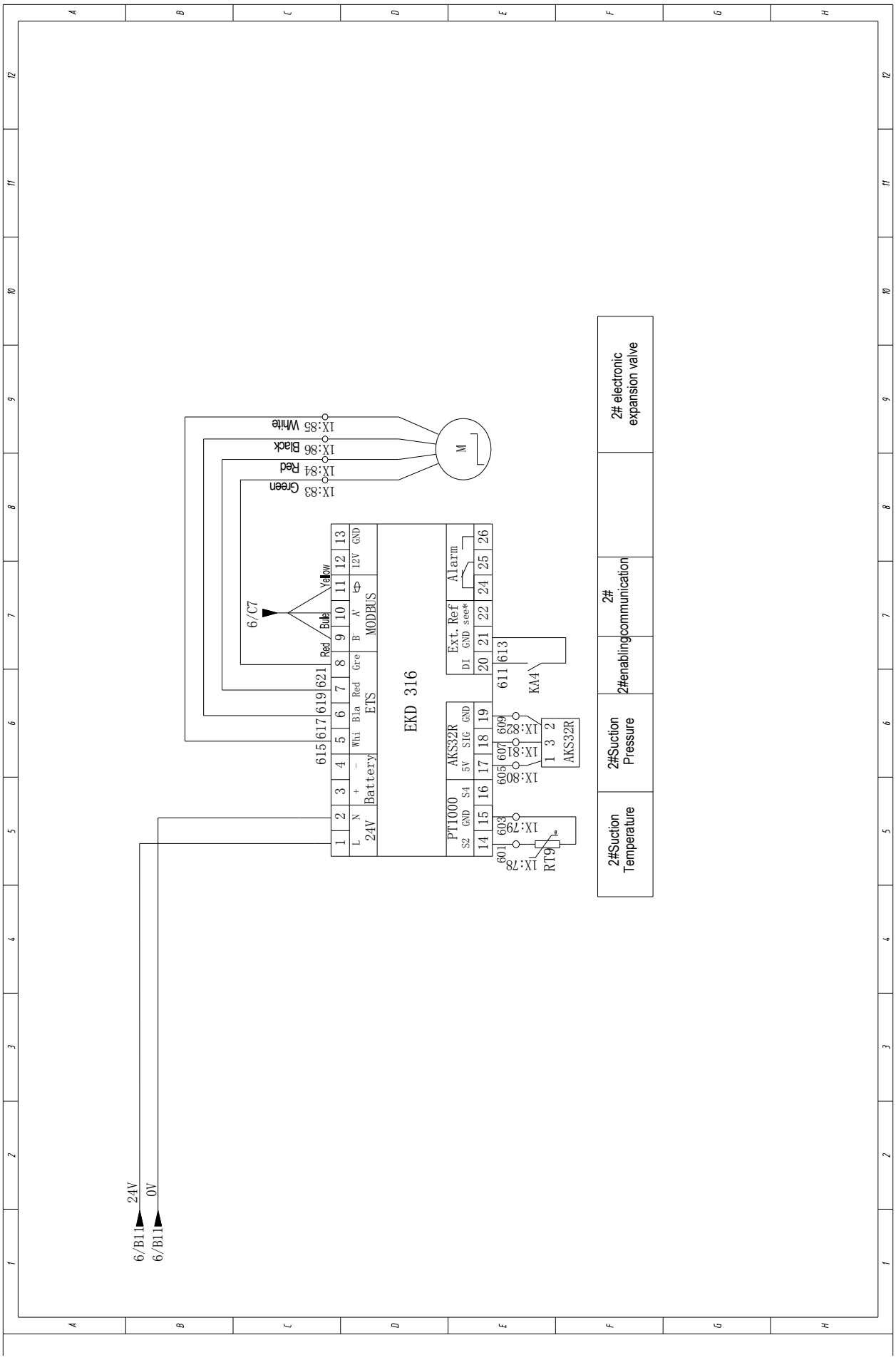
Note:The user's connection line X1-24 is in the dashed line box

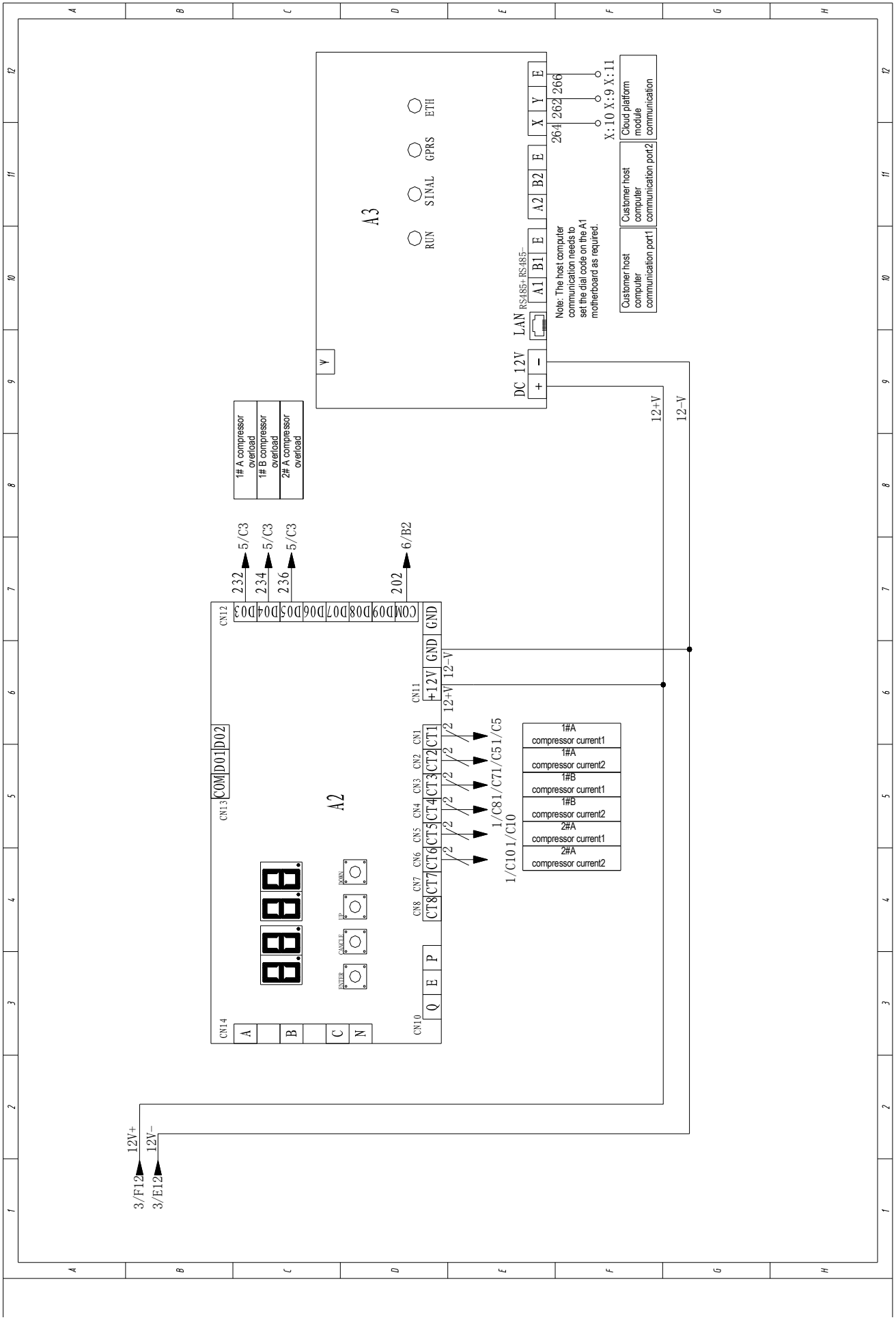


NOTE： For the host computer communication,you need to dial the dial code S2 to SINGLE Mode;
In multi-link mode,you need to dial S2 to multi-link,and set the Msater,Slave and Address dialing for S3.
The meaning of the dialing code is as follows:

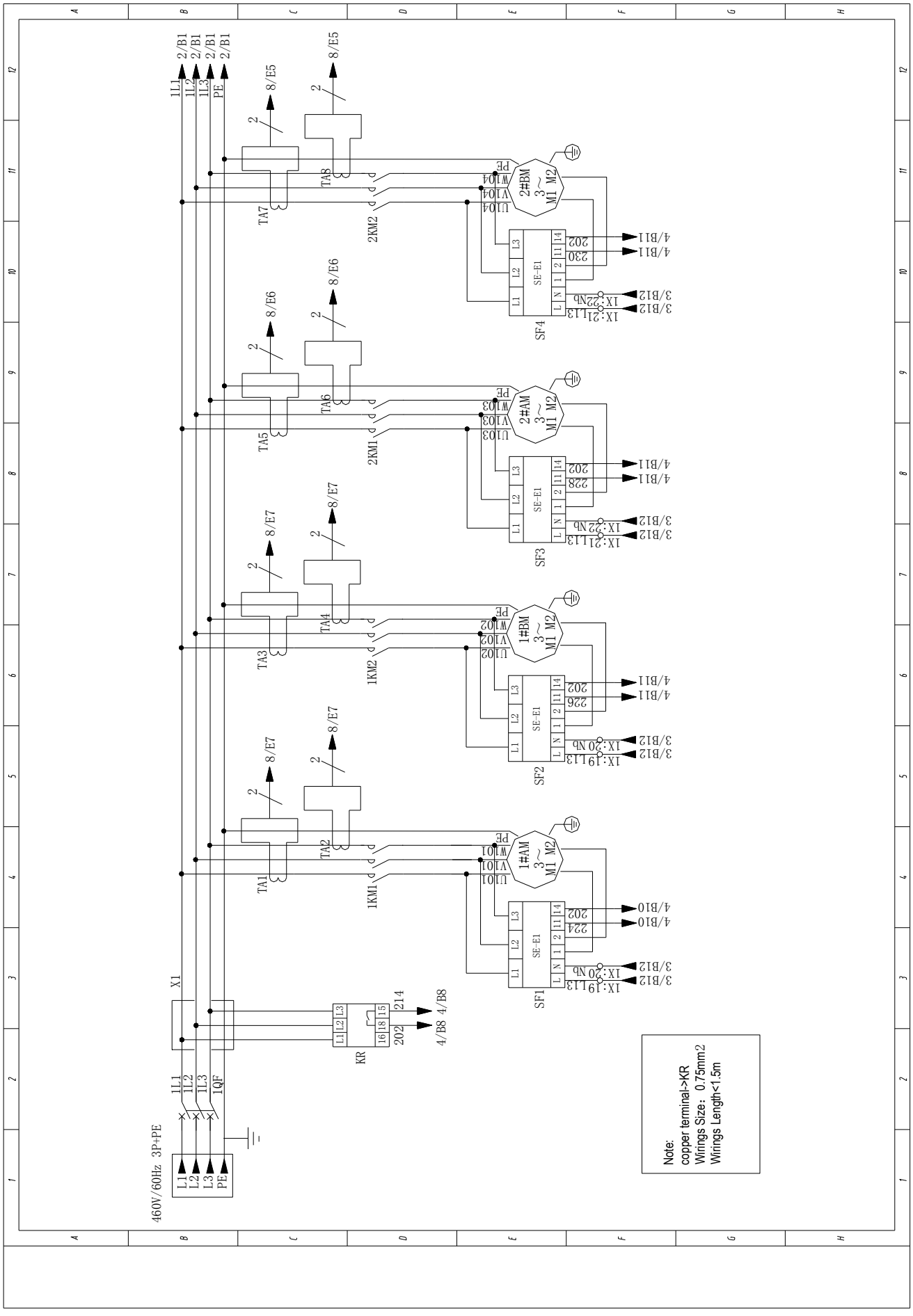
S1	1	Type choose			
	2	No function			
S2	1	ON	MULTI Mode	OFF	SINGLE Mode
	2	ON	Master	OFF	Slave
S3	Address Code				

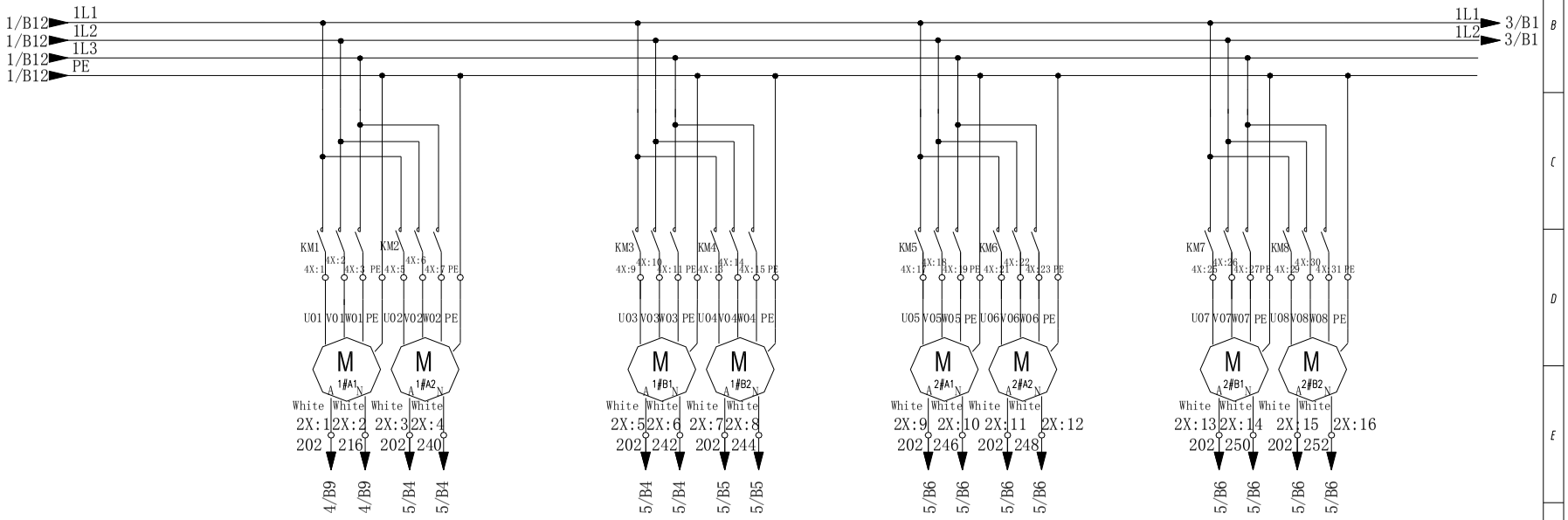

7/B1
7/B1
24V
0V
3/D12
3/D12
1X:76
1X:77
1X:75
1X:74
M
4/B5 7/C7
Yellow
Blue
Red
515 517 519 521
EKD 316
24V
Battery
ETS
MODBUS
PT1000
AKS32R
Ext. Ref
Alarm
KA3
1X:71
1X:72
1X:73
1X:70
1X:69
RT9
AKS32R
1#Suction Temperature
1#Suction Pressure
1#enablingcommunication
1# communication
1# electronic expansion valve

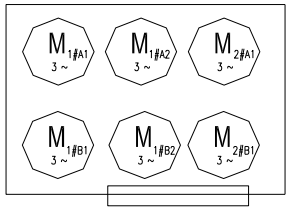

2# electronic expansion valve
2#
2#enablingcommunication
2#Suction Pressure
2#Suction Temperature
M
IX:85 White
IX:86 Black
IX:84 Red
IX:83 Green
6/C7
Yellow
Blue
Red
EKD 316
24V
0V
6/B11
6/B11
KA4
RT9
AKS32R


A3
RUN
SINAL
GPRS
ETH
DC 12V
LAN
RS485+ RS485-
A1 B1 E
A2 B2 E
X Y E
264 262 266
X:10 X:9 X:11
Note: The host computer communication needs to set the dial code on the A1 motherboard as required.
Customer host computer communication port1
Customer host computer communication port2
Cloud platform module communication
12+V
12-V
1# A compressor overload
1# B compressor overload
2# A compressor overload
232 234 236 202
5/C3 5/C3 5/C3 6/B2
CN12
COM D09 D08 D07 D06 D05 D04 D03
CN11
GND +12V 12-V GND
CN13
COM D01 D02
A2
CN14
A B C N
CN10
Q E P
CN1 CN2 CN3 CN4 CN5 CN6 CN7 CN8
CT1 CT2 CT3 CT4 CT5 CT6 CT7 CT8
1/C81/C71/C51/C5
1/C101/C10
1#A compressor current1
1#A compressor current2
1#B compressor current1
1#B compressor current2
2#A compressor current1
2#A compressor current2
3/F12 12V+
3/E12 12V-

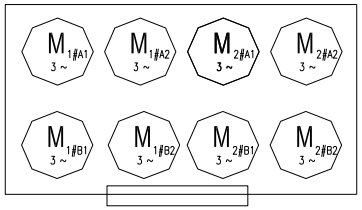
Wiring diagram of RCAE150HA22





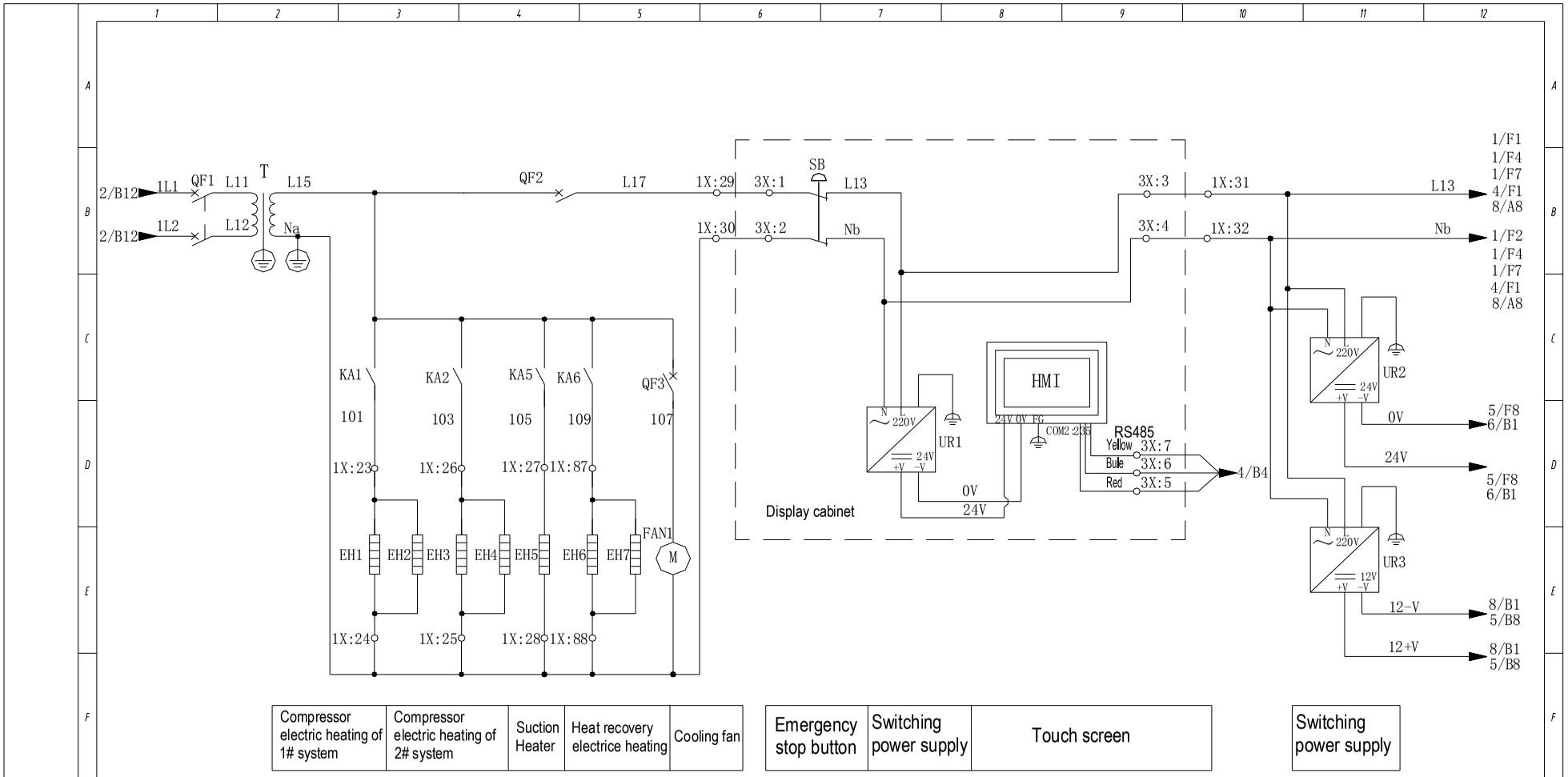


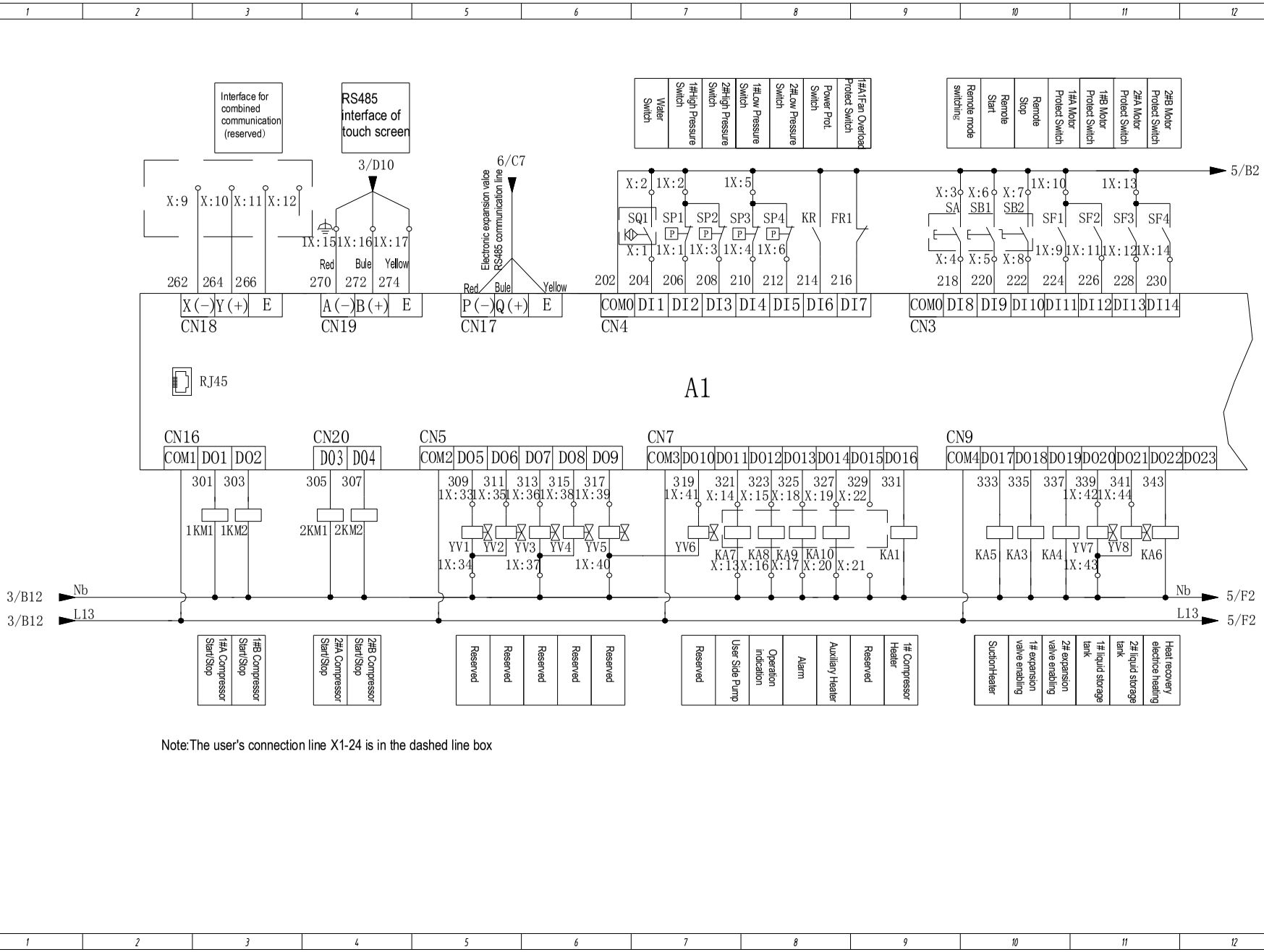
Place for instaling 6 fans



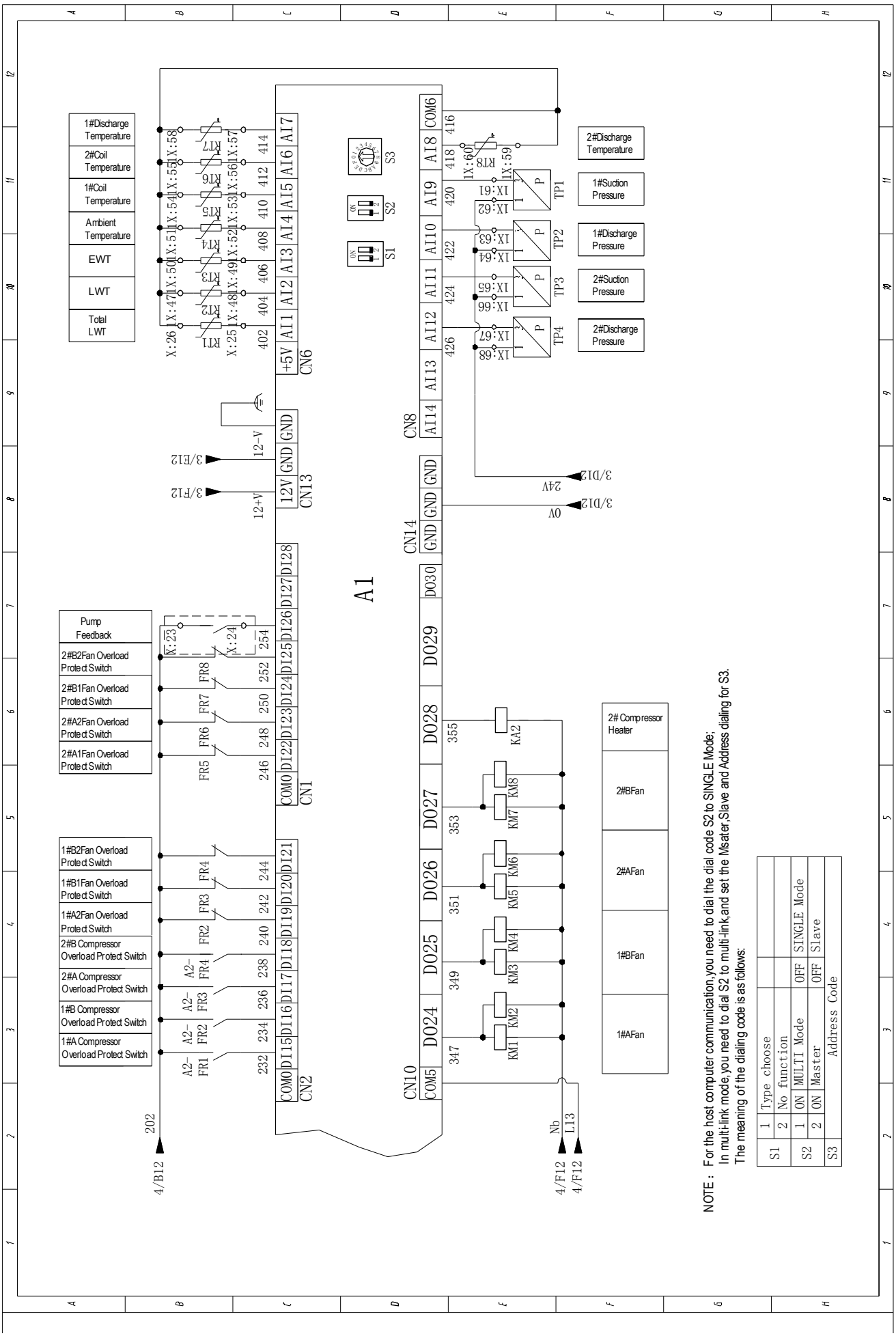
Place for instaling 8 fans

Technical requirements:
Power cable:1.5mm2
Other control cables
adopt 0.75mm2cables


2/B12
1L1
QF1
L11
T
L15
QF2
L17
1X:29
3X:1
SB
L13
1X:30
3X:2
Nb
2/B12
1L2
L12
Na
3X:3
1X:31
3X:4
1X:32
1/F1
1/F4
1/F7
4/F1
8/A8
1/F2
1/F4
1/F7
4/F1
8/A8
KA1
KA2
KA5
KA6
QF3
101
103
105
109
107
1X:23
1X:26
1X:27
1X:87
EH1
EH2
EH3
EH4
EH5
EH6
EH7
FAN1
M
1X:24
1X:25
1X:28
1X:88
HMI
24V 0V FG
COM2 232
RS485
Yellow 3X:7
Bule 3X:6
Red 3X:5
4/B4
UR1
UR2
UR3
220V
24V
12V
0V
24V
12-V
12+V
5/F8
6/B1
8/B1
5/B8
Display cabinet
Compressor electric heating of 1# system
Compressor electric heating of 2# system
Suction Heater
Heat recovery electrice heating
Cooling fan
Emergency stop button
Switching power supply
Touch screen
Switching power supply

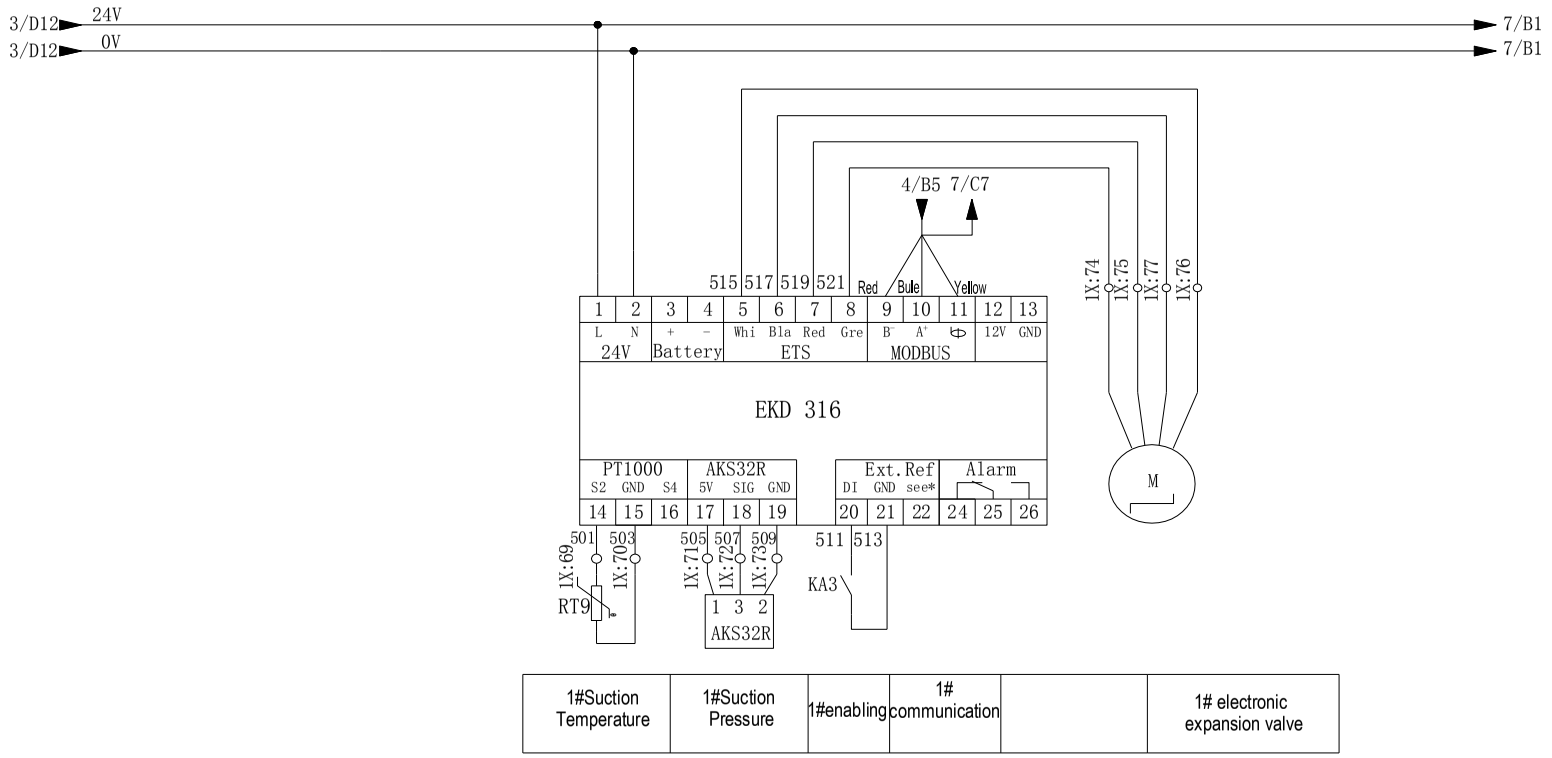


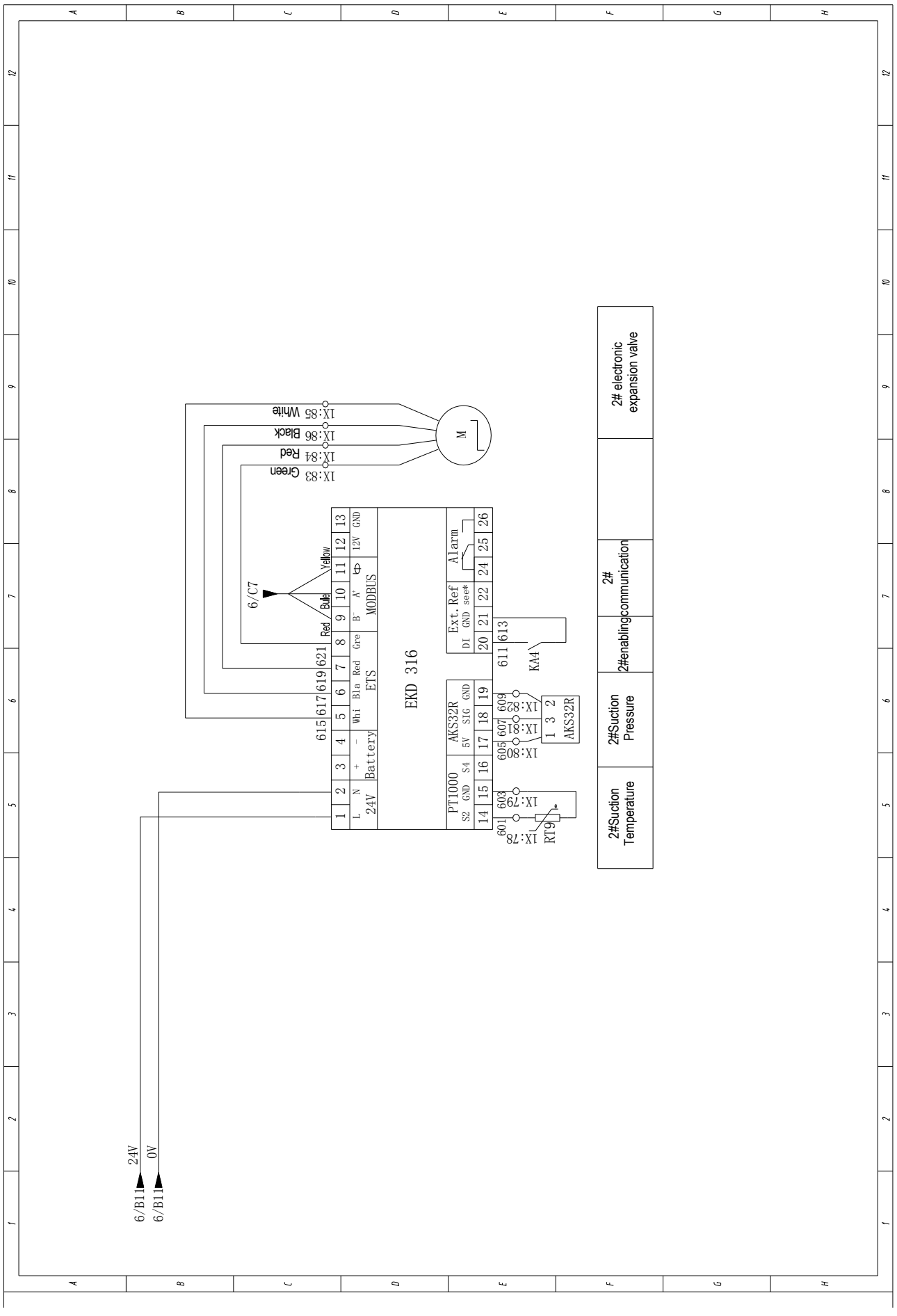
Note:The user's connection line X1-24 is in the dashed line box

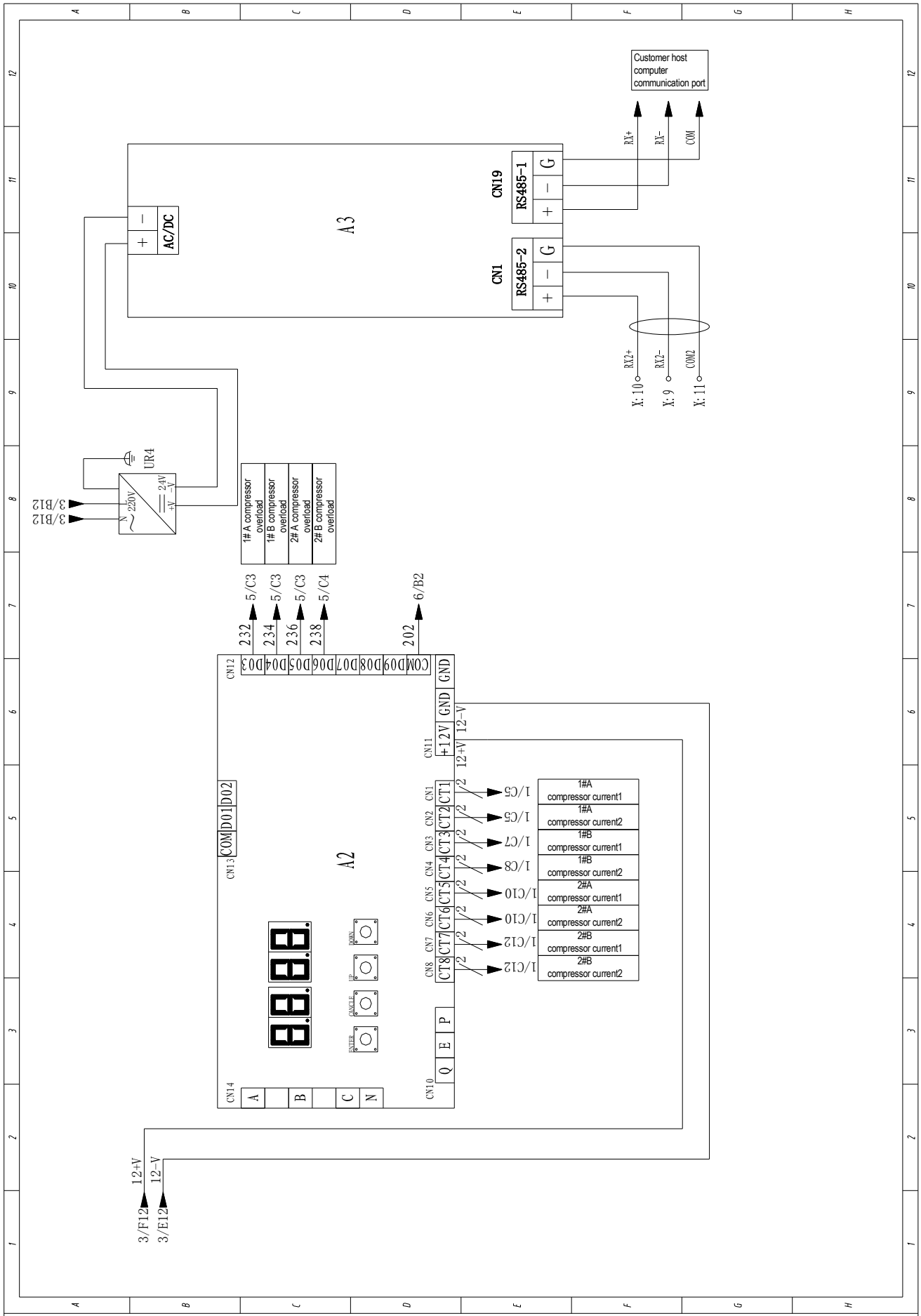


NOTE: For the host computer communication,you need to dial the dial code S2 to SINGLE Mode;
In multi-link mode,you need to dial S2 to multi-link,and set the Msater,Slave and Address dialing for S3.
The meaning of the dialing code is as follows:

S1	1	Type choose		
	2	No function		
S2	1	ON	MULTI Mode	OFF SINGLE Mode
	2	ON	Master	OFF Slave
S3	Address Code			


3/D12 24V
3/D12 0V
7/B1
7/B1
4/B5 7/C7
515 517 519 521
Red Bule Yellow
1X:74 1X:75 1X:77 1X:76
1 2 3 4 5 6 7 8 9 10 11 12 13
L N + - Whi Bla Red Gre B- A+ 485 12V GND
24V Battery ETS MODBUS
EKD 316
PT1000 AKS32R Ext.Ref Alarm
S2 GND S4 5V SIG GND DI GND see*
14 15 16 17 18 19 20 21 22 24 25 26
M
501 503 505 507 509 511 513
1X:69 1X:70 1X:71 1X:72 1X:73
RT9
KA3
1 3 2
AKS32R
1#Suction Temperature
1#Suction Pressure
1#enabling
1# communication
1# electronic expansion valve


6/B11 24V
6/B11 0V
EKD 316
L N 24V
1 2
+ - Battery
3 4
Whi Bla Red Gre ETS
615 617 619 621
5 6 7 8
Red Blue Yellow
9 10 11
B⁻ A⁺ MODBUS
12V GND
12 13
6/C7
IX:83 Green
IX:84 Red
IX:86 Black
IX:85 White
M
PT1000 S2 GND S4
14 15 16
603
IX:79
601
IX:78
RT9
AKS32R 5V SIG GND
17 18 19
605 607 609
IX:80 IX:81 IX:82
1 3 2
AKS32R
Ext.Ref D1 GND see*
20 21 22
611 613
KA4
Alarm
24 25 26
2#Suction Temperature
2#Suction Pressure
2#enablingcommunication
2# communication
2# electronic expansion valve


Customer host computer communication port
RX+
RX-
COM
CN19
RS485-1
CN1
RS485-2
A3
AC/DC
RX2+
RX2-
COM2
X: 10
X: 9
X: 11
UR4
3/B12
3/B12
1# A compressor overload
1# B compressor overload
2# A compressor overload
2# B compressor overload
5/C3
5/C3
5/C3
5/C4
6/B2
232
234
236
238
202
CN12
COM D09 D08 D07 D06 D05 D04 D03
GND
CN11
+12V GND
12+V
12-V
CN13
COM D01 D02
A2
CN14
A B C N
CN10
Q E P
ENTER
CANCLE
UP
DOWN
CN1 CT1 1/2
CN2 CT2 1/2
CN3 CT3 1/2
CN4 CT4 1/2
CN5 CT5 1/2
CN6 CT6 1/2
CN7 CT7 1/2
CN8 CT8 1/2
1/C5
1/C5
1/C7
1/C8
1/C10
1/C10
1/C12
1/C12
1#A compressor current1
1#A compressor current2
1#B compressor current1
1#B compressor current2
2#A compressor current1
2#A compressor current2
2#B compressor current1
2#B compressor current2
12+V
12-V
3/F12
3/E12

Note: For the RCAE230HA22 wiring diagram, see the wiring drawing of RCAE115HA22.

For the RCAE265HA22 wiring diagram, see the wiring drawings of RCAE115HA22 and RCAE150HA22.

For the RCAE300HA22 wiring diagram, see the wiring schematic for RCAE150HA22.

All the RCAE230HA22- RCAE300HA22 units are equipped with one communication cable for connecting two units. If the cable is not long enough, provide one yourself.

Cable positions for each model may vary without notice. For details, please refer to the circuit diagrams delivered with the systems.

WARNING!

To prevent casualties during wiring on the field, disconnect the power supply before the line is connected to the unit completely.

Table 1

Daily Inspection Record Table

Date	Ambient temperature (°C)	Inlet water temperature (°C)	Outlet water temperature (°C)	Discharge pressure (bar)	Suction pressure (bar)	Discharge temperature (°C)	Suction temperature (°C)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							

Note: The customer needs to fill in and keep this form properly. It can be copied for use.

Table 2

Inspection Record Table of Key Parts

Item	Compressor			Water side heat exchanger			Air side heat exchanger			Fan			Valves			Electric control box			Others		
Frequency	Date	Inspector	Content	Date	Inspector	Content	Date	Inspector	Content	Date	Inspector	Content	Date	Inspector	Content	Date	Inspector	Content	Date	Inspector	Content
6 months																					
1 year																					
2 years																					
3 years																					
4 years																					
5 years																					
6 years																					
7 years																					
8 years																					
9 years																					
10 years																					
11 years																					
12 years																					
13 years																					
14 years																					
15 years																					

Notes: 1. Fill A or B or C in each "Content" column, where A indicates the normal inspection result, B indicates that some parts are replaced, and C indicates that some parts are maintained.

2. Key points for inspection: ① Check the color of the compressor oil; ② Check the oil pressure difference; ③ Check the front and rear pressure difference of the dry filter and the test paper color of the sight glass

Note: The customer needs to fill in and keep this form properly. It can be copied for use.

Table 3

Maintenance Record

No.	Fault Description	Handling Measures	Handling Results	Recorded by
1				
2				
3				
4				
5				
6				
7				

Note: Fill in this form carefully and store it properly.

Table 4

Air Cooled Scroll Chiller						
Part name	Harmful substances					
	Plumbum (Pb)	Hydrargyrum (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Compressor and accessories	×	×	×	×	×	×
Fan/motor	×	O	×	O	O	O
Channel steel base	×	×	×	×	×	×
Heat exchanger	×	O	O	O	O	O
Pipeline parts and valve body	×	O	×	O	O	O
Refrigerant	O	O	O	O	O	O
Water pump (optional)	×	×	×	×	×	×
Electric control box	O	O	O	O	O	O
Electrical components, power cord, etc.	×	×	×	×	×	×
Fasteners such as screws and washers	×	O	O	O	O	O
Other rubber and plastic parts	×	×	×	×	×	×
Thermal insulation cotton and sound insulation cotton	O	O	O	O	O	O
Auxiliary materials such as glue and adhesive tape	×	×	×	×	×	×
Other metal parts	O	O	O	O	O	O
Printed matter	×	×	×	×	×	×

This table is prepared according to the provisions of SJ/T 11364.
O: indicates that the content of this harmful substance in all the homogeneous materials of this part is below the limit requirement defined in GB/T 26572.
×: indicates that the content of this harmful substance in at least one homogeneous material of this part exceeds the limit requirement defined in GB/T 26572. However, it is extremely hard to eliminate the above harmful substance from the part by relying on given existing technical conditions. The design will be improved gradually along with technical progress in the future.

INTENSITY®
AIR CONDITIONING

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Note: Product specifications change from time to time as product improvements and developments are released and may vary from those in this document.