P-K EvoHP™500
Installation & Owners Manual

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1 SAFETY PRECAUTIONS

Please read the safety precautions carefully and ensure that you fully understand the safety precautions, including the signs and symbols in this manual and follow the instructions during use to prevent damage to human health or property.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury

⚠ WARNING

WARNING indicates a potential hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury but may result in equipment or property damage only.

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS (or equivalent) signs indicate specific safety-related instructions or procedures.

Competence of service personnel

⚠ WARNING

- This equipment is not intended for use by persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the equipment by a person responsible for their safety.
- Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
- Safely dispose of packing materials such as nails and other metal or wood parts that could cause injuries.
- Ask your dealer or qualified personnel to perform installation work in accordance with this manual. Do not install the unit yourself. Improper installation could result in water leakage, electric shocks or fire
- Be sure to use only specified accessories and parts for installation work. Failure to use specified parts may result in water leakage, electric shocks, fire, or collapse from its mount.
- Install the unit on a foundation that can withstand its weight. Insufficient physical strength may cause the equipment to fall and possible injury.
- Perform specified installation work with full consideration of strong wind, hurricanes, or earthquakes. Improper installation work may result in accidents due to equipment falling.
- Make sure that all electrical work is carried out by qualified personnel according to the local laws and regulations. The manual switch should be installed on each individual circuit. Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks and fire.
- Be sure to install a ground fault circuit interrupter according to local laws and regulations. Failure to install the ground fault circuit interrupter may cause electric shocks and fire.
- Make sure all wiring is secure. Use the specified wires and ensure that terminal connections or wires are protected from water and other adverse external environment. Incomplete connection or affixing may cause a fire.
- When wiring the power supply, tidy the wires so that the front panel can be securely fastened. If the front panel is not in place there could be overheating of the terminals, electric shocks or fire.
- After completing the installation, make sure that there is no refrigerant leakage.
- Never directly touch any leaking refrigerant as it could cause severe frostbite.
- Do not touch the refrigerant pipes during or shortly after operation as the refrigerant pipes may be still too hot or too cold, which could lead to skin burns or frostbite. To avoid injury, leave the pipes return to normal temperature or wear protective gloves if you must touch the piping to complete the work.

- When wiring the power supply, tidy the wires so that the front panel can be securely fastened. If the front panel is not in place there could be overheating of the terminals, electric shocks or fire.
- Do not accelerate the defrosting process or clean manually, unless it is recommended by the manufacturer.
- The equipment shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas equipment or an operation electric heater.)
- Do not pierce or burn the unit.
- Be aware that refrigerants may not contain an odor.

⚠ NOTICE

- This heat pump unit contains fluorinated gasses. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself. Compliance with national refrigerant gas regulations shall be
- followed.
- Installation, service, maintenance and repair of this unit must be performed by a certified technician.
- Unit decommission and recycling must be performed by a certified technician.
- If the system has a leak-detection system installed, it must be checked for leaks at least every 12 months. When the unit is checked for leaks, proper record keeping procedures should be followed.

⚠ CAUTION

- Grounding the unit.
- Grounding resistance shall follow national and local laws and regulations.
- Do not connect the grounding wire to gas or water pipes, lightning conductors or telephone ground wires. Incomplete grounding may cause electric shocks.
  -Gas pipe: fire or an explosion might occur if the gas leaks.
  -Water pipes: hard vinyl tubes are not effective ground.
  -Lightning conductors or telephone grounding wires.
  -Electrical threshold may rise abnormally if struck by a lightning bolt.
- Install the power wire at least 3.3 feet (1 meter) away from televisions or radios to prevent interference or noise. Depending on the radio waves, 3.3 feet (1 meter) may not be sufficient to eliminate the noise and further clearance is required.
- Do not wash the unit by water as this may cause electric shocks or fire. The equipment must be installed in accordance with the national electrical codes and regulations. If the cable is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person to avoid a hazard.
- ·Do not install the unit in the following places:
  -where there is mist of mineral oil, oil spray or vapors. Plastic parts may deteriorate and cause possible loose or water leak.
  -where corrosive gases (such as sulfurous acid gas) are present, which could cause corrosion of copper pipes or soldered parts and therefore refrigerant leakage.
  -where there is machinery which emits electromagnetic waves. Electromagnetic waves can disturb the control system and cause equipment malfunction.
  -where flammable gases may leak, where carbon fiber or ignitable dust is suspended in the air, or where volatile flammables such as paint thinner or gasoline are handled. These types of gases might cause a fire.
  -where the air contains high levels of salt such as near the seaside.
  -where power supply voltage fluctuates a lot.
  -in vehicles or vessels.
  -where acidic or alkaline vapors are present.
- This equipment is intended to be operated by expert or trained technicians in shops, in light industry, or for commercial use.
- Disposal: Do not dispose this product as an unsorted municipal waste. Separate collection of such waste and special treatment is mandatory. Do not dispose of electrical components as municipal waste and use specialty recycling collection facilities. Contact your local government for information regarding the available collection facilities. If electrical components are disposed in landfills or dumps, hazardous substance can leak into the groundwater and get into the food chain, harming human's health and well-being.
- The wiring must be performed by professional technicians in accordance with national electrical wiring regulations and the circuit diagram in this manual. An all-pole disconnection device which has at least 3.5 mm separation distance in all poles, and a Residual Current Device (RCD) with the rating not exceeding 30 mA, shall be incorporated in the fixed wiring according to the national regulations.

- Confirm the safety of the installation area, i.e. walls, floors, etc., without potential dangers such as water, electricity, and gas before the wiring and piping works.
- Before installation, check whether the user's power supply meets the electrical installation requirements of unit, including reliable grounding, leakage, and wire diameter for the electrical load, etc. If any of the electrical installation requirements are not met, the installation shall be prohibited until all the issues are rectified.
- When installing multiple units in a centralized manner, balance the three-phase power supply loads to prevent multiple units being assembled into the same phase of the shared three-phase power supply.
- Final equipment installation should be fixed structurally safe and take reinforcement measures for seismic restraint as required by national or local laws and codes.

2 FLAMMABLE REFRIGERANT

2.1 Competence of Service Personnel

⚠ WARNING

Risk of fire: flammable refrigerant used.
Installation, repair, maintenance, decommission and disposal of the unit should be only performed by trained and certified service personnel.

Extra care and procedure are required for flammable refrigerant equipment installation, repair, maintenance and decommission.

The training should be carried out by the accredited national training organizations or manufacturers to meet the national code and standards requirements that may be set in legislation. The achieved competence should be documented by a certificate.

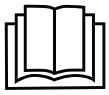
2.2 Flammable Refrigerants

⚠ WARNING

The following precautions should be complied with when installation, service, maintenance and repair, and decommissioning of equipment using flammable refrigerant.

This appliance employes A2L flammable refrigerant R32.

2.2.1 Symbol

	WARNING	This symbol indicates that this equipment uses flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire or explosion.
	CAUTION	This symbol indicates that the manual should be read carefully before installing or operating the equipment.
	CAUTION	This symbol indicates that only qualified service personnel should handle this equipment with reference to the technical manual.
	CAUTION	This symbol indicates that information is available such as the operating manual or installation manual.

⚠ WARNING

- Do not use means to accelerate the defrosting process or to clean the unit, other than the actions recommended by the manufacturer.
- The equipment shall be stored in a room without any continuously operating ignition source (for example: open flames, an operating gas appliance or an operating electric heater).
- Do not pierce or burn.
- Be aware that refrigerants might not contain an odor.

2.2.2 Installation

⚠ WARNING

Every working procedure that affects safety means shall only be carried out by competent personnel.

Examples for such working procedures are:

- breaking into the refrigeration circuit.
- opening of sealed components.
- opening of ventilated enclosures.

⚠ WARNING

The refrigerant pipe shall be protected from physical damage during installation, operation and service, and in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO, Uniform Mechanical Code, ICC International Mechanical Code, and CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

⚠ WARNING

- Safety devices, piping and fittings shall be effectively protected from adverse environmental effects, such as water collection, freezing in relief pipes, or the accumulation of dirt and debris.
- Provision shall be made for expansion and contraction of long piping runs.
- Piping in refrigerating systems shall be designed and installed to minimize the likelihood of hydraulic shock damaging the system.
- Steel pipes, fittings and components shall be protected against corrosion with a corrosion resistance coating before applying any insulation.

2.3 Servicing

2.3.1 General

⚠ CAUTION

Servicing shall be performed only by the trained and certified service personnel.

Work shall be undertaken under a controlled procedure to minimize the risk of a flammable gas or vapor being present while the work is being performed.

2.3.2 Safety Checks

Prior to beginning work on equipment containing flammable refrigerant, safety checks are necessary to ensure that the risk of ignition is eliminated or minimized. For repair to the refrigeration system, Section 1.4 shall be completed prior to conducting work on the system

2.3.3 Potable Water Source

⚠ CAUTION

If potable water is used for the water supply to the equipment, the source water supply shall be protected against backflow caused by the equipment.

2.3.4 Work Area

All maintenance staff and others working in the same local area shall be instructed on the nature of work being carried out. Works in confined spaces shall be avoided.

The area around the workspace shall be sectioned off. Ensure that the conditions within the work area have been made safe by control of flammable material.

2.3.5 Check for Presence of Refrigerant

The refrigerant concentration in the work area shall be checked with an appropriate refrigerant detector prior to and during the work, to ensure the technician is aware of any potential toxic and/or flammable gas present in the work area. Ensure that the leak detection equipment being used is suitable for use with the applicable refrigerant, i.e. non-sparking, adequately sealed or intrinsically safe.

2.3.6 Presence of Fire Extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. A dry powder or CO2 fire extinguisher should be readily available adjacent to the charging area.

2.3.7 No Ignition Sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work, shall use any source of ignition in such a manner that it can lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment shall be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

2.3.8 Ventilated Area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. The adequate continuous ventilation shall be provided during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

2.3.9 Check for the Refrigeration Equipment

Where electrical components are being changed, the replacement parts shall fit for the purpose and meet the required specifications. The manufacturer's maintenance and service guidelines shall be always followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be performed prior to any installation using flammable refrigerant:

- The refrigerant charge is within the limit based on the room size, in where the refrigerant containing parts are being installed.
- If an indirect refrigeration circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- Markings on the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
- Refrigeration piping or components are installed in a position where they are unlikely to be exposed to any substance that could corrode refrigerant containing components, unless the piping or components are constructed of materials which are inherently resistant to corrosion or are adequately protected against corrosion.

2.3.10 Check for Electrical Devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, no electrical power supply shall be connected to the circuit until the fault is cleared completely. If the fault cannot be corrected immediately but it is necessary to continue operation, a temporary alternate solution shall be used. This shall be reported to the owner and operator of the equipment, so all parties are advised.

Initial safety checks shall include:

- All capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- No live electrical components and wiring are exposed while charging, recovering or purging the system.
- that there is continuity of ground bonding.

⚠ CAUTION

Before removing the service panel and touching electric terminal parts, turn off power switch.

When service panels are removed, live parts can be easily touched by accident. Never leave the unit unattended during installation or servicing when the service panel is removed.
Do not touch water pipes during and immediately after operation as the pipes may be hot and could burn your hands. To avoid injury, leave the piping drip to room temperature or wear protective gloves.

Do not touch any switch with wet fingers. Touching a switch with wet fingers can cause electrical shock.

2.3.11 Repairs to Sealed and Intrinsically Safe Components

⚠ WARNING

Sealed electrical components shall be replaced. Intrinsically safe components must be replaced.

2.3.12 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also consider the effects of aging or continual vibration from sources such as compressors or fans.

2.3.13 Detection of Flammable Refrigerant

The potential sources of ignition shall not be used in the searching for or detection of refrigerant leaks under any circumstance. A halide torch leak detector or any other detector using a naked flame shall not be used.

The following leak detection methods are deemed acceptable for all the refrigerant systems.

- Electronic leak detectors may be used to detect refrigerant leaks. However, in the case of flammable refrigerant, the sensitivity may be inadequate, or it requires re-calibration for proper detection. Detection equipment shall be calibrated in a refrigerant-free area. Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the Lower Flammability Limit (LFL) of the refrigerant and shall be calibrated to the refrigerant used, and the appropriate percentage of gas (25 % maximum) is confirmed.
- Leak detection fluids are also suitable for use with most refrigerant but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipes.

NOTE: Other examples of leak detection methods are:

- bubble method,
- fluorescent agent method.

If a leak of a flammable refrigerant is suspected, all naked flames shall be removed or extinguished immediately.

If a leakage of refrigerant is found which requires brazing, all the refrigerants shall be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Section 1.7.

2.3.14 Refrigerant Removal and Circuit

⚠ CAUTION

Dry Oxygen Free Nitrogen (OFN) is an approved inert gas that could be used for flushing.

The system shall be flushed with OFN to render the unit safe. This process may need to be repeated several times.

OFN shall be used to purged through the system both before and during the brazing process.

⚠ CAUTION

This operation is vital if brazing operations on the pipework are to take place.

When breaking into the refrigerant circuit to make repairs - or for any other purpose – the conventional procedures shall be followed. However, for flammable refrigerants, it is important that best practice be followed, since flammability is a consideration.

The following procedure shall be adhered to:

- safely remove refrigerant following local and national standards and regulations.
- evacuate.
- continuously flush with inert gas when using flame to open circuit.
- open the circuit.

The refrigerant charge shall be recovered into the dedicated recovery cylinders.

The refrigerant charge shall be recovered into the dedicated recovery cylinders if venting is not allowed by local and national codes. For equipment containing flammable refrigerant, the system shall be purged with oxygen-free nitrogen to make the system safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For equipment containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and adequate ventilation shall be provided.

2.3.15 Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed:

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already labeled).
- Extra care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system, it shall be pressure tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

2.3.16 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is a recommended good practice that all refrigerants are recovered safely. Prior to carrying out the tasks, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

a. Be familiar with the equipment and its operation.

b. Isolate system electrically.

c. Before starting the procedure, ensure that:

   i. Mechanical handling equipment is available, if required, for handling refrigerant cylinders.

   ii. All personal protective equipment is available and being used correctly.

   iii. The recovery process is always supervised by competent personnel.

d. Pump down refrigerant system, if possible.

e. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f. Make sure that the recovery cylinders are situated on the scales before recovery takes place.

g. Start the recovery machine and operate in accordance with the instructions.

h. Do not overfill cylinders (no more than 80 % volume liquid charge).

i. Do not exceed the maximum working pressure of the cylinder, even temporarily.

j. When the cylinders have been filled correctly and the process has completed, make sure that the cylinders and the equipment are removed from site promptly and all the isolation valves on the equipment are completely closed off.

k. Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

2.3.17 Labeling

Equipment shall be labeled stating that it has been de-commissioned and the refrigerant has been emptied. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

2.3.18 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is required to follow the good practice so that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and the labeled for that refrigerant. Cylinders shall be completed with pressure relief valve and associated shut off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

2.4 Transportation, Marking and Storage for Flammable Refrigerant Equipment

The following information is provided for units that employ FLAMMABLE REFRIGERANTS.

2.4.1 Transportation

Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable transport regulations.

2.4.2 Marking

Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.

All required signs are to be maintained, and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs.

The effectiveness of signs should not be diminished by too many signs being placed together.

Any pictograms used should be as simple as possible and contain only essential details.

2.4.3 Storage

The storage of the equipment should be in accordance with the applicable regulations or instructions, whichever is more stringent.

Equipment package protection should be constructed in such a way that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.

The maximum number of pieces of equipment permitted to be stored together will be determined by local and/or national regulations.

2.4.4 Disposal

Refer to the local and national regulations.

3 System Description

3.1 Documentation

Always observe all the operating and installation instructions included with the system components.
Hand these instructions and all other applicable documents to the end user. This document is part of a documentation set. The complete set consists of:

- Installation Manual
  Preparation for the installation, good practices.
  Format: paper (in the box of the outdoor unit)
- Operation Manual (wired controller)
  Quick guide for basic usage.
  Format: paper (in the box of the outdoor unit)

3.2 Transportation and Storage

NOTICE

- Improper transportation may damage the product.
- After storage for more than half a year, the water side heat exchanger should be checked every three months for leakage.

⚠ CAUTION

- Do not store near heat sources or in direct sunlight. No open storage.
- No fire source, high temperature equipment and pressurized gas tanks are allowed to approach to prevent personal injury caused by explosion at high temperature.
- This product should be stored at room temperature.

3.3 Arrival and Unboxing

NOTICE

- After receiving the machine, please check the machine for transportation damage. If any damage is found, it should be reported to the transport company immediately in writing.
- After receiving the machine, please check whether the model, specification and quantity of the equipment are consistent with the contract; When unpacking, please take good care of the instructions and count the attachments.
- In case of problems, please contact your local supplier.
- We will not be responsible for any modification of the equipment without our written consent.

3.4 Dimensions

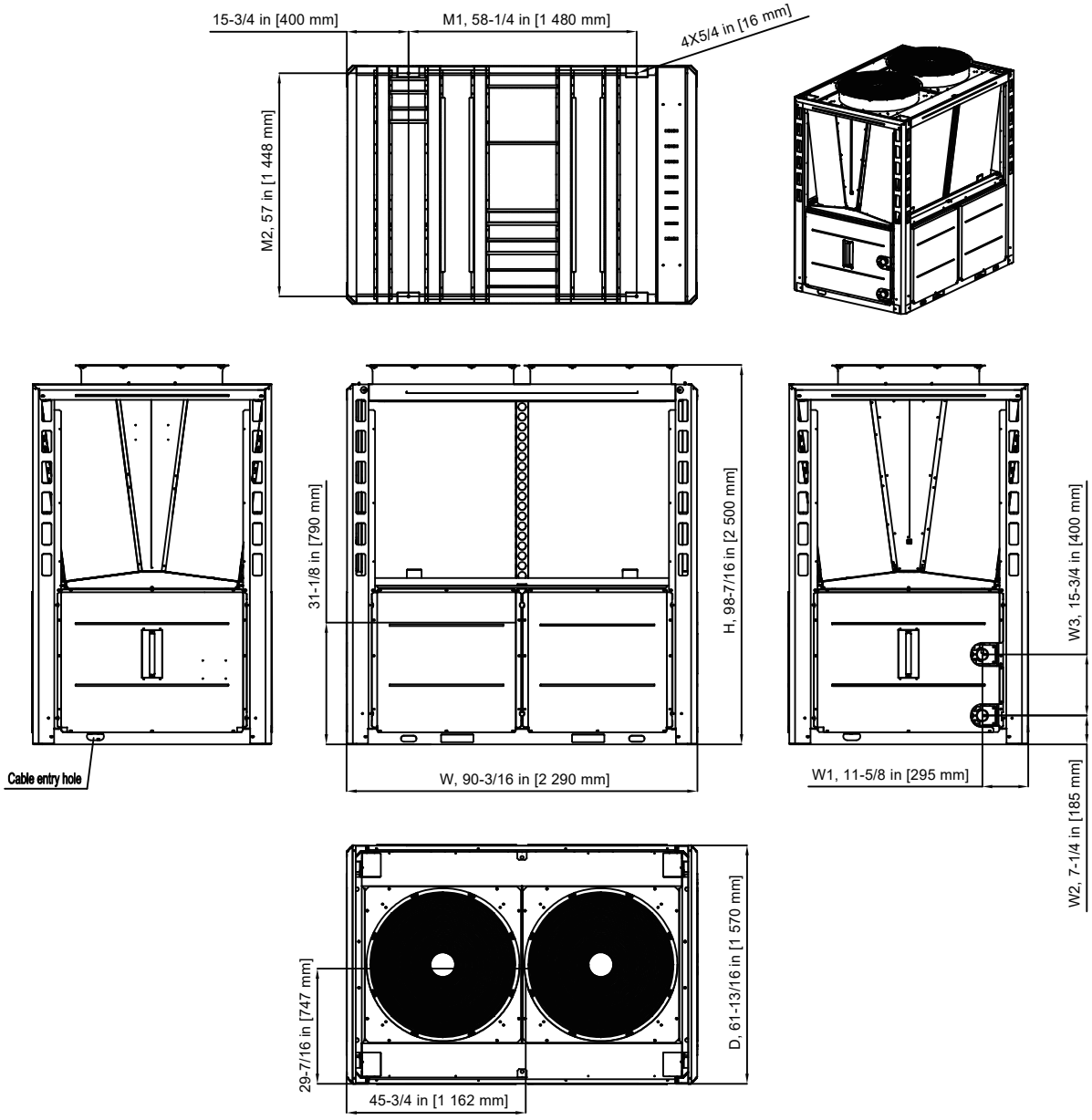


Figure 3.1 Unit Dimensions

Table 3.1 Unit Dimensions

Dimension: inch (mm)			
Width, W	Depth, D	Height, H	Water Inlet, W1
90-3/16” (2,290 mm)	61-13/16” (1,570 mm)	98-7/16” (2,500 mm)	11-5/8” (295 mm)
Water Inlet, W2	Water Outlet, W3	Mounting Hole, M1	Mounting Hole, M2
7-1/4” (185 mm)	15-3/4” (400 mm)	58-1/4” (1,480 mm)	57” (1,448 mm)

NOTICE

After installing the spring damper, the total height of the unit will increase by 5-5/16” (135 mm) in approximately.

3.5 Major Components

Table 3-2

NO.	NAME	NO.	NAME
1	Air outlet	6	Heat exchanger
2	Top cover	7	Water outlet
3	Electric control box	8	Air inlet
4	Compressor	9	Water inlet
5	Plate heat exchanger	10	Wired controller (It can be placed indoors)

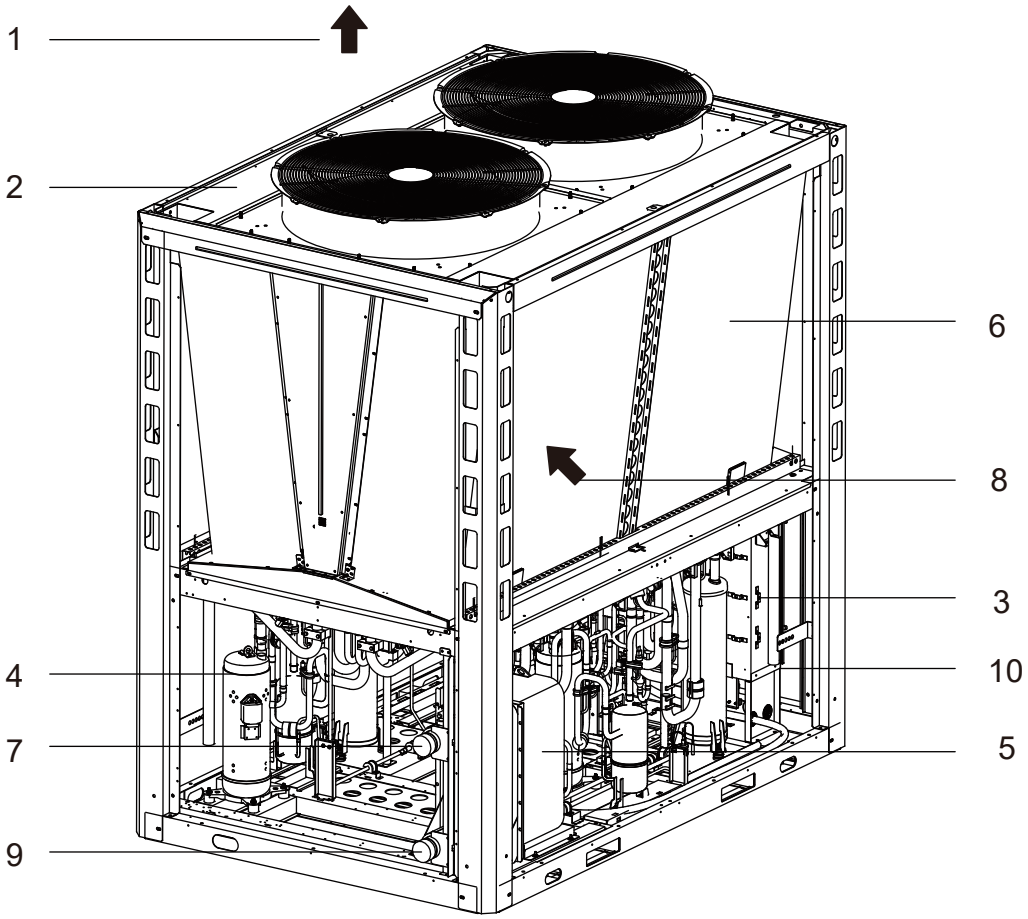


Figure 3.2 Major Components

3.6 Opening the Unit

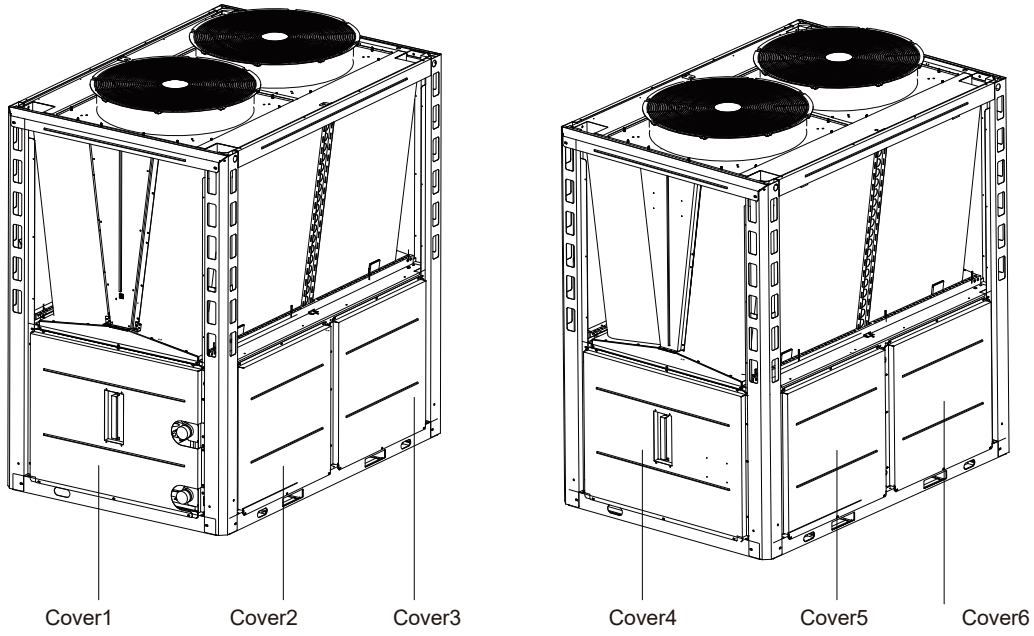


Figure 3.3 Unit Access Cover

Cover 1/2/3 give access to the compartment of water pipes and water side heat exchanger.

Cover 4 give access to the electrical parts.

Cover 5/6 give access to the hydraulic component.

3.7 Operating range

1) The standard voltage of power supply is 460 V 3~ 60 Hz, the minimum allowable voltage is 414 V, and the maximum voltage is 506 V.

2) To maintain better performance, please operate the unit under the following outdoor temperature:

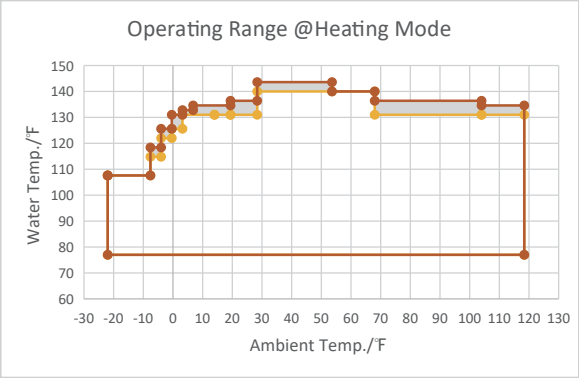


Fig. 3-4-1 Cooling operating range

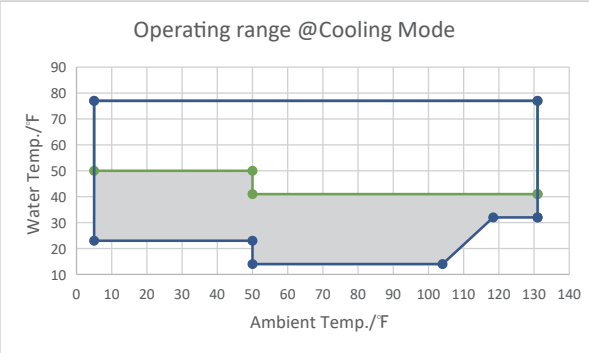


Fig. 3-4-2 Heating operating range

3) Cooling
If the unit is operating in a the temperature range with shadow, the antifreeze system must be used instead of the water system, and the antifreeze (especially the glycol solution) must meet the following two requirements at the same time:
① Volume concentration ≥30%
② The freezing point temperature of antifreeze < (coldest temperature at the usage site -10 °F). Otherwise, the water side pipes and heat exchanger may be frozen!
Tsafe is set to 14 °F in the low water output control in service menu of the wired controller, allowing the unit to enter the cooling low water output mode control to obtain water output below 32 °F.
When switching from the antifreeze system to the water system, the Tsafe must be changed to 41 °F to avoid freezing of the water side pipes and heat exchanger!

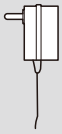
4) Heating
If the unit is operating in the temperature range with shadow, the dial code S1-2 needs to be set to ON. The frequency conversion water pump needs to be matched, and the minimum water flow of the water pump should be able to be as low as 45.3 gpm.

NOTICE

The minimum operating environment temperature of the customized central drainage model is -22 °F. Operating below this temperature may cause central drainage failure or even damage the machine.

3.8 Accessories

Table 2-3

Unit	Installation manual	Temperature testing components of total water outlet	Transformer (Input voltage: 208-230 V ~60 Hz)	Installation manual of wired controller	Water Temperature Sensor	Wired Controller
Quantity	1	1	1	1	1	1
Shape						
Purpose	/	Use for installation (only need for setting the main module)				

There is a transformer in the attachment package, which is only suitable for the input voltage range of 414 V-506 V~ 60 Hz.

3.9 Handling the Unit

The angle of inclination should not be more than 15º when carrying the unit to prevent overturn of the unit.

1) Rolling: several rolling rods of the same size are placed under the base of the unit, and the length of each rod must be more than the outer frame of the base and suitable for balancing of the unit.

2) Lifting: each lifting rope (belt) should be able to bear 4 times the weight of the unit. Check the lifting hook and ensure that it is firmly attached to the unit. To avoid damages to the unit, a protective block made of wood, rubber, cloth or hard paper should be placed between the unit and rope when lifting, and its thickness should be 1-31/32 in (50 mm) or more. It is strictly forbidden to stand under the unit when it is hoisted off the ground.

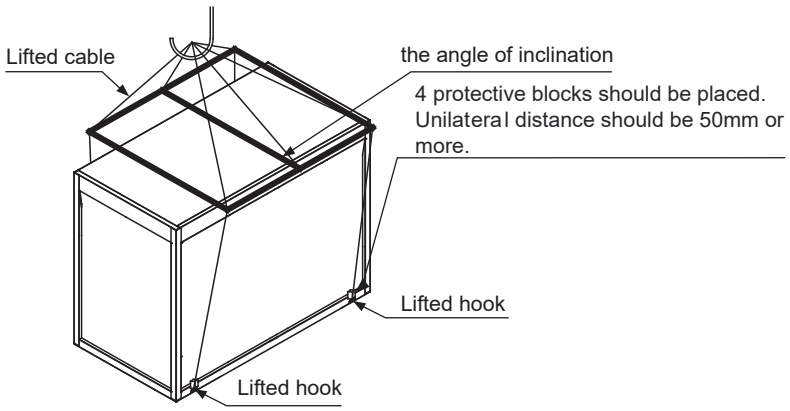


Figure 3.6 Lifting the Unit

4 IMPORTANT INFORMATION ON REFRIGERANT

This product contains fluorinated greenhouse gas covered by the Kyoto Protocol.
Do not vent gases into the atmosphere.
Refrigerant type: R32
Global Warming Potential (GWP) value: 675
The refrigerant volume is indicated on the unit nameplate.

Table 4.1 Refrigerant Charge and Greenhouse Gas Emission

Model	Total Charge ①+②, lbs (kg)	Factory Charge, lbs (kg)	Additional Charge, lbs (kg)	Tonnes CO_2 Equivalent
HP500	48.5 (22)	12.125 (5.5) / 12.125 (5.5)	12.125 (5.5) / 12.125 (5.5)	14.85

5 INSTALLATION

5.1 Installation Site

1) Units can be installed on the ground or on a roof, provided that sufficient ventilation can be guaranteed.

2) Do not install the unit in an area that noise and vibration requirements cannot be met.

3) When installing the unit, take measures to avoid exposure to direct sunlight, and keep the unit away from gas equipment flue exhaust which might corrode the condenser coil and copper pipes.

4) If the unit is located where it may be accessed by unauthorized personnel, take protective measures for safety considerations, such as fences with locks. These measures can prevent man caused or accidental injuries and can also prevent the electrical parts in operation from being exposed when the main control box is opened.

5) Install the unit on a house keeping pad at least 7-7/8 in (200 mm) high above the surrounding ground and provide a floor drain if needed, to ensure that no water will accumulate around or inside the unit.

6) If installing the unit on the ground, the steel base should be securely attached to a minimum 7-7/8 in (200 mm) high concrete house keeping pad, which must be sitting on the solid soil foundation that is structurally sound for the weight and operation of the unit. Ensure the house keeping pad is separated from buildings, as the noise and vibration of the unit may adversely affect the building structure. The unit can be fastened on the foundation securely through the installation holes on the unit base.

7) If the unit is installed on a roof, the roof must be structurally safe to bear the weight of the unit and the weight of maintenance personnel. The unit can be placed on the concrete or steel frame roof curb, like the case when the unit is installed on the ground. The weight bearing roof curb must match the installation holes and accommodate the installation of the shock absorbers.

8) For other special requirements for installation, please consult the structural engineer, architect, acoustic consultants or other professionals.

NOTICE

The selected installation site of the unit should facilitate connection of water pipes and wires, and be free from oil fume, gas flue, steam or other heat sources. The noise and vibration of the unit and discharge air should not adversely affect the surrounding environment.

5.2 Clearance

1) To ensure adequate airflow entering the condenser, the influence of descending airflow caused by the high-rise buildings around the unit should be considered when installing the unit.

2) If the unit is installed where the airflow speed is high, such as on the exposed roof, fencing and screening could be utilized to prevent the turbulent flow from disturbing the air entering the unit. If the unit needs to be surrounded with fence or screen, the fence or screen should not be higher than the unit. The fence or screen should have at least 60% free area to ensure adequate airflow through the coils.

3) If the unit needs to operate in winter and the installation site may be covered by snow, the unit should be installed higher than the potential accumulated snow depth, to ensure adequate airflow through the coils.

4) The clearance around the unit from the fence, screen or adjacent structures should be maintained as illustrated in the figure below:

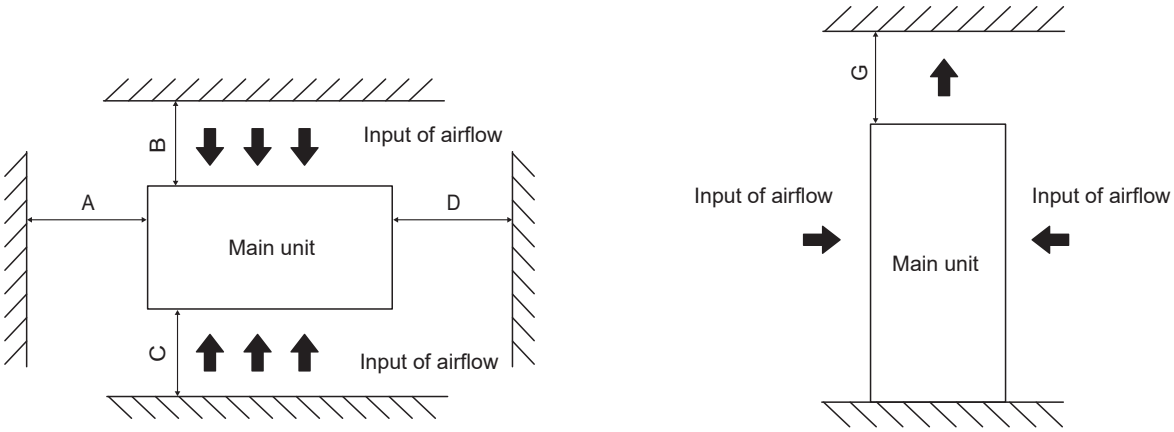


Figure 5.1 Single Unit Installation Clearance

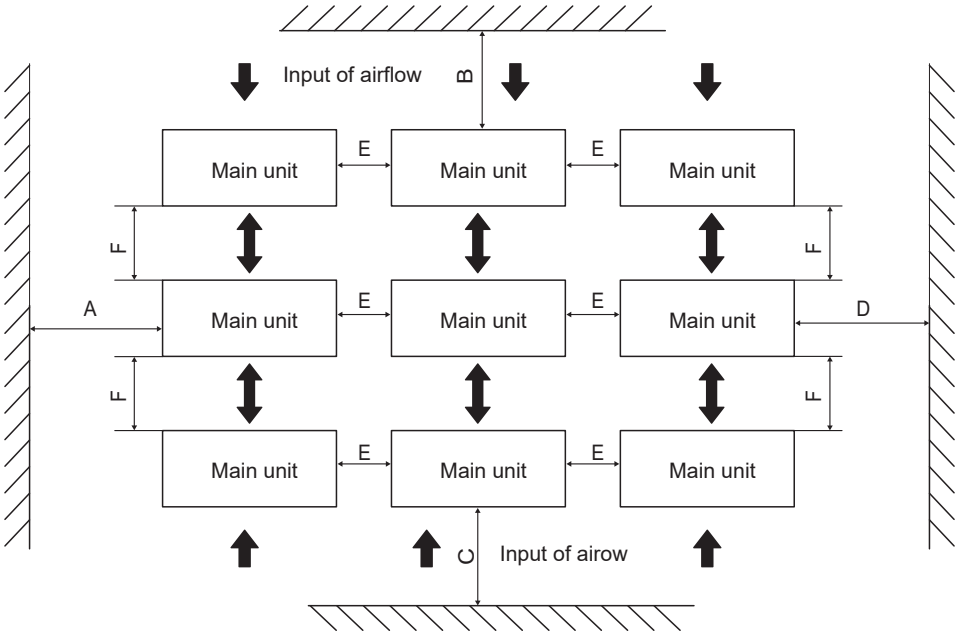


Figure 5.2 Multiple Unit Installations Clearance

Table 5.1 Unit Dimensions

Minimum Clearance Requirement						
A	B	C	D	E	F	G
59-1/16” (1,500 mm)	59-1/16” (1,500 mm)	59-1/16” (1,500 mm)	59-1/16” (1,500 mm)	31-1/2” (800 mm)	0 (0)	118-1/8” (3,000 mm)

⚠ WARNING

When the number of units installed in the same place is greater than 40 units, please contact manufacturer to confirm the installation method.

5.3 Installation Foundation

5.3.1 Base Structure

Outdoor unit base structure should be designed with the following considerations:

1) A solid base prevents excess vibration and noise. Outdoor unit base should be constructed on solid ground or on structures of sufficient strength to support the weight of the unit.

2) The unit base should be at least 200 mm high to provide sufficient access for installation of piping. Water and snow protection should also be considered for the base height.

3) Either steel or concrete bases may be suitable, and it should be designed by a professional structural engineer.

4) The bottom frame of the unit is not allowed to be embedded into the concrete of installation foundation.

5) A typical concrete base design is shown in Figure 5.3. The edges of the base should be chamfered.

6) To ensure that all contact points are equally secured, the unit base should be completely level. Base design should ensure that all the points on the unit base designed for bearing the unit weight are fully supported.

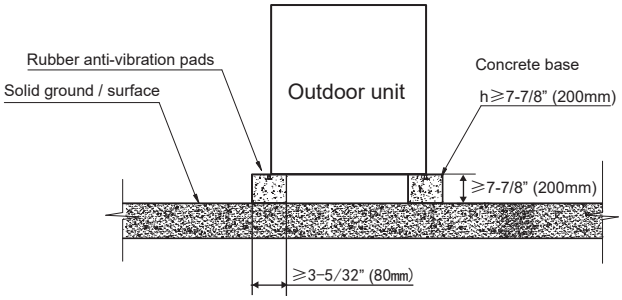


Figure 5.3 Base Structure

5.3.2 Access and Drainage

1) If the unit is located so high that it is inconvenient for maintenance personnel to conduct maintenance, a scaffold designed by a professional structural engineer can be installed around the unit for access.

2)The scaffold must be able to bear the weight of maintenance personnel and maintenance facilities.

3) A permanent drainage system should be provided to properly discharge the condensate that may form on the heat exchangers and coils when the units are running in heating mode. The drainage system should ensure that condensate is directed away from the pathways for vehicle and foot traffic, especially in locations where it is subject to freezing, which could cause slipping hazard.

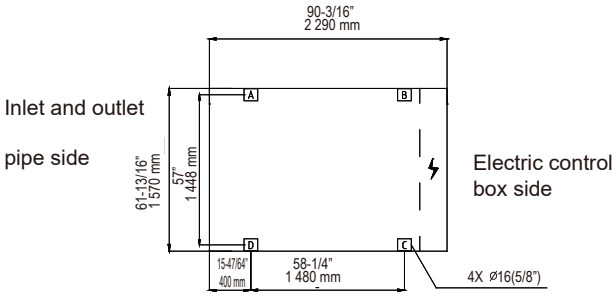
5.4 Vibration Damping Devices

5.4.1 Requirement

Damping devices must be provided between the unit and its foundation.

By means of the Φ16mm diameter installation holes on the steel frame of the unit base, the unit can be fastened on the foundation through the spring damper. See Figure 5.4 for details about center distance of the installation holes.

The vibration damping device does not come with the unit, and the user can select the damper according to the applicable local codes and requirements. When the unit is installed on the high roof or the area sensitive to vibration, please consult the relevant professionals before selecting the damper.



(Unit: inch/mm)

Figure 5.4 Anchor Locations

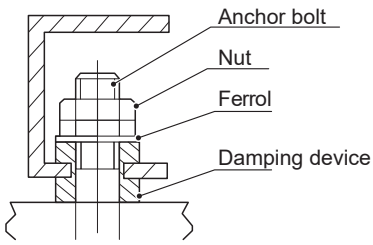


Figure 5.5 Damping Device Installation

5.4.2 Installation Steps

Step 1: Make sure that the level of the concrete foundation is within ±3 mm and place the unit on the cushion block.

Step 2: Remove the clamp nuts of the damping device and fix the damping device to the foundation. Make sure align the damping device bolt holes with the mounting holes on the unit base.

Step 3: Raise the unit to the height suitable for installation of the damping device and place the unit onto the damping device.

Step 4: Return the clamp nuts of the damping device to the mounting holes on the unit base and tighten them into the damper.

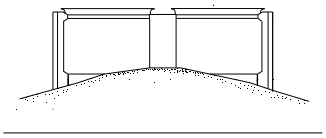
Step 5: Adjust the operational height of the damping device, and screw down the leveling bolts. Tighten the bolts by one circle to ensure equal height adjustment variance of the damper.

Step 6: The lock bolts can be tightened after the correct operational height is reached.

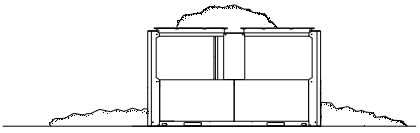
5.5 Snow and Wind Protection

When installing an air-cooled heat pump in a place with heavy snow, it is necessary to take snow protection measures to ensure trouble-free operation of the equipment. Otherwise, the accumulated snow will block the air flow and may cause equipment operation issues.

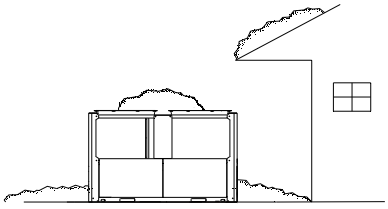
(a) Buried in the snow



(b) Snow accumulated on the top plate

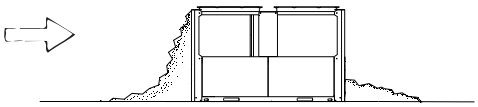


(d) Snow falling on the equipment



(d) Air inlet blocked by snow

wind with snow



(e) Equipment covered with snow

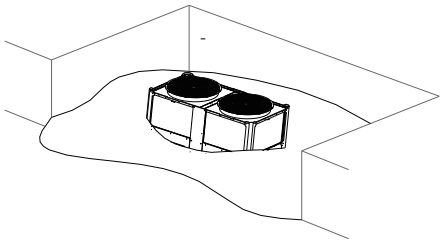


Figure 5.6 Snow Caused Issues

5.5.1 Snow Prevention Measures

Check the installation site thoroughly. Do not install the equipment under awnings, trees, or a place where the snow will be piled up.

The unit house keeping base should be set at least 4” (100 mm) higher than the predicted snow depth in the local area.

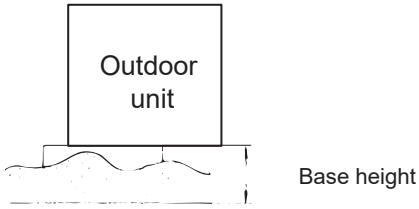


Figure 5.7 Snow Prevention Base Height

5.5.2 Snow Cover Design Precautions

1) To ensure sufficient airflow required by the air-cooled heat pump, design a protective cover to make the airflow resistance to a maximum of 1 mm H2O column lower than the allowable external static pressure of air-cooled heat pump.

2) The protective cover must be strong enough to withstand the snow weight and the forces caused by strong wind, typhoon or earthquake according to the local code.

3) The protective cover must not cause short circuit of air discharge and suction.

6 Hydronic System

6.1 Water System Diagram

Legend:

Water flow switch	Gate valve	Safety valve	Drain valve	Auto vent valve
Soft joint	Water pump	Shut off valve	Temperature sensor	Solenoid three-way valve
Water pressure meter	Check valve	Thermometer	Y-type strainer	

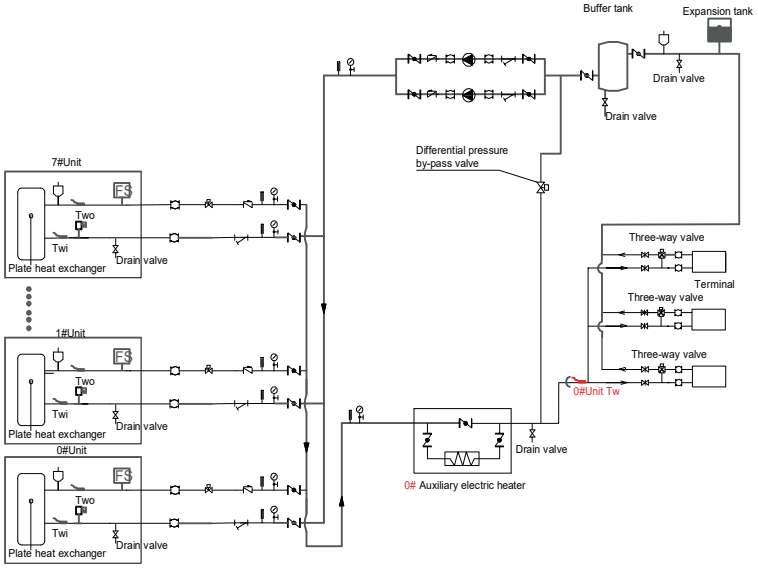


Figure 6.1 Primary Pump System with Buffer Tank (S1-3 OFF)

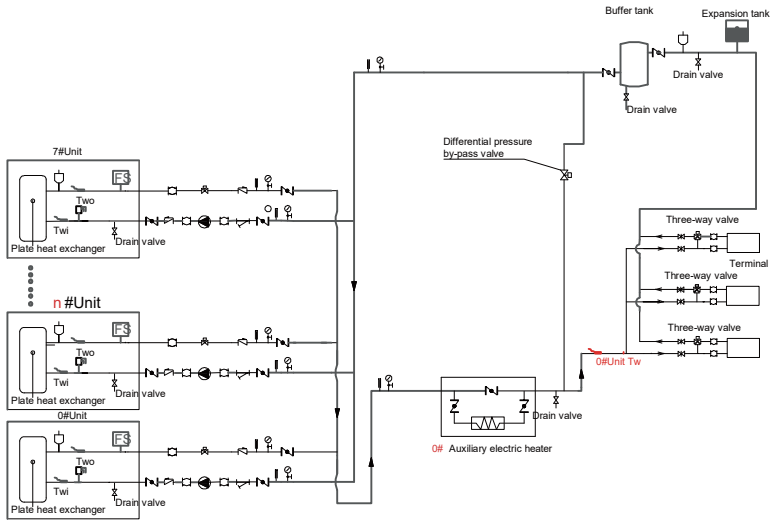


Figure 6.2 Primary Pump System with Buffer Tank (S1-3 ON)

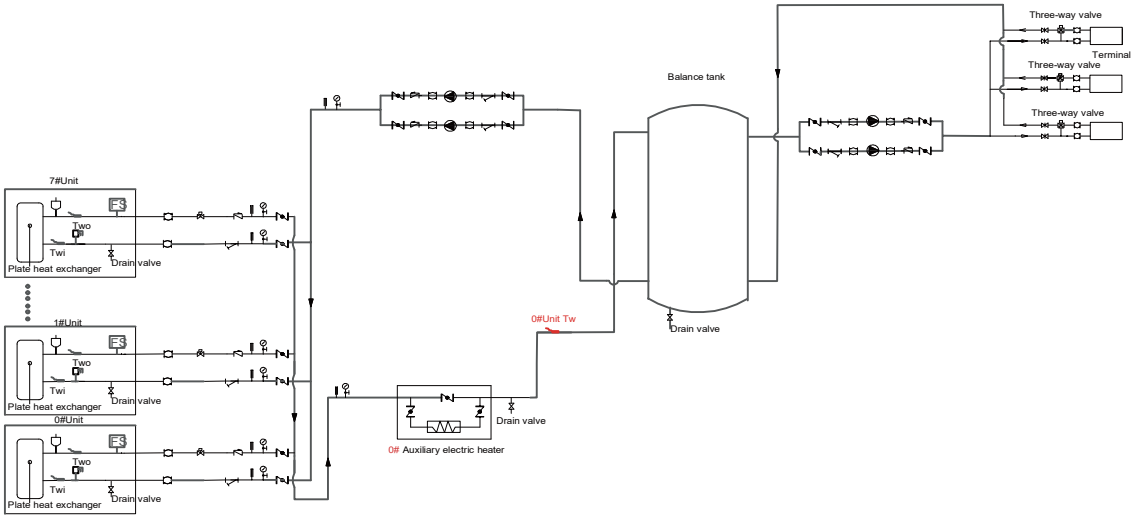


Figure 6.3 Secondary pump system with buffer tank *(S1-3 ON)*

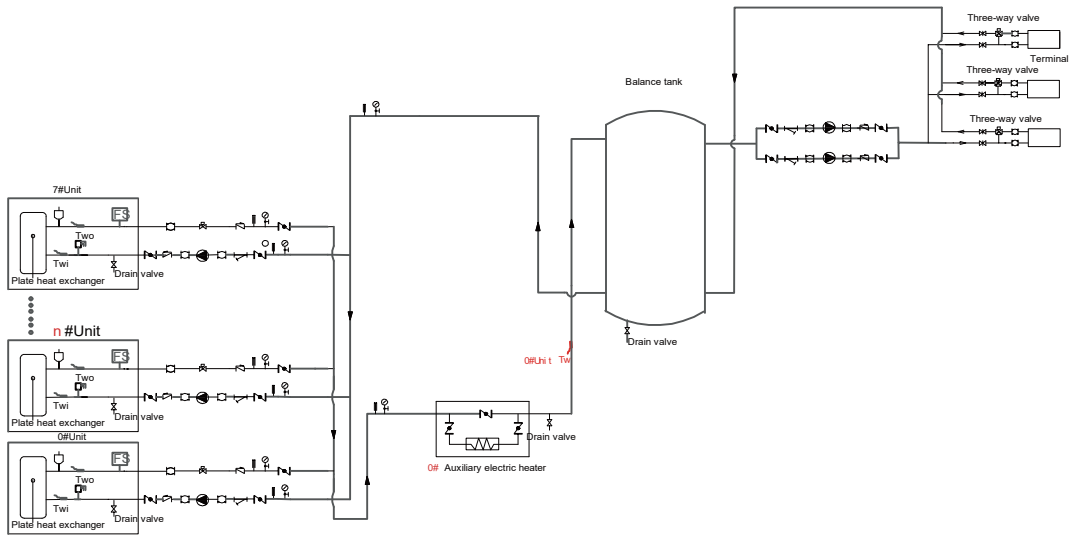


Figure 6.4 Secondary Pump System with Buffer Tank (S1-3 ON)

⚠ WARNING

To avoid backflow contamination, it is required to install a backflow preventer on the water inlet of the domestic hot water tank or water loop in accordance with the local applicable laws and codes.

NOTICE

The ratio of the two-way valves on the terminal shall not exceed 50 percent. The main outlet water temperature sensor (TW) of the unit at address “0” needs to be placed on the main outlet pipe.

6.2 Water System Installation

1) Failure to comply with the installation requirements for water systems may result in equipment damage.

2) Equipment damage resulting from this is not covered by the equipment warranty.

6.2.1 Heating and Chilled Water Piping System

⚠ WARNING

- After the unit is installed in place, heating or chilled water piping installation can be started.
- The relevant installation regulations should be followed with when conducting connection of water pipes.
- The pipes should be free of any impurity, and all the water pipes must conform to local standards and regulations.

Connection requirements of heating or chilled water pipes:

1) Prior to operating the unit, all heating or chilled water pipes should be thoroughly flushed and free of any impurity. Any impurity should not be flushed into the heat exchanger.

2) Water must enter the heat exchanger through the inlet port; otherwise, the performance of the unit will be compromised.

3) The external pump installed in the water piping system should be equipped with a starter or a variable frequency drive.

4) The pipes, accessories and connections must be independently supported but should not be supported on the unit.

5) The pipes and the connections to the heat exchanger should be easily accessible for maintenance and cleaning, as well as inspection for the evaporator coils.

6) The evaporator should be provided with a strainer with more than 40 meshes per inch at the site. The strainer should be installed as near to the inlet port as possible.

7) The by-pass pipes and by-pass valves must be installed for the heat exchanger, to facilitate cleaning of the external water piping system. During maintenance, the water through any of the heat exchangers can be isolated without affecting the operation of other heat exchangers.

8) The flexible hose connectors should be used between the interface of the heat exchanger and the external piping system, to isolate the vibration from the building system.

9) To facilitate maintenance, the inlet and outlet pipes should be provided with thermometer and manometer. The unit is not equipped with pressure and temperature instrument, so they need to be provided separately by the user.

10) All low points of the water system should be provided with drainage ports, to drain water in the evaporator and the system completely; and all high positions should be supplied with air vent valves, to facilitate expelling air from the piping system. The air vent valves and drainage ports should not be covered by insulation for easy maintenance access.

11) All the heating or chilled water pipes in the system shall be adequately insulated with continuous vapor barriers, including inlet pipes and flanges of the heat exchanger.

12) The outdoor heating or chilled water pipes should be wrapped with heat trace cables, and the material of the heat trace should be PE, EDPM, etc., with thickness of 25/32 in (20 mm), to prevent the pipes from freezing and thus cracking under freezing temperature. The power supply of the heating trace should be equipped with an independent fuse.

13) The common outlet pipelines of combined units should have temperature sensor for the mixed water temperature.

⚠ WARNING

- For the water piping network including strainers and heat exchangers, dreg or dirt may seriously damage the heat exchangers and water pipes.
- The installation persons or the users must ensure the quality of heating or chilled water, The de-icing salt mixtures and air should be excluded from the water system, since they may oxidize and corrode steel parts inside the heat exchanger.
- When the ambient temperature is lower than 35.6 °F (2 °C) and the unit will be not used for a long time, the water inside the unit should be drained.
- If the unit is not drained in winter, its power supply should not be cut off, and the fan coils in the water system must be provided with three-way valves, to ensure proper circulation of the water system when the anti-freezing solution is used in winter.
- If cooling mode is activated at ambient temperatures below 41 °F (5 °C), antifreeze should be added to the water system. Refer to the instructions in Section 3.7 for the antifreeze concentration. At the same time, the wired controller should be set to low water temperature mode.

6.2.2 Water and Drainage Pipe Connections

The water inlet and outlet pipes are installed and connected as shown in the following figures.
HP500 model uses a 2-1/2(DN65) NPT connection.

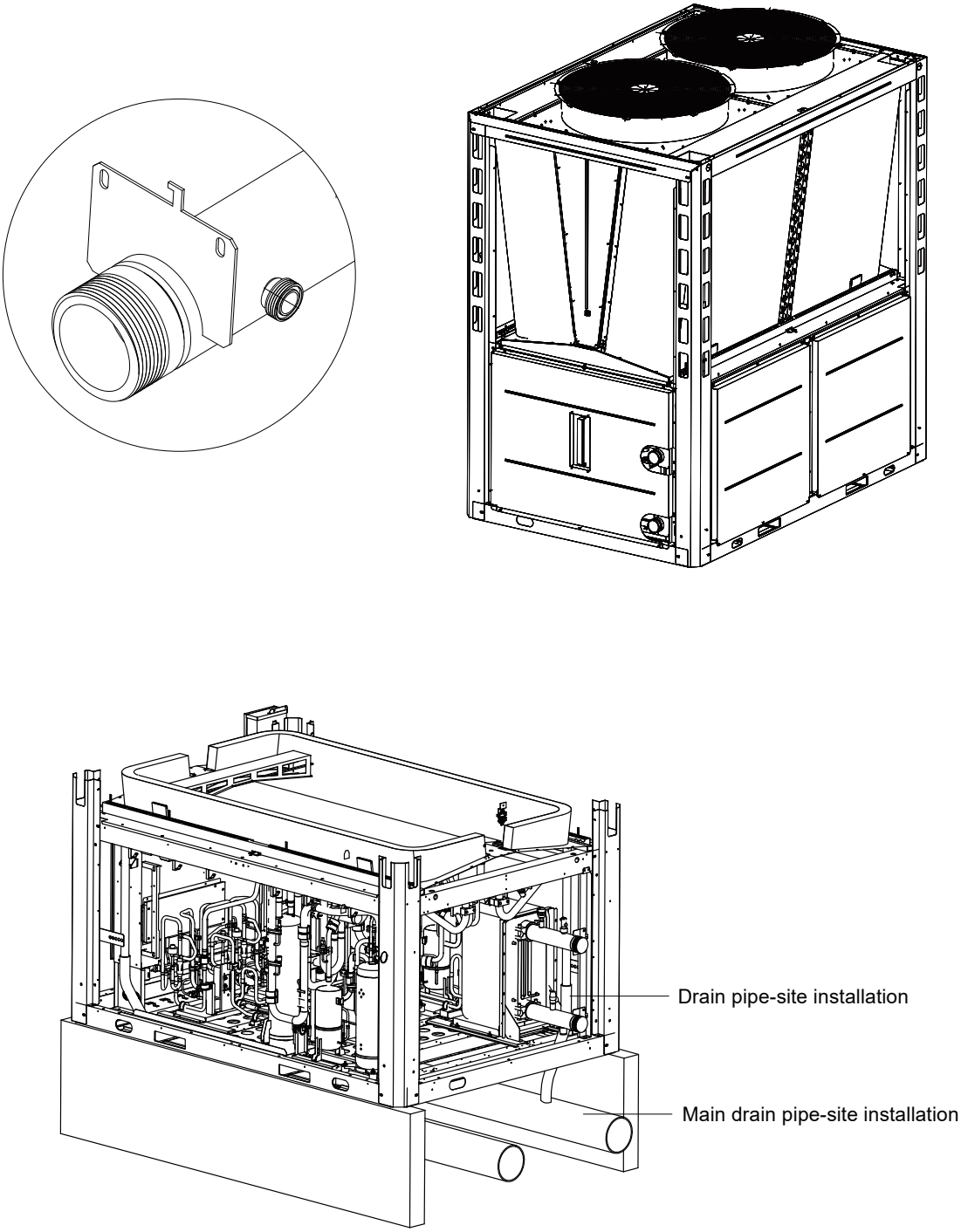


Figure 6.5 Water and Drainage Pipe Connections

NOTICE

- The 4 drainage pipes inside the unit should be connected to the main drainage pipe outside the unit.

6.2.3 Buffer Tank Selection

The role of the buffer water tank:
In cooling mode, it prevents frequent starting and stopping of the equipment, thus protecting the mechanical and electrical components.

The buffer water tank serves different purposes depending on whether the system is in cooling or heating mode. In heating mode, it ensures system stability during defrosting and reduces the need for frequent start/stop of the unit under small load conditions.

⚠ WARNING

Adequate system water capacity is a necessary condition to ensure reliable operation of equipment. Otherwise, it may cause frequent start and stop of the compressor, shorten the service life of the compressor, cause large fluctuations in defrosting water temperature during heating operation, and result in abnormal defrosting. When the water capacity of the system is insufficient, the system must add a buffer water tank to meet the minimum water capacity requirements for equipment operation.

1) Design calculation method

a. Calculation of defrosting time under heating conditions:
The most significant factor affecting the air source heat pump heating system is the defrosting in the winter. To ensure thermal stability, the main compressor defrosting time should be limited to 4 minutes during winter operation. Additionally, the water temperature before and after defrosting should not decrease by more than 3 °C. The buffer tank's volume should be calculated based on these requirements.
Heating conditions, the minimum effective water capacity calculation:

$$MH = [Qh \times Hmin \times TH / (C \times \triangle TH)] / \rho$$

Where:
MH: Minimum system water capacity, m3
Qh: Rated heat capacity, kW
Hmin: Coefficient of defrosting ability, %, generally 50%
△TH: Water temperature drop before and after defrosting, °C; generally, 3 °C
C: Specific heat Capacity of water 4.18 kJ/(kg·°C)
ρ: Density of water,1000 kg/m3
TH: Defrosting time, s; generally, 240 s.

b. Cooling running time calculation method:
During the cooling process, avoid frequently opening and stopping the equipment to protect it. Ensure that there is enough water to allow the equipment to run continuously for at least 5 minutes.
Cooling conditions, the minimum effective water capacity calculation:

$$MC = [QC \times CA \times Cmin \times TC / (C \times \triangle TC)] / \rho$$

Where:
MC: Minimum system water capacity, m3
QC: Rated cooling capacity, kW
CA: Capacity coefficient of small load condition: generally, 1.6
Cmin: The minimum operating capacity ratio of the unit, %, 100% for fixed frequency unit.30% for variable frequency unit
△TC: Control temperature range, °C; Factory default 4 °C
C: Specific heat gain of water 4.18 kJ/(kg·°C)
ρ: Density of water, 1000 kg/m3
TC: Cooling operation time, S, generally 300 s.

c. Calculate the system capacity according to the cooling and heating conditions, and take the maximum value:

$$M = MA \times (MH, MC)$$

Single cooling unit takes MC, single heating unit takes MH
d. The effective water capacity of a water system refers to its total capacity, including the main pipes, water storage tank, and the normally open end of the two-way valve in circulation system during operation.

$$M2 = V \times L$$

Where:
M2: Effective system water capacity, m3
L: Total length of system pipeline, m
V: Water capacity m3 per meter pipe length of each size.
e.Buffer tank volume refers to the minimum water capacity required to meet the normal operation of the unit:

$$Vmin = M - M2$$

Where:
Vmin - Minimum volume of buffer tank, m3

2) Empirical Estimation Method:
For renovation projects where the system water capacity cannot be estimated, the volume of the buffer tank can be estimated empirically using the following formula:

$$Vmin = Q \times K$$

Here, Vmin represents the minimum volume of the buffer tank in litres. For K value, the comfort air conditioning requires 10 L/kW, and the process air conditioning requires 15 L/kW. The stability of the system water temperature increases with a higher K value.
Q is the equipment capacity measured in kW.

3) Precautions for buffer tank selection:

a. The configuration of the buffer tank depends on the specific project requirement. If the water system volume is large or an infloor heating system, the buffer tank may not be needed. However, increasing the size of the buffer water tank has several advantages for the system operation. It helps to avoid frequent start and stop of the compressors under small load conditions, prevents thermal discomfort during defrosting, and ensures that there is enough water in the system to meet the unit defrosting requirements. This improves the comfort of the occupants.

b. There are two methods to calculate the volume of the buffer tank. The results differ, with method 1 being more accurate as it is based on actual operation data analysis. Therefore, it is recommended to use method 1 for actual design and selection. Method 2 is an empirical estimate.

c. When using multiple units in parallel, it is recommended to base the calculation on the total capacity of the parallel units.

6.2.4 Minimum and Maximum Water Flow

Table 6.1 Water Flow Requirements

Item / Model		Waterflow rate(gpm)	
		Minimum	Maximum
HP500	Normal Temperature Outlet(S1-2=OFF)	35.75 gpm (135.33 L/min)	116.19 (439.82 L/min)
	High Temperature Outlet(S1-2=ON)		

6.2.5 Minimum System Water Flow

The minimum heating or chilled water flow is shown in the Table 6.1.

If the system flow is less than the minimum flow rate, the main coil flow needs to be recirculated, as shown in the Figure 6.6.

For minimum chilled water flow rate:

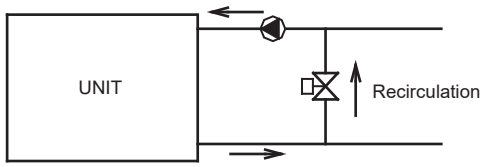


Figure 6.6 Minimum Flow Recirculation

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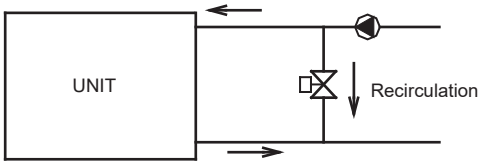


Figure 6.7 Maximum Flow Recirculation

6.2.7 Water Pump

6.2.7.1 Pump Selection

The external water pump must be controlled by the main unit host logic program and the signal should be linked with the external water pump control cabinet.

The water pump should be installed on the inlet pipe of the unit, and the inlet/outlet pipe diameter of the water pump should be the same as the main water pipe diameter. The inlet and outlet interfaces of the water pump should be connected softly, and the foundation should have vibration damping measures. The pump should be installed outdoors with rain, sun, and frost protection measures.

The selected pump power should meet the required flow/head performance curve at any point and ensure that there are no humps or inflection points in the working area. Standby pumps should be set up, with at least one backup pump, to ensure that the water system remains operational during maintenance and replacement of pumps. The standby pumps should be of the same type as the primary pumps, and no more than three units should be in operation at any given time.

If the head of a pump cannot meet the water pressure requirements at the most unfavorable points, tandem pumps can be used to increase the head while keeping the flow rate constant. If the flow rate of a single pump cannot meet the flow rate requirements at the most unfavorable points, parallel pumps can be used to increase the flow rate of the entire system while maintaining the same pressure at the water pump outlet.

6.2.7.2 Pump Sizing

1) Flow Rate
For the primary pump system, the water pump rated flow rate should be equal to or greater than the unit rated flow rate. In parallel mode, the water pump rated flow rate should be equal to or greater than the sum of the rated flow rates of the parallel units.

The secondary pump system requires a source side circulating pump flow (L1) that is equal to or greater than the unit's rated flow. The end user side circulating pump flow (L2) can be calculated using the following formula:

$$L2 = 1.2 \times Q \times 0.86 / \Delta T$$

L2: Circulating water flow m3/h
Q: Total terminal load kW
ΔT: Temperature difference of inlet and return, °C

2) Pump Head
Primary pump system, pump head is calculated using the following formula:
H = H1 + H2

On the source side:
H1 = (h11+h12) × 1.2

On the load side:
H2 = (h21+h22) × 1.2

Where:
h11: Water resistance of the coils, m
h12: The worst-case piping resistance on the source side, m, including pipes, fittings and valves resistance.
h21: Pressure required at the farthest terminal unit. m
h22: The worst-case piping resistance on the load side, m, including pipes, fittings and valves resistance.

The calculation method for the head of the secondary pump system should consider the head of the primary pump, the H1 head of the source side circulating water pump for unit water resistance and piping water resistance, the height difference between the tank and the source, and the open water system.

It is recommended that the total head value should not be less than 18 meters.

For open systems, the height difference between the tank and the host must be considered when dealing with the load side circulating water pump head H2, which is subject to the end of the end terminal unit minimum operating pressure and the most unfavorable loop water resistance.

NOTICE

- When the dial code S1-2 is set to OFF, the unit can use a constant speed pump or a variable-speed pump.
- When the dial code S1-2 is set to ON, the unit should use a variable-speed pump.
- To achieve an outlet water temperature of 143.6 °F (62 °C), a temperature difference of 18 °F (10 °C) should be ensured between the inlet and outlet water. For models using a single water pump with a capacity of HP500, the minimum flow rate should be greater than17.62 gpm (66.7 L/min).
- If the above requirements are not met, the outlet water temperature of the unit cannot reach 143.6 °F (62 °C).

6.2.8 Water Quality Requirements

When using municipal domestic water for heating and chilled water, scale buildup is rare. However, when using well water or river water, more scale, sand, and other sediments are produced. Therefore, it is necessary to filter and soften the water with water treatment and softening device prior to the system startup. Sand and dirt settled in the heat exchanger can block the circulation of heating and chilled water, leading to freezing accidents. To prevent scaling and corrosion of equipment, it is important to analyze the water quality before use, including factors such as pH value, conductivity, chloride ion concentration, and sulfur ion concentration.

Table 6.2 Water Quality Requirements

Item	Units	Permissible Value
pH (77 °F)	/	7.5 ～ 8.0
Turbidity	NTU	≤ 3
Conductivity (77 °F)	μS/cm	≤ 200
Chloride ion	mg/L	≤ 50
Iron Content	mg/L	≤ 0.3
Calcium Hardness	mg/L	≤ 80
Total Alkalinity	mg/L	≤ 200

Item	Units	Permissible Value
Dissolved Oxygen	mg/L	not detectable
Organophosphorus (P)	mg/L	not detectable
Sulfide Ion	mg/L	≤ 50
Acid Consumption	mg/L	≤ 50
Sulfide Ion	mg/L	not detectable
Ammonium Ion	mg/L	not detectable
Silicon Dioxide	mg/L	≤ 30

⚠ WARNING

Water quality is crucial to ensure the normal and reliable operation of the equipment, otherwise it may cause damage to the unit components or reduce its lifespan. Therefore, it is necessary to ensure that the water quality meets the requirements of equipment use.

6.2.9 Pipe Sizing

The following recommended values are for the total system water pipes, not the individual unit inlet and outlet water pipe. This data is for reference only and please the applicable standards, codes and engineering sizing method to meet the specific project requirements.

Table 6.3 Recommended Water Pipe Sizes

Rated Cooling Capacity, kBtu/h (kW)	Total System Pipe Size, inch (mm)
85 kBtu/h (24.9 kW) ≤ Q ≤ 135 kBtu/h (39.6 kW)	1-1/4” (DN32)
135 kBtu/h (39.6 kW) < Q ≤ 170 kBtu/h (49.8 kW)	1-1/2” (DN40)
170 kBtu/h (49.8 kW) < Q ≤ 275 kBtu/h (80.6 kW)	2” (DN50)
275 kBtu/h (80.6 kW) < Q ≤ 495 kBtu/h (145.1 kW)	2-1/2” (DN65)
495 kBtu/h (145.1 kW) < Q ≤ 715 kBtu/h (209.5 kW)	3” (DN80)

Rated cooling capacity, kBtu/h (kW)	Total System Pipe Size, inch (mm)
715 kBtu/h (209.5 kW) < Q ≤1,110 kBtu/h (325.3 kW)	4” (DN100)
1,110 kBtu/h (325.3 kW) < Q ≤1,740 kBtu/h (509.9 kW)	5” (DN125)
1,740 kBtu/h (509.9 kW) < Q ≤ 2,525 kBtu/h (740 kW)	6” (DN150)
2,525 kBtu/h (740 kW) < Q ≤ 4,440 kBtu/h (1,301.2 kW)	8” (DN200)
4,440 kBtu/h (1,301.2 kW) < Q ≤ 15,150 kBtu/h (4,440 kW)	10” (DN250)

⚠ CAUTION

Please pay attention to the following items when installing multiple modules:

- Each module corresponds to a unique address code which cannot be repeated.
- Main water outlet temperature sensor, flow controller and auxiliary electric heater are under control of the main module.
- One wired controller is required and connected on the main module.
- The unit can be started up through the wired controller only after all addresses are set and the afore mentioned items are determined. The wired controller should be ≤ 1 640.42 ft (500 m) away from the outdoor unit.

6.2.10 Single or Multiple Pump Installation

1) DIP Switch
Refer to Table 8.1 in detail to choose the DIP switch setting for single or multiple water pumps installation.

Pay attention to the following problems:
a. If the DIP switch is inconsistent, and the error code is FP, the unit is not allowed to operate.

b. Only the lead unit has the water pump output signal when single water pump is installed. The auxiliary units have to water output signal.

c. The water pump control signal is available for both the main unit and auxiliary units when multiple pumps are installed.

2) Piping Diagram

a. Single Pump Installation
Piping does not require check valve when single water pump is installed, refer to figure below.

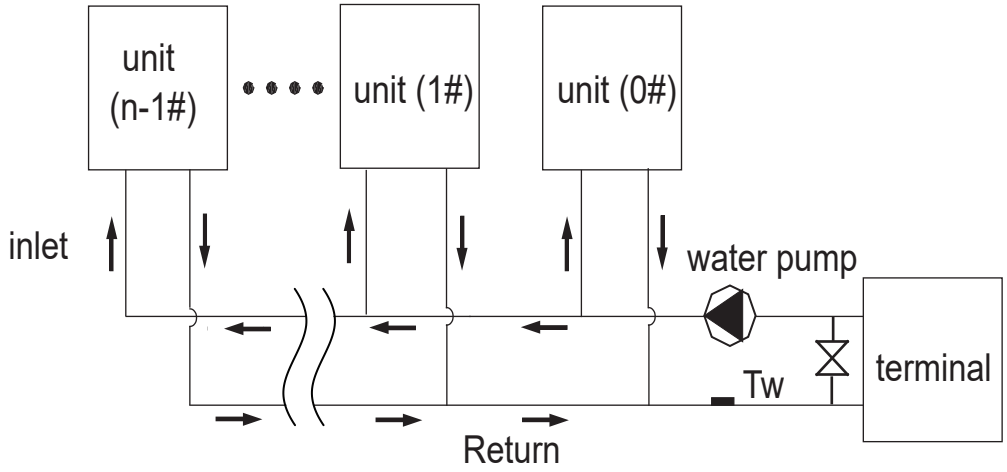


Figure 6.8 Single Pump Installation Diagram

b. Multiple Pump Installation
Each unit is required to install a check valve when multiple pumps are installed, refer to figure below.

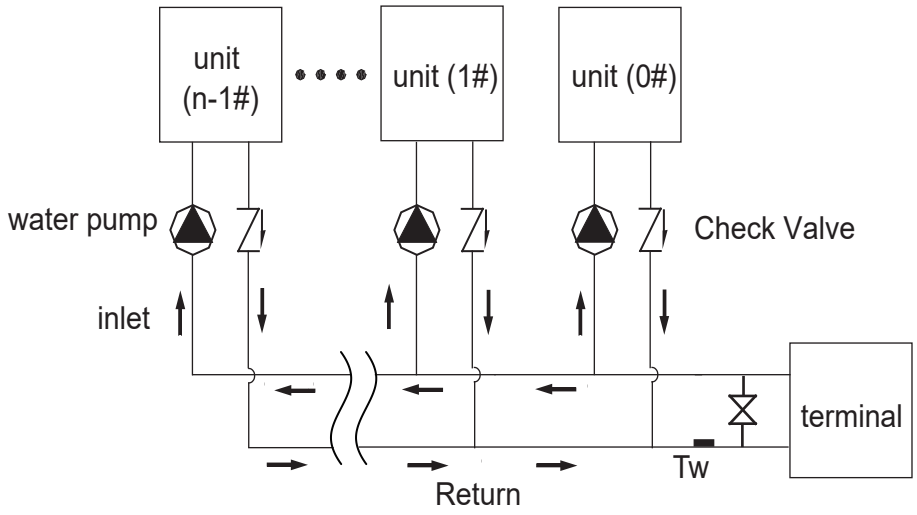


Figure 6.9 Multiple Pump Installation Diagram

3) Electric Wiring
Only the Lead unit requires wiring when single water pump is installed, and the auxiliary units do not require wiring. All the lead unit and auxiliary units require wiring when multiple water pumps are installed. For specific wiring diagrams, see Figure 7.7 and 7.8 for details.

6.2.11 Expansion Tank

The expansion water tank is divided into two types: open and closed. Its purpose is to maintain constant pressure and accommodate water expansion due to temperature variation. The open expansion tank is open to the atmosphere without pressurization and is usually installed at the suction inlet of the circulating pump, which should be 1 to 2 meters higher than the highest point of the system. The water supply of the water tank is determined by the water level. In large systems, an expansion tank should be set up for the primary pump water system if it is not equipped with a buffer tank or a thermal storage tank in the open water system. The expansion tank should be arranged at the highest point of the water system to accommodate any excess water volume.

The closed type of expansion tank can be installed in the suction inlet of the circulating pump. It should not be connected to the atmosphere. When selecting the capacity of the expansion tank, ensure that specific terms, abbreviations, and symbols are used consistently once they have been introduced. This type of expansion tank uses constant pressure water supply and is commonly used in small systems.

Capacity selection of expansion tank:
V = System Water Capacity x Expansion Coefficient x Safety Margin
The expansion coefficient ranges from 1 to 3%, and the safety margin ranges from 1.1 to 1.2.

7 Electrical Installation

7.1Control Board

The main PCB board is shown on Figure 7.1, and the key components are summarized in Table 7.1.

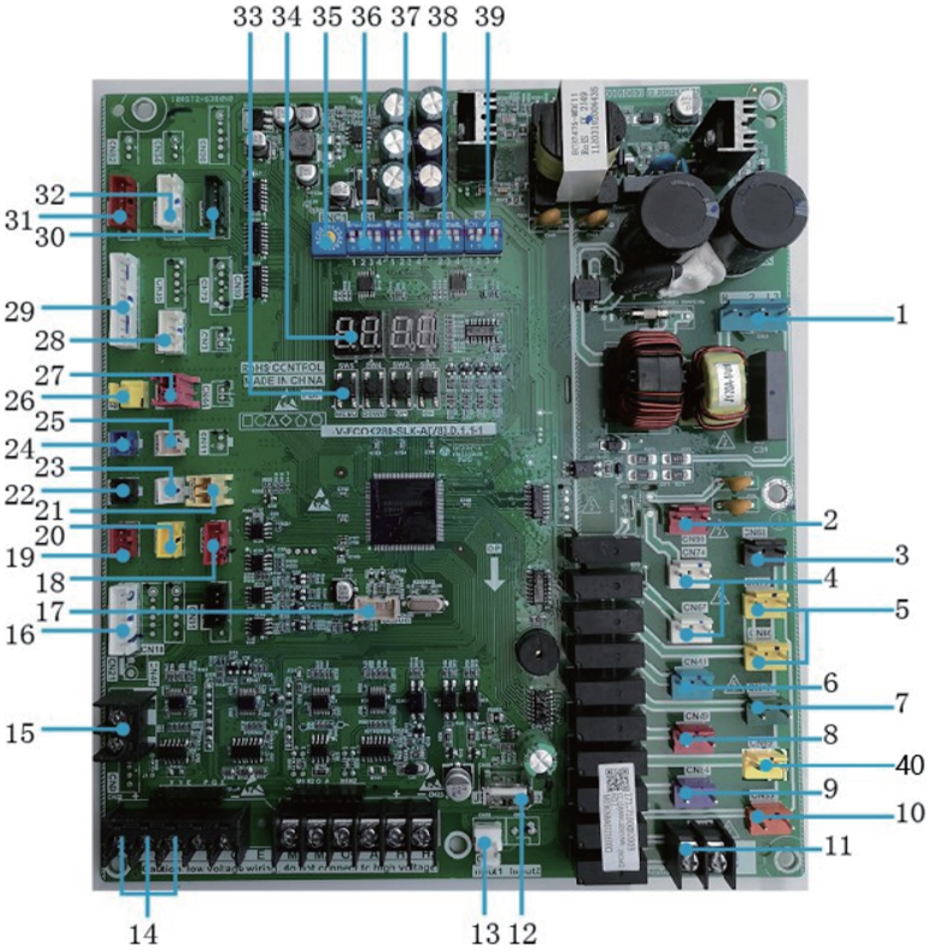


Figure 7.1 Main PCB

Table 7.1 Main PCB Key Components

NO.	Port Code	Content	Voltage	Direction
1	CN32	Main board power supply	208-230 V AC	Input
2	CN99	Expansion board power supply	208-230 V AC	Output
3	CN68	Reserved	208-230 V AC	Output
4	CN74/CN67	Reserved/Crankcase Heater	208-230 V AC	Output
5	CN75/CN66	Reserved/Electronic heating belt for plate heat exchanger	208-230 V AC	Output
6	CN48	Four-way valve	208-230 V AC	Output
7	CN47	Solenoid valve	208-230 V AC	Output
8	CN49	Water tray electric heating belt	208-230 V AC	Output
9	CN84	Reserved	0 V	Output
10	CN83	Expansion tube connecting tube antifreeze electric heating belt	208-230 V AC	Output

NO.	Port Code	Content	Voltage	Direction
11	CN93	The alarm signal output of the unit(ON/OFF signal)	Determined by external wiring	Input/Output
12	CN65	Program burn in port(USB)	5 V DC	Input/Output
13	CN28	Three-phase protector output switch	12 V DC	Input
14	CN22	Outdoor units communication and wired controller communication port	5 V DC	Output
15	CN46	The power supply port of the wired controller	12 V DC	Output
16	CN26	Compressor inverter module and Fan inverter module communication ports	12 V/5 V DC	Input/Output
17	CN300	Program burn in port	3.3 V DC	Input/Output
18	CN33	Communication with slave board	12 V/3.3 V DC	Input/Output
19	CN41	System low pressure sensor	5 V DC	Input
20	CN40	System high pressure sensor	5 V DC	Input
21	CN45	Probe of outlet water side antifreeze temp	3.3 V DC	Input
22	CN37	pipe temperature sensor of the condenser	3.3 V DC	Input
23	CN30	outdoor ambient temperature sensor	3.3 V DC	Input
24	CN16	Reserved	3.3 V DC	Input
25	CN38	Reserved	3.3 V DC	Input
26	CN27	Discharge temperature switch protection (protection code P0, prevent the compressor from over temperature 115℃)	3.3 V DC	Input
27	CN42	Reserved	3.3 V DC	Input
28	CN8	Refrigerant inlet temperature of EVI plate heat exchanger/ Refrigerant outlet temperature of EVI plate heat exchanger	3.3 V DC	Input
29	CN4	Unit water inlet temperature sensor	3.3 V DC	Input
		System suction temperature sensor		
		Unit water outlet temperature sensor		
		coil final outlet temperature sensor		
		DC inverter compressor discharge temperature sensor		
30	CN72	Port for electrical expansion valve C	12 V DC	Output
31	CN70	Port for electrical expansion valve A	12 V DC	Output
32	CN71	Port for electrical expansion valve B	12 V DC	Output
33	SW3	Up button	3.3 V DC	Input
	SW4	Down button		
	SW5	Menu Buttons		
	SW6	Confirm button		
34	DSP1/DSP2	Digital tube 1) In case of stand-by, the address of the module is displayed; 2) In case of normal operation, 10. is displayed (10 is followed by dot). 3) In case of fault or protection, fault code or protection code is displayed.	3.3 V DC	Output
35	ENC1	ENC1:NET_ADDRESS DIP switch 0-F of outdoor unit network address is enabled, which represent address 0-15.	3.3 V DC	Input
36	S1	Dip switch	3.3 V DC	Input
37	S2	Reserved	3.3 V DC	Input
38	S3	Dip switch	3.3 V DC	Input
39	S4	Dip switch	3.3 V DC	Input
40	CN69	Water tray electric heating belt	208-230 V AC	Output

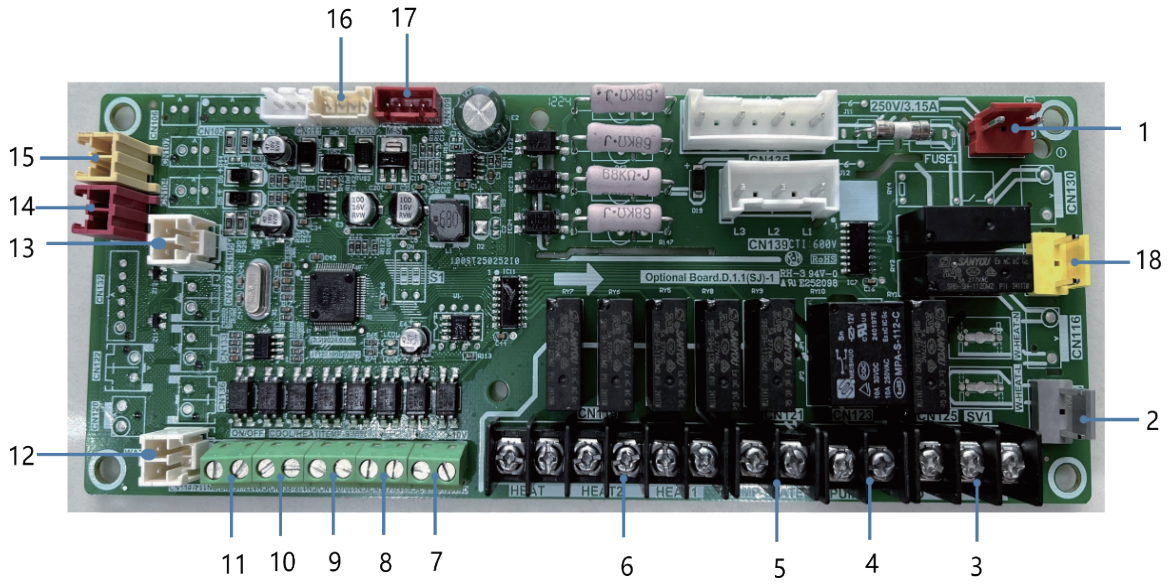


Figure 7.2 Expansion PCB

Table 7.2 Expansion PCB Key Components

NO.	Port Code	Content	Voltage	Signal Type
1	CN140	Expansion board power supply	208-230 V AC	Input
2	CN115	Electric heater of water flow switches	208-230 V AC	Output
3	CN125	Three-way valve (heating water valve)	208-230 V AC	Output
4	CN123	Port controlled by the contactor of the constant speed water pump	Determined by external wiring	Input/Output
5	CN121	Compressor status indication	Determined by external wiring	Input/Output
6	CN119	IPipe Auxiliary Heater/Hot Water Tank Auxiliary Heater	Determined by external wiring	Input/Output
7	CN108	Inverter pump 0-10 V output control signal	0-10 V DC	Output
8	CN117	Water pressure switching port	12 V DC	Input
9	CN110	Target water temperature switch	12 V DC	Input
10	CN138	Remote function of cool/heat signal	12 V DC	Input
11	CN137	Remote function of on/off signal	12 V DC	Input
12	CN114	Water flow switch signal	12 V DC	Input
13	CN105	Sensor of inlet water side antifreeze temp	3.3 V DC	Input
14	CN101	Sensor of final unit water outlet temp	3.3 V DC	Input
15	CN103	Sensor of water tank	3.3 V DC	Input
16	CN300	Software programming port	3.3 V DC	Input/Output
17	CN109	Communication with main board	12 V/3.3 V DC	Input/Output
18	CN118	Reserved	208-230 V AC	Output

7.2 Electric Wiring

7.2.1 Safety Precautions

⚠ CAUTION

- The air-conditioner should apply special power supply, whose voltage should conform to rated voltage.
- Each module corresponds to a unique address code which cannot be repeated.
- Wiring construction must be conducted by the professional technicians according to the labeling on the circuit diagram.
- The power wire and the grounding wire must be connected to the suitable terminals.
- The power wire and the grounding wire must be fastened by suitable tools.
- The terminal power wire and the grounding wire must be fully fastened and regularly checked; in case it becomes loose.
- Only use the electric components specified by the manufacturer and obtain installation and technical services from the manufacturer or authorized dealer. If wiring connection doesn't conform to electric installation specifications, it may cause many troubles like failure on controller, electronic shock and so on.
- The connected fixed wires must be equipped with full switching-off devices with at least 3mm contact separation.
- Set leakage protective devices according to the requirements of national technical standard about electrical equipment. After completing all wiring construction, conduct careful check before connecting the power supply.
- Please carefully read the labels on the electric cabinet.
- Please don't repair the controller by yourself, since improper operation may cause electric shock, damages to the controller and other unit failures. If the unit needs any repair or parts, please contact the service center.

On-site wiring, parts and materials must comply with the local and national regulations as well as relevant national electrical standards.

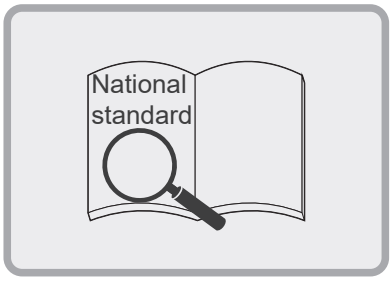


Figure 7.3 Nation Codes and Standards

Copper core wires must be used.

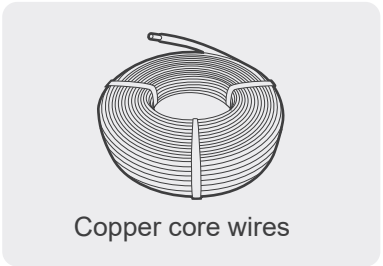


Figure 7.4 Copper Wires

It is advisable to use 3-core shielded cables for unit to minimize interference. Do not use the unshielded multicore conductor cables.

Figure 7.5 Shielded Cables

Power wiring must be installed by qualified electricians.

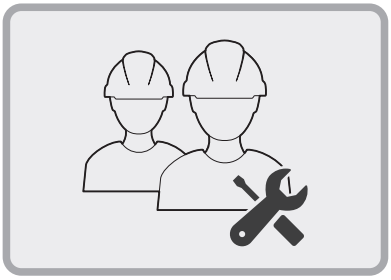


Figure 7.6 Qualified Electricians

7.2.2 Overall

If multiple units are connected in cascade, the unit address should be set on the DIP switch ENC1. With 0-F being valid, 0/1 indicates the master unit and 2-F indicate slave units.

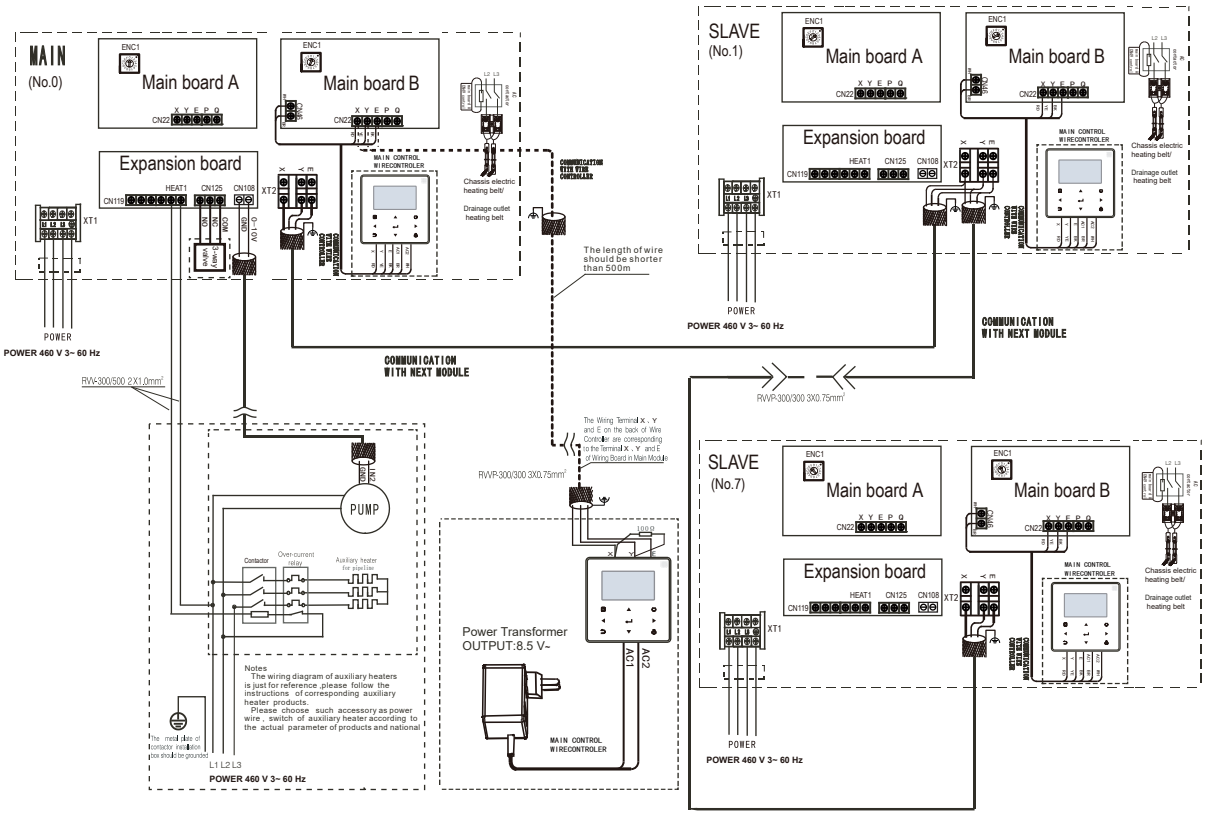


Figure 7.7 Single Pump Installation Networking Communication Schematics

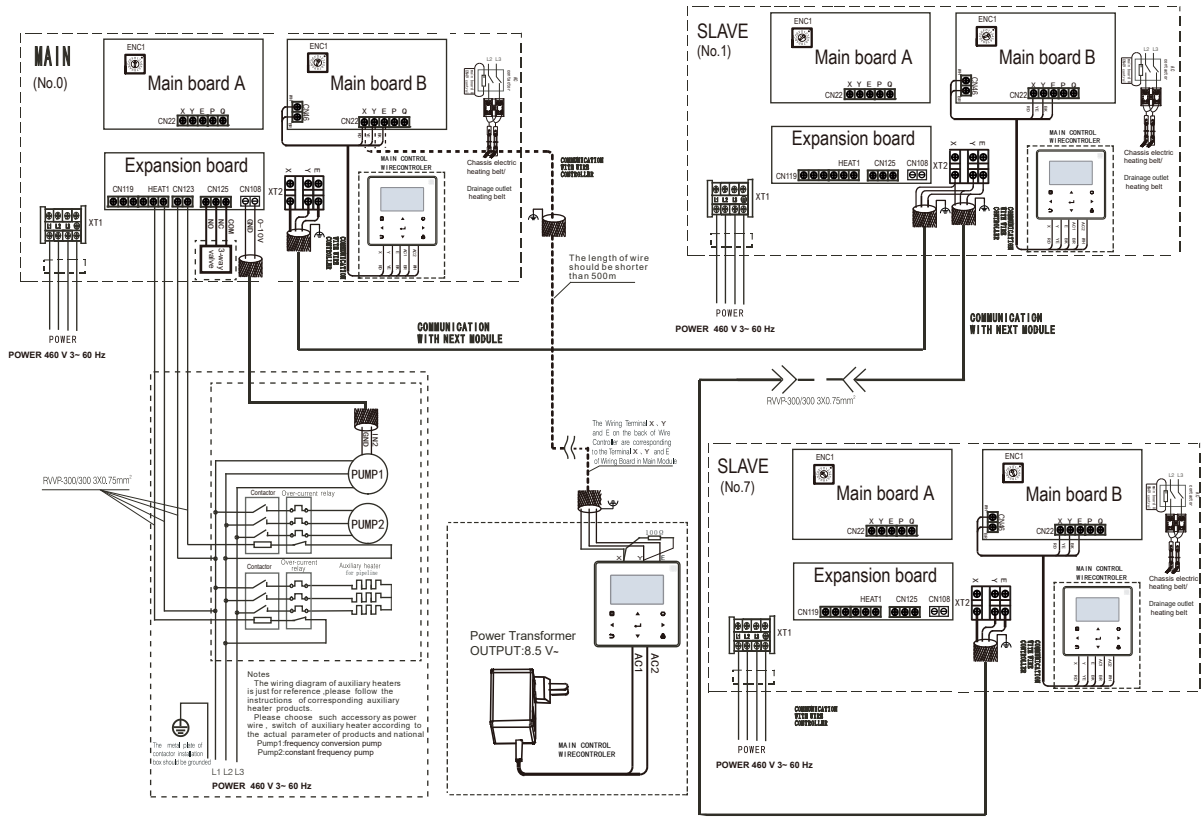


Figure 7.8 Multiple Pumps Installation Networking Communication Schematics

NOTICE

When the power cord is parallel to the signal wire, make sure that they are enclosed in respective conduits and are kept a reasonable wire spacing. Distance between the power cord and signal wire is 11-13/16 in (300 mm) if below 10A, and 19-11/16 in (500 mm) if below 50 A.

⚠ CAUTION

In the case of multiple unit connection, the HMI can be parallel with the same system.

7.2.3 Power Supply Specifications

- Verify that the power supply complies with the unit nameplate specifications.
- Inspect all control panel components and tighten any loose connections.
- Connect properly sized and protected power supply wiring to a field-supplied & installed disconnect switch and to the main power terminal block in the unit control panel.
- Install proper grounding wires and internal fuses of the unit: Ceramic packaging, 63 A, 690 V AC.

⚠ DANGER

All field-installed wiring must comply with the National Electrical Code and applicable local codes.

Table 7.3 Electrical Specifications

Model	Power supply	MCA	MOP
HP500	460 V,3Phase,60 Hz	106 A	125 A

7.2.4 Power Supply Wiring Requirement

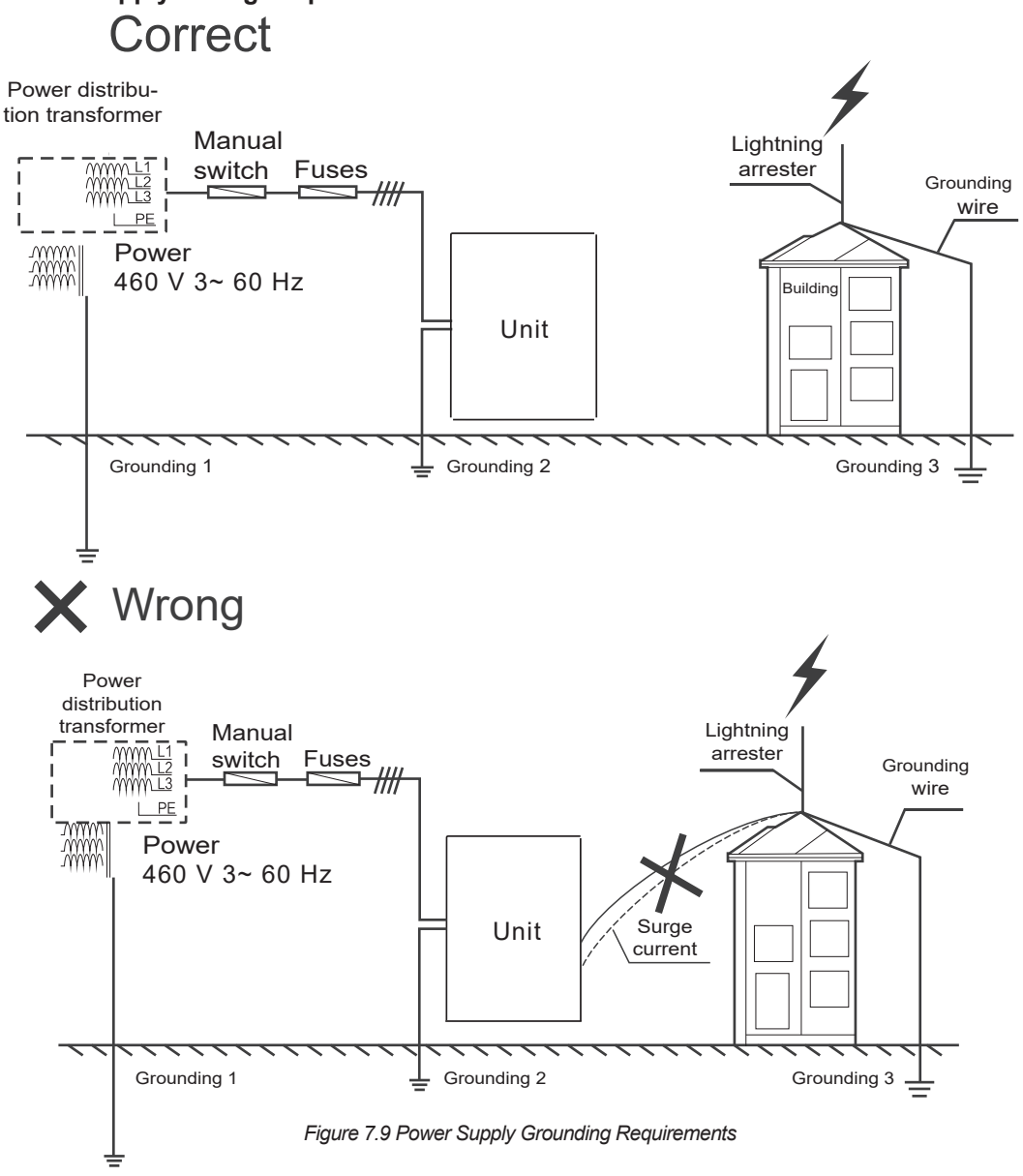


Figure 7.9 Power Supply Grounding Requirements

⚠ CAUTION

Do not connect the grounding wire of the lightning arrester to the unit shell. The grounding wire of the lightning arrester and the power supply grounding wire must be configured separately.

7.2.5 Power Cord Connection

Connect the power cord according to the National Electrical Code requirements.

⚠ CAUTION

Please use round type terminal with the correct specifications to connect the power code.

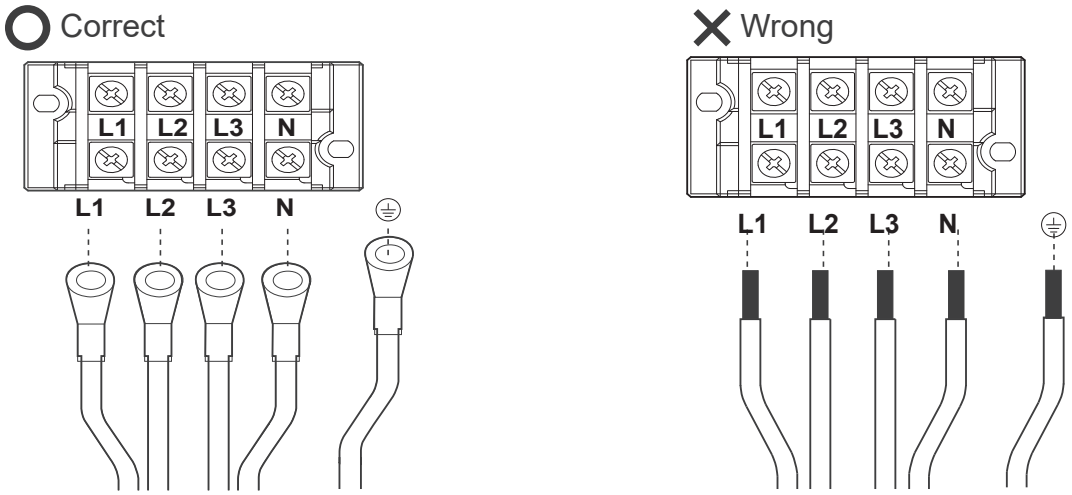


Figure 7.10 Power Cord Connection Requirements

7.2.6 Terminal Function

As shown in the figure below, for HP500, the unit communication signal wire is connected to the terminal block XT2 at XYE inside the electric control box.

The wired controller signal wire is connected to the terminal block CN22 at XYE on main board B inside the electric control box.

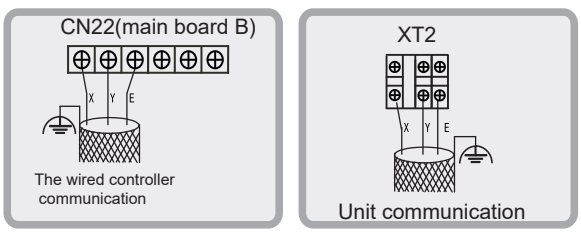


Figure 7.11 Communication Terminal Connection

When the auxiliary heater is added externally, a 3-phase contactor must be used for the control. The model of contactor is subject to the heater power. The contactor coil is controlled by the expansion board. See the Figure 7.11 below for coil wiring. The user can connect an AC light to monitor the state of compressor. When the compressor is operating, the light will be powered on.

The wiring of pipe auxiliary heater and AC light of the state of compressor is as follows. Connect the frequency conversion pump and constant frequency pump according to unit requirements. The 3-way valve uses the CN125 port of the expansion board and there is 208-230V power supply.

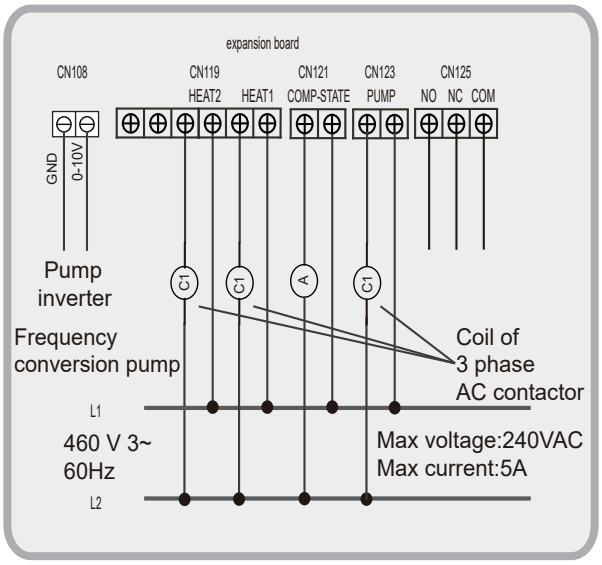


Figure 7.12 Pipe Auxiliary Heater and Compressor Status Light Wiring Diagram

7.2.7 ON/OFF Port Wiring

The remote function of “ON/OFF” must be set by the DIP switch. The remote function of “ON/OFF” is effective when S1-1 is set as ON. At the same time, the wired controller is no longer in control.

Connect the “ON/OFF” port of the main unit’s electric control box in parallel, then connect the “ON/OFF” signal (provide by user) to the “ON/OFF” port of main unit as follows:
For 20-ton model: shorting the terminal block CN137 at expansion board inside the electric control box to enable the remote function of “ON/OFF”.

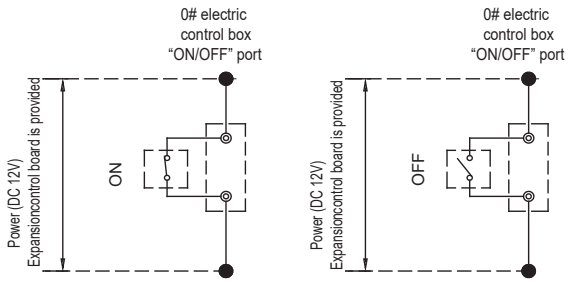


Figure 7.13 ON/OFF Port Wiring Diagram

7.2.8 HEAT/COOL Port Wiring

The remote function of “HEAT/COOL” must be set by the DIP switch. The remote function “HEAT/COOL” is effective when S1-1 is set as ON, At the same time, the wired controller is no longer in control.

Connect the “HEAT/COOL” port of the main unit’s electric control box in parallel, then connect the “ON/OFF” signal (provide by user) to the “HEAT/COOL” port of main unit as follows:
For HP500: shorting the terminal block CN138 at expansion board inside the electric control box to enable the remote function of “HEAT/COOL”.

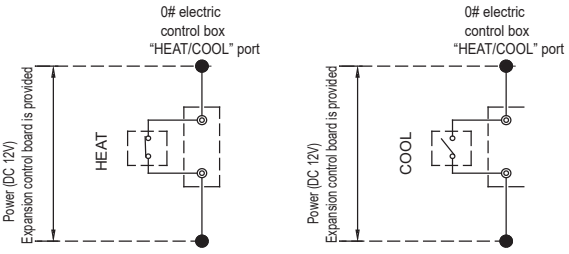
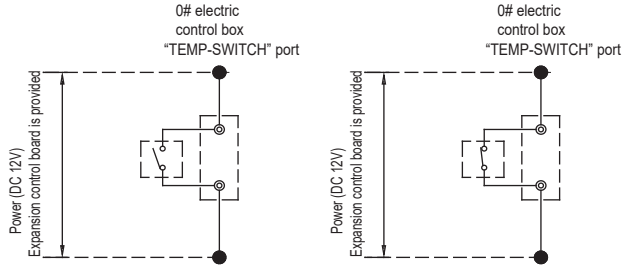


Figure 7.14 HEAT/COOL Port Wiring Diagram

7.2.9 TEMP-SWITCH Port Wiring

The function of “TEMP-SWITCH” must be set by the wired controller for two water temperature settings for cooling and heating mode.

For HP500: shorting the terminal block CN110 at expansion board inside the electric control box to choose the target water temperature.



First target water temperature Second target water temperature

Figure 7.15 TEMP-SWITCH Port Wiring Diagram

7.2.10 ALARM Port Wiring

If the unit is operating abnormally, the ALARM port is closed. Otherwise, the ALARM port is open.

The ALARM ports are on the main control board A. See the wiring diagram for details. Connect the device provided by user to the “ALARM” ports of the module units as follows:

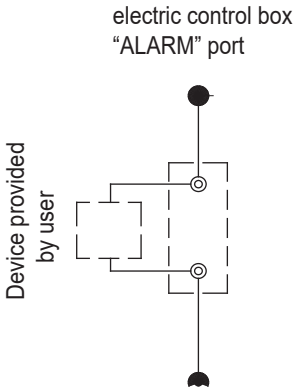


Figure 7.16 ALARM Port Wiring Diagram

7.2.11 Control System Installation Precautions

Use only shielded wires as control wires. Any other type of wires may produce a signal interference that will cause the units to malfunction.

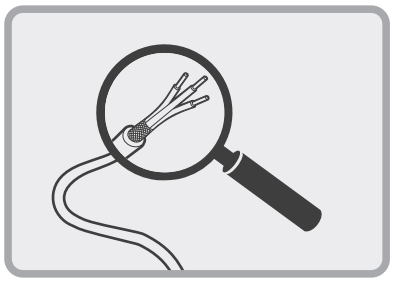


Figure 7.17 Shielded Control Wire

The shielding nets at both ends of the shielded wire must be grounded. Alternatively, the shielding nets of all shielded wires are interconnected and then connected to ground through one metal plate.

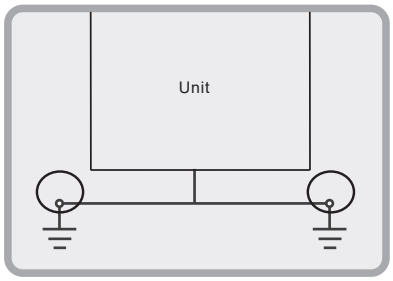


Figure 7.18 Control Wire Grounding

Do not bind the control wire, refrigerant piping and power cord together. When the power cord and control wire are laid parallel, they should be kept at a minimum distance of 300 mm to prevent signal source interference.

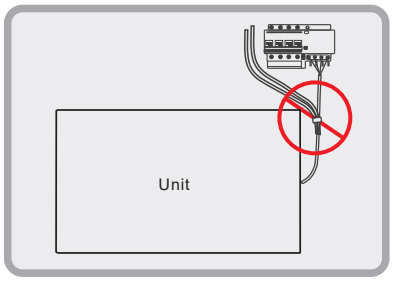


Figure 7.19 Wire Separation

Pay attention to the polarity of the control wire when conducting wiring operations

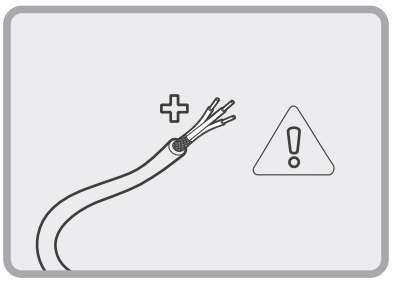


Figure 7.20 Wire Polarity

8 Configuration

8.1 Initial Start-up at Low Outdoor Temperature

During initial start-up and when water temperature is low, it is important that the water is heated gradually. Failure to do so may result in concrete floors cracking due to rapid temperature change. Please contact the responsible general contractor for further details.

8.2 Pre-trial Run Checks

1) After the water system pipe is flushed several times, make sure that the purity of water meets the requirements. The system is re-filled with water and the pump is started up. Then make sure that water flow and the pressure at the outlet meet the requirements.

2) The unit is connected to the main power 12 hours before the start up, to supply power to the heat trace and pre-heat the compressor. Inadequate pre-heating may cause damages to the compressor.

3) Setting of the wired controller: See the control section in this manual regarding the settings of the controller, including basic settings of refrigeration & heating mode, manual adjustment & automatic adjustment mode, and pump mode. Under normal circumstances, the parameters are set at standard operating conditions for the trial run, and the extreme working conditions should be prevented as much as possible.

4) Carefully adjust the minimum flow of the water pump on the water system and the inlet shut-off valve of the unit to ensure that the water flow rate of the system is at least 110% of the minimum water flow rate specified in Table 6.1.

8.3 DIP Switch Instructions

DIP switch, buttons and digital display positions of units are shown in the figures below.

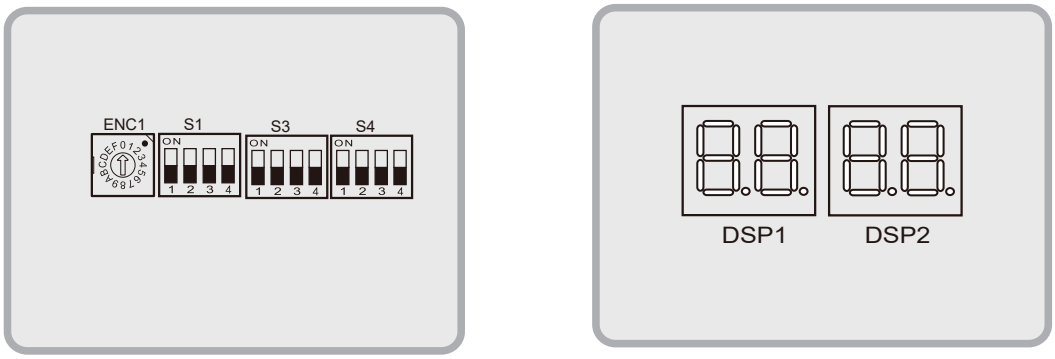
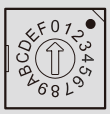
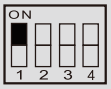
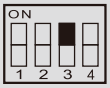
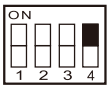
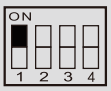
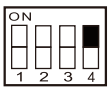


Figure 8.1 DIP Switch and Digital Display

Table 8.1 Electrical Specifications

			Meaning	Notes
			Each unit is composed of two independent refrigerant circulation systems, and each refrigerant circulation system corresponds to its own address dialing code. Among them, 0# address is the A system of the host, 1# address is the B system of the host, and the address dialing code of other unit computer systems is dialing code in order from small to large.	Host system A address dial code to 0#; Each refrigerant circulation system should choose the address dialing code; Other system address dialing code cannot be repeated
ENC1 system address		0-F		
S1-1 remote control		OFF	When the dial code is off, the unit has no remote control, can only be controlled by the wired controller (factory default).	This dial is valid for 0# address, but not for other addresses

S1-1 remote control		ON	When the dial code is on, the remote control of the unit takes effect. 1. Control the start and stop of the unit through the ON/OFF port of the mainboard extension board. Short-circuit unit starts, disconnected unit shuts down; 2. Adjust the unit operation mode through the H/C port on the expansion board. The short connection is heating mode, and the disconnection is cooling mode. 3. If the unit is connected with the wired controller, the wired controller can only change the setting temperature, boot back error and other parameters (if there is no wired controller, it is controlled by the default value).	This dial is valid for 0# address, but not for other addresses
S1-2 heating outlet temperature selection		OFF	When the dial code is off, the maximum temperature of the heating mode can be set to 140 °F (factory default).	Each system in the system controlled by the same one-line controller needs to select S1-2, and it is recommended to select the same.
		ON	When the dial code is on, the maximum temperature of the heating mode can be set to 143.6 °F. Note that only when the unit is equipped with a frequency conversion pump and the water flow range meets our company's requirements, this dial code can be set to ON, otherwise it may lead to the unit not reaching the set temperature.	
S1-3 multi pump & single pump selection		OFF	When all units controlled by the same wired controller share the same main water pump, this dial code should be OFF (factory default).	Single unit this dial code should be off; It is necessary to select S1-3 in the parallel system controlled by the same line controller, and the selection should be consistent, otherwise the fault FP will be displayed. The model of all pumps in the same parallel system should be uniform.
		ON	When each unit in a system controlled by the same wire is equipped with a separate water pump, this dial should be ON.	
S1-4 constant and variable water pump linkage control		OFF	When a single unit machine is matched with a single fixed speed water pump or a single variable frequency water pump, this dial code should be OFF (factory default).	Each system in the system controlled by the same line controller needs to select S1-4.
		ON	When the hydrodynamic equipment of a single unit machine is a constant speed water pump and parallel variable frequency water pump, this dial code should be ON. When the dial code is on, the fixed speed water pump and the variable frequency water pump will be adjusted.	

S3-1 unit machine system differentiation		OFF	This dial code is used to distinguish the AB system in A single unit machine. When the dial code is off, the system is A system.	Once this dial has been set, installation and debugging need not be changed. When a failure code appeared, check whether this dial is in the correct.
		ON	This dial code is used to distinguish the AB system in a single unit machine. When the dial code is on, it means that the system is B system.	
S3-4 Fan Synchronization Function		OFF	When the dip switch is set to the OFF position, the fans of the two systems will be controlled independently.	This function is only to be used when a system cannot start normally due to other faults.
		ON	When the dip switch is set to the ON position, the fan in the faulty system will maintain the same speed as the fan in the normally operating system.	

9 INSTALLATION CHECKLIST

Table 9.1 Installation Checklist

·Table 9-1

Item	Descriptions	Yes	No
Installation Site	Units are fixed mounting on level base.		
	Ventilating space for heat exchanger at the air side meets the requirements in this manual.		
	Maintenance space meets the requirements in this manual.		
	Noise and vibration measures meet the requirements in this manual.		
	Direct sunlight, rain and snow proof measures meet the requirements in this manual.		
	External clearance meets the requirements in this manual.		
Water System	Pipe size meets the requirements in this manual.		
	The length of system meets the requirements in this manual.		
	Water drainage meets the requirements in this manual.		
	Water quality control meets the requirements in this manual.		
	Flexible hoses connection meets the requirements in this manual.		
	Pressure control meets the requirements in this manual.		
	Thermal insulation meets the requirements in this manual.		
	Wire capacity meets the requirements in this manual.		
	Switch capacity meets the requirements in this manual.		
	Fuse capacity meets the requirements in this manual.		
	Voltage and frequency meet the requirements in this manual.		
Electrical Installation	Connections are secured for joining wires.		
	Operation control device meets the requirements in this manual.		
	Safety device meets the requirements in this manual.		
	Chained control meets the requirements in this manual.		-
	Phase sequence of power supply meets the requirements in this manual.		

10 COMMISSIONING

⚠ CAUTION

- The unit can control start and stop of the unit only. So, when the water system is flushed, the operation of the pump should not be controlled by the unit.
- Do not start up the unit before draining the flushed water system completely and filling with the fresh water.
- The flow switch must be installed correctly. The wiring of the flow switch must be connected according to the control schematic diagram. Otherwise, the faults caused by water shortage while the unit is in operation should be the user's responsibility.
- Do not re-start the unit within 10 minutes after the unit is shut down during the trial run.
- When the unit is used frequently, do not cut off the power supply after the unit is shut down. Otherwise, the compressor cannot be heated, causing damages.
- If the unit is not in service for a long time and the power supply needs to be cut off, the unit should be connected to the power supply 12 hours prior to re-starting of the unit, to pre-heat the compressor, pump, heat exchanger and differential pressure valve.

1) Start up the controller and check whether the unit displays a fault code. If a fault occurs, address and remove the fault first. After determining that there is no fault existing in the unit, start the unit according to the operating method in the unit control instruction.

2) Conduct trial run for 30 minutes. When the inlet and outlet temperature become stabilized, adjust the water flow to the rated value, to ensure normal operation of the unit.

3) After the unit is shut down, it should be put back into operation 10 minutes later, to avoid frequent start of the unit.

4) In the end, check whether the unit meets the requirements according to the contents in Table 10.1.

Table 10.1 Final Start-Up Checklist

Items	Description	Acceptance method and specification requirements	Yes	No
Unit installation and acceptance	Whether the appearance integrity of the unit meets the requirements	No scratches, fins inverted, etc		
	Check whether the attached accessories are complete	Please refer to the appendix		
	Whether the integrity of the internal systems and components of the unit meets the requirements.	No pipe bump, loose parts and leaks		
	Whether the unit installation three-dimensional space meets the requirements	See the installation space requirements of the unit in the instruction manual for details		
	Whether the installation base height of the unit meets the requirements	The base height of the cold temperature zone should be ≥ 500 mm/19.68 in; The base height of other temperature zones should be ≥ 300 mm/11.81 in		
	Whether the vibration reduction measures of the unit and water pump meet the requirements	Standard damping parts or damping springs have been installed		
	Whether the unit is installed on a firm foundation and leveling meets the requirements	Fixed bolts are locked and levelled with horizontal instruments		
	Whether the air inlet and outlet space of the wind side heat exchanger meet the requirements	Air circulation and no shelter around the heat exchanger		
	Whether the unit against direct sunlight, water pump rain meet the requirements	Confirm that there is no direct sunlight sensor and that the water pump has rain protection measures		
	Whether after-sales maintenance and repair work space meet the requirements	The sheet metal around the unit is convenient for disassembly and electric control box maintenance space		

	Whether the snow protection measures of the unit meet the requirements	The height of the base should be more than 200 mm higher than the maximum snowfall height in the area, and snow and ice removal should be performed regularly to ensure the normal operation of the unit		
	Whether the noise of the unit has an impact on the surrounding environment and whether the resonance of the unit has an impact on the building	Noise reduction and resonance avoidance measures for noise-sensitive areas		
Water system installation and acceptance	Whether the installation of the entire water system and the appearance of the water tank meet the requirements	See the standard water system installation connection diagram in the instruction manual for details		
	Whether the pump head and flow meet the design requirements	Calculate the pump head and total flow of the whole engineering system		
	Whether the water supply control of the water system meets the design requirements	Check the reliability of the water supply control, the test pressure is not lower than the water pressure corresponding to the pump head		
	Whether the water quality of the water system meets the design requirements.	See the water quality control requirements in the instruction manual for details		
	Whether the water pipe specifications of single and multiple units meet the requirements	See the pipe diameter requirements corresponding to pipe diameter accounting in the Instructions for details		
	Whether the end cleaning and tight pressure to meet the requirements	Ensure that the end and unit are disconnected to maintain pressure and clean, control the water pressure value		
	Whether the water system pipeline cleaning and tight pressure to meet the requirements	See the acceptance specification for pressure holding, sealing and cleaning in the Instruction Manual for details		
Water system installation and acceptance	Whether the highest point of the water system and the high point of the branch emptying measures meet the requirements	Check the location and number of exhaust valves at the branch and the highest point		
	Whether the low point of the water system and the low point drainage measures of the branch meet the requirements	Check that drain valves are provided at all the low points to allow complete drain of the entire system.		
	Whether the entire water system pipeline, water tank and valve insulation to meet the requirements	Check the thickness and adhesive quality of insulation cotton, and the protective layer is fixed		
	Whether the installation of water flow switch of the unit meets the requirements	See the installation requirements of water flow switch in the instruction manual for details		
	Whether the water system filtration and descaling device installation meets the requirements	The flow direction of the strainer, the mesh number and technical requirements of the strainer		
	Whether the total water temperature sensor installation of the entire water system meets the requirements	See the installation requirements of the total water temperature sensor in the instruction manual for details		
	Ethylene glycol percentage (if available)	Confirm the glycol percentage		
	Whether to open all isolation valves (or globe valves)	Open or not		
	Water channel cleaning	Ensure water quality		
	Cleaning of strainers	Make sure the strainer is clean		
Electrical installation and acceptance	Whether the circuit and electrical components inside the electrical control box meet the requirements	Check electrical components and wiring plugs, terminals are loose		
	Whether the integrity of lines and protection devices inside the unit meets the requirements	Check the cable ties, fasteners, sensors are disconnected, etc		
	Whether the power supply voltage and frequency of the unit meet the design requirements	The main supply voltage value is in the range of 414 V-506 V, and the frequency is 60 Hz		
	Whether the power phase sequence wiring and wire specifications meet the design requirements	See the wire diameter specification and check the phase sequence wiring in the instruction manual for details		
	Whether the protection switch specifications of the system meet the design requirements	See the technical requirements for protection switch in the instruction manual for details		

Electrical installation and acceptance	Whether the electrical control box needs external access to the weak line wiring meets the requirements	Check that the access line corresponds to the identification of the terminal row, and the terminal is locked		
	Whether the linkage control of pump control cabinet and unit meets the design requirements	The linkage test run and acceptance of water pump and unit on site		
	Whether the connection between the wired controller and the unit and the power supply meet the design requirements	The three-core communication line and shielding layer of the wired controller are properly connected, and the power supply source requirements		
	Whether the dial settings of the host and the slave are correct when multiple sets are installed	Note the dial code settings of the master and slave units, and note the water flow Settings of the main machine		
	Whether the lock of each terminal meets the design requirements at the site	Make sure all lugs and terminals are locked before test run		
	Whether the earthing of power supply, the internal earthing of unit and electric control box meet the design requirements	Check the effectiveness of earthing measures with a multimeter on site		
	Whether the lightning protection net of the unit site meets the design requirements	Check the existing lightning protection measures and the lightning protection network system of the access building		
	Whether the power preheating reaches 12 hours	Compressor protection		

11 MAINTENANCE

11.1 Error Code

In case the unit runs under abnormal condition, error codes will display on both control panel and wired controller, and the indicator on the wired controller will flash with 1Hz. The display codes are shown in the following Table11.1.

Table 11.1 Error Codes

No.	Code	Content	Note
1	E0	Midea/clivet model mismatch fault	The capability selection is inconsistent with the actual model. Power on again after setting correctly
2	E1	Phase sequence error of main control board check	Recovered upon failure recovery
3	E2	Communication failure between master and the HMI or master and salve	Recovered upon failure recovery
	2E2	Communication failure between main control and extension board	Recovered upon failure recovery
	3E2	Communication failure between master and salve in a unit	Recovered upon failure recovery
4	E3	Total water outlet temperature sensor failure	Recovered upon failure recovery
5	E4	Unit water outlet temperature sensor failure	Recovered upon failure recovery
6	1E5	Condenser tube temperature sensor T3A failure	Recovered upon failure recovery
7	E6	Water tank temperature sensor T5 failure	Recovered upon failure recovery
8	E7	Ambient temperature sensor failure	Recovered upon failure recovery
9	E8	Power supply phase sequence protector output error	Recovered upon failure recovery
10	E9	Water flow detection failure	Failure locking for 3 times in 60 minutes(Recovered by power off or Wired controller clear fault)
11	1Eb	Taf1 the pipe of the tank antifreeze protection sensor failure	Recovered upon failure recovery
12	2EB	Taf2 cooling evaporator low-temperature antifreeze protection sensor failure	Recovered upon failure recovery
13	Ed	System discharge temperature sensor failure	Recovered upon failure recovery
14	1EE	EVI plate heat exchanger refrigerant temperature T6A sensor failure	Recovered upon failure recovery
	2EE	EVI plate heat exchanger refrigerant temperature T6B sensor failure	Recovered upon failure recovery
15	EF	Unit water return temperature sensor failure	Recovered upon failure recovery
16	EP	Discharge sensor failure alarm	Recovered upon failure recovery
17	EU	Tz sensor failure	Recovered upon failure recovery
18	P0	System high-pressure protection or discharge temperature protection	for 3 times in 60 minutes (Recovered by power off)
	1P0	System high-pressure switch disconnect protection	Recovered upon failure recovery
19	P1	System low pressure protection（or Severe refrigerant leakage protection)	for 3 times in 60 minutes (Recovered by power off)
20	P3	T4 ambient temperature too high in cooling mode	Recovered upon failure recovery
21	P4	1P4 System A current protection	for 3 times in 60 minutes (Recovered by power off)
		2P4 System A DC bus current protection	
22	P6	Inverter module failure	Recovered upon error recovery
23	P7	High temperature protection of system condenser	for 3 times in 60 minutes (Recovered by power off)
24	P9	Water inlet and outlet temperature difference protection	Recovered upon failure recovery
25	PA	Abnormal water inlet and outlet temperature difference protection	Recovered upon failure recovery
26	PC	Cooling evaporator pressure too low	Recovered upon error recovery
27	PE	Cooling evaporator low temperature antifreeze protection	Recovered upon error recovery
28	PH	Heating T4 too high temperature protection	Recovered upon error recovery
29	PL	Tfin module temperature too high protection	for 3 times in 100 minutes(Recovered by power off)
	1PU	DC fan A module protection	Recovered upon failure recovery
30	1bH	Module 1 failure	Recovered upon error recovery

No.	Code	Content	Note
31	H5	Voltage too high or too low	Recovered upon error recovery
32	1H9	Compressor inverter module is not matched	Recovered upon error recovery
33	HC	High pressure sensor failed	Recovered upon error recovery
34	1HE	No inset A valve error	Recovered upon error recovery
	2HE	No inset B valve error	Recovered upon error recovery
	3HE	No inset C valve error	Recovered upon error recovery
35	1F0	IPM module A transmission error	Recovered upon error recovery
36	F2	Superheat insufficient	Wait at least 20min before recovering
37	F4	1F4 module 1L0 or 1LE protection occurs for 3 times in 60 minutes	Recovered by power off
38	1F6	A system bus voltage error (PTC)	Recovered upon error recovery
39	Fb	Low pressure sensor error	Recovered upon error recovery
40	Fd	Suction temperature sensor error	Recovered upon error recovery
41	1FF	DC fan A error	Recovered by power off
42	FP	DIP switch inconsistency of multiple water pumps	Recovered by power off
43	1L10	Overcurrent protection	Overcurrent fault
	1L11	Transient phase current overcurrent protection	
	1L12	Phase current overcurrent lasts 30s protection	
44	1L20	Module over temperature protection	Over temperature fault
45	1L31	Low bus voltage error	Power fault
	1L32	High bus voltage error	
	1L33	Excessively high bus voltage error	
	1L34	Phase loss error	
46	1L43	Phase current sampling bias abnormal	hardware fault
	1L45	Motor code not match	
	1L46	IPM protection	
	1L47	Module type not match	
47	1L50	Startup failure	Control fault
	1L51	Out of step error	
	1L52	Zero speed error	
48	1L60	Fan motor phase loss protection	Diagnostic fault
	1L65	IPM short circuit error	
	1L66	FCT detection error	
	1L6A	Open circuit of U-phase upper tube	
	1L6B	Open circuit of U-phase lower tube	
	1L6C	Open circuit of V-phase upper tube	
	1L6D	Open circuit of V-phase lower tube	
	1L6E	Open circuit of W-phase upper tube	
	1L6F	Open circuit of W-phase lower tube	

11.2 Main Board Digital Display

The data display area is divided into upper and lower area, with two groups of two-digit half 7-segment digital display, respectively.

1) Temperature display:
Temperature display is used for displaying the mixed outlet water temperature of unit system, individual outlet water temperature, condenser pipe temperature T3A of system A, condenser pipe temperature T3B of system B, outdoor environmental temperature T4, anti-freezing temperature T6 and setting temperature Ts, with allowable data display range 5 °F – 158 °F (-15 °C – 70 °C). If the temperature is higher than 158 °F (70 °C), it is displayed as 158 °F (70 °C). If there is no effective data, it displays "— —" and indication point is on.

2) Current display:
Current display is used for displaying Modular unit system A compressor current IA or system B compressor current IB, with allowable display scope 0A~99A. If it is higher than 99A, it is displayed as 99A. If there is no effective data, it displays "— —" and indication point is on.

3) Failure display
It is used for displaying the total failure warning data of unit or a Modular unit, with failure display scope E0~EF, E indicating failure. 0~F indicating failure code. "E-" is displayed when there is no failure and indication point is on at the same time.

4) Protection display
It is used for displaying the system protection data of unit or the system protection data of Modular unit, with protection display scope P0~PF. P indicating system protection, 0~F indicating protection code. "P-" is displayed when there is no failure.

5) Unit number display
It is used for displaying the address number of the currently selected Modular unit, with display scope 0~15 and indication point is on at the same time.
6)Display of online unit number and startup unit number
They are used for displaying the total online Modular units of the whole unit system and the number of the Modular unit under running state, respectively, with display scope 0~16.

Any time when the spot check page is entered to display or change Modular unit, it is needed to wait for the up-to-date data of the Modular unit received and selected by wired controller.

Before receiving the data, the wired controller only displays "——" on the data display lower area, and the upper area displays the address number of the Modular unit. No page can be turned, which continues until the wired controller receives the communication data of this Modular unit.

11.3 Care and Maintenance

11.3.1 Maintenance Period

It's recommended that before cooling in summer and heating in winter every year, consult local air conditioner customer service center to check and service the unit, to prevent HVAC system errors which could cause thermal discomfort and inconvenience to the occupants.

11.3.2 Critical Checks

Close attention should be paid to the discharge and suction pressure during the running process. Find out the causes and eliminate the failure if abnormality is found.

Control and protect the equipment. Make sure no random adjustment can be made on the set points on site.

Regularly check whether the electric connection is loose, and whether there is bad contact at the contact point caused by oxidation and debris etc. and take timely measures if necessary.

Frequently check the working voltage, current and phase balance.

Check the reliability of the electric elements. Ineffective and unreliable elements should be replaced in time.

11.4 Removing Scale

After long-time operation, calcium oxide or other minerals will be settled in the heat transfer surface of the water-side heat exchanger. These substances will affect the heat transfer performance when there is too much scale in the heat transfer surface and sequentially cause that electricity consumption increases, and the discharge pressure is too high (or suction pressure too low). Organic acids such as formic acid, citric acid and acetic acid may be used to clean the scale. But in no circumstance should cleaning agent containing fluoroacetic acid or fluoride should be used as the water-side heat exchange is made from stainless steel and is easy to be eroded to cause refrigerant leakage. Pay attention to the following aspects during the cleaning and scale removing process:

1) Water-side heat exchanger cleaning should be done be professionals. Please contact the local HVAC customer service center.

2) Clean the pipe and heat exchanger with clean water after cleaning agent is used. Install water treatment device to prevent water system from being eroded or re-absorption of scale.

3) In case of using cleaning agent, adjust the density of the agent, cleaning time and temperature according to the scale settlement condition.

4) After the cleaning is completed, neutralization treatment needs to be done on the waste liquid. Contact relevant company for treating the waste liquid.

5) Protection equipment (such as goggles, gloves, mask and shoes) must be used during the cleaning process to avoid breathing in or contacting the agent as the cleaning agent and neutralization agent can cause irritation to eyes, skins and nasal mucosa.

11.5 Winter Shut Down

For shutdown in winter, the inside and outside surface of the unit should be cleaned and dried. Cover the unit to prevent dust. Open discharge water valve to discharge the stored water in the water system to prevent freezing accident. It is preferable to inject antifreeze in the pipe).

11.6 Parts Replacement

Parts to be replaced should be the ones provided by the original manufacturer. Never replace any part with different part.

11.7 Re-Start After Long-Time Shut Down

The following preparations should be made for re-start up of unit after long-time shutdown:

1) Thoroughly check and clean unit.

2) Clean water pipe system.

3) Check pump, control valve and other equipment of water pipe system.

4) Fix connections of all wires.

5) It is a must to electrify the machine 12 hours before startup.

11.8 Refrigeration System

Determine whether refrigerant is needed by checking the value of suction and discharge pressure and check whether there is a leakage. Airtight test must be made if there is a leakage, or any part of refrigeration system is to be replaced. Take different measures in the following two different conditions from refrigerant injection.

1) Total leakage of refrigerant.
In case of such situation, leakage detection must be made on the pressurized nitrogen used for the system. If repair welding is needed, welding cannot be made until all the gas in the system is discharged or recovered. Before injecting refrigerant, the whole refrigeration system must be completely dry and of vacuum pumping. Connect vacuum pumping pipe at the fluoride nozzle at low-pressure side. Remove air from the system pipe with vacuum pump. The vacuum pumping lasts for above 3 hours. Confirm the pressure in dial gauge is within the specified scope. When the required degree of vacuum is reached, inject refrigerant into the refrigeration system with refrigerant bottle. Appropriate amount of refrigerant for injection has been indicated on the nameplate and the table of main technical parameters. Refrigerant must be injected from the low-pressure side of system. The injection amount of refrigerant will be affected by the ambient temperature. If the required amount has not been reached but no more injection can be done, make the chilled water circulate and start up the unit for injection. Make the low-pressure switch temporarily short circuit if necessary.

2) Refrigerant supplement.
Connect refrigerant injection bottle on the fluoride nozzle at low-pressure side and connect pressure gauge at low pressure side. Make chilled water circulate, start up unit, and make the low-pressure control switch short circuit if necessary. Slowly inject refrigerant into the system and check suction and discharge pressure.

⚠ CAUTION

- When injection is completed, the short-circuited low-pressure switch must be reset.
- Never inject oxygen, acetylene or other flammable or poisonous gas to the refrigeration system for leakage detection and airtight test. Only pressurized nitrogen or refrigerant can be used.

11.9 Compressor Disassembling

Follow the following procedures if compressor needs to be disassembled:

1) Cut off the power supply of unit.

2) Remove power source connection wire of compressor.

3) Remove suction and discharge pipes of compressor.

4) Remove fastening screw of compressor.

5) Move the compressor.

11.10 System Anti-freezing

In case of freezing at the water-side heat exchanger internal channel, severe damage may be caused, i.e. heat exchange may be broken and cause leakage. This damage of frost crack is not within the warranty scope, so special attention is required by the owner and operator.

1) If the unit that is shutdown for standby and it is placed in an environment where the outdoor temperature is lower than 32 °F (0 °C), the water in the water system should be drained.

2) Water pipe may be frozen when the water flow controller and anti-freezing temperature senor become ineffective at running. Therefore, the flow controller must be connected in accordance with the connection diagram.

3) Frost crack may happen to water-side heat exchanger at maintenance when refrigerant is injected to the unit or is discharged for repair. Pipe freezing is likely to happen any time when the pressure of refrigerant is below 0.4 MPa. Therefore, the water in the heat exchanger must be kept flowing or be thoroughly discharged.

4) When the water flow switch is off during the operation, the unit will display the fault code, and the pump and compressor will stop running. When the fault disappears, the pump will run again and check whether the water flow is normal. If it is still abnormal, the pump will stop running.

5) When the temperature of the antifreeze temperature sensor is detected lower than the set value, the compressor will stop the cooling operation, the unit will display the fault code, the pump will continue to run and detect the temperature of the antifreeze temperature sensor. If it still does not rise to the set value, the unit will start the heating operation until the water temperature is heated up to the set value.

11.11 Water Flow Switch Antifreezing

When the unit is shut down and powered off at a lower ambient temperature and if it is placed in an outdoor environment with a temperature below 35.6 °F (2 °C), the water flow switch inside the unit should be removed (as shown in the figure below), and the remaining water should be dried completely before reinstalling it in place.

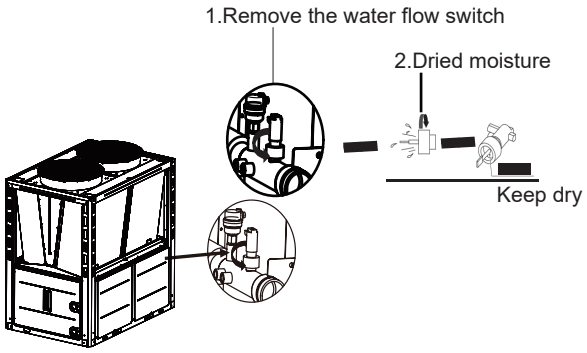


Figure 11.1 Flow Switch Drying

11.12 Frost Protection

The system design must consider the following methods as a whole:
1) Ensure continuous water circulation in the pipes and heat exchangers.

2) Apply additional heating to the exposed pipes (inside and outside) as well as devices along the pipes.

3) Add appropriate amount of glycol solution to the water system.

4) If the unit does not work during the winter, clean and drain the water in heat exchanger and pipes completely.

⚠ WARNING

- It is the installers' and/or maintenance personnel's responsibility to ensure that the above antifreeze methods are used.
- Ensure proper protection against freezing is always maintained.
- Failure to follow the above instructions may result in damage to the equipment and a significant leak of refrigerant.

NOTICE

- Note that damage caused by freezing is not covered by the warranty.
- Electric heater (available on request).
- Heat trace is installed on water-side components (water-water heat exchangers and expansion tanks, etc.) to protect key components of the water system.
- The on-site ammonia heat trace must be provided by the trained installation personnel.

11.13 Y-Type Strainer

The Y-type strainer must be installed.
1) Function of Y-type Strainer

Used to strainer impurities and particles from water. Protect the heat exchanger from being damaged. Protect the water flow switch to ensure operation. Protect water pumps, valves, water meters and other equipment from being turned off warning

2) Y-type Strainer Selection
Y-type strainer should meet standards according to the technical parameters provided by the Y-type strainer manufacturer. Additional water resistance should be accounted in the calculation of pump selection.

3) Installation Precautions
Ensure that the use of pressure should be within the specified range, to avoid excessive pressure on the Y-type strainer to cause damage.
Before installing the Y-type strainer, the inside of the Y-type strainer must be thoroughly cleaned to ensure the efficiency of the Y-type strainer.

⚠ WARNING

- Not installing Y-type strainer or installing incorrect Y-type device will lead to heat exchanger damage, resulting in the leakage of refrigerant and serious consequences.

NOTICE

- It is noted that the Y-type strainer will accumulate certain impurities after a period of use, affecting the filtration efficiency. Therefore, the Y-type strainer should be cleaned regularly.
- If you want to clean or replace the Y strainer, close the valves on both sides and start cleaning after reducing pressure. Empty the impurities, clean the mesh strainer or replace the mesh strainer as needed. When replacing the mesh strainer, it is necessary to select the mesh strainer with the matching specification and model of the Y-type strainer to ensure the filtration efficiency.

11.14 Maintenance Checklist

11.14.1 By the User

Table 11.2 User Maintenance Checklist

Item	Recommended Frequency	YES	NO
Clean the surrounding of the outdoor unit	Once a month		

11.14.2 By the Installer

Table 11.3 Installer Maintenance Checklist

Item	Recommended Frequency	YES	NO
General			
Check if all the parts are in the proper position	Once a year		
Water Loop			
Check if the water pressure is sufficient	Once a year		
Clean the strainer in water system	Once a year		
Check if the flow switch works in good condition	Once a year		
Check if the water pressure relief valve (in water system) works in good condition	Once a year		
Check if the insulation of backup heater is in good condition	Once a year		
Check if there is water leakage in the water loop Take care if anti-refrigerant is applied	Once a year		
Wiring and Electrical Parts			
Check if the temperature sensor works in good condition	Once a year		
Check if the wiring and cables of the installation is in good condition	Once a year		
Check if the contactors and circuit breakers work in good condition	Once a year		
Refrigerant Loop			
Check if there is refrigerant leakage in the refrigerant loop	Once a year		

Table 11.4 Maintenance Records

Model:	Code labeled on the unit:
Customer name and address:	Date:

1. Check temperature of chilled water or hot water

   Inlet ( ) Outlet ( )

2. Check air temperature of air-side heat exchanger:

   Inlet ( ) Outlet ( )

3. Check refrigerant suction temperature and superheating temperature:

   Refrigerant suction temperature: ( ) ( ) ( ) ( ) ( )

   Superheating temperature: ( ) ( ) ( ) ( ) ( )

4. Check pressure:

   Discharge pressure: ( ) ( ) ( ) ( ) ( )

   Suction pressure: ( ) ( ) ( ) ( ) ( )

5. Check running current: ( ) ( ) ( ) ( ) ( )

6. Whether unit has been through refrigerant leakage test? ( )

7. Whether there is noise on all the panels of unit? ( )

8. Check whether the main power source connection is correct. ( )

Table 11.5 Routine Check Record

Model:			Date:												
Weather:			Operation time: Startup ( ) Shutdown ( )												
Outdoor temperature	Dry bulb	°F													
	Wet bulb	°F													
Indoor temperature		°F													
Compressor	High pressure	psi													
	Low pressure	psi													
	Voltage	V													
	Current	A													
Air temperature of air-side heat exchanger	Inlet (dry bulb)	°F													
	Outlet (dry bulb)	°F													
Temperature of chilled water or hot water	Inlet	°F													
	Outlet	°F													
Current of cooling water pump or hot water pump		A													
Note:															

12 TECHNICAL DATA

Table 12-1

Model		Unit	HP500
Power supply		V/PH/Hz	460//3/60
Cooling[1]	Capacity	TR	37.85
	Input Power	kBtu/h	162.2
		kW	47.55
	EER	Btu/(W*h)	9.55
		COP	2.80
	IPLV	Btu/(W*h)	19.76
Heating 47 °F / 105 °F (8.3 °C / 40.6 °C) LWT[2]	Capacity	kBtu/h	494.1
		kW	144.8
	Input Power	kBtu/h	129.7
		kW	37.90
	COP	kW/kW	3.81
Heating 17 °F / 105 °F (-8.33 °C / 40.56 °C) LWT[2]	Capacity	kBtu/h	393.6
		kW	115.4
	Input Power	kBtu/h	156.2
		kW	45.68
	COP	kW/kW	2.52
Heating 47 °F / 120 °F (8.33 °C / 48.89 °C) LWT[2]	Capacity	kBtu/h	486.1
		kW	142.5
	Input Power	kBtu/h	146.4
		kW	42.88
	COP	kW/kW	3.32
Heating 17 °F / 120 °F (-8.33 °C / 48.89 °C) LWT[2]	Capacity	kBtu/h	392.6
		kW	115.1
	Input Power	kBtu/h	176.8
		kW	51.77
	COP	kW/kW	2.22
Sound Pressure[3]	Cooling	dB(A)	71.2
	Heating	dB(A)	72.9
Refrigerant[4]	Refrigerant Name	-	R32(675)
	Total Charge	lbs (kg)	24.25 (11.0) × 2
	Factory Charge	lbs (kg)	12.125 (5.5) × 2
	Additional Charge	lbs (kg)	12.125 (5.5) × 2
Compressor	Type	-	Inverter Scroll × 2
	Oil Type	-	FW68HT
Water side heat exchanger	Type	-	Plate
	Water Pressure Drop	psi	4.39
		kPa	30.3
	Maximum Allowable Pressure in the Water Circuit	MPa	0.6
	Standard Flow (Cooling/Heating)	gpm	90.48
		m^3/h	20.55
	Inlet/Outlet Diameter (Water Pipe)	inch	2-1/2(DN65)
Fan	type	-	BLDC
	Number of Fans	-	2
	Air Flow Rate	cfm	13849*2
		m^3/h	23530*2
Net weight		lbs	2315
		kg	1050
Net Dimensions	W x H x D	inch	90-3/16 × 98-7/16 × 61-13/16
		mm	2290 × 2500 × 1570
Operating Ambient Temperature Range	Cooling	°F	5~131
		°C	-15~55
	Heating	°F	-22~118.4
		°C	-30~48
Supply Water Temperature Range[5]	Cooling	°F	14~77
		°C	-10~25
	Heating	°F	77~143.6
		°C	25~62

1. AHRI 550/590 cooling capacity conditions: 95 °F (35 °C) ambient air, 54 °F (12.22 °C) EWT and 44 °F (6.67 °C) LWT.
2. Full load heating performance tested to AHRI standard 550/590.
3. Sound pressure tested at 3.3 feet (1 m).
4. This product contains fluorinated greenhouse gases R32, GWP - Global warning potential: 675.
5. The standard maximum heating supply water temperature for HP500 is 140 °F (60 °C), and 143.6 °F(62 °C) can be customized; Antifreeze fluid is needed when water temperature is less than 41°F (5°C).
6. Some specifications may change, for reference only.

16127100A14330 V.B

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印刷技术要求

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规格	210*297 mm （双面）
颜色	黑白
其他	/

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