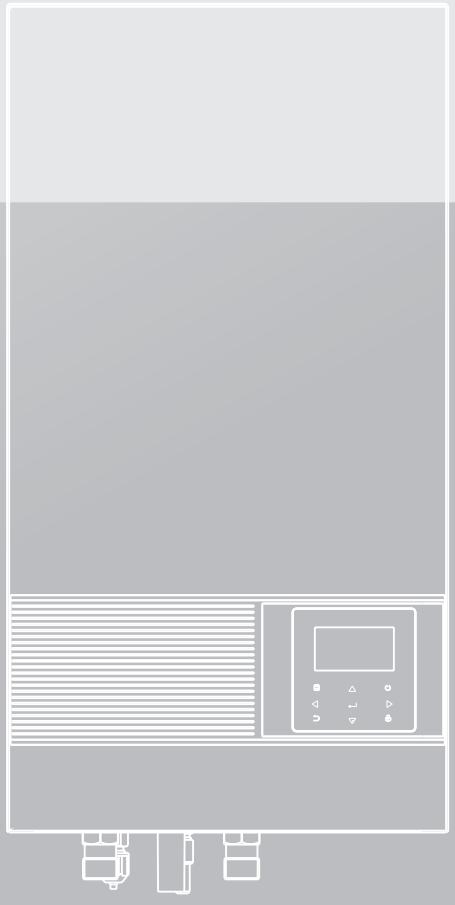
INSTALLATION AND OWNER'S MANUAL

M-thermal split

Indoor unit



IMPORTANT NOTE:

Original instructions.

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

All the pictures in this manual are for illustrations purpose only.

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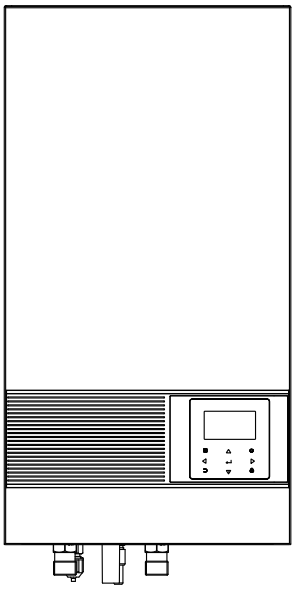
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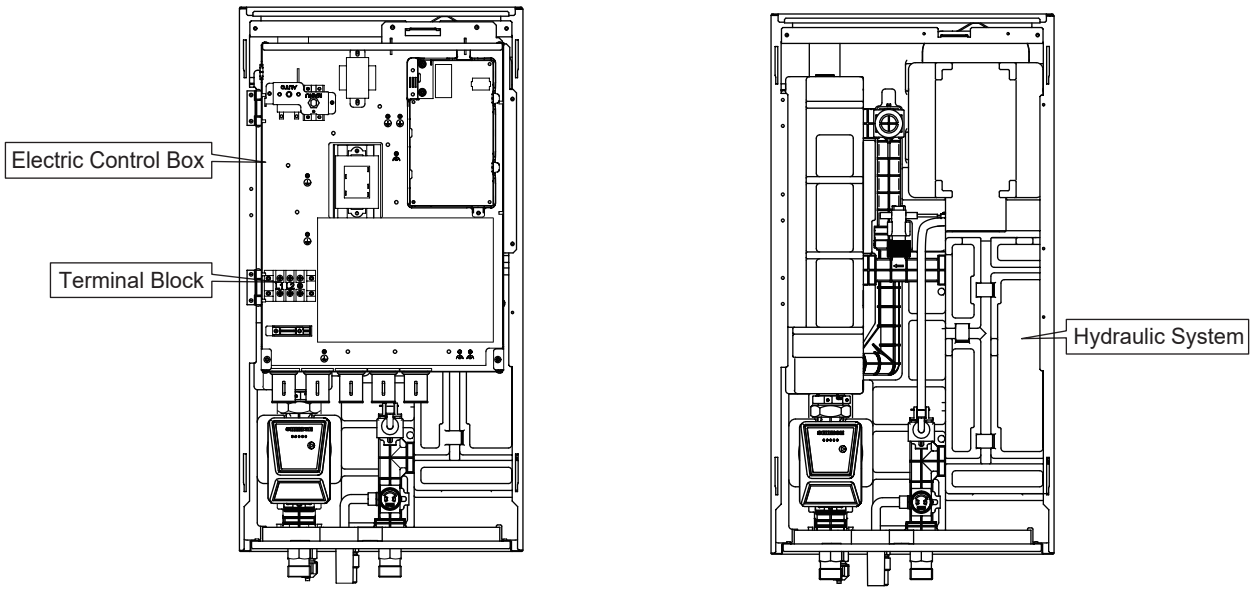
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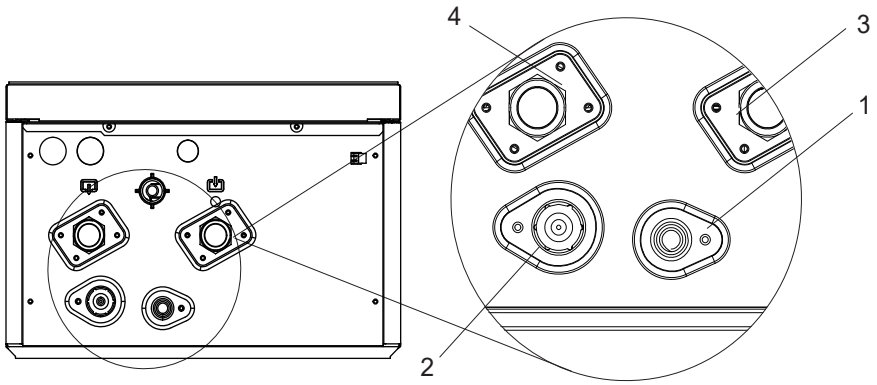
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Diameter(in/mm)			
1	2	3	4
3/8(9.53)	5/8(15.88)	1(25.4)	1(25.4)

Technical Specifications

Outdoor unit				MHA-V12WD2MN8-B2	MHA-V14WD2MN8-B2	MHA-V16WD2MN8-B2
Power supply				208/230 V~ 60 Hz		
Heating	A44.6W95 °F A7W35 °C	Capacity	Btu/h(kW)	41 283(12.1)	49 471(14.5)	54 589(16)
		Rated input	kW	2.44	3.09	3.56
		COP	W/W	4.95	4.70	4.50
	A44.6W113 °F A7W45 °C	Capacity	Btu/h(kW)	41 965(12.3)	48 448(14.2)	54 589(16)
		Rated input	kW	3.24	3.89	4.44
		COP	W/W	3.80	3.65	3.60
	A44.6W131 °F A7W55 °C	Capacity	Btu/h(kW)	40 942(12)	47 083(13.8)	54 589(16)
		Rated input	kW	3.87	4.6	5.52
		COP	W/W	3.10	3.00	2.90
	A35.6W95 °F A2W35 °C	Capacity	Btu/h(kW)	31 730(9.3)	38 895(11.4)	44 353(13)
		Rated input	kW	2.35	3.12	3.71
		COP	W/W	3.95	3.65	3.50
	A35.6W113 °F A2W45 °C	Capacity	Btu/h(kW)	36 506(10.7)	39 918(11.7)	43 671(12.8)
		Rated input	kW	3.57	4.09	4.49
		COP	W/W	3.00	2.86	2.85
	A35.6W131 °F A2W55 °C	Capacity	Btu/h(kW)	38 895(11.4)	42 306(12.4)	45 718(13.4)
		Rated input	kW	4.47	5.06	5.58
		COP	W/W	2.55	2.45	2.40
	A19.4W95 °F A-7W35 °C	Capacity	Btu/h(kW)	34 118(10)	40 942(12)	45 377(13.3)
		Rated input	kW	3.33	4.29	4.93
		COP	W/W	3.00	2.80	2.70
	A19.4W113 °F A-7W45 °C	Capacity	Btu/h(kW)	34 800(10.2)	40 259(11.8)	44 012(12.9)
		Rated input	kW	4.25	5.02	5.78
		COP	W/W	2.40	2.35	2.23
	A19.4W131 °F A-7W55 °C	Capacity	Btu/h(kW)	34 118(10)	37 530(11)	42 648(12.5)
		Rated input	kW	4.88	5.37	6.19
		COP	W/W	2.05	2.05	2.02
Cooling	A95W64.4 °F A35W18 °C	Capacity	Btu/h(kW)	40 942(12)	46 059(13.5)	48 448(14.2)
		Rated input	kW	3	3.74	3.93
		EER	Btu/(W*h)	13.65	12.33	12.33
		COP	W/W	4	3.61	3.61
	A95W44.6 °F A35W7 °C	Capacity	Btu/h(kW)	39 577(11.6)	43 330(12.7)	47 765(14)
		Rated input	kW	4.22	4.98	5.71
		EER	Btu/(W*h)	9.38	8.70	8.37
		COP	W/W	2.75	2.55	2.45

Outdoor Unit			MHA-V12WD2MN8-B2	MHA-V14WD2MN8-B2	MHA-V16WD2MN8-B2
Rated water flow		gpm	9.25	10.79	12.11
		m³/h	2.1	2.45	2.75
Compressor	Type		Twin rotary DC inverter		
Outdoor fan	Motor type		Brushless DC motor		
	Number of fans		1		
Air side heat exchanger	Type		Finned tube		
Refrigerant (R32)	Factory charge	lb(kg)	4.04 (1.835)		
Throttle type			Electronic expansion valve		
Piping connections	Type		Flare		
	Liquid Dia.(OD)	in(mm)	3/8 (9.53)		
	Gas Dia.(OD)	in(mm)	5/8 (15.88)		
	Min. pipe length	ft(m)	6.5 (2)		
	Max. pipe length	ft(m)	98 (30)		
Installation height difference	Outdoor unit above	ft(m)	65.5 (20)		
	Outdoor unit below	ft(m)	65.5 (20)		
Sound pressure level (39.37 in /1m) [1]		dB(A)	49 / 51 / 57		
ODU Net dimensions (WxHxD)		in(mm)	44x34-1/16x20-9/16 (1 118x865x523)		
ODU Net		lb(kg)	213.85 (97)		
Operating temperature range	Cooling	°F(°C)	23 to 110 (-5 to 43)		
	Heating	°F(°C)	-13 to 95 (-25 to 35)		
	DHW	°F(°C)	-13 to 110 (-25 to 43)		

Indoor Unit				HB-A160CMDM30GN8-B2
Function				Heating and cooling
Setting water temperature range	Cooling		°F(°C)	41~77 (5~25)
	Heating		°F(°C)	77~149 (25~65)
	DHW [2]		°F(°C)	68~140 (20~60)
Power supply				208/230 V~ 60 Hz
Backup E-heater	Standard mounted		kW	3
	Capacity steps			1
	Power supply	3 kW		208/230 V~ 60 Hz
Sound pressure level (39.37 in /1m) [1]			dB(A)	35
Dimension (WxHxD)			in(mm)	16-9/16x31-1/8x10-5/8 (420x790x270)
Net weight			lb(kg)	88.2 (40)
Water circuit	Piping connections		in(mm)	NPT 1" (NPT 25.4 mm)
	Safety valve set pressure		psi(bar)	43.51 (3)
	Drain pipe connection		in(mm)	1 (25.4)
	Expansion tank	Volume	gallon(L)	1.32 (5)
		Max. water pressure	psi(bar)	43.51 (3)
		Pre-pressure	psi(bar)	21.8 (1.5)
	Water side exchanger			Plate type
	Water pump head		ft(m)	29.5 (9)
	Water flow range		gpm(m³/h)	3.08~13.21 (0.7~3)
	Internal water volume		gallon(L)	0.66-1.93 (2.5-7.3)
Refrigerant circuit	Liquid Dia. (0D)		in(mm)	3/8 (9.53)
	Gas Dia. (0D)		in(mm)	5/8 (15.88)

NOTICE

1. Sound pressure level is the maximum value tested under the two conditions of Heating: A44.6W95 °F (A7W35 °C) and Cooling: A95W64.4 °F (A35W18 °C).
2. Maximum domestic hot water temperature 140 °F (60 °C) is only available with TBH support.
3. Some specifications may change, for reference only.

1 SAFETY PRECAUTIONS

The precautions listed here are divided into the following types. They are quite important, so be sure to follow them carefully.
Read these instructions carefully before installation. Keep this manual in a handy place for future preference.

Hazard Definitions

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product .

DANGER

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

WARNING

WARNING indicates a 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.

SAFETY INSTRUCTIONS

Safety instruction(or equivalent) signs indicate specific safety-related instructions or procedures.

DANGER

- Before 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, give the piping time to return to normal temperature or be sure to wear protective gloves.
- Do not touch any switch with wet fingers. Touching a switch with wet fingers can cause electrical shock.
- Before touching electrical parts, turn off all applicable power to the unit.

WARNING

- Tear apart and throw away plastic packaging bags so that children will not play with them. Children playing with plastic bags face danger of death by suffocation.
- 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 the unit falling from its mount.
- Install the unit on a foundation that can withstand its weight. Insufficient physical strength may cause the equipment to fall and possibly cause 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 certain that all electrical work is carried out by qualified personnel according to the local laws and regulations and this manual using a separate circuit. Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks or fire.
- Be sure to install a ground fault circuit interrupter according to local laws and regulations. Failure to install a 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 forces. Incomplete connection or affixing may cause a fire.
- When wiring the power supply, form 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 work, check to 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 and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor and other refrigerant cycle parts. Burns or frostbite are possible if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation. Touching the internal parts can cause burns. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Every working procedure that affects safety means shall only be carried out by competent persons.
- Examples for such working procedures are: breaking into the refrigerating circuit; Opening of sealed components; Opening of ventilated enclosures.

⚠ WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

Do not pierce or burn the unit.

Be aware that refrigerants may not contain an odor.

⚠ WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons who lack experience and knowledge, unless they are supervised or have been given instructions concerning the use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

Any person who is involved with working on or opening a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment credential.

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 a person competent in the use of flammable refrigerants.

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to minimize the risk of ignition.

⚠ WARNING

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

General

This appliance contains A2L flammable refrigerant R32.

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 refrigerating circuit;
– opening of sealed components;
– opening of ventilated enclosures.

General

⚠ WARNING

- **Pipe-work shall be in compliance with national and local codes and standards.**
- The pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed;
- After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements;
- The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

  -field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 0.012 lbs per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected;

  -taking into consideration the length and diameter of the connecting refrigerant piping, add refrigerant to complete the installation according to the information provided on the label for determining the required additional refrigerant charge, as well as the instructions in this manual on how to complete the refrigerant charge.
- The minimum INSTALLED HEIGHT shall comply with the corresponding requirements in this manual.
- Protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects, for example the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris;
- Provision shall be made for expansion and contraction of long runs of piping;

WARNING

This appliance contains FLAMMABLE REFRIGERANTS, the minimum floor area of the room shall comply with the requirements in the " Required Minimum Room Area" table within this manual;

The detailed information on the following topics is included in the manual:

-function, operation and required servicing measures;

-specified end-of-life and replacement instructions;

-other information about REFRIGERANT DETECTION SYSTEMS.

Unventilated areas

WARNING

The appliance contains more than m1 (6 times LOWER FLAMMABILITY LIMIT) for any refrigerating circuit, an unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.

The applice shall be stored in an area where the room size corresponds to the room area as specified for operation;

The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example an operating electric heater, hot surfaces);

The appliance shall be stored so as to prevent mechanical damage from occurring.

Information on servicing

General

CAUTION

Servicing shall **Be Performed Only By Trained and Certified Service Personnel.**

Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, Clause “Work procedure” to Clause “No ignition sources” shall be completed prior to conducting work on the system.

Work procedure

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

General work area

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

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

Checking for presence of refrigerant

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

Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

No ignition sources

No person carrying out work in relation to a **refrigerating system** which involves exposing any pipe work shall use any sources 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 is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

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. A degree of ventilation shall continue 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.

Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance.

*The following checks shall be applied to installations using **flammable refrigerants**:*

*– the **refrigerant charge** is in accordance with the room size within which the refrigerant containing parts are installed;*

– the ventilation machinery and outlets are operating adequately and are not obstructed;

– if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

– marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

– refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which can corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Checks to 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, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate

temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

– that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

– that no live electrical components and wiring are exposed while charging, recovering or purging the system;

– that there is continuity of earth bonding.

Repairs to sealed components and intrinsically safe components

⚠ WARNING

Sealed electrical components shall be replaced if it fails or is damaged.

Repair to intrinsically safe components

⚠ WARNING

Intrinsically safe components must be replaced if it fails or is damaged.

Wiring

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

Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

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

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of **flammable refrigerants**, the sensitivity can be inadequate, or can need re-calibration. (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 ***LFL*** of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipe-work.

NOTE Examples of leak detection methods are

– bubble method,

– fluorescent agent method.

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant 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 “ Refrigerant removal and circuit evacuation”

Refrigerant removal and circuit evacuation

⚠ CAUTION

Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. 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 regulations;
- evacuate;
- purge the circuit with inert gas;
- continuously flush with inert gas when using flame to open circuit;
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance 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 appliances 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 (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). 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 ventilation shall be available.

CAUTION

An inert gas, specifically, is dry oxygen free nitrogen(OFN).
The system shall be “flushed” with OFN to render the unit safe. This process may need to be repeated several times.

CAUTION

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

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 refrigerating system is grounded prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already labeled).
- Extreme care shall be taken not to overfill the refrigerating 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.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, 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) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

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 cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with 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 completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

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

Labeling

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. 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.

Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is required to follow 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 labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete 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 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.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that **flammable refrigerant** does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

⚠CAUTION

Be sure the heat pump is grounded. In order to avoid electric shock, make sure that the unit is grounded and that the ground wire is not connected to a gas or water pipe, lightning conductor or telephone ground wire.

Do not operate the heat pump with a wet hands. An electric shock may happen.

Do not operate the heat pump when using a room fumigation-type insecticide. Failure to observe this precaution could cause the chemicals to become deposited in the unit, which could endanger the health of those who are hypersensitive to chemicals. It may also cause the refrigerant sensor to alarm.

To avoid oxygen deficiency, ventilate the room sufficiently if equipment with a burner is used together with the heat pump.

Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause wetting of the building, furniture, etc.

Never touch the internal parts of the controller. Do not remove the front panel. Some parts inside are dangerous to touch, and machine troubles may occur.

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.

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.

Storage package protection should be constructed 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 regulations.

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.

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

Do not place appliances which produce open flame in places exposed to the air flow from the unit or under the indoor unit. It may cause incomplete combustion or deformation of the unit due to the heat.

Do not install the heat pump in a location where flammable gas may leak out. If the gas leaks out and stays around the heat pump, a fire may break out.

⚠WARNING

The appliance uses R32 refrigerant.



⚠WARNING

These instructions are exclusively intended for qualified contractors and authorized installers.

Work on the refrigerant circuit with mild flammable refrigerant in safety group A2L may only be carried out by authorized heating contractors. These heating contractors must be trained in accordance with UL 60335-2-40, Section HH. The certificate of competence from an industry accredited body is required.

Work on electrical equipment may only be carried out by a qualified electrician.

Before initial commissioning, all safety – related points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

Special requirements for R32

⚠WARNING

- Do NOT have refrigerant leakage and open flame.
- Be aware that the R32 refrigerant does NOT contain an odor.

⚠WARNING

- Do NOT re-use joints which have been used already.
- Joints made in installation between parts of refrigerant system shall be accessible for maintenance purposes.

WARNING

Make sure installation, servicing, maintenance and repair comply with instructions and with applicable legislation (for example national gas regulation) and are executed only by authorized persons.

CAUTION

- Pipework should be protected from physical damage.
- Installation of pipework shall be kept to a minimum length.

PRECAUTIONS ON REFRIGERANT LEAKAGE

In UL/CSA 60335-2-40, R32 refrigerant is classified as class A2L, which is mildly flammable. Therefore, R32 refrigerant is suitable for systems needing additional refrigerant charge and which will limit the area of the rooms being served by the system.

The total amount of refrigerant in the system shall be less than or equal to the allowable maximum refrigerant charge. The allowable maximum refrigerant charge depends on the area of the rooms being served by the system.

If the total refrigerant charge in the system is < 4.04 lb(1.835kg), there are no additional installation room minimum floor area requirements. Use the first column of Table 1 to determine minimum floor area requirement of the installation room.

If the total refrigerant charge in the system is ≥ 4.04 lb(1.835kg), you need to comply with additional minimum floor area requirements as described in the following diagrams, tables and flow chart. The diagrams show an example installation room and, if required, a secondary natural ventilation room. The flow chart steps through the process of determining the minimum floor area requirement per the refrigerant charge and IDU installation height. The tables provide the values needed to step through the flow chart.

Table 1-Minimum floor area per refrigerant charge & IDU installation height: indoor unit.

Table 2-Minimum venting opening area to secondary room for natural ventilation: indoor unit.

CAUTION

The space considered shall be any space which contains refrigerant-containing parts or into which refrigerant could be released.

For installation of the indoor unit, refer to the corresponding installation and operation manual. If an indoor unit is installed in an unventilated area, the area shall be so constructed that should any refrigerant leak, it will not stagnate to create a fire or explosion hazard.

*installation height (h0) is measured from the floor to the bottom of the indoor unit.

The room area (A) of the smallest, enclosed, occupied space shall be used in the determination of the refrigerant quantity limits.

For determination of room area (A) when used to calculate the refrigerant charge limit, the following shall apply. The room area (A) shall be defined as the room area enclosed by the projection to the base of the walls, partitions and doors of the space in which the appliance is installed.

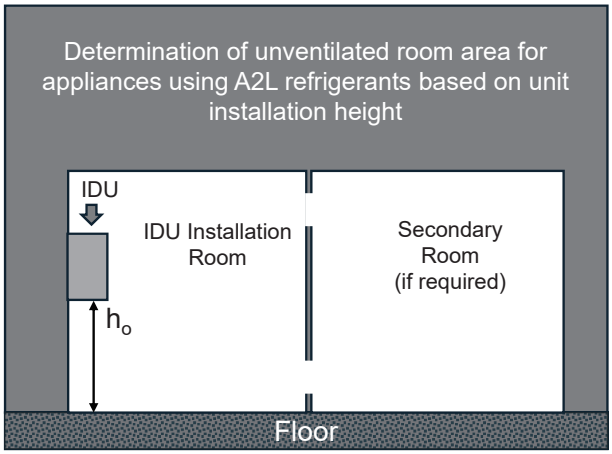
Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space. Units mounted higher than 70-7/8 in(1.8m) and spaces divided by partition walls that are no higher than 62-7/8(1.6m) in shall be considered a single space.

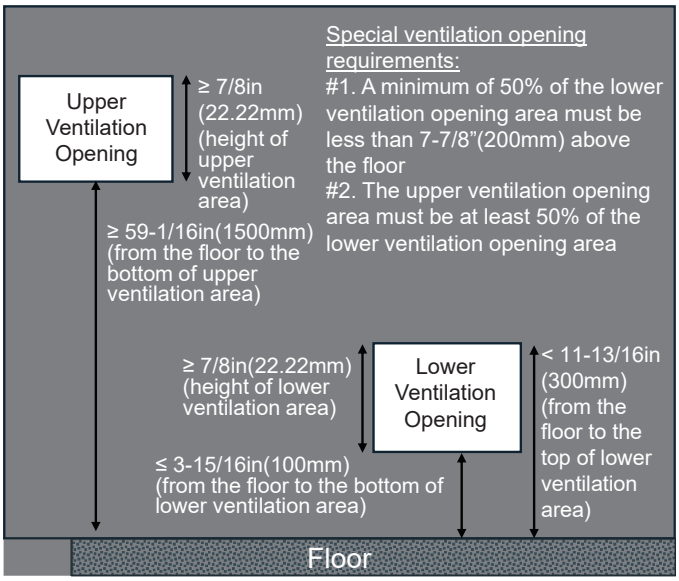
Rooms on the same floor and connected by an open passageway between the spaces can be considered a single room when determining compliance to Amin, if the passageway complies with all the following.

1) It is a permanent opening.

2) It extends to the floor.

3) It is intended for people to walk through.


Determination of unventilated room area for appliances using A2L refrigerants based on unit installation height
IDU
IDU Installation Room
Secondary Room (if required)
h_o
Floor


Special ventilation opening requirements:
#1. A minimum of 50% of the lower ventilation opening area must be less than 7-7/8"(200mm) above the floor
#2. The upper ventilation opening area must be at least 50% of the lower ventilation opening area
Upper Ventilation Opening
≥ 7/8in (22.22mm) (height of upper ventilation area)
≥ 59-1/16in(1500mm) (from the floor to the bottom of upper ventilation area)
Lower Ventilation Opening
≥ 7/8in(22.22mm) (height of lower ventilation area)
< 11-13/16in (300mm) (from the floor to the top of lower ventilation area)
≤ 3-15/16in(100mm) (from the floor to the bottom of lower ventilation area)
Floor

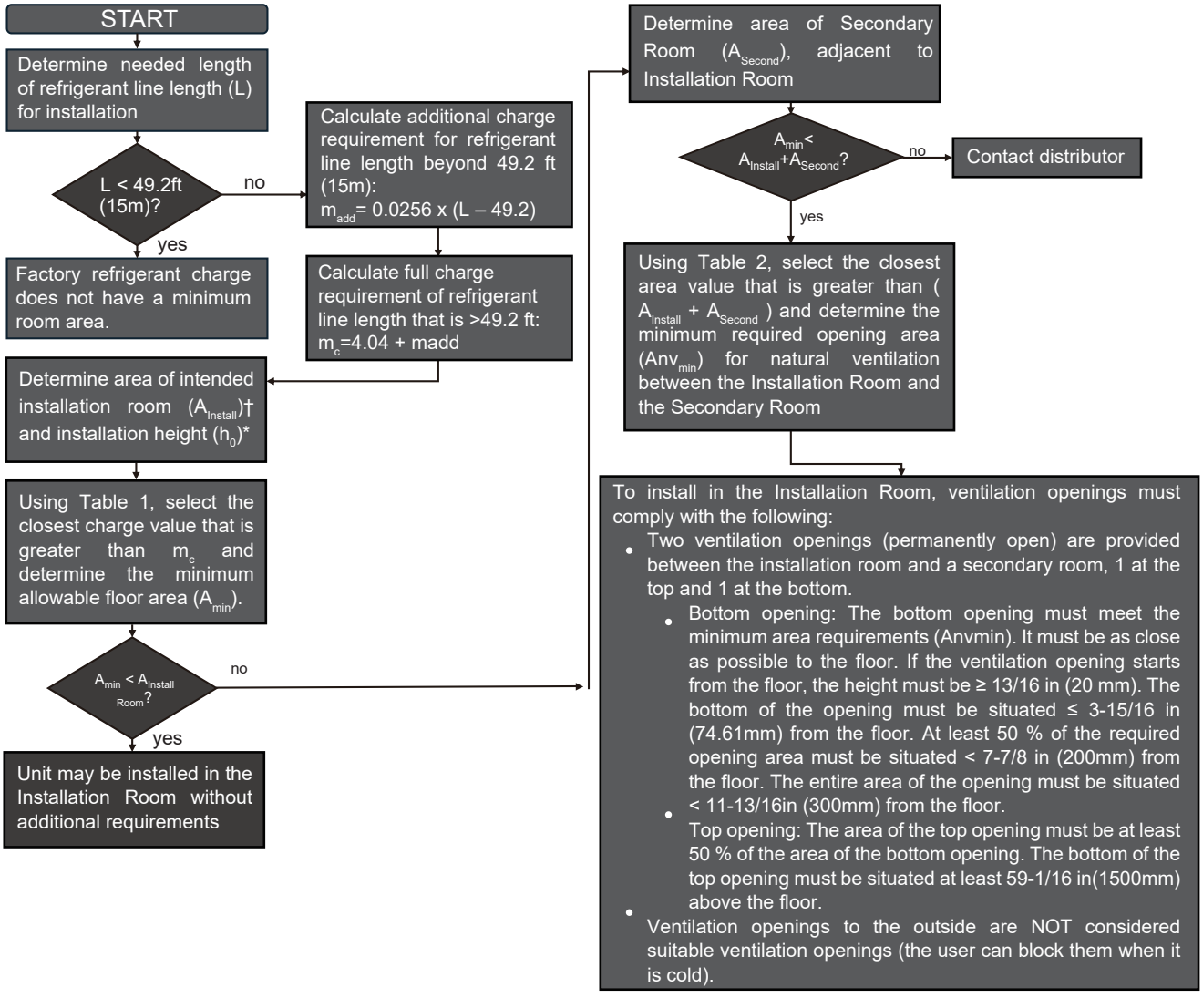

START
Determine needed length of refrigerant line length (L) for installation
L < 49.2ft (15m)?
no
yes
Calculate additional charge requirement for refrigerant line length beyond 49.2 ft (15m):
m_{add}= 0.0256 x (L – 49.2)
Factory refrigerant charge does not have a minimum room area.
Calculate full charge requirement of refrigerant line length that is >49.2 ft:
m_c=4.04 + madd
Determine area of intended installation room ($A_{Install}$)† and installation height (h_0)*
Using Table 1, select the closest charge value that is greater than m_c and determine the minimum allowable floor area (A_{min}).
A_{min} < $A_{Install\ Room}$?
no
yes
Unit may be installed in the Installation Room without additional requirements
Determine area of Secondary Room (A_{Second}), adjacent to Installation Room
A_{min} < $A_{Install}$+A_{Second}?
no
Contact distributor
yes
Using Table 2, select the closest area value that is greater than ($A_{Install}$ + A_{Second}) and determine the minimum required opening area (Anv_{min}) for natural ventilation between the Installation Room and the Secondary Room
To install in the Installation Room, ventilation openings must comply with the following:
• Two ventilation openings (permanently open) are provided between the installation room and a secondary room, 1 at the top and 1 at the bottom.
  • Bottom opening: The bottom opening must meet the minimum area requirements (Anvmin). It must be as close as possible to the floor. If the ventilation opening starts from the floor, the height must be ≥ 13/16 in (20 mm). The bottom of the opening must be situated ≤ 3-15/16 in (74.61mm) from the floor. At least 50 % of the required opening area must be situated < 7-7/8 in (200mm) from the floor. The entire area of the opening must be situated < 11-13/16in (300mm) from the floor.
  • Top opening: The area of the top opening must be at least 50 % of the area of the bottom opening. The bottom of the top opening must be situated at least 59-1/16 in(1500mm) above the floor.
• Ventilation openings to the outside are NOT considered suitable ventilation openings (the user can block them when it is cold).

Table 1 - Minimum required Room Area

Refrigerant line length ft(m)	System Charge, m_{max} lbs(kg)	Install height-ho (in/m)					
		63 (1.6)	60 (1.52)	56 (1.42)	52 (1.32)	48 (1.22)	44 (1.12)
		Minimum room area, Amin(ft²/m²)					
≤49.2(15)	4.04(1.835)	No limit	No limit	No limit	No limit	No limit	No limit
55.8(17)	4.21(1.91)	83.9 (7.79)	88.1 (8.18)	94.4(8.77)	101.7(9.45)	110.2(10.24)	120.2(11.17)
62.3(19)	4.38(1.99)	87.3 (8.11)	91.6 (8.51)	98.2(9.12)	105.7(9.82)	114.5(10.64)	125.0(11.61)
68.9(21)	4.54(2.06)	90.6 (8.42)	95.1 (8.84)	101.9(9.47)	109.8(10.2)	118.9(11.05)	129.7(12.05)
75.4(23)	4.71(2.14)	94.0 (8.73)	98.6 (9.16)	105.7(9.82)	113.8(10.57)	123.3(11.45)	134.5(12.50)
82.0(25)	4.88(2.21)	97.3 (9.04)	102.2 (9.49)	109.5(10.17)	117.9(10.95)	127.7(11.86)	139.3(12.94)
88.6(27)	5.05(2.29)	100.6 (9.35)	105.7 (9.82)	113.2(10.52)	121.9(11.32)	132.1(12.27)	144.1(13.39)
95.1(29)	5.21(2.36)	104.0 (9.66)	109.2 (10.15)	117.0(10.87)	126.0(11.71)	136.5(12.68)	148.9(13.83)
98.4(30)	5.30(2.40)	105.6 (9.81)	110.9 (10.30)	118.9(11.05)	128.0(11.89)	138.7(12.89)	153.7(14.28)

Refrigerant line length ft(m)	System Charge, m_{max} lbs(kg)	Install height-ho (in/m)				
		40 (1.02)	36 (0.91)	32 (0.81)	28 (0.71)	24 (0.61)
		Minimum room area, Amin(ft²/m²)				
≤49.2(15)	4.04(1.835)	No limit	No limit	No limit	No limit	No limit
55.8(17)	4.21(1.91)	132.2 (12.28)	146.9 (13.65)	183.4 (17.04)	239.6 (22.26)	326.1 (30.30)
62.3(19)	4.38(1.99)	137.4 (12.76)	156.7 (14.56)	198.3 (18.42)	259.0 (24.06)	352.5 (32.75)
68.9(21)	4.54(2.06)	142.7 (13.26)	168.9 (15.69)	213.8 (19.86)	279.2 (25.94)	380.1 (35.31)
75.4(23)	4.71(2.14)	148.0 (13.75)	181.6 (16.87)	229.8 (21.35)	300.2 (27.89)	408.6 (37.96)
82.0(25)	4.88(2.21)	157.7 (14.65)	194.7 (18.09)	246.5 (22.90)	321.9 (29.91)	438.2 (40.71)
88.6(27)	5.05(2.29)	168.8 (15.68)	208.4 (19.36)	263.7 (24.50)	344.4 (32.00)	468.8 (43.55)
95.1(29)	5.21(2.36)	180.2 (16.74)	222.4 (20.66)	281.5 (26.15)	367.7 (34.16)	500.4 (46.49)
98.4(30)	5.30(2.40)	186.0 (17.28)	229.6 (21.33)	290.6 (27.00)	379.6 (35.27)	516.7 (48.00)

Table 2 - Minimum required Ventilation Opening

Room area (ft^2/m²)	Install height-ho (in/m)					
	63 (1.6)	60 (1.52)	56 (1.42)	52 (1.32)	48 (1.22)	44 (1.12)
	Minimum Ventilation Opening, Anvmin (in²/cm²)					
515(47.85)	---	---	---	---	---	---
450(41.81)	---	---	---	---	---	---
400(37.16)	---	---	---	---	---	---
350(32.52)	---	---	---	---	---	---
250(23.23)	---	---	---	---	---	---
200(18.58)	---	---	---	---	---	---
150(13.94)	---	---	---	---	---	1.5 (9.68)
95(8.83)	---	---	---	7.8 (50.32)	16.4 (105.81)	25.8 (166.45)
75(6.97)	---	4.5 (29.03)	11.1 (71.61)	18.3 (118.06)	26 (167.74)	34.4 (221.94)
40(3.72)	22 (141.94)	25.4 (163.87)	30.3 (195.48)	35.6 (229.68)	41.4 (267.1)	47.8 (308.39)

Room area (ft^2/m²)	Install height-ho (in/m)				
	40 (1.02)	36 (0.91)	32 (0.81)	28 (0.71)	24 (0.61)
	Minimum Ventilation Opening, Anvmin (in²/cm²)				
515(47.85)	---	---	---	---	0.1 (0.65)
450(41.81)	---	---	---	---	15.9 (102.58)
400(37.16)	---	---	---	---	28 (180.64)
350(32.52)	---	---	---	8.1 (52.26)	40 (258.06)
250(23.23)	---	---	12.9 (83.23)	36.3 (234.19)	63.5 (409.68)
200(18.58)	---	10.6 (68.39)	29 (187.1)	50.1 (323.23)	74.6 (481.29)
150(13.94)	14.4 (92.9)	28.7 (185.16)	44.8 (289.03)	63.2 (407.74)	84.8 (547.1)
95(8.83)	36.2 (233.55)	47.8 (308.39)	60.8 (392.26)	75.9 (489.68)	93.8 (605.16)
75(6.97)	43.7 (281.93)	54.1 (349.03)	65.9 (425.16)	79.6 (513.55)	95.8 (618.06)
40(3.72)	54.9 (354.19)	62.9 (405.81)	72 (464.52)	82.7 (533.55)	95.5 (616.13)

2 BEFORE INSTALLATION

- **Before installation**

  Be sure to confirm the model name and the serial number of the unit.

CAUTION

Frequency of Refrigerant Leakage Checks
- For unit that contains fluorinated greenhouse gases in quantities of 5 tonnes of CO_2 equivalent or more,but of less than 50 tonnes of CO_2 equivalent,at least every 12 months, or where a leakage detection system is installed, at least every 24 months.
- For unit that contains fluorinated greenhouse gases in quantities of 50 tonnes of CO_2 equivalent or more, but of less than 500 tonnes of CO_2 equivalent at least every six months, or where a leakage detection system is installed, at least every 12 months.
- For unit that contains fluorinated greenhouse gases in quantities of 500 tonnes of CO_2 equivalent or more,at least every three months, or where a leakage detection system is installed,at least every six months.
- This air-conditioning unit is a hermetically sealed equipment that contains fluorinated greenhouse gases.
- Only certificated person is allowed to do installation, operation and maintenance.

3 INSTALLATION SITE

WARNING

- There is flammable refrigerant in the unit and it should be installed in a well-ventilated site. If the unit is installed inside, an additional refrigerant detection device and ventilation equipment must be added in accordance with the standard EN378. Be sure to adopt adequate measures to prevent the unit from being used as a shelter by small animals.
- Small animals making contact with electrical parts can cause malfunction, smoke or fire. Please instruct the customer to keep the area around the unit clean.
- The equipment is not intended for use in a potentially explosive atmosphere.

- Select an installation site where the following conditions are satisfied and one that meets with your customer's approval.
  - Places that are well-ventilated.
  - Safe places which can bear the unit's weight and vibration and where the unit can be installed at an even level.
  - Places where there is no possibility of flammable gas or product leak.
  - The equipment is not intended for use in a potentially explosive atmosphere.
  - Places where servicing space can be well ensured.
  - Places where the units' piping and wiring lengths come within the allowable ranges.
  - Places where water leaking from the unit cannot cause damage to the location (e.g. in case of a blocked drain pipe).
  - Do not install the unit in places often used as a work space. In case of construction work (e.g. grinding etc.) where a lot of dust is created, the unit must be covered.
  - Do not place any object or equipment on top of the unit (top plate)
  - Do not climb, sit or stand on top of the unit.
  - Be sure that sufficient precautions are taken in case of refrigerant leakage according to relevant local laws and regulations.

CAUTION

The indoor unit should be installed in an indoor water proof place, or the safety of the unit and the operator cannot be ensured.

The indoor unit is to be wall mounted in an indoor location that meets the following requirements:

- The installation location is frost-free.
- The space around the unit is adequate for serving, see figure 4-3.
- The space around the unit allows for sufficient air circulation.
- There is a provision for condensate drain and pressure relief valve blow-off.

CAUTION

When the unit running in the cooling mode, condensate may drop from the water inlet and water outlet pipes. Please make sure the dropping condensate will not result in damage of your furniture and other devices.

- The installation surface is a flat and vertical non-combustible wall, capable of supporting the operation weight of the unit.
- All piping lengths and distance have been taken into consideration.

Table 3-1

Requirement	Value
Maximum allowable piping length between the 3-way valve SV1 and the indoor unit (only for installations with domestic hot water tank)	9.84 ft (3m)
Maximum allowable piping length between the domestic hot water tank and the indoor unit (only for installations with domestic hot water tank). The temperature sensor cable supplied with the indoor unit is 32.8 ft(10m) in length.	26.24 ft (8m)（a）
Maximum allowable piping length between the TW2 and the indoor unit. The temperature sensor a cable of TW2 supplied with the indoor unit is 32.8 ft(10m) in length.	26.24 ft (8m)

(a) The static pressure of the tank differs. In case of the tank with high static pressure, the maximum piping length might be lower than 26.24 ft (10m).

4 INSTALLATION PRECAUTIONS

4.1 Dimensions

Dimensions of the wall bracket:

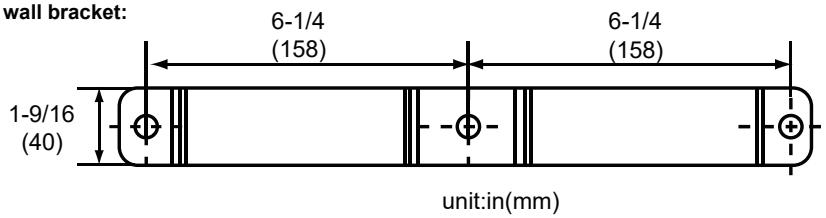


Fig.4-1

Dimensions of the unit:

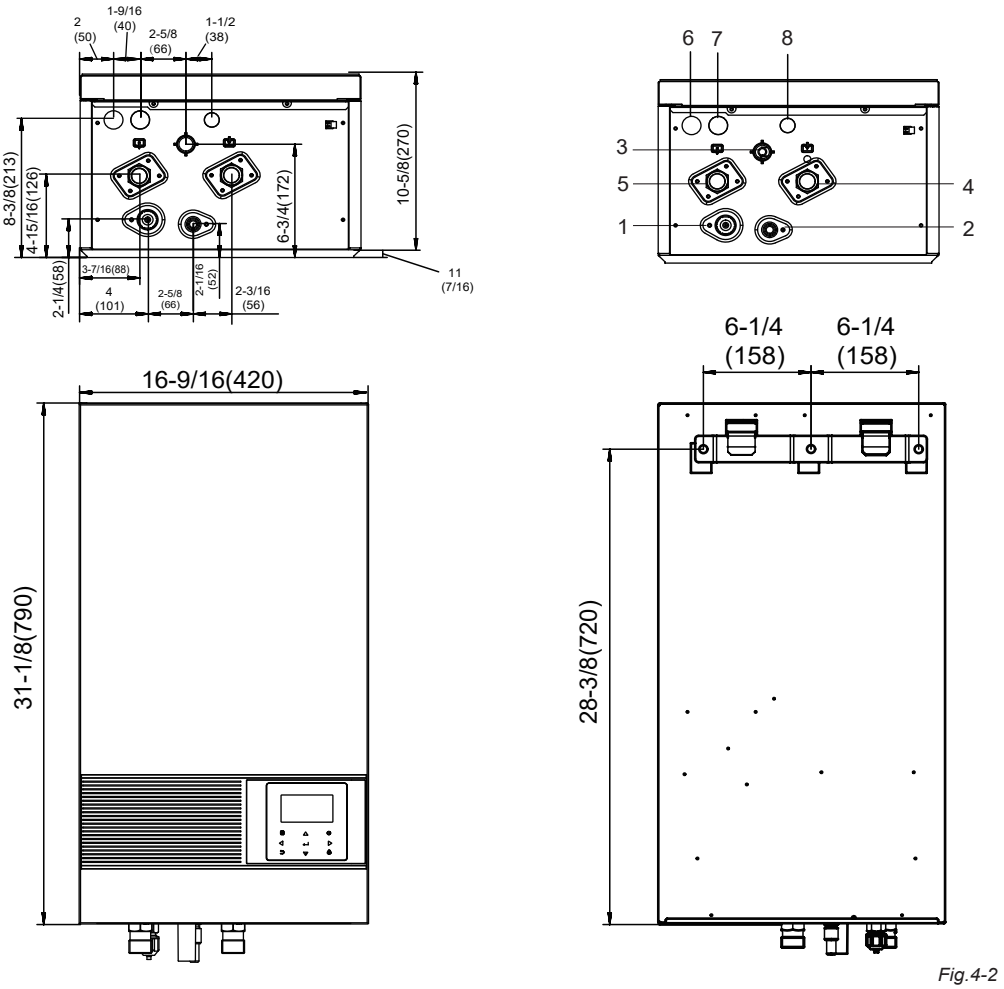


Fig.4-2

unit:in(mm)

NO.	
1	Refrigerant gas pipe size 5/8"(15.88mm)，connection size 7/8"(22.22mm)-14UNF
2	Refrigerant liquid pipe size 3/8"(9.53mm)，connection size 5/8"(15.88mm)- 18UNF
3	Drain ∅ 25
4	Water Inlet 1"(25.4mm)NPT
5	Water Outlet 1"(25.4mm)NPT
6	Wiring hole ∅ 28.3
7	Wiring hole ∅ 28.3
8	Wiring hole ∅ 22.5

4.2 Installation requirements

- The indoor unit is packed in a box.
- At delivery, the unit must be checked and any damage must be reported immediately to the carrier claims agent.
- Check if all indoor unit accessories are enclosed.
- Bring the unit as close as possible to the final installation position in its original package in order to prevent damage during transport.
- The indoor unit weight is approximately 88.2 lb(40kg) and should be lifted by two persons.

⚠ WARNING

Do not grasp the control box or pipe to lift the unit!

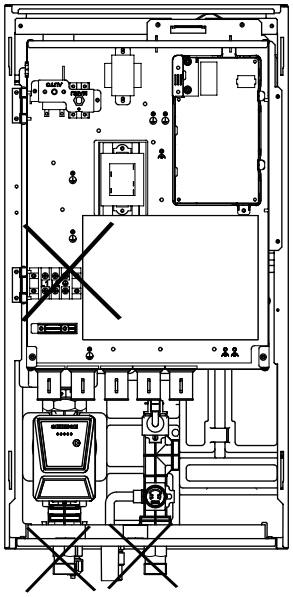
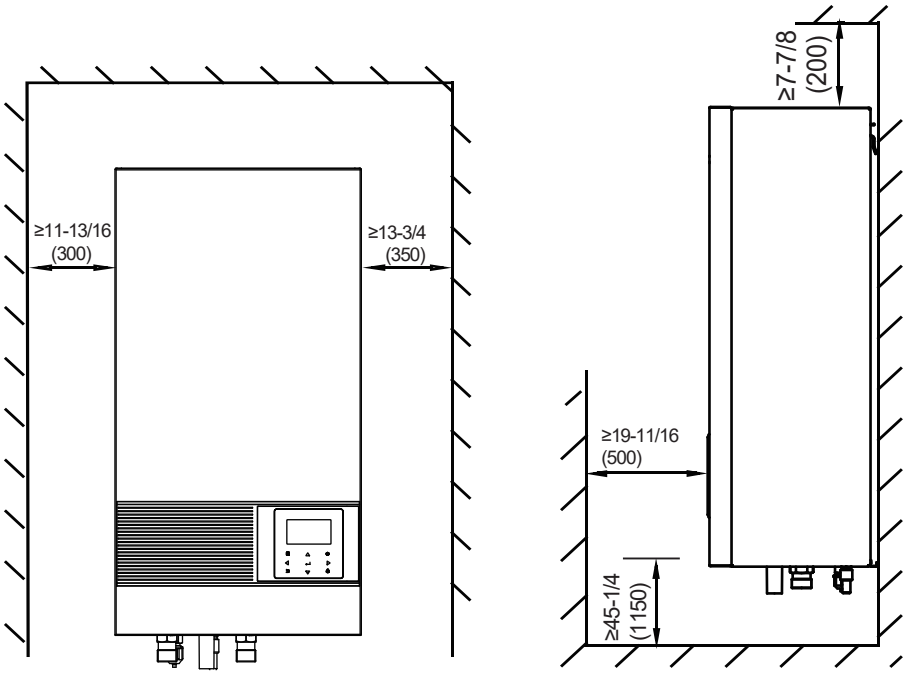


Fig.4-3

4.3 Servicing space requirements



unit:in(mm)

Fig.4-4

4.4 Mounting the indoor unit

- Fix the wall mounting bracket to the wall using appropriate plugs and screws.
- Make sure the wall mounting bracket is horizontal level.
- Pay special attention to prevent overflow of the drain pan.
- Hang the indoor unit on the wall mounting bracket.

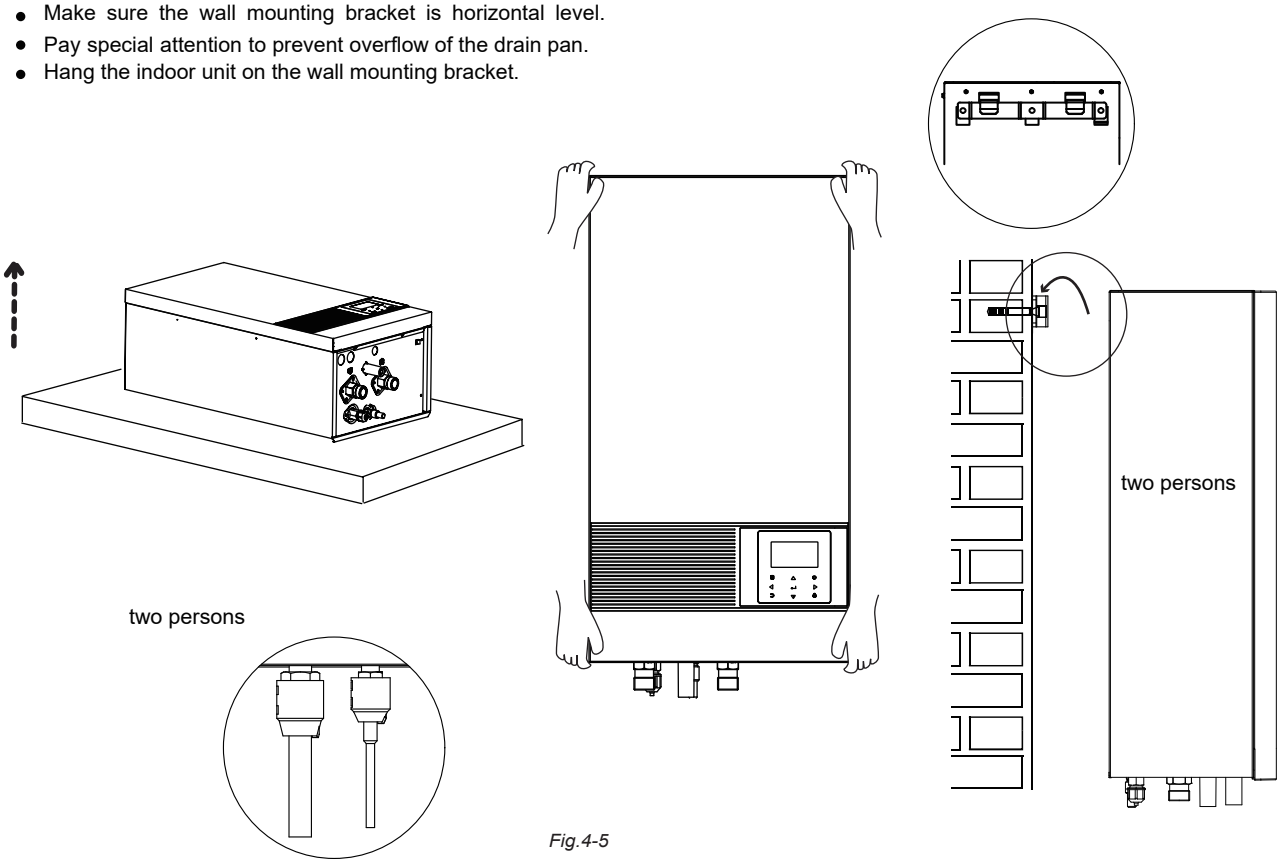


Fig.4-5

4.5 Refrigerant pipe connection

WARNING

The pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE15，ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

The installation of pipe-work shall be kept to a minimum.

All joints made in the installation between parts of the refrigerating system, with at least one part charged, shall be made in accordance with the following:

— A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe or any uncharged refrigerating system part.
— Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.
— Refrigerant tubing shall be protected or enclosed to avoid damage.
— Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during normal operation shall be protected against mechanical damage.

Compliance is checked according to the installation instructions and a trial installation, if necessary.

Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

For installations with field applied joints that are exposed in the occupied space，these joints shall be at least one of the following:

— Mechanical joints in compliance with ISO 14903 or UL 207 (U.S. only).
— Welded or brazed joints.
— Joints in enclosures that vent to the unit or to the outside.

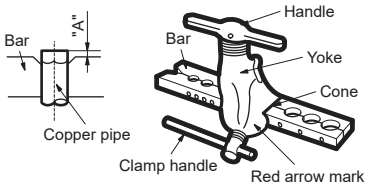
Compliance is checked by inspection and tests.

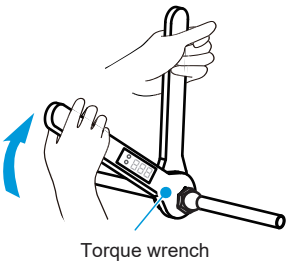
⚠ WARNING

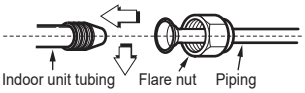
After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements.
The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected.

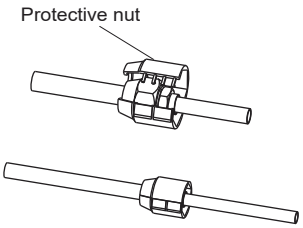
- Align the center of the pipes.
- Sufficiently tighten the flare nut with fingers, and then tighten it with a spanner and torque wrench .
- The protective nut is a one-time part, it can not be reused. In case it is removed, it should be replaced with a new one.

Outer diam.	Tightening torque(lb.ft/Nm)	Additional tightening torque(lb.ft/Nm)
ϕ3/8	18.45(25)	19.19(26)
ϕ5/8	33.21(45)	34.69(47)









- In order to application convenient, first, application the refrigerant liquid pipe and refrigerant gas pipe, and then, application the water pipe.

⚠ CAUTION

- The installation of pipe-work shall be kept to a minimum.
- Excessive torque can break nut on installation conditions.
- When flared joints are reused indoors,the flare part should be re-fabricated.

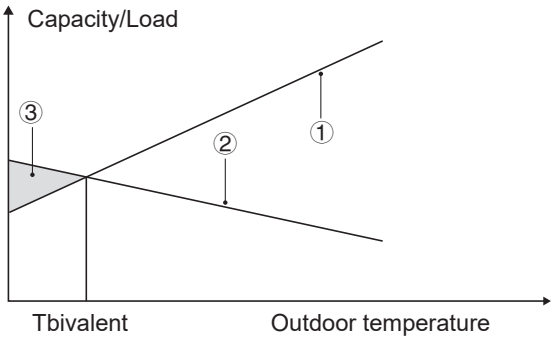
5 GENERAL INTRODUCTION

These units are used for both heating and cooling applications and domestic hot water tanks. They can be combined with fan coil units, floor heating applications, low temperature high efficiency radiators, domestic hot water tanks (field supply) and solar kits (field supply).
A wired controller is supplied with the unit .

If you choose the built-in backup heater unit, the backup heater can increase the heating capacity during cold outdoor temperatures. The backup heater also serves as a backup in case of malfunctioning and for frozen protection of the outside water piping during winter time.

NOTICE

- Maximum length of communication wirings between the indoor unit and the controller is 164 ft(50m).
- Power cords and communication wiring must be laid out separately, they can not be placed in the same conduit. Otherwise, it may lead to electromagnetic interference. Power cords and communication wirings should not come in contact with the refrigerant pipe so as to prevent the high temperature pipe from damaging wirings.
- Communication wirings must use shielded lines. Including indoor unit to outdoor unit PQE line ,indoor unit to controller ABXYE line.



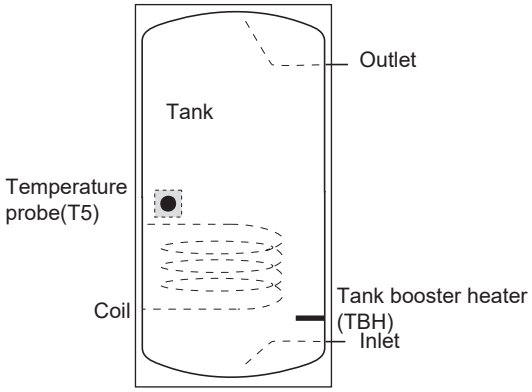
① Heat pump capacity.
② Required heating capacity (site dependent).
③ Additional heating capacity provided by backup heater.

Domestic hot water tank (field supply)

DANGER

Domestic hot water tank shall comply with UL 174 STANDARD FOR SAFETY.

A domestic hot water tank(with or without booster heater) can be connected to the unit.
The requirement of the tank is different for different unit and material of heat exchanger.



The booster heater should be installed below the temperature probe (T5).
The heat exchanger (coil) should be installed below the temperature probe.

Indoor Unit		160
Volume of tank/gallon(L)	Recommended	44~110 (200~500)
Heat exchange area/sqft(m²) (Stainless steel coil)	Minimum	17.22(1.6)
Heat exchange area/sqft(m²) (Enamel coil)	Minimum	26.91(2.5)

Room thermostat(field supply)

Room thermostat can be connected to the unit(room thermostat should be kept away from heating source when selecting the installation place).

Solar kit for domestic hot water tank(field supply)

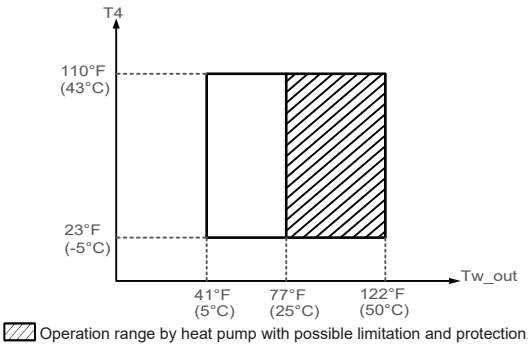
An optional solar kit can be connected to the unit.

Operation range

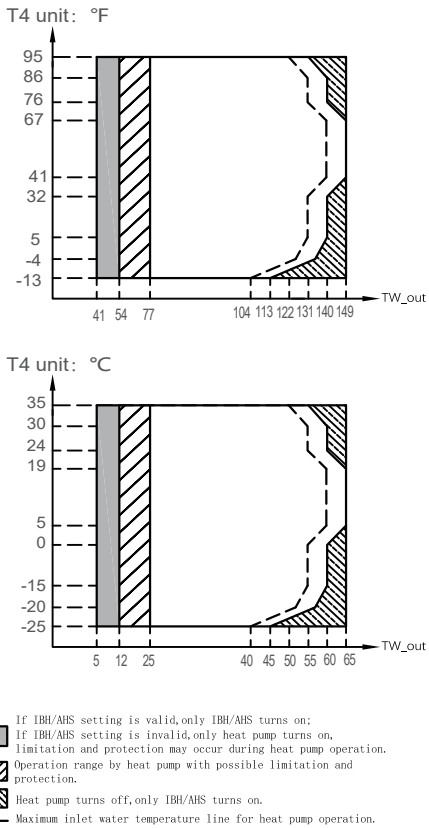
Operation range of indoor unit	
Outlet water (Heating mode)	54 °F ~ 149 °F(12℃ ~ 65℃)
Outlet water (Cooling mode)	41 °F ~ 77 °F(5 ℃ ~ 25℃)
Domestic hot water	54 °F ~ 140 °F (12 ℃ ~ 60 ℃)
Ambient temperature	41 °F ~ 95 °F (5 ℃ ~ 35 ℃)
Water pressure	14.50 psi ~ 43.51 psi (1 bar ~ 3 bar)
Water flow	3.08 gpm~13.21 gpm(0.7 m³/h~3 m³/h)

The unit have a freeze prevention function that uses the heat pump or backup heater（Customized model） to keep the water system safe from freezing in all conditions. Since a power failure may happen when the unit is unattended, It's suggested to use anti-freezing flow switch in the water system. (Refer to **8.5** "**Water piping**").

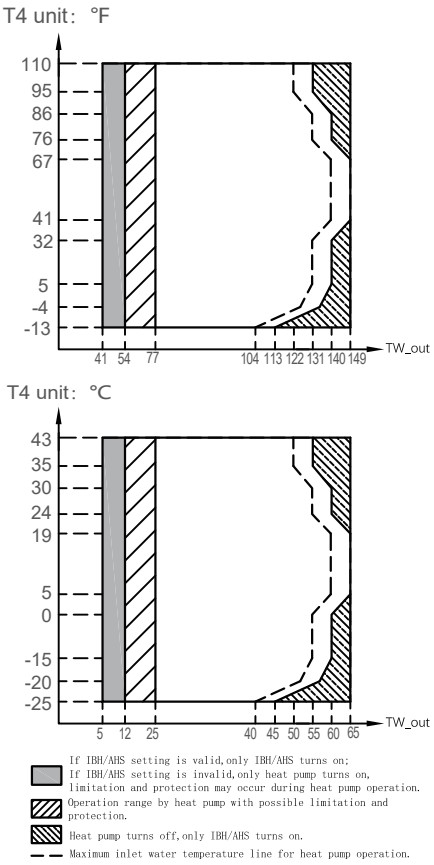
In cooling mode, the water flowing temperature (TW_out) range in different outdoor temperature (T4) is list below:



In heating mode, the water flowing temperature (TW_out) range in different outdoor temperature (T4) is listed below:



In DHW mode, the water flowing temperature(TW_out) range in different outdoor temperature(T4) is listed below:



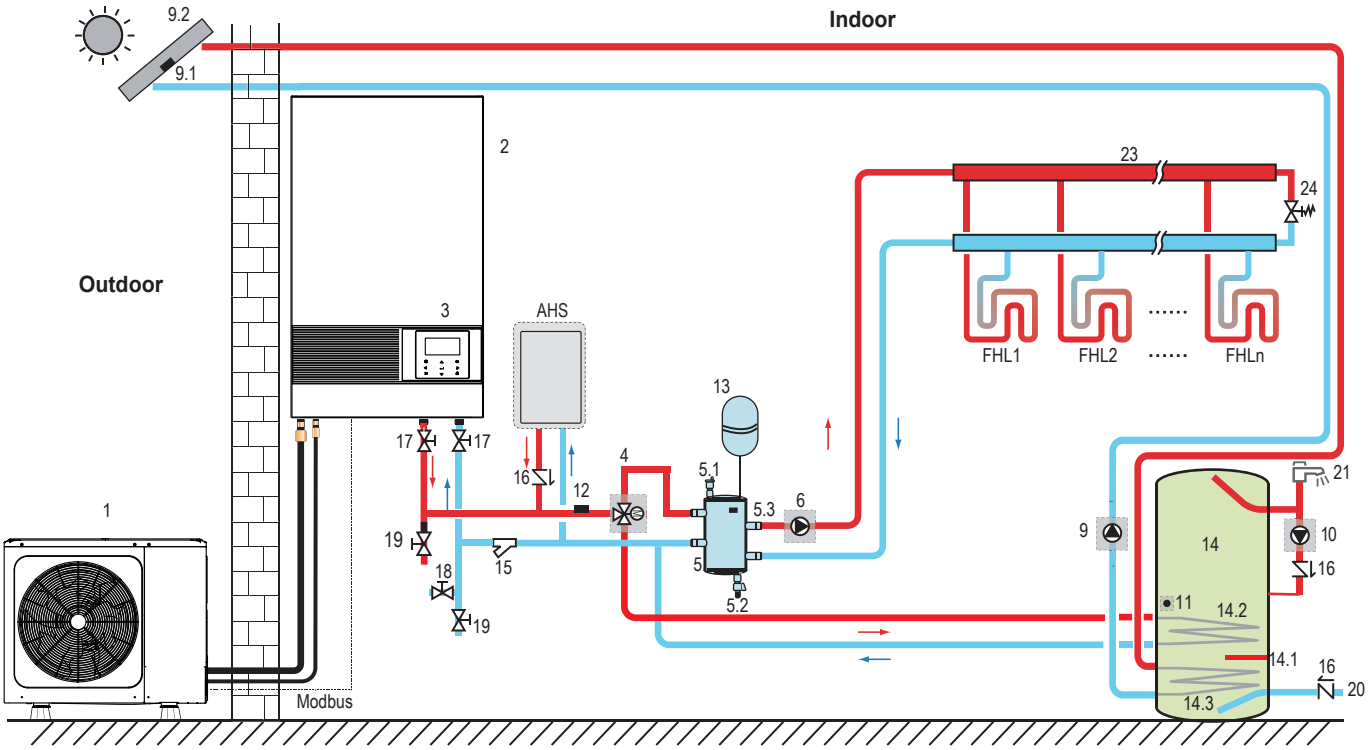
6 ACCESSORIES

Installation Fittings		
Name	Shape	Quantity
Indoor Unit Product Manual		1
Operation manual (Wire controller)		1
M16 Copper Nut Tamper Cap		1
M9 Copper Nut Tamper Cap		1
M8 expansion screws		5
M16 Copper nut		1
M9 Copper nut		1
Thermistor T5(or Tw2 or Tbt or Tsolar)		1
Tie Wrap		2
Network matching resistor		1

7 TYPICAL APPLICATIONS

The application examples given below are for illustration only.

7.1 Application 1



Code	Assembly unit	Code	Assembly unit
1	Outdoor unit	13	Expansion vessel (Field supply)
2	Hydraulic module	14	Domestic hot water tank (Field supply)
3	User interface	14.1	TBH: Domestic hot water tank booster heater (Field supply)
4	SV1:3-way valve (Field supply)	14.2	Coil 1, heat exchanger for heat pump
5	Hydraulic separator (Field supply)	14.3	Coil 2, heat exchanger for Solar energy
5.1	Automatic air purge valve	15	Filter(Field supply) ≥ 60 mesh
5.2	Drain valve	16	Check valve (Field supply)
5.3	Tbt1: Hydraulic separator upper temperature sensor (Optional)	17	Shut-off valve (Field supply)
6	P_o: Zone A circulation pump (Field supply)	18	Filling valve (Field supply)
9	P_s: Solar pump (Field supply)	19	Drain valve (Field supply)
9.1	Tsolar: Solar temperature sensor (Optional)	20	Tap water inlet pipe (Field supply)
9.2	Solar panel (Field supply)	21	Hot water tap (Field supply)
10	P_d: DHW pipe pump (Field supply)	23	Collector/distributor (Field supply)
11	T5: Domestic water tank temperature sensor (Accessory)	24	Bypass valve (Field supply)
		FHL1…n	Floor heating loop (Field supply)
12	T1: Total water flow temperature sensor (Optional)	AHS	Auxiliary heat source (Field supply)

- **Space heating**

  The ON/OFF signal and operation mode and temperature setting are set on the user interface. P_o(6) keeps running as long as the unit is ON for space heating, SV1(4) keeps OFF.

- **Domestic water heating**

  The ON/OFF signal and target tank water temperature (T5S) are set on the user interface. P_o(6) stops running as long as the unit is ON for domestic water heating, SV1(4) keeps ON.

- **AHS (auxiliary heat source) control**

  The AHS function is set on the user interface.
  1) When the AHS is set to be valid only for heating mode, AHS can be turned on in the following ways:
  a. Turn on the AHS via BACKHEATER function on the user interface;
  b. AHS will be turned on automatically if initial water temperature is too low or target water temperature is too high at low ambient temperature.
  P_o(6) keeps running as long as the AHS is ON, SV1(4) keeps OFF.
  2) When the AHS is set to be valid for heating mode and DHW mode. In heating mode, AHS control is same as part 1); In DHW mode, AHS will be turned on automatically when the initial domestic water temperature T5 is too low or the target domestic water temperature is too high at low ambient temperature. P_o(6) stops running, SV1(4) keeps ON.
  3) When the AHS is set to be valid, M1M2 can be set to be valid on the user interface. In heating mode, AHS will be turned on if MIM2 dry contact closes. This function is invalid in DHW mode.

- **TBH (tank booster heater) control**

  The TBH function is set on the user interface.
  1） When the TBH is set to be valid, TBH can be turned on via TANK HEATER function on the user interface; In DHW mode, TBH will be turned on automatically when the initial domestic water temperature T5 is too low or the target domestic water temperature is too high at low ambient temperature.
  2） When the TBH is set to be valid, M1M2 can be set to be valid on the user interface. TBH will be turned on if MIM2 dry contact closes.

- **Solar energy control**

  Hydraulic module recognizes solar energy signal by judging Tsolar or receiving SL1SL2 signal from user interface. The recognition method can be set via SOLAR INPUT on the user interface. Please refer to 8.9.6/1 "For solar energy input signal" for wiring.(see 9.5.14 "INPUT DEFINE")
  1） When Tsolar is set to be valid, Solar energy turns ON when Tsolar is high enough, P_s(9) starts running; Solar energy turns OFF when Tsolar is low, P_s(9) stops running.
  2） When SL1SL2 control is set to be valid, Solar energy turns ON after receiving Solar kit signal from user interface, P_s(9) starts running; Without solar kit signal. Solar energy turns OFF, P_s(9) stops running.

⚠CAUTION

The highest outlet water temperature may reach 70 ℃ (158 °F), please beware of burns.

NOTICE

Make sure to fit the (SV1) 3-way valve correctly. For more details, please refer to 8.9.6 "Connection for other components.

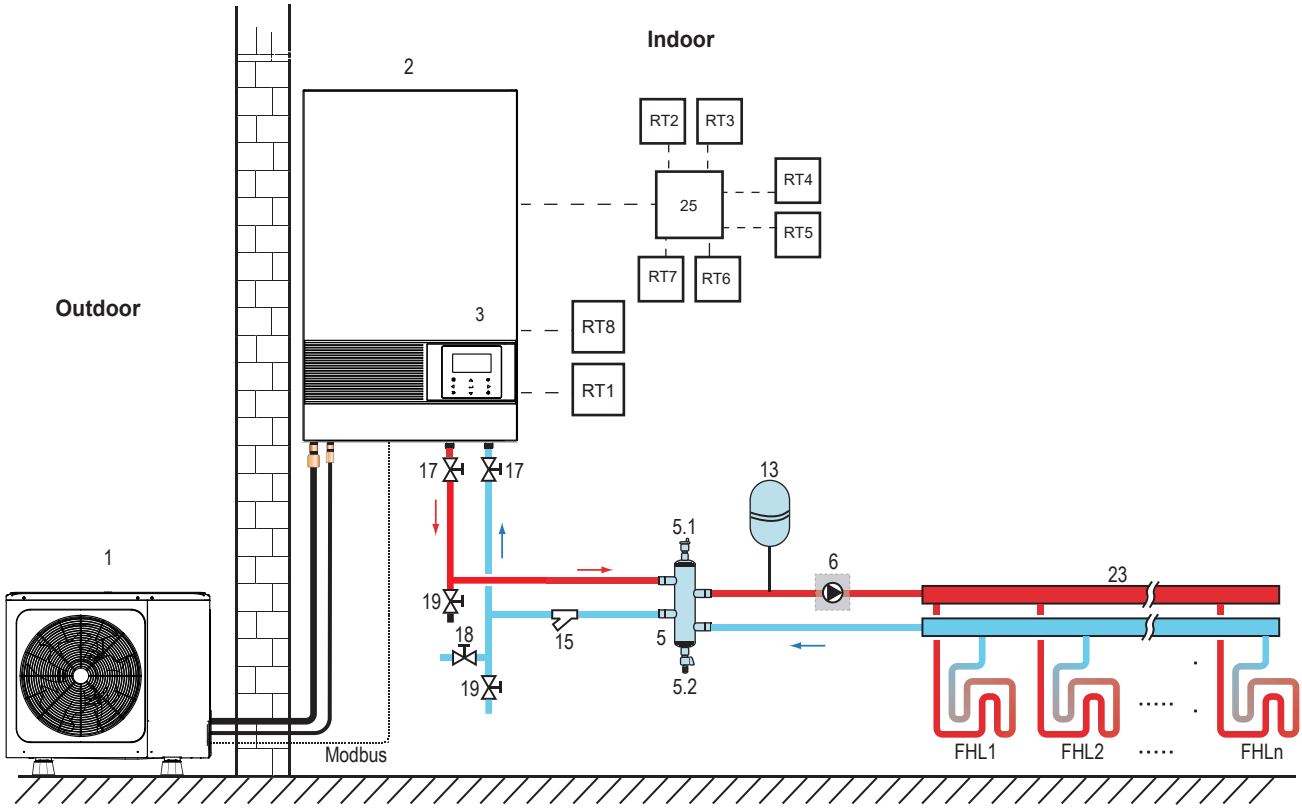
At extremely low ambient temperature, the domestic hot water is exclusively heated by TBH, which assures that heat pump can be used for space heating with full capacity.

Details on domestic hot water tank configuration for low outdoor temperatures (T4DHWMIN) can be found in 9.5.1 "DHW MODE SETTING".

7.2 Application 2

ROOM THERMOSTAT Control for Space heating or cooling need to be set on the user interface. It can be set in three ways: MODE SET/ONE ZONE/DOUBLE ZONE. The indoor unit can be connected to a high voltage room thermostat and a low voltage room thermostat. A thermostat transfer board can also be connected. Another six thermostats can be connected to the thermostat transfer board. Please refer to 8.9.6/6) “For room thermostat” for wiring. (see 9.5.6 "ROOM THERMOSTAT")

7.2.1 One zone control

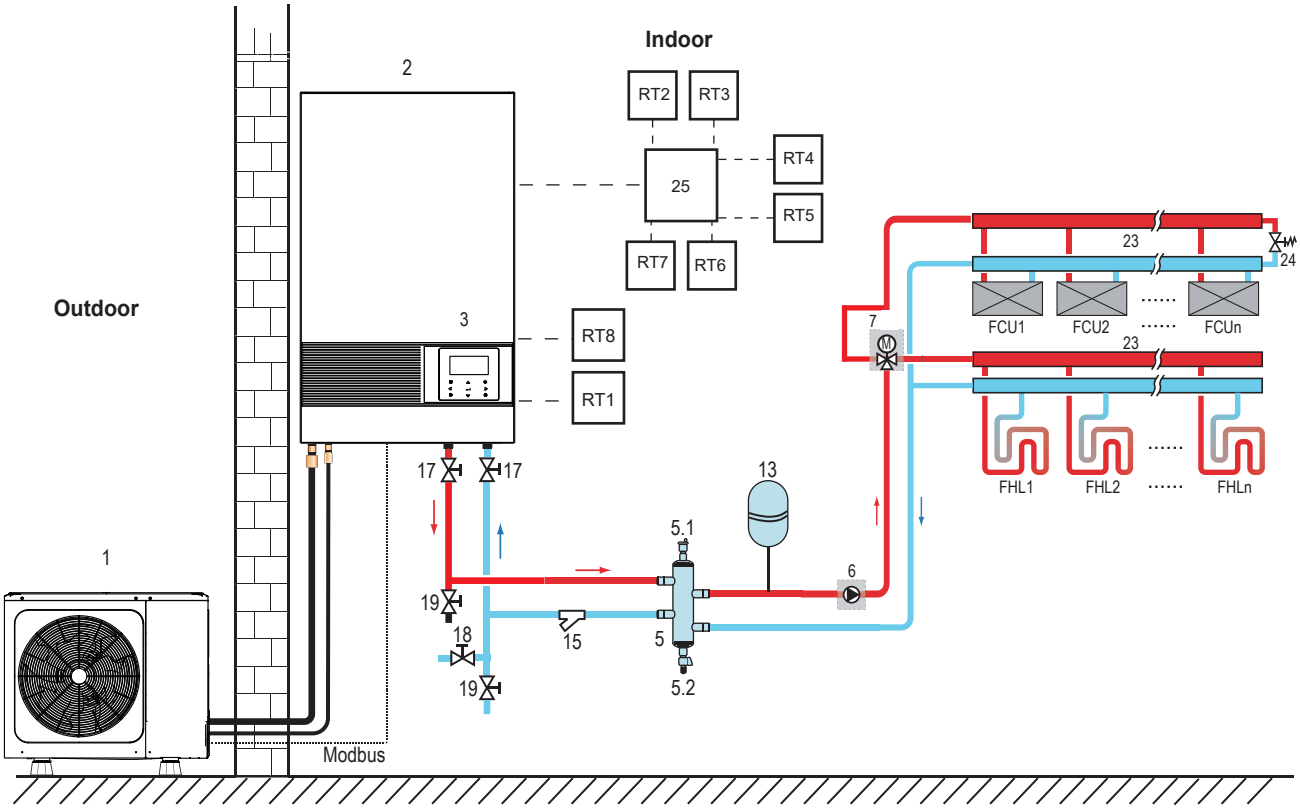


Code	Assembly unit	Code	Assembly unit
1	Outdoor unit	17	Shut-off valve (Field supply)
2	Indoor unit	18	Filling valve (Field supply)
3	User interface	19	Drain valve (Field supply)
5	Hydraulic separator (Field supply)	23	Collector/distributor (Field supply)
5.1	Automatic air purge valve	25	Thermostat transfer board (Optional)
5.2	Drain valve	RT 1…7	Low voltage room thermostat (Field supply)
6	P_o: Outside circulation pump (Field supply)	RT8	High voltage room thermostat (Field supply)
13	Expansion vessel (Field supply)	FHL 1…n	Floor heating loop (Field supply)
15	Filter(Field supply) ≥ 60 mesh		

- **Space heating**
  One zone control: the unit ON/OFF is controlled by the room thermostat, cooling or heating mode and outlet water temperature are set on the user interface. System is ON when any “BC” of all the thermostats closes. When all “BC” open, system turns OFF.

- **The circulation pumps operation**
  When the system is ON, which means any “BC” of all the thermostats closes, P_o(6) starts running; When the system is OFF, which means all “BC” open, P_o (6) stops running.

7.2.2 Mode set control



Code	Assembly unit	Code	Assembly unit
1	Outdoor unit	17	Shut-off valve (Field supply)
2	Indoor unit	18	Filling valve (Field supply)
3	User interface	19	Drain valve (Field supply)
5	Hydraulic separator (Field supply)	23	Collector/distributor (Field supply)
5.1	Automatic air purge valve	24	Bypass valve (Field supply)
5.2	Drain valve	25	Thermostat transfer board (Optional)
6	P_o: Outside circulation pump (Field supply)	RT 1…7	Low voltage room thermostat (Field supply)
7	SV2: 3-way valve (Field supply)	RT8	High voltage room thermostat (Field supply)
13	Expansion vessel (Field supply)	FHL 1…n	Floor heating loop (Field supply)
15	Filter(Field supply) ≥ 60 mesh	FCU 1...n	Fan coil unit (Field supply)

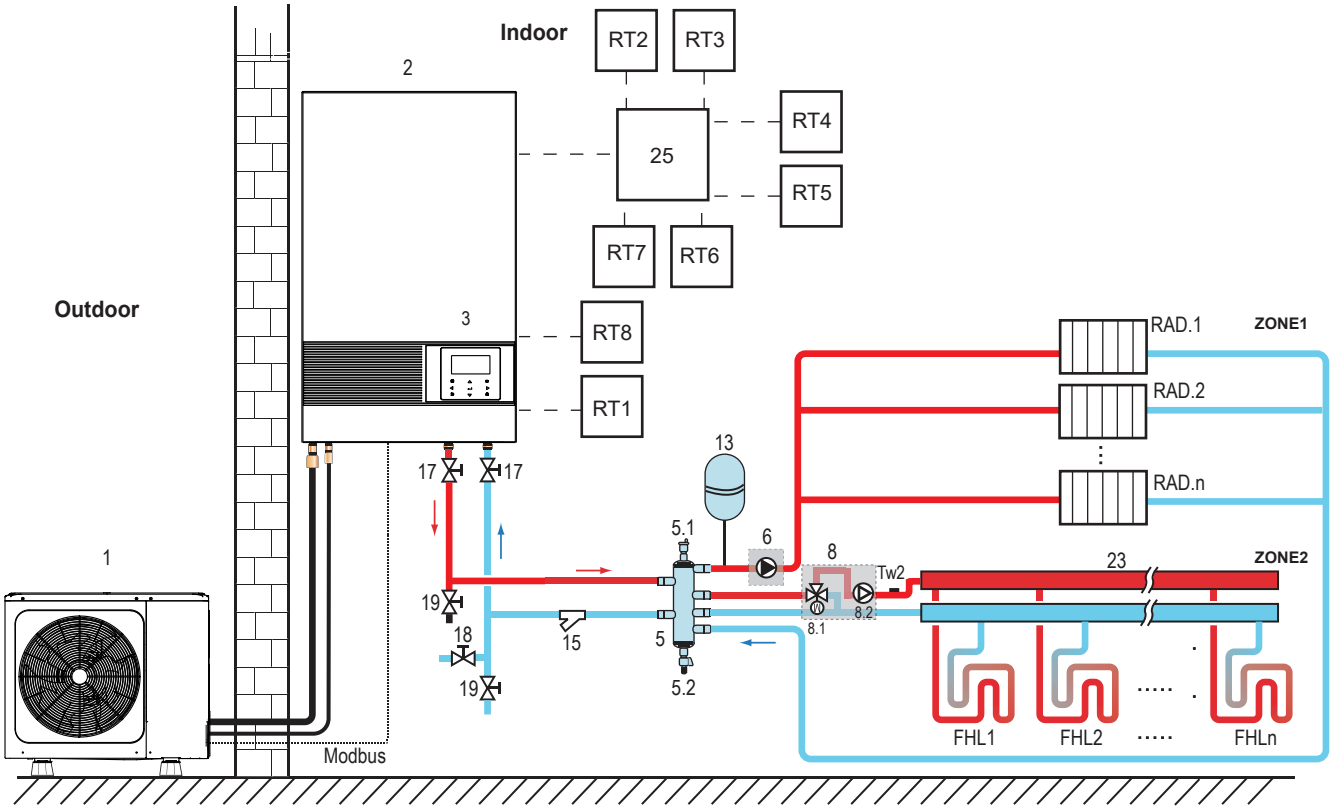
- **Space heating**

  Cooling or heating mode is set via the room thermostat, water temperature is set on the user interface.
  1) When any “YC” of all the thermostats close, system will be set at cooling mode.
  2) When any “BC” of all the thermostats close and all “YC” open, system will be set at heating mode.

- **The circulation pumps operation**

  1) When the system is in cooling mode, which means any “YC” of all the thermostats closes, SV2(7) keeps OFF, P_o(6) starts running;
  2) When the system is in heating mode, which means one or more “BC” close and all “YC” open, SV2(7) keeps ON, P_o(6) starts running.

7.2.3 Double zone control



Code	Assembly unit	Code	Assembly unit
1	Outdoor unit	15	Filter(Field supply) ≥ 60 mesh
2	Indoor unit	17	Shut-off valve (Field supply)
3	User interface	18	Filling valve (Field supply)
5	Hydraulic separator (Field supply)	19	Drain valve (Field supply)
5.1	Automatic air purge valve	23	Collector/distributor (Field supply)
5.2	Drain valve	25	Thermostat transfer board (Optional)
6	P_o: zone 1 circulation pump (Field supply)	RT 1…7	Low voltage room thermostat (Field supply)
8	Mixing station (Field supply)	RT8	High voltage room thermostat (Field supply)
8.1	SV3: Mixing valve (Field supply)	Tw2	Zone 2 water flow temperature sensor (Optional)
8.2	P_c: zone 2 circulation pump	FHL 1…n	Floor heating loop (Field supply)
13	Expansion vessel (Field supply)	RAD. 1...n	Radiator (Field supply)

- **Space heating**

  Zone1 can operate in cooling mode or heating mode, while zone2 can only operate in heating mode; While installation, for all thermostats in zone1, only " BC" terminals need to be connected. For all thermostats in zone2, only " YC" terminals need to be connected.

  1) The ON/OFF of zone1 is controlled by the room thermostats in zone1. When any "BC" of all thermostats in zone1 closes, zone1 turns ON. When all "BC" turn OFF, zone1 turns OFF; Target temperature and operation mode are set on the user interface;

  2) In heating mode, the ON/OFF of zone2 is controlled by the room thermostats in zone2. When any "YC" of all thermostats in zone2 closes, zone2 turns ON. When all "YC" open, zone2 turns OFF. Target temperature is set on the user interface; Zone 2 can only operate in heating mode. When cooling mode is set on the user interface, zone2 keeps in OFF status.

- **The circulation pump operation**

  When zone 1 is ON, P_o(6) starts running; When zone 1 is OFF, P_o(6) stops running;
  When zone 2 is ON, SV3(8.1) is ON, P_c(8.2) starts running; When zone 2 is OFF, SV3(8.1) is OFF, P_c(8.2) stops running .

The floor heating loops require a lower water temperature in heating mode compared to radiators or fan coil units. To achieve these two set points, a mixing station is used to adapt the water temperature according to requirements of the floor heating loops. The radiators are directly connected to the unit water circuit and the floor heating loops are after the mixing station. The mixing station is controlled by the unit.

CAUTION

1) Make sure to connect the SV2/SV3 terminals in the wired controller correctly,please refer to 8.9.6/2)

2) Thermostat wires to the correct terminals and to configure the ROOM THERMOSTAT in the wired controller correctly . Wiring of the room thermostat should follow method A/B/C as described in 8.9.6 "Connection for other components / 6) For room thermostat".

NOTICE

1) Zone 2 can only operate in heating mode. When cooling mode is set on user interface and zone 1 is OFF, “CL” in zone 2 closes, system still keeps “OFF”. While installation, the wiring of thermostats for zone 1 and zone 2 must be correct.

2) Drain valve(9) must be installed at the lowest position of the piping system.

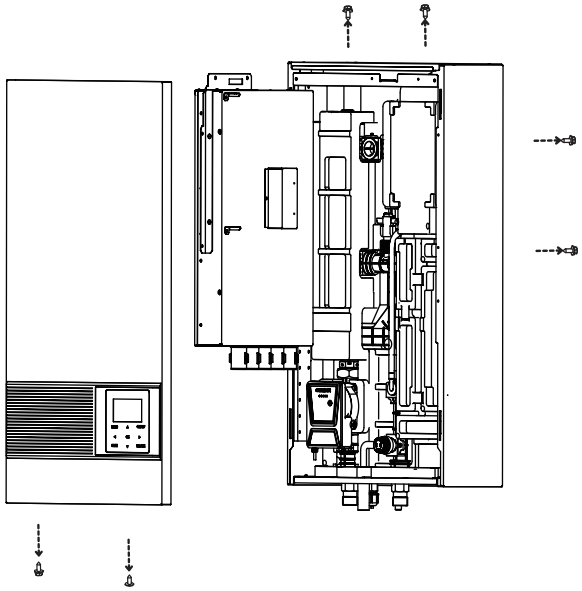
The Hydraulic separator volume requirement:

NO.	Indoor unit model	Hydraulic separator 70
1	160	≥30gal(113.56L)

8 OVERVIEW OF THE UNIT

8.1 Disassembling the unit

The indoor unit cover can be removed by removing the 2 screws and unhitching the cover.



CAUTION

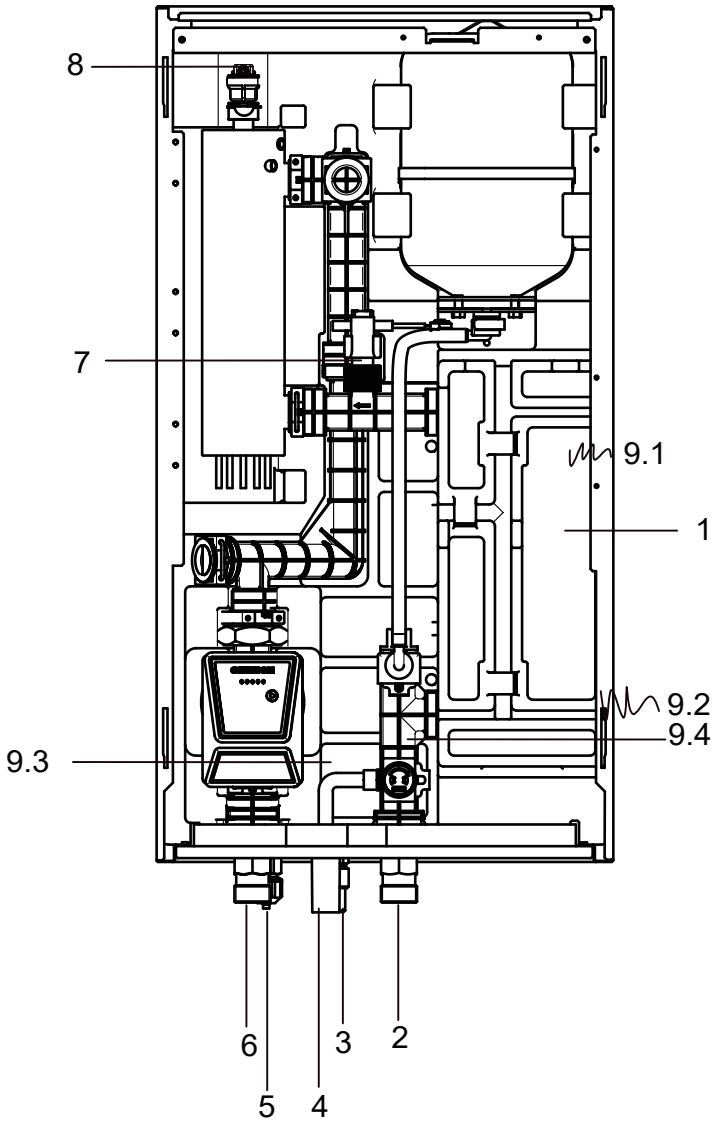
Make sure to fix the cover with the screws and nylon washers when installing the cover (screws are delivered as accessory) .Parts inside the unit can be hot.

- To gain access to the control box components – e.g. to connect the field wiring – the control box service panel can be removed. Thereto, loosen the front screws and unhitch the control box service panel.

CAUTION

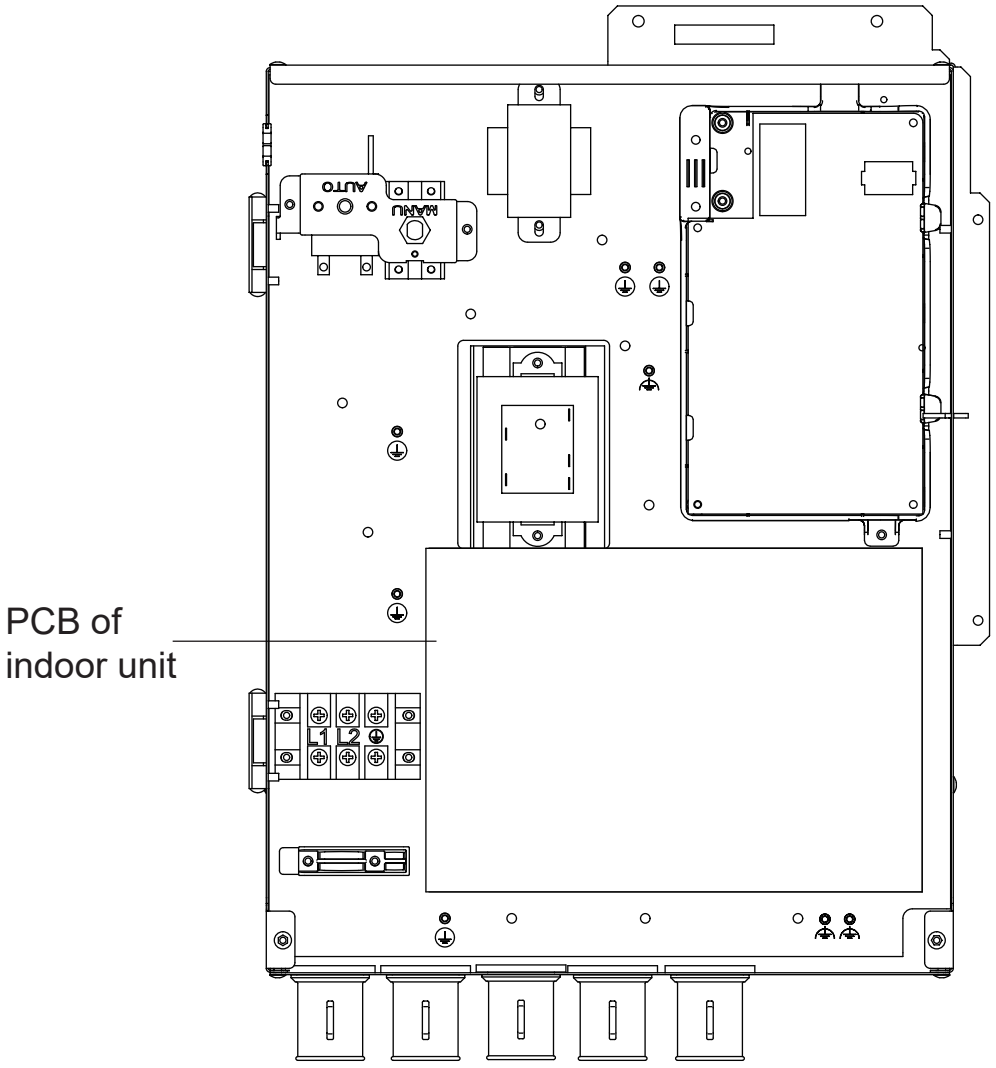
Switch off all power supply – i.e. outdoor unit power supply ,indoor unit power supply, electric heater and additional heater power supply before removing the control box service panel.

8.2 Main components



Code	Description	Explanation
1	Plate heat exchanger	Heat exchanging between water and refrigerant.
2	Flange joint	Water inlet.
3	Refrigerant liquid pipe	/
4	Drainage port	/
5	Refrigerant gas pipe	/
6	Flange joint	Water outlet.
7	Flow switch	If water flow is below 0.6 m³/h(15.85gpm), the flow switch open, then when the water flow reach 0.66 m³/h(17.43gpm),the flow switch close.
8	Automatic air purge valve	Remaining air in the water circuit will be automatically removed via the automatic air purge valve.
9	Temperature sensors	Four temperature sensors determine the water and refrigerant temperature at various points. 9.1-Tw_out ;9.2-Tw_in ;9.3-T2B ;9.4-T2

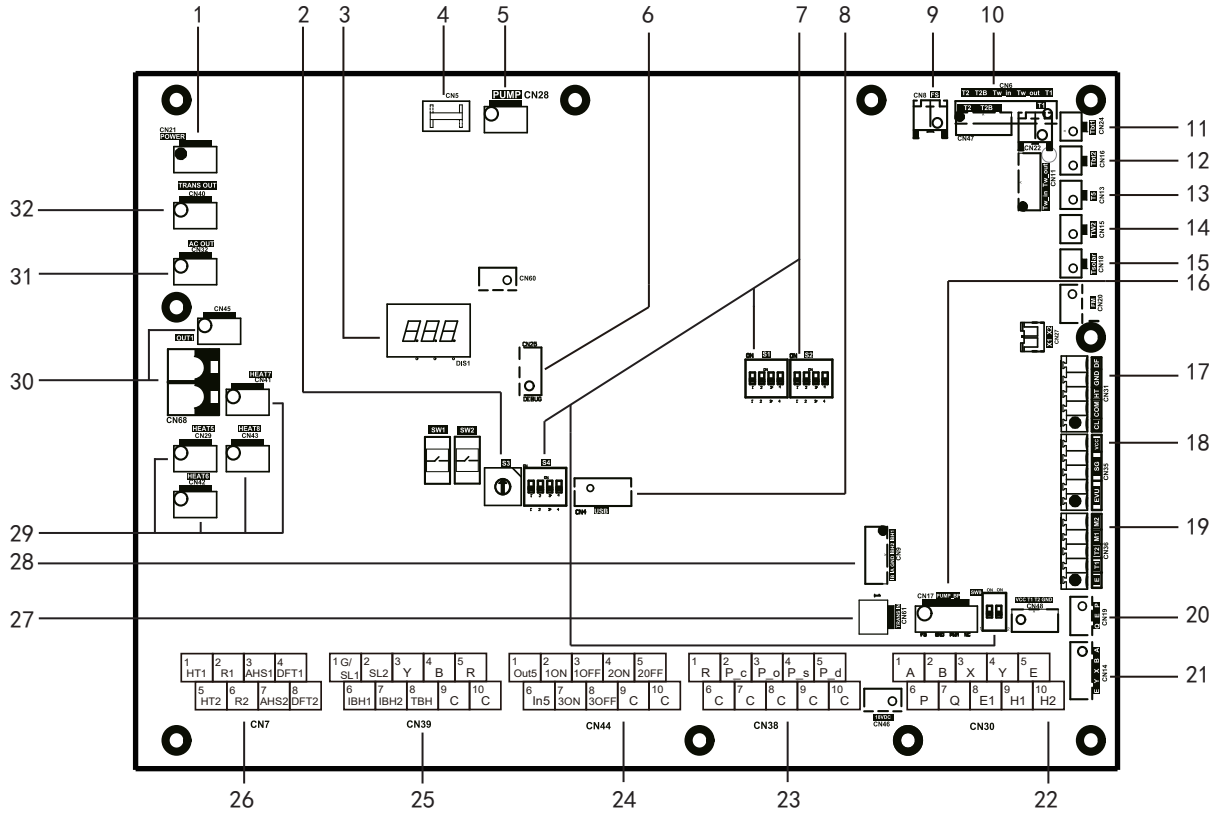
8.3 Electronic control box



NOTICE

The picture is only for reference, please refer to the actual product.

8.3.1 Main control board of indoor unit



Order	Port	Code	Assembly unit
1	CN21	POWER	Port for power supply
2	S3	/	Rotary dip switch
3	DIS1	/	Digital display
4	CN5	/	To Frame or chassis
5	CN28	PUMP	Port for pump power output
6	CN25	DEBUG	Port for IC programming
7	S1,S2,S4,SW9	/	Dip switch
8	CN4	USB	Port for USB programming
9	CN8	FS	Port for flow switch
10	CN47	T2	Port for temperature sensor of refrigerant liquid side temperature of indoor unit (heating mode)
		T2B	Port for temperature sensor of refrigerant gas side temperature of indoor unit (cooling mode)
	CN11	TW_in	Port for temperature sensor of inlet water temperature of plate heat exchanger
		TW_out	Port for temperature sensor of outlet water temperature of plate heat exchanger
	CN22	T1	Port for temperature sensor of final outlet water temperature of indoor unit
11	CN24	Tbt1	Port for upper temp. sensor of Hydraulic separator
12	CN16	Tbt2	Port for upper temp. sensor of Hydraulic separator
13	CN13	T5	Port for domestic hot water tank temp. sensor
14	CN15	Tw2	Port for zone 2 temperateness of outlet water
15	CN18	Tsolar	Port for solar panel temp. sensor
16	CN17	PUMP_BP	Port for variable speed pump communication
17	CN31	HT	Control port for room thermostat (heating mode)
		COM	Power port for room thermostat
		CL	Control port for room thermostat (cooling mode)
		DF	0-10V Gas Furnace Control Signal
18	CN35	SG	Port for smart grid (grid signal)
		EVU	Port for smart grid (photovoltaic signal)

Order	Port	Code	Assembly unit
19	CN36	M1/M2	Port for remote switch
		T1 T2	Port for thermostat transfer board
20	CN19	P Q	Communicate port between indoor unit and outdoor unit
21	CN14	A B X Y E	Port for communication with the wired controller
22	CN30	1 2 3 4 5	Port for communication with the wired controller
		6 7	Communicate port between indoor unit and outdoor unit
		9 10	Port for Internal machine Parallel
23	CN38	1 6	24V AC
		2 7	Port for zone 2 pump
		3 8	Port for outside circulation pump
		4 9	Port for solar energy pump
		5 10	Port for DHW pipe pump
24	CN44	2 3 9	Port for SV1(3-way valve)
		4 5 10	Port for SV2(3-way valve)
		7 8 9	Port for SV3(3-way valve)
		1 6	Reserved
25	CN39	1 2	Input port for solar energy
		3 4	Port for room thermostat
		8 9	Control port for tank booster heater
		6 10	Control port for internal backup heater 1
		7 10	Control port for internal backup heater 2
26	CN7	2 6/4 8	Compressor run/Defrost run
		1 5	Port for antifreeze E-heating tape(external)
		3 7	Port for additional heat source
27	CN61	TRANS IN	Port for trans
28	CN9	IB IA GND IBH2 IBH1	Port for board
29	CN29/ 41/42 /43	HEAT5/6/ 7/8	Port for anti-freeze electric heating tape(internal)
30	CN68 /45	OUT1	Reserved
31	CN32	AC OUT	Port for backup heater
32	CN40	TRANS OUT	Port for trans

8.4 Refrigerant pipework

For all guidelines, instructions and specifications regarding refrigerant pipework between the indoor unit and outdoor unit, please refer to **"Installation and owner's manual "**.

CAUTION

When connecting the refrigerant pipes, always use two wrenches/spanners for tightening or loosening nuts! Failure to do so can result in damaged piping connections and leaks.

NOTICE

- The appliance contains fluorinated greenhouse gases. Chemical name of the gas: R32
- Fluorinated greenhouse gases are contained in hermetically sealed equipment.
- An electrical switchgear has a tested leakage rate of less than 0.1 % per year as set out in the technical specification of the manufacturer.

8.5 Water piping

All piping lengths and distances have been taken into consideration.Refer to Table. 3-1.

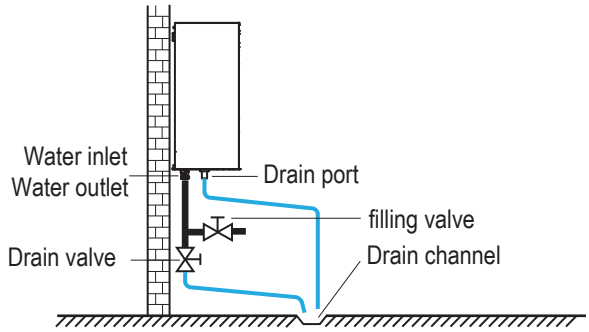
NOTICE

If no glycol is in the system, in case of a power supply failure or pump operating failure, drain all the water system if the water temperature is below 32 °F(0℃) in the cold winter(as suggested in the figure below).

CAUTION

1.IF a potable water source is used for the equipment's water supply, the source water supply shall be protected against back siphonage by the equipment.

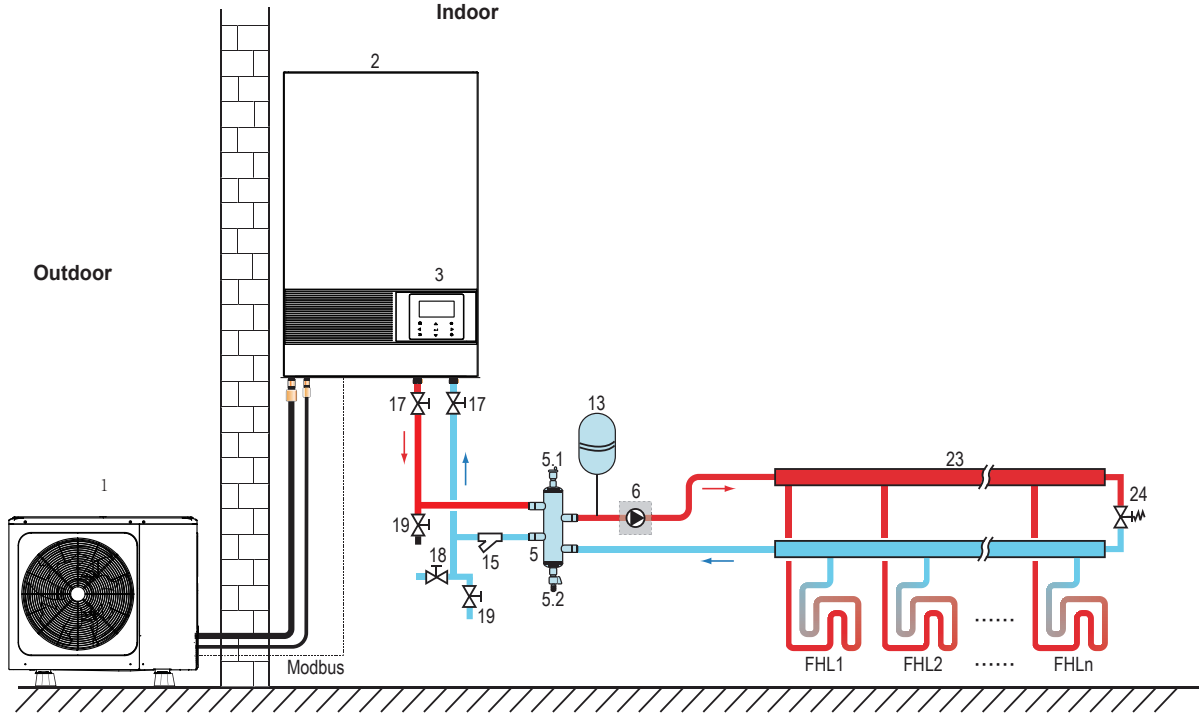
2.The appliance is intended to be permanently connected to the water pipe, and it is not recommended to use a hose connection



The unit is equipped with a water inlet and water outlet for connection to a water circuit. This circuit must be provided by a licensed technician and must comply with local laws and regulations.

8.5.1 Check the water circuit

When water is at standstill inside the system, freezing is very likely to happen and damage the system in the process.
The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.
Example



Code	Assembly unit	Code	Assembly unit
1	Outdoor unit	15	Filter(Field supply) ≥ 60 mesh
2	Indoor unit	17	Shut-off valve (field supply)
3	User interface (accessory)	18	Filling valve (field supply)
5	Hydraulic separator (field supply)	19	Drain valve (field supply)
5.1	Automatic air purge valve	23	Collector/distributor (field supply)
5.2	Drain valve	24	Bypass valve (field supply)
6	P_o: Outside circulation pump (field supply)	FHL 1…n	Floor heating loop (field supply)
13	Expansion vessel (field supply)		

Before continuing installation of the unit, check the following:

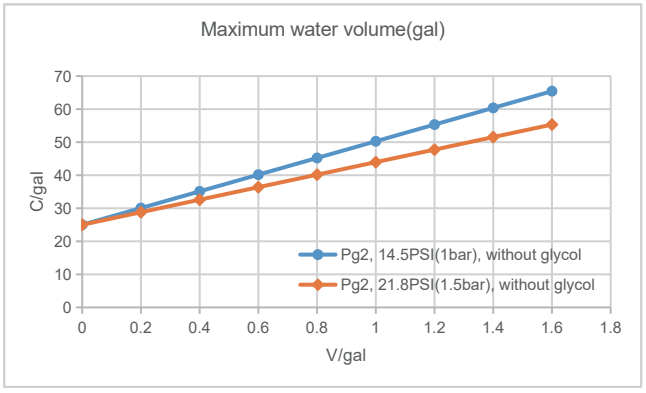
- The maximum water pressure ≤ 43.5 psi (3bar).
- The maximum water temperature ≤ 158 °F(70°C) according to safety device setting.
- Always use materials that are compatible with the water used in the system and with the materials used in the unit.
- Ensure that components installed in the field piping can withstand the water pressure and temperature.
- Drain taps must be provided at all low points of the system to permit complete drain of the circuit during maintenance.
- Air vents must be provided at all high points of the system. The vents should be located at points that are easily accessible for service. An automatic air purge is provided inside the unit. Check that this air purge valve is not tightened so that automatic release of air in the water circuit is possible.

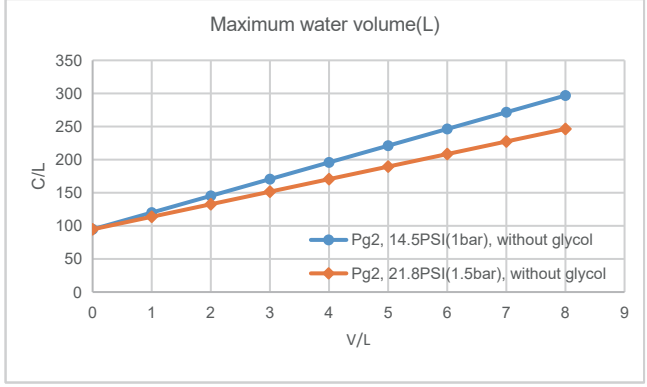
8.5.2 Water volume and sizing expansion vessels

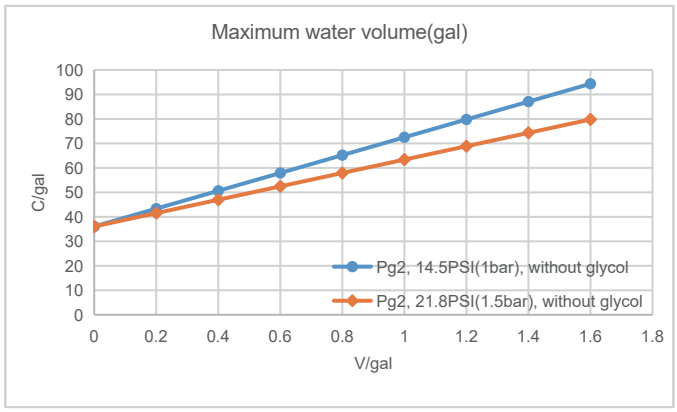
The units are equipped with an expansion vessel of 1.32 gal (5L) that has a default pre-pressure of 21.8 psi (1.5 bar).
1) Check that the total water volume in the installation, excluding the internal water volume of the unit, is at least 10.56 gal (40L).
See 14 "Technical specifications" to find the total internal water volume of the unit.
2) When the capacity of the integrated expansion vessel is insufficient for the system due to high water volume, an additional expansion vessel (supplied by the user) is needed.
Refer to the formula below to determine the specification of the additional expansion vessel.

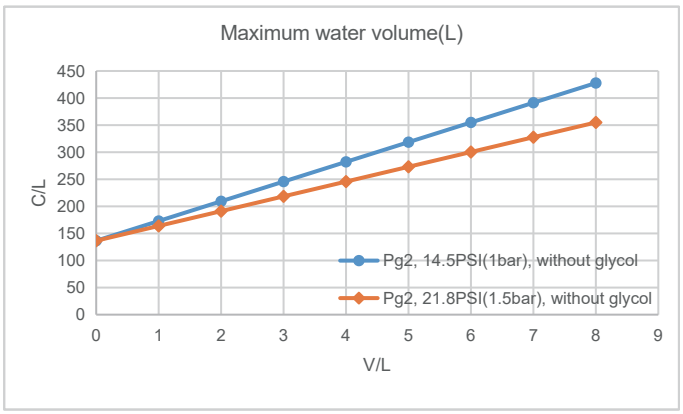
System with only water	System with 35 % glycol
$V_2 = \frac{1.148 * C - V_1 * (43.5 - Pg_1)}{43.5 - Pg_2}$	$V_2 = \frac{0.796 * C - V_1 * (43.5 - Pg_1)}{43.5 - Pg_2}$

V2: Additional expansion vessel volume, in gal;
V1: Integrated expansion vessel volume, in gal, 1.32 gal (5L);
C: System water volume, in gal;
Pg2: Additional expansion vessel Pre-pressure (relative pressure), in psi.
Pg1: Integrated expansion vessel Pre-pressure (relative pressure), in psi, 21.8 psi (1.5 bar).









8.5.3 Water circuit connection

Water connections must be made correctly in accordance with labels on the indoor unit, with respect to the water inlet and water outlet.

CAUTION

Be careful not to deform the unit's piping by using excessive force when connecting the piping. Deforming the piping can cause the unit to malfunction.

If air, moisture or dust gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:

- Use clean pipes only.
- Hold the pipe end downwards when removing burrs.
- Cover the pipe end when inserting it through a wall to prevent dust and dirt entering.
- Use a good thread sealant for sealing the connections. The sealing must be able to withstand the pressures and temperatures of the system.
- When using non-copper metallic piping, be sure to insulate two kind of materials from each other to prevent galvanic corrosion.
- As copper is a soft material, use appropriate tools for connecting the water circuit. Inappropriate tools will cause damage to the pipes.

NOTICE

The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping:

- Never use Zn-coated parts in the water circuit. Excessive corrosion of these parts may occur as copper piping is used in the unit's internal water circuit.
- When using a 3-way valve in the water circuit. Preferably choose a ball type 3-way valve to guarantee full separation between the domestic hot water and floor heating water circuit.
- When using a 3-way valve or a 2-way valve in the water circuit. The recommended maximum changeover time of the valve should be less than 60 seconds.

8.5.4 Water circuit anti-freeze protection

All internal hydronic parts are insulated to reduce heat loss. Insulation must also be added to the field piping.

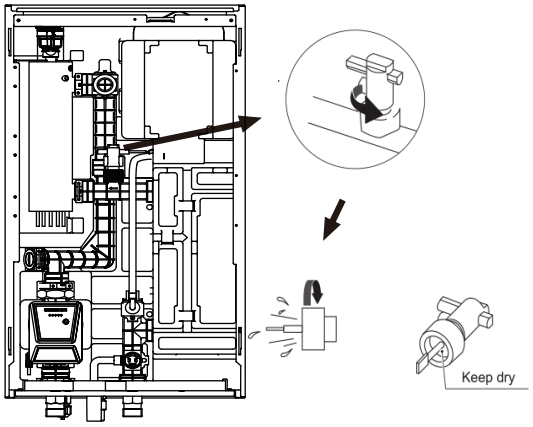
The software contains special functions using the heat pump and backup heater (if it is available) to protect the entire system against freezing. When the temperature of the water flow in the system drops to a certain value, the unit will heat the water, either using the heat pump, the electric heating tap, or the backup heater. The freeze protection function will turn off only when the temperature increases to a certain value.

In event of a power failure, the above features would not protect the unit from freezing.

CAUTION

When the unit is not running for a long time,make sure the unit is powered on all the time,if you want to cut off the power,the water in the system pipe needs to be drained clean,avoid the pump and pipeline system be damaged by freezing. Also the power of the unit needs to be cut off after water in the system is drained clean.

Water may enter into the flow switch and cannot be drained out and may freeze when the temperature is low enough. The flow switch should be removed and dried, then can be reinstalled in the unit.



NOTICE

1.Counterclockwise rotation, remove the flow switch.
2.Drying the flow switch completely.

8.6 Water quality requirement

NOTICE

- Circulators function well exclusively with clean and high-quality tap water.
- Risk of material damage due to poor-quality water.
- The most frequent factors that can affect circulators and the system are oxygen, limescale, sludge, acidity level and other substances (including chlorides and minerals).
- In addition to the quality of water, installation also plays an important role. The heating system must be airtight. Choose materials that are not sensitive to oxygen diffusion (risk of corrosion...).

Characteristics of the water

- Compliant with local regulations.
- Langelier Index (LI) between 0 and + 0.4.
- Within the limits indicated in the chart.

Water quality must be checked by qualified personnel.

Hardness

If the water is hard, install a system suitable to preserve the unit from harmful deposits and limestone formation.

NOTICE

If necessary, fit a water softener to reduce water hardness.

Cleanliness

Before connecting the water to the unit, clean the system thoroughly with specific products effective to remove residues or impurities that may affect functioning. Existing systems must be free from sludge and contaminants and protected against buildups.

New systems

In case of new installations, it is essential to wash the entire installation (with the circulator uninstalled) before commissioning the central installation. This removes residues of the installation process (welding, waste, joint products...) and preservatives (including mineral oil). The system must then be filled with clean high-quality tap water.

Existing systems

If a new boiler or heat pump is installed on an existing heating system, the system must be rinsed to avoid the presence of particles, sludge and waste. The system must be drained before installing the new unit. Dirt can be removed only with a suitable water flow. Each section must then be washed separately.

Particular attention must also be paid to “blind spots” where a lot of dirt can accumulate due to the reduced water flow. The system must then be filled with clean high-quality tap water. If, after rinsing, the quality of the water is still unsuitable, a few measures must be taken to avoid problems. An option to remove pollutants is to install a strainer. Various types of strainers are available. A mesh strainer is designed to catch large dirt particles. This strainer is usually placed in the part with the larger flow. A tissue strainer is designed to catch the finer particles.

Water component for corrosion limit on copper

PH	7.5-9.0	
Ryznar Stability Index (RSI)	< 6.0	
Electric conductivity	100-500	µS/cm
Total Hardness	4.5-8.5	dH
Max. quantity glycol	40	%
Sulfate ions (SO_4)	< 50	ppm
Alkalinity (HCO_3)	70-300	ppm
Chloride ions (Cl-)	< 50	ppm
Phosphates (PO_4)	< 2.0	ppm
NH_3	< 0.5	ppm
Iron (Fe)	< 0.3	ppm

Manganese (Mn)	< 0.05	ppm
Sulfur (S)	None	
Ammonium ions (NH_4)	None	
Silica (SiO_2)	< 30	ppm
CO_2	< 50	ppm
Oxygen content	< 0.1	ppm
Sand	< 10 mg/L, 0.1 to 0.7mm max diameter	
Ferrite hydroxide Fe_3O_4 (black)	Dose < 7.5 mg/L, 50 % of mass, with diameter < 10 µm	
Iron oxide Fe_2O_3 (red)	Dose < 7.5 mg/L, diameter < 1 µm	

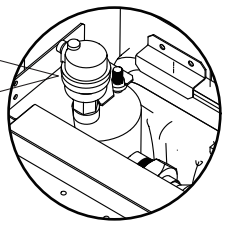
⚠CAUTION

If a potable water source is used as the equipment's water supply, a backsiphonage prevention device should be installed between the potable water source and the equipment.

8.7 Filling water

- Connect the water supply to the filling valves and open the valve.
- Make sure all the automatic air purge valves are open (at least 2 turns).
- Filling with water until the manometer indicates a pressure of approximately 29 psi(2bar). Remove air in the circuit as much as possible using the automatic air purge valves.

Do not fasten the black plastic cover on the automatic bleed valve at the topside of the unit when the system is running. Open the automatic bleed valve, turn counterclockwise at least 2 full turns to release air from the system.



NOTICE

During filling, it might not be possible to remove all air in the system. Remaining air will be removed through the automatic bleed valve during the first operating hours of the system. Topping up the water afterwards might be required.

- The water pressure indicated on the manometer will vary depending on the water temperature (higher pressure at higher water temperature). However, at all times water pressure should remain above 4.35 psi(0.3bar) to avoid air entering the circuit.
- The unit might drain-off too much water through the pressure relief valve.

8.8 Water piping insulation

The complete water circuit including all piping, water piping must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity as well as prevention of freezing of the outside water piping during winter. The insulation material should at least of B1 fire resistance rating and complies with all applicable legislation. The thickness of the sealing materials must be at least 1/2 in(13mm) with thermal conductivity 0.039 W/mK in order to prevent freezing on the outside water piping.

If the outdoor ambient temperature is higher than 86 °F(30°C) and the humidity is higher than RH 80 %, then the thickness of the sealing materials should be at least 13/16 in(20mm) in order to avoid condensation on the surface of the seal.

8.9 Field wiring

WARNING

In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC)

A main switch or other means of disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local laws and regulations. Switch off the power supply before making any connections. Use only copper wires. Never squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections. All field wiring and components must be installed by a licensed electrician and must comply with relevant local laws and regulations.

The field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.

Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.

Be sure to establish a earth. Do not earth the unit to a utility pipe, surge protector, or telephone earth. Incomplete earthing may cause electrical shock.

Be sure to install a earth fault circuit interrupter (30 mA). Failure to do so may cause electrical shock.

Be sure to install the required fuses or circuit breakers.

8.9.1 Precautions on electrical wiring work

- Fix cables so that cables do not make contact with the pipes (especially on the high pressure side).
- Secure the electrical wiring with cable ties as shown in figure so that it does not come in contact with the piping, particularly on the high-pressure side.
- Make sure no external pressure is applied to the terminal connectors.
- When installing the earth fault circuit interrupter make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the earth fault circuit interrupter.

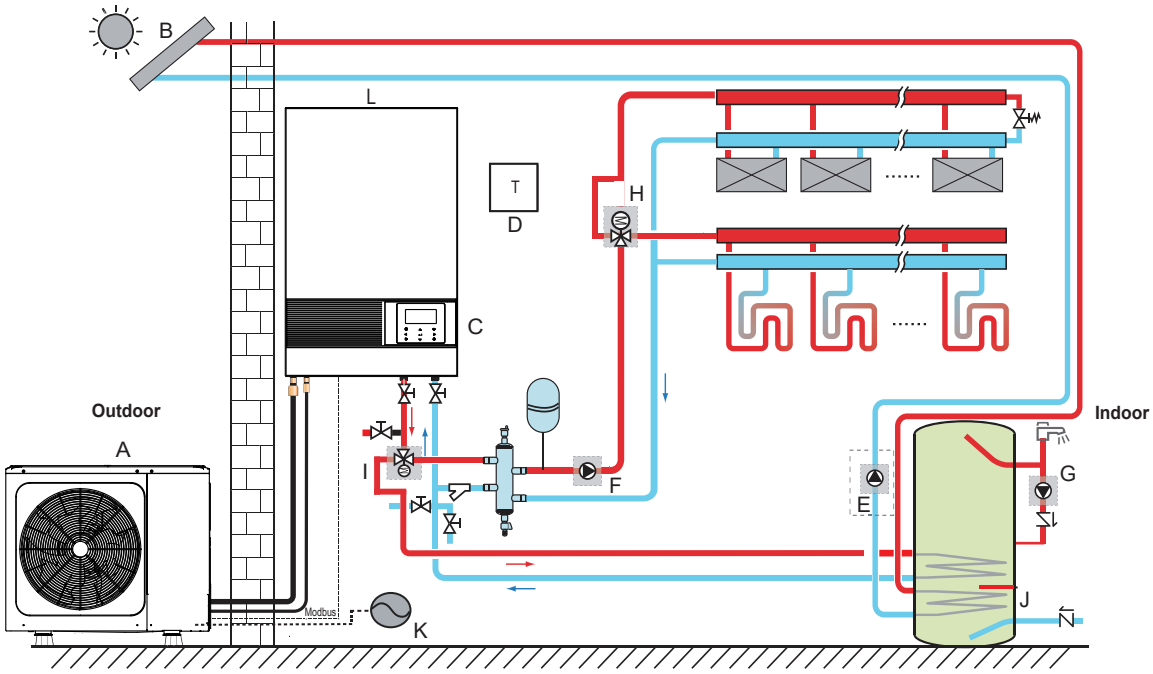
NOTICE

The earth fault circuit interrupter must be a high- speed type breaker of 30 mA (< 0.1 s).

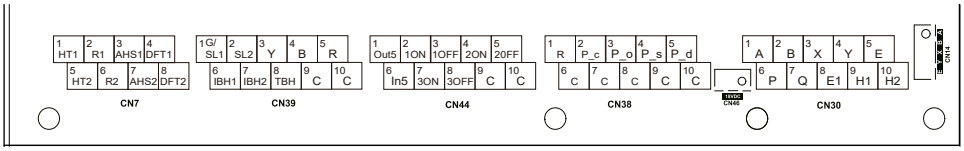
- This unit is equipped with an inverter. Installing a phase advancing capacitor not only will reduce the power factor improvement effect, but also may cause abnormal heating of the capacitor due to high-frequency waves. Never install a phase advancing capacitor as it could lead to an accident.

8.9.2 Wiring overview

The illustration below gives an overview of the required field wiring between several parts of the installation. Refer also to "**7 Typical application**".



The connection ports of each component on the indoor unit electrical control board are as follows:



Code	Assembly unit	Connection port	Code	Assembly unit	Connection port
A	Outdoor unit	CN30-P/Q/E	H	SV2: 3-way valve (field supply)	CN44-2ON/2OFF/C
B	Solar energy kit (field supply)	CN39-SL1/SL2	I	SV1: 3-way valve for domestic hot water tank (field supply)	CN44-1ON/1OFF/C
C	User interface	CN30-A/B/X/Y/E	J	Booster heater	CN39-TBH/C
D	Room thermostat (field supply)	CN39-Y/B/R	K	Power supply	/
E	Solar pump (field supply)	CN38-P_s/C	L	Indoor unit	/
F	Outside circulation pump (field supply)	CN38-P_o/C			
G	DHW pump (field supply)	CN38-P_d/C			

NOTICE

Please use H07RN-F for the power wire, all the cables are connect to high voltage except for thermistor cable and cable for user interface.

- Equipment must be earthed.
- All high-voltage external load, if it is metal or a earthed port, must be earthed.
- All external load current is needed less than 0.2 A, if the single load current is greater than 0.2 A, the load must be controlled through AC contactor.
- "AHS1" "AHS2", "HT1" "HT2", "R1" "R2" and "DFT1" "DFT2" wiring terminal ports provide only the switch signal. Please refer to image of 8.9.6 to get the ports position in the unit.

Field wiring guidelines

- Most field wiring on the unit is to be made on the terminal block inside the switch box. To gain access to the terminal block, remove the switch box service panel.

WARNING

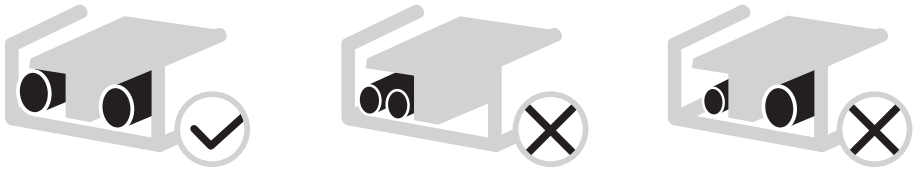
Switch off all power including the unit power supply and backup heater and domestic hot water tank power supply (if applicable) before removing the switch box service panel.

- Fix all cables using cable ties.
- A dedicated power circuit is required for the backup heater.
- Installations equipped with a domestic hot water tank (field supply) require a dedicated power circuit for the booster heater. Please refer to the domestic hot water tank Installation & Owner's Manual.
- Lay out the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely.
- Follow the electric wiring diagram for electrical wiring works (the electric wiring diagrams are located on the rear side of control box cover)
- Install the wires and fix the cover firmly so that the cover may be fit in properly.

8.9.3 Precautions on wiring of power supply

- Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instructions.

  - Do not connect different gauge wires to the same power supply terminal. (Loose connections may cause overheating.)
  - When connecting wires of the same gauge, connect them according to the figure below.



- Use the correct screwdriver to tighten the terminal screws. Small screwdrivers can damage the screw head and prevent appropriate tightening.
- Over-tightening the terminal screws can damage the screws.
- Attach a earth fault circuit interrupter and fuse to the power supply line.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside force cannot affect the terminals.

8.9.4 Safety device requirements

1. Select the wire diameters(minimum value) individually for each unit based on the table below.
2. Select circuit breaker that having a contact separation in all poles not less than 30mA providing full disconnection, where MFA is used to select the current circuit breakers and residual current operation breakers:

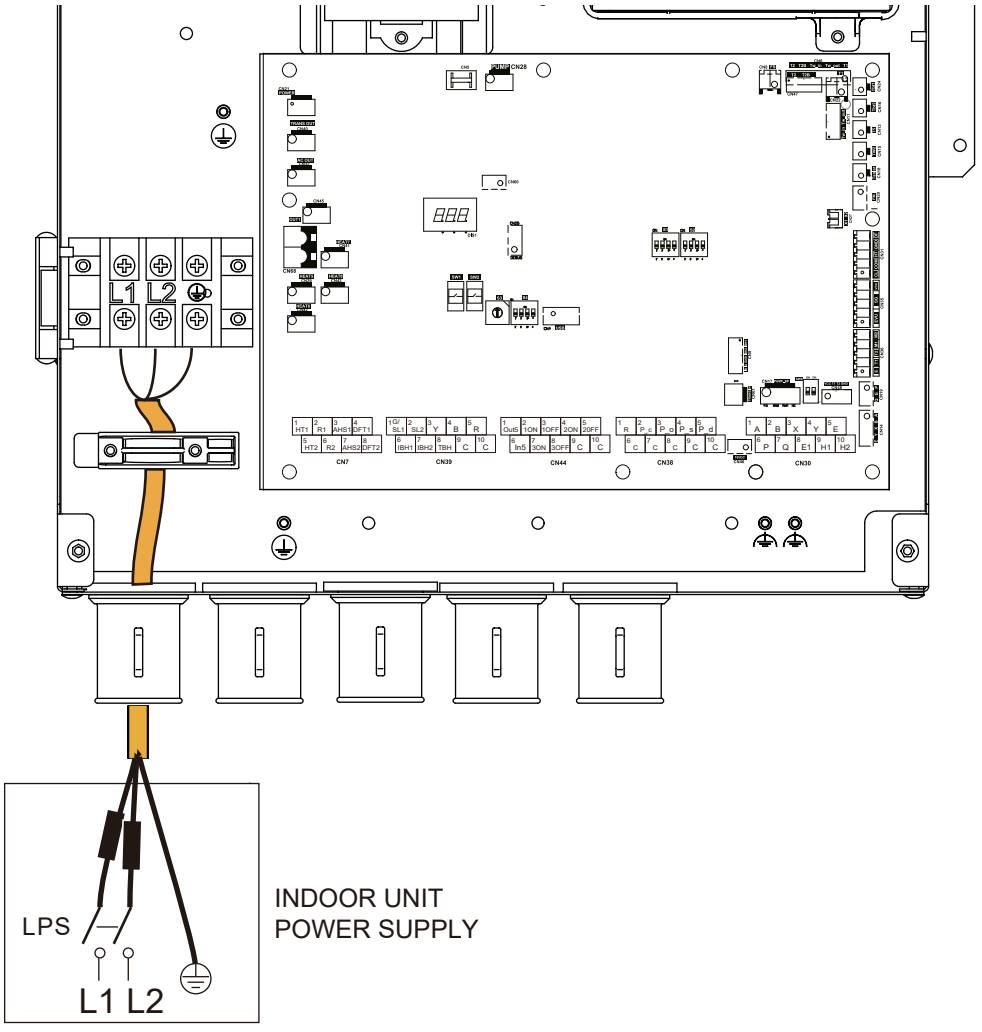
system	Power Current						IWPM	
	Hz	Voltage (V)	Min. (V)	Max. (V)	MCA (A)	MFA (A)	kW	F(ALA)
160(3 kW heater)	60	208	198	264	17.3	25	0.095	0.9
	60	230	198	264	19	25	0.095	0.9

NOTICE

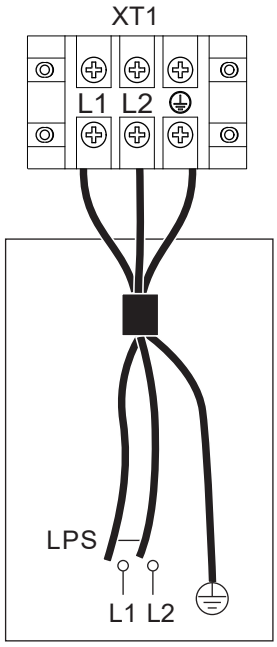
MCA : Min. Circuit Amps. (A)
MFA : Max. Fuse Amps. (A)
IWPM: Indoor Water Pump Motor
FLA : Full Load Amps. (A)

8.9.5 Specifications of standard wiring components

Equipment main Power Supply Wiring



- Stated values are maximum values (see electrical data for exact values).



Unit	3 kW - 1 PH
Wiring size(AWG)	12

- Stated values are maximum values (see electrical data for exact values).

CAUTION

When connecting to the power supply terminal, use the circular wiring terminal with the insulation casing (see Figure 8.1). Use power cord that conforms to the specifications and connect the power cord firmly. To prevent the cord from being pulled out by external force, make sure it is fixed securely.

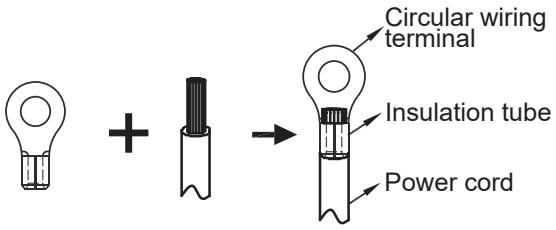
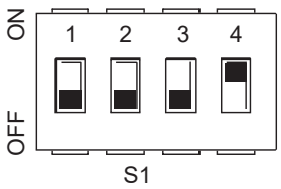


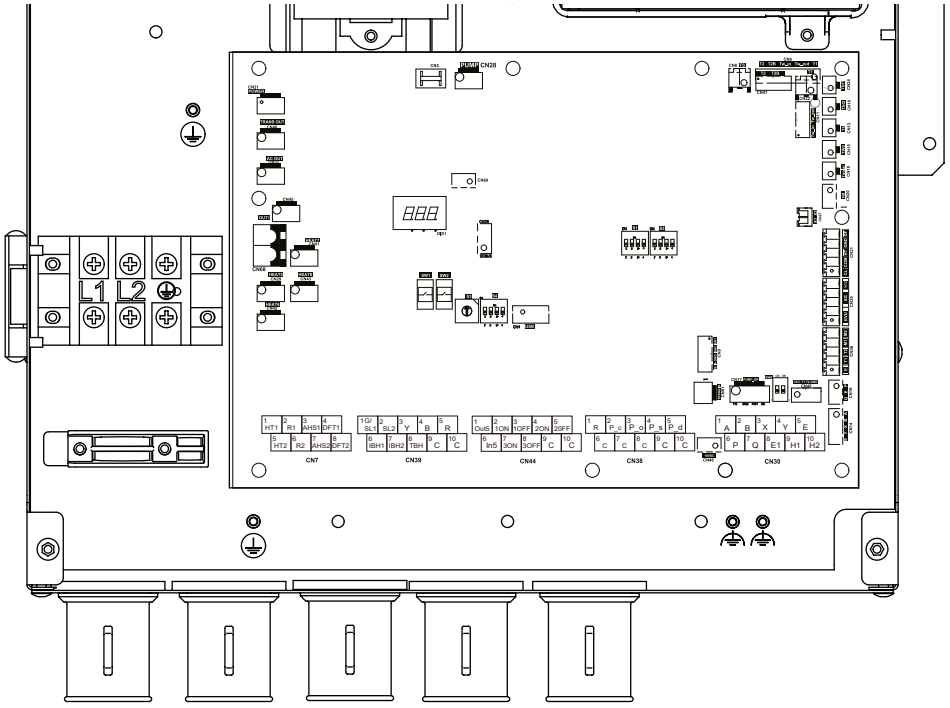
Figure 8.1

NOTICE

The earth fault circuit interrupter must be a high-speed type breaker of 30 mA (<0.1 s).Flexible cord must meet 60245IEC(H05VV-F) standards.

Mode selection of 1-phase 3 kW backup heater
Option 1/3 kW


8.9.6 Connection for other components



	Code	Print		Connect to
CN7	①	2	R1	Compressor run
		6	R2	
		4	DFT1	Defrost or alarm signal
		8	DFT2	
	②	1	HT1	Antifreeze E-heating tape(external)
		5	HT2	
	③	3	AHS1	Additional heat source
		7	AHS2	

	Code	Print		Connect to
CN39	①	1	SL1	Solar energy input signal
		2	SL2	
	②	3	Y	Room thermostat input
		4	B	
		5	R	
	③	6	IBH1	Internal backup heater
		7	IBH2	
		9	C	
		8	TBH	Tank booster heater
		10	C	

	Code	Print		Connect to
CN44	①	2	1ON	3-way valve
		3	1OFF	
		9	C	
		4	2ON	
		5	2OFF	
		10	C	
		7	3ON	
		8	3OFF	
		10	C	
	②	1	Out5	Reserved
		6	In5	

	Code	Print		Connect to
CN38	①	1	R	Output 24V AC
		6	C	
	②	2	P_c	Pumpc(zone2 pump)
		7	C	
	③	3	P_o	Outside circulation pump/Zone1 pump
		8	C	
	④	4	P_s	Solar energy pump
		9	C	
	⑤	5	P_d	DHW pipe pump
		10	C	

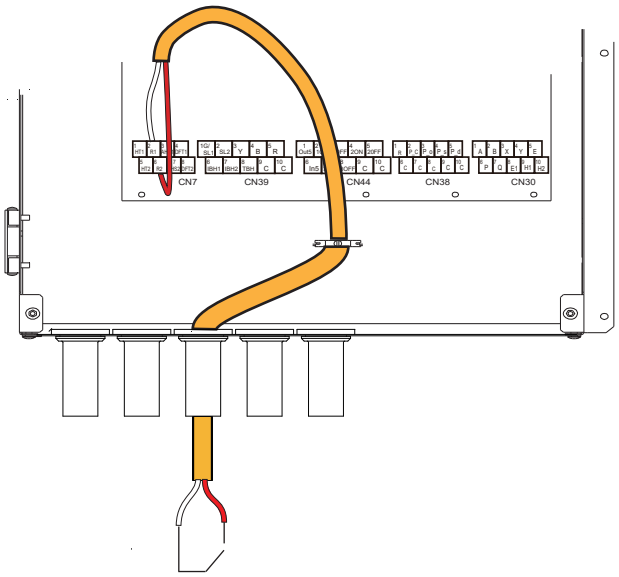
	Code	Print		Connect to
CN30	①	1	A	Wired controller
		2	B	
		3	X	
		4	Y	
		5	E	
	②	6	P	Outdoor unit
		7	Q	
	③	9	H1	Internal machine Parallel
		10	H2	

XT1	L1	Indoor unit power supplier
	L2	
	G	

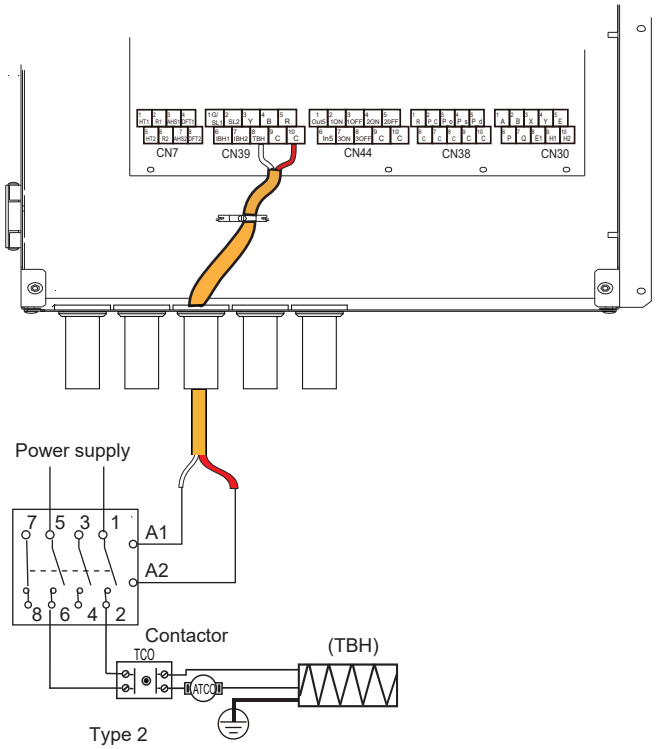
Port provide the control signal to the load. Two kind of control signal port:

Type 1: Dry connector without voltage.

Type 2: Port provide the signal with 24 V AC voltage.



Type 1 Running



Type 2

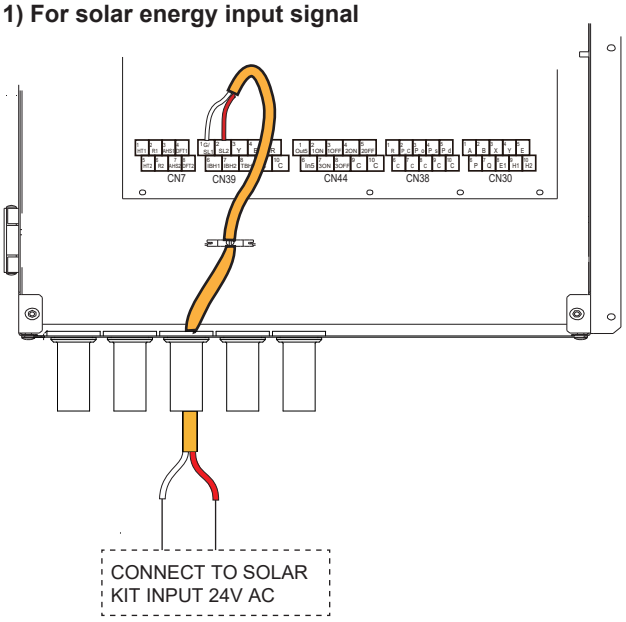
Control signal port of indoor unit: The **CN39/CN44/CN38** contains terminals for solar energy, 3-way valve, pump, booster heater , etc.

The parts wiring is illustrated below:

⚠CAUTION

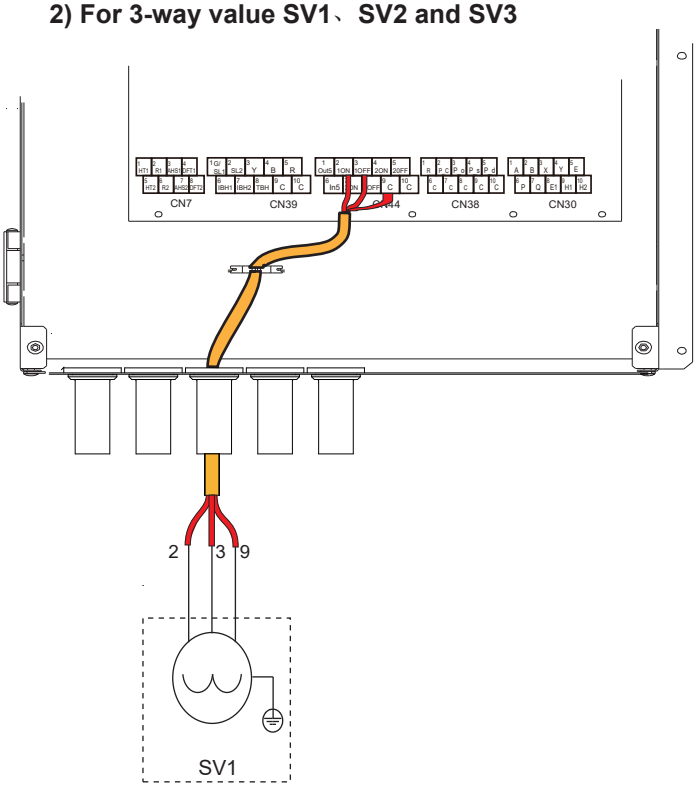
These Type 2 loads can be powered through the terminalson the control board as long as the total demand at anygiven time is less than 65 VA (with both loads onsimultaneously). If the total demand exceeds this value, an external transformer will be required.

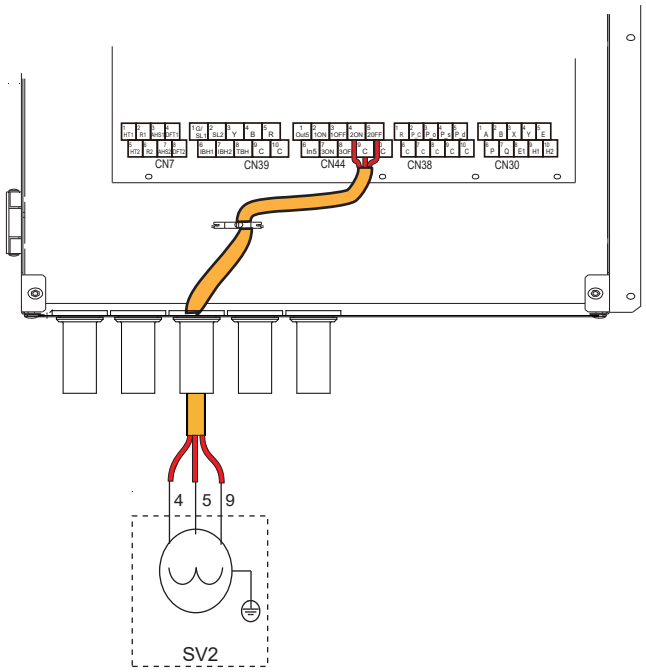
1) For solar energy input signal

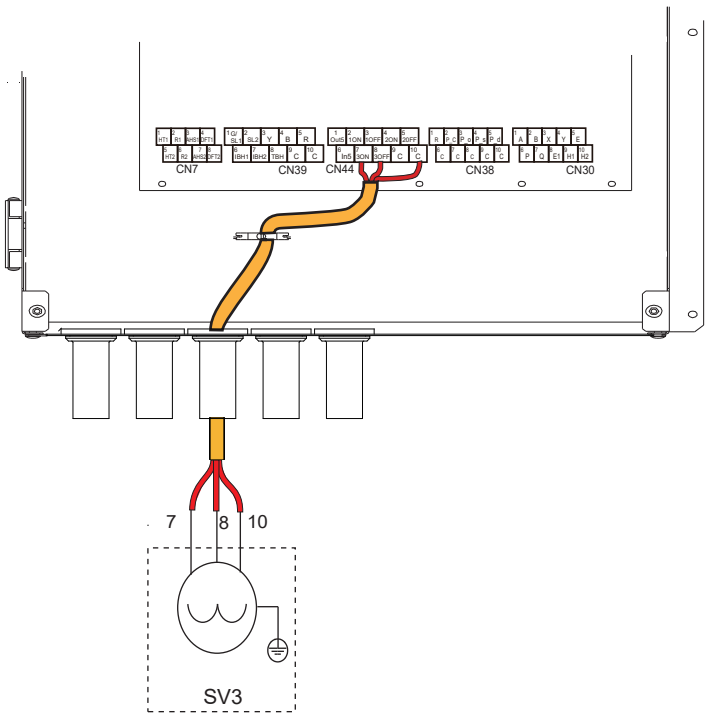


Voltage	24 V AC
Minimum wiring size(AWG)	18

2) For 3-way value SV1、SV2 and SV3





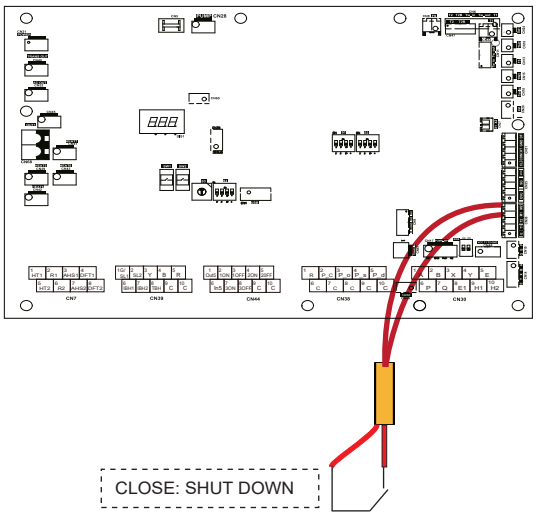


Voltage	24 V AC
Maximum running current(A)	0.2
Minimum wiring size(AWG)	18
Control port signal type	Type 2

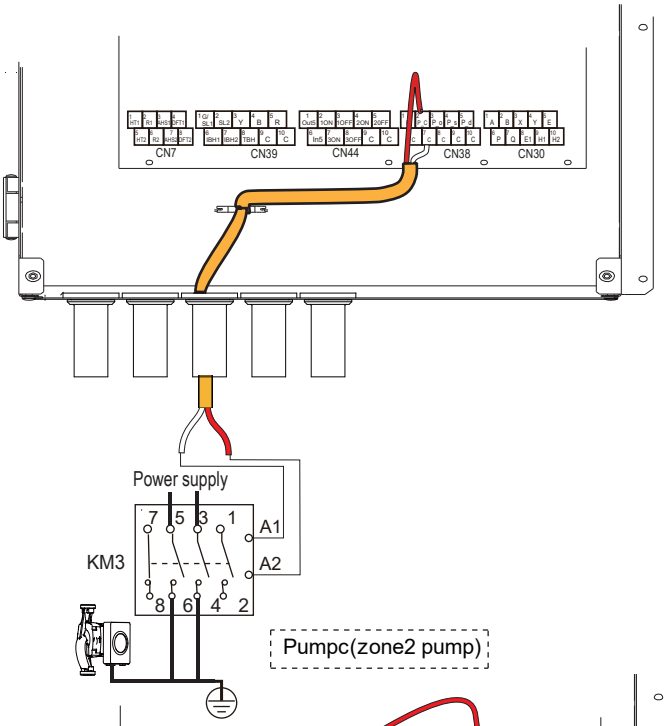
a) Procedure

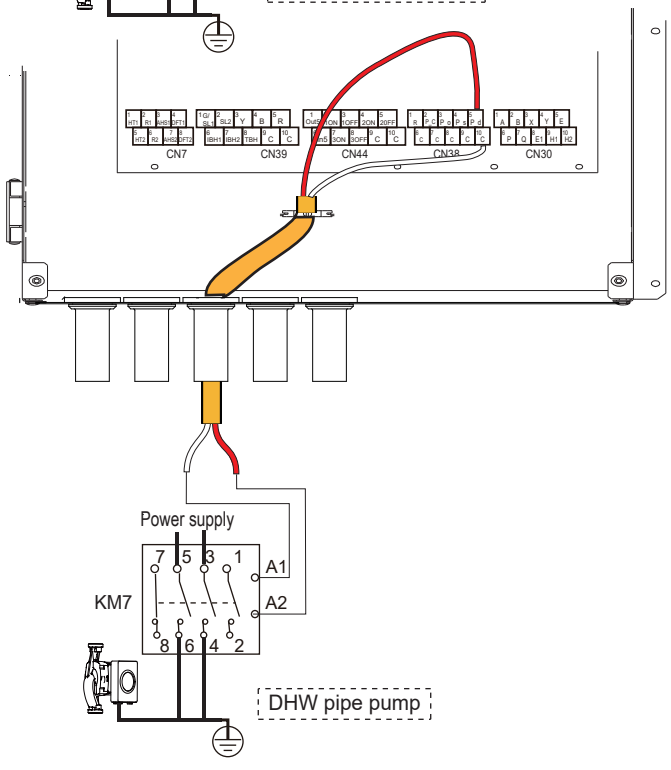
- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable reliably.

4) For remote shut down:



5) For Pumpc and DHW pipe pump :





Voltage	24 V AC
Maximum running current(A)	0.35
Minimum wiring size(AWG)	18
Control port signal type	Type 2

a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable reliably.

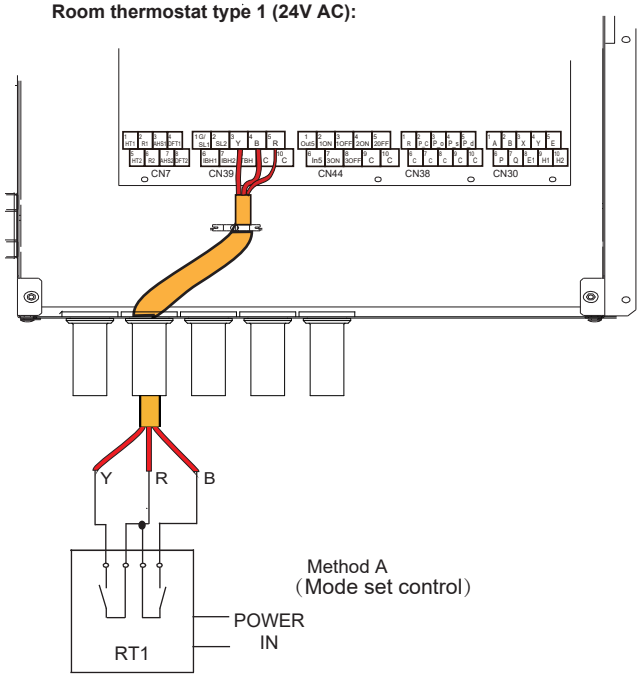
6) For room thermostat:

Room thermostat : "POWER IN" provide the working voltage to the RT, doesn't provide the voltage to the RT connector directly. Port "5-R" provide the 24 V AC voltage to the RT connector.

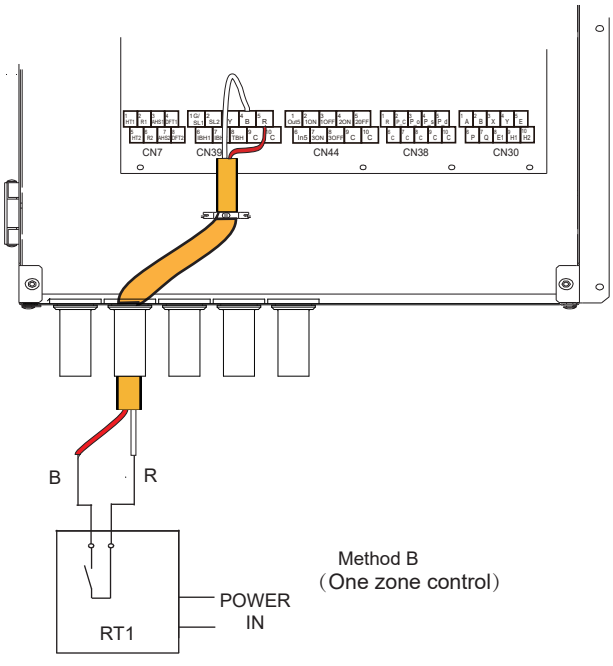
NOTICE

There are two optional connect method depend on the room thermostat type.

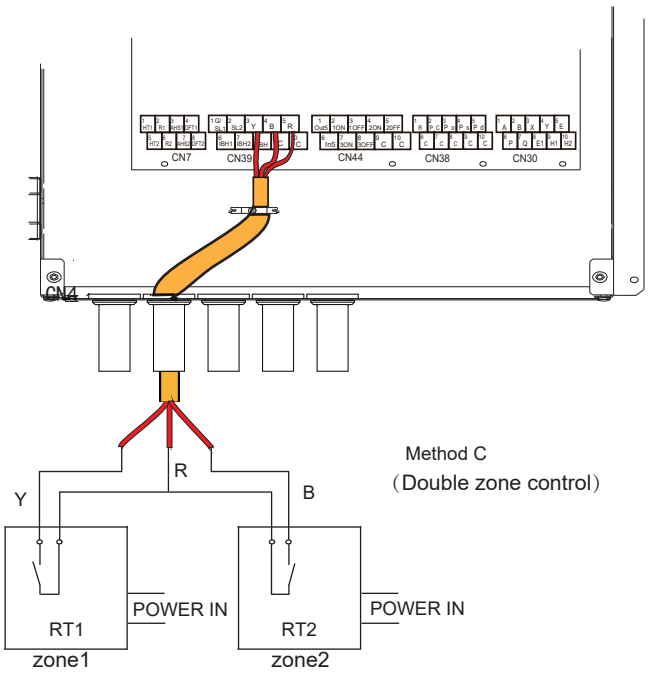
Room thermostat type 1 (24V AC):



Method A
(Mode set control)



Method B
(One zone control)



Method C
(Double zone control)

Voltage	24 V AC
Minimum wiring size(AWG)	18

There are three methods for connecting the thermostat cable (as described in the picture above) and it depends on the application.

- **Method A** (Mode set control)

RT can control heating and cooling individually, like the controller for 4-pipe FCU. When the indoor unit is connected with the external temperature controller, user interface FOR SERVICEMAN set ROOM THERMOSTAT to MODE SET:

A.1 When unit detect voltage is 24 V AC between Y and C ,the unit operates in the cooling mode.

A.2 When unit detect voltage is 24 V AC between B and C, the unit operates in the heating mode.

A.3 When unit detect voltage is 0 V AC for both side(Y-C, B-C) the unit stop working for space heating or cooling.

A.4 When unit detect voltage is 24 V AC for both side(Y-C, B-C) the unit working in cooling mode.

- **Method B** (One zone control)

RT provide the switch signal to unit. User interface FOR SERVICEMAN set ROOM THERMOSTAT to ONE ZONE:

B.1 When unit detect voltage is 24 V ACV AC between B and C, unit turns on.

B.2 When unit detect voltage is 0 V AC between B and C, unit turns off.

- **Method C** (Double zone control)

Indoor unit is connected with two room thermostat, while user interface FOR SERVICEMAN set ROOM THERMOSTAT to DOUBLE ZONE:

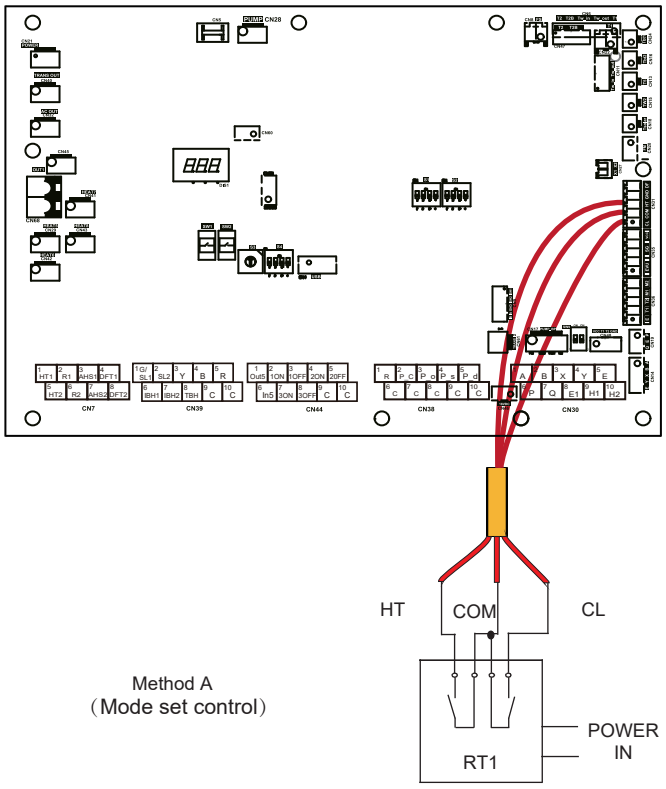
C.1 When unit detect voltage is 24 V AC between B and C ,zone1 turns on. When unit detect voltage is 0 V AC between B and C, zone1 turns off.

C.2 When unit detect voltage is 24 V AC between Y and C, zone2 turns on according to climate temp curve. When unit detect voltage is 0 V between Y and C, zone2 turns off.

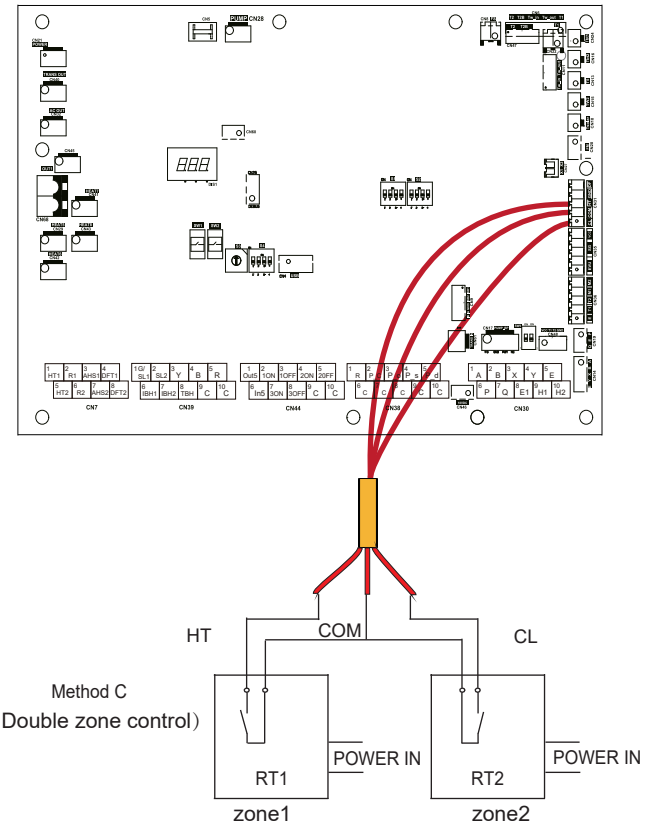
C.3 When B-C and Y-C are detected as 0 V AC, unit turns off.

C.4 when B-C and Y-C are detected as 24 V AC, both zone1 and zone2 turn on.

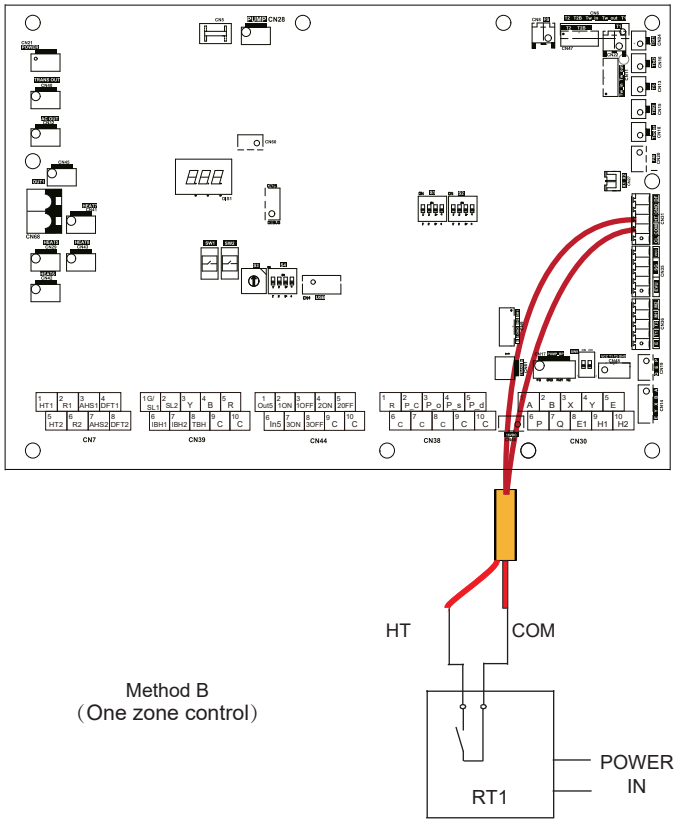
Room thermostat type2 (Low voltage):



Method A
（Mode set control）



Method C
（Double zone control）



Method B
（One zone control）

There are three methods for connecting the thermostat cable (as described in the picture above) and it depends on the application.

- **Method A**（Mode set control）

RT can control heating and cooling individually, like the controller for 4-pipe FCU. When the indoor unit is connected with the external temperature controller, user interface FOR SERVICEMAN set ROOM THERMOSTAT to MODE SET：

A.1 When unit detect voltage is 12 V DC between CL and GND ,the unit operates in the cooling mode.

A.2 When unit detect voltage is 12 V DC between HT and GND, the unit operates in the heating mode.

A.3 When unit detect voltage is 0 V DC for both side(CL-GND, HT-GND) the unit stop working for space heating or cooling.

A.4 When unit detect voltage is 12 V DC for both side(CL-GND, HT-GND) the unit working in cooling mode.

- **Method B**（One zone control）

RT provide the switch signal to unit. User interface FOR SERVICEMAN set ROOM THERMOSTAT to ONE ZONE：

B.1 When unit detect voltage is 12 V DC between HT and GND, unit turns on.

B.2 When unit detect voltage is 0 V DC between HT and GND, unit turns off.

- **Method C**（Double zone control）

Indoor unit is connected with two room thermostat, while user interface FOR SERVICEMAN set ROOM THERMOSTAT to DOUBLE ZONE:

C.1 When unit detect voltage is 12 V DC between HT and GND ,zone1 turn on. When unit detect voltage is 0 V DC between HT and GND, zone1 turn off.

C.2 When unit detect voltage is 12 V DC between CL and GND, zone2 turn on according to climate temp curve. When unit detect voltage is 0V between CL and GND, zone2 turn off.

C.3 When HT-GND and CL-GND are detected as 0 V DC, unit turn off.

C.4 when HT-GND and CL-GND are detected as 12 V DC, both zone1 and zone2 turn on.

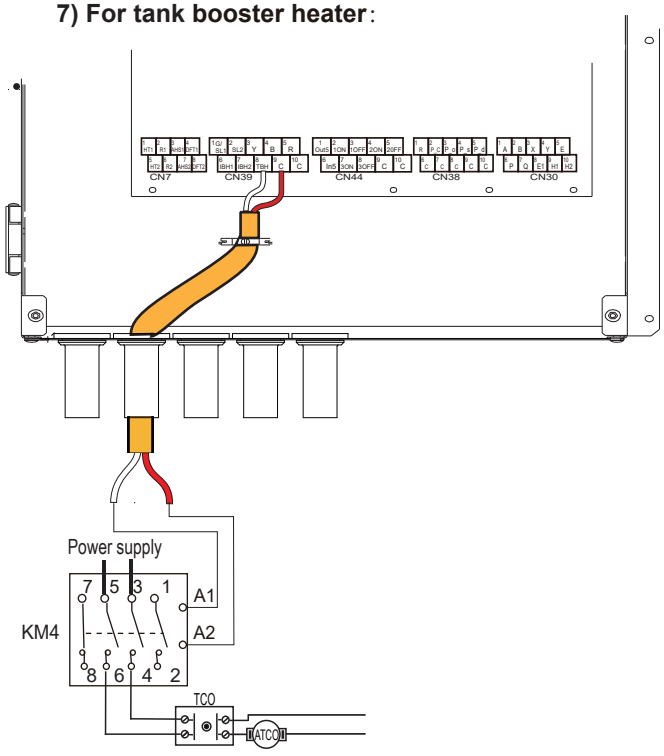
NOTICE

- The wiring of the thermostat should correspond to the settings of the user interface. Refer to **ROOM THERMOSTAT.**
- Power supply of machine and room thermostat must be connected to the same Neutral Line .
- When ROOM THERMOSTAT is not set to NON, the indoor temperature sensor Ta can't be set to valid
- Zone 2 can only operate in heating mode, When cooling mode is set on user interface and zone1 is OFF,"CL" in zone2 closes, system still keeps 'OFF'. While installation, the wiring of thermostats for zone1 and zone2 must be correct.

a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

7) For tank booster heater:

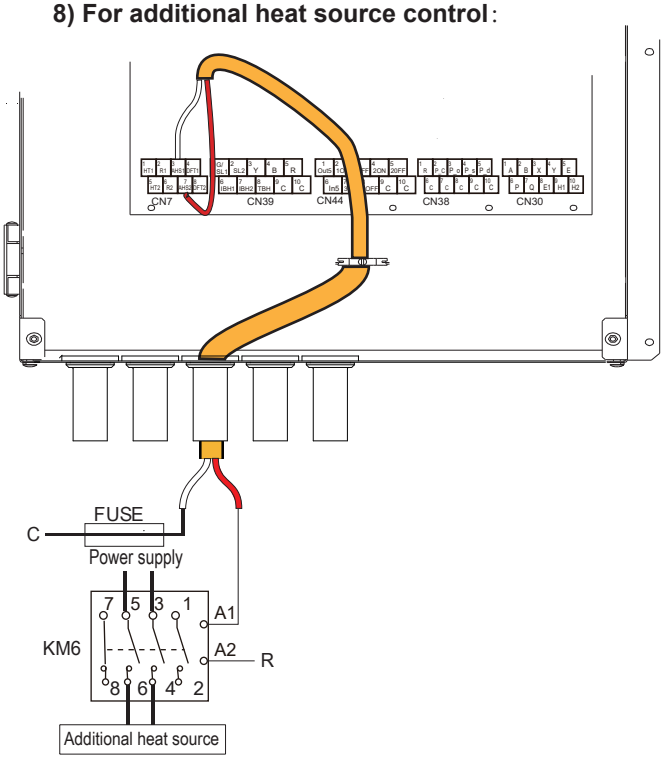


Voltage	24 V AC
Maximum running current(A)	0.35
Minimum wiring size(AWG)	18
Control port signal type	Type 2

NOTICE

The unit only sends an ON/OFF signal to the heater.

8) For additional heat source control:

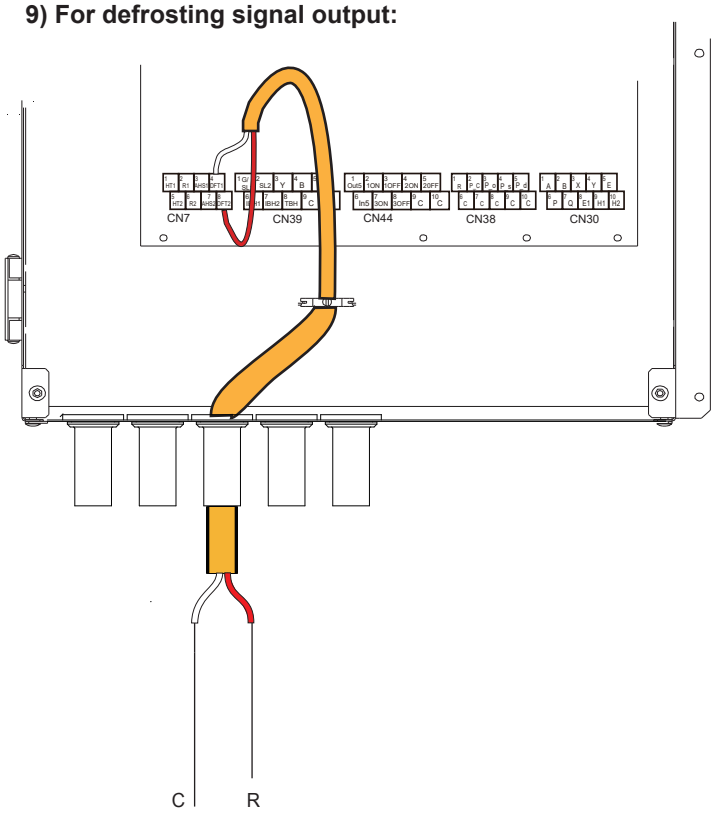


Voltage	24 V AC
Maximum running current(A)	1
Minimum wiring size(AWG)	18
Control port signal type	Type 1

WARNING

This part only applies to Basic. For Customized, cause there is an interval backup heater in the unit, the indoor unit should not be connected to any additional heat source.

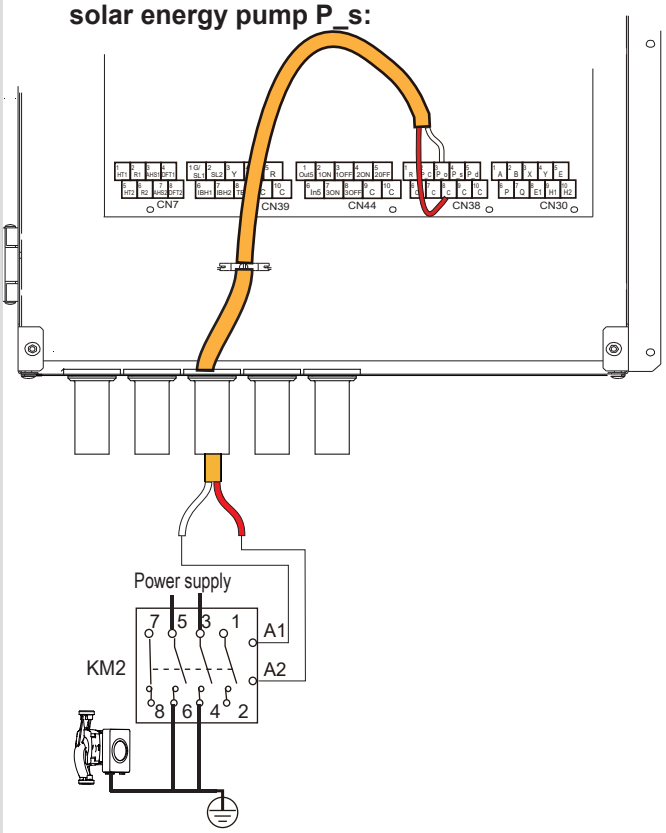
9) For defrosting signal output:



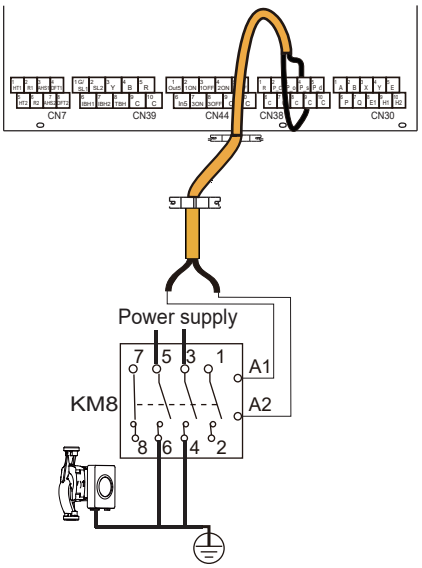
DEFROSTING PROMPT SIGNAL

Voltage	24 V AC
Maximum running current(A)	1
Minimum wiring size(AWG)	18
Control port signal type	Type 1

10) For outside circulation pump P_o and outside solar energy pump P_s:



outside circulation pump P_o



outside solar energy pump P_s

Voltage	24 V AC
Maximum running current(A)	0.35
Minimum wiring size(AWG)	18
Control port signal type	Type 2

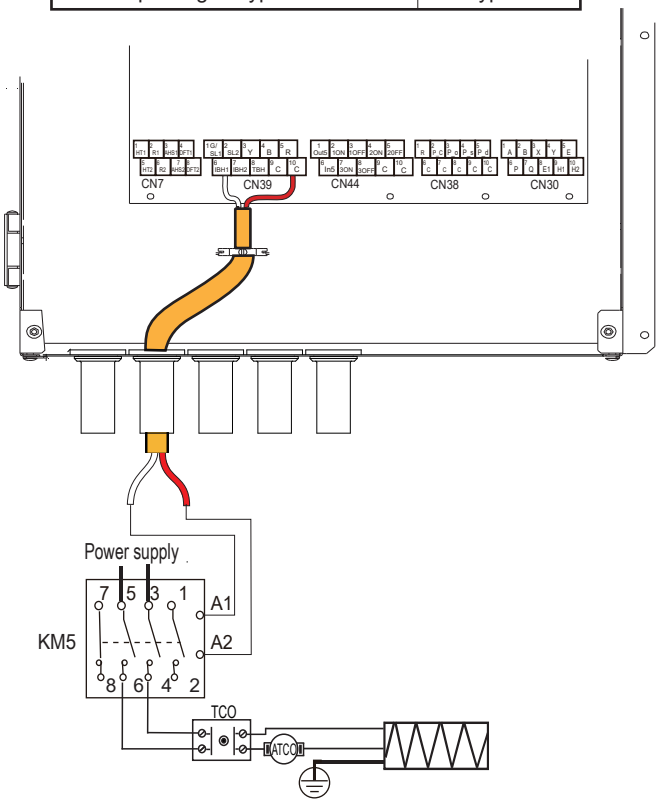
a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

11) For backup heater:

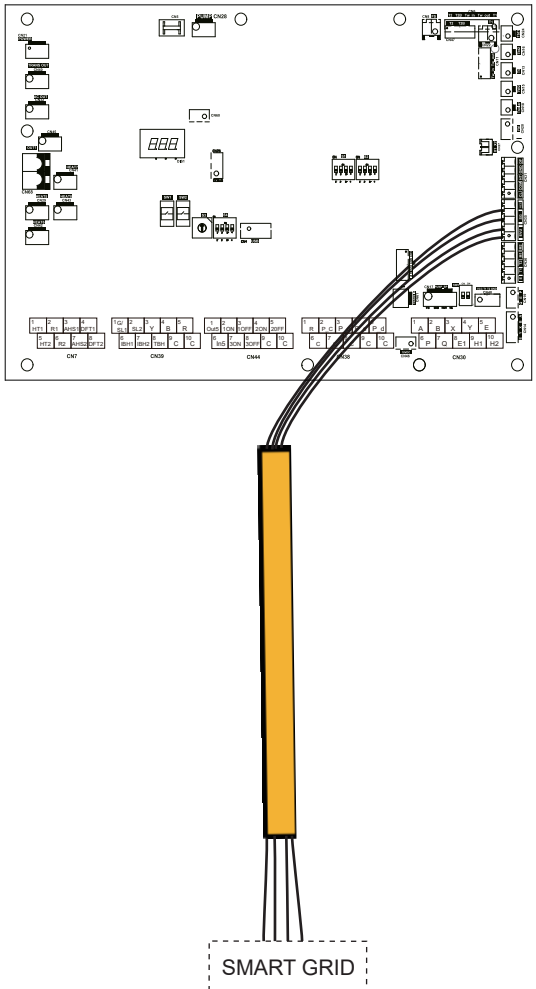
The indoor unit contains a 3kW internal backup heater. If an external backup heater needs to be installed, the following ports can be connected.

Voltage	24 V AC
Maximum running current(A)	0.35
Minimum wiring size(AWG)	18
Control port signal type	Type 2



12) For smart grid:

The unit has smart grid function, there are two ports on PCB to connect SG signal and EVU signal as following:



1. When EVU signal is on , and SG signal is on, as long as the DHW mode is set to be valid, heat pump will operate DHW mode priority and the DHW mode setting temperature will be change to 158℉(70 ℃).
T5＜138℉(58.5 ℃), the TBH is on, T5≥158 ℉(70 ℃), the TBH is off.

2. When EVU signal is on , and SG signal is off, as long as the DHW mode is set to be valid and the mode is on, heat pump will operate DHW mode priority. T5＜T5S-4， the TBH is on,T5≥T5S+6， the TBH is off.

3. When EVU signal is off, and SG signal is OFF, the unit operates normally.

4.When EVU signal is off, and SG signal is ON, the unit operates as below: The unit will not operate DHW mode, and the TBH is invalid, disinfect function is invalid； when running in cooling or heating mode, the unit will be off immediately.

9 START-UP AND CONFIGURATION

The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

⚠CAUTION

It is important that all information in this chapter is read sequentially by the installer and that the system is configured as applicable.

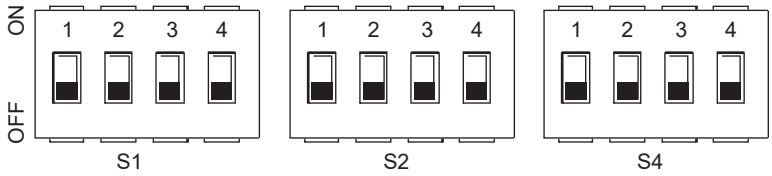
9.1 DIP switch settings overview

9.1.1 Function setting

DIP switch S1、S2 and S4 is located on the indoor unit main control board (see "**8.3.1 main control board of indoor unit**") and allows configuration of additional heating source thermistor installation, the second inner backup heater installation, etc.

⚠WARNING

Switch off the power supply before opening the switch box service panel and making any changes to the DIP switch settings.



DIP switch		ON=1	OFF=0	Factory defaults
S1	1/2	0/0=Integrated electric heater 0/1=External electric heater		Refer to electrically controlled wiring diagram
	3/4	0/0=No IBH 0/1=With IBH (One-step control) 1/0=With IBH (Two-step control) 1/1=With IBH (Three-step control)		

DIP switch		ON=1	OFF=0	Factory defaults
S2	1	Reserved		Refer to electrically controlled wiring diagram
	2	Reserved		
	3/4	0/0=variable speed pump 1 0/1=Fixed speed pump 1/0=Reserved 1/1=variable speed pump 2		

DIP switch		ON=1	OFF=0	Factory defaults
S4	1	master= Clear all slave address codes slave=Clear self-address code	Keep current address code	Refer to electrically controlled wiring diagram
	2	with refrigerant sensor (customized)	without refrigerant sensor	
	3	External MH-KIT	No external MH-KIT	
	4	Reserved		

9.2 Initial start-up at low outdoor ambient 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 cast concrete building contractor for further details.
To do so, the lowest water flow set temperature can be decreased to a value between 77℉(25℃) and 95℉(35℃) by adjusting the FOR SERVICEMAN. Refer to **SPECIAL FUNCTION**

9.3 Pre-operation checks

Checks before initial start-up.

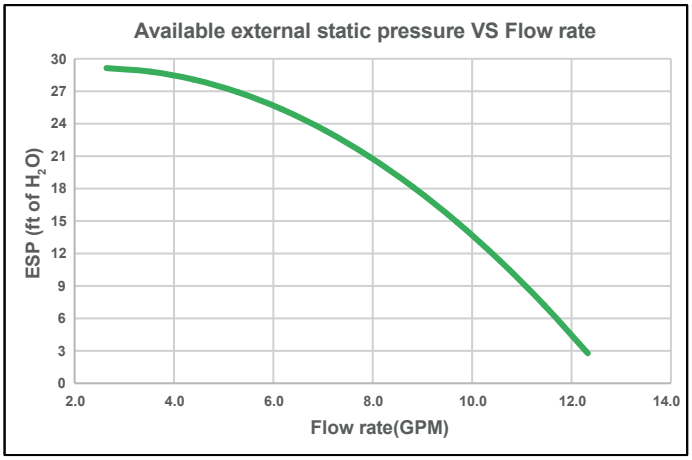
DANGER

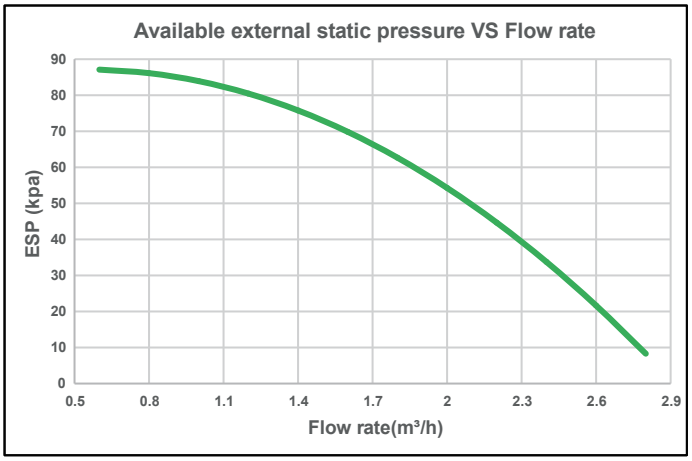
Switch off the power supply before making any connections.
After the installation of the unit, check the following before switching on the circuit breaker:

- Field wiring: Make sure that the field wiring between the local supply panel and unit and valves (when applicable), unit and room thermostat (when applicable), unit and domestic hot water tank, and unit and backup heater kit have been connected according to the instructions described in the chapter **8.9 "Field wiring"**, according to the wiring diagrams and to local laws and regulations.
- Fuses, circuit breakers, or protection devices Check that the fuses or the locally installed protection devices are of the size and type specified in **13 "Technical specifications"**. Make sure that no fuses or protection devices have been bypassed.
- Backup heater circuit breaker: Do not forget to turn on the backup heater circuit breaker in the switchbox (it depends on the backup heater type). Refer to the wiring diagram.
- Booster heater circuit breaker: Do not forget to turn on the booster heater circuit breaker (applies only to units with optional domestic hot water tank installed).
- Earth wiring : Make sure that the earth wires have been connected properly and that the earth terminals are tightened.
- Internal wiring: Visually check the switch box for loose connections or damaged electrical components.
- Mounting: Check that the unit is properly mounted, to avoid abnormal noises and vibrations when starting up the unit.
- Damaged equipment: Check the inside of the unit for damaged components or squeezed pipes.
- Refrigerant leak: Check the inside of the unit for refrigerant leakage. If there is a refrigerant leak, call your local dealer.
- Power supply voltage: Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.
- Air purge valve: Make sure the air purge valve is open (at least 2 turns).
- Shut-off valves: Make sure that the shut-off valves are fully open.

9.4 Circulation Pump

The internal pump maintains maximum output, the indoor unit can provide the head and flow:





Indoor unit 160

CAUTION

If the valves are at the incorrect position, the circulation pump will be damaged.

DANGER

If it's necessary to check the running status of the pump when unit power on, please do not touch the internal electronic control box components to avoid electric shock.

Failure diagnosis at first installation

- If nothing is displayed on the user interface, it is necessary to check for any of the following abnormalities before diagnosing possible error codes.

  -Disconnection or wiring error (between power supply and unit and between unit and user interface).

  -The fuse on the PCB may be broken.

- If the user interface shows "E8" or "E0" as an error code, there is a possibility that there is air in the system, or the water level in the system is less than the required minimum.
- If the error code E2 is displayed on the user interface, check the wiring between the user interface and unit.

More error code and failure causes can be found in **12.3 "Error codes"**.

9.5 Field settings

The unit should be configured to match the installation environment (outdoor climate, installed options, etc.) and user demand.

A number of field settings are available. These settings are accessible and programmable through “FOR SERVICEMAN” in user interface.

Procedure

To change one or more field settings, proceed as follows.

NOTICE

Temperature values displayed on the wired controller (user interface) are in °F.

About FOR SERVICEMAN

"FOR SERVICEMAN" is designed for the installer to set the parameters.

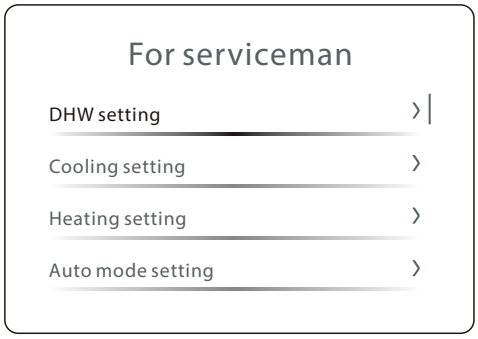
- Setting the composition of equipment.
- Setting the parameters.

How to go to FOR SERVICEMAN

How to enter FOR SERVICEMAN mode

Press and hold ☰ and 〉 simultaneously for 3 seconds to enter the authorization page. Enter password 234 and confirm it. Then, the system jumps into the page with a list of advanced settings.





NOTICE

"FOR SERVICEMAN" is only for installer or other specialist with sufficient knowledge and skills.

The end user who use "FOR SERVICEMAN" is regarded as improper use.

Save the settings and quit FOR SERVICEMAN mode

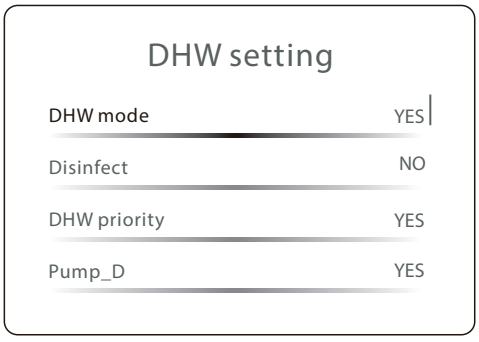
After all settings are adjusted, press ☰, and the confirmation page pops out. Select Yes and confirm to quit FOR SERVICEMEN mode.

NOTICE

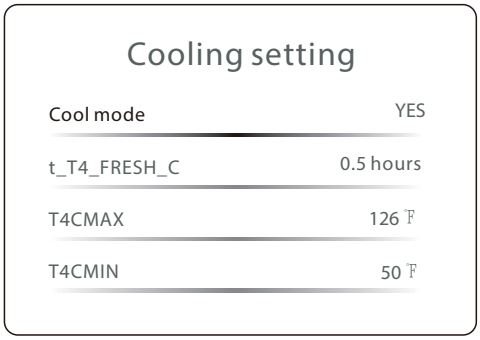
- The settings are saved automatically after you quit FOR SERVICEMAN mode.

9.5.1 DHW setting

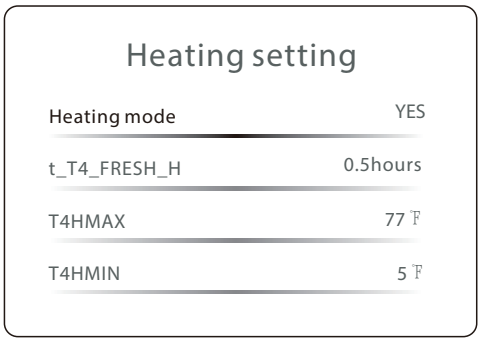
Select the target item and enter the setting page. Adjust the launch settings and values based on end user demands.



9.5.2 Cooling setting

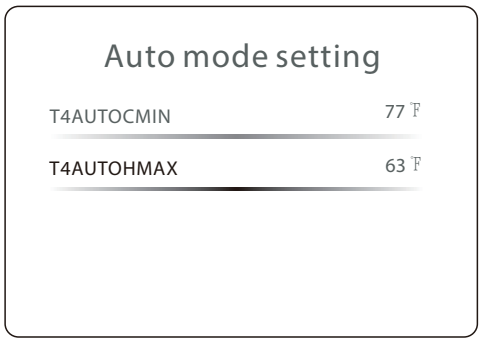


9.5.3 Heating setting

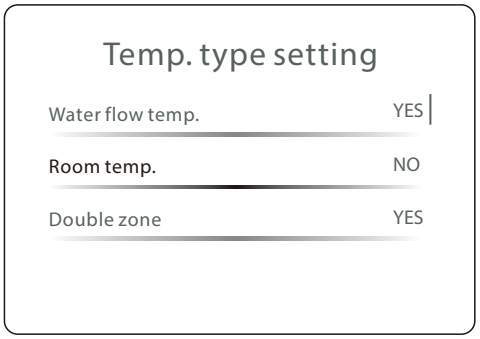


Either cooling mode or heating mode must be enabled, and they cannot be both set to NO at the same time.

9.5.4 Auto mode setting



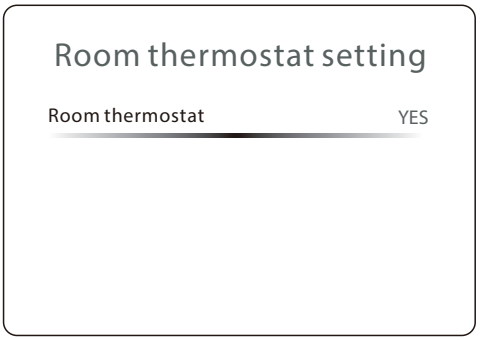
9.5.5 Temp. type setting



When both DOUBLE ZONE and ROOM TEMP. are enabled, the room temperature control is valid only for Zone 2, and Zone 1 is always under water temperature control.

When Room temp. is enabled, the temperature curve for the room temperature control zone is enforced, and the set temperature of the room temperature control zone can still be adjusted. The type of the temperature curve and the temperature offset can be set. (The unit will stop running if either the set temperature or the temperature curve is reached).

9.5.6 Room thermostat setting



- When Room thermostat is set to any value rather than NO, the setting of Temp. type is invalid.
- When Room thermostat is set to DOUBLE ZONE, DOUBLE ZONE is enabled automatically, and the temperature control mode is water temperature control.
- When Room thermostat is set to MODE SETTING/ONE ZONE, DOUBLE ZONE is disabled automatically, and the temperature control mode is water temperature control.

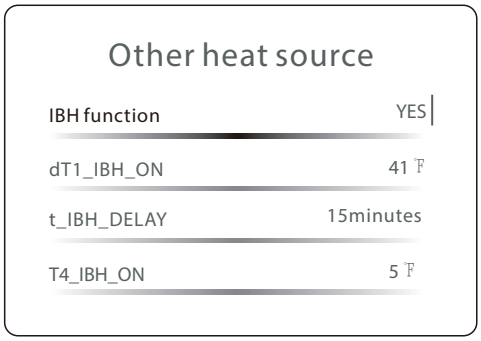
1) When Room thermostat is set to NO, the room thermostat is invalid.

2) When Room thermostat is set to MODE SETTING, the wired controller cannot be used to turn on/off the unit or set the operation mode. Besides the timer related to DHW, all timers in Schedule are invalid. The unit can read the operating status of the unit, and set the temperature if the temperature curve is inactive.

3) When Room thermostat is set to ONE ZONE, the wired controller cannot be used to turn on/off Zone 1. Besides the timer related to DHW, all timers in Schedule are invalid. The unit can read the operating status of the unit, and set the operation mode (excluding Auto mode), and the temperature if the temperature curve is inactive.

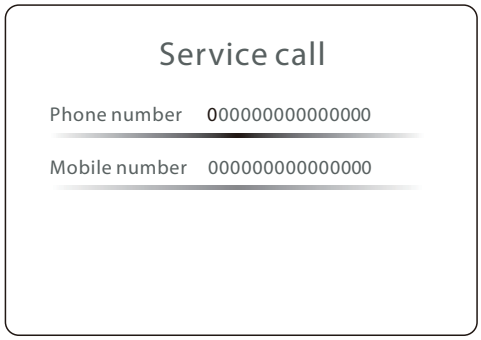
4) When Room thermostat is set to DOUBLE ZONE, the wired controller cannot be used to turn on/off the Zone 1 or Zone 2. Besides the timer related to DHW, all timers in Schedule are invalid. The unit can read the operating status of the unit, and set the operation mode (excluding Auto mode), and the temperature if the temperature curve is inactive.

9.5.7 Other heat source



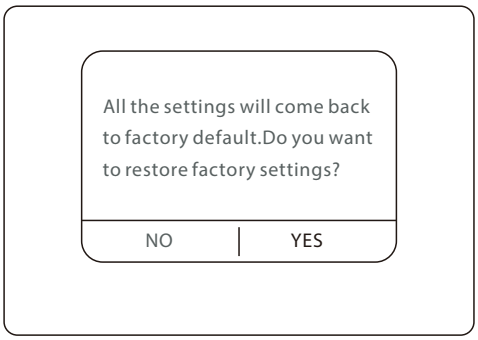
1) When EnSwitchPDC is set to NO, T4_AHS_ON can be set manually. When EnSwitchPDC is set to YES, T4_AHS_ON cannot be set manually.
2) When AHS function is set to NO, EnSwitchPDC is enforced to be NO.
3) When DHW mode is invalid, IBH function is enforced to be Heating.
4) When AHS function is set to NO, AHS_PUMP_I CONTROL is enforced to be RUN.

9.5.8 Service call



Up to two phone numbers can be saved, and the maximum length of the phone numbers is 15 characters. If the length is smaller than 15 character, use 0 in the front to indicate blank characters.

9.5.9 Restoration of factory settings

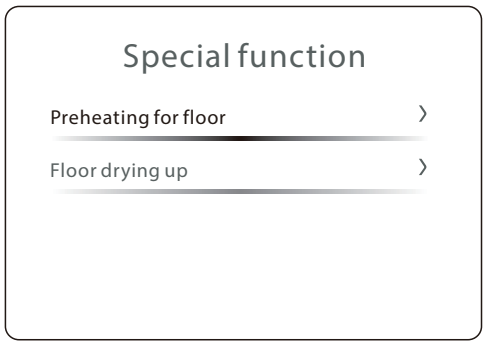


Allow all operating parameters to be restored to the factory preset values.
Select YES and confirm to validate this function.

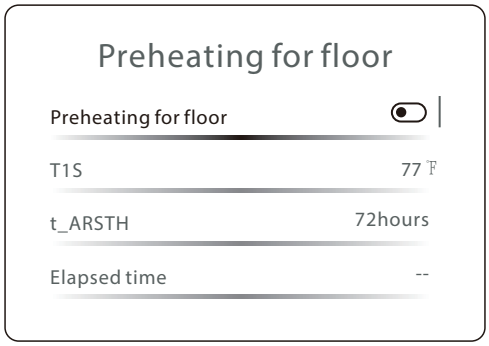
9.5.10 Trail run

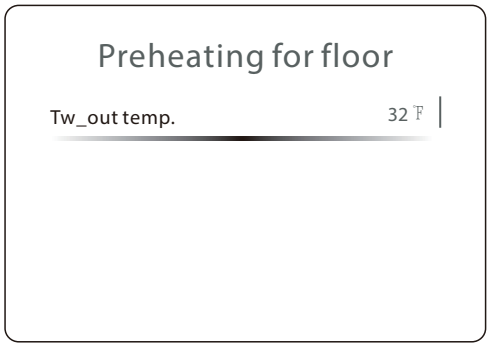
Refer to 11. Commissioning for further information.

9.5.11 Special function

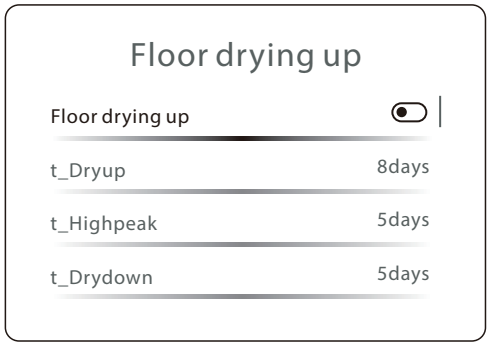


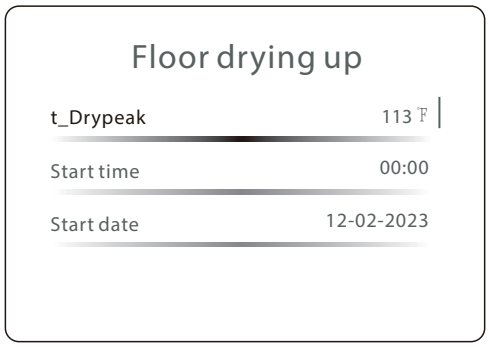
Preheating for floor
Provide mild heat to the underfloor water piping for initial heating operation to diminish the risk of damage to the floor and piping system.





The first line is the operating status. Grey means it is off, and green means it is on.
T1S is the set temperature. t_ARSTH is the duration. Elapsed time is the time for which the function is enabled. Tw_out temp. is the current leaving water temperature.
Floor drying up
Provide mild heat to the concrete or other structural materials around the underfloor water piping in a certain period of time, accelerate the process of dehumidification.

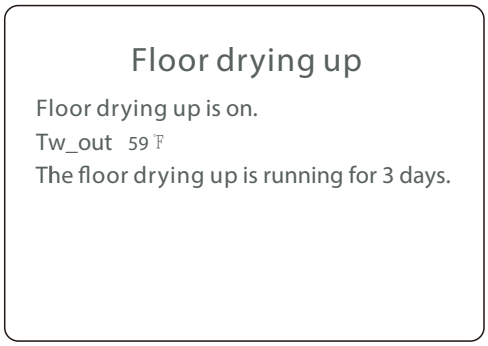




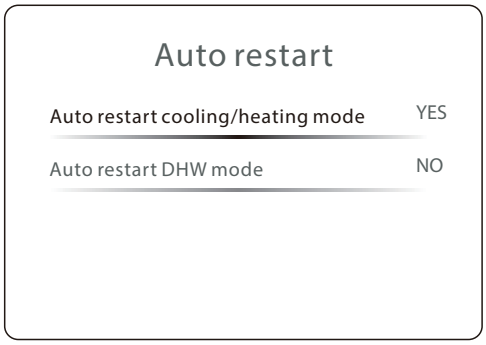
The first line is the status indicator. Grey means it is off, and green means it is on.

t_Dryup is the time for which the unit rises the temperature. t_Highpeak is the time for which the unit maintains the temperature. t_Drydown is the time for which the unit drops the temperature. t_Drypeak is the target temperature. This function will be enabled only when the time reaches the Start time and Start day.

When the function is enabled, you can see the interface as below.

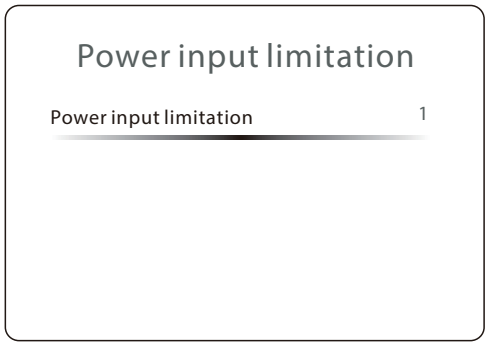


9.5.12 Auto restart



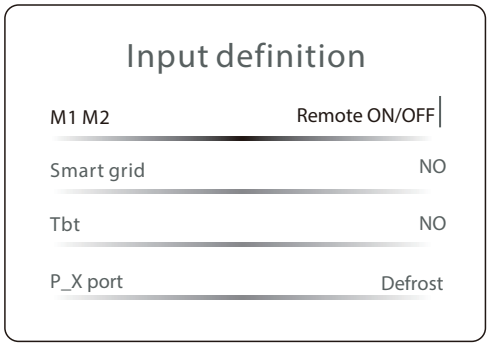
Refer to 9.5.1 DHW setting for the operation method.

9.5.13 Power input limitation



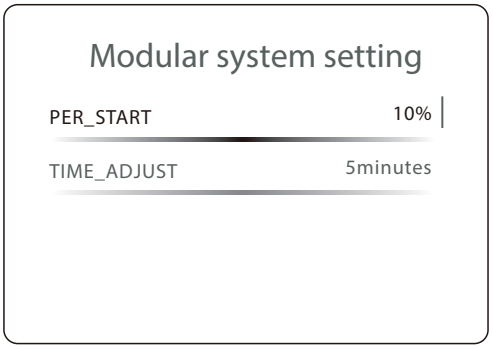
Refer to 9.5.1 DHW setting for the operation method.

9.5.14 Input definition



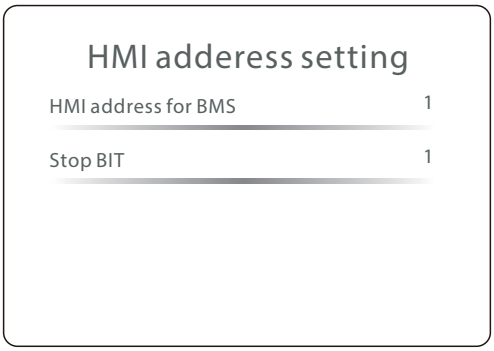
Refer to 9.5.1 DHW setting for the operation method.

9.5.15 Modular system setting



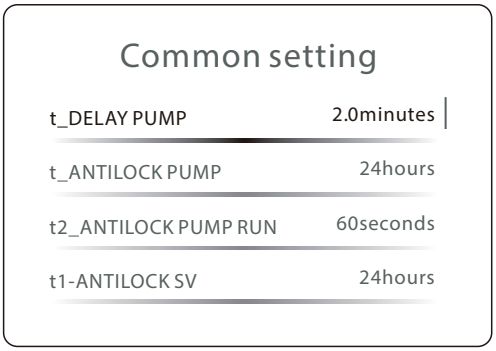
Refer to 9.5.1 DHW setting for the operation method.

9.5.16 HMI address setting



Refer to 9.5.1 DHW setting for the operation method.

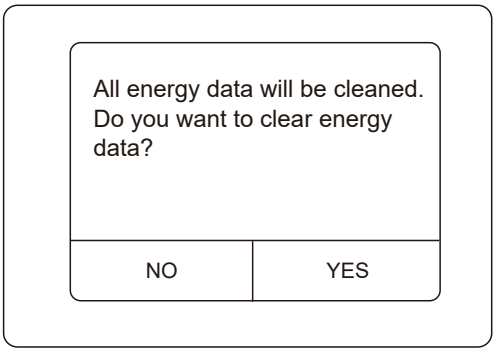
9.5.17 Common setting



Refer to 9.5.1 DHW setting for the operation method.

9.5.18 Clear energy data

Clear all energy metering data.



Refer to 9.5.1DHW setting for the operation method.

9.6 Operation Settings

Title	Code	State	Default	Minimum	Maximum	Set interval	Unit
DHW heating setting	DHW mode	Enable or disable DHW mode: 0=NO, 1=YES	1	0	1	1	/
	Disinfect	Enable or disable the disinfect mode: 0=NO, 1=YES	1	0	1	1	/
	DHW priority	Enable or disable DHW priority mode: 0=NO, 1=YES	1	0	1	1	/
	Pump_D	Enable or disable DHW pump mode: 0=NO, 1=YES	0	0	1	1	/
	DHW priority time set	Enable or disable DHW priority time setting: 0=NO, 1=YES	0	0	1	1	/
	dT5_ON	The temperature difference for starting DHW mode	18(10)	2(1)	54(30)	1	°F(°C)
	dT1S5	The difference value between Twout and T5 in DHW mode	18(10)	9(5)	72(40)	1	°F(°C)
	T4DHWMAX	The maximum ambient temperature at which the heat pump can operate for domestic water heating	110(43)	95(35)	110(43)	1	°F(°C)
	T4DHWMIN	The minimum ambient temperature at which the heat pump can operate for domestic water heating	14(-10)	-13(-25)	86(30)	1	°F(°C)
	T5S_Disinfect	The target temperature of water in the domestic hot water tank in DISINFECT mode	149(65)	140(60)	158(70)	1	°F(°C)
	t_DI_HIGHTEMP.	The time for which the highest temperature of water in the domestic hot water tank in DISINFECT mode lasts	15	5	60	5	Minutes
	t_DI_MAX	The maximum time for which disinfection lasts	210	90	300	5	Minutes
	t_DHWHP_Restrict	The operating time for heating/cooling	30	10	600	5	Minutes
	t_DHWHP_MAX	The maximum continuous operating time of the heat pump in DHW PRIORITY mode	90	10	600	5	Minutes
	Pump_D timer	Enable or disable the DHW pump to run as scheduled and to keep running for PUMP RUNNING TIME: 0=NO, 1=YES	1	0	1	1	/
	Pump_D running time	The certain time for which the DHW pump keeps running	5	5	120	1	Minutes
	Pump_D disinfect	Enable or disable the DHW pump to operate when the unit is in DISINFECT mode and T5 is larger than or equal to T5S_DI-2: 0=NO, 1=YES	1	0	1	1	/
Cooling setting	Cooling mode	Enable or disable the cooling mode:0=NO,1=YES	1	0	1	1	/
	t_T4_Fresh_C	The refresh time of climate-related curves in cooling mode	0.5	0.5	6	0.5	Hours
	T4CMAX	The highest ambient operating temperature in cooling mode	126(52)	95(35)	126(52)	1	°F(°C)
	T4CMIN	The lowest ambient operating temperature in cooling mode	50(10)	23(-5)	77(25)	1	°F(°C)
	dT1SC	The temperature difference for starting the heat pump (T1)	9(5)	4(2)	18(10)	1	°F(°C)
	dTSC	tThe temperature difference for starting the heat pump (Ta)	4(2)	2(1)	18(10)	1	°F(°C)
	Zone 1 C-emission	The type of Zone 1 terminal for cooling mode:0=FLH（floor heating), 1=FCU(fan coil unit), 2=RAD(radiator)	1	0	2	1	/
	Zone 2 C-emission	The type of Zone 2 terminal for cooling mode: 0=FLH（floor heating), 1=FCU(fan coil unit), 2=RAD(radiator)	1	0	2	1	/
	Heating mode	Enable or disable the heating mode: 0=NO, 1=YES	1	0	1	1	/

Heating setting	t_T4_Fresh_H	The refresh time of climate-related curves in heating mode	0.5	0.5	6	0.5	Hours
	T4HMAX	The maximum ambient operating temperature in heating mode	77(25)	68(20)	95(35)	1	°F(°C)
	T4HMIN	The minimum ambient operating temperature in heating mode	5(-15)	-13(-25)	86(30)	1	°F(°C)
	dT1SH	The temperature difference for starting the unit (T1)	9(5)	4(2)	36(20)	1	°F(°C)
	dTSH	The temperature difference for starting the unit (Ta)	4(2)	2(1)	18(10)	1	°F(°C)
	Zone 1 H-emission	The type of Zone 1 terminal for heating mode: 0=FLH（floor heating) 1=FCU(fan coil unit), 2=RAD(radiator)	2	0	2	1	/
	Zone 2 H-emission	The type of Zone 2 terminal for heating mode: 0=FLH（floor heating) 1=FCU(fan coil unit), 2=RAD(radiator)	0	0	2	1	/
	Force defrost	Enable or disable the force defrost: 0=NO, 1=YES.	0	0	1	1	/
AUTO mode setting	T4AUTOCMIN	The minimum operating ambient temperature for cooling in auto mode	77(25)	68(20)	85(29)	1	°F(°C)
	T4AUTOHMAX	The maximum operating ambient temperature for heating in auto mode	63(17)	50(10)	63(17)	1	°F(°C)
Temp. type setting	Water flow temp.	Enable or disable the Water flow temp.: 0=NO, 1=YES	1	0	1	1	/
	Room temp.	Enable or disable the Room temp.: 0=NO, 1=YES	0	0	1	1	/
	Double zone	Enable or disable the Double zone: 0=NO, 1=YES	0	0	1	1	/
Room thermostat setting	Room thermostat	The style of room thermostat: 0=NO, 1=Mode set, 2=One zone, 3=Double zone	0	0	3	1	/
	Mode set priority	Select the priority mode in Room thermostat: 0=Heating, 1=Cooling	0	0	1	1	/
Other heat source	IBH function	Select the mode of IBH (Internal backup heater : 0=Heating and DHW, 1=Heating	0 (DHW=valid) 1 (DHW= invalid)	0	1	1	/
	dT1_IBH_ON	The temperature difference between T1S and T1 for starting the backup heater	9(5)	4(2)	18(10)	1	°F(°C)
	t_IBH_Delay	The time for which the compressor has run before startup of the first step backup heater	30	15	120	5	Minutes
	T4_IBH_ON	The ambient temperature for starting the backup heater	23(-5)	5(-15)	86(30)	1	°F(°C)
	P_IBH1	Power input of IBH1	0.0	0.0	20.0	0.5	kW
	P_IBH2	Power input of IBH2	0.0	0.0	20.0	0.5	kW
	AHS function	Enable or disable the AHS (Auxiliary heating source) function: 0=NO, 1=Heating, 2=Heating and DHW	0	0	2	1	/
	AHS_Pump_I Control	Select the pump operating status when only AHS runs: 0=Run, 1=Not run	0	0	1	1	/
	dT1_AHS_ON	The temperature difference between T1S and T1 for starting the auxiliary heating source	9(5)	4(2)	36(20)	1	°F(°C)
	t_AHS_Delay	The time for which the compressor has run before startup of the additional heating source	30	5	120	5	Minutes
	T4_AHS_ON	The ambient temperature for starting the additional heating source	23(-5)	5(-15)	86(30)	1	°F(°C)
	EnSwitchPDC	Enable or disable automatic switch of heat pump and auxiliary heating source based on running cost: 0=NO, 1=YES	0	0	1	1	/
	GAS-COST	Price of gas	0.85	0.00	5.00	0.01	price/m^3
	ELE-COST	Price of electricity	0.20	0.00	5.00	0.01	price/ kWh

Other heat source	MAX-SETHEATER	Maximum set temperature of additional heating source	176(80)	34(1)	176(80)	1	°F(°C)
	MIN-SETHEATER	Minimum set temperature of additional heating source	86(30)	32(0)	175(79)	1	°F(°C)
	MAX-SIGHEATER	The voltage corresponding to the maximum set temperature of additional heating source	10	1	10	1	V
	MIN-SIGHEATER	The voltage corresponding to the minimum set temperature of additional heating source	3	0	9	1	V
	TBH function	Enable or disable the TBH (Tank booster heater) function: 0=NO, 1=YES	1	0	1	1	/
	dT5_TBH_ OFF	The temperature difference between T5 and T5S (the set water tank temperature) for turning the booster heater off	9(5)	0(0)	18(10)	1	°F(°C)
	t_TBH_DELAY	The time for which the compressor has run before startup of the booster heater	30	0	240	5	Minutes
	T4_TBH_ON	The ambient temperature for starting the tank booster heater	41(5)	23(-5)	122(50)	1	°F(°C)
	P_TBH	Power input of TBH	2.0	0.0	20.0	0.5	kW
	Solar function	Enable or disable the Solar function: 0=NO, 1=Solar and HP, 2=Only solar (Heat Pump)	0	0	2	1	/
	Solar control	Solar pump (pump_s) control: 0=SL1SL2, 1=Tsolar	0	0	1	1	/
	Deltatsol	The temperature deviation for solar functon running	18(10)	9(5)	36(20)	1	°F(°C)
Special function	Preheating for floor	Enable or disable floor preheating: 0=NO, 1=YES	0	0	1	1	/
	T1S	The set outlet water temperature during first floor preheating	77(25)	77(25)	95(35)	1	°F(°C)
	t_ARSTH	Running time for first floor preheating	72	48	96	12	Hours
	Floor drying up	Enable or disable floor drying: 0=NO, 1=YES	0	0	1	1	/
	t_Dryup	Temp-up days for floor drying	8	4	15	1	Days
	t_Highpeak	Days for floor drying	5	3	7	1	Days
	t_Drydown	Temp-down days for floor drying	5	4	15	1	Days
	t_Drypeak	Outlet water temperature for floor drying	113(45)	86(30)	131(55)	1	°F(°C)
	Start time	The start time of floor drying	00:00	0:00	23:30	1/30	h/min
	Start date	The start date of floor drying	Current date+1	Current date+1	31/12/2099	1/1/1	dd/mm/ yyyy
Auto restart	Auto restart cooling/heating mode	Enable or disable the auto restart of cooling/heating mode: 0=NO, 1=YES	1	0	1	1	/
	Auto restart DHW mode	Enable or disable the auto restart of DHW mode: 0=NO, 1=YES	1	0	1	1	/
Power input limitation	Power input limitation	The type of power input limitation	1	1	8	1	/
Input definition	M1 M2	Define the function of the M1M2 switch: 0=remote ON/OFF, 1=TBH ON/OFF, 2=AHS ON/OFF	0	0	2	1	/
	Smart grid	Enable or disable the smart grid: 0=NO, 1=YES	0	0	1	1	/
	T1T2	Control options of Port T1T2: 0=NO, 1=RT/Ta_PCB	0	0	1	1	/
	Tbt	Enable or disable the TBT: 0=NO, 1=YES	0	0	1	1	/
	P_X port	Select the function of P_X port: 0=Defrost, 1=Alarm	0	0	1	1	/
Modular system setting	PER_START	Percentage of operating units among all units	10	10	100	10	%
	TIME_ADJUST	Time interval for determining the necessity of unit loading/unloading	5	1	60	1	Minutes

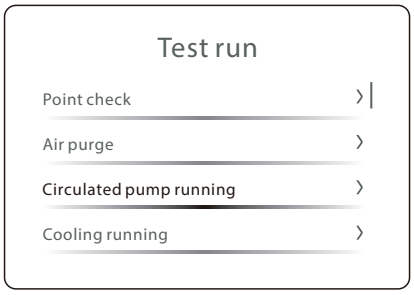
HMI address setting	HMI address for BMS	Set the HMI address code for BMS	1	1	255	1	/
	Stop BIT	Upper computer stop bit: 1=STOP BIT1, 2=STOP BIT2	1	1	2	1	/
Common setting	t_Delay pump	The time for which the compressor has run before startup of the pump	2.0	0.5	20.0	0.5	Minutes
	t1_Antilock pump	The pump anti-lock interval	24	5	48	1	Hours
	t2_Antilock pump run	The pump anti-lock running time	60	0	300	30	Seconds
	t1_Antilock SV	The valve anti-lock interval	24	5	48	1	Hours
	t2_Antilock SV run	The valve anti-lock running time	30	0	120	10	Seconds
	Ta-adj.	The corrected value of Ta inside the wired controller	0(0)	-18(-10)	18(10)	1(1)	°F(°C)
	Pump_I silent output	The Pump_I max output limitation	100	50	100	5	%
	Energy metering	Enable or disable the energy analysis: 0=NO, 1=YES	1	0	1	1	/
	Pump_O	Additional circulation pump operation: 0=ON (keep running) 1=Auto (controlled by the unit)	0	0	1	1	/
	PUMP I minimum output	Lower limit of operation for PUMP I	30	30	80	5	/
Intelligent function settings	Energy correction	Correction for Energy metering	0	-50	50	5	%
	Sensor backup mode	Sensor backup operation function, 0 =NO, 1=YES	1	0	1	1	/

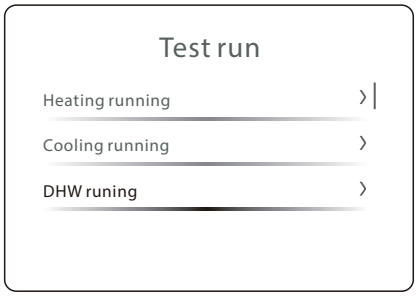
NOTICE

- Please set P_IBH1, P_IBH2, P_TBH according to the field installation. If the values are different with the actual values, the energy metering calculation could deviate from actual situation.
- There are some items that are invisible if the function is disabled or unavailable.

10 COMMISSIONING

Test run is used to confirm the functionality of the valves, air purge, circulation pump operation, cooling, heating and domestic water heating.





Checklist during commissioning

☐	Test run for the actuator.
☐	Air purge.
☐	Test run for operation.
☐	Check of the minimum flow rate .

10.1 Test Run for the Actuator

NOTICE

During the commissioning of the actuator, the protection function of the unit is disabled. Excessive use may damage components.

Why

Check whether each actuator is in good working conditions.

What - Actuator List

No.	Name		Note
1	SV2	Three-way valve 2	
2	SV3	Three-way valve 3	
3	PUMP_I	Integrated circulation pump	
4	PUMP_O	Additional circulation pump(for Zone 1)	
5	PUMP_C	Zone 2 pump	
6	IBH	Internal backup heater	
7	AHS	Additional heat source	
8	SV1	Three-way valve 1	Invisible if DHW is disabled
9	PUMP_D	DHW pipe pump	Invisible if DHW is disabled
10	PUMP_S	Solar heating loop circulation pump	Invisible if DHW is disabled
11	TBH	Tank booster heater	Invisible if DHW is disabled

How

1	Go to “FOR SERVICEMAN” (Refer to 9.5).
2	Find “Test run” and enter the process.
3	Find “Point check” and enter the process.
4	Select the actuator, and press ○ to activate or deactivate the actuator. • The status ON means the actuator is activated, and OFF means the actuator is deactivated.

NOTICE

When you return to the upper layer, all actuators turn OFF automatically.

10.2 Air Purge

Why

To purge out the remaining air in the water loop.

How

1	Go to “FOR SERVICEMAN” (Refer to 9.5).
2	Find “Test run” and enter the process.
3	Find “Air purge” and enter the process.
4	Select “Air purge” and press ○ to activate or deactivate the air purge function. • ◐ means the air purge function is activated, and ◑ means the air purge function is deactivated.

Besides

“Air vent Pump_I output”	To set Pump_I output. The higher the value is, the pump gives a higher output.
“Air vent running time”	To set the duration of air purge. When the set time is due, air purge is deactivated.
“Status check”	Additional operation parameters can be found.

10.3 Test Run

Why

Check whether the unit is in good working conditions.

What

Circulated pump operation
Cooling operation
Heating operation
DHW operation

How

1	Go to “FOR SERVICEMAN” (Refer to 9.5)
2	Find “Test run” and enter the page.
3	Find “Other” and enter the process.
4	Select “XXXX”* and press ○ to run the test. During test, press ○ , select OK and confirm to return to the upper layer. * - Four performance test options are shown in **What**.

NOTICE

In performance test, the target temperature is preset and cannot be changed.
If the outdoor temperature is outside the range of operating temperature, the unit may not operate or may not deliver the required capacity.
In circulated pump operation, If the flow rate is out of recommended flow rate range, please make proper change of the installation, and ensure that the flow rate in the installation is guaranteed in all conditions.

10.4 Check of the Minimum Flow Rate

1	Check the hydraulic configuration to find out the space heating loops that can be closed by mechanical, electronic, or other valves.
2	Close all space heating loops that can be closed.
3	Start and operate the circulation pump (See "10.3 Test Run ").
4	Read out the flow rate[a] and modify the bypass valve settings until the set value reaches the minimum flow rate required + 2 l/min.

(a) During pump trail run, the unit can operate below the minimum required flow rate.

11 HAND-OVER

Once the trail run is finished and the unit operates properly, please make sure the following is clear for the user:

- Fill the installer setting table (in the OPERATION MANUAL) with the actual settings.
- Empty the error history in the HMI before hand-over to the user.
- It is highly recommended to do the WLAN connection of the unit. You can read more information in the APP.
- Make sure that the user has the printed documentation and ask him/her to keep it for future reference.
- Explain to the user how to properly operate the system and what to do in case of problems.

-Basic operation guidelines can be found in the OPERATION MANUAL.
-For additional information about operation, see 11.2 Additional Operation Reference.

- Show the user what to do for the maintenance of the unit.
- Explain to the user about energy saving tips as described below.

11.1 Energy Saving Tips

Tips about room temperature

- Make sure the desired room temperature is NEVER too high (in heating mode) or too low (in cooling mode), and ALWAYS set it according to your actual needs. An rise/drop of one degree centigrade can save up to 6% of heating/cooling costs.
- Do NOT increase/decrease the desired room temperature to speed up space heating/cooling as such operation cannot accelerate the heating/cooling process.
- When your system layout contains slow heat emitters (such as underfloor heating), avoid large fluctuations of the desired room temperature and do NOT drop or rise the room temperature excessively. Otherwise, it will take more time and energy to heat up/cool down the room again.
- Use a weekly schedule to meet your normal space heating or cooling needs. If necessary, you can easily deviate from the schedule:

1) For shorter periods: You can override the scheduled room temperature until the next scheduled action starts. For example, you can do this when you have a party, or when you are leaving for a couple of hours.
2) For longer periods: You can use the holiday mode.

Tips about DHW tank temperature

- Use a weekly schedule to meet your normal domestic hot water needs (only in scheduled mode).
- Program to heat up the DHW tank to a preset value during the night, because the space heating demand during such period is low.
- If heating up the DHW tank only at night is not sufficient, program to additionally heat up the DHW tank to a preset value during the day.
- Make sure the desired DHW tank temperature is NOT too high. For example, after installation, lower the DHW tank temperature daily by 1 °F(1 °C) and check if you still have enough hot water.
- Program to turn ON the domestic hot water pump only during periods of the day when instant hot water is necessary, such as in the morning and evening.

11.2 Additional Operation Reference

11.2.1 Mode

What

Set the unit operation mode for room comfort.

- Three modes in all – Space heating mode, space cooling mode, and auto mode.

AUTO mode	The unit will select the operation mode automatically based on the outdoor ambient temperature and some settings in "FOR SERVICEMEN". • This icon is invisible if either the heating function or cooling function is disabled.
Heating	The icon of heating is invisible if the heating function is disabled.
Cooling	The icon of cooling is invisible if the cooling function is disabled.

11.2.2 Schedule

What

Make unit operation plans.

- This function is based on the current time displayed on the HMI. Make sure the time is correct.

Conflicts and operation priority

1) A daily schedule and a weekly schedule can work simultaneously.

2) For all schedules, timers (if more than one) for the same zone or appliance must be different, and the operation mode of Zone 1 and Zone 2 in the same time setting must be the same. Otherwise, the most recent setting is invalid, and a notice window appears.

3) When the unit is in Holiday away or Holiday home mode, the daily timer, weekly timer and temperature curve function (11.2.3 Weather temp. setting) become invalid and will not recover until the unit quits Holiday away and Holiday home mode.

4) If Holiday away and Holiday home mode are active simultaneously, the date for both the modes cannot be overlapped. Otherwise, the most recent setting is invalid, and a notice window appears.

More

1) All daily schedules and weekly schedules become inactive, the set time turns to 0:00, and the set temperature turns to 76°F(24 °C)in case of any change of the temperature control mode .

2) The unit runs disinfection based on the settings of 9.5.1 DHW setting, if the disinfection function in Holiday away mode is inactive.

3) In case of power failure during Holiday away or Holiday home mode, the unit will run in Holiday away or Holiday home mode after power restoration if the current date is still within the period for Holiday away or Holiday home mode.

4) If the mode setting is OFF, the set temperature turns to 32 °F(0 °C).

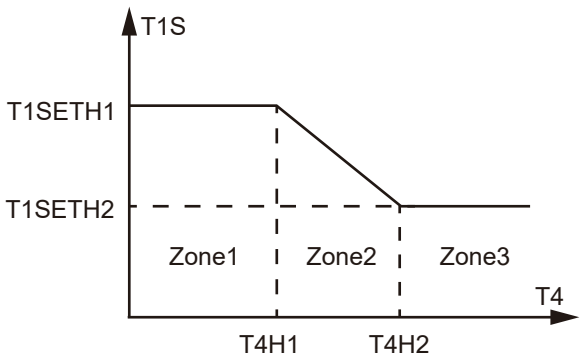
11.2.3 Weather temp. setting

What

Allow the set water temperature to regulate depending on the outdoor ambient temperature.

- This function is only applicable to space heating and space cooling. When the function is active, the unit will apply the temperature curve if the current operation mode is set the same as that of the activated function.
- Three types of curves in all – Standard, ECO, Custom.

Illustration of temperature curve



T1S – set water temperature

T4 – outdoor ambient temperature

In Zone 1 and Zone 3, the set water temperature remains stable despite the change of the outdoor ambient temperature. In Zone 2, the set water temperature regulates depending on the outdoor ambient temperature.

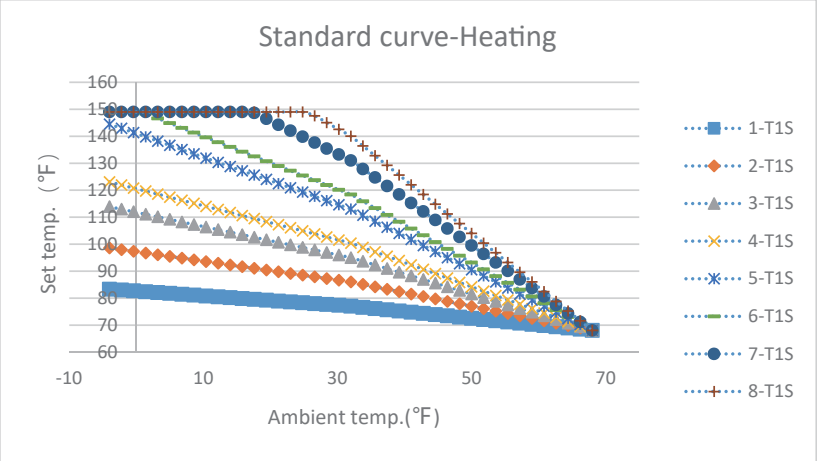
Standard

Up to 8 curves are preset by the manufacturer, and the parameter values are as below.

For heating:

	T4<32	32≤T4<68	T4≥68
1-T1S	-0.175*(0-T4) + 82.6	-0.25*(0-T4) + 85	68
2-T1S	-0.35*(0-T4) + 97.2	-0.5*(0-T4) + 102	68
3-T1S	-0.525*(0-T4) + 111.8	-0.75*(0-T4)+ 119	68
4-T1S	-0.63*(0-T4) + 120.56	-0.9*(0-T4) + 129.2	68
5-T1S	-0.875*(0-T4) + 141	-1.25*(0-T4) + 153	68
6-T1S	-0.98*(0-T4) + 149.76	-1.4*(0-T4) + 163.2	68
7-T1S	-1.225*(0-T4) + 170.2	-1.75*(0-T4)+ 187	68
8-T1S	-1.4*(0-T4) + 184.8	-2*(0-T4) + 204	68

Illustration of all 8 curves



For cooling (FCU – fan coil application):

T4	14≤T4＜59	22≤T4＜72	72≤T4＜86	86≤T4
1-T1S	61	52	47	41
2-T1S	63	54	49	43
3-T1S	65	56	50	45
4-T1S	67	58	52	47
5-T1S	68	59	54	49
6-T1S	70	61	56	50
7-T1S	72	63	58	52
8-T1S	74	65	59	54

For cooling (RAD – radiator application, FLH – underfloor heating application):

T4	14≤T4＜59	22≤T4＜72	72≤T4＜86	86≤T4
1-T1S	68	65	63	61
2-T1S	70	67	65	63
3-T1S	72	68	67	63
4-T1S	74	70	67	65
5-T1S	76	70	68	65
6-T1S	76	72	68	67
7-T1S	77	72	70	67
8-T1S	77	74	70	68

About Temperature offset
It makes the overall set water temperature of the temperature curve increase or decrease.

ECO

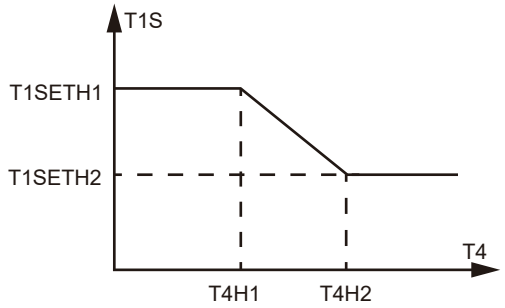
NOTICE

ECO is available for Zone 1 heating mode only.

T4	-4	-2.2	-0.4	1.4	3.2	5	6.8	8.6	10.4	12.2	14	15.8	17.6	19.4	21.2	23	24.8	26.6	28.4	30.2	32
1-T1S	85	85	85	85	83	83	83	83	83	83	83	83	81	81	81	81	81	81	77	77	77
2-T1S	90	90	90	90	88	88	88	88	88	88	88	88	86	86	86	86	86	86	86	86	86
3-T1S	101	101	101	101	101	99	99	99	99	99	99	97	97	97	97	97	97	95	95	95	95
4-T1S	104	104	104	104	103	103	103	103	103	103	103	103	101	101	101	101	101	101	101	101	99
5-T1S	113	113	113	113	112	112	112	112	112	112	112	112	110	110	110	110	110	110	110	110	108
6-T1S	119	119	119	119	117	117	117	117	117	117	117	117	115	115	115	115	115	115	115	115	113
7-T1S	126	126	126	126	124	124	124	124	124	124	124	124	122	122	122	122	122	122	122	122	121
8-T1S	131	131	131	131	130	130	130	130	130	130	130	130	128	128	128	128	128	128	128	128	126
T4	33.8	35.6	37.4	39.2	41	42.8	44.6	46.4	48.2	50	51.8	53.6	55.4	57.2	59	60.8	62.6	64.4	66.2	68	
1-T1S	76	76	76	76	74	74	74	74	72	72	72	72	70	70	70	70	68	68	68	68	
2-T1S	85	85	83	83	81	81	79	79	77	77	76	76	74	74	72	72	70	70	68	68	
3-T1S	94	92	90	90	88	86	85	85	83	81	79	79	77	76	74	74	72	70	68	68	
4-T1S	99	97	95	94	92	90	88	86	85	85	83	81	79	77	76	74	72	70	68	68	
5-T1S	108	108	106	104	101	99	97	95	92	90	88	86	83	81	79	77	74	72	70	68	
6-T1S	113	113	110	108	106	103	101	97	95	94	90	88	85	83	81	77	76	72	70	68	
7-T1S	121	121	121	119	115	112	108	106	103	99	95	94	90	86	83	81	77	74	70	68	
8-T1S	126	126	126	126	122	119	115	112	108	104	101	97	94	90	86	83	79	76	72	68	

You can see “ECO timer” at the bottom of the page. You can set the start time and end time of the timer and activate the timer. If the timer is active, the unit will execute the ECO curve only during the set period of the timer. If the timer is inactive, the unit will execute the ECO curve all the way.

Custom



T1S – Set water temperature
T4 – Outdoor ambient temperature
T1SETH1, T1SETH2, T4H1, and T4H2 can be adjusted.

NOTICE

The illustration on HMI is for reference only. If the set T1SETH1 is lower than T1SETH2 or T4H2 is lower than T4H1, the unit will reverse T1SETH1 and T1SETH2, T4H1 and T4H2 automatically.

11.2.4 DHW setting

NOTICE

Invisible if DHW MODE is disabled.

What

More settings of DHW.

Disinfection

• When the unit is running in disinfection mode with DHW on, if you turn off DHW on the home page, the unit will ask if you want to disable the disinfection. If you confirm the disablement, a notice window will appear.

NOTICE

If any timer of DHW OFF is during the disinfection working. Then the disinfection will be turned off automatically without any notice.

• When the unit is running in disinfection mode with DHW off, if you turn on DHW on the home page, the disinfection continues.

Tank heater

The tank heater and backup heater cannot operate simultaneously. The most recent setting is valid while the previous setting becomes invalid

• For instance, when the backup heater is valid and running, if the tank heater is turned off, the backup heater stops running.

11.2.5 Options

What

More general settings.

Silent mode

The start time and end time of the silent mode timer cannot be identical.
If two silent mode timers are activated simultaneously, the date of both the timers cannot be overlapped. Otherwise, the most recent setting is invalid, and a notice window appears.

Backup heater

Invisible if IBH and AHS are disabled.

WLAN setting

In case of any change of the WIFI name, the unit will lost WLAN connection and need to be reconnected.

Force defrost

Invisible if the unit is running in cooling mode.

11.2.6 Unit status

What

More information of the unit and its operation status.

Operating parameter

The run time is rounded down. For instance, if the unit is hour, and the actual run time is 0.5 h, the displayed value is 0.

Energy metering

For accumulated data(Day, Week, Month, Year),

1) The start time is the beginning of that day, week, month, year.

2) If the time of HMI is reset and there is data logging from the beginning of that day, week, month, year, the calculation will start from the beginning of that day, week, month, year.

3) If the time of HMI is reset and there is no data logging from the beginning of that day, week, month, or year, the calculation will start from the time when the resetting occurs.

For Historical data,

• It records up to 10-year data. For instance, if the unit starts running from 2023, when it comes to 2035, you can check the data only from 2025 to 2035.

11.2.7 Error info

What

Error history of the unit.

The first column shows the unit number, if slave units are available.
Press the Menu button for 5 seconds to clear all error records.

11.2.8 FAQ

What

Assistance for common questions.

12 TROUBLE SHOOTING

This section provides useful information for diagnosing and correcting certain troubles which may occur in the unit.
This troubleshooting and related corrective actions may only be carried out by your local technician.

12.1 General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

⚠ WARNING

When carrying out an inspection on the switch box of the unit, always make sure that the main switch of the unit is switched off.

When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances can safety devices be bridged or changed to a value other than the factory setting. If the cause of the problem cannot be found, call your local dealer.

If the pressure relief valve is not working correctly and is to be replaced, always reconnect the flexible hose attached to the pressure relief valve to avoid water dripping out of the unit!

NOTICE

For problems related to the optional solar kit for domestic water heating, refer to the troubleshooting in the Installation and owner's manual for that kit.

12.2 General symptoms

Symptom 1: The unit is turned on but the unit is not heating or cooling as expected

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check the parameters.T4HMAX,T4HMIN in heat mode. T4CMAX,T4CMIN in cool mode.T4DHWMAX,T4DHWMIN in DHW mode.
The water flow is too low.	• Check that all shut off valves of the water circuit are in the right position. • Check if the water filter is plugged. • Make sure there is no air in the water system. • Check on the manometer that there is sufficient water pressure. The water pressure must be>14.5 PSI(water is cold). • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump.
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to "**8.5.2 Water volume and sizing expansion vessels**").

Symptom 2: The unit is turned on but the compressor is not starting (space heating or domestic water heating)

POSSIBLE CAUSES	CORRECTIVE ACTION
The unit maybe operate out of its operation range (the water temperature is too low).	In case of low water temperature, the system utilizes the backup heater to reach the minimum water temperature first (54 °F/12 °C). • Check that the backup heater power supply is correct. • Check that the backup heater thermal fuse is closed. • Check that the backup heater thermal protector is not activated. • Check that the backup heater contactors are not broken.

Symptom 3: Pump is making noise (cavitation)

POSSIBLE CAUSES	CORRECTIVE ACTION
There is air in the system.	Purge air.
Water pressure at pump inlet is too low.	• Check on the manometer that there is sufficient water pressure. The water pressure must be > 14.5 psi(1 bar) (water is cold). • Check that the manometer is not broken. • Check that the expansion vessel is not broken. • Check that the setting of the pre-pressure of the expansion vessel is correct (refer to "**8.5.2 Water volume and sizing expansion vessels**").

Symptom 4: The water pressure relief valve opens

POSSIBLE CAUSES	CORRECTIVE ACTION
The expansion vessel is broken. Replace the expansion vessel.	
The filling water pressure in the installation is higher than 0.3MPa.	Make sure that the filling water pressure in the installation is about 0.10~0.20MPa (refer to "**8.5.2 Water volume and sizing expansion vessels**").

Symptom 5: The water pressure relief valve leaks

POSSIBLE CAUSES	CORRECTIVE ACTION
Dirt is blocking the water pressure relief valve outlet.	Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clockwise: • If you do not hear a clacking sound, contact your local dealer. • In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.

Symptom 6: Space heating capacity shortage at low outdoor temperatures

POSSIBLE CAUSES	CORRECTIVE ACTION
Backup heater operation is not activated.	Check that the "OTHER HEATING SOURCE/ BACKUP HEATER"is enabled, see "**9.5 Field settings**" Check whether or not the thermal protector of the backup heater has been activated (refer to "Controls parts for backup heater(IBH)"). Check if booster heater is running, the backup heater and booster heater can't operate simultaneously.
Too much heat pump capacity is used for heating domestic hot water (applies only to installations with a domestic hot water tank).	Check that the "t_DHWHP_MAX" and "t_DHWHP_RESTRICT" are configured appropriately: • Make sure that the "DHW PRIORITY" in the user interface is disabled. • Enable the "T4_TBH_ON" in the user interface/FOR SERVICEMAN to activate the booster heater for domestic water heating.

Symptom 7: Heat mode can't change to DHW mode immediately

POSSIBLE CAUSES	CORRECTIVE ACTION
Volume of tank is too small and the location of water temperature probe not high enough	• Set "dT1S5" to maximum value, and set "t_DHWHP_RESTRICT" to minimum value. • Set dT1SH to 3 °F(2 °C). • Enable TBH, and TBH should be controlled by the outdoor unit. • If AHS is available, turn on first, if requirement for turn heat pump on is fulfilled, the heat pump will turn on. • If both TBH and AHS are not available, try to change the position of T5 probe(refer to **5 "General introduction"**).

Symptom 8: DHW mode can’t change to Heat mode immediately

POSSIBLE CAUSES	CORRECTIVE ACTION
Heat exchanger for space heating not big enough	• Set "t_DHWHP_MAX" to minimum value, the suggested value is 60min. • If circulating pump out of unit is not controlled by unit, try to connect it to the unit. • Add 3-way valve at the inlet of fan coil to ensure enough water flow.
Space heating load is small	Normal , no need for heating
Disinfect function is enabled but without TBH	• Disable disinfect function • add TBH or AHS for DHW mode
Manual turn on the FAST WATER function, after the hot water meets the requirements, the heat pump fails to switch to the air-conditioning mode in time when the air conditioner is in demand	Manual turn off the FAST WATER function
When the ambient temperature is low, the hot water is not enough and the AHS is not operated or operated late	• Set "T4DHWMIN", the suggested value is ≥ 23 ℉(-5 ℃) • Set "T4_TBH_ON", the suggested value is ≥ 41 ℉(5 ℃)
DHW mode priority	If there is AHS or IBH connect to the unit, when the outdoor unit failed, the indoor unit must run DHW mode till the water temperature reach the setting temperature before change to heating mode.

Symptom 9: DHW mode heat pump stop work but setpoint not reached, space heating require heat but unit stay in DHW mode

POSSIBLE CAUSES	CORRECTIVE ACTION
Surface of coil in the tank not large enough	The same solution for Symptom 7
TBH or AHS not available	Heat pump will stay in DHW mode untill "t_DHWHP_MAX" reached or setpoint is reached. Add TBH or AHS for DHW mode,TBH and AHS should be controlled by the unit.

12.3 Error codes

When a safety device is activated, an error code will be displayed on the user interface.

A list of all errors and corrective actions can be found in the table below.

Reset the safety by turning the unit OFF and back ON.

In case this procedure for resetting the safety is not successful, contact your local dealer.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
E0	Water flow fault (3 times E8)	1.The wire circuit is short connected or open. Reconnect the wire correctly. 2.Water flow rate is too low. 3. Water flow switch is failed, switch is open or close continuously, change the water flow switch.
E2	Communication fault between wired controller and indoor unit	1.Wire doesn't connect between wired controller and unit. connect the wire. 2.Communication wire sequence is not right. Reconnect the wire in the right sequence. 3.Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc.. To add a barrier to protect the unit or to move the unit to the other place.
E3	Hydro-box water outlet temperature sensor (T1) fault	1.Check the resistance of the sensor 2.The T1 sensor connector is loosen. Reconnect it. 3.The T1 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive. 4.The T1 sensor failure, change a new sensor
E4	Water tank temperature sensor (T5) fault	1.Check the resistance of the sensor 2.The T5 sensor connector is loosen. Reconnect it. 3.The T5 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4.The T5 sensor failure, change a new sensor. 5.If you want to close the domestic water heating when T5 sensor do not connected to the system, then T5 sensor can not be detected, refer to 9.5.1 "DHW MODE SETTING"
E8	Water flow fault	Check that all shut off valves of the water circuit are completely open. 1. Check if the water filter needs cleaning. 2. Refer to "8.7 Filling water" 3. Make sure there is no air in the system(purge air). 4. Check on the manometer that there is sufficient water pressure. The water pressure must be >14.5 psi(1 bar). 5. Check that the pump speed setting is on the highest speed. 6. Make sure that the expansion vessel is not broken. 7. Check that the resistance in the water circuit is not too high for the pump (refer to "9.4 Circulation Pump"). 8. If this error occurs at defrost operation (during space heating or domestic water heating), make sure that the backup heater power supply is wired correctly and that fuses are not blown. 9. Check that the pump fuse and PCB fuse are not blown.
Ed	Hydro-box plate heat exchanger water inlet temperature sensor (Tw_in) fault	1.Check the resistance of the sensor 2. The Tw_in sensor connector is loosen. Re connect it. 3.The Tw_in sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4. The Tw_in sensor failure, change a new sensor.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
EE	Hydro-box PCB EEPROM fault	1. The EEPROM parameter is error, rewrite the EEPROM data. 2. EEPROM chip part is broken, change a new EEPROM chip part. 3. Main control board of indoor unit is broken, change a new PCB.
H0	Communication fault between hydro-box and outdoor unit	1.Wire doesn't connect between outdoor unit and main control board of indoor unit. connect the wire. 2.Communication wire sequence is not right. Reconnect the wire in the right sequence. 3. Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc.. To add a barrier to protect the unit or to move the unit to the other place
H2	Plate heat exchanger outlet(heat) refrigerant temperature sensor(T2) fault.	1.Check the resistance of the sensor 2.The T2 sensor connector is loosen. Re connect it. 3.The T2 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4. The T2 sensor failure, change a new sensor.
H3	Plate heat exchanger inlet (heat) refrigerant temperature sensor(T2B) fault	1.Check the resistance of the sensor 2. The T2B sensor connector is loosen. Reconnect it. 3.The T2B sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4. The T2B sensor failure, change a new sensor.
H5	Room temperature sensor (Ta) fault	1.Check the resistance of the sensor 2. The Ta senor is in the interface; 3. The Ta sensor failure， change a new sensor or change a new interface, or reset the Ta, connect a new Ta from the indoor unit PCB.
H9	Zone 2 water flow temperature sensor (Tw2) fault	1.Check the resistance of the sensor 2. The T1B sensor connector is loosen. Reconnect it. 3.The T1B sensor connector is wet or there is water in. Remove the water, make the connector dry. add waterproof adhesive 4. The T1B sensor failure, change a new sensor.
HA	Hydro-box plate heat exchanger water outlet temperature sensor (Tw_out) fault	1. The TW_out sensor connector is loosen. Reconnect it. 2.The TW_out sensor connector is wet or there is water in. remove the water, make the connector dry. add waterproof adhesive 3. The TW_out sensor failure, change a new sensor.
P5	Tw_out - Tw_in value high protection	1. Check that all shut off valves of the water circuit are completely open. 2. Check if the water filter needs cleaning. 3. Refer to "8.7 Filling water" 4. Make sure there is no air in the system (purge air). 5. Check on the manometer that there is sufficient water pressure. The water pressure must be >14.5 psi(1 bar) (water is cold). 6. Check that the pump speed setting is on the highest speed. 7. Make sure that the expansion vessel is not broken. 8. Check that the resistance in the water circuit is not too high
Pb	Anti-freeze mode	Unit will return to the normal operation automatically.
PP	Tw_out-Tw_in unusual protection	1.Check the resistance of the two sensor 2.Check the two sensors locations 3.The water inlet/outlet sensor wire connector is loosen. Reconnect it. 4.The water inlet/outlet （TW_in /TW_out） sensor is broken, Change a new sensor. 5. Four-way valve is blocked. Restart the unit again to let the valve change the direction. 6.Four-way valve is broken, change a new valve.

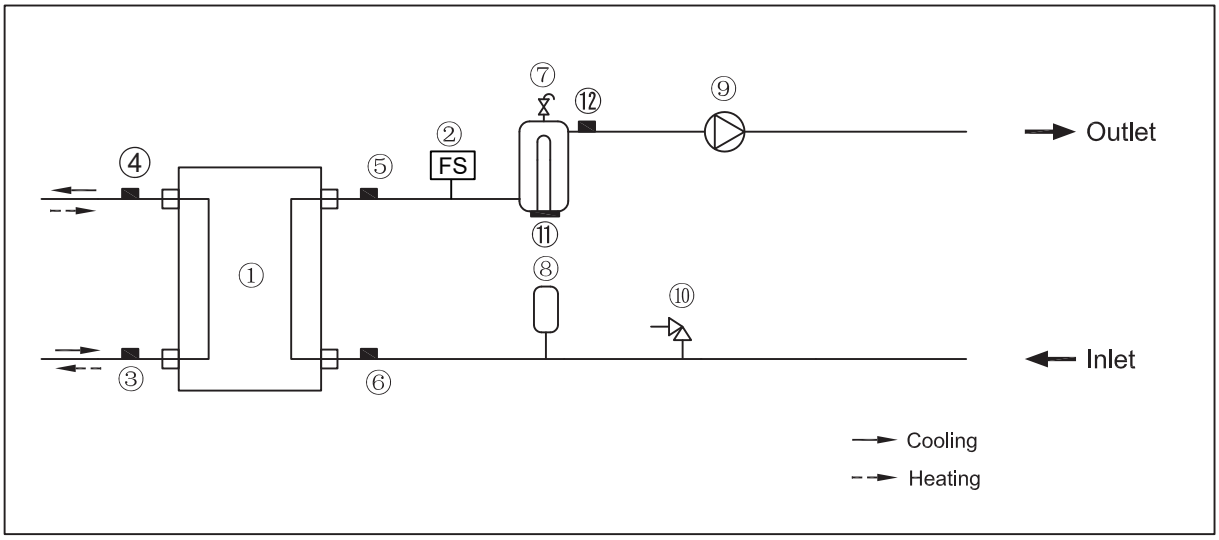
ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
Hb	Three times 'PP' protection and Tw_out<45°F(7 ℃)	The same to "PP".
E7	Hydraulic separator temperature sensor (Tbt) fault	1.Check the resistance of the sensor. 2.The Tbt1 sensor connector is loosen,reconnect it. 3.The Tbt1 sensor connector is wet or there is water in,remove the water ,make the connector dry. Add waterproof adhesive. 4.The Tbt1 sensor failure,change a new sensor."
Eb	Solar panel temperature sensor (Tsolar) fault	1.Check the resistance of the sensor. 2.The Tsolar sensor connector is loosen,reconnect it. 3.The Tsolar sensor connector is wet or there is water in,remove the water ,make the connector dry. Add waterproof adhesive. 4.The Tsolar sensor failure,change a new sensor."
HE	The communication fault between indoor unit and Ta/room thermostat transfer PCB	RT/Ta PCB is set to be valid on user interface but the thermostat transfer board is not connected or the communication between thermostat transfer board and main board is not effectively connected. If the thermostat transfer board is not needed， set the RT/Ta PCB to invalid. If the thermostat transfer board is needed， please connect it to the main board and make sure the communication wire is connected well and there is no strong electricity or strong magnetic interference.
CL	Water pump communication wire fault	The communication line of the water pump is not properly connected to the main control board of indoor unit. connect the wire.
EL	Communication fault between hydraulic module and MH-kit	1.Wire doesn’t connect between main control board of indoor unit and MH-kit. connect the wire. 2.Communication wire sequence is not right. Reconnect the wire in the right sequence. 3. Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc.. To add a barrier to protect the unit or to move the unit to the other place.

⚠CAUTION

- In winter, if the unit has E0 and Hb failure and the unit is not repaired in time, the water pump and pipeline system may be damaged by freezing, so E0 and Hb failure must be repaired in time.

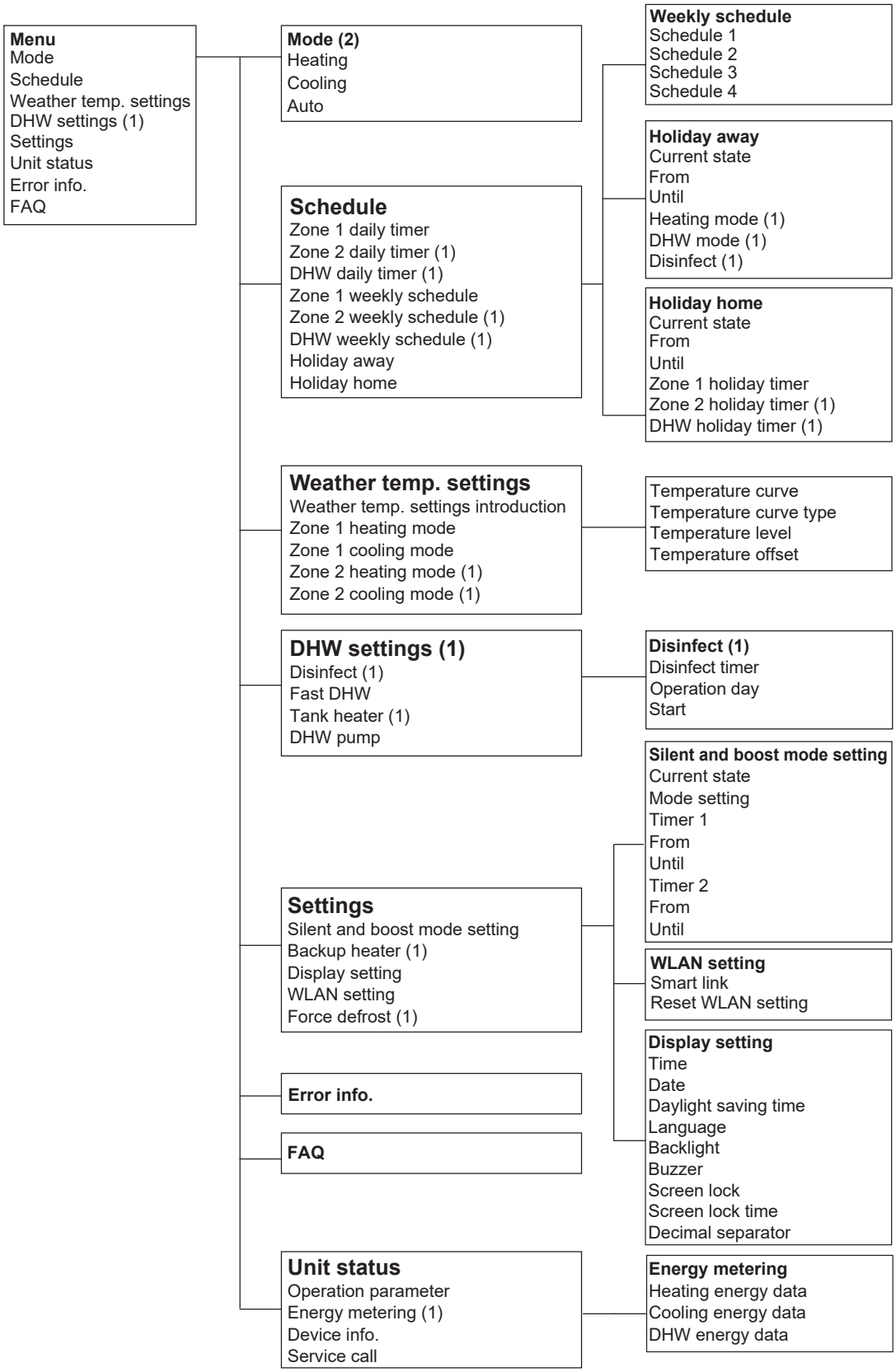
ANNEX

ANNEX A: Refrigerant cycle



Item	Description	Item	Description
1	Water Side Heat Exchanger (Plate Heat Exchange)	7	Automatic air purge valve
2	Flow switch	8	Expansion vessel
3	Refrigerant liquid line temperature sensor	9	Circulating pump
4	Refrigerant gas line temperature sensor	10	Pressure relief valve
5	Water outlet temperature sensor	11	Internal backup heater
6	Water inlet temperature sensor	12	Total outlet temperature sensor

Annex B. Menu structure (wired controller)

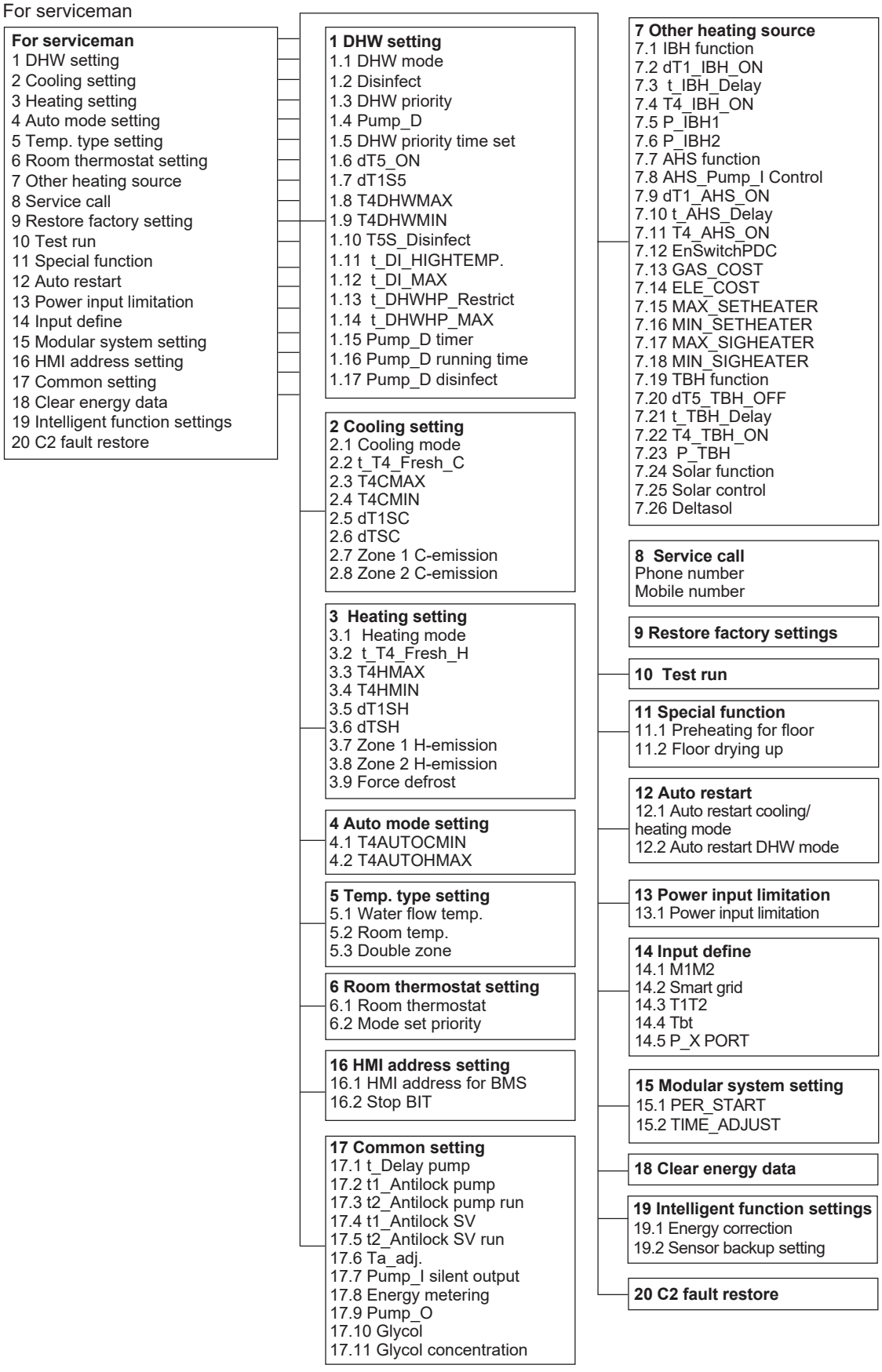


(1) Invisible if corresponding function is disabled.

(2) The layout could be different if the corresponding function is disabled or enabled.

There are also some other items that are invisible if the function is disabled or unavailable.

For serviceman



There are some items that are invisible if the function is disabled or unavailable.

Annex C. Modbus mapping table

1) MODBUS PORT COMMUNICATION SPECIFICATIONS

Port: RS-485; H1 and H2 are the Modbus communication ports.

Communication address: Only one-to-one connection is available for the host computer and wired controller, and the wired controller is a slave unit. The communication address of the host computer and wired controller is consistent with the address of 17.2 HMI Address for BMS (In FOR SERVICEMAN mode).

Baud rate: 9600. Number of digits: 8 Verification: none. Stop bit: 1 bit

Communication protocol: Modbus RTU (Modbus ASCII not supported)

2)Mapping of registers in the wired controller

Please download the file via QR code.



NOTE

NOTE

Different languages

1612530000 4919 V.C

技术要求
规格：210*297（双面）
材料：封底封面铜版纸105g、内页双胶纸80g、黑白印刷，胶装

更改说明（本页不打印）

版本升级	更改人	更改日期	更改主要内容	涉及更改页面 （印刷页码）
A-B	彭泉贵	20250213	试产后变更，增加北美单位和勘误等	all
B-C	彭泉贵	20250317	增加单位，更改水流量参数	P2, P3