



Air To Water Heat Pump (Outdoor Unit)

STU Series

Installation Manual

Version 3.0

www.solaxpower.com



eManual in the QR code or
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About This Manual

Scope of Validity

This manual is an integral part of outdoor unit of air to water heat pump. It describes the assembly, installation, commissioning, maintenance and failure of the product. Please read it carefully before operating.

This manual is valid for the following heat pump models:

- 3-phase

[STU3-C08R290](#) | [STU3-C10R290](#) | [STU3-C12R290](#) | [STU3-C14R290](#) | [STU3-C16R290](#)

- 1-phase

STU1-C08R290 | STU1-C10R290 | STU1-C12R290 | STU1-C14R290 | STU1-C16R290

Model description

STUX-CXXR290

A diagram of a simple pendulum consisting of a horizontal black rod. A vertical orange line is attached to the rod, representing the string of the pendulum. The line is shown in two positions: a lower position on the left with a small orange dot, and an upper position on the right with a small orange dot. The number '1' is written below the lower dot, and the number '2' is written below the upper dot.

Item	Meaning	Description
1	Phase	"1": one phase "3": three phase
2	Power	"08": rated output power of 8 kW.

Conventions

The symbols that may be found in this manual are defined as follows.

Symbol	Description
 DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION!	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE!	Provides tips for the optimal operation of the product.

Change History

Version 3.0 (2025-07-31)

Updated "7.3 Mounting the Unit"

Updated "8.1 Preparations for Installation" (Added the requirements of heat exchange area)

Updated "17 Technical Data"

Version 2.0 (2025-05-29)

Updated "2.5 Main Parts of Outdoor Unit"

Updated "2.6 Operating Range"

Updated "9 Electrical Connection"

Updated "17 Technical Data"

Version 1.0 (2025-04-08)

Updated "17 Technical Data"

Version 0.0 (2025-03-31)

Initial release

Table of Contents

1	Safety	1
1.1	General Safety Instructions	1
1.2	Safety Instructions for Refrigerant.....	3
1.3	Safety Instructions for Installation	6
1.4	Safety Instructions for Electrical Connection	7
1.5	Safety Instructions for Operation.....	8
1.6	Safety Instructions for Storage.....	10
2	Product Overview	12
2.1	Appearance and Dimensions.....	12
2.2	Main Modules of Outdoor Unit.....	13
2.3	Hydraulic Components of Outdoor Unit	14
2.4	Main Parts of Control Box.....	15
2.5	Main Parts of Outdoor Unit	17
2.6	Operating Range.....	18
2.7	Symbols on the Label and Heat Pump.....	20
3	System Overview.....	21
4	Transportation and Storage	22
5	Preparation before Installation.....	23
5.1	Selection of Installation Location	23
5.2	Tools Requirement.....	27
5.3	Additionally Required Materials	28
6	Unpacking and Inspection	29
6.1	Unpacking.....	29
6.2	Accessories of Outdoor Unit.....	30
7	Unit Installation.....	31
7.1	Installation Scenario.....	31
7.2	Creating the Foundation.....	31
7.3	Mounting the Unit	33
7.4	Draining Condensate	34
8	Hydraulic Installation.....	37
8.1	Preparations for Installation.....	37
8.2	Connecting the Water Loop.....	39

8.3	Freeze Protection.....	45
8.4	Checking the Water Loop	48
9	Electrical Connection	49
9.1	Opening the Electrical Box Cover	49
9.2	Back Plate Layout for Wiring.....	50
9.3	Overview of Electrical Wiring.....	51
9.4	Electrical Wiring Guidelines.....	54
9.5	Connecting the Power Supply.....	56
9.6	Connecting Other Components.....	60
10	Completion of Installation	61
11	Configuration.....	62
11.1	Checking before Configuration.....	62
11.2	Configuration on the Wired Controller	63
12	Commissioning	64
12.1	Checking the Actuator	64
12.2	Checking the System Empty	65
12.3	Checking the Unit.....	65
12.4	Checking the Minimum Flow Rate	66
13	Hand-over to the User.....	67
14	Troubleshooting	68
14.1	General Guidelines.....	68
14.2	Typical Problems.....	68
14.3	Error Codes	71
15	Maintenance	72
15.1	Safety Precautions for Maintenance	72
15.2	Maintenance Routines.....	73
16	Disposal.....	75
17	Technical Data	77
17.1	General	77
17.2	Piping Diagram.....	79
18	Typical Applications	81
18.1	Control Module + AHS.....	81
18.2	Hydraulic Module	84
18.3	Hydraulic Module + AHS	86
18.4	Cascade Mode (Control Module + AHS)	88

18.5 Cascade Mode (Hydraulic Module + AHS)	90
19 Appendix	92
19.1 Terms and Abbreviation	92
19.2 Service Record	94

1 Safety

1.1 General Safety Instructions

1.1.1 Target Group

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

Work on the refrigerant circuit with flammable refrigerant in safety group A3 may only be carried out by authorized heating contractors.

- Heating contractors must be trained in accordance with EN 378 Part 4 or IEC 60335-2-40, Section HH.
- Heating contractors must hold the certificate of competence from an industry recognized body.

Brazing or soldering work on the refrigerant circuits may only be carried out by personnel certified in accordance with ISO 13585 and AD 2000, Datasheet HP 100 R.

Brazing or soldering work on accumulator connections requires certification of personnel and processes by a notified body according to the Pressure Equipment Directive (2014/68/EU).

Electrical work should only be carried out by a qualified electrician.

All safety related points must be checked by the specified certified heating contractors before commissioning. System commissioning must be carried out by the system installer or qualified personnel.

1.1.2 Intended Use

WARNING!

- Improper or unintended use may result in injury or death to the user or others, or damage to the product and other property.

Product introduction

- The product is the outdoor unit of an air-to-water heat pump with single-unit and split-unit design.
- The product is only intended for outdoor installation.
- The product uses the outdoor air as a heat source and can be used to heat a residential building and generate domestic hot water.
- The air that escapes from the product must be able to flow out freely, and must not be used for any other purposes.

- The product is intended exclusively for domestic use.

Limitations on use

The following places are not appropriate for installation:

- Where there is mist of mineral oil or oil spray or vapors. Plastic parts may deteriorate, and cause joint loose and leakage of water.
- Where corrosive gases (such as sulfurous acid gas) are produced, or corrosion of copper pipes or soldered parts may cause leakage of refrigerant.
- Where flammable gases may leak, carbon fiber or ignitable dust is suspended in the air or volatile flammables such as paint thinner or gasoline are handled. These types of gases might cause a fire.
- Where the air contains high levels of salt such as a location near the ocean.
- Where there is machinery which emits massive electromagnetic waves. Enormous electromagnetic waves can disturb the control of the system and cause equipment malfunction.
- Where voltage fluctuates a lot, such as a location in a factory.
- In vehicles or vessels.
- Where acidic or alkaline vapors are present.

Regulatory compliance

- Observe the operating instructions of the product and any other installation components.
- Comply with all inspection and maintenance conditions listed in the instructions.
- Install and set up the product in accordance with the product and system approval.
- Installation, commissioning, inspection, maintenance and troubleshooting by qualified contractors and authorized installers.
- Cover installation in accordance with the IP code.

WARNING!

- Any other use that is not specified in these instructions, or use beyond that specified in this document, should be considered as improper use.

CAUTION!

- Improper use of any kind is prohibited.
- Do not rinse the unit.
- 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.

1.2 Safety Instructions for Refrigerant

1.2.1 Leakage and Detection

Use and calibration of electronic leak detectors

- The electronic leak detector is the primary testing tool, verify that its sensitivity meets the needs of the type of refrigerant (e.g., R290, etc.) to be tested.
- Calibration needs to be done in a refrigerant free environment to avoid interference.
- Based on manufacturer's recommendations or industry standards (e.g., monthly), calibrate regularly to ensure accuracy.
- Leak detectors need to be explosion-proof to avoid being a source of ignition and to match the explosive properties of the refrigerant (e.g., flash point, LEL).

Gas concentration monitoring

Leak detectors can measure gas concentrations (ppm), which need to be combined with the lower explosive limit (LEL) of the refrigerant to assess risk. For example, R290 has a LEL of 2.1% (21,000 ppm) and immediate action should be taken if a 10% LEL (2,100 ppm) is detected.

The above personal gas detectors are usually set up with two levels of alarm (e.g. 10% LEL warning, 20% LEL emergency response) for personnel safety and protection.



CAUTION!

- High humidity or dusty environments may affect the accuracy of the leak detector and require regular maintenance.

Selection of leak detection fluid

Applicable type:

- Bubble method: apply to joints and welds and observe bubble formation.
- Fluorescence method: cooperate with UV lamp, suitable for tiny leakage locating.

Prohibited substances:

- Avoid chlorine-containing detergents (such as bleach) to prevent reaction with refrigerant leading to corrosion of copper pipes.

Emergency response to leak

- Remove open flames, disconnect power supply and ensure ventilation.
- Use explosion-proof tools to evacuate people and avoid sparks.

Prepare before servicing

- Evacuate refrigerant or isolate leak area by closing shut-off valve.
- Make sure there is no residual gas before brazing and purge with nitrogen if necessary.

Example flow (when a leak is found)

- Activate the ventilation system and evacuate anyone else.
- Use detectors to confirm the leak concentration and establish a warning zone.
- Close the system valve and start the refrigerant recovery process.
- Locate the leak with a fluorescent leak detector or an electronic leak detector.
- After maintenance, perform a pressure retention test and re-check the leak to ensure that there are no residual leaks.

1.2.2 Removal and Evacuation

DANGER!

- Do not use compressed air or oxygen for system cleaning. Only noble gases such as N₂ and CO₂ are allowed for system purging.

DANGER!

- The operation area should be equipped with explosion-proof ventilation equipment. Keep the hose outlet away from the fire source and maintain air circulation.

Operation procedure

Step 1: Refrigerant recovery

- Use special refrigerant recovery cylinders (with corresponding refrigerant labels). Make sure that the cylinder pressure relief valve and shut-off valve function properly. Empty cylinders need to be pre-evacuated and cooled to low temperature.
- Transfer the refrigerant to the recovery cylinder by vacuuming. Match the sufficient number of cylinders according to the system charging quantity.

Step 2: System purification

- Preferably use CO₂ or N₂ to flush the refrigeration circuit. Keep injecting until the electronic leak detector reads ≤ 0 PPM.
- Use an electronic leak detector at the end of the hose for continuous monitoring. If the reading rises above 0 PPM, the system needs to be re-flushed.

Step 3: Circuit Emptying and Cutting

- Vacuum the circuit after purging is complete. Use a two-stage vacuum pump to ensure that the vacuum level is up to standard.
- Open the circuit by cutting or brazing. Wear a protective mask during operation to avoid metal splashing.

Quality control

The recovered refrigerant should be tested for purity (no impurities, water content up to standard). Only the same type of equipment can be recharged and used.

Record the recovered quantity, cylinder number and gas detection data; keep the calibration report of the leak detector for inspection.

WARNING!

- Mixing of different refrigerant cylinders will result in an explosion risk.
- No welding or cutting operations until the system has been completely emptied.
- Emergency ventilation procedures are immediately activated in case of refrigerant leakage.

CAUTION!

- Perform evacuation in accordance with EN378-1 Environmental Safety Code.
- Use of EN13313 certified refrigerant recovery units, no direct venting to atmosphere is permitted.

1.2.3 Charge

Preparation before charging

Requirements for equipment and environment:

- Use special charging equipment to ensure the shortest line length to reduce refrigerant residue.
- Refrigerant cylinders must be placed firmly in the direction of the marking (upright for liquid charging and inverted for gas charging).
- Prepare calibrated electronic scales for accurate measurement.

Safety precautions:

- Mandatory reliable grounding of the refrigeration system.
- Protective goggles and anti-freeze gloves for the operator
- Good ventilation of the working area.

Standard charging procedure

System preprocessing:

- The maintenance system shall be evacuated first (vacuum degree $\leq 500 \mu\text{m Hg}$).
- The newly installed system shall be pressure tested with inert gas such as dry nitrogen (test pressure refer to the technical parameters of the equipment).

Accurate charging:

- Connect the certified refrigerant electronic scale (accuracy class II and above).
- Control the flow rate of liquid charging method $\leq 0.8\text{kg/min}$.
- Monitor the system pressure in real time to ensure that it does not exceed 90% of the design pressure.
- Close the valve of the cylinder after reaching the nominal charging volume.

Quality verification

- Use electronic leak detector (sensitivity $\leq 5\text{g/year}$) to detect all connection points.
- Focus on valve body interface, weld seam, piping connections.

After charging

- Paste the refrigerant information label in the prominent position of the unit, including refrigerant type, charging date and total amount, operator's signature.
- Fill in the refrigerant charging record sheet and archive, including ambient temperature and humidity, start/end cylinder weight, system pressure value, leakage detection data.

WARNING!

- It is forbidden to mix different types of refrigerants.
- The charging error should be controlled within $\pm 3\%$ of nominal value.
- Operators should receive special training and obtain relevant certificates.

1.2.4 Recovery

WARNING!

- Comply with local environmental and safety regulations to ensure legal operation.
- Always wear protective equipment to avoid direct contact with refrigerants.
- Use containers specifically designed to recover refrigerant and ensure that they are sealed.
- When the recovery equipment is connected to the refrigeration system, ensure that the interface is well sealed to prevent leakage.
- In case of leakage or equipment failure, stop operation immediately and take emergency measures.
- Ensure that the recovery equipment is in good condition, regularly inspected and maintained.
- Ensure that recovered refrigerants are handled according to regulations to avoid contamination.

1.3 Safety Instructions for Installation

Preparation before lifting

- Clarify the model, specification, installation location and foundation requirements of the heat pump unit.
- Ensure that the lifting site is level, free of obstacles, and meet the requirements for the passage and operation of lifting equipment.
- Inspect the lifting equipment (e.g. crane, sling) to ensure its good performance.
- The lifting operator, signalman and rigger must be licensed.

Lifting equipment and tools

- Select the appropriate crane according to the weight and size of the heat pump and make sure its rated lifting capacity meets the requirements.
- Use canvas sling or steel wire rope with sufficient strength (diameter >10mm), and add protective pads on the contact parts to avoid damaging the unit when lifting.
- Equipped with winches, ground cows, jacks and other tools for equipment leveling and adjustment.
- Check whether the crane's outriggers, brakes, limiters and other safety devices are normal before lifting.

Requirements of lifting

- Avoid lifting operations in windy or snowy weather or strong wind conditions.
- When handling the unit, the tilting angle should be less than 15°, carry it gently and put it down lightly to avoid violent collision.
- During lifting, make sure the unit is stable and avoid shaking or collision. The sling should be subjected to uniform force, avoiding excessive local force.
- The lifting height should meet the requirements of the installation position of the unit, and the height of the sling should be considered at the same time.
- During the lifting process, it is strictly prohibited for people to stay or pass under the lifting object.

Unit installation

- Lift the heat pump unit to a predetermined position.
- Use shock-absorbing shims and fix it with bolts to ensure that the unit is level and securely installed.
- When installing the import and export piping, make sure that the connections are well sealed and free of leakage.
- Check whether the unit is firmly installed, confirm that the unit is installed in the correct position and that connecting pipes have no leakage.

1.4 Safety Instructions for Electrical Connection

DANGER!

- Contact with live components can result in injuries. Before removing covers from the appliances, wait at least 4 minutes until the voltage has completely dropped out.
- Wear suitable personal protective equipment when carrying out any work.
- Do not touch any switch or electrical parts with wet fingers. It may cause electrical shock and compromise the system.
- Do not smoke. Avoid naked flames and sparks. Never switch lights or electrical appliances on or off in environments with naked flames or sparks.

 CAUTION!

- Take measures to prevent static electricity.
- Electrostatic discharge may damage electronic components. Before beginning work, touch earthed objects, such as heating or water pipes, to discharge any static.

Before electrical connection

- Installation needs to be in strict compliance with local laws, regulations and standards, and voltage and frequency need to be checked.
- Use only grounded outlets for the unit, and the unit should have an independent switch.
- Prepare the tools required for electrical wiring, make sure they are in good condition and can be used properly.
- Confirm that there is a suitable power outlet or distribution box near the installation location, and the power supply voltage and frequency should be consistent with the requirements of the unit.
- Make sure that there is a reliable grounding device to ensure the safety of electricity.

During electrical connection

- Connect the power cable and control cable correctly according to the requirements of the equipment manual.
- Ensure that the wiring is firm and in good contact to avoid loose, short circuit and other problems.
- The wiring should be neat and standardized to avoid friction and extrusion with other pipes or objects, and should be protected by wearing pipes if necessary.

After electrical connection

- Ensure the grounding of the equipment is good, and the leakage protection device is working properly.
- Test the insulation performance of the equipment to ensure that no leakage and other safety accidents will occur during operation.

1.5 Safety Instructions for Operation

1.5.1 Commissioning Safety

Before commissioning

- Ensure that the heat pump is firmly installed to avoid vibration or tipping during operation.
- Ensure that the equipment is disconnected from the power supply and that it is well grounded to avoid electric shock.
- Check all parts to ensure that there is no damage or abnormality.

- Make sure the power and control cables are connected correctly and securely to prevent short-circuiting or loosening.
- Check the refrigerant piping to ensure there is no leakage.
- Conduct pressure test to ensure that the system has no leakage and the pressure is normal.

During commissioning

- Pay attention to high temperature parts, such as compressor, heat exchanger, etc., avoid direct contact.
- The commissioning should be carried out by qualified technicians. Strictly follow the operation manual for commissioning.
- Closely monitor the operation status during commissioning and stop the machine immediately for inspection if any abnormality is found.

1.5.2 Emergency Response

Response to refrigerant leakage

DANGER!

- Immediately keep a distance of at least 2 meters from the equipment and prohibit uninvolved persons (especially children) from approaching.
- Evacuate persons from the danger zone and ensure ventilation (open windows/ activate exhaust system).
- Open flames, smoking and spark-producing operations (e.g. switching on/off electrical units) are strictly prohibited.
- Quickly cut off the power supply to the equipment (via the main switch or distribution box) and remove surrounding sources of ignition.
- Avoid direct contact with the refrigerant (to prevent frostbite/asphyxiation) and prohibit inhalation of vapors.
- Immediately contact a professional maintenance organization for treatment, and deactivate the system until the repair is completed.

WARNING!

- Maintenance must be performed by a licensed contractor and operation by unauthorized personnel is prohibited.
- Users are required to supervise the control of ignition sources during maintenance.

Response to water leakage

- Immediately turn off the main power supply to the system (via fuse box or switchboard).
- Prohibit contact with leaking equipment and evacuate the wet area by wearing insulated shoes.

- Keep away from hot water leakage area and avoid touching hot parts with bare hands.

Response to the freezing outdoor unit

- Violent de-icing is prohibited.
- Prohibit striking the ice with sharp tools to prevent equipment damage.
- Before using EN 60335-2-30 certified electric heating equipment, refrigerant needs to be tested for leaks.
- It is recommended to install condensate tray electric heating belt (professional installation is required) in high-cold areas.
- Regularly check the sealing of refrigerant piping.
- Anti-icing heating devices should be pre-installed in areas with frequent icing.

1.5.3 Maintenance check

- Before starting up the equipment, a comprehensive gas device leakage test (recommended to use soapy water or electronic leak detector) needs to be executed.
- At least 1 systematic leakage test per quarter, shorter cycles are required for high risk environments.
- After the refrigeration system repair is completed, the vacuum process must be carried out, holding pressure for 30 minutes to confirm that there is no leakage; ensure that air and non-condensable gases are thoroughly discharged.
- Only the specified refrigerant (labeled with specific types) is allowed to be used, and mixed charging is strictly prohibited.

1.6 Safety Instructions for Storage

1.6.1 Storage of Unit



- The outdoor unit is charged at the factory with refrigerant R290 (propane).

Storage environment requirements

- Strictly comply with the regulations and standards on product storage.
- Keep away from fire source, heat source and combustible materials (such as oil, paper, wood, etc.).
- Prohibit the use of open flame equipment (such as gas equipment, electric heaters) near the storage area of outdoor unit.
- Prohibit smoking, open flame or spark operation.
- Prohibit the use of explosion-proof electrical equipment (such as lamps, switches).
- Anti-static devices should be installed on the floor to avoid static electricity

accumulation.

- Ensure air circulation in the storage area (such as ≥ 6 air changes per hour).
- The temperature is controlled within the range of -25°C to 70°C.

Packaging and stacking

- Retain the anti-shock foam and packing outer box from the factory to prevent transport damage.
- Stack the unit no more than 2 layers, and pad the pallet at the bottom to avoid deformation caused by extrusion.
- The maximum number of outdoor units that can be stored in one place depends on local conditions.

⚠ WARNING!

- The use of open flames in the storage or servicing area is strictly prohibited.
- It is prohibited for non-professionals to handle repairs involving flammable refrigerants.
- It is prohibited to transfer the handling unit by destructive means (e.g. knocking, corrosive substances).
- In the event of a fire in the storage area, select a carbon dioxide (CO₂) or dry powder fire extinguisher, and prohibit the use of water-based fire extinguishers (which may extend the scope of the leak) or foam extinguishers.

1.6.2 Disposal

This equipment uses flammable refrigerants. Disposal of the equipment must be in accordance with national regulations.

- Do not dispose of this product as unsorted municipal waste. Such waste must be collected separately for special treatment.
- Contact your local authority for information on the collection system.

If the unit is disposed of in a landfill or rubbish heap, hazardous substances may leach into the groundwater or enter the food chain, thus harming your health and well-being.



WARNING: Risk of fire

2 Product Overview

2.1 Appearance and Dimensions

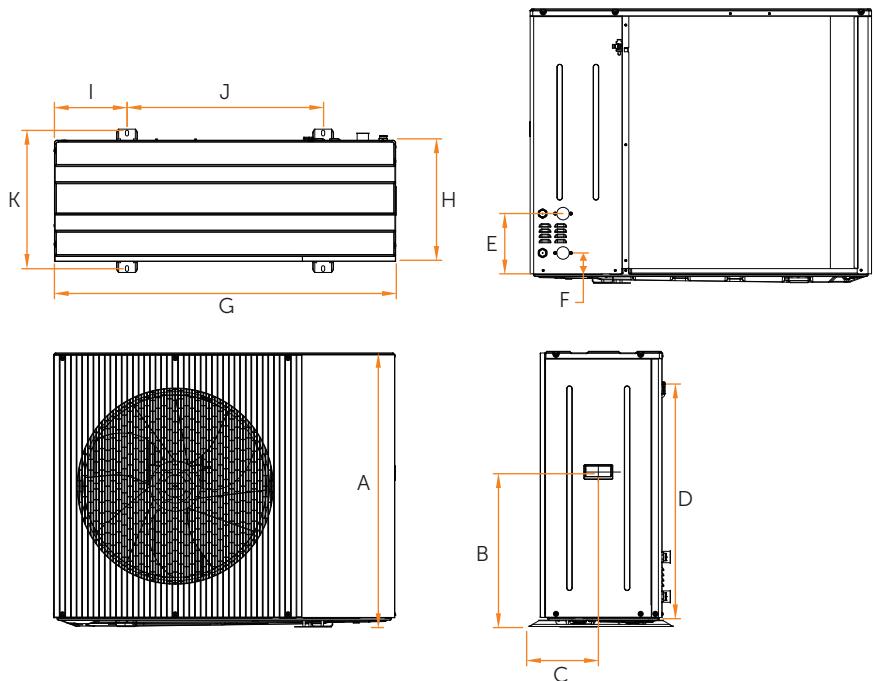


Table 2-1 Dimensions (Unit: mm)

Model	A	B	C	D	E	F	G	H	I	J	K
3-phase (8-16 kW)	1050	589	264	899	231	80	1310	465	279	753	530
1-phase (8-16 kW)	1050	589	264	899	231	80	1310	465	279	753	530

2.2 Main Modules of Outdoor Unit

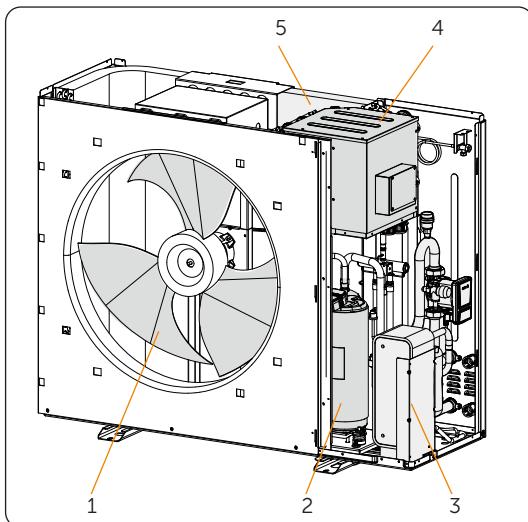


Table 2-1 Description of main modules

No.	Name	Description
1	Fan blade	For promoting air flow and enhancing heat transfer
2	Compressor	Core component. It can transfer heat by compressing refrigerant, which can achieve heating or cooling.
3	Hydraulic components	For transferring heat, maintaining hydraulic balance, and reducing energy consumption and noise
4	Control box	For executing various commands and monitoring the operation of the entire system
5	Finned heat exchanger	For increasing heat transfer area and improving heat transfer efficiency

2.3 Hydraulic Components of Outdoor Unit

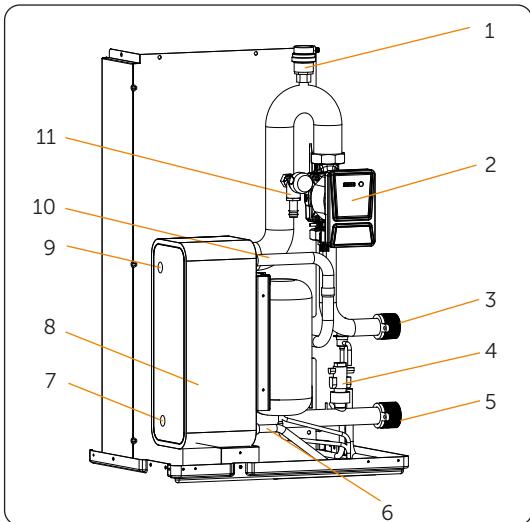
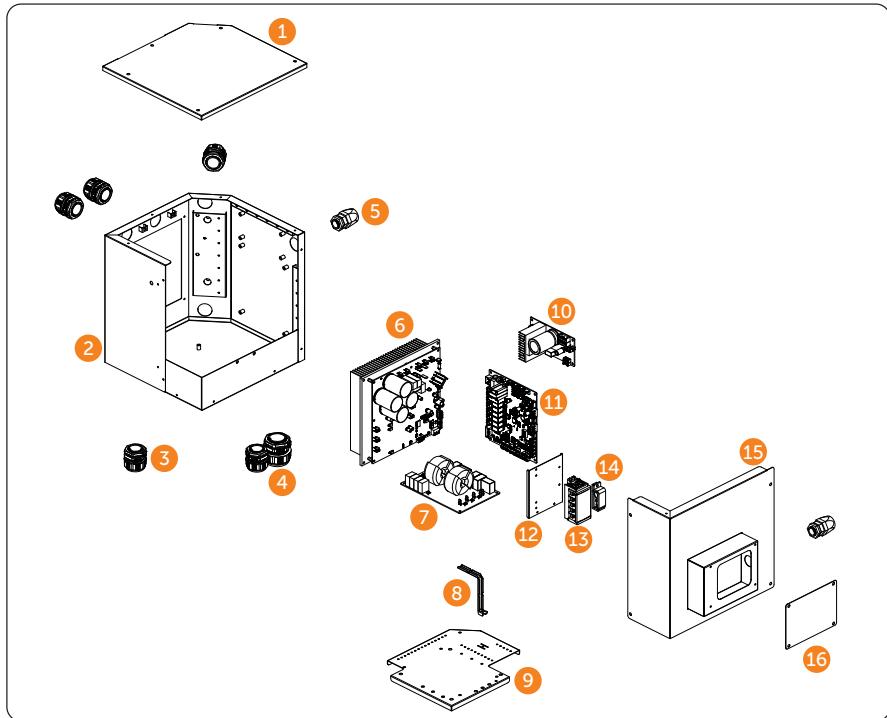


Table 2-1 Description of hydraulic components

No.	Name	Description
1	Exhaust valve	Automatically removes the remaining air from the water loop.
2	Water pump	Circulates water in the water loop.
3	Water outlet pipe	/
4	Water flow switch	Water loop protection switch. The switch will trigger in the event of insufficient water flow.
5	Water inlet pipe	/
6	Refrigerant liquid pipe	/
7	Temperature sensor	Temperature sensor determine the water and refrigerant temperature at various points in the water loop: TW_in
8	Plate heat exchanger	Transfers heat between the refrigerant and the water.
9	Temperature sensor	Temperature sensor determine the water and refrigerant temperature at various points in the water loop: TW_out
10	Refrigerant gas pipe	/
11	Pressure relief valve	Prevents excessive water pressure by opening when the pressure reaches 0.3 MPa (3 bar) and discharging water from the water loop.

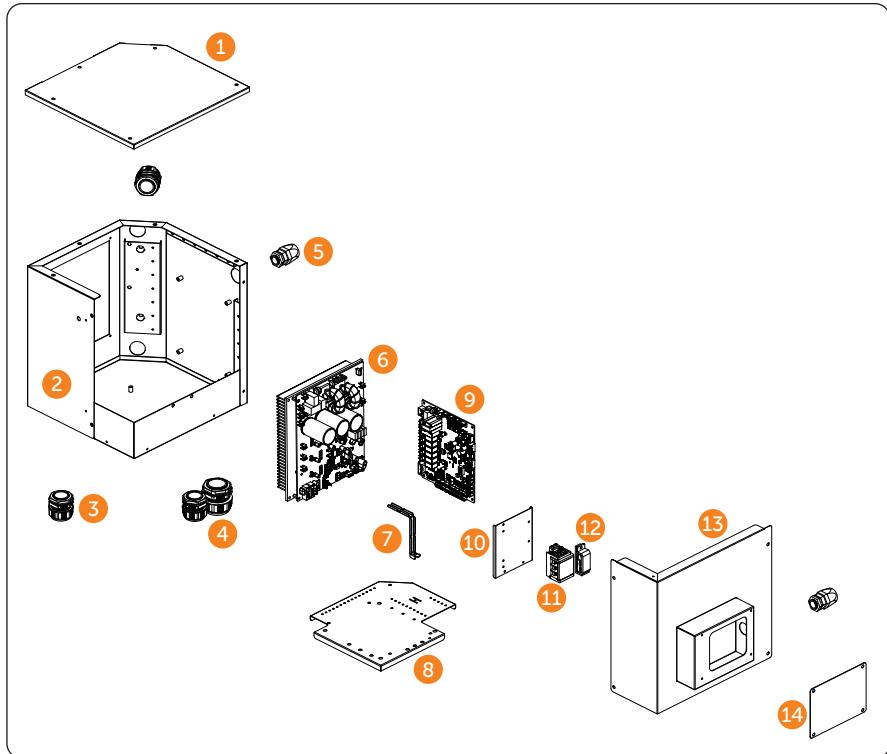
2.4 Main Parts of Control Box

3-phase



1	Control box top cover plate	7	Filter board	13	Five-position terminal block
2	Control box body	8	Signal line bridge	14	Wire clamp
3	PG joint (M30*1.5)	9	Electronic control mounting plate	15	Control box front cover plate
4	PG joint (M32*1.5)	10	Fan drive board	16	Electrical box cover plate
5	Fastened joint (M25*1.5)	11	PCB		
6	Compressor driver board	12	Terminal block mounting plate		

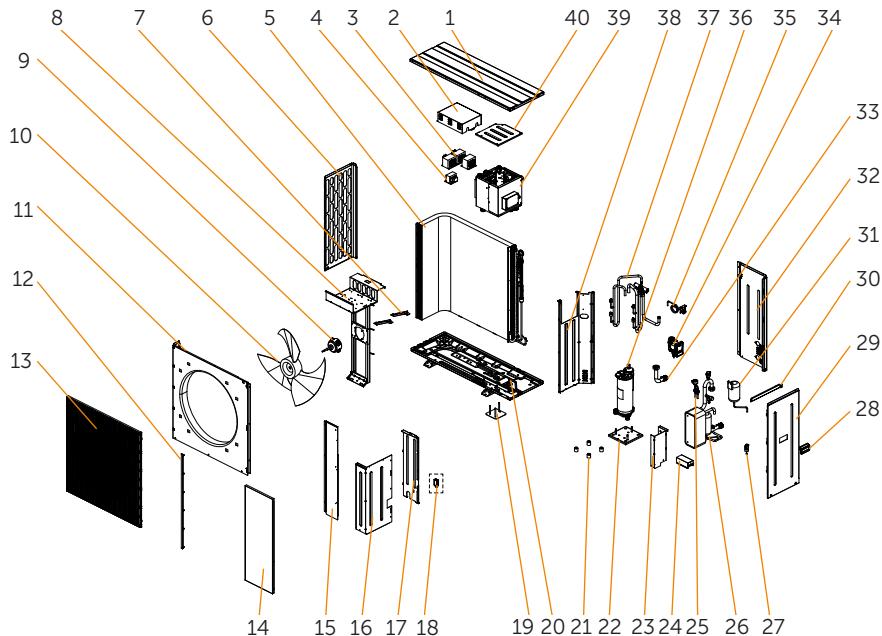
1-phase



1	Control box top cover plate	6	Compressor driver board	11	Three-position terminal block
2	Control box body	7	Signal line bridge	12	Wire clamp
3	PG joint (M30*1.5)	8	Electronic control mounting plate	13	Control box front cover plate
4	PG joint (M32*1.5)	9	PCB	14	Electrical box cover plate
5	Fastened joint (M25*1.5)	10	Terminal block mounting plate		

2.5 Main Parts of Outdoor Unit

STU3-C16R290



NOTICE!

- This diagram takes STU3-C16R290 as an example, the main parts of other models are different.

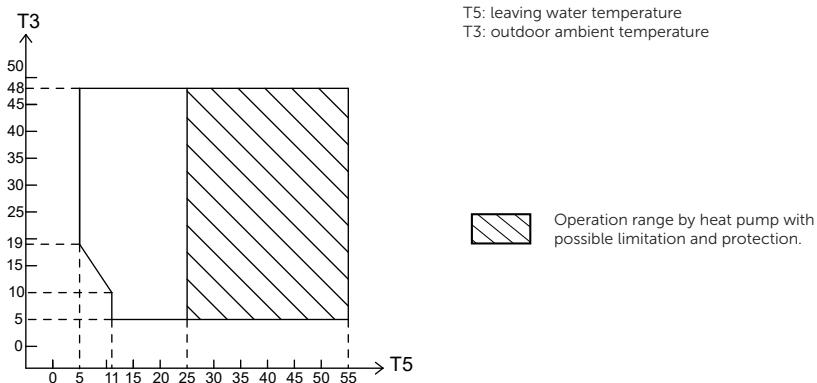
1	Top cover	15	Center pillar	29	Right plate
2	Reactor cover	16	Compressor compartment right plate	30	Connecting strips of front and rear plates
3	Harmonic reactor	17	Compressor compartment rear plate	31	Liquid storage tank
4	Inverter reactor	18	Refrigerant sensor (Optional)	32	Rear maintenance plate
5	Finned heat exchanger	19	Triangular support bracket	33	Inlet and outlet pipe components

6	Left plate	20	Chassis	34	Water pump
7	Reactance bridge frame	21	Rubber feet	35	Globe valve components
8	Motor bracket	22	Compressor mounting plate	36	Compressor
9	Motor	23	Plate heat exchanger pillar	37	4-way valve component
10	Fan blade	24	Plate heat exchanger support bracket	38	Median septum
11	Wind guide ring	25	Expansion valve component	39	Control box
12	Decorative strip	26	Plate heat exchanger component	40	Control box cover
13	Front plate	27	Water flow switch		
14	Front maintenance plate	28	Handle		

2.6 Operating Range

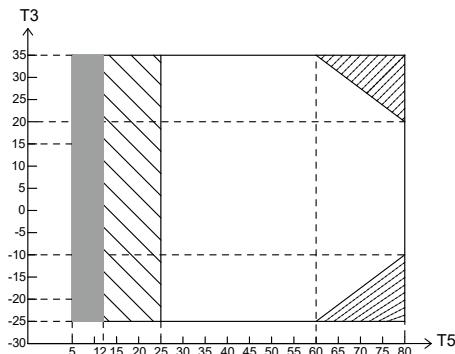
Cooling mode

In cooling mode, the heat pump works at an outdoor temperature of 5°C to 48°C.



Heating mode

In heating mode, the heat pump works at an outdoor temperature of -25°C to 35°C.



T5: leaving water temperature
T3: outdoor ambient temperature

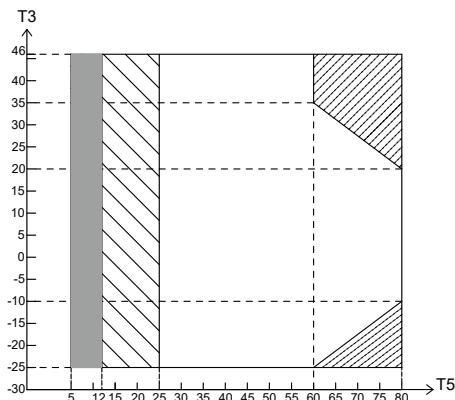
If IBH/AHS setting is valid, only IBH/AHS turns on;
If IBH/AHS setting is invalid, only heat pump turns on, limitation and protection may occur during heat pump operation.

Operation range by heat pump with possible limitation and protection.

Heat pump turns off, only IBH/AHS turns on.

DHW mode

In DHW mode, the heat pump works at an outdoor temperature of -25°C to 46°C.



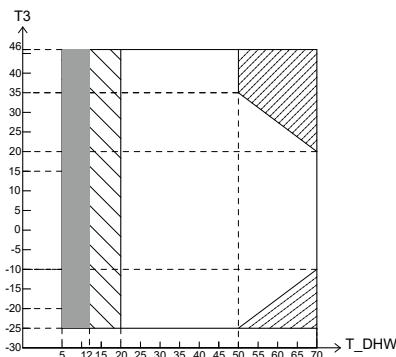
T5: leaving water temperature
T3: outdoor ambient temperature

If IBH/AHS setting is valid, only IBH/AHS turns on;
If IBH/AHS setting is invalid, only heat pump turns on, limitation and protection may occur during heat pump operation.

Operation range by heat pump with possible limitation and protection.

Heat pump turns off, only IBH/AHS turns on.

In DHW mode, the heat pump works at an outdoor temperature of -25°C to 46°C.



T_DHW: DHW tank temperature
T3: outdoor ambient temperature

If TBH/IBH/AHS setting is valid, only TBH/IBH/AHS turns on;
If TBH/IBH/AHS setting is invalid, only heat pump turns on, limitation and protection may occur during heat pump operation.

Operation range by heat pump with possible limitation and protection.

Heat pump turns off, only IBH/AHS turns on.

2.7 Symbols on the Label and Heat Pump

Symbol	Description
	CE mark. The heat pump complies with the requirements of the applicable CE guidelines.
	Additional grounding point.
	Risk of electric shock. High voltage exists after the heat pump is powered on!
	Risk of danger. Potential hazards exist after the heat pump is powered on!
	Risk of fire. Heat pumps contain refrigerant inside, and the heat pump are at risk of explosion when exposed to an fire.
	Do not dispose of the heat pump together with household waste.
	The manual should be read carefully.
	Information is available such as the installation manual.
	Only a competent service should be handling this equipment with reference to the installation manual.

3 System Overview

System overview

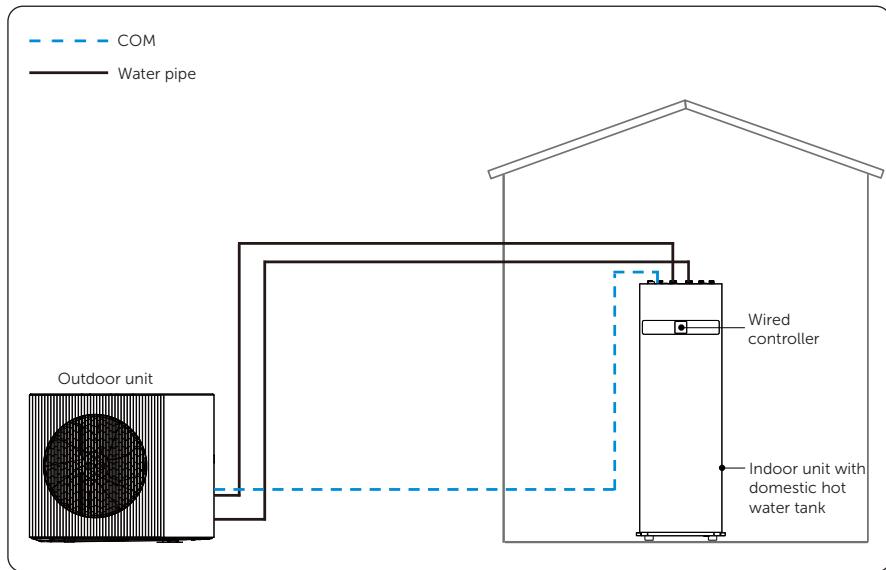


Figure 3-1 System diagram

NOTICE!

- The system diagram is for illustration purposes only. Heat pumps are not limited to one application scenario.

4 Transportation and Storage

Transportation

CAUTION!

- The barycenter of the product and the hook should be kept in a straight line in the vertical direction to prevent excessive tilting.
- For the weight distribution, the compressor side of the unit is significantly heavier than the fan motor side.

- Select the proper lifting tool and lifting ropes, ensure they can meet the weight and size requirements of heat pump (refer to "[17 Technical Data](#)").
- Use two paper edge protector underneath the outdoor unit to protect the housing part from damage.
- Do not tilt the unit more than 15° during lifting.
- After transportation, remove the lifting ropes.

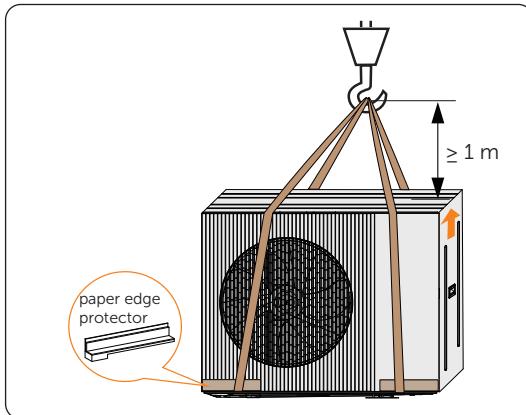


Figure 4-2 Lifting the unit

Storage

- Stack the heat pump in accordance with the caution signs on the heat pump carton to prevent their falling down and device damage.
- Do not place the heat pump upside down.

5 Preparation before Installation

5.1 Selection of Installation Location

5.1.1 Environment Requirement

- Install the outdoor unit on the outdoors, avoiding room corners, alcoves or between walls.
- Install safety piping when passing through a building wall from the outdoor unit.
- Select an installation location with good sound absorption properties, such as an area with grass, hedges or fences.
- Select an installation location that is free of large amounts of snow in winter.
- Select an installation location where the air intake is not affected by strong winds. If the installation location is not protected from wind, please install a protective wall.
- Prevent air from flowing back through the vents.
- Bury hydraulic piping and electrical wiring in the ground.
- Lay gravel and rubble for the condensate drain.
- Ensure that water does not accumulate in the subsoil.
- Ensure that the subsoil absorbs water well.
- Ensure that the ambient temperature range of the outdoor unit is -25°C~48°C.
- Avoid snow accumulation and strong sunlight. It is recommended to install an awning over the heat pump.

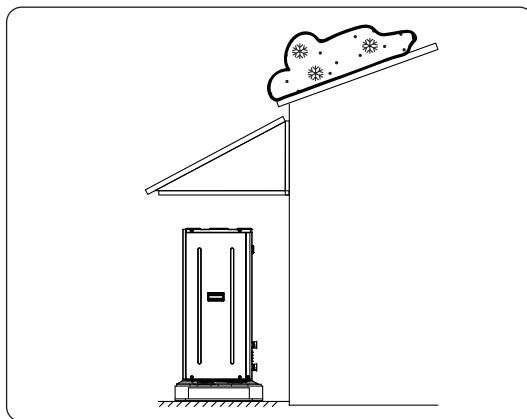


Figure 5-3 Installing an awning

5.1.2 Safety Zone Requirement

The refrigerant circuit in the outdoor unit contains easily flammable refrigerant in safety group A3 as described in ISO 817 and ANSI/ASHRAE Standard 34. So the safety zone is defined near the outdoor unit.

CAUTION!

- This refrigerant has a higher density than air. In the event of a leak, escaping refrigerant may be collected near the earth.

The following conditions must be avoided within the safety zone:

- Property boundaries, neighboring properties, footpaths, and driveways;
- Pump shafts, inlets to waste water systems, downpipes, and waste water shafts, etc.;
- Other slopes, troughs, depressions, and shafts;
- Electrical house supply connections;
- Electrical systems, sockets, lamps, and light switches;
- Building openings such as windows, doors, light wells, and flat roof windows;
- Outdoor air and exhaust air apertures of ventilation and air conditioning systems;
- Snowfall from roofs.

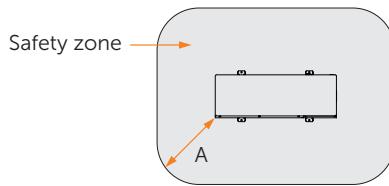
Do not introduce ignition sources into the safety zone:

- Tools that generate sparks;
- Naked flames or burner gauze assemblies;
- Objects with a temperature of above 360°C;
- Grills;
- Electrical devices not free of ignition sources, mobile devices with integrated batteries (such as mobile phones and fitness watches).

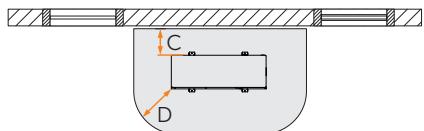
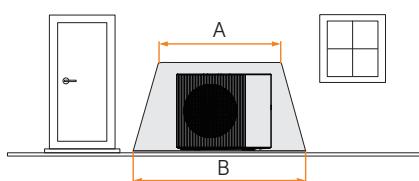
NOTICE!

- The particular safety zone is dependent on the surroundings of the outdoor unit.
- The safety zones shown below are floor standing installation.

Ground installation (no obstacle)



Ground installation (in front of the wall)



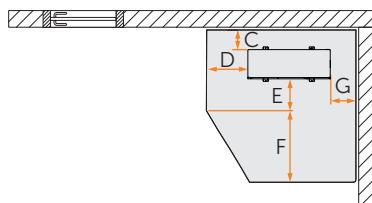
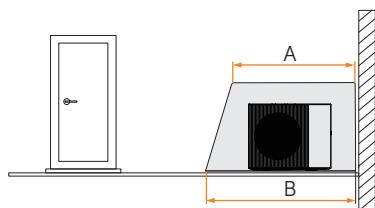
A	2400 mm
---	---------

B	3400 mm
---	---------

C	≥ 300 mm
---	---------------

D	1000 mm
---	---------

Ground installation (in a corner with wall)



A	2400 mm
---	---------

B	2900 mm
---	---------

C	300 mm
---	--------

D	500 mm
---	--------

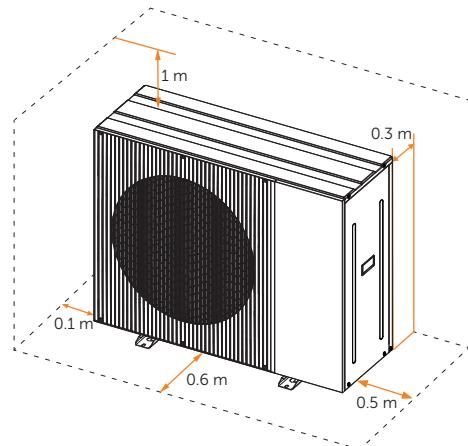
E	500 mm
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F	1800 mm
---	---------

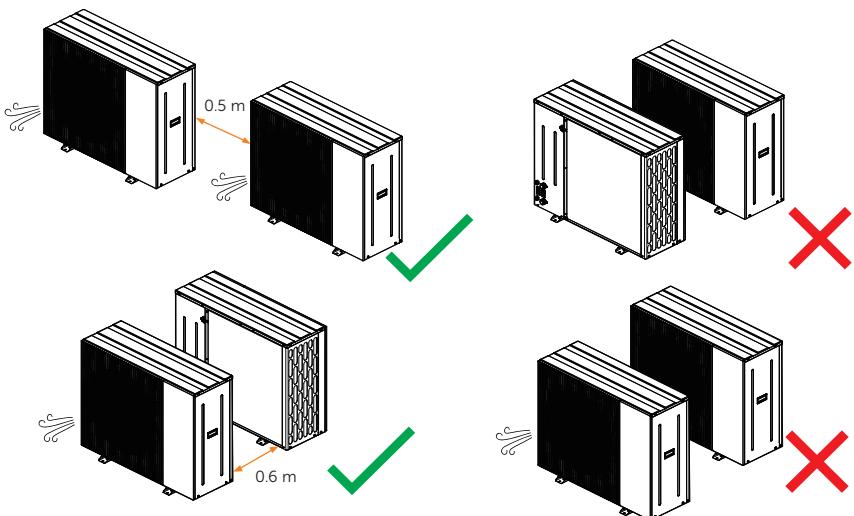
G	500 mm
---	--------

5.1.3 Clearance Requirement

Single unit



Two units



WARNING!

- Make sure that the air vents of two heat pumps can not be blocked!

5.2 Tools Requirement

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site. Please note that the tools used must comply with local regulations.



5.3 Additionally Required Materials

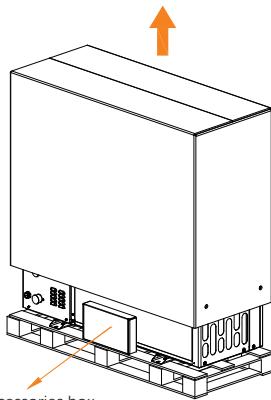
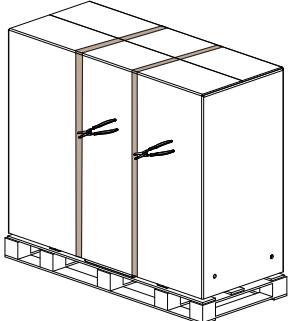
Table 5-1 Additionally required materials

No.	Required material	Type	Conductor cross-section	Outer diameter
1	Main power cable (3-phase)	 Three-core cable, voltage rating of 600 V, a temperature resistance of 105°C	4~6 mm ²	5~10 mm
2	Main power cable (1-phase)	 Five-core cable, voltage rating of 600 V, a temperature resistance of 105°C	4~6 mm ²	5~10 mm

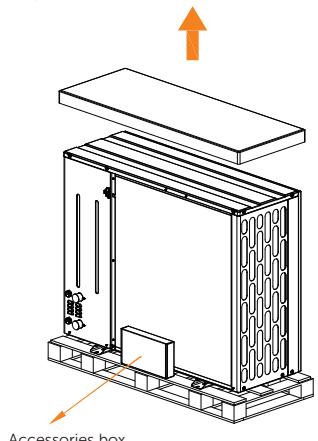
6 Unpacking and Inspection

6.1 Unpacking

- 1 Cut the tape above the outer package;
- 2 Remove the outer cover of the carton upward;



- 3 Pick up the cover above the outdoor unit;
- 4 Remove the protective cardboard.



Hollow plate (For protection purposes, remove it after unit installation)

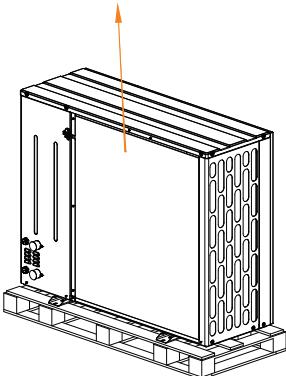


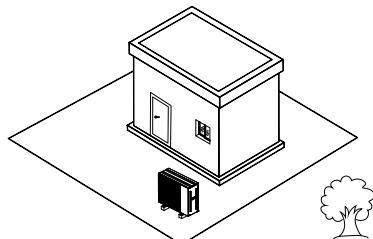
Figure 6-1 Unpacking

6.2 Accessories of Outdoor Unit

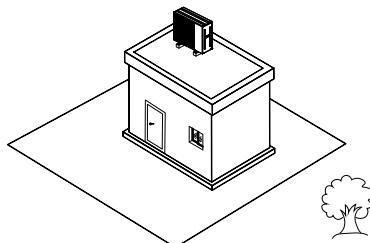
Illustration	Name	Quantity	Remark
	Installation manual	1 PC	Guiding installers to install the product correctly
	Y-type strainer (G 1 1/4")	1 PC	Installed at the inlet side of the pressure relief valve, for removing impurities from the medium
	Temperature probe (5 m)	1 PC	For real-time monitoring of total system water temperature
	Drain joint (36*33 mm)	1 PC	Installed at the centralized drain hole in the chassis, for discharging condensate generated by the unit
	Energy label	1 PC	/
	Cable tie (3.6*230 mm)	7 PCS	For bundling and securing cables, pipes or other items
	Paper edge protector (210*30*45 mm)	2 PCS	For protecting the corners of the product packaging carton

7 Unit Installation

7.1 Installation Scenario



Install on the ground



Install on the flat roof

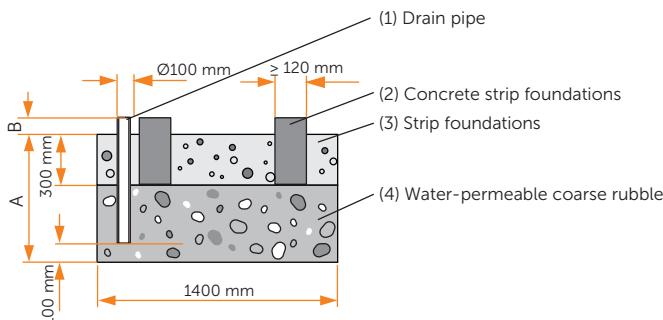
NOTICE!

- Considering the length of the communication cable and the performance of the built-in pump, the installation distance between the outdoor unit and indoor unit should be as close as possible.
- The connection pipes between the outdoor unit and indoor unit should be as straight as possible to minimize the use of elbow joints.

7.2 Creating the Foundation

7.2.1 Creating the Foundation on the Soft Ground

If the outdoor unit is installed on the soft ground (such as lawn, soil), the creation of the foundation needs to be completed.



Procedures for creating the foundation

Step 1: Dig a hole (Ø100 mm) in the ground. For the location of the drain hole, please refer to "[7.4.1 Drain Hole Position](#)".

Step 2: Insert the drain pipe (1) into the hole for draining condensate.

Step 3: Add a layer of water-permeable coarse rubble (4).

NOTICE!

- Calculate the depth (A) in accordance with local conditions.
 - Region with ground frost: minimum depth: 900 mm.
 - Region without ground frost: minimum depth: 600 mm.
- Calculate the height (B) in accordance with local conditions. Such height should not be smaller than 100 mm.

Step 4: Create two concrete strip foundations (2). The recommended width of concrete strip foundation is not smaller than 120 mm.

NOTICE!

- Make sure the two foundations are level.
- There are no restrictions on the width or length of foundations, it is required that the outdoor unit can be mounted on the foundation properly and the drain pipe is not blocked.

Step 5: Add a gravel bed between and beside the strip foundations (2) to divert the condensate.

7.2.2 Creating the Foundation on the Solid Ground

If the outdoor unit is installed on the solid ground (such as concrete), two strip foundations should be created on the ground surface.

- The height of the strip foundation should not be smaller than 100 mm.
- The width of the strip foundation should not be smaller than 120 mm.

7.2.3 Creating the Foundation on the Flat Roof

If the outdoor unit is installed on the flat roof, two strip foundations should be created on the roof surface.

- The height of the strip foundation should not be smaller than 100 mm.
- The width of the strip foundation should not be smaller than 120 mm.

NOTICE!

- Take drainage layout into consideration, and the unit should be installed close to the drainage system.

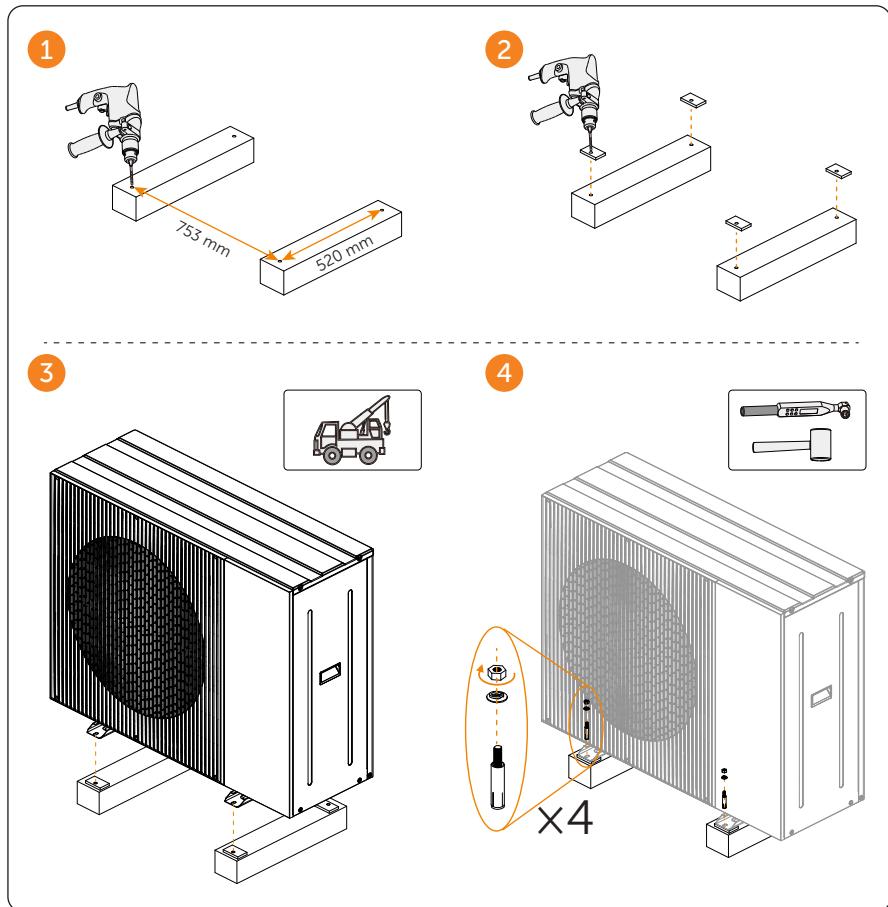
7.3 Mounting the Unit

Step 1: Mark and drill four holes on two concrete strip foundations (Recommended hole diameter $\Phi 12$, hole depth 20mm).

Step 2: Drill holes on four anti-vibration pads (hole diameter $\Phi 12$, field supply). Align the holes and place four anti-vibration pads above the strip foundations.

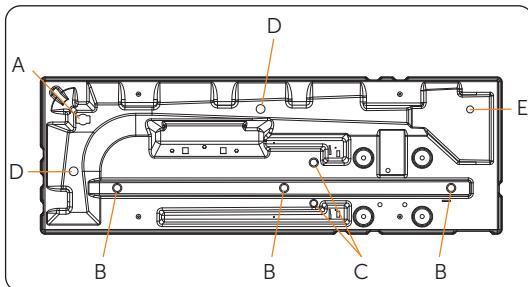
Step 3: Align the holes and lift the outdoor unit on the strip foundations.

Step 4: Install four sets of expansion bolts (M10*15, field supply) and fix the outdoor unit to the strip foundations.



7.4 Draining Condensate

7.4.1 Drain Hole Position



Item	Explanation
A	Centralized drain hole (Connecting to drain joint for condensate discharge)
B	Secondary drain holes (Used for drainage when the centralized drain hole and reserved drain holes are blocked)
C	Tertiary drain holes (Used for drainage when all drain holes are blocked)
D	Reserved drain holes (Sealed with rubber plugs, remove the plugs when in use) Note: If other drainage holes cannot meet the drainage requirements, the reserved drain holes can be used.
E	Hole for exhaust and drainage

 **CAUTION!**

- Pay attention to condensation when removing the rubber plug attached to the reserved drain holes.
- Make sure the condensate is drained properly. Collect and direct the condensate dripped from the unit base to a drain tray. Avoid water dripping onto the floor that may cause a slip hazard, especially in winter.

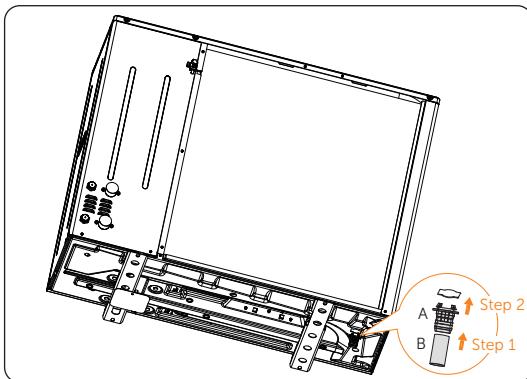
NOTICE!

- For cold climates, it is highly recommended to install a belt heater to avoid damage to the outdoor unit due to the freeze in case of a low drainage rate.

7.4.2 Installing the Drain Joint

Step 1: Connect the drain hose (B) to the drain joint (A).

Step 2: Plug the connected drain joint into the drain hole at the bottom of the outdoor unit.

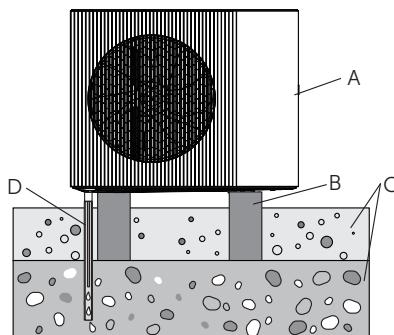


Item	Explanation
A	Drain joint (plastic, Pagoda connection, 1")
B	Drain hose (field supply)

7.4.3 Draining Condensate on the Soft Ground

Draining condensate into a gravel bed

If condensate is drained into a gravel layer below ground, the pipe must be directed to the frost-free area. The gravel layer needs to be large enough for the condensate to flow freely.



A - Outdoor unit
 B - Concrete strip foundations
 C - Foundation (See "7.2 Creating the Foundation")
 D - Drain pipe (at least DN30)

NOTICE!

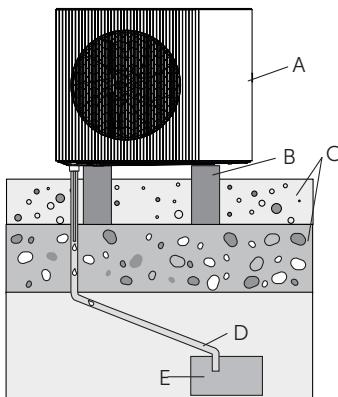
- To prevent the condensate from freezing, self-regulating heating cable (field supply) must be threaded into the downpipe so that the condensate can discharge via the downpipe.

Draining condensate through a pump sump / soakaway / sewer

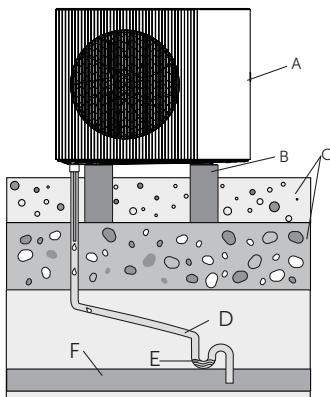
If condensate is to be discharged into a pump sump, soakaway or sewer, pay attention to the slope of the pipe and ensure that the pipe is frost free.

WARNING!

- Do not connect to a sewer that is connected to the room, because leaking refrigerant may enter the building.



A - Outdoor unit
B - Concrete strip foundations
C - Foundation (See "7.2 Creating the Foundation")
D - Drain pipe (at least DN30)
E - Pump sump/soakaway



A - Outdoor unit
B - Concrete strip foundations
C - Foundation (See "7.2 Creating the Foundation")
D - Drain pipe (at least DN30)
E - Sewer
F - Sump trap in an area free from frosting risks

7.4.4 Draining Condensate on the Solid Ground

Use a hose to guide the condensate into a sewer, pump sump or soakaway, and run it off..

7.4.5 Draining Condensate on the Flat Roof

Use a hose to guide the condensate into a sewer, pump sump or soakaway, and run it off.

8 Hydraulic Installation

8.1 Preparations for Installation

Valves and pipes in water loop

- When a 3-way valve is used in the water loop, it is recommended to use a ball valve to guarantee full separation between the domestic hot water loop and the floor heating water loop.
- When a 3-way valve or a 2-way valve is used in the water loop, it is recommended that the valve reversal time is less than 60 s.
- To optimize the efficiency of unit operation, it is recommended that the valve and the domestic hot water tank are installed as close as possible to the outdoor unit.
- If plastic pipes are used, make sure that they meet the requirements for complete oxygen tightness according to DIN 4726.
- It is necessary to avoid diffusion of oxygen into the pipes, as this may lead to corrosion of the pipes.

System water volume

- Check the total water volume in the installation according to the expansion vessel.
- The expansion tank must be dimensioned according to standard EN 12828.
- The outdoor unit does not contain an integrated expansion tank. The expansion tank integrated in the indoor unit has a volume of eight liters. If the volume of expansion tank is insufficient, please install an additional expansion tank (field supply).

CAUTION!

- To ensure proper operation of the expansion tank, the working pressure of the expansion tank needs to be properly adjusted. The equipment must be checked every 12 months.
- The maximum operating pressure of the expansion tank needs to be considered.

NOTICE!

- It is recommended to install an expansion tank on the intake side.

Flow rate range

The operating flow rate ranges for each unit are shown below. During installation, check and ensure that the flow rate is guaranteed under all conditions.

Table 8-1 Flow rate range

Unit	8 kW	10 kW	12 kW	14 kW	16 kW
Flow rate range (m ³ /h)	0.5*-1.65	0.5*-2.0	0.7*-2.5	0.7*-2.9	0.7*-3.2

*The minimum output flow value of the pump can be set via the wired controller.

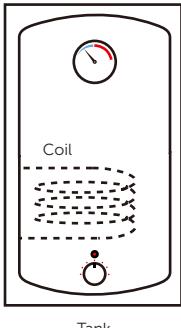
 CAUTION!

- The heat exchanger could be damaged by freezing water due to low water flow rate.

Requirements for third-party water tanks

If a third-party water tank need to be connected to the unit, follow the below requirements.

- The heat exchange area of the water tank coil are shown below.



Model		8-10 kW	12-16 kW
Tank volume (L)	Recommended	150~300	200~500
Heat exchange area (m ²) (stainless steel coil)	Minimum	1.4	1.6
Heat exchange area (m ²) (enamel coil)	Minimum	2.0	2.5

- The tank thermistor must be located above the heat exchanger coil.
- The booster heater must be located above the heat exchanger coil.
- Notice the pressure loss of the water tank and install a water pump externally if necessary.

 NOTICE!

- Performance:** The performance data for third-party water tanks is for reference only, and the performance cannot be guaranteed.
- Configuration:** The configuration of the third-party water tank depends on the size of the heat exchanger coil of the tank.

For the installation of the domestic hot water tank (supplied by the user), please refer to the specific manual of the domestic hot water tank.

Thermistor of domestic hot water tank

The maximum allowable thermistor cable length is 20 m, which is equal to the maximum allowable distance between the domestic hot water tank and the unit (only for the

installation with a domestic hot water tank). The length of thermistor cable supplied with the domestic hot water tank is 10 m. The resistance value is: $R_{25}=10\text{K}\Omega\pm2\%$; $B_{25/50}=3950\text{K}\pm2\%$.

Requirements for balance tank volume

Installing a balancing tank in the system (provided by the user) can effectively reduce the frequency of unit start-up, enable efficient defrosting and effectively mitigate room temperature fluctuations. Recommended balancing tank capacities are listed below.

Table 8-2 Recommended balancing tank capacity

No.	Model	Balance tank (L)
1	8-10 kW	≥ 25
2	12-16 kW	≥ 40
3	Cascade system	$\geq 40*n$ (n: Number of outdoor units)

8.2 Connecting the Water Loop

Step 1: Connect the water pipe to the outdoor unit.

Step 2: Check the water.

Step 3: Fill the water loop with water.

Step 4: Fill the domestic hot water tank with water (if available).

Step 5: Insulate the water pipe.

8.2.1 Connecting the Water Pipe

Requirements of components used

- The pipe inside must be clean.
- Do not use Zn-coated parts.
- Do not use materials that will react with the water used in the system and the materials used in the unit.
- The components installed in the piping meet the requirements of the water pressure and water temperature.

Procedures for connecting the water pipe



Before installation:

- Reserve enough space for installation.
- Clean the water pipes and connectors with clean water. Make sure they are free of dirt.

 CAUTION!

During installation:

- Use proper tools to avoid damage to the mounting components. Because copper is soft.
- Correctly connect the water outlet and water inlet. Otherwise, it will cause the unit failure.
- When connecting the pipes provided on-site, do not apply excessive force and ensure the pipe connections are properly aligned. No deformation and cracks occurs on the pipe.
- When the pipe needs to be installed through a wall, cover the pipe end to prevent dust and dirt from entering the pipe.
- The joint parts of seals shall be impermeable with Teflon tape, rubber sleeves or sealant.
- When using non-copper metallic piping, connections between different materials need to be insulated to prevent galvanic corrosion.
- In cold areas, take proper drainage and antifreeze measures.

 CAUTION!

- A Y-type strainer must be installed at the water inlet. Otherwise, plate heat exchangers are prone to deposits inside, which may lead to fault and even refrigerant leaks.
- It is recommended to use a strainer with 60 mesh or higher.
- Pay attention to the correct flow direction of the Y-type strainer.
- Problems caused by not installing a strainer are not covered by the warranty.

Step 1: Connect the Y-type strainer with the water inlet (b) of the unit, and use thread sealing tape at the connection. The extension pipe (c) is required between the water inlet (b) of the unit and the Y-type strainer (d) to facilitate cleaning of the Y-type strainer.

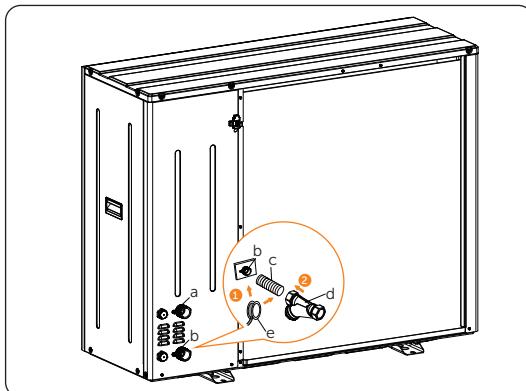


Figure 8-3 Connecting the Y-type strainer with the water inlet

Step 2: Connect the pipe (field supply) to the water outlet (a) of the unit.

Item	Explanation
a	Water outlet (connection with screws, male, 1 1/4" for 8-16 kW units)
b	Water inlet (connection with screws, male, 1 1/4" for 8-16 kW units)
c	Extension pipe (the length depends on the field conditions)
d	Y-type strainer (delivered with the unit, 2 screws for connection, female, 1 1/4" for 8-16 kW units)
e	Thread seal tape

Domestic hot water tank

For the installation of the domestic hot water tank, please refer to the specific manual of the domestic hot water tank.

Others

NOTICE!

- The exhaust valve (supplied by user) used in indoor water loop must be installed at the highest point of the system.
- The drain valve (supplied by user) should be installed on the water inlet pipe of outdoor unit and close to outdoor unit, and antifreeze protection measures should be taken.

8.2.2 Checking the Water

NOTICE!

- Poor quality water will increase the risk of damage to system.
- The circulator will only work properly if clean and high quality tap water is used.
- The main factors affecting the running of the circulator and system are oxygen, lime levels, sludge, acidity levels and other substances (including chlorides and minerals).
- The quality of pipe installation in water system is very important. The heating system must be airtight. Choose materials that are not sensitive to oxygen diffusion to reduce the risk of corrosion.

Requirements of water

- Comply with local regulations.
- Water quality must be checked by qualified personnel.
- Langolier Index (LI) between 0 and +0.4.
- With proper hardness. If the water is hard, fit a water softener
- With certain cleanliness. Before filling the water to water loop, clean the system thoroughly with specific products.

- Water component for corrosion limit on copper:

Water component	Limit	
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
Sulfate ions (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 0.7 mm max diameter	
Ferrite hydroxide Fe ₃ O ₄ (black)	Dose < 7.5 mg/L, 50% of mass, with diameter < 10 µm	
Iron oxide Fe ₂ O ₃ (red)	Dose < 7.5 mg/L, diameter < 1µm	

How to clean the water loop

- If the new system is assembled for the first time, clean all connecting parts and pipes to ensure the filling water is clean and of high quality.
- If installing the heat pump on the existing heating system:
 - » Drain and flush the system by a proper flow of water to avoid particulate sludge and waste.
 - » Clean each connecting parts and pipes individually and adequately.

NOTICE!

- If a potable water source is used as the water supply for the unit, an anti-siphon device needs to be installed between the potable water source and the unit.
- Installation of a sludge filter in the water loop is effective in preventing degradation of the system performance.
- It is recommended to install additional filters in the heating water loop. Especially for the removal of metal particles from the heating pipes, magnetic or cyclone filters are recommended, because such small particles may damage the unit and will not be removed by standard heat pump system filters.

8.2.3 Filling Water Loop with Water

Before filling water, make sure the water meets the requirements of "[8.2.2 Checking the Water](#)". Pumps and valves may become stuck as a result of poor water quality.

For the water filling, please follow below procedures:

Step 1: Turn the exhaust valve at least 1 full turn counterclockwise to release air from the system. Do not tighten the yellow knob on the exhaust valve at the top of the unit while the system is running.

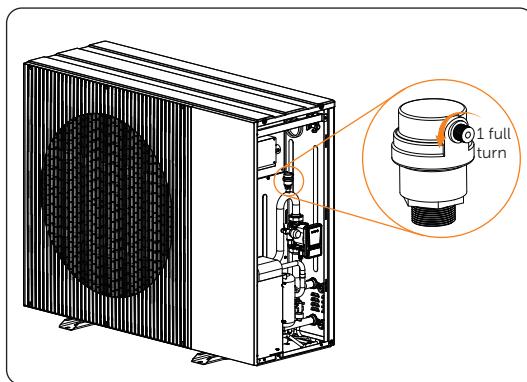


Figure 8-4 Opening the air vent valve

Step 2: Connect the water supply to the filling valve (supplied on site) by following the relative regulations.

Step 3: Start filling water.

Step 4: Monitor the water pressure. When the water pressure reaches 0.3 MPa (3 bar \pm 0.3), the unit may discharge excess water through the pressure relief valve.

Step 5: After the water filling is completed, if the pressure gauge shows less than 1 bar of water pressure, it is necessary to refill the water. And check for leaks at the water pipe connections.

NOTICE!

- During filling, it may not be possible to remove all air from the system. During the first operation of the system, the remained air will be removed automatically through the exhaust valve. It may be necessary to refill with water afterward.

8.2.4 Filling Domestic Hot Water Tank with Water

Please refer to the specific manual of the domestic hot water tank.

8.2.5 Insulating Water Pipes

Water pipes need to be insulated to prevent heat loss to the external environment and condensate on the pipe surface when the unit is running.

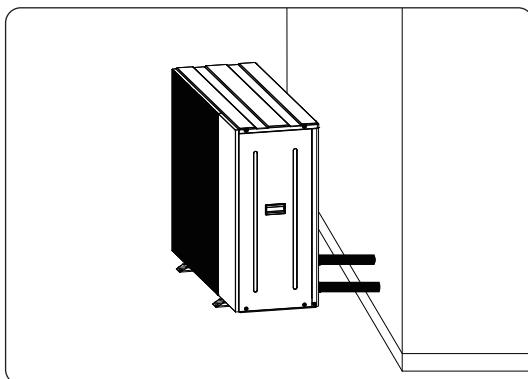


Figure 8-5 Connecting insulated water pipes

NOTICE!

- The insulation material should be provided with a fire resistance rating of B1 or above and comply with all applicable regulations.
- For cooling function requirements, the insulation type must be suitable for cold water, and all pipe joints must be sealed tightly to prevent that the insulation becomes wet from the inside.
- The thermal conductivity of the sealing material should be below 0.039 W/mK. Recommended thickness of the sealing material is shown as below.
- The recommended minimum insulation thickness ensures the correct operation of the product, but regulations may be different everywhere and must be followed.

Table 8-3 Recommended thickness of the sealing material

Pipe length (m) between the unit and the terminal device	Minimum insulation thickness (mm)
<20	20
20~30	30
30~40	40
40~50	50

8.3 Freeze Protection

8.3.1 Freeze Protection by Software

The outdoor unit is equipped with antifreeze protection function, the function is enabled by default. The pump run mode is set to "KEEP RUN", it can make the pump run all the time after the power is turned on and ensure that the water can keep flowing and protect the whole system from freezing.

NOTICE!

- If you need to disable the antifreeze function, please contact the technical support.

⚠ CAUTION!

- If the power supply of the unit is switched off for a long time, add glycol to the water or drain off the water to avoid freeze. For more details about how to add glycol and drain off water, refer to "[8.3.2 Freeze Protection by Glycol](#)" and "[8.3.3 Freeze Protection by Valves \(Supplied by User\)](#)".

8.3.2 Freeze Protection by Glycol

Adding glycol to water can lower the freezing point. In areas where the water temperature is below 0°C, an approved antifreeze must be used to protect water pipes. Adding antifreeze to the system may cause a reduction in the actual performance of the unit.

Requirements of use of glycol

- Only qualified personnel can add the glycol. Do not touch the glycol during operation.
- Do not use any automotive glycol.
- Do not use galvanized pipes in glycol systems.
- Comply with local laws and regulations.

- Type of glycol:
 - » If the system contains a domestic hot water tank, Only use propylene glycol^[a].
 - » If the system does not contain a domestic hot water tank, either propylene glycol^[a] or ethylene glycol can be used.

(a): Propylene glycol, including the necessary inhibitors, falls in Category III according to EN1717.



- Ethylene glycol and propylene glycol are toxic.

How to add glycol

Add glycol according to the table below.

Table 8-4 Required concentration of glycol

Lowest expected outdoor temperature	Prevention ^[1] from freezing	Prevention ^[2] from bursting
-5°C	10%	15%
-10°C	15%	25%
-15°C	20%	35%
-20°C	25%	N/A*
-25°C	30%	N/A*
-30°C	35%	N/A*

*Additional action is needed to prevent freezing.

[1]: Glycol can prevent the piping from bursting, but cannot prevent the liquid inside the piping from freezing.

[2]: Glycol can prevent the liquid inside the piping from freezing.



- The actual concentration required is related to the type of glycol used. Please refer to the requirements set by the glycol manufacturer.
- The added concentration of glycol should NEVER exceed 35%.
- Check the antifreeze concentration in the system periodically to maintain the same concentration.
- When using this antifreeze measure, you should minimize the exposure time of glycol to the air.
- If the liquid in the system is frozen, the pump will not start. Please note that solely preventing the system from bursting may not prevent the liquid inside from freezing.
- If water remains stagnant within the system, it is highly likely to freeze and cause damage to the system.

NOTICE!

- Adding glycol to the water loop reduces the maximum allowed water volume of the system.

8.3.3 Freeze Protection by Valves (Supplied by User)

In cold environments, in case of a prolonged power outage or long-term failure of components such as the circulation pump, use the anti-freeze valve to drain off the water to prevent freezing.

Requirements of use of anti-freeze valve

- No glycol is added to the water.
- When the anti-freeze valve is open, the normally closed valve (located indoors near the pipe inlet/outlet) prevents all water from being drained from the indoor pipe.

⚠ CAUTION!

- If glycol is added to the water, do not install the anti-freeze valve, the glycol may leak.

How to install the anti-freeze valve

- Vertically install the anti-freeze valve at the lowest point of all pipes.
- The anti-freeze valve is at least 12 cm above the ground.

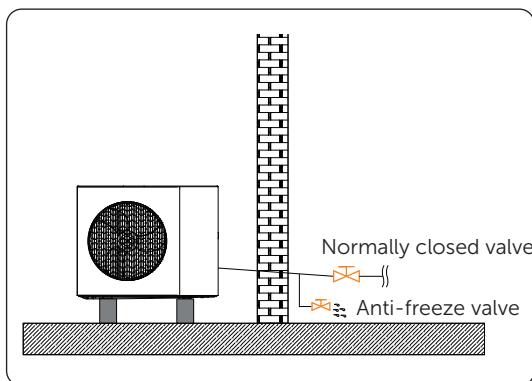


Figure 8-6 Draining the system

8.3.4 Other Freeze Protection Measures

There is a flow switch in the water loop. In the event of a power failure, water may enter the flow switch and cannot be drained out, and may freeze when the temperature is low enough. Please do as follows:

Step 1: Rotate the flow switch counterclockwise to remove it.

Step 2: Dry the flow switch completely.

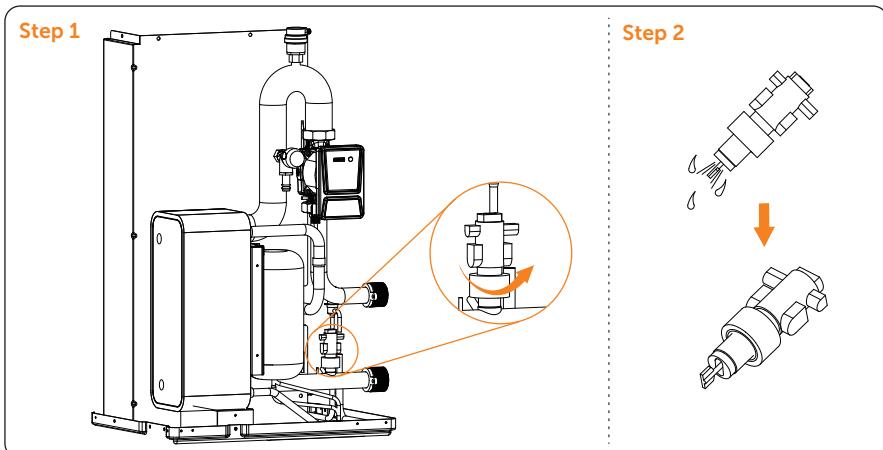


Figure 8-7 Removing and drying the flow switch

NOTICE!

- After the operation is completed, it is necessary to restore the original state: the direction of the arrow on the flow switch is same as the direction of the water flow from the inlet.

8.4 Checking the Water Loop

The conditions below should be met:

- The maximum water pressure is lower than or equal to 3 bar.
- The temperature resistance of the water loop related devices is not less than 80°C.
- Drain taps must be installed at lowest points of the system to ensure complete drainage of the circuit during maintenance.
- Exhaust valves must be installed at highest points of the system. The vents should be located at points that are easily accessible for service.
- Make sure that the exhaust valve is not tightened so that water loop can automatically release air.

9 Electrical Connection

DANGER!

- Risk of electrocution.

WARNING!

- The unit should be installed in accordance with national wiring regulations.
- This unit incorporates an earth connection for functional purposes only.
- Be sure to install the required fuses or circuit breakers. An all-pole disconnection switch having a contact separation of at least 3 mm in all poles should be connected in fixed wiring.
- It is prohibited to install emergency stop switches, remote stop switches (including circuit breaker, contactor and relay), within two meters of the unit.

9.1 Opening the Electrical Box Cover

WARNING!

- Risk of electrocution.
- Risk of burning.

NOTICE!

- Keep the screws properly for later use.

To access the unit for installation and maintenance, follow the instructions below.

Step 1: Unscrew the four screws on the cover plate of the outdoor unit, and take off the cover plate downward and outward.

Step 2: Unscrew the four screws on the cover plate of the electrical box, and take off the cover plate of the electrical box.

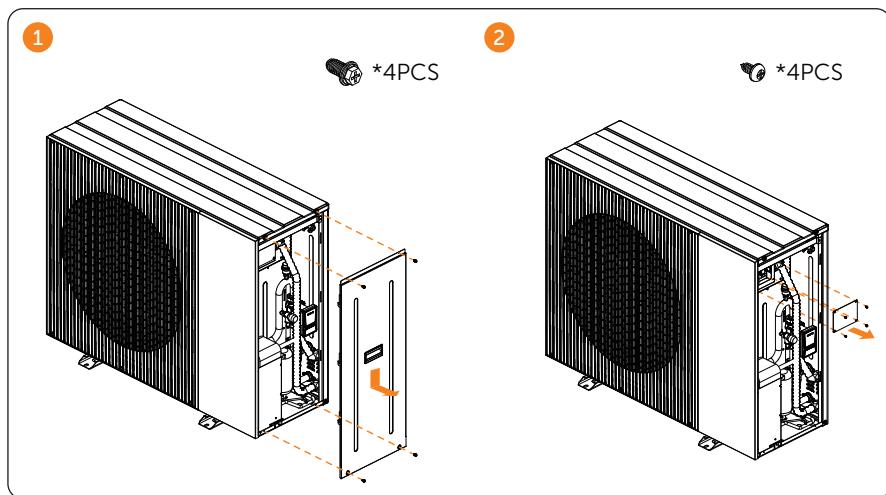


Figure 9-1 Opening the electrical box cover

9.2 Back Plate Layout for Wiring

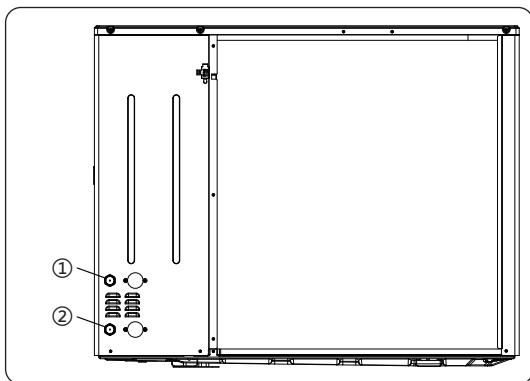


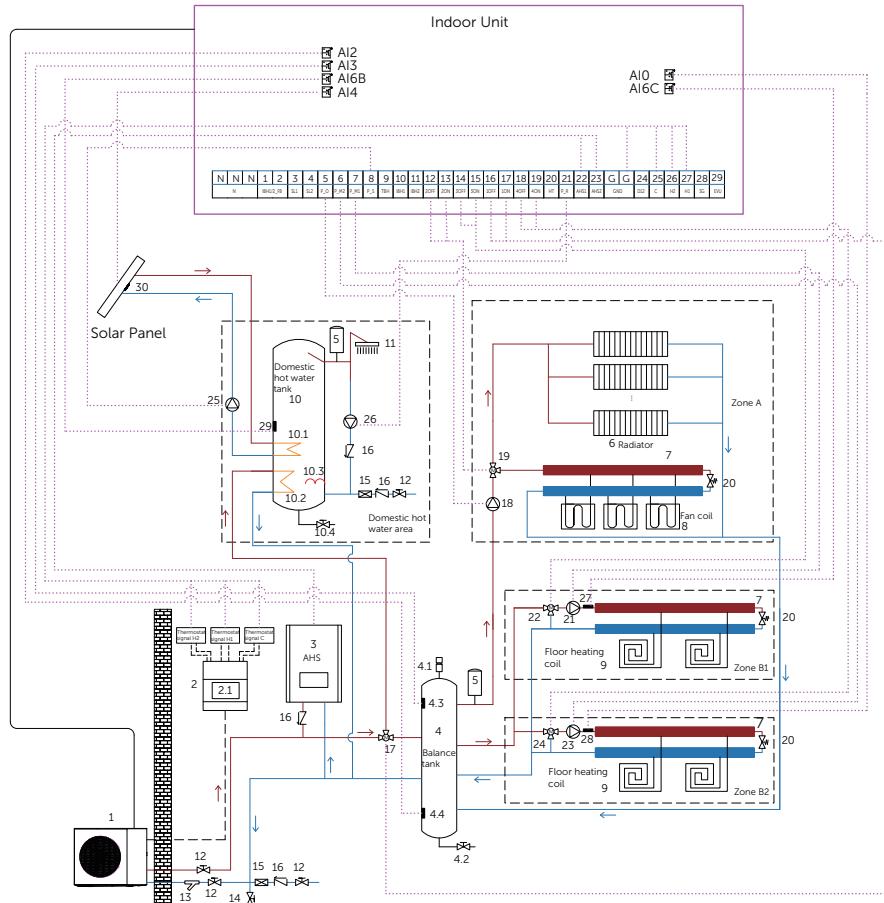
Figure 9-2 Back plate layout for wiring

- ① For low voltage wiring (for communication)
- ② For high voltage wiring (for main power supply)

9.3 Overview of Electrical Wiring

- Use a round crimp-style terminal for connection to the power supply terminal board.
- The power cable model is H07RN-F.
- Leakage protection switch must be installed.

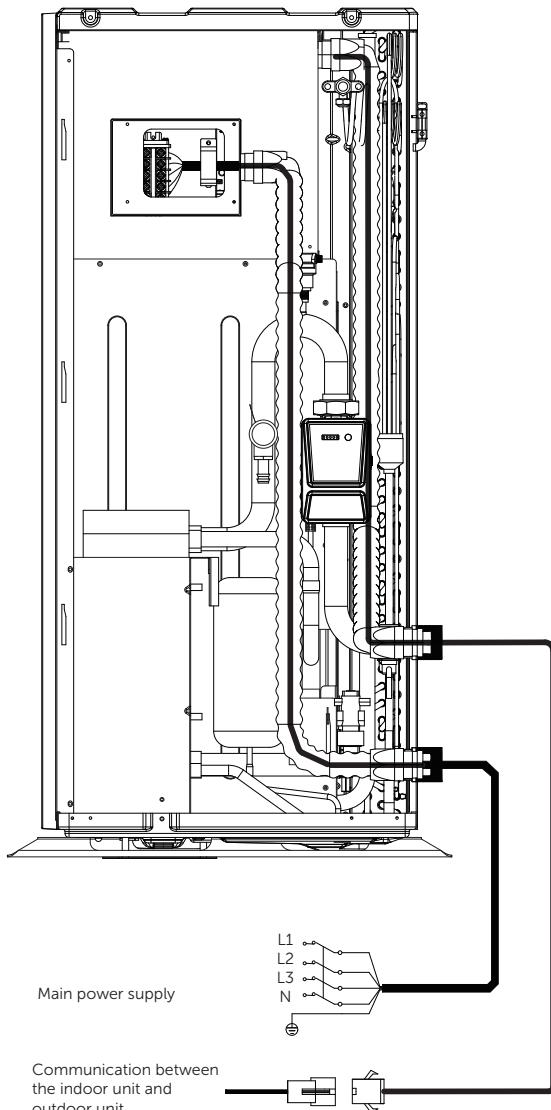
Wiring overview of the different components



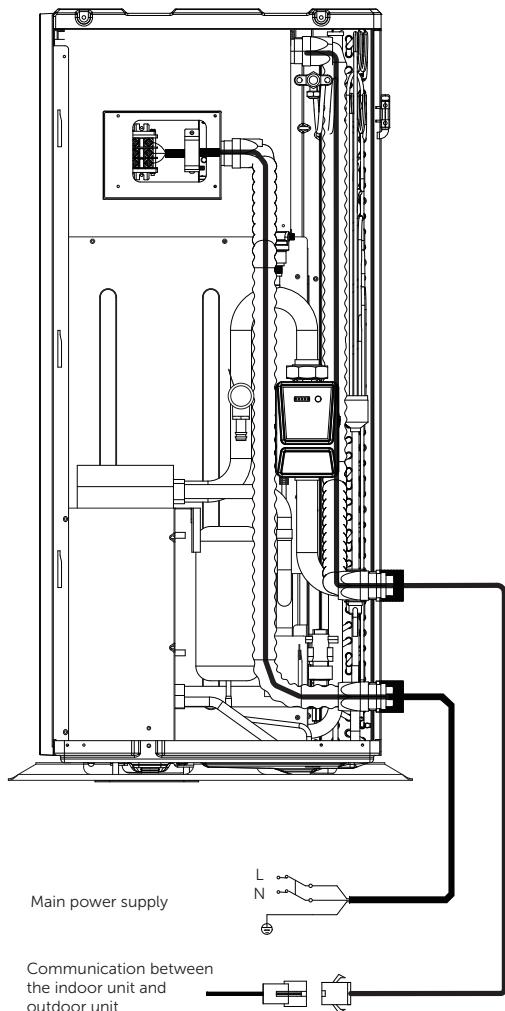
Electrical Connection

Item	Name	Item	Name
1	Outdoor unit	12	Shut-off valve (Field supply)
2	Indoor unit: Controller module	13	Y-type strainer
2.1	Wired controller	14	Drain valve (Field supply)
3	AHS: Additional heat source (Field supply)	15	Filter (Field supply)
4	Balance tank (Field supply)	16	Check valve (Field supply)
4.1	Exhaust valve (Field supply)	17	S3V1: 3-way valve (Field supply)
4.2	Drain valve (Field supply)	18	PUMPo: Outside circulator pump (Field supply)
4.3	TACt1: Balance tank upper temperature sensor (Field supply)	19	S3V2: 3-way valve (Field supply)
4.4	TACt2: Balance tank lower temperature sensor (Field supply)	20	Bypass valve (Field supply)
5	Expansion vessel (Field supply)	21	PUMPmb1: Zone B1 circulation pump (Field supply)
6	Radiator (Field supply)	22	S3V3/S3Vmpb1: Mixing valve (Field supply)
7	Collector/separator (Field supply)	23	PUMPmb2: Zone B2 circulation pump (Field supply)
8	Fan coil (Field supply)	24	S3Vmpb2: Mixing valve (Field supply)
9	Floor heating loop (Field supply)	25	PUMPs1: Solar pump (Field supply)
10	Domestic hot water tank (Field supply)	26	PUMPre1: Lower return water pump (Field supply)
10.1	Coil 1, heat exchanger for heat pump (Field supply)	27	TMb1: Zone B1 water flow temperature sensor (optional)
10.2	Coil 2, heat exchanger for solar energy (Field supply)	28	TMb2: Zone B2 water flow temperature sensor (optional)
10.3	TBH: Domestic hot water tank booster heater (Field supply)	29	THWt: Temperature sensor of domestic water tank (Field supply)
10.4	Drain valve (Field supply)	30	TSL_SENSOR: Solar temperature sensor (Field supply)
11	Hot water tap (Field supply)		

3-phase



1-phase



9.4 Electrical Wiring Guidelines

9.4.1 Field Wiring Guidelines

- Most field wiring of the unit is to be made on the terminal block inside the electrical box. To gain access to the terminal block, remove the electrical box cover plate.

- Fix all cables with cable ties.
- Lay out the electrical cables so that the front cover does not rise up during the wiring, and attach the front cover securely.
- Install the wires and fix the cover firmly so that the cover may be fit properly.

9.4.2 Operating Current and Wire Diameter

- Refer to the table below to select the wire diameter (minimum value) individually for each unit.
- The maximum allowable voltage deviation between phases is 2%.
- Select circuit breakers that have a contact separation of at least 3 mm in all poles for full disconnection.

Table 9-5 Recommended wire

Unit	Power supply	Maximum circuit current (A)	Recommended wire size
8kW		17	UL1015 12AWG
10kW		22	UL1015 12AWG
12kW	220-240 V 1N~ 50 Hz	29	UL1015 10AWG
14kW		35	UL1015 10AWG
16kW		35	UL1015 10AWG
8kW		6	UL1015 12AWG
10kW		8	UL1015 12AWG
12kW	380-415 V 3N~ 50Hz	10	UL1015 12AWG
14kW		12	UL1015 12AWG
16kW		12	UL1015 12AWG

9.4.3 Tightening Torque

Table 9-6 Tightening torques

Item	Tightening torque (N·m)
M4 (power terminal, electric control board terminal)	1.2 to 1.4
M4 (earthing)	1.2 to 1.4
M5 (power terminal, electric control board terminal)	2.0 to 2.5
M5 (earthing)	2.0 to 2.5

9.5 Connecting the Power Supply

9.5.1 Precautions

For connection of the unit to a power supply terminal, the terminal should be a circular wiring terminal with an insulation casing.

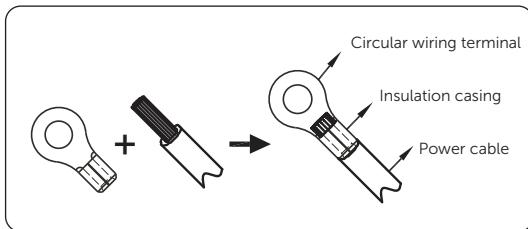


Figure 9-3 Wiring terminal

Observe the following instructions:

- Use a power cable that conforms to the specifications and connect the power cable firmly. Apply a proper tightening torque (refer to "9.4.3 Tightening Torque") to prevent the cord from being accidentally pulled out by an external force.
- Do not connect two power cables with different diameters to the same power supply terminal. Otherwise, the cables may overheat due to loose wiring.

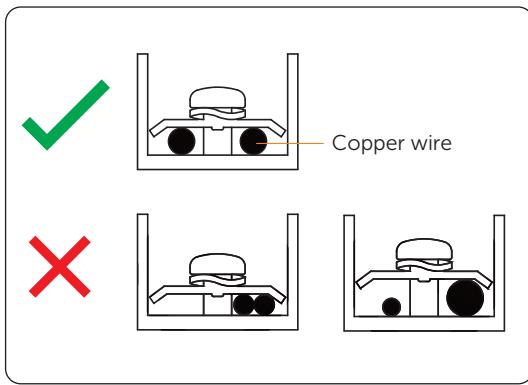


Figure 9-4 Proper power wiring connections

9.5.2 Instructions of Corrugated Pipe and Joint

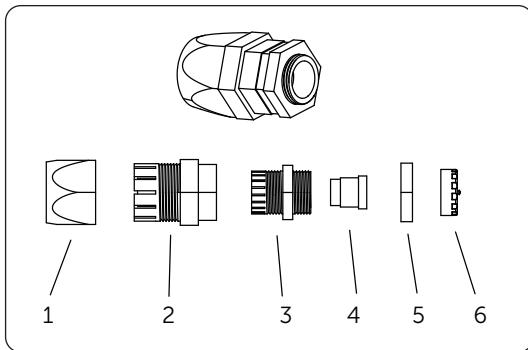


Figure 9-5 Exploded view of the joint

- Unscrew the dust cover (6), loosen the locking part (1), and then the corrugated pipe can be removed.
- Unscrew the cable locking parts (2) and (3), take out the rubber plug (4), and trim the rubber plug (4) according to the selected diameter of the power cable until the power cable can pass.
- Pass the power cable or communication cable through all the components and the corrugated pipe from one side in sequence. After the wiring is completed, first tighten (2) and (3) to fix the cable; then insert the corrugated pipe into (1) and (2), tighten (1) and (2) to fix the corrugated pipe.

9.5.3 Wiring of Main Power Supply

Step 1: Open the right plate and remove the joint cap at the hole ② of back plate (refer to ["9.2 Back Plate Layout for Wiring"](#)); remove the corrugated pipe on the side of the electrical box and straighten the corrugated pipe.

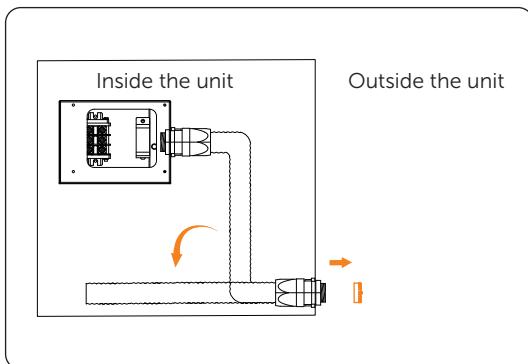


Figure 9-6 Removing the joint cap

Step 2: After the main power cable is threaded through the outside of the joint, return the corrugated pipe to its original position.

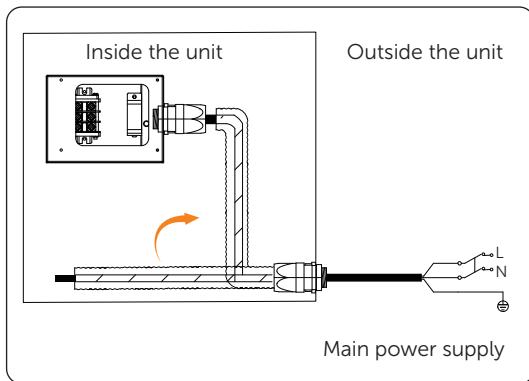


Figure 9-7 Returning the corrugated pipe to its original position

Step 3: After connecting the main power terminal block, insert the corrugated pipe into the joint and snap it securely.

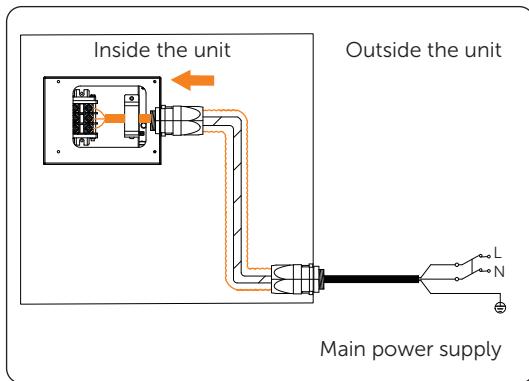


Figure 9-8 Inserting the corrugated pipe into the joint

9.5.4 Wiring of Communication Cable

Step 1: Open the right plate of the outdoor unit, and remove the joint cap at the hole ① of back plate (refer to ["9.2 Back Plate Layout for Wiring"](#)).

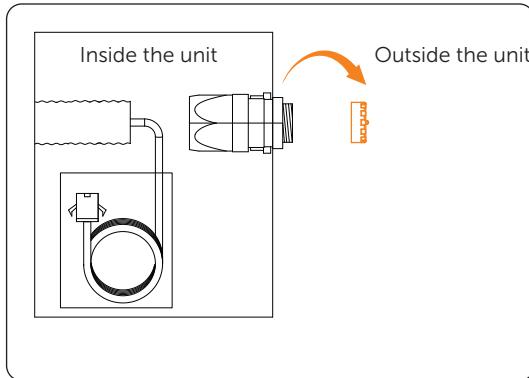


Figure 9-9 Removing the joint cap

Step 2: Cut the cable ties that bind the communication cable of the indoor unit and outdoor units. Route the communication cable (reserved inside the outdoor unit) outward from the inside of the unit through the joint.

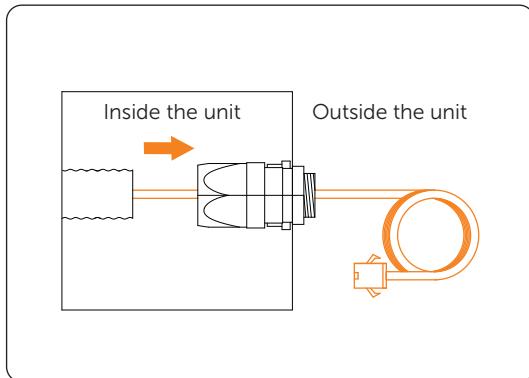


Figure 9-10 Routing the communication cable outward

Step 3: Plug the corrugated pipe into the joint and snap it securely.

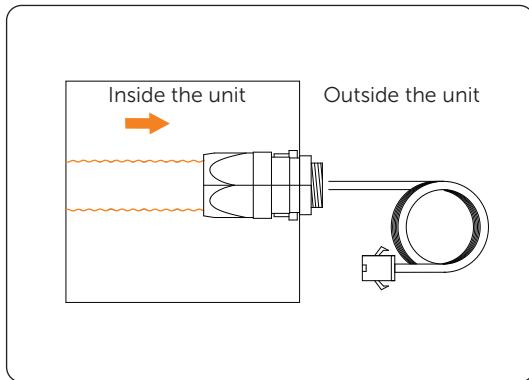


Figure 9-11 Plugging the corrugated pipe

9.6 Connecting Other Components

For details about connecting other components, please refer to the *Indoor Unit Installation Manual*.

10 Completion of Installation

Step 1: Cover the electrical box with the cover plate, and screw four screws to secure the cover plate of the electrical box.

Step 2: Snap the cover plate of the outdoor unit inwards and upwards, and screw four screws to secure the cover plate of the outdoor unit.

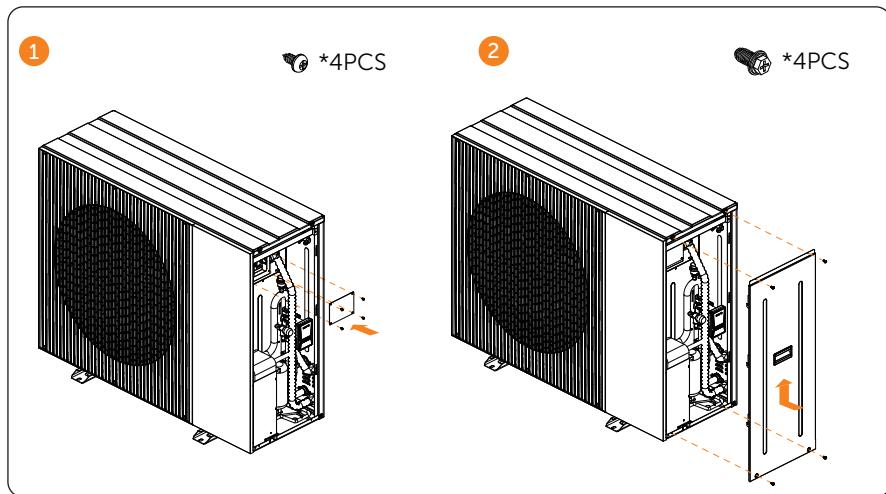


Figure 10-12 Completing the installation

11 Configuration

WARNING!

- The unit should be configured by an authorized installer to match the installation environment (outdoor climate, installed options,etc.) and meet the needs of users.

11.1 Checking before Configuration

Before powering on the unit, check the following items:

Item	YES	NO
Field wiring: Ensure all wiring connections follow the instructions mentioned in the installation manual.	<input type="checkbox"/>	<input type="checkbox"/>
Fuses, circuit breakers or protective devices: Check the size and type according to " 9.4 Electrical Wiring Guidelines ". Make sure no fuse or protective device has been bypassed.	<input type="checkbox"/>	<input type="checkbox"/>
Internal wiring: Check the wiring and connections inside the electrical box have no loose or damaged parts, including the ground wire.	<input type="checkbox"/>	<input type="checkbox"/>
Piping installation and insulation: Check that the unit and water system are installed correctly, and that the piping has insulation measures..	<input type="checkbox"/>	<input type="checkbox"/>
Integrity of the unit: Check that there is no visible damage to the internal components and piping of the outdoor unit.	<input type="checkbox"/>	<input type="checkbox"/>
Refrigerant leakage: Check that there is no refrigeration leakage inside the outdoor unit.	<input type="checkbox"/>	<input type="checkbox"/>
Power supply voltage: Check that the power supply voltage must be consistent with the voltage on the identification label of the machine.	<input type="checkbox"/>	<input type="checkbox"/>
Exhaust valve: Ensure the exhaust valve is open (at least 1 turn counterclockwise).	<input type="checkbox"/>	<input type="checkbox"/>
Sheet metal: Check that all sheet metal of the outdoor unit is installed correctly.	<input type="checkbox"/>	<input type="checkbox"/>
Water Flow: Ensure the amount of water in the system is within the corresponding limits of the unit.	<input type="checkbox"/>	<input type="checkbox"/>
Strainers: Ensure strainers are installed correctly and kept clean.	<input type="checkbox"/>	<input type="checkbox"/>

After powering on the unit, check the following items:

Item	YES	NO
If nothing is displayed on the wired controller: Check the following exceptions before diagnosing possible error codes. <ul style="list-style-type: none">• Wiring problems (power supply or communication signals)• Fuse failure on PCB	<input type="checkbox"/>	<input type="checkbox"/>
Empty the entire unit for test run: Check the water system and tank are filled with water, and air is removed.	<input type="checkbox"/>	<input type="checkbox"/>
If error code "1" is displayed on the wired controller: Check whether the wiring sequence of the three-phase live wire is right.	<input type="checkbox"/>	<input type="checkbox"/>
If error code "7" is displayed on the wired controller: Check whether the wiring of three-phase fire wire is connected correctly or whether the power supply is normal.	<input type="checkbox"/>	<input type="checkbox"/>
If error code "83" is displayed on the wired controller: Check whether the communication cable of the wired controller is well plugged in.	<input type="checkbox"/>	<input type="checkbox"/>
If error code "178" is displayed on the wired controller: Check the communication cable between the indoor unit and outdoor unit is correctly connected.	<input type="checkbox"/>	<input type="checkbox"/>

NOTICE!

- More error codes can be found in *Indoor Unit Installation Manual*.

11.2 Configuration on the Wired Controller

After the installation of the unit is completed, it is necessary to set some operating parameters of the unit before it can be used. These settings need to be completed through the operation of wired controller. For more detailed information, please refer to *Wired Controller Operating Manual*.

12 Commissioning

12.1 Checking 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	Explanation	Note
1	S3V2	Three-way valve 2	/
2	S3V3/S3Vmpb1	Three-way valve 3	/
3	S3Vmpb2	Three-way valve 4	/
4	PUMPo	PUMPo pump state	/
5	PUMPmb1	PUMPmb1 pump state	/
6	PUMPmb2	PUMPmb2 pump state	/
7	IBH1	IBH1 e-heating state	/
8	IBH2	IBH2 e-heating state	/
9	AHS	AHS state	/
10	S3V1	Three-way valve 1	Invisible if DHW is disabled
11	PUMPre	PUMPre pump state	Invisible if DHW is disabled
12	PUMPSl	PUMPSl pump state	Invisible if DHW is disabled
13	TBH	TBH e-heating state	Invisible if DHW is disabled

How

- 1 Go to "Set menu".
- 2 Find "Advanced setting" and enter the page.
- 3 Find "Manual test" and enter the page.
- 4 Select the actuator to activate or deactivate the actuator.
The status  means the actuator is activated, and  means the actuator is deactivated.

NOTICE!

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

12.2 Checking the System Empty

Why

To remove air from the water circulating system and reduce the impact on piping corrosion and unit performance.

How

- 1 Go to "Set menu".
- 2 Find "Advanced setting" and enter the page.
- 3 Select "System empty" and confirm it.

12.3 Checking the Unit

Why

Check whether the unit is in good working conditions.

What

- Circulation pump operation
- Cooling operation
- Heating operation
- DHW operation

How

- 1 Go to "Set menu".
- 2 Find "Advanced setting" and enter the page.
- 3 Select "Pump test" / "Cool test" / "Heat test" / "Hotwater test".
The unit will run according to the default parameters. During the test, you can select the exit button to return to the top layer.

NOTICE!

- During performance test, the target temperature is preset and cannot be changed.
- If the outdoor temperature is not within the operating temperature range, the unit may not operate or may not provide the required capacity. Operation of the unit in all modes needs to meet the operating temperature range requirements, otherwise the unit may not start or achieve the desired results.
- During circulation pump commissioning, if the flow rate exceeds the recommended range, please make reasonable changes to the installation to meet the recommended requirements, and ensure that the flow rate in the installation is met under all operating conditions of the unit.

12.4 Checking the Minimum Flow Rate

How

- 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.
- 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 test run for the pump, the unit can operate below the minimum flow rate required.

13 Hand-over to the User

- Ensure that the user understands all the operating procedures and marks the manual to locate relevant information quickly.
- Provide a detailed list of contact information, including technical support, customer service and emergency contact information, to ensure that the user can get help in a timely manner in case of any problems.
- Provide a thorough demonstration before the user operates the equipment to ensure that the user is able to perform basic operations independently.
- Instruct users on how to monitor the operating status of the equipment, including key indicators such as temperature and pressure.
- Emphasize the importance of regular inspection and maintenance to reduce the risk of unplanned downtime, and advise users to develop a maintenance plan.
- Remind users to be safe during operation and to follow all applicable safety regulations and standards.
- Ensure that users are satisfied with the functionality and performance of the entire system, and encourage them to contact technical support whenever they have any questions during operation.
- Explain to the user how to switch between the various modes and set up special functions. For details, please refer to *Wired Controller Operating Manual*.

14 Troubleshooting

This chapter provides guidance on some of the problems and solutions that may occur in the daily operation of the unit, which is convenient for users to check on their own or for professional maintenance personnel to carry out troubleshooting.

14.1 General Guidelines

NOTICE!

- Before dealing with any technical problems, first check that the unit's power connections are correct and that all external control switches are in the proper position, mark or record any obvious anomalies, and contact your local supplier promptly.

NOTICE!

- Make sure the unit's maintenance and inspection records are up to date, which will help to quickly identify and resolve problems.

14.2 Typical Problems

Problem 1: Unsatisfied with the cooling or heating effect of the unit during operation.

Possible cause	Solution
Improper target temperature	<ul style="list-style-type: none">• Check the setting temperature is appropriate.• Check the temperature collection point is set correctly. If there is any abnormality, modify it in time, please refer to <i>Wired Controller Operating Manual</i>.
Low water flow rate	<ul style="list-style-type: none">• Check the water pressure is normal, the pressure value should not less than 1.5 bar.• Check the water loop is not blocked, especially at the filter connections.
Insufficient system charge	<ul style="list-style-type: none">• Check the system water volume meet the recommended value (refer to "8.1 Preparations for Installation").• Check the value of water pressure meter is 2.0~2.5 bar.

Problem 2: There is abnormal noise from the circulation pump.

Possible cause	Solution
There is air in the water loop	<ul style="list-style-type: none"> Enable the System empty function for test run, please refer to "12.2 Checking the System Empty". Open the exhaust valve and fill the system with water until the pressure is 2.0~2.5 bar.
The pressure of pump inlet is low	<ul style="list-style-type: none"> Check the water pressure is not less than 1.5 bar. Check the expansion vessel and pressure gauge are working properly.

Problem 3: Water is discharged through the connection pipe of the pressure relief valve.

Possible cause	Solution
High water pressure in the water system	<ul style="list-style-type: none"> Open the pressure relief valve to drain the excess water. The recommended value of the pressure gauge is 2.0~2.5 bar.
Damaged pressure relief valve	<ul style="list-style-type: none"> Check the pressure relief valve is working properly, replace the pressure relief valve if necessary. Check the pressure relief valve connection piping for damage or improper installation.
High operating pressure	<ul style="list-style-type: none"> Check if the system is overloaded or the pressure is out of the normal working range. Ensure that the maximum working pressure of the equipment is not exceeded by adjusting the system pressure to a safe level.
Damaged expansion vessel	<ul style="list-style-type: none"> Check that the expansion vessel is working properly, if not, replace it.

Problem 4: DHW is not heated.

Possible cause	Solution
Damaged internal thermal element	<ul style="list-style-type: none"> Check the heating element for damage, if damaged, replace with a new element.
Mode disabled	<ul style="list-style-type: none"> Set the DHW mode via the wired controller and observe the display screen for the mode icon.
Tank heating protector activated	<ul style="list-style-type: none"> Switch on the DHW tank and press the reset button of the heating protector.

Problem 5: The unit has pressed the on button, but the compressor will not start.

Possible cause	Solution
Control panel failure	<ul style="list-style-type: none">Check that the control panel is working properly and that there are no error codes on the display. If there is an error code, please refer to the chapter of troubleshooting in <i>Indoor Unit Installation Manual</i>.
Compressor protector activated	<ul style="list-style-type: none">If the compressor protector has been activated due to an overload or short circuit, please reset the protector.
Compressor malfunction	<ul style="list-style-type: none">Check if the compressor motor winding is damaged, if the start capacitor has failed, or if the internal mechanical parts of the compressor are stuck or damaged.
Too low Water temperature, out of operating range	<ul style="list-style-type: none">In case of low water temperature, the system activates the backup heater to reach the minimum water temperature (12°C) first.Verify that the backup heater is properly powered.Verify that the thermal fuse for the backup heater is closed.Verify that the backup heater's thermal protector is not activated.Verify that the backup heater's contactor is not damaged.

Problem 6: The outdoor ambient temperature is too low and the heating capacity is insufficient.

Possible cause	Solution
Insufficient or leaking system refrigerant	<ul style="list-style-type: none">Perform a pressure test on the system to check that the amount of refrigerant charged is up to standard (refer to "17 Technical Data") and make necessary replenishment or repair leaks.
Exceeding the operating range of heating mode	<ul style="list-style-type: none">Turn on the TBH or IBH.Check whether IBH is enabled.Check whether the thermal protector of IBH is activated.Check whether TBH is running.Check that the IBH and TBH can not operate simultaneously.

Possible cause	Solution
Excessive heat pump capacity used for heating domestic hot water (applicable only to installations with a domestic hot water tank)	<p>When all of the following conditions are met, turn on the TBH:</p> <ul style="list-style-type: none">• Received the command to force on TBH.• There is a demand for hot water.• THWt hot water temp. < HOT_WATER_TEMP_SET -1°C <p>When any of the following conditions are met, turn off the TBH:</p> <ul style="list-style-type: none">• Received the command of shutdown.• THWt hot water temp. ≥ HOT_WATER_TEMP_SET

NOTICE!

- The above is only a list of common problems and solution guide, if you encounter more other faults, please contact the supplier or professional personnel to solve.

14.3 Error Codes

Each error code and its explanation can be found in *Indoor Unit Installation Manual*.

15 Maintenance

Regular inspections are required at certain intervals to ensure optimum unit performance.

15.1 Safety Precautions for Maintenance

DANGER!

- Risk of electrocution.

WARNING!

- Do not flush the unit directly with water, as this may cause damage to the electrical circuits or even electric shock or fire.
- When disassembling the unit for maintenance operations, it must be guarded during the period until the maintenance work is completed.
- Use insulated tools and equipment to avoid direct contact of metal tools with live parts.
- Ensure that the work area is dry and avoid performing electrical maintenance in a wet environment.

NOTICE!

- Touch the metal parts of the unit before performing any maintenance or repair work to eliminate static electricity and protect the PCB.
- Periodic maintenance is required to prevent serious performance degradation of the unit as well as to increase the risk of abnormal operation of parts.
- When replacing or inspecting electrical parts, it should be performed by a professional and follow the appropriate safety procedures.
- During maintenance, the operator should wear appropriate protective equipment such as insulated gloves and safety shoes.
- During maintenance, safety warning signs should be checked periodically to ensure that they are clearly visible and that all operators are aware of them.
- After completing maintenance, a thorough inspection should be carried out to ensure that all parts are correctly installed, not loose or damaged, and to reconfirm that the equipment is in power-off state.

15.2 Maintenance Routines

By user

Items	Check notes	Maintenance interval
General	Clean around the outdoor unit	Once a month

By installer

Items	Check notes	Maintenance interval
General	Check if all the parts are in the proper position	Once a year
Outdoor unit	Clean dust on the finned heat exchanger of the outdoor unit	Once every three months
	Clean dust from fan blades	Once every three months
	Check if the water pressure is sufficient	Once a year
	Check that the water quality meets the requirements (Be careful if antifreeze is added)	Once a year
	Check for leaks in the water loop	Once a year
	Check for air inside the water loop system	Once a year
	Check that the flow switch is working properly	Once a year
Water loop	Check that the backup heater is well insulated (If installed)	Once a year
	Clean the filter connected in the water loop and wash out the dirt	Once a year
	Check that the water pressure reducing valve in the DHW water loop is working properly	Once a year
	Check that the booster heater in the DHW water tank is clean and in good condition	Once a year
	Check that all sensors (temperature sensors, pressure sensors, etc.) are working properly.	Once a year
Wiring and electrical parts	Check that all installation wiring and cables are intact	Once a year
	Check contactors and circuit breakers for proper operation	Once a year
	Check all terminals for good contact	Once a year

Items	Check notes	Maintenance interval
Refrigerant loop	Check if there is refrigerant leakage in the refrigerant loop	Once a year

NOTICE!

- Before starting a service on a system containing flammable refrigerants, a safety check must be carried out to minimise the risk of ignition.
- After all checks have been completed and the problem has been solved, the equipment must be restored to its original condition to ensure that it can operate properly.
- The above is only a list of the more important checks, please contact your local dealer for more information.

16 Disposal

WARNING!

- All parts and accessories of the unit are different from normal household waste. The unit, compressor, motor, etc. should only be disposed of by qualified professionals.

WARNING!

- The unit uses R290 refrigerant, only carry out the removal, evacuation and recovery of refrigerant by the operators who have specialized refrigeration knowledge and are able for handle R290 refrigerant.

Package handling

Dispose of all packaging properly.

Comply with all relevant regulations.

Removal and evacuation of refrigerant

It is important to follow the best practice since flammability should be considered. Follow the procedures below:

Step 1: Remove the refrigerant, and put it in correct recovery cylinders.

Step 2: Purge the circuit with inert gas (such as oxygen free nitrogen (OFN)) until the system reaches the working pressure;

NOTICE!

- Compressed air or oxygen should not be used.

Step 3: Pump the system, and recover the system to a vacuum.

NOTICE!

- Ensure that the outlet of the vacuum pump is not closed to any ignition sources and adequate ventilation is available.

Step 4: Repeat Step 2 and Step 3 several times until no refrigerant exists in the system.

NOTICE!

- Upon the final OFN charge, the system should be vented down to reach the atmospheric pressure to start the work.

Recovery

Preparation before recovery

- Wear protective equipment (including gloves, goggles, protective clothing) when recovering.
- Check that the equipment is in good condition and that containers are certified, well sealed, and clearly labelled.
- Prepare R290-specific recycled cylinders that meet local standards and ensure that the remaining volume of the cylinder before filling is $\geq 20\%$ (to avoid the risk of thermal expansion).
- Check connected hoses for no cracks or deterioration.
- Check that the operating area is well ventilated without any flammable and hazardous materials.
- Turn off the heat pump and make sure the system is off.
- Verify system pressure is within safe limits.
- Prepare emergency equipment: fire extinguishers, leak treatment tools (such as absorbent).
- Prepare recovery record sheet for recording information (such as refrigerant type, amount recovered, time).

Procedures for recovering

NOTICE!

- Operators should hold relevant certificates or local refrigerant handling qualifications, and ensure that they meet the requirements of operation as specified locally.

Step 1: Connect the hoses from the recovery device to the heat pump. Make sure the connections are tight to prevent leakage.

Step 2: Power on the recovery device and start the unit. Set the recycling mode.

Step 3: Slowly open the valve of the heat pump to start recovering the refrigerant.

Step 4: Monitor the pressure, temperature and refrigerant flow of the recovery device in real time. When the system pressure drops to a safe level and the recovery is complete, close valves and power off the recovery device.

Step 5: Slowly loosen the hose connecting the recovery device to the heat pump. Check hoses and connections to ensure no residual refrigerant.

Step 6: Store the recovered refrigerant in special containers, ensuring that they are sealed and clearly labelled with the type of refrigerant and the date of recovery.

Step 7: Clean up the operating area and check for leaks or residue. Dispose of waste properly (such as damaged hoses).

Step 8: Fill out the recovery record sheet. If required, submit recycling reports to the relevant authorities.

17 Technical Data

17.1 General

3-phase

Model		STU3-C08R290	STU3-C10R290	STU3-C12R290	STU3-C14R290	STU3-C16R290
Power supply		380-415 V 3N~ 50 Hz				
Heating (A:7/6°C W: 30/35°C)	Capacity [kW]	8.50	10.00	12.50	14.00	15.50
	COP	5.15	4.95	4.90	4.75	4.55
Heating (A:7/6°C W: 47/55°C)	Capacity [kW]	8.00	10.00	12.00	14.00	16.00
	COP	3.45	3.25	3.25	3.15	3.10
Cooling (A:35°C W: 23/18°C)	Capacity [kW]	8.50	10.00	12.00	14.00	15.50
	EER	5.20	4.70	4.70	4.50	4.35
Cooling (A:35°C W: 12/7°C)	Capacity [kW]	8.00	9.00	12.00	13.00	14.00
	EER	3.40	3.20	3.10	3.05	2.75
Seasonal space heating energy efficiency class	LWT at 35°C			A+++		
	LWT at 55°C			A+++		
SCOP	LWT at 35°C	5.44	5.30	5.07	4.95	4.90
	LWT at 55°C	4.16	4.11	3.89	3.84	3.84
Electric heat power input				9 kW		
Compressor	Type			Rotary DC inverter		
Outdoor fan	Motor type			Brushless DC motor		
	Number of fans			1		
Throttle type				Electronic expansion valve		
Air side heat exchanger	Type			Finned tube		
Water side heat exchanger	Type			Plate type		
Refrigerant	Type/GWP			R290/3		
	Factory charge [g]	1200	1200	1500	1500	1500
Sound level [dB(A)]		49	49	51	52	52

Technical Data

Model	STU3-C08R290	STU3-C10R290	STU3-C12R290	STU3-C14R290	STU3-C16R290
Net dimensions (WxHxD) [mm]	1310 x 1050 x 465				
Net weight [kg]	151	151	165	165	165
Piping connection	G1-1/4"				
	Heating	-25°C ~ 35°C			
Operation range	Cooling	5°C ~ 48°C			
	DHW	-25°C ~ 46°C			
Water outlet	5°C ~ 80°C				

1-phase

Model	STU1-C08R290	STU1-C10R290	STU1-C12R290	STU1-C14R290	STU1-C16R290	
Power supply	220-240 V 1N~ 50 Hz					
Heating (A:7/6°C W: 30/35°C)	Capacity [kW]	8.50	10.00	12.50	14.00	15.50
	COP	5.15	4.95	4.90	4.75	4.55
Heating (A:7/6°C W: 47/55°C)	Capacity [kW]	8.00	10.00	12.00	14.00	16.00
	COP	3.45	3.25	3.25	3.15	3.10
Cooling (A:35°C W: 23/18°C)	Capacity [kW]	8.50	10.00	12.00	14.00	15.50
	EER	5.20	4.70	4.70	4.50	4.35
Cooling (A:35°C W: 12/7°C)	Capacity [kW]	8.00	9.00	12.00	13.00	14.00
	EER	3.40	3.20	3.10	3.05	2.75
Seasonal space heating energy efficiency class	LWT at 35°C	A+++				
	LWT at 55°C	A+++				
SCOP	LWT at 35°C	5.44	5.30	5.07	4.95	4.90
	LWT at 55°C	4.16	4.11	3.89	3.84	3.84
Electric heat power input	9 kW					
Compressor	Type	Rotary DC inverter				
Outdoor fan	Motor type	Brushless DC motor				
	Number of fans	1				
Throttle type	Electronic expansion valve					
Air side heat exchanger	Type	Finned tube				

Model	STU1-C08R290	STU1-C10R290	STU1-C12R290	STU1-C14R290	STU1-C16R290
Water side heat exchanger	Type				Plate type
Refrigerant	Type/GWP				R290/3
	Factory charge [g]	1200	1200	150	1500
Sound level [dB(A)]	49				51
Net dimensions (WxHxD) [mm]	1310 x 1050 x 465				
Net weight [kg]	140	140	154	154	154
Piping connection	G1-1/4"				
Operation range	Heating	-25°C ~ 35°C			
	Cooling	5°C ~ 48°C			
	DHW	-25°C ~ 46°C			
Water outlet	5°C ~ 80°C				

17.2 Piping Diagram

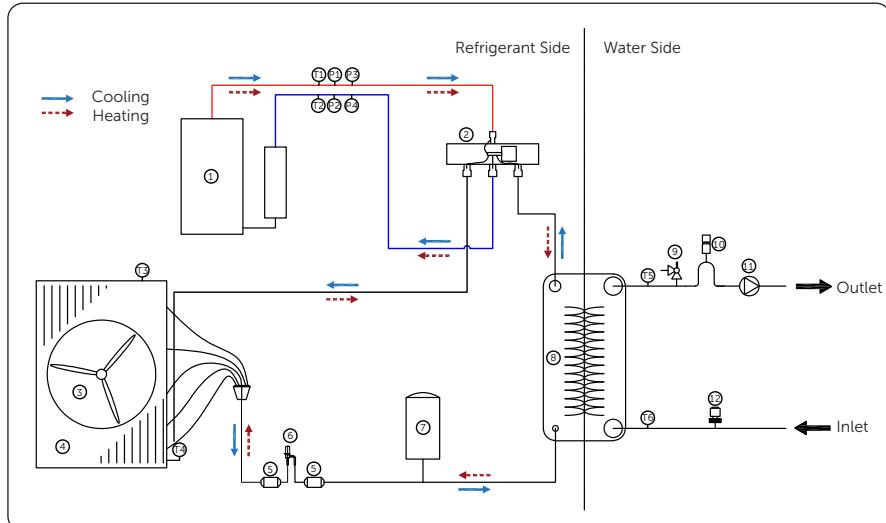


Figure 17-13 System diagram

Technical Data

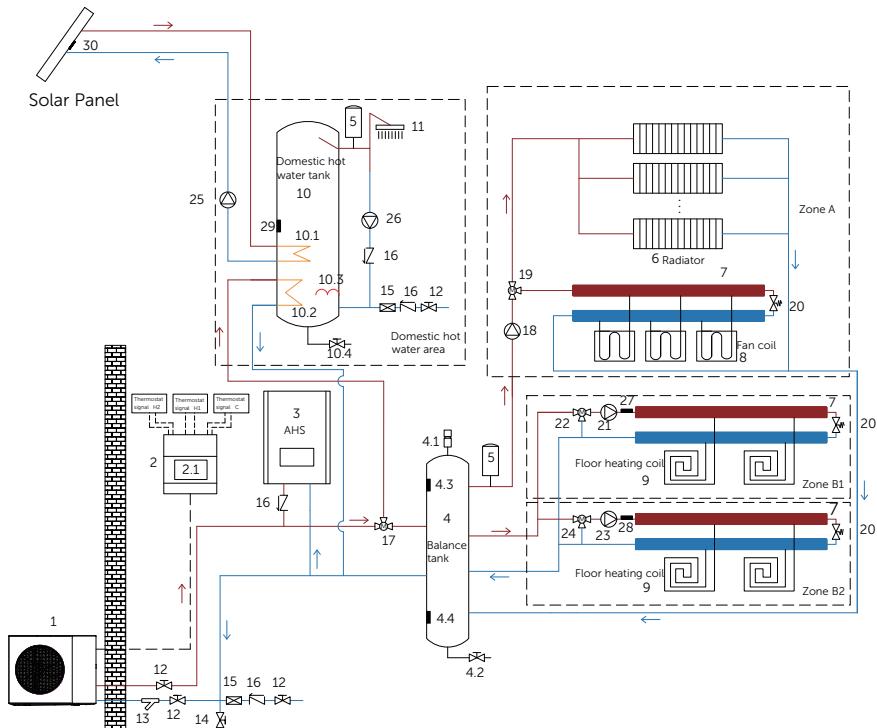
Item	Description	Item	Description
1	Compressor	12	Flow switch
2	Four-way switching valve	T1	Temperature sensor (TD: Compressor discharge)
3	Fan	T2	Temperature sensor (TS: Compressor suction)
4	Heat exchanger	T3	Temperature sensor (Outdoor air)
5	Filter	T4	Temperature sensor (Heat exchanger temperature)
6	Electronic expansion valve	T5	Temperature sensor (Tw_out: Outlet water)
7	Fluid reservoir	T6	Temperature sensor (Tw_in: Inlet water)
8	Plate heat exchanger	P1	High pressure switch
9	Pressure relief valve	P2	Low pressure switch
10	Exhaust valve	P3	High pressure sensor
11	Water pump	P4	Low pressure sensor

18 Typical Applications

The following settings can be made on the wired controller:

- Single-zone water temperature + hot water
- Single-zone room temperature + hot water
- Two-zone water temperature + hot water
- Two-zone water temperature + room temperature + hot water
- Three-zone water temperature + hot water

18.1 Control Module + AHS



Typical Applications

Item	Name	Item	Name
1	Outdoor unit	12	Shut-off valve (Field supply)
2	Indoor unit: Control unit	13	Y-type strainer
2.1	Wired controller	14	Drain valve (Field supply)
3	AHS: Additional heat source (Field supply)	15	Filter (Field supply)
4	Balance tank (Field supply)	16	Check valve (Field supply)
4.1	Exhaust valve (Field supply)	17	S3V1: 3-way valve (Field supply)
4.2	Drain valve (Field supply)	18	PUMPo: Outside circulator pump (Field supply)
4.3	TACt1: Balance tank upper temperature sensor (Field supply)	19	S3V2: 3-way valve (Field supply)
4.4	TACt2: Balance tank lower temperature sensor (Field supply)	20	Bypass valve (Field supply)
5	Expansion vessel (Field supply)	21	PUMPmb1: Zone B1 circulation pump (Field supply)
6	Radiator (Field supply)	22	S3V3/S3Vmpb1: Mixing valve (Field supply)
7	Collector/separator (Field supply)	23	PUMPmb2: Zone B2 circulation pump (Field supply)
8	Fan coil (Field supply)	24	S3Vmpb2: Mixing valve (Field supply)
9	Floor heating loop (Field supply)	25	PUMPs1: Solar pump (Field supply)
10	Domestic hot water tank (Field supply)	26	PUMPre1: Lower return water pump (Field supply)
10.1	Coil 1, heat exchanger for heat pump (Field supply)	27	TMb1: Zone B1 water flow temperature sensor (optional)
10.2	Coil 2, heat exchanger for solar energy (Field supply)	28	TMb2: Zone B2 water flow temperature sensor (optional)
10.3	TBH: Domestic hot water tank booster heater (Field supply)	29	THWt: Temperature sensor of domestic water tank (Field supply)
10.4	Drain valve (Field supply)	30	TSL_SENSOR: Solar temperature sensor (Field supply)
11	Hot water tap (Field supply)		

Space heating

The ON/OFF signal, operation mode, and temperature are set on the wired controller. When PUMPo keeps running and S3V1 remains OFF, the unit can turn on the heating mode.

Domestic hot water

The ON/OFF signal and target tank water temperature (AI6B) are set on the wired controller. When PUMPo stops running and S3V1 remains ON, the unit can turn on the hot water mode.

AHS control

When the unit is in heating mode:

- When all the following conditions are met, turn on the AHS:
 - » Received the command to force on AHS.
 - » External heat source control temperature < FM target temperature -2°C
- When any of the following conditions are met, turn off the AHS:
 - » Received the shutdown command.
 - » External heat source control temperature \geq FM target temperature + adjustable unloading deviation

When the unit is in hot water mode:

- When all the following conditions are met, turn on the AHS:
 - » Received the command to force on AHS.
 - » **THWt hot water temp. < HOT_WATER_TEMP_SET -1°C**
- When any of the following conditions are met, turn off the AHS:
 - » Received the shutdown command.
 - » **THWt hot water temp. \geq HOT_WATER_TEMP_SET**

TBH control

- When all the following conditions are met, turn on the TBH:
 - » Received the command to force on TBH.
 - » Received the command of hot water.
 - » **THWt hot water temp. < HOT_WATER_TEMP_SET -1°C**
- When any of the following conditions are met, turn off the TBH:
 - » Received the shutdown command.
 - » **THWt hot water temp. \geq HOT_WATER_TEMP_SET**

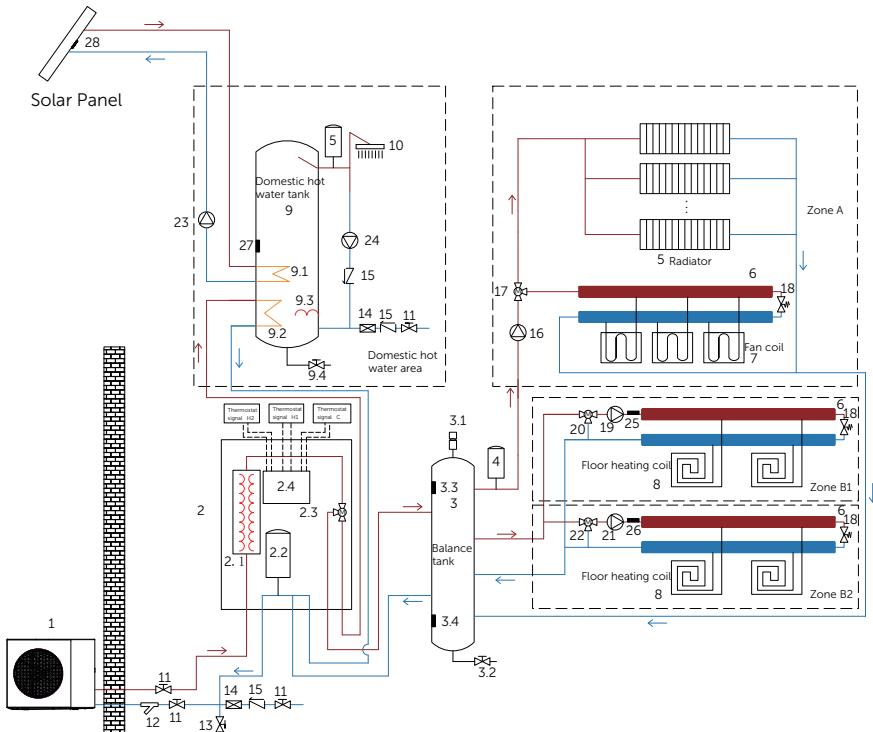
Solar control

Premise: **SOLAR** is set to "Use" and **HOT_WATER** is set to "Use".

- When **TSL_SENSOR** is set to "Disabled":
 - » When the solar signal is detected and **THWt hot water temp. < HOT_WATER_TEMP_SET** - return difference, turn on **PUMPsI**.

- » When the solar signal is disconnected or **THWt hot water temp. = HOT_WATER_TEMP_SET**, turn off **PUMPsl**.
- When **TSL_SENSOR** is set to "Use":
 - » When **TSL solar temp.** reaches the allowable opening temperature and **THWt hot water temp. < HOT_WATER_TEMP_SET** - return difference and **TSL solar temp. > THWt hot water temp. +1°C**, turn on **PUMPsl**.
 - » When **TSL solar temp. < the opening temperature** - return difference or **THWt hot water temp. = HOT_WATER_TEMP_SET** or **TSL solar temp. < THWt hot water temp.**, turn off **PUMPsl**.

18.2 Hydraulic Module



Item	Name	Item	Name
1	Outdoor unit	9.4	Drain valve (Field supply)
2	Indoor unit: Hydraulic unit	10	Hot water tap (Field supply)
2.1	Auxiliary electric heating 1	11	Shut-off valve (Field supply)
2.2	Expansion vessel	12	Y-type strainer
2.3	SV1: 3-way valve	13	Drain valve (Field supply)
2.4	Wired controller	14	Filter (Field supply)
3	Balance tank (Field supply)	15	Check valve (Field supply)
3.1	Exhaust valve (Field supply)	16	PUMPo: Outside circulator pump (Field supply)
3.2	Drain valve (Field supply)	17	S3V2: 3-way valve (Field supply)
3.3	TACt1: Balance tank upper temperature sensor (Field supply)	18	Bypass valve (Field supply)
3.4	TACt2: Balance tank lower temperature sensor (Field supply)	19	PUMPmb1: Zone B1 circulation pump (Field supply)
4	Expansion vessel (Field supply)	20	S3V3/S3Vmpb1: Mixing valve (Field supply)
5	Radiator (Field supply)	21	PUMPmb2: Zone B2 circulation pump (Field supply)
6	Collector/separator (Field supply)	22	S3Vmpb2: Mixing valve (Field supply)
7	Fan coil (Field supply)	23	PUMPs1: Solar pump (Field supply)
8	Floor heating loop (Field supply)	24	PUMPre1: Lower return water pump (Field supply)
9	Domestic hot water tank (Field supply)	25	TMb1: Zone B1 water flow temperature sensor (optional)
9.1	Coil 1, heat exchanger for heat pump (Field supply)	26	TMb2: Zone B2 water flow temperature sensor (optional)
9.2	Coil 2, heat exchanger for solar energy (Field supply)	27	THWt: Temperature sensor of domestic water tank (Field supply)
9.3	TBH: Domestic hot water tank booster heater (Field supply)	28	TSL_SENSOR: Solar temperature sensor (Field supply)

Heating mode

The general control logic of the unit is the same as the single zone control. S3Vmpb2 and PUMPmb2 operate when zone B2 is on. Zone B2 cannot be in cooling operation.

The domestic water tank, AHS, TBH and solar control can be connected. The control method is the same as described in the above section.

Control through wired controller and room thermostat (RT)

Space heating or cooling control is available through the room thermostat. It can be controlled through the mode setting on the wired controller, single zone control, two zone control or three zone control.

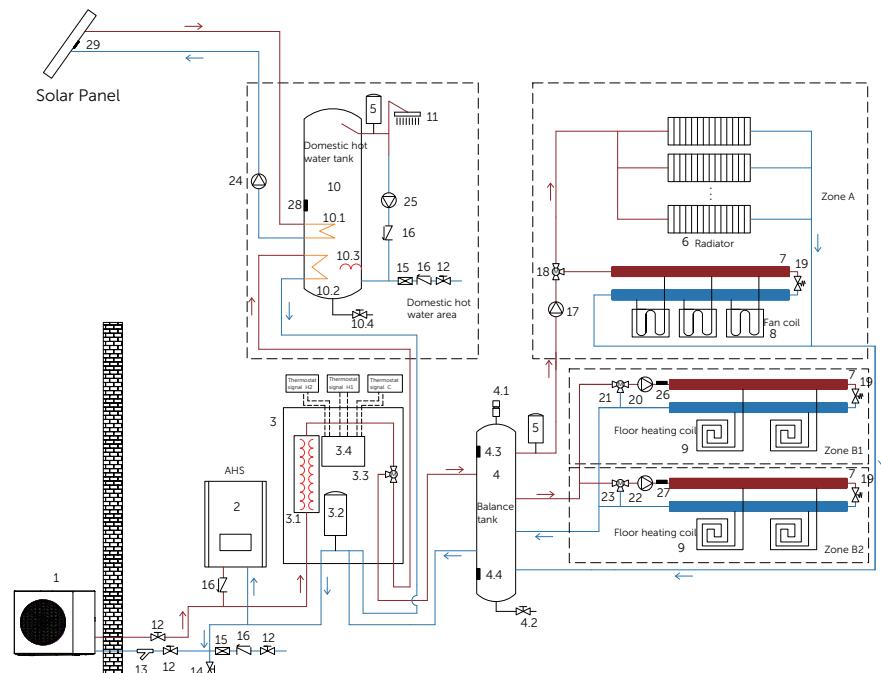
When **RT_CTRL** is set to "**ZoneA.Mode.SW** (Single zone mode switch)":

- When C signal is closed, zone A turns on the cooling mode.
- When C signal is disconnected and H signal is closed, zone A turns on the heating mode.
- When both C signal and H signal are disconnected, zone A turns off the RT control function.

When **RT_CTRL** is set to "**ZONE.A.SWITCH** (Single zone switch)":

- When C signal is closed, zone A turns on the RT control function.
- When C signal is disconnected, zone A turns off the RT control function.

18.3 Hydraulic Module + AHS



Item	Name	Item	Name
1	Outdoor unit	10.4	Drain valve (Field supply)
2	AHS: Additional heat source (Field supply)	11	Hot water tap (Field supply)
3	Indoor unit: Hydraulic unit	12	Shut-off valve (Field supply)
3.1	Auxiliary electric heating 1	13	Y-type strainer
3.2	Expansion vessel	14	Drain valve (Field supply)
3.3	SV1: 3-way valve	15	Filter (Field supply)
3.4	Wired controller	16	Check valve (Field supply)
4	Balance tank (Field supply)	17	PUMPo: Outside circulator pump (Field supply)
4.1	Exhaust valve (Field supply)	18	S3V2: 3-way valve (Field supply)
4.2	Drain valve (Field supply)	19	Bypass valve (Field supply)
4.3	TACt1: Balance tank upper temperature sensor (Field supply)	20	PUMPmb1: Zone B1 circulation pump (Field supply)
4.4	TACt2: Balance tank lower temperature sensor (Field supply)	21	S3V3/S3Vmfpb1: Mixing valve (Field supply)
5	Expansion vessel (Field supply)	22	PUMPmb2: Zone B2 circulation pump (Field supply)
6	Radiator (Field supply)	23	S3Vmfpb2: Mixing valve (Field supply)
7	Collector/separator (Field supply)	24	PUMPs1: Solar pump (Field supply)
8	Fan coil (Field supply)	25	PUMPr1: Lower return water pump (Field supply)
9	Floor heating loop (Field supply)	26	TMb1: Zone B1 water flow temperature sensor (optional)
10	Domestic hot water tank (Field supply)	27	TMb2: Zone B2 water flow temperature sensor (optional)
10.1	Coil 1, heat exchanger for heat pump (Field supply)	28	THWt: Temperature sensor of domestic water tank (Field supply)
10.2	Coil 2, heat exchanger for solar energy (Field supply)	29	TSL_SENSOR: Solar temperature sensor (Field supply)
10.3	TBH: Domestic hot water tank booster heater (Field supply)		

Space heating

The cooling or heating mode is set via the room thermostat and the water temperature is set on the wired controller.

- 1) When C signal is closed, zone A turns on the cooling mode and the system will be set to operate in cooling mode.
- 2) When C signal is disconnected and H signal is closed, the system will be set to the heating mode.

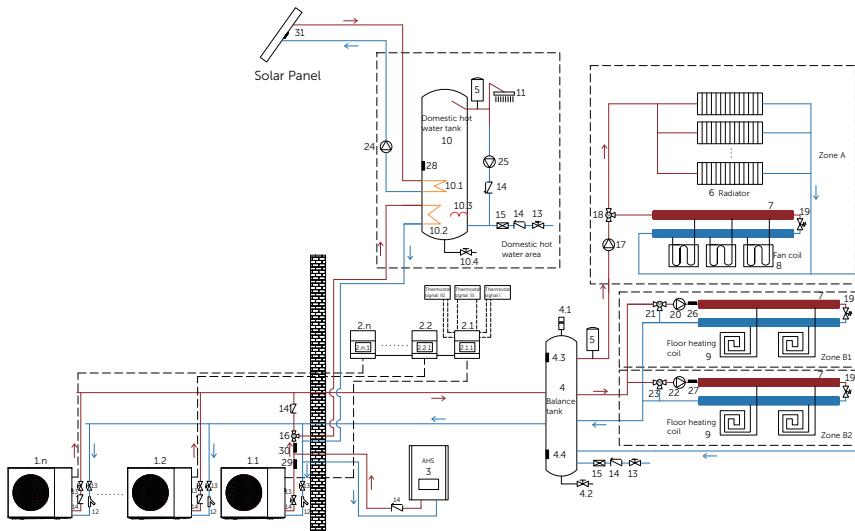
Circulation pump operation

1) When the system is in cooling mode, this means that thermostat "C" is closed, S3V1 remains closed, and PUMPo starts.

2) When the system is in heating mode, this means that "C" is disconnected and "H" is closed, S3V1 remains closed and PUMPo starts.

The domestic water tank, AHS, TBH and solar control can be connected. The control method is the same as described in the above section.

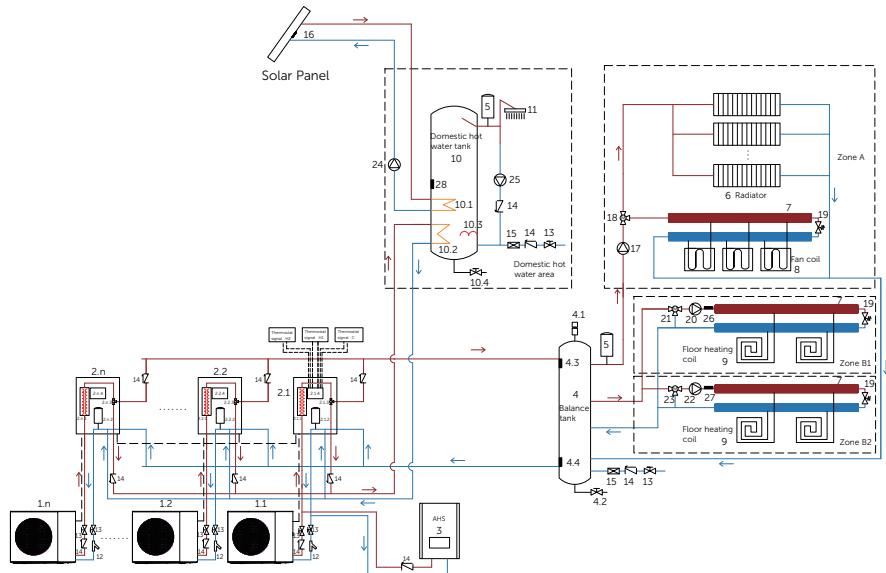
18.4 Cascade Mode (Control Module + AHS)



Item	Name	Item	Name
1.1	Master unit	11	Hot water tap (Field supply)
1.2...n	Slave unit	12	Y-type strainer (accessory)

Item	Name	Item	Name
2.1	Indoor unit: Master controller module	13	Shut-off valve (Field supply)
2.2...n	Indoor unit: Slave controller module	14	Check valve (Field supply)
2.1.1	Master wired controller	15	Filter (Field supply)
2.2(n).1	Slave wired controller	16	S3V1: 3-way valve (Field supply)
3	AHS: Additional heat source (Field supply)	17	PUMPo: Outside circulator pump (Field supply)
4	Balance tank (Field supply)	18	S3V2: 3-way valve (Field supply)
4.1	Exhaust valve (Field supply)	19	Bypass valve (Field supply)
4.2	Drain valve (Field supply)	20	PUMPmb1: Zone B1 circulation pump (Field supply)
4.3	TACt1: Balance tank upper temperature sensor (Field supply)	21	S3V3/S3Vmpb1: Mixing valve (Field supply)
4.4	TACt2: Balance tank lower temperature sensor (Field supply)	22	PUMPmb2: Zone B2 circulation pump (Field supply)
5	Expansion vessel (Field supply)	23	S3Vmpb2: Mixing valve (Field supply)
6	Radiator (Field supply)	24	PUMPs1: Solar pump (Field supply)
7	Collector/separator (Field supply)	25	PUMPr1: Lower return water pump (Field supply)
8	Fan coil (Field supply)	26	TMb1: Zone B1 water flow temperature sensor (optional)
9	Floor heating loop (Field supply)	27	TMb2: Zone B2 water flow temperature sensor (optional)
10	Domestic hot water tank (Field supply)	28	THWt: Temperature sensor of domestic water tank (Field supply)
10.1	Coil 1, heat exchanger for heat pump (Field supply)	29	TWout2: Total water flow temperature sensor (optional)
10.2	Coil 2, heat exchanger for solar energy (Field supply)	30	TWout3: System total water flow temperature sensor (optional)
10.3	TBH: Domestic hot water tank booster heater (Field supply)	31	TSL_SENSOR: Solar temperature sensor (Field supply)
10.4	Drain valve (Field supply)		

18.5 Cascade Mode (Hydraulic Module + AHS)



Item	Name	Item	Name
1.1	Master unit	10.3	TBH: Domestic hot water tank booster heater (Field supply)
1.2...n	Slave unit	10.4	Drain valve (Field supply)
2.1	Indoor unit: Water module	11	Hot water tap (Field supply)
2.2...n	Indoor unit: Slave water module	12	Y-type strainer (accessory)
2.1(n).1	IBH: Internal backup heater	13	Shut-off valve (Field supply)
2.1(n).2	Expansion vessel (Field supply)	14	Check valve (Field supply)
2.1(n).3	S3V1: 3-way valve (Field supply)	15	Filter (Field supply)
2.1.4	Master wired controller	16	TSL_SENSOR: Solar temperature sensor (Field supply)
2.2(n).4	Slave wired controller	17	PUMPo: Outside circulator pump (Field supply)
3	AHS: Additional heat source (Field supply)	18	S3V2: 3-way valve (Field supply)
4	Balance tank (Field supply)	19	Bypass valve (Field supply)

Item	Name	Item	Name
4.1	Exhaust valve (Field supply)	20	PUMPPmb1: Zone B1 circulation pump (Field supply)
4.2	Drain valve (Field supply)	21	S3V3/S3Vmpb1: Mixing valve (Field supply)
4.3	TACt1: Balance tank upper temperature sensor (Field supply)	22	PUMPPmb2: Zone B2 circulation pump (Field supply)
4.4	TACt2: Balance tank lower temperature sensor (Field supply)	23	S3Vmpb2: Mixing valve(Field supply)
5	Expansion vessel (Field supply)	24	PUMPSl: Solar pump (Field supply)
6	Radiator (Field supply)	25	PUMPREt: Lower return water pump (Field supply)
7	Collector/separator (Field supply)	26	TMb1: Zone B1 water flow temperature sensor (optional)
8	Fan coil (Field supply)	27	TMb2: Zone B2 water flow temperature sensor (optional)
9	Floor heating loop (Field supply)	28	THWt: Temperature sensor of domestic water tank (Field supply)
10	Domestic hot water tank (Field supply)		
10.1	Coil 1, heat exchanger for heat pump (Field supply)		
10.2	Coil 2, heat exchanger for solar energy (Field supply)		

Module number setting

- Cascade wiring: refer to the "cascade" interface in the electrical connection diagram. In the power-off state, connect the cascade A1 and B1 communication cables of each module, i.e. 1 and A1 of each module, B1 connect modules one by one with B1 in sequence.
- Address dialing code: as shown in the electrical connection diagram, set the address of each module in the power-off state. Address 0 is the main module, address 1 is submodule 1, and so on. And the display screen and network monitoring only need to be connected to the main module.
- Parameter setting: when multiple modules are cascaded, the number of modules should be set to the corresponding number, and each module can be set to enable or disable. After changing the parameters on the main module, it will be automatically broadcasted to the sub modules.

19 Appendix

19.1 Terms and Abbreviation

Terms	Explanation
AI4	Solar temperature sensor
AI5C	Total outlet water temperature sensor
AI6A	Total system outlet temperature sensor
AI6B	Domestic hot water tank temperature sensor
AI6C	Underfloor heating inlet water temperature sensor
SL1	Solar signal
SL2	
P_O (PUMPo)	Outside circulator pump
P_M2 (PUMPmb2)	2# Mixing water pump
P_M1 (PUMPmb1)	1# Mixing water pump
P_S (PUMPSl)	Solar pump
IBH1	1# Internal backup heater
IBH2	2# Internal backup heater
TBH	Tank booster heater
2OFF	2# 3-way valve (Heating direction)
2ON	2# 3-way valve (Cooling direction)
3OFF	3# 3-way valve (Zone B1 open circulation)
3ON	3# 3-way valve (Zone B1 close circulation)
1OFF	1# 3-way valve (DHW direction)
1ON	1# 3-way valve (H&C direction)
4OFF	4# 3-way valve (Zone B2 open circulation)
4ON	4# 3-way valve (Zone B2 close circulation)
HT	Anti-freeze electric heater belts
P_R (PUMPre)	Lower return water pump
PUMPf	Variable frequency pump

Terms	Explanation
DFR1	Defrost indication
DFR2	
ERR1	Fault indication
ERR2	
AHS1	Additional heat source
AHS2	
MRV1	1# Mixing ratio valve
MRV2	2# Mixing ratio valve
DI2	Remote switch
C	Thermostat signal C
H2	Thermostat signal H2
H1	Thermostat signal H1
G/GND	Grounding
SG	Smart grid (SG)
EVU	Smart grid (EVU)
MR	Magnet ring
Short	Short wiring

19.2 Service Record

SERVICE 01	Date:	SERVICE 02	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No.:		Telephone No.:	
Operative ID No.:		Operative ID No.:	
Comments:		Comments:	
SERVICE 03	Date:	SERVICE 04	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No.:		Telephone No.:	
Operative ID No.:		Operative ID No.:	
Comments:		Comments:	
SERVICE 05	Date:	SERVICE 06	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No.:		Telephone No.:	
Operative ID No.:		Operative ID No.:	
Comments:		Comments:	
SERVICE 07	Date:	SERVICE 08	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No.:		Telephone No.:	
Operative ID No.:		Operative ID No.:	
Comments:		Comments:	

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Warranty Registration

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