Installation

and Commissioning Manual

R290 Monoblock

Air to Water Heat Pump

Capacity	Models
4kw	ACHP-H04/4R2HA-M ACHP-H04/4R2HA-M(NE)
6kw	ACHP-H06/4R2HA-M ACHP-H06/4R2HA-M(NE)
8kw	ACHP-H08/4R2HA-M ACHP-H08/5R2HA-M ACHP-H08/4R2HA-M(NE)
10kw	ACHP-H10/4R2HA-M ACHP-H10/5R2HA-M ACHP-H10/4R2HA-M(NE)
12kw	ACHP-H12/4R2HA-M ACHP-H12/5R2HA-M ACHP-H12/4R2HA-M(NE) ACHP-H12/5R2HA-M(NE)
14kw	ACHP-H14/4R2HA-M ACHP-H14/5R2HA-M ACHP-H14/4R2HA-M(NE) ACHP-H14/5R2HA-M(NE)
16kw	ACHP-H16/4R2HA-M ACHP-H16/5R2HA-M ACHP-H16/4R2HA-M(NE) ACHP-H16/5R2HA-M(NE)

Version 2

2024-07-01

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Part1 SAFETY PRECAUTIONS

The precautions listed here are divided into the following types. They are quite important, so be sure to follow them carefully.

INFORMATION

Read these instructions carefully before installation. Keep this manual in a handy for future reference. Improper installation of equipment or accessories may result in electric shock, short-circuit, leakage, fire or other damage to the equipment.

- Be sure to only use accessories made by the supplier, which are specifically designed for the equipment and make sure to get installation done by a professional.
- All the activities described in this manual must be carried out by a licensed technician. Be sure to wear adequate personal protection equipment such as gloves and safety glasses while installing the unit or carrying out maintenance activities, contact your dealer for any further assistance.
- Any activity that requires the unit to be opened must only be carried out by competent persons who have knowledge about the particular properties and risks of R290 refrigerant.
- Specific expert refrigeration knowledge in compliance with the local laws is required when carrying out work on the refrigerant circuit. This also includes specialist knowledge about handling flammable refrigerants, the corresponding tools and the required personal protective equipment.
- Comply with the corresponding local laws and regulations.
- Risk of death caused by fire or explosion if there is a leak in the refrigerant circuit,
- The product contains the combustible refrigerant R290. In the event of a leak, escaping refrigerant may mix with air to form a flammable atmosphere.
- There is a risk of fire and explosion, A protective zone is defined for the area close around the product, See section "Protective zone".
- Ensure that there are no ignition sources, such as plug sockets, light switches, lamps, electrical switches or other permanent ignitions sources, in the protective zone.
- Do not use any sprays or other combustible gases in the protective zone.
- If you are working on the product when it is open, before starting work, use a gas sniffer to ensure that there is no leak.
- The gas sniffer itself must not be an ignition source, The gas sniffer must be calibrated to R290 refrigerant and set to s 25%of the lower explosive limit.
- Keep all ignition sources away from the protective zone, In particular, open flames, hot surfaces with temperatures above 370℃, electrical devices or tools that are not free from electrical sources, static discharges.

1.1 Meaning of warnings and symbols

⚠ DANGER

Indicates a situation that results in death or serious injury.

⚠ WARNING

Indicates a situation that could result in death or serious injury.

⚠ CAUTION

Indicates a situation that could result in minor or moderate injury.

NOTICE

Indicates a situation that could result in equipment or property damage.

1.2 Safety precautions

⚠ DANGER

- Turn off the power switch before touching the electrical terminal parts.
- Don't touch the switch with wet fingers. Touching the switch with a wet finger can cause an electric shock.
- Live parts are prone to accidental contact when removing the maintenance panel.
- Never leave the unit unattended when removing the service panel during installation or maintenance.
- Do not touch water pipes during and immediately after operation as the pipes may be hot and could burn your hands. To avoid injury, give the piping time to return to normal temperature or be sure to wear protective gloves.
- Do not touch any accidental leaking refrigerant.

⚠ WARNING

- Rip and throw away the plastic packaging so the kids won't play with it. Children playing with plastic bags risk choking to death.
- Safely dispose of packing materials that may cause injury, such as nails and other metal or wood parts.
- Ask your dealer or qualified personnel to follow this manual for installation. Only use accessories, optional equipment and spare parts made or approved by AUX. Don't install it by yourself. Improper installation may result in water leakage, electric shock, or fire.
- Ensure that only specified accessories and parts are used for installation. Failure to use the required components may result in water leakage, electric shock, fire, or falling off the base of the device.
- Install the equipment on a foundation that can support its weight. Lack of physical strength may cause equipment to fall and may cause personal injury.
- Strong winds, hurricanes or earthquakes should be considered when performing required installations. Improper installation may cause accidents due to falling equipment.
- Ensure that all electrical work is performed by qualified personnel using separate circuits in accordance with local laws and regulations and this manual. Insufficient power supply circuit capacity or improper electrical construction may cause electric shock or fire.
- When installing ground fault circuit breakers, comply with local laws and regulations. Failure to install a ground fault circuit breaker may cause electric shock or fire.
- Make sure all the wiring is secure. Use specified wires and ensure that terminal connections or wires are not affected by water or other adverse forces. Incomplete connection or pasting may cause fire.
- When conducting power wiring, the wires on the front panel should be arranged in a row so that the front panel is fixed firmly. If the front panel is not properly installed, terminal overheating, electric shock, or fire may occur.
- After installation, check whether refrigerant leaks.
- Do not touch any leaking refrigerant directly, as it may cause severe frostbite. Do not touch the refrigerant pipe during or after operation. Depending on the flow of refrigerant lines, compressors, and other refrigerant circulating components, refrigerant lines may be hot or cold. Contact with refrigerant pipes may cause burns or frostbite. To avoid injury, give the pipe time to return to normal temperature. Wear protective gloves if you must touch the pipe.
- Do not touch internal components (pumps, spare heaters, etc.) during and immediately after operation. Touching internal parts can cause burns. To avoid injury, allow time for internal components to return to normal temperature and be sure to wear protective gloves if you must touch them.

⚠ CAUTION

- Wear adequate personal protective equipment (protective gloves, safety glasses…) when installing, maintaining, or servicing the system.
- Do not touch the air inlet or aluminum fins of the unit.
- Do not place any objects or equipment on top of the unit.
- Do not push or place redundant cable length in the unit.
- Do not sit, climb or stand on the unit.
- The grounding resistance must comply with local laws and regulations.
- Do not connect ground cables to gas, water pipes, lightning rods, or telephone ground cables.
- When connecting the power supply: connect the earth cable first, before making the current-carrying connections.
- When disconnecting the power supply: disconnect the current-carrying cables first, before separating the earth connection.
- The length of the conductors between the power supply stress relief and the terminal block itself must be as such that the current-carrying wires are tautened before the earth wire is in case the power supply is pulled loose from the stress relief.
- Before installation, check whether the power supply meets the electrical installation requirements of the unit (including reliable grounding, leakage, and wire diameter electrical load, etc.). If the electrical installation requirements are not met, do not install the product until the product is rectified.
- When multiple air conditioners are installed in a centralized manner, check the load balance of the three-phase power supply to prevent multiple units from forming the same phase of the three-phase power supply.
- To guarantee the unit is completely earthed, always connect the backup heater power supply and the earth cable.
- Install the power cord at least 3 feet (1 meter) away from the TV or radio to prevent interference or noise. (Depending on the radio waves, 3 feet (1 meter) may not be enough to cancel the noise.)
- Do not wash the machine. This could cause an electric shock or a fire. The installation of equipment must comply with the national wiring regulations. If the power cord is damaged, it must be replaced by the manufacturer, its service agent, or similarly qualified person to avoid danger.
- Wiring shall be carried out by professional technicians in accordance with national wiring regulations and this circuit diagram. According to national regulations, fixed wiring should be installed in the pole separation distance is not less than 3mm all pole disconnect device and rated current is not more than 30mA residual current device.

NOTICE

- Make sure refrigerant piping installation complies with applicable legislation. In Europe, EN378 is the applicable standard.
- Make sure the field piping and connections are not subjected to stress.
- After all the piping has been connected, make sure there is no gas leak. Use nitrogen to perform a gas leak detection.
- To avoid compressor breakdown, do not charge more than the specified amount of refrigerant.
- When the refrigerant system is to be opened, refrigerant MUST be treated according to the applicable legislation.
- Do not connect wiring of different thicknesses to the power terminal block (slack in the power wiring may cause abnormal heat).
- For wiring, use the designated power wire and connect firmly, then secure to prevent outside pressure being exerted on the terminal board.
- About Fluorinated Gasses

  -This air-conditioning unit contains fluorinated gasses. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself, Compliance with national gas regulations shall be observed.

  -Installation, service, maintenance and repair of this unit must be performed by a certified technician.

  -Product uninstallation and recycling must be performed by a certified technician.

  -If the system has a leak-detection system installed, it must be checked for leaks at least every 12 months. When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

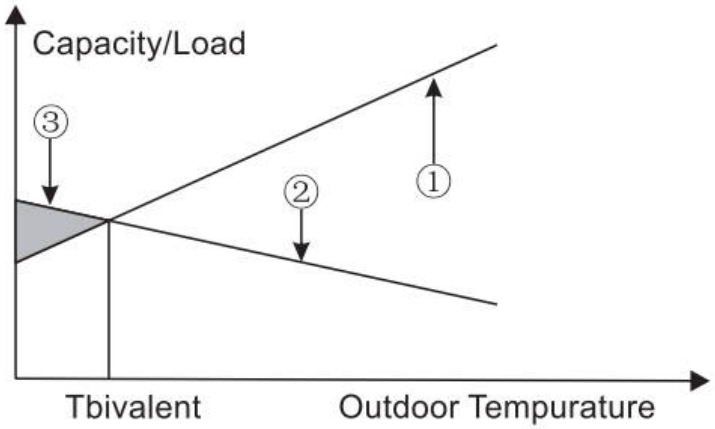
Part2 GENERAL INTRODUCTION

2.1 The relationship between capacity (Load) and ambient temperature

- These units are used for both heating and cooling applications and domestic hot water tanks. They can be combined with fan coil units, floor heating applications, low temperature high efficiency radiators, domestic hot water tanks (field supply) and solar kits (field supply).
- If you choose the built-in backup heater unit, the backup heater can increase the heating capacity during cold outdoor temperatures. The backup heater also serves as a backup in case of malfunctioning and for frozen protection of the outside water piping during winter time.

NOTICE

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



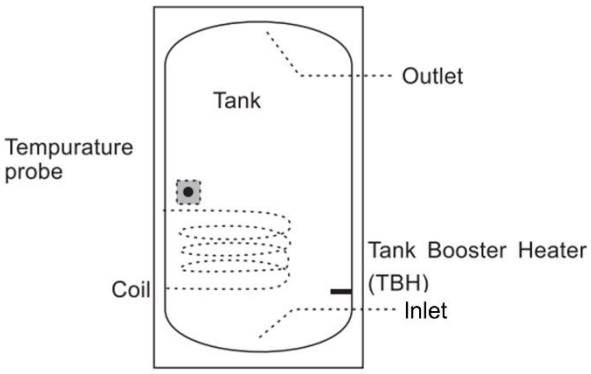
① Heat pump capacity.

② Required heating capacity (site dependent)

③ Additional heating capacity provided by backup heater

2.2 Domestic hot water tank (field supplied)

- A domestic hot water tank (with or without booster heater) can be connected to the unit.
- The requirement of the tank is different for different unit and material of heat exchanger.
- The booster heater should be installed below the temperature probe.
- The heat exchanger (coil)should be installed below the temperature probe.
- The pipe length between the outdoor unit and tank should be less than 10 meters.



1. Based on experience, recommended values for the volume and heat exchanger of domestic hot water tank are shown in the table below.

Capacity(kW)	4-6kW	8-10kW	12-16kW
Water Tank Volume (L)	100~250	150~300	200~500
Minimum heat exchange area of Stainless-steel coil (m^2)	1.4	1.4	1.6
Minimum heat exchange area of enamel coil (m^2)	2.0	2.0	2.5

2. Calculate the tank volume according to the formula.

(1) Consumption based on water consumption per capita.

Building type	Unit	Daily water consumption(L)	Design temperature (℃)
House	Per person, Per day	40~80	60
Villa	Per person, Per day	70~110	60

(2) Consumption based on sanitary utensils.

Utensils type	Daily water consumption(L)	DHW temperature(℃)
Bathtub, sprinkler system (with shower)	150	40
Bathtub, sprinkler system (without shower)	125	40
Shower	70~100	37~40
Wash basin	3	30

(3) Selection of the water tank

Selection of the water tank should consider the flow rate of the shower head, duration of use per person and daily water consumption.

$$\text{Value of the water tank} = \frac{T(\text{Design temperature}) - T(\text{Entering cold water temperature})}{T(\text{Water tank temperature set point}) - T(\text{Entering cold water temperature})} * \text{consumption}$$

$$= \alpha * \text{consumption}$$

T (Design temperature):generally it is 60℃

T (Entering cold water temperature):it differs for different regions

T (Water tank temperature set point):it is the target heating temperature of the water tank

α: correction factor

Correction factor also use experience value according shower head and shower time.

Duration of Use (min/Person) / Flow Rate of the Shower Head (L/min)	10	15	20	25	30	40
4	0.48	0.71	0.94	1.18	1.42	1.89
6	0.71	1.06	1.42	1.77	2.12	2.83
8	0.95	1.42	1.89	2.36	2.83	3.77
10	1.18	1.77	2.36	2.95	3.54	4.72
15	1.76	2.65	3.54	4.42	5.31	7.08

2.3 Water pump (field supplied)

- When the internal water pump does not meet the water flow requirements, the external water pump should be installed.
- If double zone control is required, water mixing pump should be installed.
- If need instant hot water, DHW pump should be installed.
- If want to realize solar hot water. Solar pump should be installed.

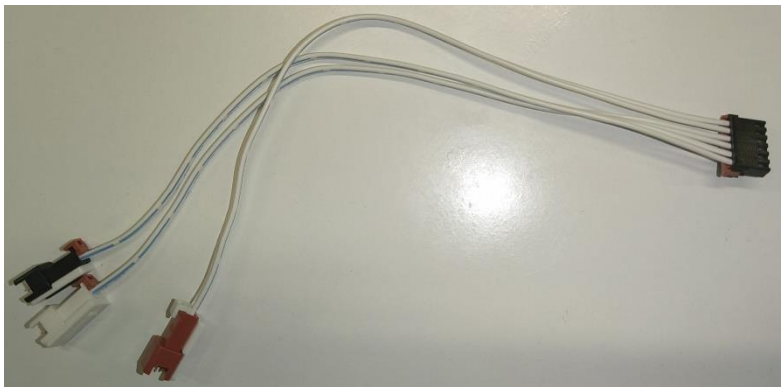
The following are some pump brands and models we recommend for reference only. Please choose according to your specific needs.

Type	Recommended Brand	Recommended model
External circulation pump	Grundfos	UPMM25-95
	Wilo	Para25/9
Floor heating mixing water pump	Grundfos	UPMM25-95
	Wilo	Para25/9
DHW water pump	Wilo	RS15/6
solar water pump	Wilo	Para25/8

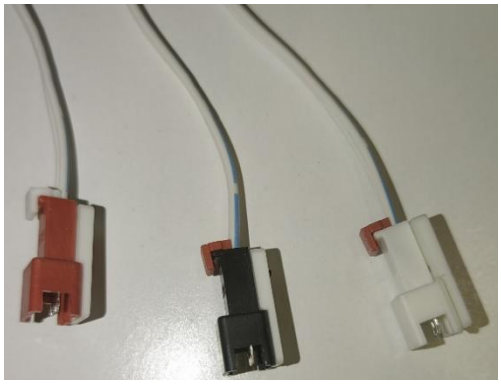
2.4 Temperature sensor (field supplied)

We only supply domestic water tank temperature sensor，others can be purchased and installed locally according to system requirements.

	Type	Resistance
Temperature sensor	NTC	20K



Adapter



Adapter

The temperature sensor adapter is shown in the picture above. Please purchase and install the adapter according to its corresponding structure.

2.5 Room thermostat (field supplied)

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

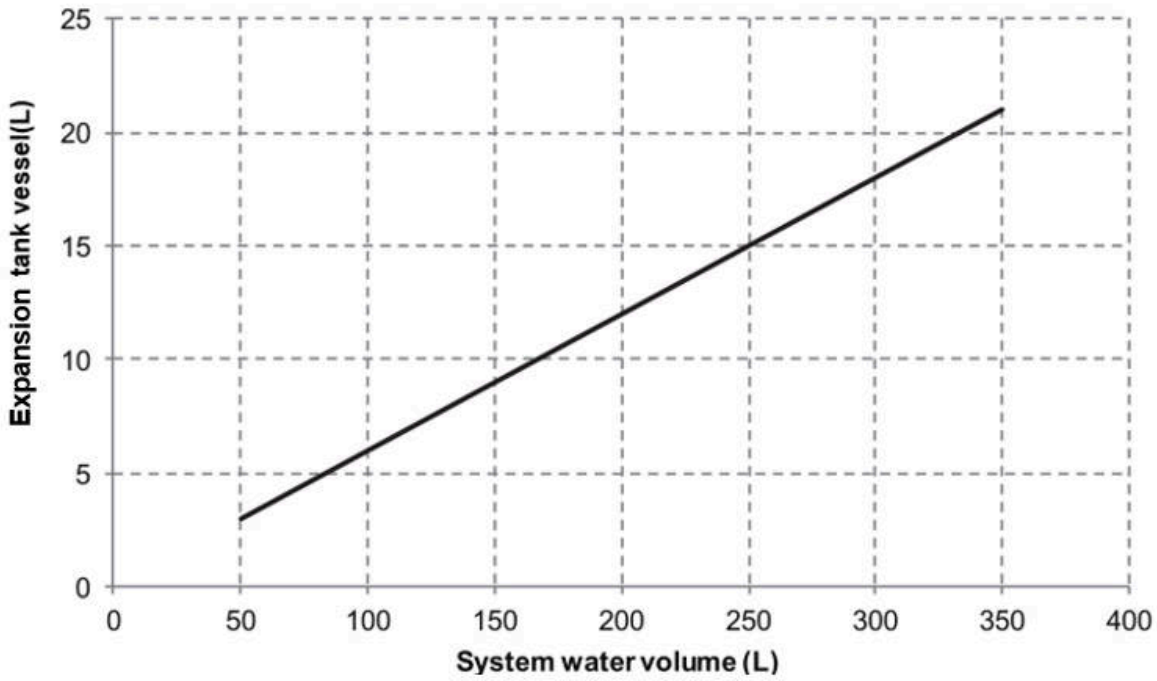
2.6 Solar kit for domestic hot water tank (field supplied)

An optional solar kit can be connected to the unit.

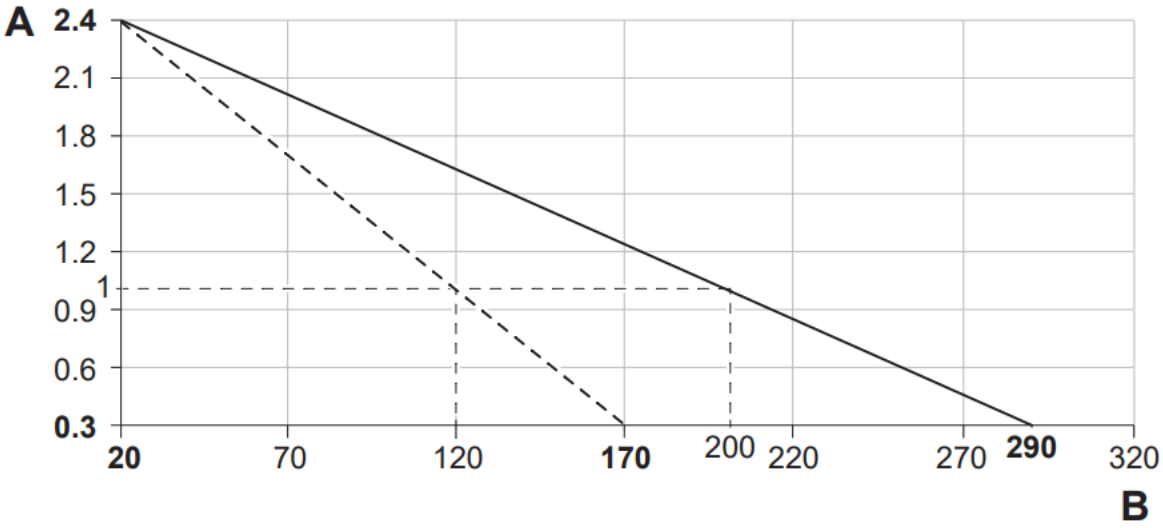
2.7 Expansion tank (field supplied)

1.The units are equipped with an expansion tank of 5L that has a default pre-pressure of 1.0 bar.

2.Expansion tank volume must fit the total water system volume.



3. The pre-filling pressure of the expansion tank is selected according to the figure below.



A Pre-pressure(bar)

B Maximum water volume(l)

—— Water

----- Water + glycol

2.8 Operation range

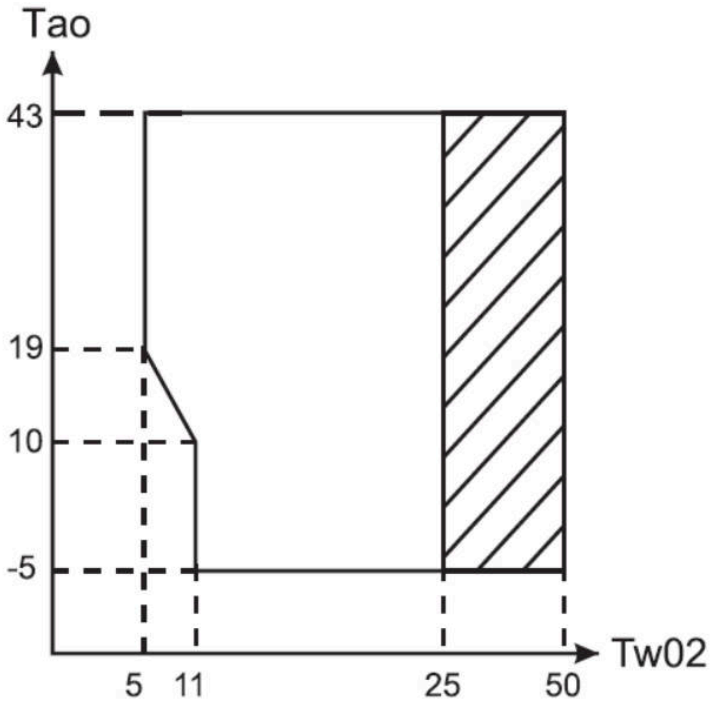
The unit must operate within its appropriate range. （ambient temperature, water pressure, and water flow etc.） Otherwise, the device may not function properly or could be damaged to some extent.

Outlet water （Cooling mode）		+5~+25℃
Outlet water （Heating mode）		+25~80℃
Domestic hot water		+30~+75℃
Ambient temperature （Cooling mode）		-5~+48℃
Ambient temperature （Heating mode）		-25~+35℃
Ambient temperature （DHW mode）		-25~+43℃
Water pressure		0.1~0.3MPa
Water flow	4kW	0.40~1.25m³/h
	6kW	
	8kW	0.70~3.00m³/h
	10kW	
	12kW	
	14kW	
	16kW	

The unit have a freeze prevention function that uses the heat pump or backup heater (Customized model) to keep the water system safe from freezing in all conditions.

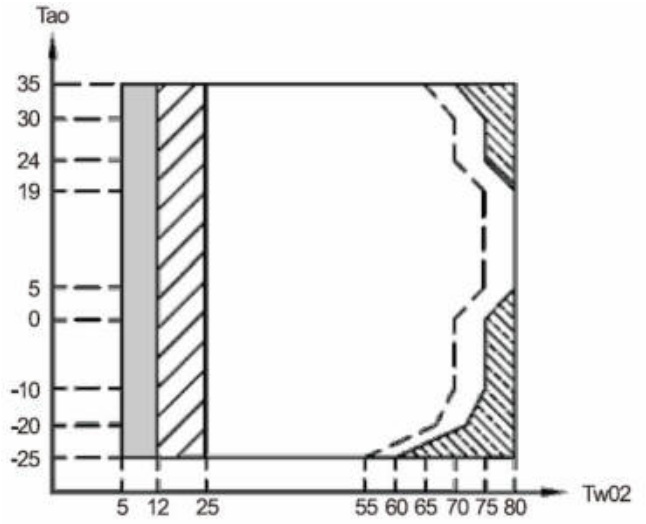
Since a power failure may happen when the unit is unattended, it's suggested to use anti-freezing flow switch in the water system. (Refer to 10.4“Water piping”)

In cooling mode, the water flowing temperature (Tw02) range indifferent outdoor temperature (Tao) is listed below:



Operation range by heat pump with possible limitation and protection.

In heating mode, the water flowing temperature (Tw02) range in different outdoor temperature (Tao) is listed below:



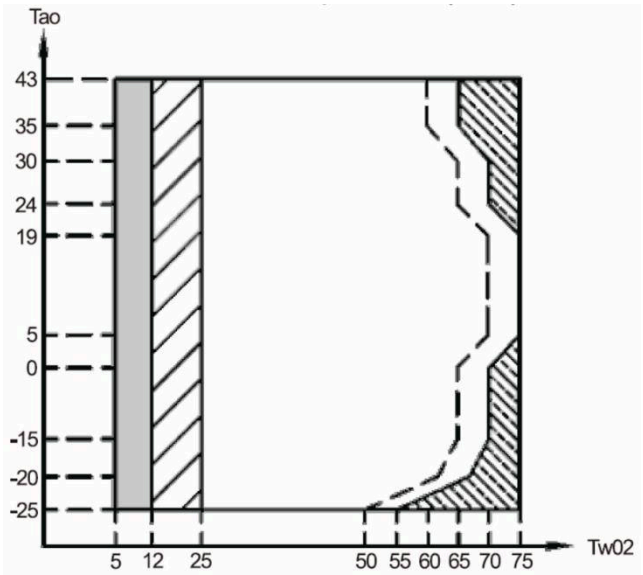
If IBH/AHS setting is valid. Only IBH/AHS turns on.

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.

Maximum inlet water temperature line for heat pump operation.

In DHW mode, the water flowing temperature (TW02) range in different outdoor temperature (Tao) is listed below:



If IBH/AHS setting is valid. Only IBH/AHS turns on;

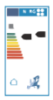
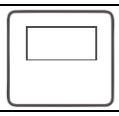
If IBH/AHS setting is invalid, only heat pump turns on; limitation and protection may occur during heat pump operation.

Operation range by heat pump with possible limitation and protection. Heat pump turns off only IBH/AHS turns on.

— — Maximum inlet water temperature line for heat pump operation.

Part3 ACCESSORIES

3.1 Accessories supplied with the unit

NAME	SHAPE	QUANTITY	NAME	SHAPE	QUANTITY
Installation and commissioning manual		1	Drain hose		1
Operation manual		1	Energy label		1
Technical data manual		1	Thermistor for domestic hot water tank		1
Y-shape filter		1	Wired controller communication wire		1
Wired controller		1	Wired controller communication adapter		1

3.2 Accessories available from supplier

NAME	SHAPE	QUANTITY
Buffer tank temperature sensor 1（Twt-BT1）		1
Extension wire for Twt_BT1		1
Buffer tank temperature sensor 2（Twt-BT2）		1
Extension wire for Twt_BT2		1
Floor heating inlet water temperature sensor（Twi_FLH）		1
Extension wire for Twi_FLH		1
Solar panel temperature sensor（Tsolar）		1
Extension wire for Tsolar		1
Room temperature 1 sensor(main zone)（Tai）		1
Extension wire for Tai		1
Room temperature 2 sensor(second zone)（Tai_FLH）		1
Extension wire for Tai_FLH		1

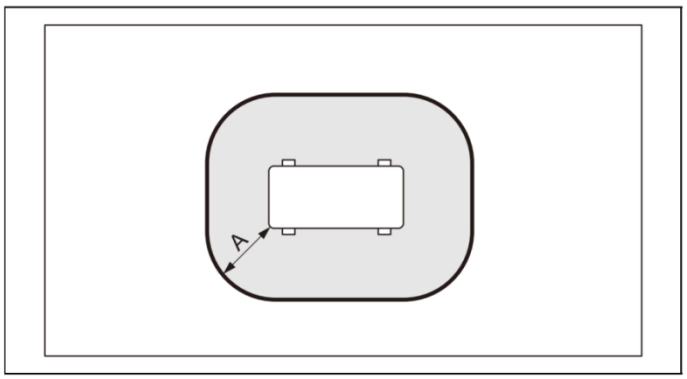
Thermistor and extension wire for Twt-BT, Twi-FLH Tsolar can be shared, if these functions are needed at the same time, and 10m in length of the sensor cable please order these thermistors and extension wire additionally.

Part4 PROTECTIVE ZONE

4.1 Protective zone

- The product contains R290 refrigerant. Note that this refrigerant has a higher density than air. In the event of a leak, escaping refrigerant may collect near the ground.
- The refrigerant must not collect in any way that may lead to a dangerous, explosive. suffocating or toxic atmosphere.
- The refrigerant must not get inside the building via building openings. The refrigerant must not collect in grooves.
- A protective zone is defined around the product. There must be no windows, doors, light shafts, cellar entrances, escape hatches, flat-roof windows, or ventilation openings in the protective zone.
- There must be no ignition sources, such as plug sockets, light switches, lamps, electrical switches or other permanent ignitions sources, in the protective zone.
- The protective zone must not extend to adjacent buildings or public traffic areas.
- In the protective zone, you are not permitted to make any subsequent structural alterations which infringe the stated rules for the protective zone.

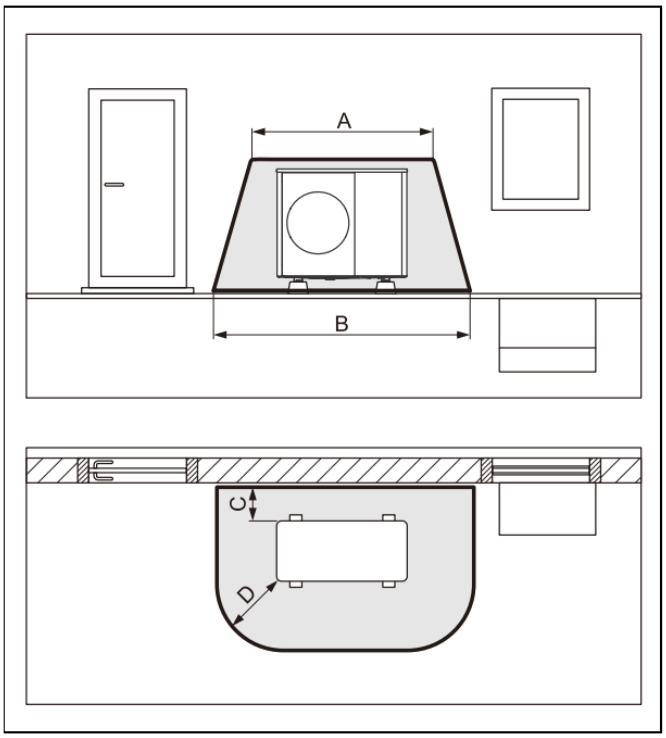
Protective zone for ground installation on the premises



A 1000mm

Dimension A is a clearance around the product.

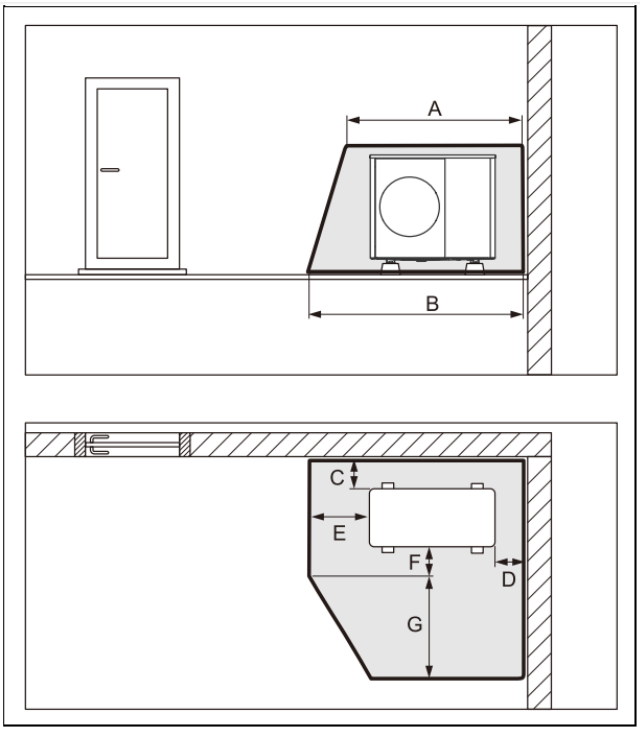
Protective zone for ground installation in front of a building wall.



A	2100 mm	C	200 mm/250 mm
B	3100 mm	D	1000 mm

Dimension C is the minimum clearance that must be maintained to the wall (➞Section 7).

Protective zone for ground installation in a building corner



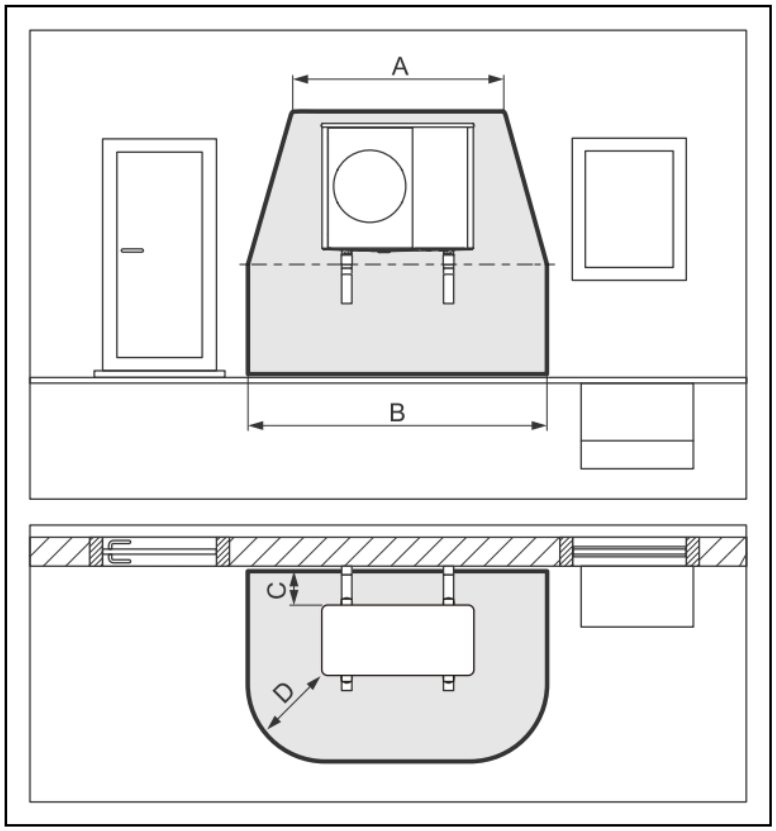
A	2100 mm	E	1000 mm		
B	2600 mm	F	500 mm		
C	200 mm/250 mm	G	1800 mm	D	500 mm

The right-hand corner of the building is shown here.

Dimensions C and D are the minimum clearances that must be maintained to the wall (→Section 7).

Dimension D varies for the left-hand corner of the building.

Protective zone for wall installation in front of a building wall

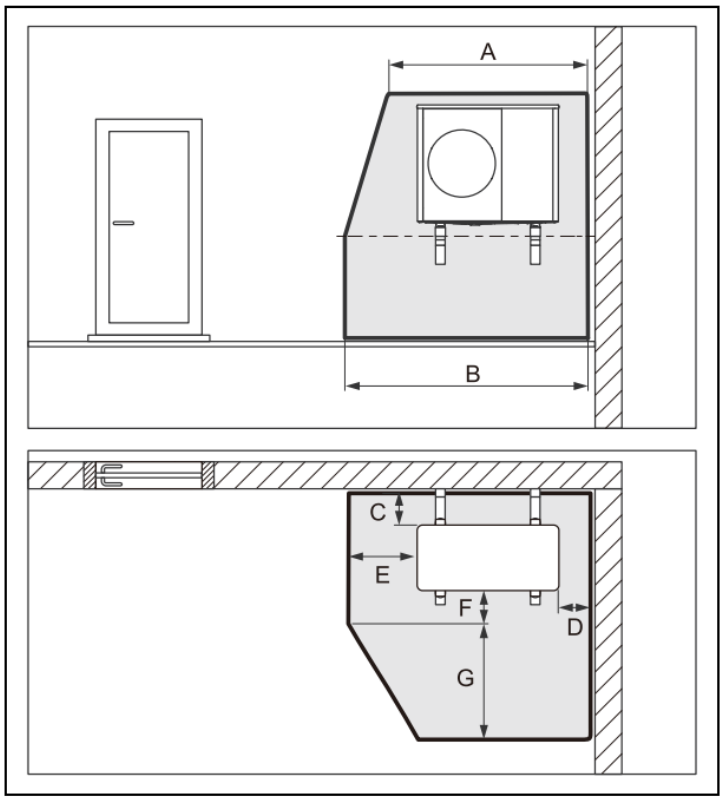


A	2100mm	C	200 mm/250 mm
B	3100mm	D	1000mm

The protective zone below the product extends as far as the floor.

Dimension C is the minimum clearance that must be maintained to the wall (→Section 7).

Protective zone for wall installation in a building corner



A	2100mm	E	1000mm
B	2600mm	F	500mm
C	200mm/250mm	G	1800mm
D	500mm		

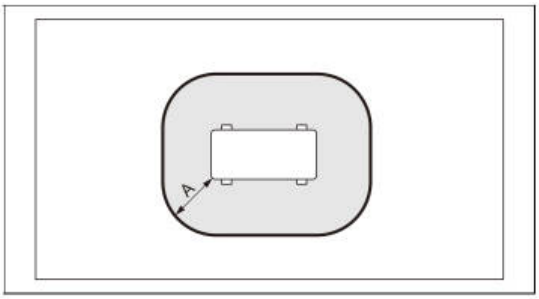
The protective zone below the product extends as far as the floor.

The right-hand corner of the building is shown here.

Dimension C is the minimum clearance that must be maintained to the wall (➞Section 7).

Dimension D varies for the left-hand corner of the building.

Protective zone for flat-roof installation



A 1000 mm

Dimension A is a clearance around the product.

Part5 BEFORE INSTALLATION

5.1 Before installation

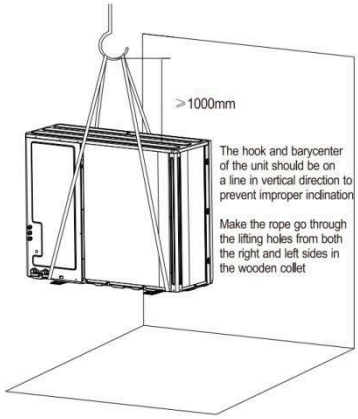
- Be sure to confirm the model's name and the serial number of the unit.
- The product contains the combustible refrigerant R290.The refrigerant may mix with air to form a flammable atmosphere.
- There is a risk of fire and explosion.
  - Only carry out the work if you are competent at handling R290 refrigerant.
  - Wear suitable personal protective equipment and bring a fire extinguisher with you.
  - Only use tools and units that are permitted for R290 refrigerant and are in proper working condition.
  - Ensure that no air gets into the refrigerant circuit, into refrigerant-carrying tools or units, or into the refrigerant cylinder.
  - Note that the refrigerant R290 must never be introduced into the sewage system.
- Prepare the path along which you want to bring the unit inside in advance.
- Bring the packed unit as close as possible to its final installation position to prevent damage during transport.
- The unit must be checked for damage. Any damage must be reported immediately to the claim agent of the carrier.

5.2 Transport

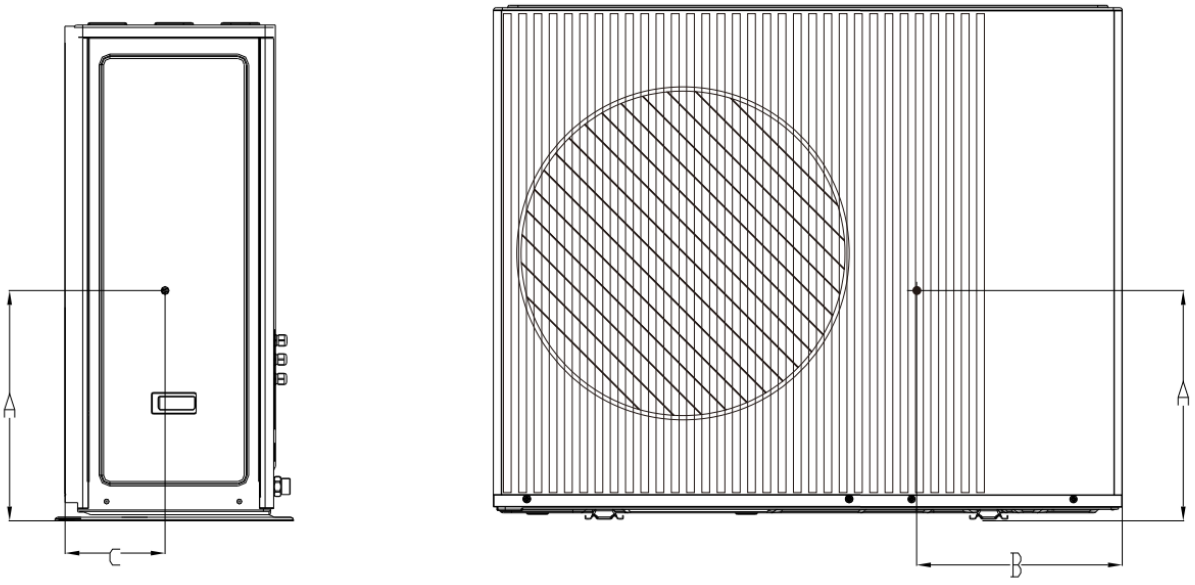
Due to relatively large dimensions and heavy weight, the unit should only be hoisted by lifting tools with slings. The slings can be fitted into foreseen sleeves at the base frame that are made specifically for this purpose.

⚠ CAUTION

- The unit is top heavy! Prevent the unit from falling due to improper inclination during handling.
- To avoid injury, do not touch the air inlet or aluminum fins of the unit.
- Do not use the grips in the fan grills to avoid damage.



Center of gravity position diagram



Model of unit	Dimension for positioning the center of gravity / mm		
	A	B	C
ACHP-H04	300	400	180
ACHP-H06			
ACHP-H08	550	480	280
ACHP-H10			
ACHP-H12	500	470	245
ACHP-H14			
ACHP-H16			

Part6 IMPORTANT INFORMATION FOR THE REFRIGERANT

6.1 Refrigerant Overview

The refrigerant utilized in this product is R290, which is non-toxic and environmentally friendly, and does not damage the ozone layer. Its GWP value is 3, and it is prohibited to be discharged into the air (GWP=global warming potential).

6.2 Refrigerant charge quantity

The refrigerant specified for the unit in the following table has been pre-charged prior to shipment from the factory.

Model of unit	Refrigerant type	Quantity / kg	Tones CO2 equivalent
ACHP-H04	R290	0.55	0.00165
ACHP-H06		0.55	0.00165
ACHP-H08		0.85	0.00225
ACHP-H10		0.85	0.00225
ACHP-H12		1.35	0.00405
ACHP-H14		1.35	0.00405
ACHP-H16		1.35	0.00405

⚠ CAUTION

Frequency of Refrigerant Leakage Checks

- For unit that contains fluorinated greenhouse gases in quantities of 5 tons of CO2 equivalent or more, but of less than 50 tons of Co12 months, or where a leakage detection system is installed, at least every 24 months. equivalent, at least every
- For unit that contains fluorinated greenhouse gases in quantities of 50 tons of CO2 equivalent or more, but of less than 500 tons of CO2 equivalent at least every six months, or where a leakage detection system is installed, at least every 12 months.
- For unit that contains fluorinated greenhouse gases in quantities of 500 tons of CO2 equivalent or more, at least every three months. Or where a leakage detection system is installed, at least every six months.
- This air-conditioning unit is a hermetically sealed equipment that contains fluorinated greenhouse gases
- Only certificated person is allowed to do installation, operation and maintenance.

Part7 INSTALLATION SITE

⚠ WARNING

- There is flammable refrigerant in the unit and it should be installed in a well-ventilated site. If the unit is installed inside an additional refrigerant detection device and ventilation equipment must be added in accordance with the standard EN378.
- Be sure to adopt adequate measures to prevent the unit from being used as a shelter by small animals.
- Small animals contacting electrical parts can cause malfunction, smoke, or fire. Please instruct the customer to keep the area around the unit clean.

7.1 Installation site requirements of the outdoor unit

Select an installation location that meets the following conditions and has been approved by the customer:

- Adequate space for maintenance and repair must be provided at the installation site.
- Ensure that air circulation in the installation area and unit vents are not blocked.
- Ensure that the installation site can withstand the weight and vibration of the unit.
- Ensure that the installation site is level.
- Ensure the installation site is protected from rain.
- Places where the units' piping and wiring lengths come within the allowable ranges.
- Please refrain from selecting the installation location listed below:
  - An area with potential risk of explosion.
  - An area with potential risk of fire.
  - An area with corrosive gases. Corrosion of refrigerant pipes may cause refrigerant leakage.
  - An area with large voltage fluctuations. If the voltage fluctuation is too large, it may cause the unit to stop.
  - An area with high levels of electromagnetic waves. The electromagnetic wave can interfere with the control system, causing unit control failure.
  - An area that is sensitive to sound.
  - Do not install the unit in places often used as a work space. In case of construction work where a lot of dust is created, the unit must be covered.
  - Do not stack the units on each other.
  - Do not hang the unit on the ceiling.

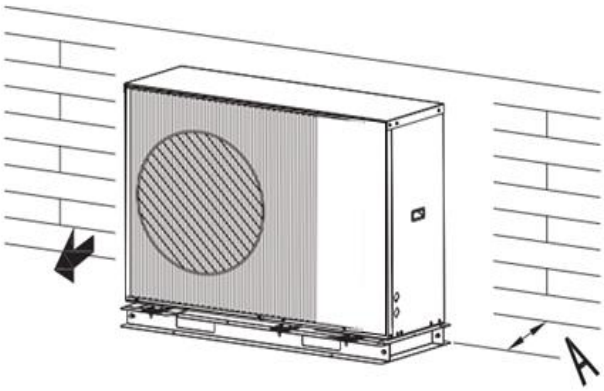
7.2 Additional Installation site requirements in high wind areas

When installing the unit in a place exposed to strong wind, pay special attention to the following.

Strong winds of 18 km/h or more blowing against the unit's air outlet causes a short circuit suction of discharge air), and this may have the following consequences:

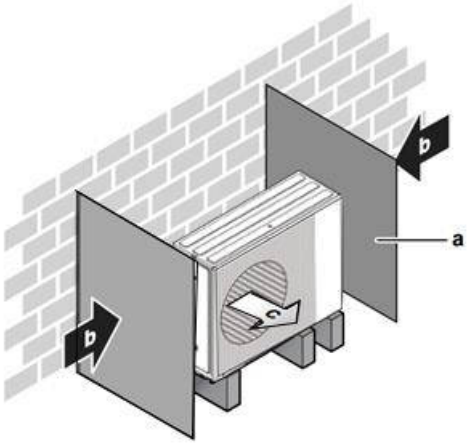
- Frequent frost acceleration during heating process of the unit.
- Unit shutdown due to low-pressure decrease or high-pressure increase.
- The strong wind speeds up the fan rotation, causing the fan to be damaged.

The following figure shows the normal installation position of an outdoor unit:



Unit	A（mm）
4~16kW	⩾300

It is recommended to install a baffle plate when the air outlet is exposed to wind. It is recommended to install the outdoor unit with the air inlet facing the wall and not directly exposed to the wind.

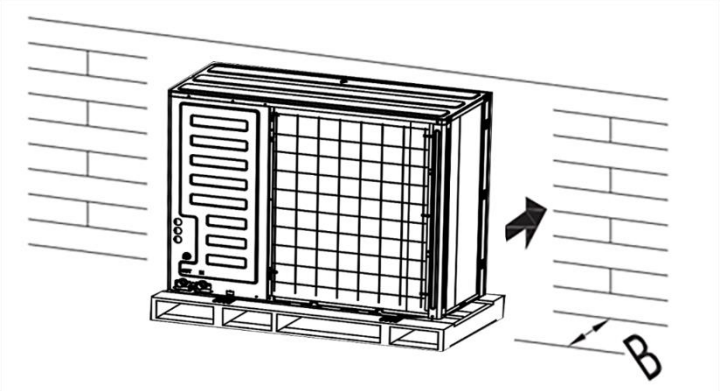


a Baffle plates

b Prevailing wind direction

c Air outlet

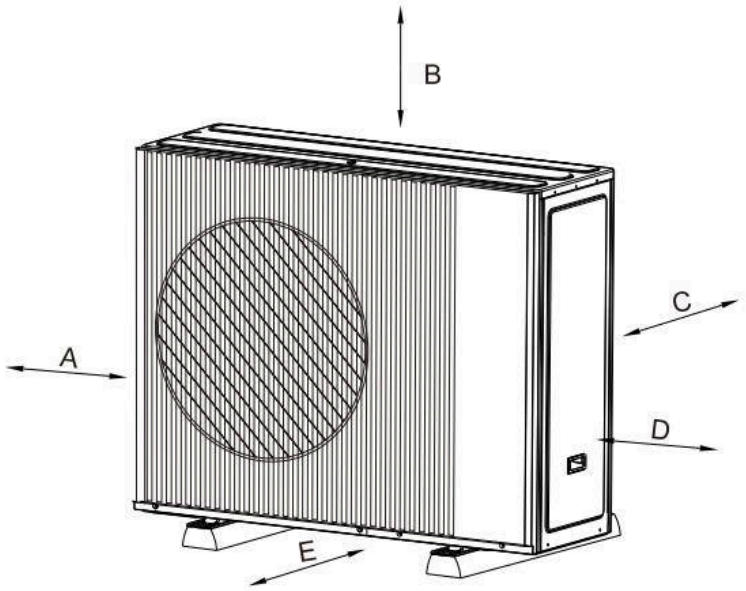
In case of strong wind and the wind direction can be foreseen, refer to the figures below for installation of the unit. Turn the air outlet side toward the building's wall, fence, or screen.



Unit	B（mm）
4~6kW	⩾1000
8~16kW	⩾1500

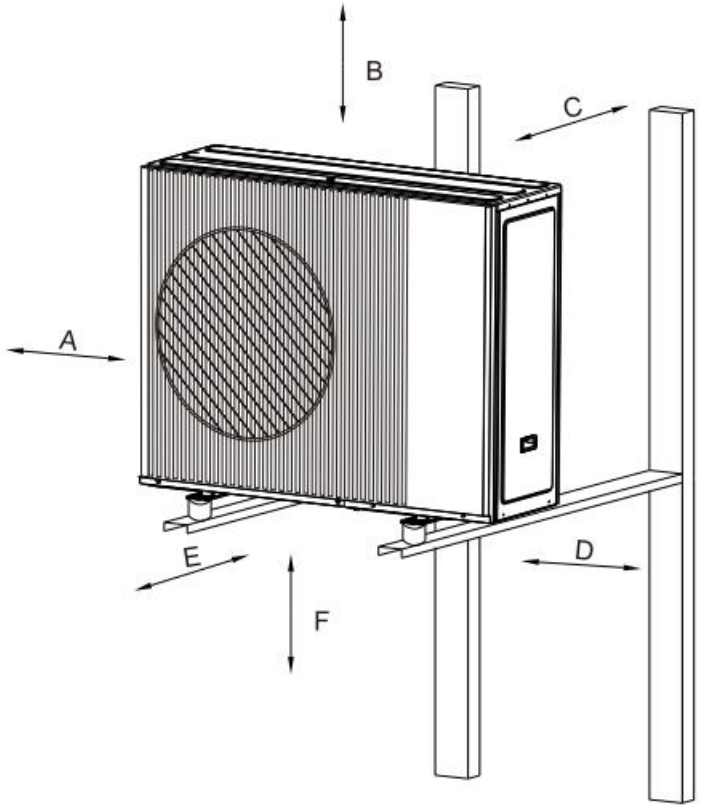
To guarantee sufficient air flow and to facilitate maintenance work, observe the minimum clearances that are specified. Ensure that there is sufficient room to install the hydraulic lines.

Validity: Floor installation OR Flat roof installation:



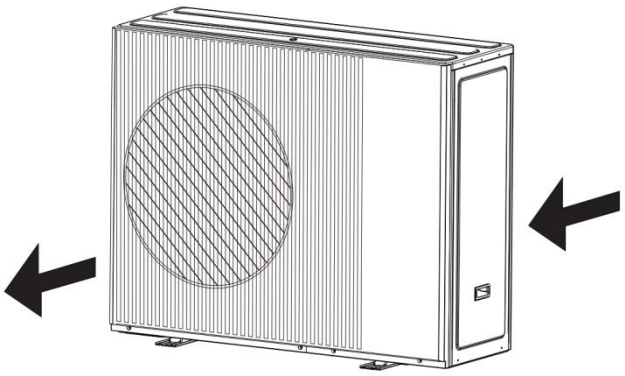
Minimum clear-ance	Heating mode	Heating and cooling mode
A	100 mm	100 mm
B	1000 mm	1000 mm
C	200 mm	250 mm
D	500 mm	500 mm
E	600 mm	600 mm

Validity: Wall-mounting:



Minimum clear-ance	Heating mode	Heating and cooling mode
A	100 mm	100 mm
B	1000 mm	1000 mm
C	200 mm	250 mm
D	500 mm	500 mm
E	600 mm	600 mm
F	300 mm	300 mm

Make sure there is enough room to do the installation. Set the outlet side at a right angle to the direction of the wind.



- Prepare a water drainage channel around the foundation to drain wastewater from the unit.
- If water does not drain easily from the unit, mount the unit on a foundation of concrete blocks, etc. (the height of the foundation should be about 100 mm (3.93 in).

- If you are installing the unit on a frame, please install a waterproof plate (approximately 100 mm) underneath to prevent water from entering from below.
- When installing the unit in a location frequently exposed to snow, it is important to ensure that the foundation is elevated as high as possible.
- If you are installing the unit on a building frame, please make sure to install a waterproof tray (supplied in the field) with a depth of about 100mm underneath the unit to prevent water from dripping. (Refer to the picture on the right).

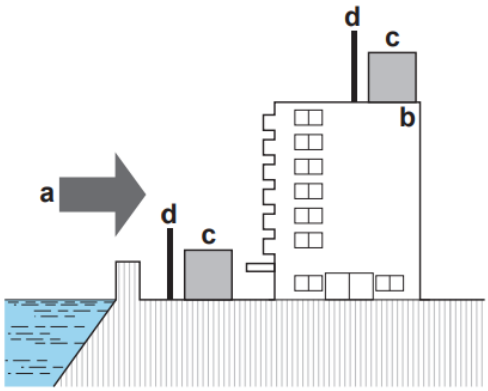


7.3 Additional installation site requirements in coastal areas

Sea breezes contain high concentrations of salt, which can lead to corrosion of outdoor units. Therefore, it is recommended that outdoor units are not directly exposed to sea breezes.

If the outdoor unit is exposed to direct sea breeze, it requires a windbreaker:

- The height of the windbreaker ⩾1.5×the height of the outdoor unit.
- The installation and maintenance space of the unit should be considered when installing the windbreaker.



a Sea winds

b Building

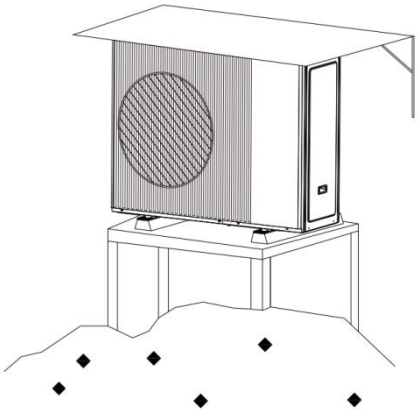
c Outdoor unit

d Windbreaker

7.4 Additional installation site requirements in cold climates

Protect the outdoor unit against direct snowfall and take care that the outdoor unit is never snowed up.

- It is recommended to add a baffle on the exhaust side of the unit.
- Position the suction side of the outdoor unit towards the wall to avoid direct exposure to wind
- The height reserved below the outdoor unit must be at least 100mm higher than the historical maximum snowfall level.
- It is crucial to protect outdoor units from snow in snowy areas, so it is best to construct a base and ceiling for them.



① Construct a large canopy.

② Construct a pedestal. Install the unit high enough off the ground to prevent it from being buried in snow.

7.5 Additional installation site requirements in hot climates

As the outdoor temperature is measured by the unit's ambient temperature sensor, make sure to install it in a shaded area or under a canopy to avoid direct sunlight. Otherwise, the unit may be affected by solar heat.

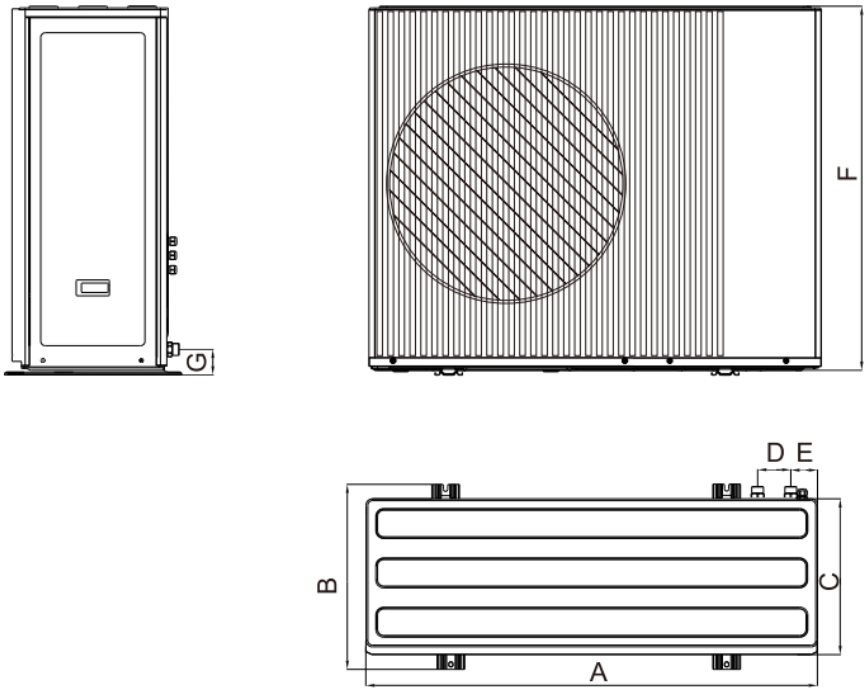
7.6 Installation distance requirement

The outdoor unit is designed for outdoor installation only. Mind the measurement guidelines:

Maximum height difference between domestic hot water tank and outdoor unit		5m
Maximum distance between outdoor unit and…		
	domestic hot water tank	10m
	3-way valve	10m

Part8 INSTALLATION PRECAUTIONS

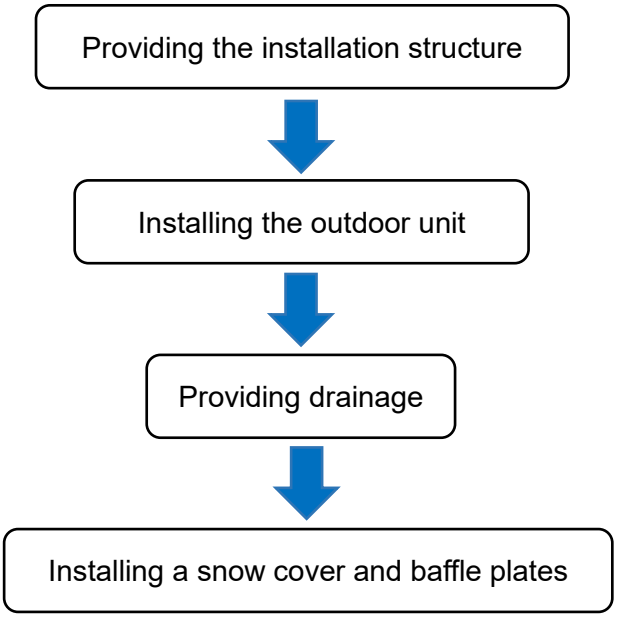
8.1 Dimensions



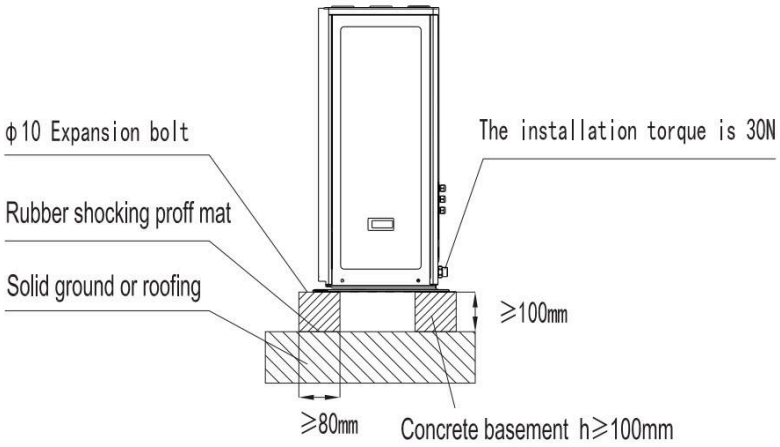
Model	A	B	C	D	E	F	G
4/6kW	1130	480	450	102	116	710	67
8/10/12/14/16kW	1280	480	450	94	81	1040	72

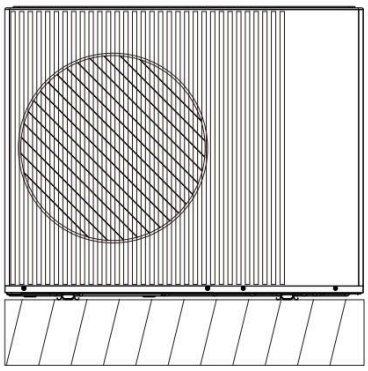
8.2 Installation requirements

- You must mount the outdoor unit before you can connect the water piping.
- Unit installation typically involves the following stages:



- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise.
- Outdoor units should not be installed on supporting structures that could be damaged by water build in the event of a blocked drain.
- Bases should be at least 100mm high to provide sufficient drainage and to prevent water ingress into the base of the unit.
- Fix the unit securely to foundation by means of the Φ10 expansion bolt. It is best to screw in the foundation bolts until their length is 20 mm from the foundation surface.

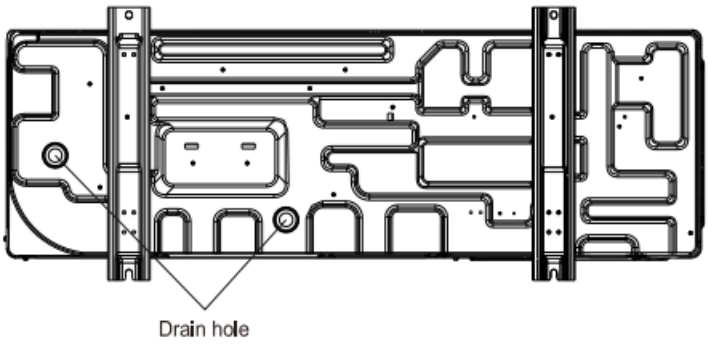




8.3 Drainage

Drainage ditch should be provided to allow drainage of condensate that may form on the air side heat exchanger when the unit is running in heating mode or domestic hot water mode. The drainage should ensure that condensate is directed away from roadways and footpaths, especially in locations where the climate is such that condensate may freeze.

Please refer to the figure below for the location of the drain hole, and be careful not to cover it.



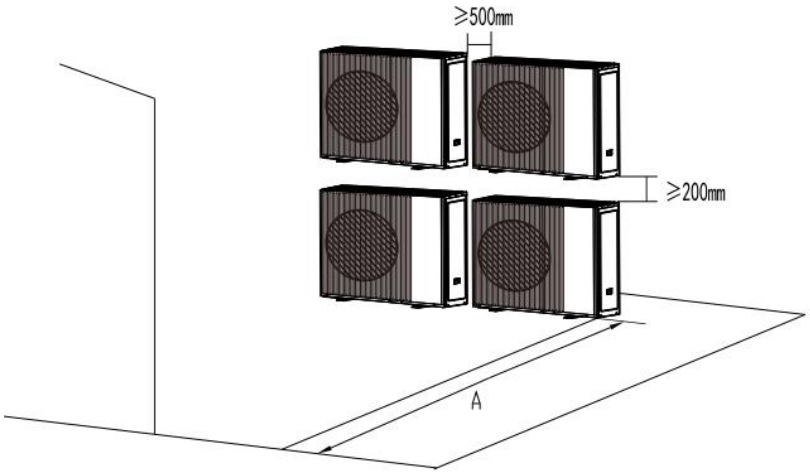
Please note that only one of the two drainage holes shown in the picture on the left can be used for the 8-16kW unit.

It's necessary to install an electrical heating belt if water can't drain out in cold weather even the big drain hole has opened.

8.4 Servicing space requirements

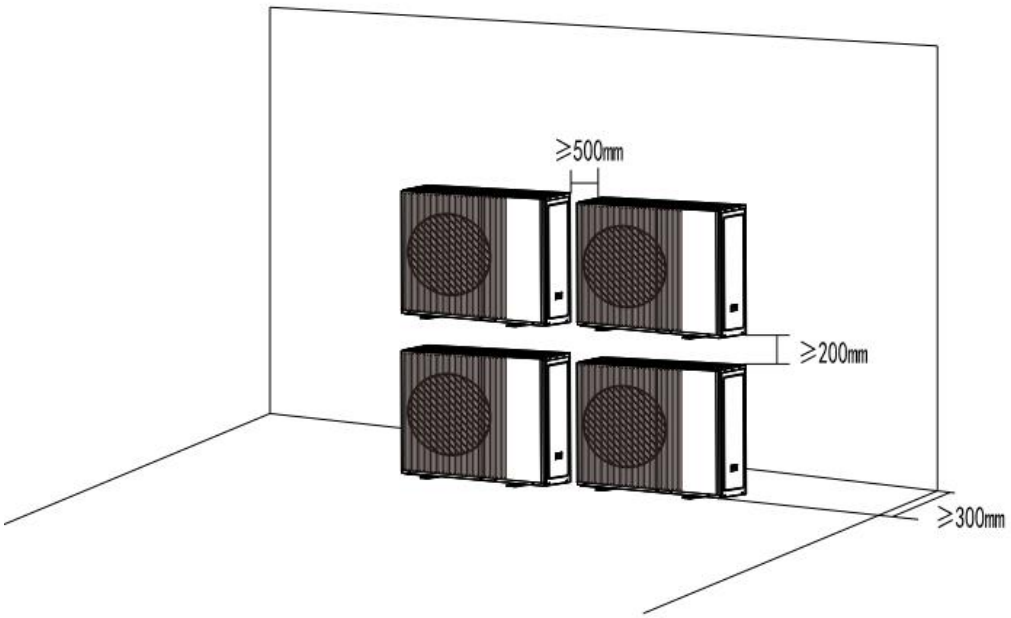
During unit maintenance, a certain amount of operating space is required. Therefore, installation space should be considered according to the figure below.

- In case obstacles exist in front of the outlet side.

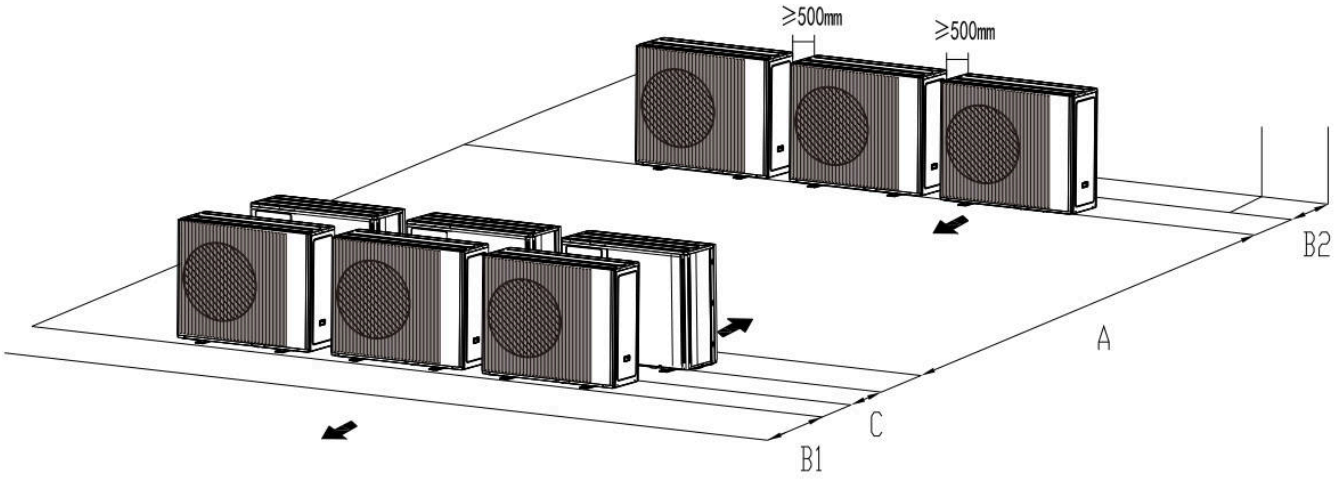


Unit	A(mm)
4~6kW	≥1000
8~16kW	≥1500

- In case obstacles exist in front of the air inlet



- In case of multiple-row installation



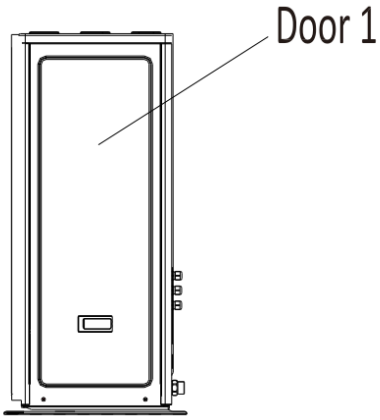
Unit	A(mm)	B1(mm)	B2(mm)	C(mm)
4~6kW	≥2500	≥1000	≥300	≥600
8~16kW	≥3000	≥1500		

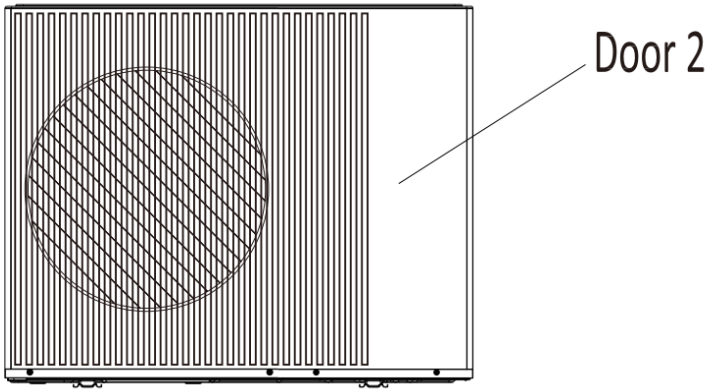
Part9 OVERVIEW OF THE UNIT

9.1 Main components

Door 1 To access to the hydraulic compartment and electrical parts.

Door 2 To access to the compressor.





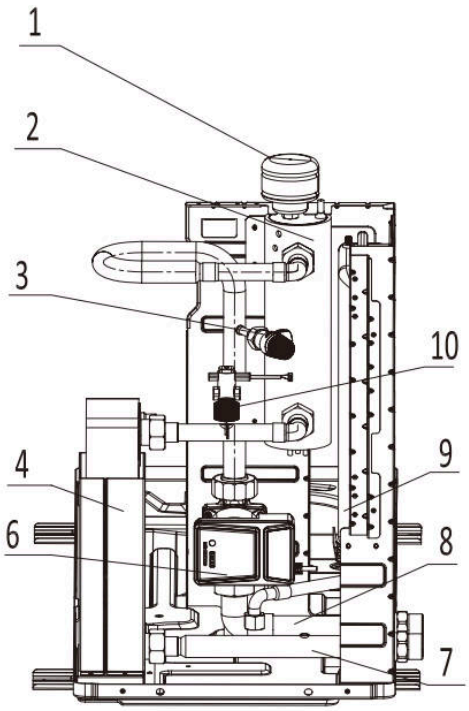
CAUTION

- Switch off all power—i.e. unit power supply and backup heater and domestic hot water tank power supply (if applicable) —before removing door 1 and door 2.
- Parts inside the unit may be hot.

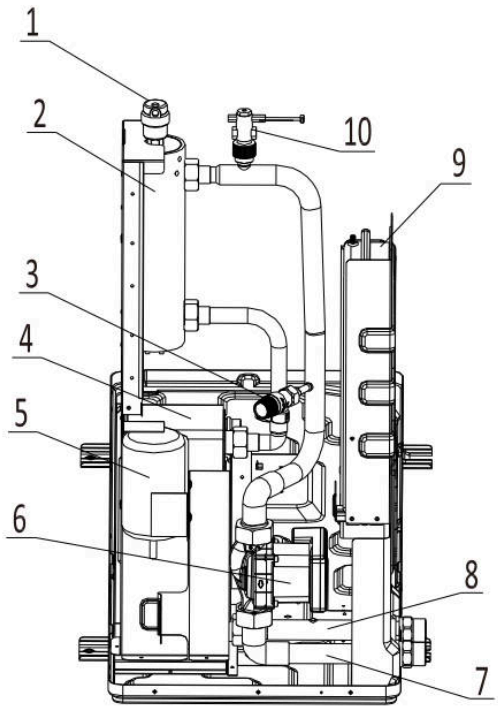
9.2 Main components

- Hydraulic module

4kW-6kW



8kW-16kW



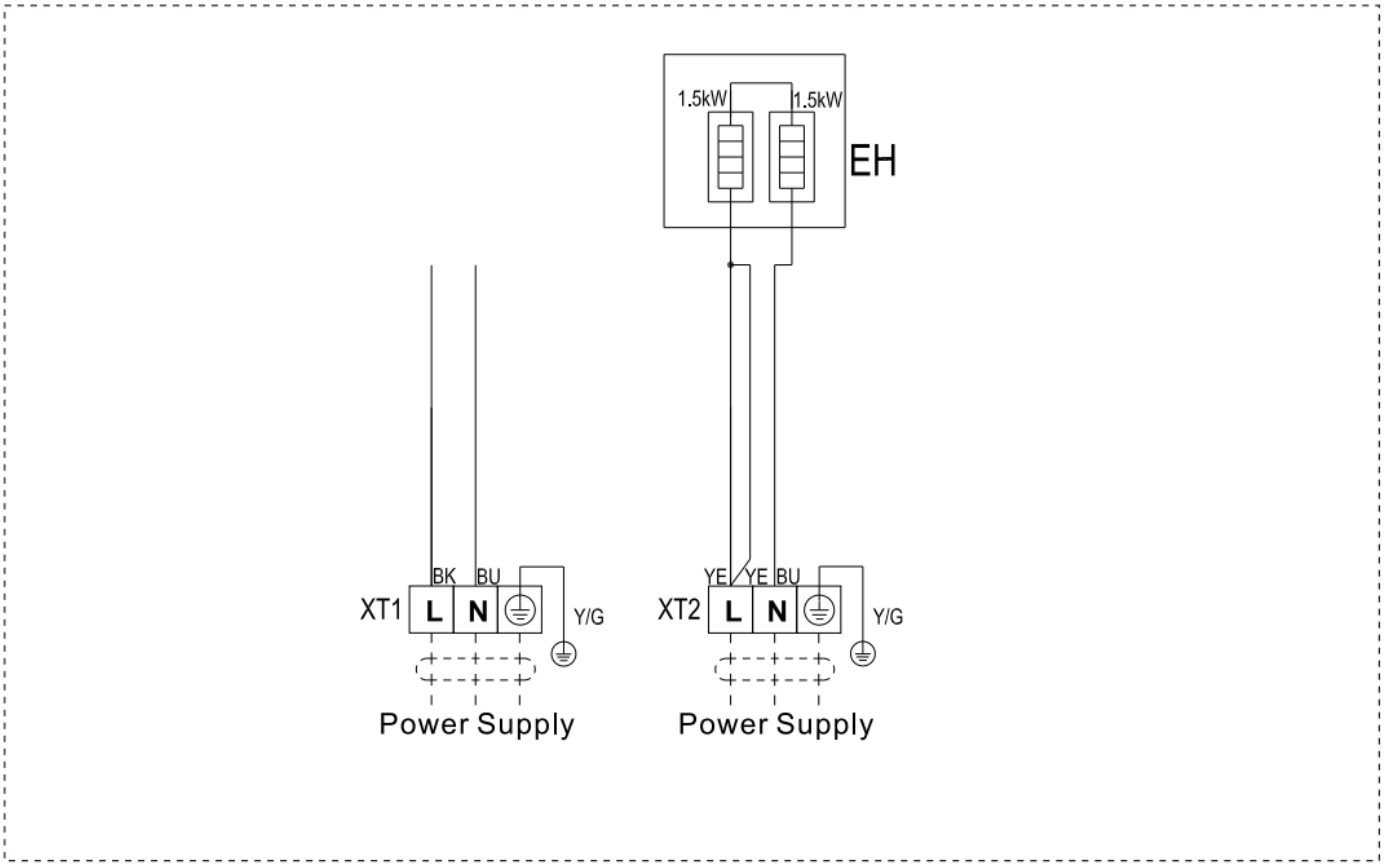
With backup heater for example (optional)

Code	Assembly	Explanation
1	Automatic air purge valve	Remaining air in the water circuit will be automatically removed via the automatic air purge valve.
2	Internal backup heater	The backup heater consists of an electric heating element that will provide additional heating capacity to the water circulation system if the heating capacity is insufficient due to low outdoor temperatures. It also protects external water pipes from freezing during cold periods.
3	Pressure relief valve	The pressure relief valve prevents excessive water pressure the water circuit by opening at 43.5 psi(g)/0.3MPa(g) and discharging some water.
4	Plate heat exchanger	Heat exchanging between water and refrigerant
5	Refrigerant storage tank	Only 12kW~16kW.
6	Pump_i	The pump circulates the water in the water circuit.
7	Water outlet pipe	/
8	Water Inlet pipe	/
9	Expansion vessel(5L)	/
10	Flow switch	If water flow is below 0.6m^3 /h, the flow switch open (8~16KW). If water flow is below 0.36m^3 /h, the flow switch open (4~6KW).

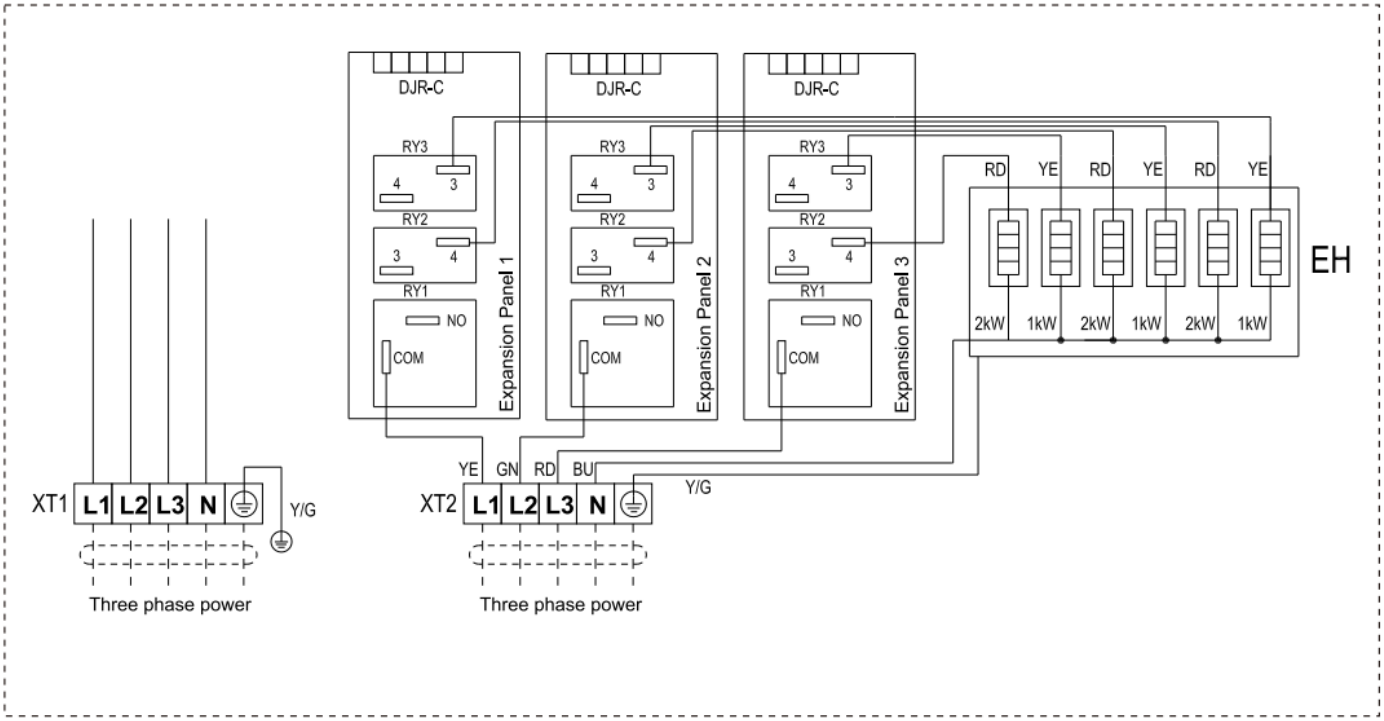
9.3 Electronic control box

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

4~16kW(1-phase)

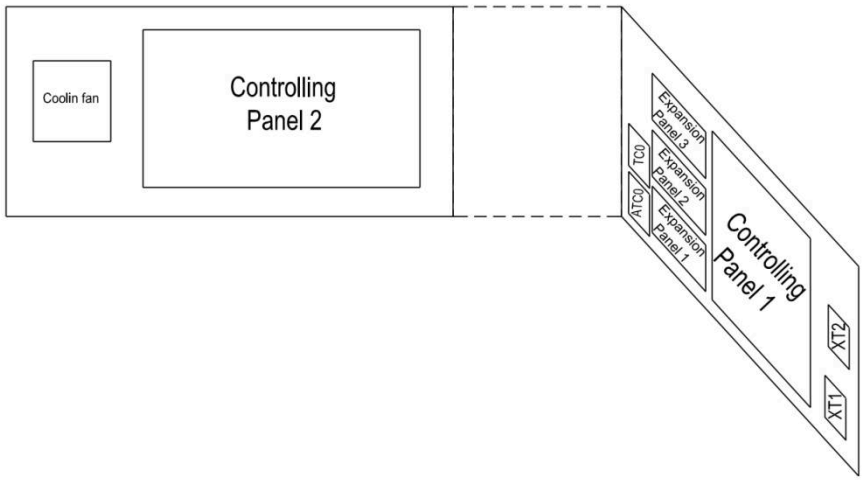


8~16kW (3-phase)

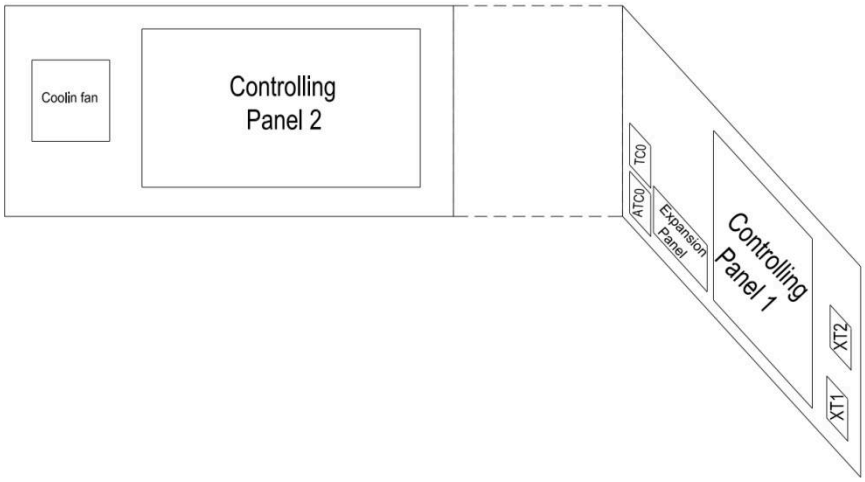


Position description

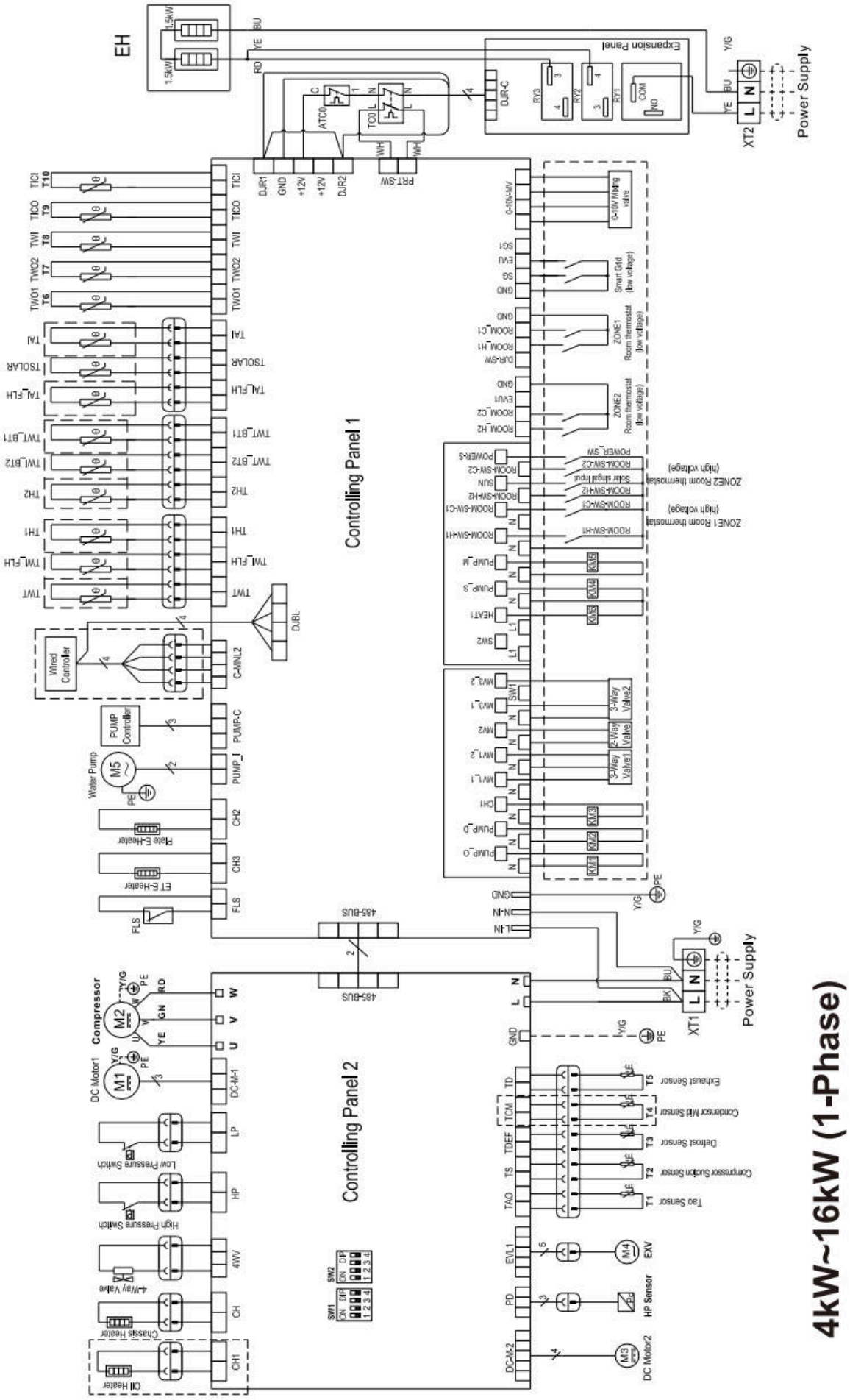
4~16kW(1-phase)



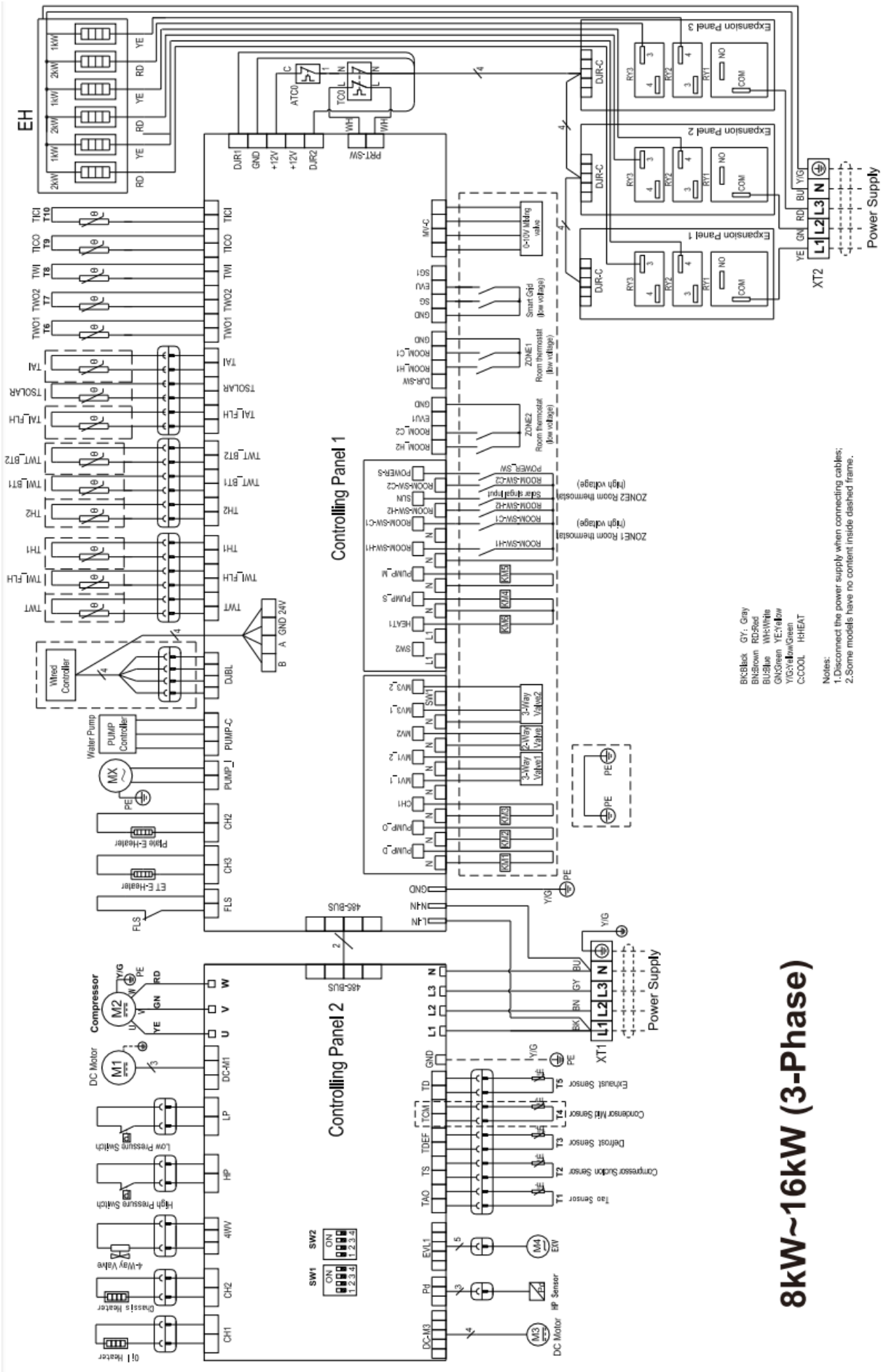
8~16kW (3-phase)



4~16kW(1-phase)



8~16kW (3-phase)



Components description:

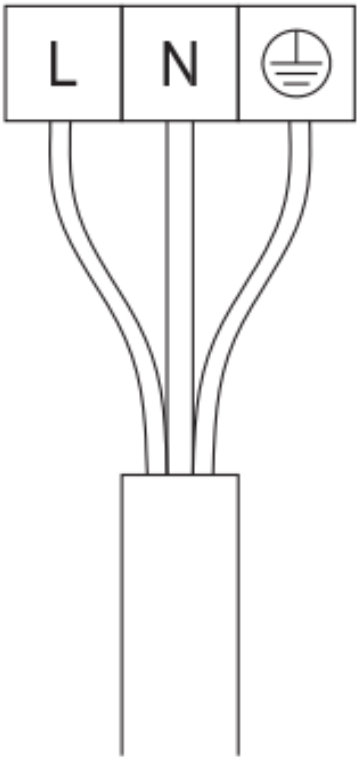
TCO	Thermostat
ATCO	Automatic Thermostat
FLS	Water flow switch
EH	Electric Heater
XT1	Power terminal board
XT2	Heater Power terminal board
KM1	DHW PIPE PUMP AC Contactor1
KM2	Zone1 PUMP AC Contactor2
KM3	Electric heating for water tank AC contactor3
KM4	Solar PUMP AC contactor4
KM5	Zone 2 PUMP AC contactor5
KM6	Additional heat source AC contactor6
SG	Smart Grid
EVD	Commercial power
TWO1	Outlet water temp. sensor of plate heat exchanger
TWO2	Outlet water temp. sensor of Electric heating

TWI	Inlet water temp. sensor of plate heat exchanger
TICO	Evaporator Outlet Sensor
TICI	Evaporator Inlet Sensor
TWT_BT1	Balance tank temp. sensor1
TWT_BT2	Balance tank temp. sensor2
TWI_FLH	Floor heating water inlet temp. sensor
TWT	Tank water temp. sensor
TAI	ZONE1 Room temp. sensor
TSOLAR	Solar panel temp. sensor
TAI_FLH	ZONE2 Room temp. sensor
T1	Temperature Sensor
T2	Compressor Suction Sensor
T3	Defrost Sensor
T4	Condensor Mid Sensor
T5	Exhaust Sensor

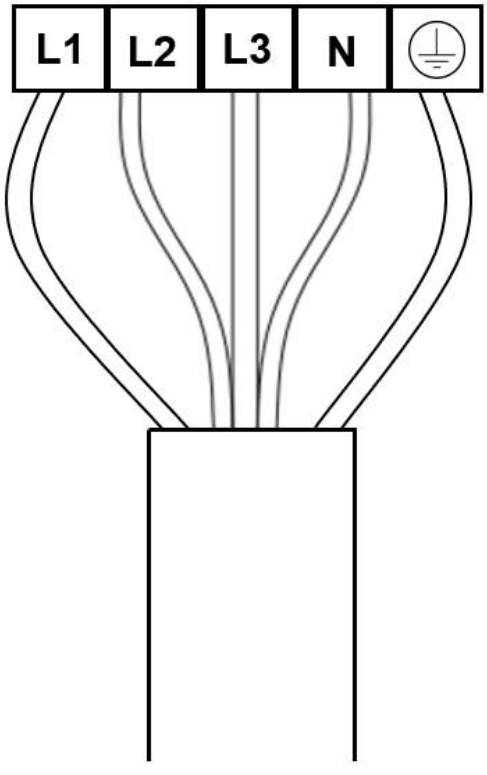
9.3.1 Equipment main Power Supply Wiring

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

Unit	4~6kW 3kW-1PH heater	8~10kW 3kW-1PH heater	12~16kW 3kW-1PH heater	8~10kW 9kW-3PH heater	12~16kW 9kW-3PH heater
1PH-Wiring size /mm²	4.0	4.0	6.0	/	/
3PH-Wiring size /mm²	/	/	/	4.0	4.0



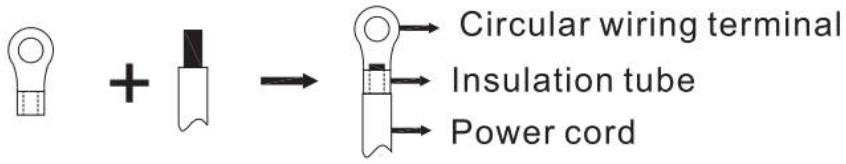
UNIT POWER SUPPLY（1-phase）



UNIT POWER SUPPLY（3-phase）

⚠ CAUTION

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



NOTICE

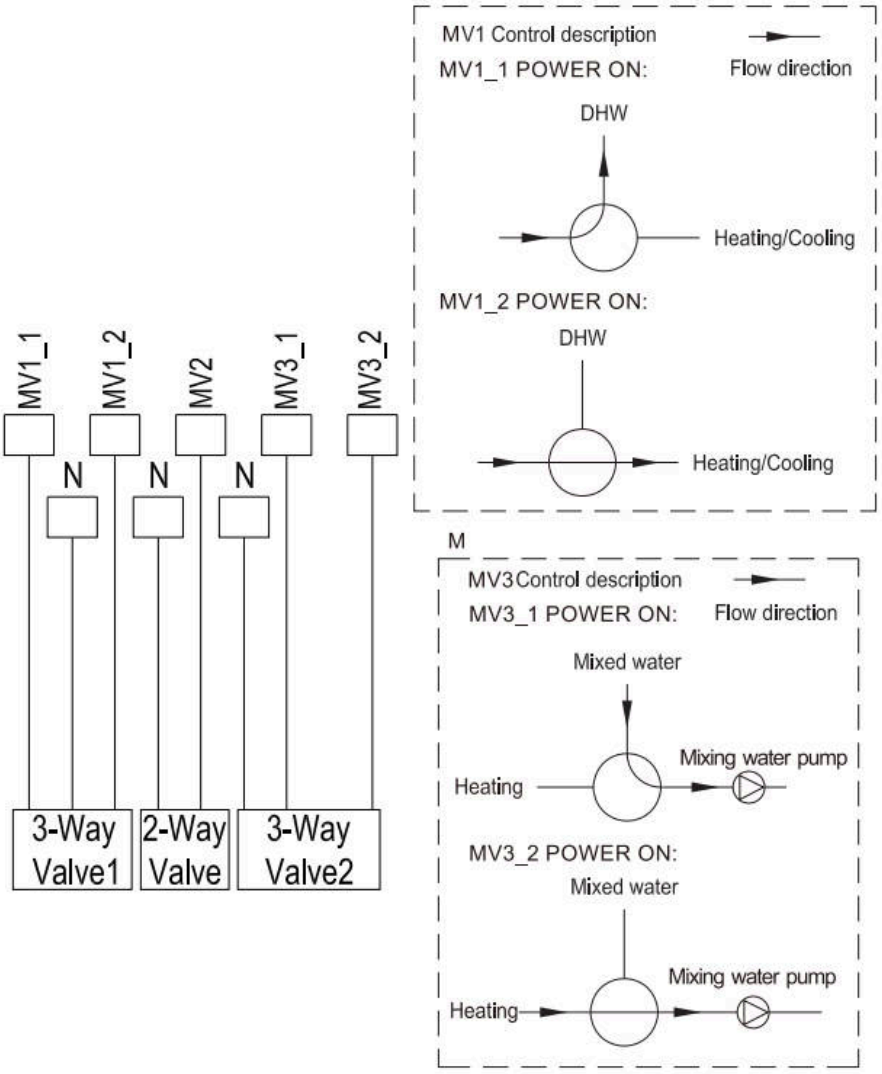
- The ground fault circuit interrupter must be 1 high-speed type of 30 mA (<0.1 s).
- Please use 3-core shielded wire.
- Flexible cord must meet 60245IEC(HO5VV-F) standards.
- Leakage protection switch must be installed to the power supply of the unit.

9.3.2 Connection for other components

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

Port provides the signal with 220 voltages. If the current of load is < 0.2A load can connect to the port directly, If the current of load is ⩾0.2A, the AC contactor is required to connected for the load.

- **For 3-way value MV1. MV2 and MV3**



Voltage	220-240 VAC
Maximum running current (A)	0.2
Wiring size (mm²)	0.75

Procedure:

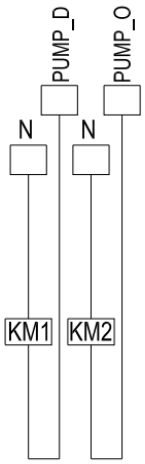
Connect the cable to the appropriate terminals as shown in the picture. Fix the cable reliably.

MV1: Motorized 3way valve

MV2: Two-way valve

MV3: Mixing valve

- **For Zone1 pump and DHW pipe pump**



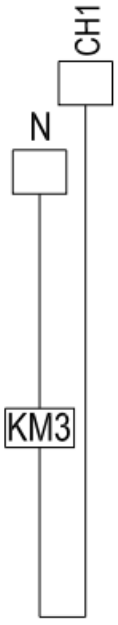
Voltage	220-240 VAC
Maximum running current (A)	0.2
Wiring size (mm²)	0.75

Zone1 pump: External circulation pump

KM1: DHW PIPE PUMP AC Contactor1

KM2:Zone1 PUMP AC Contactor2

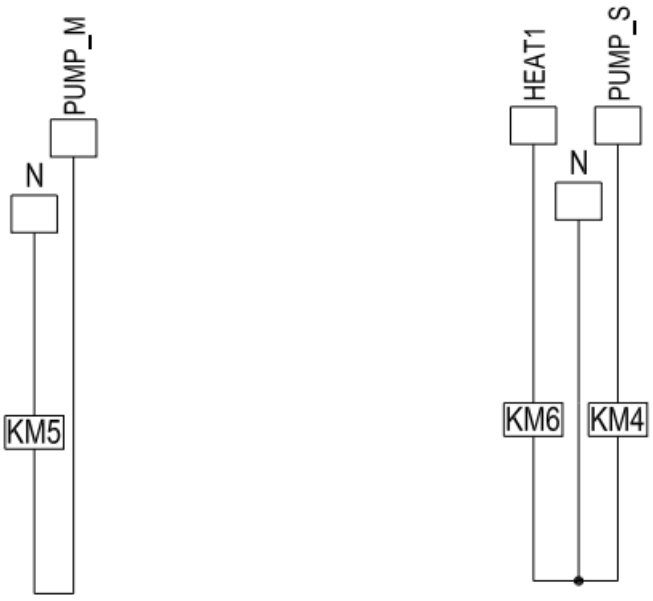
- **For tank booster heater**



Voltage	220-240 VAC
Maximum running current (A)	0.2
Wiring size (mm²)	0.75

KM3: Electric heating for water tank AC contactor3

➢ **For zone2 pump and additional heat source control**



Voltage	220-240 VAC
Maximum running current (A)	0.2
Wiring size (mm²)	0.75
Control port signal type	Type 2

Zone2 pump: Mixing valve

KM5: Zone 2 PUMP AC contactor5

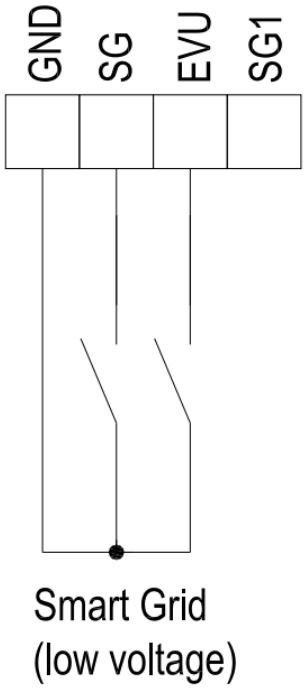
Additional heat source control: AHS

KM6: Additional heat source AC contactor6

⚠ WARNING

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

➢ **For smart grid**



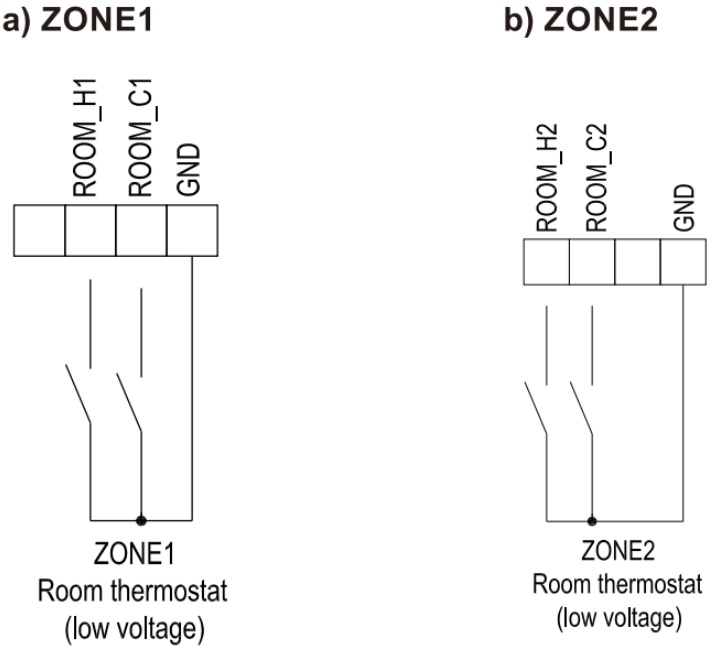
The unit has smart grid function, there are two ports on PCB to connect SG signal and EVU signal as following:

1.when EVU signal is on, the unit operate as below: DHW mode turn on, the setting temperature will be changed to70°C automatically, and the TBH operate as below. Twt<69. the TBH is on, Twt>70, the TBH is off. The unit operate in cooling/heating mode as the normal logic.

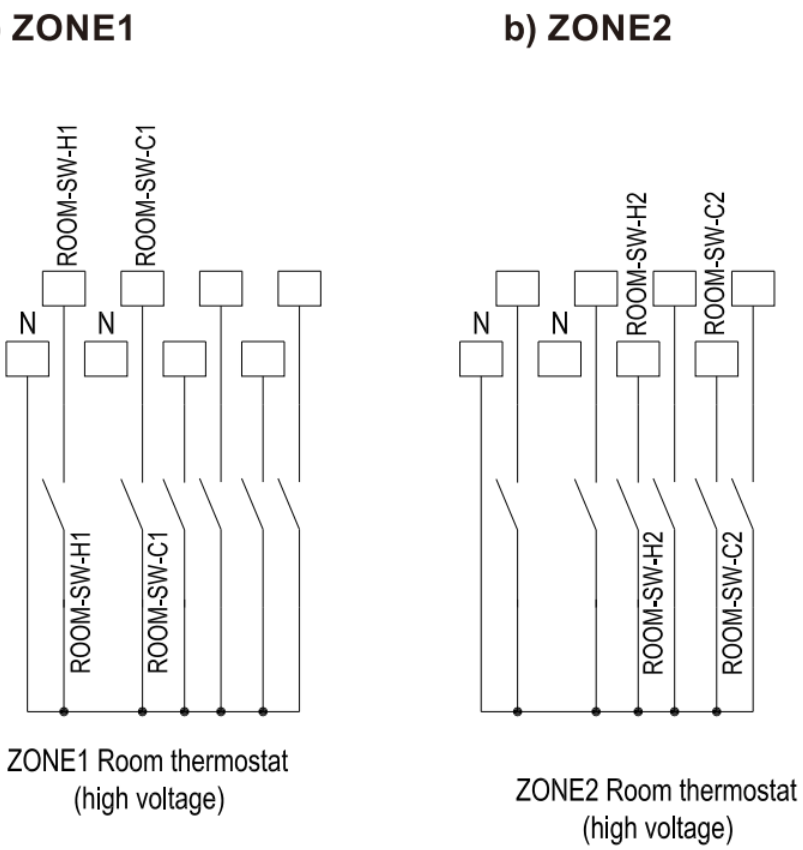
2. When EVU signal is off, and SG signal is on, the unit operate normally.

3. When EVU signal is off, SG signal is off, the DHW mode is off. and the TBH is invalid, disinfect function is invalid. The max running time for cooling/heating is “SG RUNNIN TIME” then unit will be off

➢ **Room Thermostat (Low Voltage)**



- **Room Thermostat (High Voltage)**

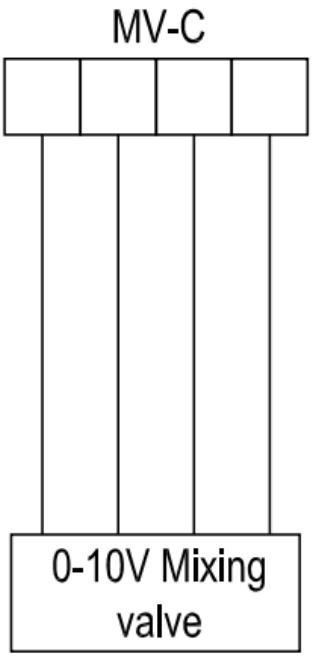


ZONE1 Room thermostat (high voltage)

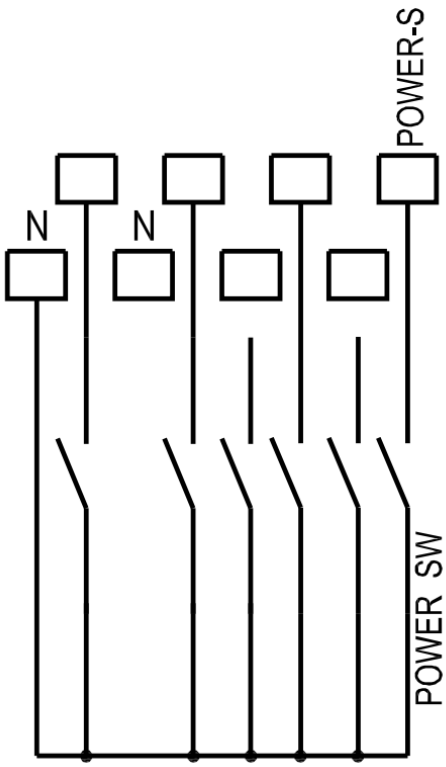
ZONE2 Room thermostat (high voltage)

- **0-10V Mixing valve**

(Only one can be used of mixing valve and MV3)



➢ **Backup power**



9.4 Water piping

All piping lengths and distances have been taken into consideration.

NOTICE

- If no glycol is in the system, in case of a power supply failure or pump operating failure. drain all the water system if the water temperature is below 0'C in the cold winter.
- When water is at standstill inside the system. freezing is very likely to happen and damage the system in the process.

9.4.1 Check the water circuit

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

The unit should only be connected to closed water circuits. Connection to an open water circuit would lead to excessive corrosion of the water piping. Only materials complying with all applicable legislation should be used.

Before continuing installation of the unit, check the following:

- The maximum water pressure ⩽ 3 bar.
- The maximum water temperature ⩽ 80°C according to safety device setting.
- Always use materials that are compatible with the water used in the system and with the materials used in the unit.
- Ensure that components installed in the field piping can withstand the water pressure and temperature.
- Drain taps must be provided at all low points of the system to permit complete drainage of the circuit

during maintenance.

- Air vents must be provided at all high points of the system. The vents should be located at points that are easily accessible for service. An automatic air purge is provided inside the unit. Check that this air purge valve is not tightened so that automatic release of air in the water circuit is possible.

9.4.2 Water volume and sizing expansion vessels

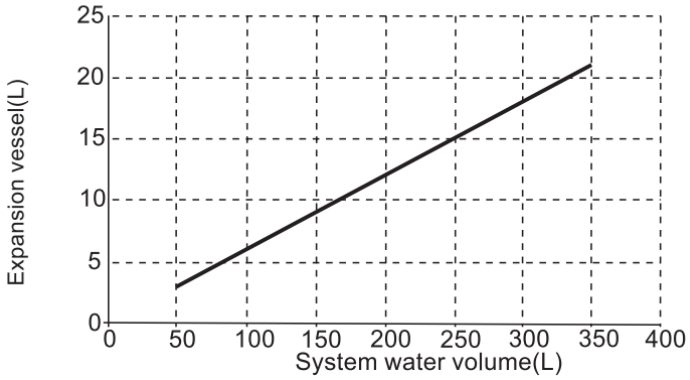
The units are equipped with an expansion vessel of 5L that has a default pre‑pressure of 1.0bar. To assure proper operation of the unit, the pre‑pressure of the expansion vessel might need to be adjusted.

- Check that the total water volume in the installation, excluding the internal water volume of the unit, is at least 40L.

NOTICE

- In most applications this minimum water volume will be satisfactory.
- In critical processes or in rooms with a high heat load though, extra water might be required.
- When circulation in each space heating loop is controlled by remotely controlled valves, it is important that this minimum water volume is kept even if all the valves are closed.

- Expansion vessel volume must fit the total water system volume.
- To size the expansion for the heating and cooling circuit.
- The expansion vessel volume can follow the figure below:



9.4.3 Water circuit connection

Water connections must be made correctly in accordance with the labels on the outdoor unit, with respect to the water inlet and water outlet. Therefore, always take into account the following when connecting the water circuit:

- Do not use excessive force when connecting the field piping and make sure the piping is aligned properly. Deformation of the piping can cause malfunctioning of the unit.
- When connecting the field piping, hold the nut on the inside of the unit in place using a spanner to provide extra leverage.
- Use a good thread sealant for sealing the connections. The sealing must be able to withstand the pressures and temperatures of the system.
- When using non-copper metallic piping, be sure to insulate the two kinds of materials from each

other to prevent galvanic corrosion.

- Use a decent thread sealant to seal connections.
- When using non-brass metallic piping, make sure to insulate both materials from each other to prevent galvanic corrosion.
- Because brass is a soft material, use appropriate tooling for connecting the water circuit. Inappropriate tooling will cause damage to the pipes.

If air, moisture, or dust gets in the water circuit, problems may occur. Offer the following suggestions:

U

Use clean pipes only.

H

Hold the pipe end downwards when removing burrs

C

Cover the pipe end when inserting it through a wall to prevent dust and dirt entering.

NOTICE

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

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

9.4.4 Water circuit anti-freeze protection

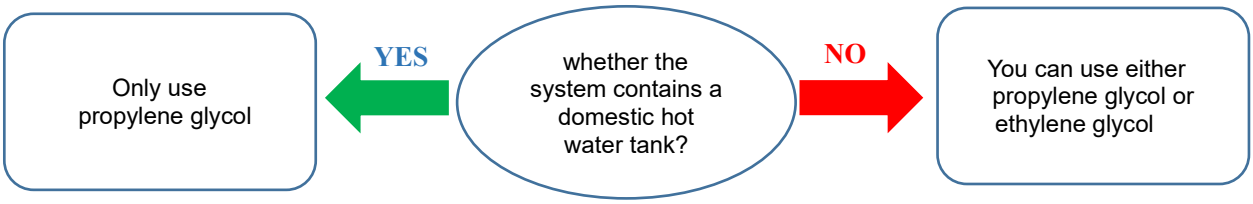
Ice formation can cause damage to the hydronic system. All internal hydronic parts are insulated to reduce heat loss. Insulation must also be added to the field piping.

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

In event of a power failure, the above features would not protect the unit from freezing. Since a power failure could happen when the unit is unattended, the supplier recommends add glycol to the water system (Adding glycol to the water lowers the freezing point of water).

- Glycol type selection

The types of glycols that can be used depend on whether the system contains a domestic hot water tank.



- Glycol concentration selection

Depending on the expected lowest outdoor temperature, make sure the water system is filled with a concentration of glycol as mentioned in the table below. When glycol is added to the system, the performance of the unit will be affected. The correction factor of the unit capacity, flow rate and pressure drop of the system is listed in the table.

Ethylene Glycol

Freezing point (°C)	Concentration of ethylene glycol (%)	Modification coefficient			
		Cooling capacity	Power input	Water resistance	Water flow
0	0	1.000	1.000	1.000	1.000
-4	10	0.984	0.998	1.118	1.019
-9	20	0.973	0.995	1.268	1.051
-16	30	0.965	0.992	1.482	1.092
-23	40	0.960	0.989	1.791	1.145
-37	50	0.950	0.983	2.100	1.200

Propylene Glycol

Freezing point (°C)	Concentration of Propylene glycol (%)	Modification coefficient			
		Cooling capacity	Power input	Water resistance	Water flow
0	0	1.000	1.000	1.000	1.000
-3	10	0.976	0.966	1.071	1.000
-7	20	0.961	0.992	1.189	1.016
-13	30	0.948	0.988	1.380	1.034
-22	40	0.938	0.984	1.728	1.078
-35	50	0.925	0.975	2.150	1.125

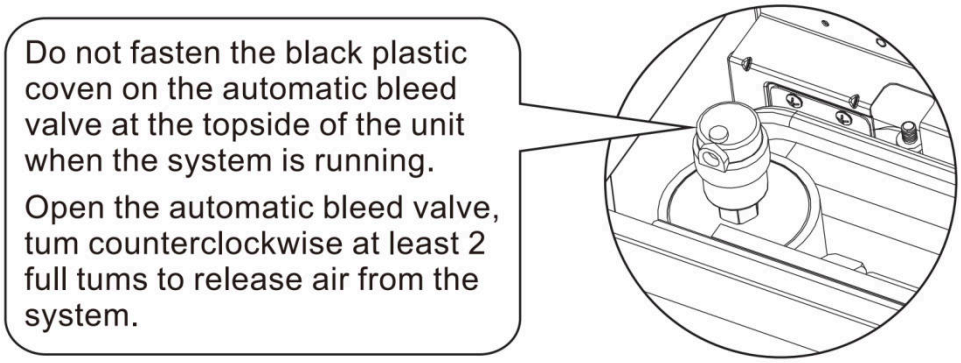
- Precautions for using ethylene glycol

Uninhibited glycol will turn acidic under the influence of oxygen. This process is accelerated by presence of copper and at higher temperatures. The acidic uninhibited glycol attacks metal surfaces and forms galvanic corrosion cells that cause severe damage to the system. It is of extreme importance:

- That the water treatment is correctly executed by a qualified water specialist.
- That a glycol with corrosion inhibitors is selected to counteract acids formed by the oxidation of glycols.
- That in case of an installation with a domestic hot water tank, only the use of propylene glycol is allowed. In other installations the use of ethylene glycol is fine.
- That no automotive glycol is used because their corrosion inhibitors have a limited lifetime and contain silicates that can foul or plug the system.
- That galvanized piping is not used in glycol systems since it may lead to the precipitation of certain elements in the glycol's corrosion inhibitor.
- To ensure that the glycol is compatible with the materials used in the system.

9.5 Filling water

- Connect the water supply to the filling valves and open the valve.
- Make sure all the automatic air purge valves are open (at least 2 turns).
- Filling with water until the manometer indicates a pressure of approximately 2.0bar. Remove air in the circuit as much as possible using the automatic air purge valves.



NOTICE

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

- The water pressure indicated on the manometer will vary depending on the water temperature (higher pressure at higher water temperature). However, at all times water pressure should remain above 1 bar to avoid air entering the circuit.
- The unit might drain-off too much water through the pressure relief valve.
- Water quality should be complied with EN 98/83 EC Directives.
- Detailed water quality condition can be found in EN98/83 EC Directives.

9.6 Flow switch

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

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

- Counterclockwise rotation, remove the water flow switch.
- Drying the water flow switch completely.

9.7 Water Piping Insulation

The complete water circuit including all piping, water piping must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity as well as prevention of freezing of the outside water piping during winter. The insulation material should at least of B1 fire resistance rating and complies with all applicable legislation.

The thickness of the sealing materials must be at least 13mm with thermal conductivity 0.039W/mK to prevent freezing on the outside water piping. If the outdoor ambient temperature is higher than 30°C and the humidity is higher than RH 80%, the thickness of the sealing materials should be at least 20mm to avoid condensation on the surface of the seal.

9.8 Field wiring

- All installation and wiring must be carried out by competent and suitably qualified, certified, and accredited professionals and in accordance with all applicable legislation.
- Electrical systems should be grounded in accordance with all applicable legislation.
- Overcurrent circuit breakers and residual‐current circuit breakers (ground fault circuit interrupters) should be used in accordance with all applicable legislation.
- Wiring patterns shown in this data book are general connection guides only and are not intended for, or to include all details for, any specific installation.
- The water piping, power wiring and communication wiring are typically run in parallel. However, the communication wiring should not be bound together with power wiring. To prevent signal interference, the power wiring and communication wiring should not be run in the same conduit. If the power supply is less than10A, a separation of at least 300mm between power wiring and communication wiring conduits should be maintained; if the power supply is in the range 10A to 50A then a separation of at least 500mm should be maintained.

9.8.1 Precautions on electrical wiring work

Fix cables so that cables do not contact the pipes (especially on the high-pressure side).

Secure the electrical wiring with cable ties so that it does not come in contact with the piping, particularly on the high‐pressure side.

Make sure no external pressure is applied to the terminal connectors. When installing the ground fault circuit interrupter make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the ground fault circuit interrupter.

NOTICE

- The ground fault circuit interrupter must be a high- speed type breaker of 30 mA (<0.1 s).
- This unit is equipped with an inverter. Installing, a phase advancing capacitor not only will reduce the power factor improvement effect, but also may cause abnormal heating of the capacitor due to high-frequency waves. Never install a phase advancing capacitor as it could lead to an accident.

9.8.2 Wiring overview

Field wiring needs to meet:

(a)Minimum cable section AWG18(0.75 mm2).

(b)The thermistor cable is delivered with the unit: if the current of the load is large, an AC contactor is needed.

NOTICE

- Please use HO7RN-F for the power wire, all the cables are connected to high voltage except for thermistor cable and cable for user interface.
- Equipment must be grounded.
- All high-voltage external load, if it is metal or a grounded port, must be grounded.
- All external load current is needed less than 0.2A, if the single load current is greater than 0.2A, the load must be controlled through AC contactor.
- Plate heat exchanger E-Heating tape and Expansion tank E-Heating tape share a control port.
- Most field wiring on the unit is to be made on the terminal block inside the switch box. To gain

WARNING

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

- Fix all cables using cable ties.
- A dedicated power circuit is required for the backup heater.
- Installations equipped with a domestic hot water tank (field supply) require a dedicated power circuit for the booster heater, please refer to the domestic hot water tank installation & Owner's Manual.
- Lay out the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely.
- Follow the electric wiring diagram for electrical wiring works (the electric wiring diagrams are located on the rear side of door 2.
- Install the wires and fix the cover firmly so that the cover may be fit in properly.

9.8.3 Precautions on wiring of power supply

- Always use multicore cable for power supply cables.
- If the power supply has a missing or wrong N-phase, equipment might break down.
- Establish proper earthing. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earthing may cause electrical shock.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside force cannot affect the terminals.

- Use the correct screwdriver to tighten the terminal screws. Small screwdrivers can damage the screw head and prevent appropriate tightening.
- Over-tightening the terminal screws can damage the screws.
- Attach a ground fault circuit interrupter and fuse to the power supply line.

9.8.4 Safety device requirement

1.Select the wire diameters (minimum value) individually for each unit based on the table below.

2.Select circuit breaker that having a contact separation in all poles not less than 3 mm providing full disconnection.

1-phase 4-16kW(Backup heater:3kW) and 3-phase 8-16kW(Backup heater:9kW) standard

System	Power current						WPM	
	Hz	Voltage(V)	Min(V)	Max(V)	MCA(A)	MHA(A)	kW	FLA(A)
4-6kW	50	220-240/1N	198	264	14	15	0.095	0.75
8-10kW	50	220-240/1N	198	264	20	15	0.095	0.75
8-10kW 3-PH	50	380~415V/3N	342	456	7	15	0.095	0.75
12-16kW	50	220-240/1N	198	264	33	15	0.095	0.75
12-16kW 3-PH	50	380~415V/3N	342	456	11	15	0.095	0.75

1-phase 4-16kW standard without backup heater

System	Power current						WPM	
	Hz	Voltage(V)	Min(V)	Max(V)	MCA(A)	MHA(A)	kW	FLA(A)
4-6kW	50	220-240/1N	198	264	14	/	0.095	0.75
8-10kW	50	220-240/1N	198	264	20	/	0.095	0.75
12-16kW	50	220-240/1N	198	264	33	15	0.095	0.75

NOTICE

- MCA: Max. Compressor. (A)
- MFA: MAX. Electrical heat. (A)
- WPM: Water Pump Motor
- FLA: Full Load Amps. (A)

A creepage circuit breaker above the maximum current must be installed to avoid possible electric shocks.

Part10 START-UP AND CONFIGURATION

This chapter describes the precautions for starting and configuring the system after it is installed.

⚠ CAUTION

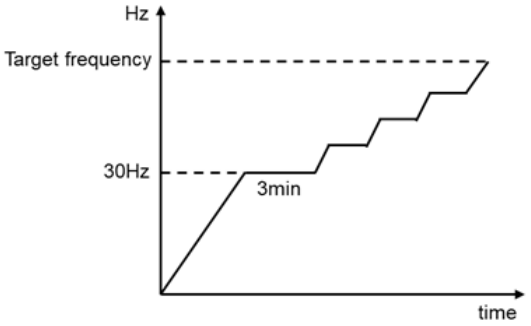
If you do NOT configure the system correctly, it might not work as expected. The configuration influences the following:

- The calculations of the software.
- What you can see on and do with the user interface.

10.1 Start-up Control

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

Before starting the compressor again, it needs to ensure that the minimum shutdown time of the compressor is 3 minutes. This balances the pressure in the refrigerant system and prevents frequent compressor on/off. The compressor will run at 30Hz for 3 minutes, then the compressor frequency is controlled by temperature difference between set temperature and outlet water temperature.



10.2 Start-up Control for Heating and Domestic Hot Water Operation

Component	Wiring diagram label	4-16kW	Control functions and states
Inverter compressor	COMP	●	According to the compressor startup control
DC fan motor	FAN	●	According to ambient temperature
Electronic expansion valve	EXV	●	According to initial steps and ambient temperature
Four-way valve	4-WAY	●	ON

10.3 Start-up Control for Cooling Operation

Component	Wiring diagram label	4-16kW	Control functions and states
Inverter compressor	COMP	●	According to the compressor startup control
DC fan motor	FAN	●	According to ambient temperature
Electronic expansion valve	EXV	●	According to initial steps and ambient temperature
Four-way valve	4-WAY	●	OFF

10.4 Pre-start checks

- Damaged equipment：Check the inside of the unit for damaged components or squeezed pipes.
- Power supply voltage：Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.
- Ground wiring：Make sure that the ground wires have been connected properly and that the ground terminals are tightened.
- Internal wiring：Visually check the switch box for loose connections or damaged electrical components.
- Mounting：Check that the unit is properly mounted, to avoid abnormal noises and vibrations when starting up the unit.
- Fuses, circuit breakers, or protective devices Check that fuses or locally installed protective devices are of the specified size and type. Make sure that no fuses or protection devices have been bypassed.
- Field wiring： Make sure that the field wiring between the local supply panel and unit and valves (when applicable), unit and room thermostat (when applicable), unit and domestic hot water tank, and unit and backup heater kit have been connected according to the wiring diagrams and to local laws and regulations.
- Refrigerant leak：Check the inside of the unit for refrigerant leakage. If there is a refrigerant leak, call your local dealer.
- Shut-off valves：Make sure that the shut-off valves are fully open.

10.5 Failure diagnosis at first installation

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

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

-The fuse on the PCB may be broken.

More error code and failure causes can be found in 14.3 "Error codes"

10.6 Installation procedure and matching setting of wired controller

Technical indicators	
Power voltage range	DC 24V
Mounting hole spacing	58~62mm
Button	Touch button
Humidity	RH20%~RH90%
Working ambient humidity	0~50℃
Max communication line length	60m
Dimensions(W*H*D)	120*120*20mm



The installation procedure and wiring diagram for the controller are as follows.

1. Cut off the power of indoor unit.

2. As shown in Fig.1, use a flathead screw driver to pry the bottom groove of the wire controller lightly (too much force would damage circuit board), pry rotationally to open the back cover.

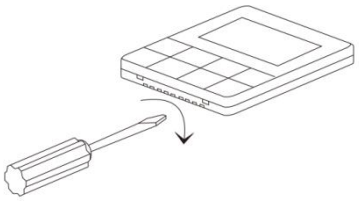


Fig.1

3. As shown in Fig.2 fix the wire controller to the wall with three screws through the three oval holes on the back cover of the wire controller. (Prepare three screws which are readily available in the market)



Fig.2

4. Connect port introduction

①Signal to BMS/Central to controller

②Signal to Main control board of hydraulic module (plug-in connection)

③Signal to Main control board of hydraulic module (screw connection) For "②" and "③", you can select one of them depending on your installation conditions

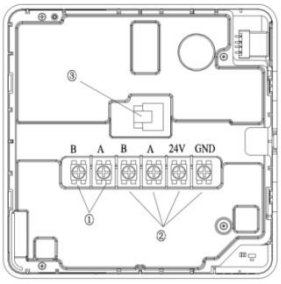


Fig.3

5. If the plug-in connection 485 communication wiring mode is selected, Connect the wire controller and main control board of hydraulic module through two communication wirings. (Check to prevent reverse connection of terminals) Communication wiring.

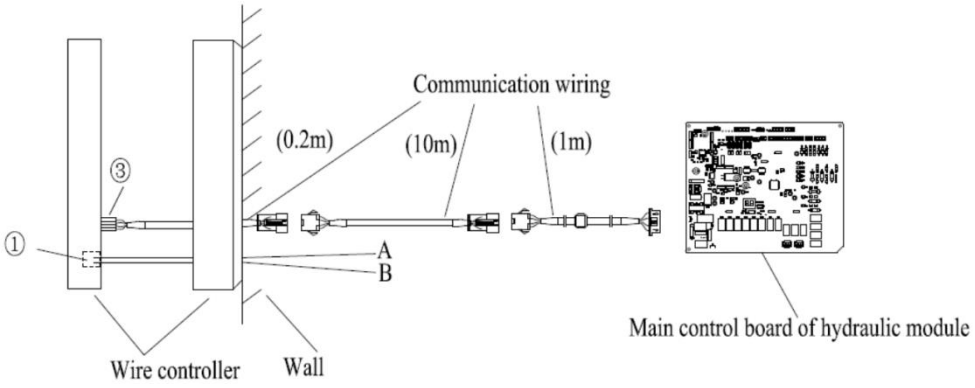


Fig.4

6. If screw connection 485 communication wiring mode is selected, Connect the wired controller and main control board of hydraulic module with screws. (Check to prevent reverse connection of terminals).

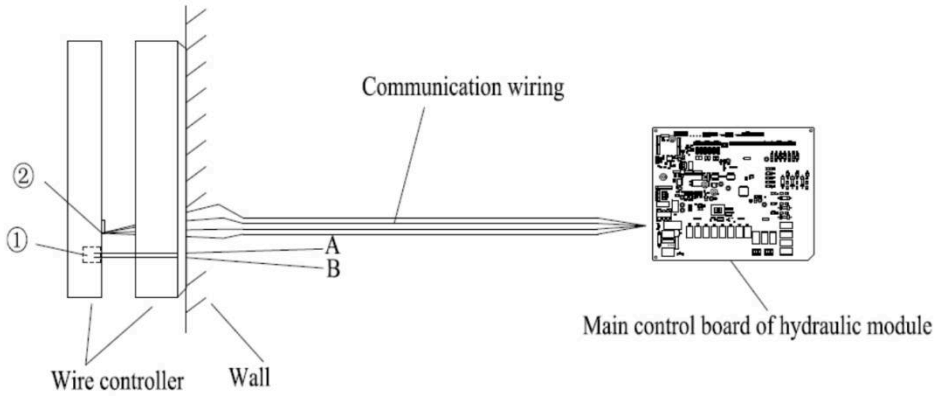


Fig.5

7. After connecting the connecting wire to the main body of the wire controller, as shown in Fig. 4, install main body part according to the following steps:

1). Push the upper part of main body into the clip.

2). Use the force of inclined top to install the lower part of main body (horizontal installation is prohibited, which is easy to damage the structural slot).

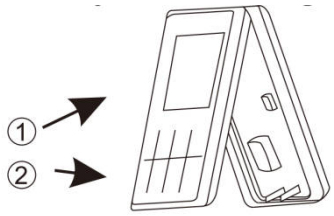


Fig.6

10.7 Final checks

Before switching on the unit, read following recommendations:

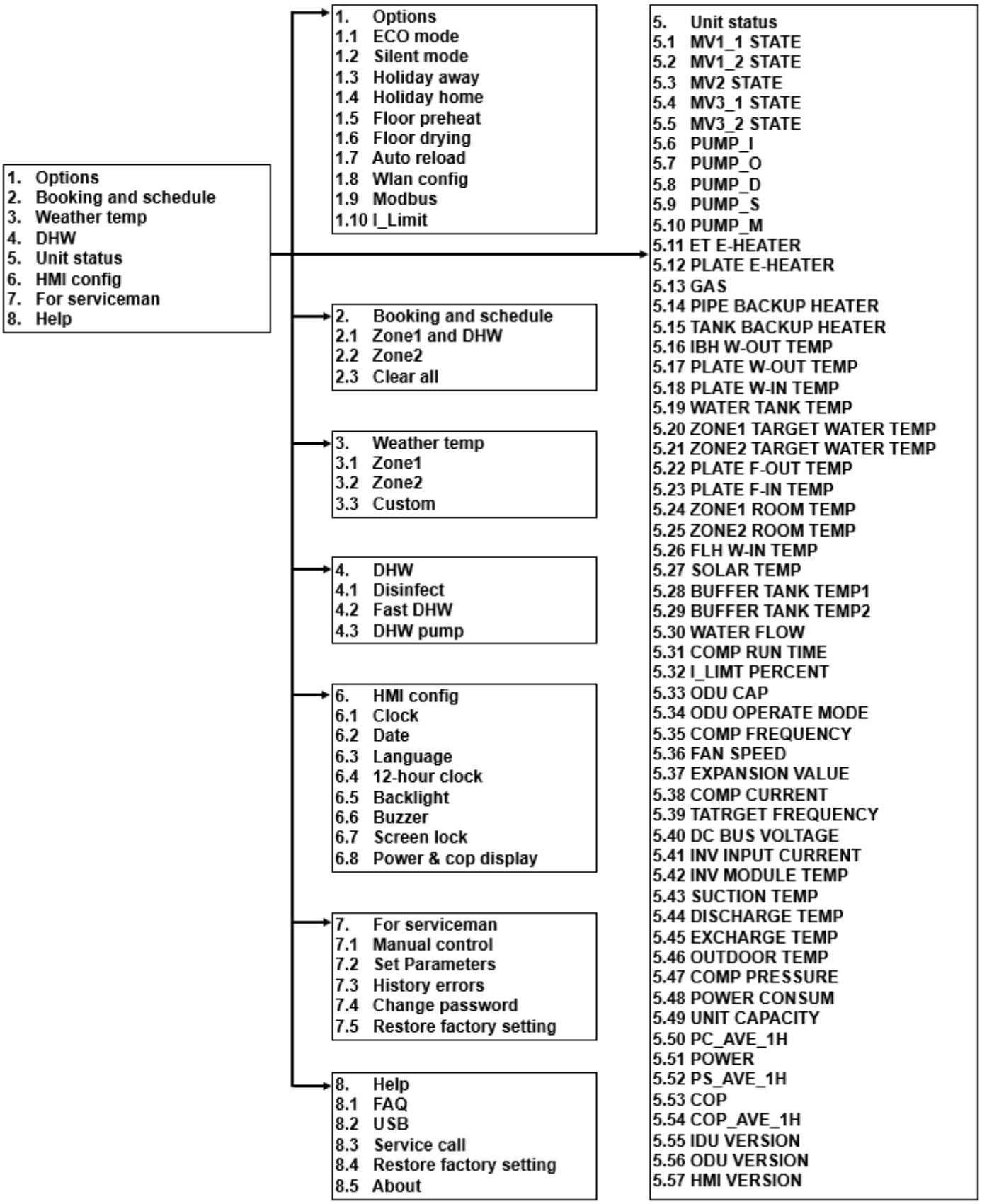
- When the complete installation and all necessary setting have been carried out, close all front panels of the unit, and refit the unit cover.
- The service panel of the switch box may only be opened by a licensed electrician for maintenance purpose.

Note:

Hat during the first running period of the unit, required power input may be higher than stated on the nameplate of the unit.

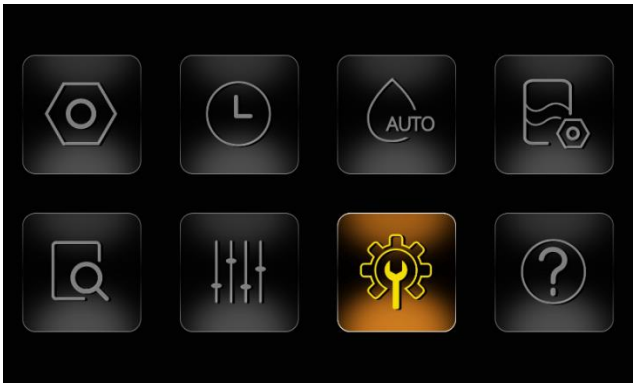
This phenomenon originates from the compressor that needs elapse of a 50 hours run in period before reaching smooth operation and stable power consumption.

Part11 MENU STRUCTURE: OVERVIEW



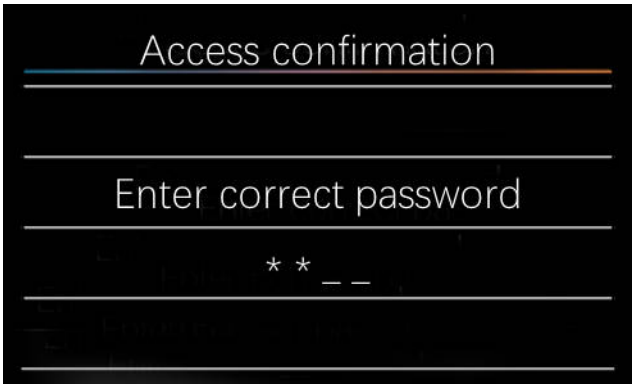
Part12 COMMISSIONING

12.1 Enter service mode

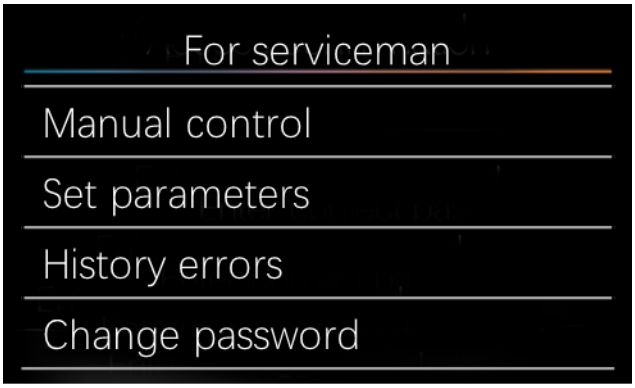


Press【MENU/OK】to enter the menu page;

Switch to FOR SERVICEMAN and enter the service page.

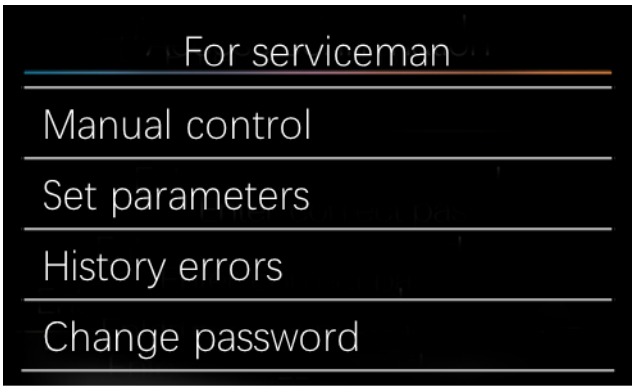


Enter password 1234 to enter service mode.

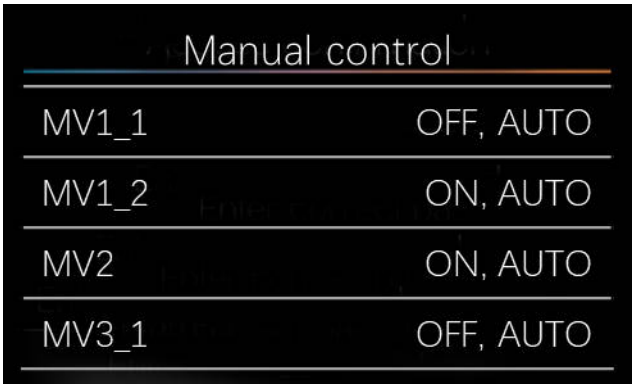


Switch different service menu by pressing “Λ” or “V”.

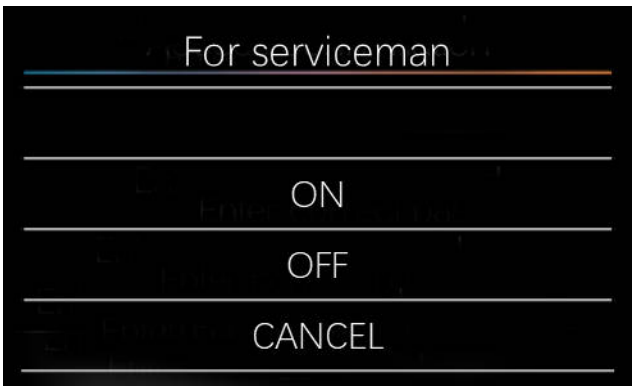
12.2 Manual control



On the service page select MANUAL CONTROL and press the【MENU/OK】to enter the MANUAL CONTROL page.

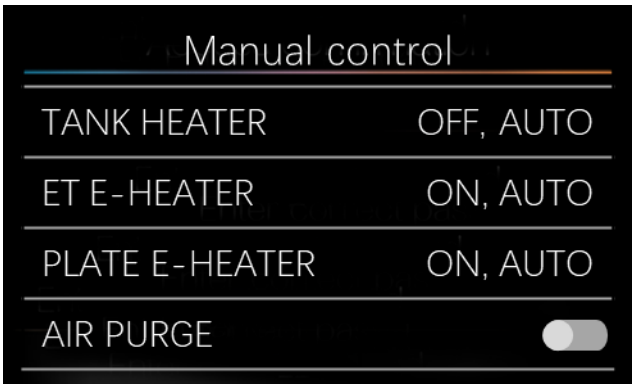


On the manual control page, you can manually switch on and off components such as valves, water pumps, electric heaters, etc.



Select different components by pressing “Λ” or “V”, and press the【MENU/OK】to start setting.

Select OFF/ON/CANCEL by “Λ” or “V”, and press the【MENU/OK】to make sure.



Select AIR PURGE and press the “<” or “>” to set on/off.



Select FORCED DEFROSTING and press the【MENU/OK】to make sure.

Press the “<” or “>” to select YES/NO.

Part13 FINAL CHECKS

The installation personnel are obligated to conduct inspections and debugging of the unit following its installation.

13.1 Final checks

To be safe, we recommend conducting an item-by-item inspection before testing the unit.

Checklist		
classification	items	√ / ×
Electrical	All field wiring has been completed in accordance with the instructions.	
	The ground terminal has been securely fastened.	
	The supply voltage corresponds to the rated voltage indicated on the nameplate.	
	There are no loose connections or damaged electrical components in the switch box.	
	There are no damaged components or squeezed pipes on the inside of the outdoor unit.	
	The fuses or locally installed protection devices are installed, and have not been bypassed.	
Valve	The pressure relief valve purges water when opened. Clean water must come out.	
	The shut-off valves are properly installed and fully open.	
Others	You have read all of the installation instructions.	
	The outdoor unit has been installed.	
	There are no water leaks inside the outdoor unit.	
	Satisfy the minimum water requirements of the unit.	
	The correct pipe size is installed and the pipes are properly insulated.	

Part14 MAINTENANCE AND SERVICE

In order to ensure the efficient operation of the unit and prolong its service life, it is necessary to check and maintain the unit, water system pipeline and the field wiring.

We recommend inspection and maintenance at least once a year. This maintenance needs to be performed by your local professional personnel.

14.1 Maintain safety precautions

- Please pay attention to the safety of electricity, and make sure to cut off the main power switch of the unit before maintenance.
- Please be mindful of the water temperature to avoid getting burned.
- Pay attention to the risks of electrostatic discharge and touch the metal part of the device before performing any maintenance to avoid damage to the PCB board caused by electrostatic discharge.

14.2 Yearly maintenance

- Heat exchanger

The heat exchanger is built into the outdoor unit, the dust and sand in the surrounding environment may enter the heat exchanger which can lead to blockages and reduced efficiency in heat exchange. Therefore, it is necessary to clean the heat exchanger regularly.

- Water pressure

Ensure that the water pressure > 100kPa. If it is low, add more water.

- Water filter

Close the valve, check if the water filter is broken, if it is, replace it with a new one.

Clean the water filter to make sure it is not clogged.

- Water pressure relief valve

Open the water pressure relief valve, check if it is operating correctly:

If the amount of water coming out of the valve is sufficient, then the valve is not blocked.

If the amount of water coming out of the valve is small and dirty, it indicates that the water system needs to be cleaned.

Notice: the water come out of the valve is very hot.

- Pressure relief valve of the domestic hot water tank

Open the valve, check if it is operating correctly, the method is the same as water pressure relief valve.

- Switch box

Conduct a visual inspection to determine if there are any visibly loose terminals or cables within the switch box.

Utilize an ohmmeter to verify the proper functionality of all contactors. All contacts of these contactors must be in open position when the power is turned off.