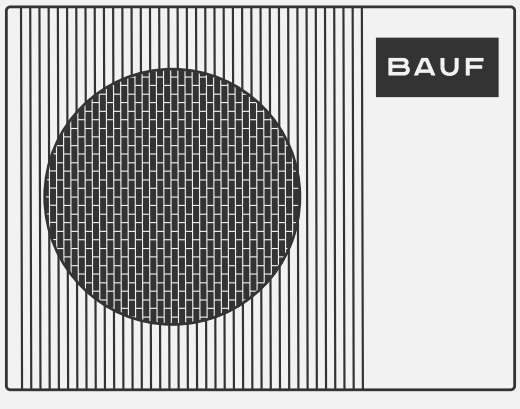
BAUF

BAUF INSTALLER HEAT PUMP MONOBLOCK RHEIN R290



INDEX

1. SAFETY

Description

Safety precautions are categorized into dangers, warnings, cautions, and notes. All of them are very important and must be strictly followed.

Instruction

- Read this manual carefully before installing the product. Please keep this manual properly for future reference.
- Improper installation of this device or its accessories may cause electric shock, short circuit, leakage, fire, or other damage to the device. Use only accessories that are made by the supplier specifically for the device, and be sure to ask professionals to install them.
- All actions described in this manual must be performed by certified technicians. Always wear necessary personal protective equipment such as gloves and safety goggles when installing or maintaining the device.
- For more assistance, contact your dealer.

Warning: Flammable!

Warning: This device contains flammable refrigerant. Repairs should only be performed in accordance with the manufacturer's recommendations. Maintenance and repairs assisted by other skilled personnel should be performed under the supervision of persons competent to use flammable refrigerants.

Danger: Indicates an imminently hazardous situation that, if not avoided, could result in death or serious injury.

Warning: Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

Caution: Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury. The symbol is also used for warning of unsafe actions.

Note: Indicates a situation that, if not avoided, could result in equipment damage or property loss.

The symbols that may be found on the unit are defined as follows:

Indicates that it is prohibited to be exposed to fire sources. Otherwise, there is a risk of fire.

Indicates that service personnel should refer to the installation manual to operate this device.

Indicates that the operating manual should be read carefully.

Indicates available information, such as the operating manual or installation manual.

Indicates that the device uses flammable refrigerant. There is a risk of fire if the refrigerant leaks and is exposed to an external ignition source.

General Safety Information

Danger

- Turn off the power switch before touching the wiring terminal.
- When removing the access panel, be careful not to touch live parts by accident.
- Never leave the device unattended while the access panel is removed during installation or maintenance.
- Do not touch the water pipes during and immediately after operation as they may be hot and may burn your hands. To avoid injury, allow water pipes time to return to normal temperatures or be sure to wear protective gloves.
- Do not touch any switch with wet hands. Otherwise, an electric shock may occur.
- Turn off all power supply to the device before touching electrical parts.

Warning

- To avoid danger of suffocation, tear open and keep the plastic bags for packaging away from children. Children playing with plastic packaging bags may be in danger of suffocation.
- Safely handle packaging materials, such as nails and other metal or wooden parts that can cause injury.
- Please ask the dealer or qualified personnel to install the device according to this manual. Do not install the device by yourself. Improper installation may result in water leakage, electric shock, or fire.
- Be sure to use specified accessories and parts to install the device. Otherwise, water leakage, electric shock, or fire may occur, or the device may fall.
- Install the device on a foundation that can bear the weight of the device. If the foundation is not strong enough, the device may fall and cause injury.
- When installing the device, take full account of strong winds, hurricanes, or earthquakes. Improper installation may cause the device to fall and lead to an accident.
- Make sure that all electrical work is performed by qualified personnel using a separate circuit in accordance with local laws and regulations and this manual. Insufficient capacity of the power supply circuit or improper electrical construction may result in electric shock or fire.
- Be sure to install a grounding circuit breaker in accordance with local laws and regulations.

Failure to install a grounding circuit breaker may result in electric shock and fire.

- Make sure that all wires are connected securely. Use specified wires and make sure that the connection of terminals or wires is not affected by water or other adverse external forces. Improper connection or fixing may cause fire.

- When wiring the power supply, lay the wires in a line so that they are securely fixed. Otherwise, terminal overheating, electric shock, or fire may occur.

- After the installation, check for refrigerant leakage.

- Never touch leaking refrigerant directly. Otherwise, you may be severely frostbitten. Do not touch refrigerant pipes during and immediately after operation because the pipes may be hot or cold depending on the conditions of the refrigerant flowing through the refrigerant pipes, compressor, and other refrigerant circulating components. If you touch the refrigerant pipes, you may be burnt or frostbitten. To avoid injury, allow pipes time to return to normal temperatures or be sure to wear protective gloves if you must touch them.

- Do not touch internal parts (such as the pump and backup heater) during and immediately after operation. Otherwise, you may be burnt. To avoid injury, allow internal parts time to return to normal temperatures or be sure to wear protective gloves if you must touch them.

Note:

- Ground the device.

- The grounding resistance must comply with local laws and regulations.

- Do not connect the earth line to a gas tube, water pipe, lightning rod, or telephone ground wire. Improper grounding may result in electric shock.

- Gas tube: If gas leaks, a fire or explosion may occur.
- Water pipe: A rigid vinyl pipe is not an effective grounding material.
- Lightning rod or telephone ground wire: If the rod or wire is struck by lightning, electrical thresholds may rise abnormally.

- Route the power wire at least 3 feet (1 meter) away from a television or radio to prevent interference or noise. Depending on the radio wave, 3 feet (1 meter) may not be enough to eliminate noise.

- Do not wash the device. Otherwise, electric shock or fire may occur. The installation of the device must comply with national wiring regulations. A damaged power wire must be replaced by the manufacturer, a repair agent, or personnel with similar qualification.

- Do not install the device in the following places:

- Places with mineral oil mist, oil mist, or steam. Plastic parts may deteriorate, become loose, or cause leakage.
- Places where corrosive gases (such as sulfurous acid gas) are generated. Corroded copper pipes or welded parts can cause refrigerant leakage.
- Places with a machine that emits electromagnetic waves. Electromagnetic radiation may interfere with the control system, thus leading to a device fault.
- Places where flammable gases may leak, where carbon fiber or combustible dust suspends in the air, or where volatile flammables such as paint thinner or gasoline are handled. These materials may cause fire.
- Places with high levels of salt in the air, such as near the ocean.
- Places with large voltage fluctuations, such as in factories.
- Vehicles or vessels.
- Places with acidic or alkaline vapors.

- This device can be used by children aged eight and over and persons with reduced physical, sensory, or mental abilities or lack of experience and knowledge if they have been given supervision or instruction in using this device safely and understand the hazards involved. Children should not operate this device. Children cannot be left unsupervised to clean or maintain this device.

- Children should be supervised and prevented from playing with electrical appliances.

- A damaged power wire must be replaced by the manufacturer, a service agent, or personnel with similar qualification.

- Recycling or scrapping: Do not dispose of this product as unsorted municipal waste. Such waste must be collected separately for special treatment. Use separate collection facilities instead of treating electrical appliances as municipal waste. For information about available collection systems, please contact your local authority. If electrical appliances are disposed of in landfills or dumps, hazardous materials can leak into groundwater and enter the food chain, harming your health and well-being.

- Wiring must be carried out by professionals in accordance with national wiring regulations and the circuit diagram. According to national regulations, fixed wiring should contain an all-pole disconnect device and a residual current device (RCD) with a rated value not exceeding 30 mA.

- Before the wire and pipe layout, confirm that the installation area (including the walls and floors) is safe and free of water, electricity, and gas hazards.

- Before installation, check whether the user's power supply meets the electrical requirements of the unit for reliable grounding, leakage, wire diameter electrical load, and other aspects. If the electrical installation requirements are not met, the device cannot be installed.

- When installing multiple air conditioners in a centralized manner, confirm the load balance of the three-phase power supply to prevent the units from being assembled to the same phase of the three-phase power supply.

- The device should be firmly installed and fixed, and reinforcement measures should be taken when necessary.

- The unit must be powered on again after at least 1 minute has passed following a power failure.

Notes:

- Maintenance and repairs on this device must be performed by certified technicians.
- This device must be moved and reinstalled, or recycled by certified technicians.
- If a leakage detection system is installed, check for leakage at least every 12 months. In the event of a leakage, we strongly recommend that all inspection records be properly kept.

Key Information of Refrigerant

This product contains flammable refrigerant R290. It is strictly prohibited to install this product in flammable and explosive areas.

Refrigerant type: R290 **GWP:** 3
GWP: Global Warming Potential

Model	Refrigerant charge in the unit	
	Refrigerant (kg)	Carbon dioxide equivalent / Ton
TICA040KHLB	0.51	0.00153
TICA060KHLB	0.51	0.00153
TICA080KHLB	0.8	0.0024
TICA100KHLB	0.8	0.0024

2. ACCESSORIES

Accessories Provided with the Device

Name	Quantity
User manual	1
Technical data manual	1
Energy label	1
Y type filter	1

Standard Accessories

Name	Quantity
Wired controller	1
Instruction manual for the wired controller	1

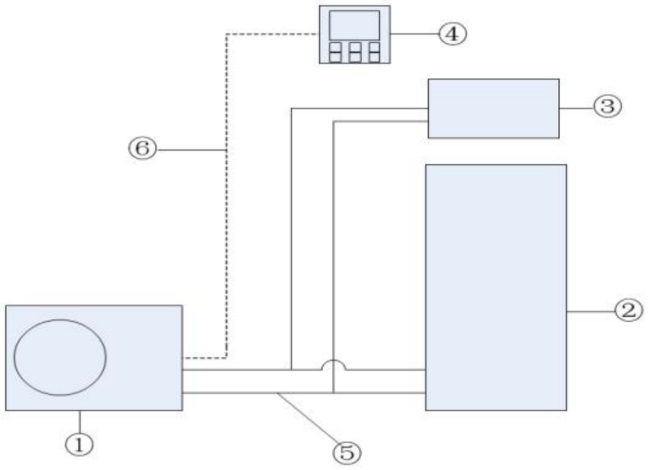
Accessories Provided on Site

Name	Quantity
Water tank temperature sensor of domestic hot water	1
Water flow temperature sensor in zone 2	1
Solar temperature sensor	1
Buffer tank temperature sensor	1
Temperature probe for total water outlet	1
Three-way valve SVa	1
Three-way valve SVb	1
Automatic discharge valve	1
Water inlet check valve	1
External circulation pump	1
DHW water pump	1
Zone-2 circulation pump	1
Solar circulation pump	1
Stop valve	1
Check valve	1
Three-way valve SVd/SVc	1
Shunt valve	1

3. PRODUCT DESCRIPTION

▪ Introduction to the System

This product is an air-water heat pump outdoor unit (ODU) with an integrated structure. It has the functions of cooling, heating, and preparing domestic hot water. You can use the wired controller to set the functions of the product.

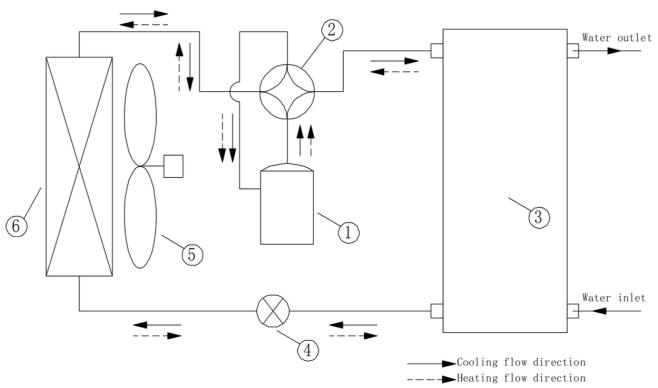


1. Heat pump ODU
2. Domestic hot water tank
3. Air side product
4. Controller
5. Water circulation loop
6. Communication cable

This product can also operate in silent mode. In silent mode, the product is quieter than in normal operation. This is achieved by limiting and adjusting the speed of the compressor and fan. However, in silent mode, the capabilities of the unit reduce accordingly.

The heat pump has a closed refrigerant loop in which the refrigerant circulates. In heating mode, thermal energy is absorbed from the environment through cycles of evaporation, compression, liquefaction, and expansion, and then released into the building. In cooling mode, thermal energy is extracted from the building and released into the environment.

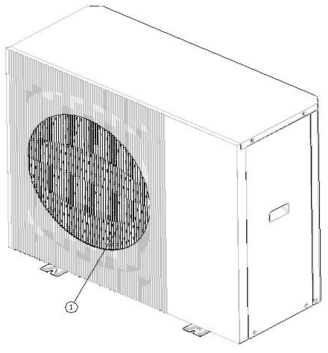
Operating principle:



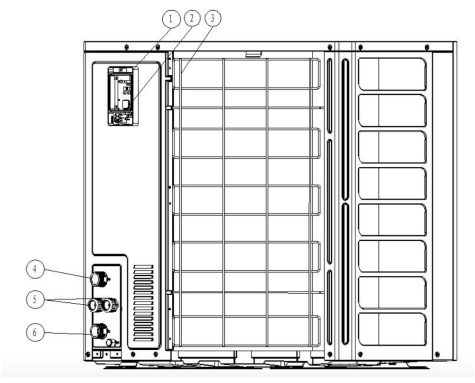
1. Compressor
2. Four-way valve
3. Plate heat exchanger
4. Expansion valve
5. Fan
6. Fin-tube heat exchanger

▪ Product Structure

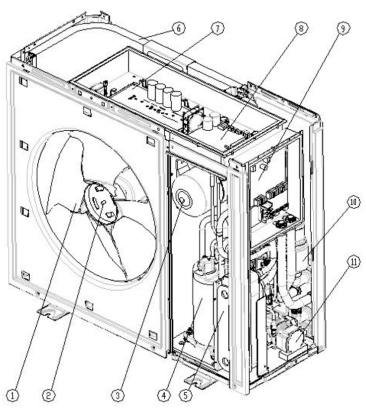
Appearance



① Air outlet



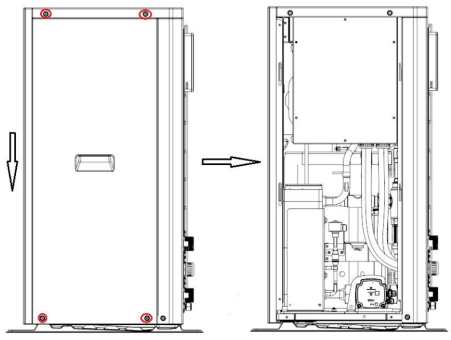
1. 4G module
2. Ambient temperature sensor
3. Protective net
4. Water outlet
5. Connecting tube
6. Water inlet



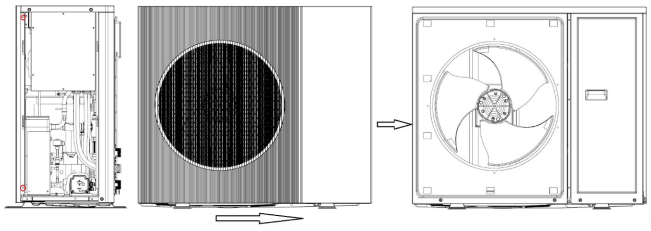
1. Fan blade
2. Motor
3. Expansion tank
4. Compressor
5. Plate heat exchanger
6. Fin-tube heat exchanger
7. Drive board
8. Main control board
9. Expansion board
10. Water-gas separator
11. Water pump

▪ Components Disassembly and Assembly

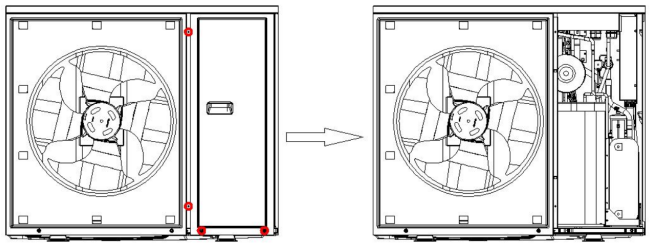
Step 1: Remove the right side sheet metal.



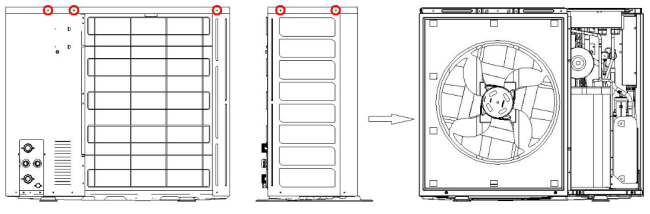
Step 2: Remove the front grille (Remove the upper and lower screws on the side first).



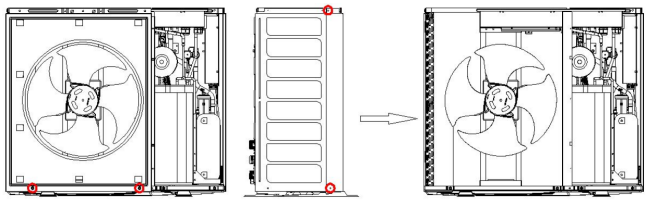
Step 3: Remove the front panel from the mesh cover



Step 4: Remove the top cover plate

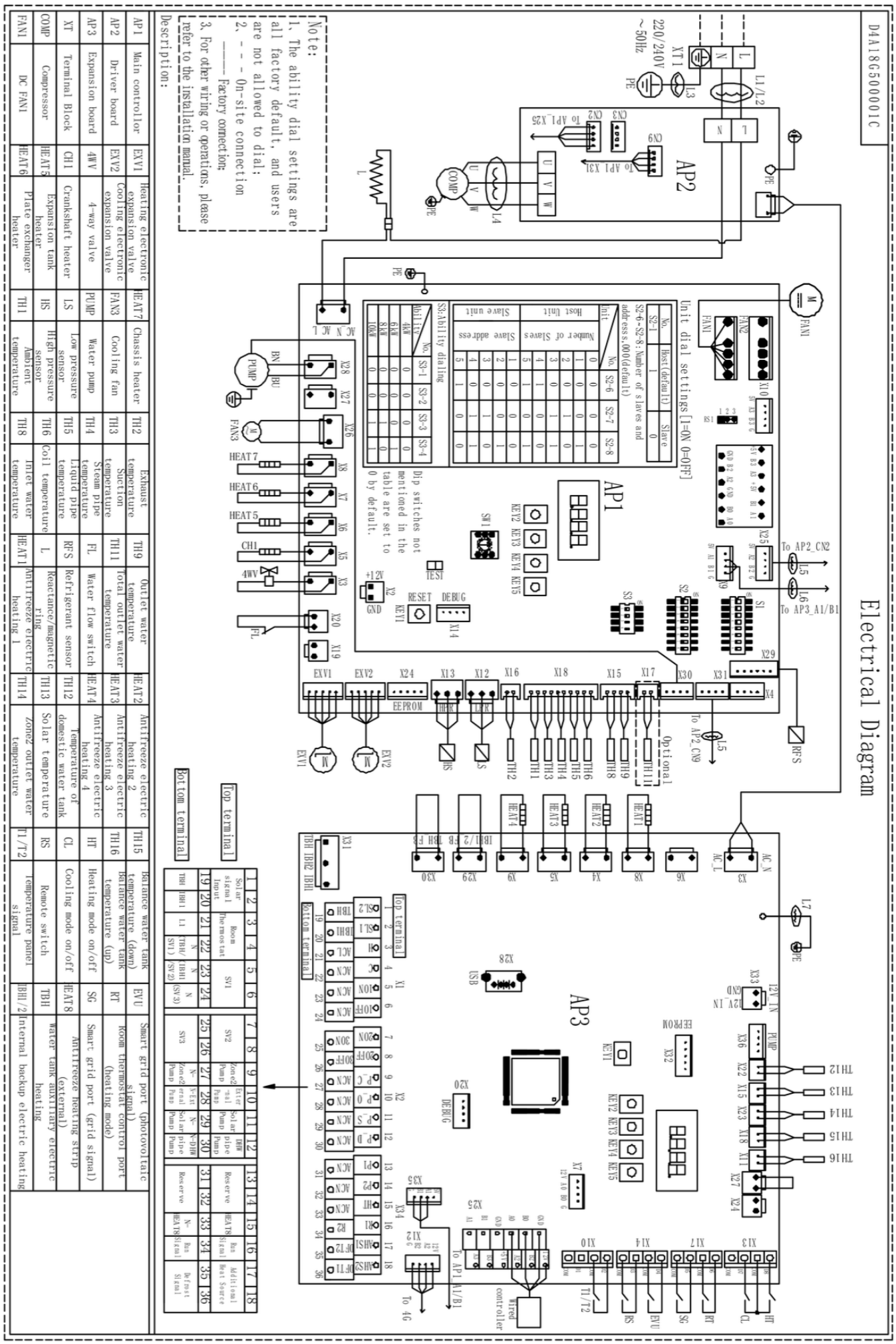


Step 5: Remove the fan guide ring



Note: Before removing cover plate 1, cut off all power sources, including unit power, backup heater, and domestic hot water tank power (if applicable). The components inside the device may be very hot.

▪ Unit Electrical Schematic Diagram



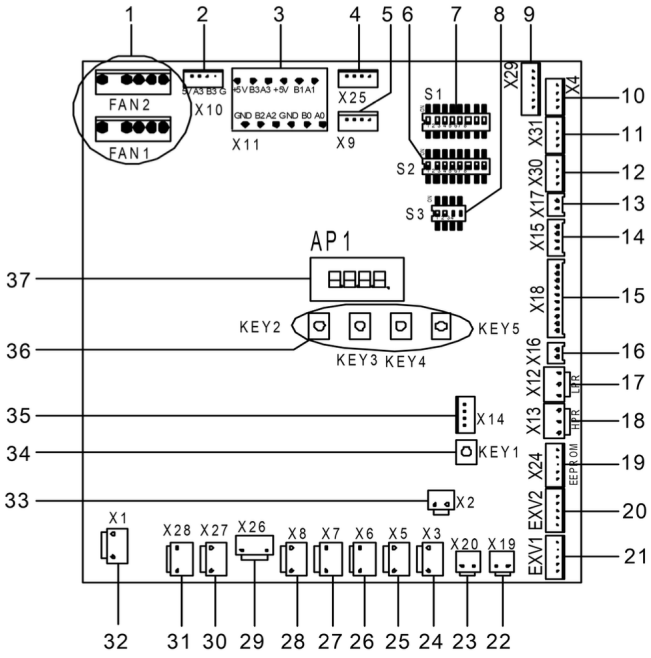
AP1	Main controller	EXV1	Heating electronic expansion valve	HEAT7	Chassis heater	TH12	Exhaust temperature	TH9	Outlet water temperature	HEAT2	Antifreeze electric heating 2	TH15	Balance water tank temperature (down)	EVU	Smart grid port (photovoltaic signal)
AP2	Driver board	EXV2	Cooling electronic expansion valve	FAN3	Cooling fan	TH13	Suction temperature	TH11	Total outlet water temperature	HEAT3	Antifreeze electric heating 3	TH16	Balance water tank temperature (up)	RT	Room thermostat control port (heating mode)
AP3	Expansion board	4WV	4-way valve	PUMP	Water pump	TH14	Steam pipe temperature	FL	Water flow switch	HEAT4	Antifreeze electric heating 4	HT	Heating mode on/off	SG	Smart grid port (grid signal)
XT	Terminal Block	CH1	Crankshaft heater	LS	Low pressure sensor	TH15	Liquid pipe temperature	RFS	Refrigerant sensor	TH12	Temperature of domestic water tank	CL	Cooling mode on/off	HEAT8	Antifreeze heating strip (external)
COMP	Compressor	HEAT5	Expansion tank heater	HS	High pressure sensor	TH6	Coil temperature	L	Reactance/magnetic ring	TH13	Solar temperature	RS	Remote switch	TBH	Water tank auxiliary electric heating
FAN1	DC FAN1	HEAT6	Plate exchanger heater	TH1	Ambient temperature	TH8	Inlet water temperature	HEAT1	Antifreeze electric heating 1	TH14	ZoneZ outlet water temperature	T1/T2	Temperature panel signal	IBH/2	Internal backup electric heating

Top terminal																		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Solar signal Input		Room Thermostat		SV1		SV2		Zone2 Pump	External Pump	Solar pipe Pump	DHW	Reserve		HEAT8 Signal	Run Signal	Additional Heat Source		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
TBH	IBH1	L1	TBH/IBH1 (SV1)	N (SV2)	N (SV3)	SV3		Zone2 Heat Pump	N-	Solar pipe Pump	N-DHW	Reserve		N- HEAT8	Run Signal	Defrost Signal		

Bottom terminal																		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
TBH		IBH2		IBH1		ACN		ACN		ACN		ACN		ACN		ACN		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
TBH		IBH2		IBH1		30ON	30FF	ACN	ACN	ACN	ACN	ACN		ACN		ACN		

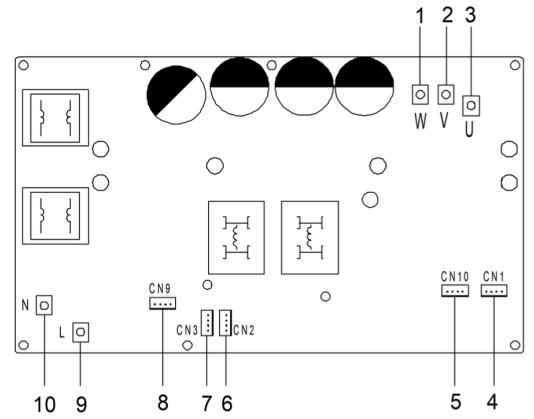
Unit Control Board

PCB (AP1) - main control board



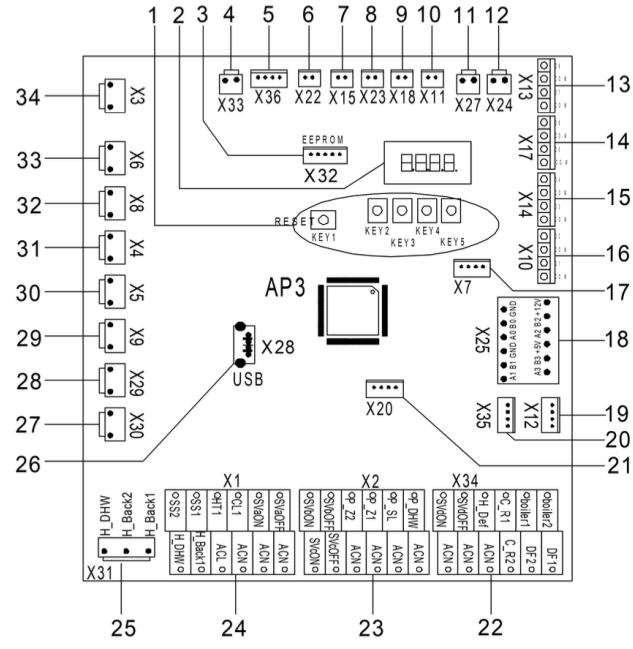
№	Description
1	Port for fan (FAN1/FAN2)
2	Reserved (X10)
3	Reserved (X11)
4	Port for communication with PCB AP2 (X25)
5	Port for communication with PCB AP3 (X9)
6	Switch for Master/Slave set up (S2)
7	Reserved (S1)
8	Switch for Model set up (S3)
9	Port for refrigerant senso r(X29)
10	Reserved (X4)
11	Port for communication with PCB AP2 (X31)
12	Communication with pump (X30)
13	Port for total water temp sensor (X17)
14	Port for inlet/outlet water temp sensor (X15)
15	Port for environment/suction/liquid/ steam/coil temp sensor (X18)
16	Port for discharge temp sensor (X16)
17	Port for low pressure sensor (X12)
18	Port for high pressure sensor (X13)
19	Reserved (X24)
20	Port for EXV2 (EXV2)
21	Port for EXV1 (EXV1)
22	Reserved (X19)
23	Port for water flow switch (X20)
24	Port for 4-way valve (X3)
25	Port for crankshaft heating belt (X5)
26	Port for expansion tank heating belt (X6)
27	Port for plate type heat exchanger heater (X7)
28	Port for chassis heater (X8)
29	Port for cooling fan of electric control box (X26)
30	Reserved (X27)
31	Port for pump (X28)
32	Port for power input (X1)
33	Reserved (X2)
34	Reset button (KEY1)
35	Debug (X14)
36	Debug button (KEY2/3/4/5)
37	Digital display

PCB (AP2) - drive board



№	Description
1	Compressor connection port W
2	Compressor connection port V
3	Compressor connection port U
4	101T Debug (CN1)
5	908B Debug (CN10)
6	Port for communication with PCB AP1 (CN2/CN3)
7	Port for communication with
8	PCB AP1(CN9)
9	Port for power input L
10	Port for power input N

PCB (AP2) - drive board



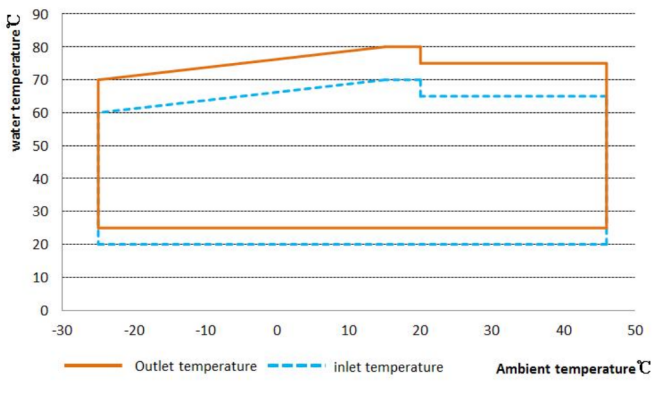
№	Port	Code	Description
1	KEY1	RESET	Reset button
	KEY2-5	/	Debug button
2	/	DIS1	Digital display
3	X32	EEPROM	EEPROM Debug
4	X33	+ 12V/GND	12V power (Reserved)
5	X36	PUMP	Port for communication with pump (Reserved)
6	X22	/	Port for domestic hot water tank temp. sensor
7	X15	/	Port for solar water tank temp. sensor
8	X23	/	Port for outlet water of zone 2 temp. sensor
9	X18	/	Port for balanced water tank of up temp. sensor
10	X11	/	Port for balanced water tank of down temp. sensor
11	X27	/	Port for water flow switch (Reserved)
12	X24	/	Reserved
13	X13	D8	Control port for room thermostat (heating mode)
		COM	Power port for DI input
		D7	Control port for room thermostat (cooling mode)

№	Port	Code	Description
14	X17	D6	Control port for room Thermostatic controller (heating mode)
		COM	Power port for DI input
		D5	Port for smart grid (grid signal)
		COM	Power port for DI input
15	X14	D4	Port for smart grid (photovoltaic signal)
		COM	Power port for DI input
		D3	Port for remote switch
		COM	Power port for DI input
16	X10	D2	Port for temperature board
		COM	Power port for DI input
		D1	Reserved
		COM	Power port for DI input
17	X7	12V A0 B0 G	Port for communication with host controller (Reserved)
18	X25	12V	12V power
		GND	Signal ground
		A0 B0	Port for communication with host controller
		A1 B1	Reserved
		A2 B2	Port for communication with 4G box (Reserved)
		A3 B3	Reserved
19	X12	12V A2 B2 G	Port for communication with 4G box
20	X35	5V A1 B1 G	Port for communication with AP1
21	X20	DEBUG	Port for debug
22	X34	SVdON SVdOFF	Port for SV d (3-way valve)
		ACN	ACN
		H_Def ACN	Control port for heater of defreezing (external)
		C_R1 C_R2	Running signal of Compressor
		boiler1 boiler2	Control port for additional heat source
		DF1 DF2	Defrost signal
23	X2	SVbON SVbOFF ACN	Port for SV b (3-way valve)
		SVcON SVcOFF ACN	Port for SV c (3-way valve)
		P_Z2 ACN	Port for zone 2 pump
		P_Z1 ACN	Port for external pump
		P_SL ACN	Port for solar pump
		P_DHW ACN	Port for DHW pipe pump
24	X1	SS1 SS2	Port for solar signal input (active 220-240VAC)
		HT1 ACL	Port for room thermostat (heating mode)
		CL1 ACL	Port for room thermostat (cooling mode)
		SVaON SVaOFF ACN	Port for SV a (3-way valve)
		H_DHW	Control port for tank booster heater 1
		H_Back1	Control port for internal backup heater 1
25	X31	H_DHW	Control port for tank booster heater 1
		H_Back2	Reserved
		H_Back1	Control port for internal backup heater 1
26	X28	USB	Port for U disk
27	X30	H_DHW_FB	Feedback port for external temperature switch(shorted in default)
28	X29	H_Back1/2_FB	Feedback port for temperature switch (shorted in default)
29	X9	HEAT4	Port for antifreeze electric heating tape (internal)
30	X5	HEAT3	Port for antifreeze electric heating tape (internal)
31	X4	HEAT2	Port for antifreeze electric heating tape (internal)
32	X8	HEAT1	Port for antifreeze electric heating tape (internal)
33	X6	PUMP	Reserved
34	X3	POWER	Port for power input

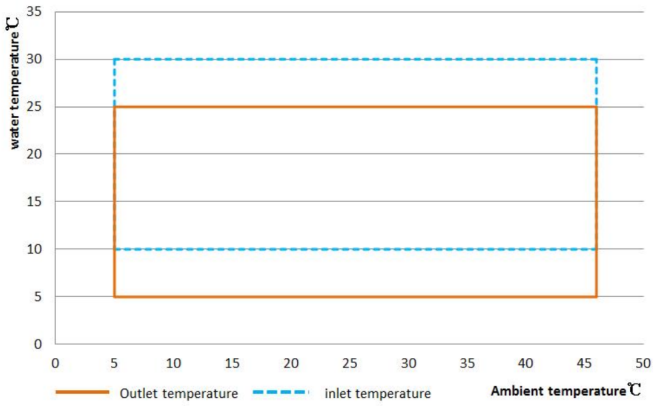
Operating Ranges

The following figures show the operating ranges of the ODU:

Heating operating range



Cooling operating range

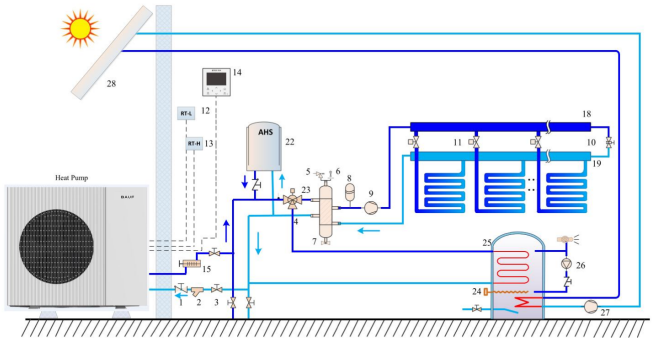


Note: The device has an anti-freezing function. It can use the heat pump or electric heater to ensure that the water system does not freeze under any circumstances.

System Application Solutions

The following application examples are for reference only.

Application Solution 1



№	Name
Heat Pump	ODU
1	Check valve
2	Y type filter
3	Stop valve
4	Balance tank
5	Pressure relief valve
6	Automatic discharge valve
7	Drain valve
8	Expansion tank
9	Zone-1 circulation pump
10	Shunt valve
11	Electric two-way valve
12	Low-voltage room thermostat
13	High-voltage room thermostat
14	Wired controller
15	Auxiliary electric heater on water side
18	Collector
19	Water separator
22	Supplementary heat source
23	SVa (electric three-way valve)
24	Auxiliary heater of water tank
25	Domestic water tank
26	Domestic hot water circulation pump
27	Solar circulation pump
28	Solar heat collector

- **Heating mode**

You can set the on/off signal, operating mode, and temperature on the wired controller. As long as the unit is in heating mode and the circulation pump remains on, the three-way valve SVa is always off.

- **Domestic hot water**

The on/off signal, operating mode, and temperature are set on the user interface. In domestic hot water mode, the circulation pump remains off while the three-way valve SVa remains on.

- **Control of other supplementary heat sources**

You can set the control of supplementary heat sources on the wired controller.

1. When a supplementary heat source is set to be valid only in heating mode, you can enable it in either of the following ways:

a. Enable the supplementary heat source function on the wired controller.
b. If the ambient temperature is low, and the initial water temperature is too low or the target water temperature is too high, the supplementary heat source will be automatically enabled.

As long as the supplementary heat source is active, the circulation pump will remain operational while the three-way valve SVa will remain off.

2. When a supplementary heat source is set to be valid in both heating and domestic hot water modes: In heating mode, the control of the supplementary heat source is the same as that when the supplementary heat source is set to be valid only in heating mode. In domestic hot water mode, if the initial domestic water temperature is too low or the target domestic water temperature under a low ambient temperature is too high, the supplementary heat source will be automatically enabled. The circulation pump stops running, and the three-way valve SVa remains on.

3. When a supplementary heat source is set to be valid, you can set M1 and M2 to be effective on the user interface. In heating mode, the supplementary heat source will be on if the M1 and M2 dry contacts are closed. This function is unavailable in domestic hot water mode.

- **Electric heating control of a water tank**

You can set the electric heating function of a water tank on the wired controller.

1. When the electric heater of a water tank is set to be valid, you can enable the heater through the water tank heater function on the user interface. In domestic hot water mode, if the initial domestic water temperature is too low or the target domestic water temperature under a low ambient temperature is too high, the electric heater of the water tank will be automatically enabled.

2. When the electric heater of a water tank is set to be valid, you can set M1 and M2 to be effective on the user interface. The electric heater of the water tank will be on if the M1 and M2 dry contacts are closed.

- **Control of solar circulation pump**

The unit identifies the solar signal interface by determining the solar temperature sensor or receiving the SL1SL2 signal sent by the user. You can set the identification method by using "solar input" on the user interface. See section 7.3 "Wiring of Other Components" for wiring.

1. When the solar temperature sensor is set to be valid, and the sensor detects a high temperature, the solar circulation pump starts operating. When the solar temperature sensor detects a low temperature, the solar circulation pump stops operating.

2. When the SL1SL2 control is set to be valid, the solar circulation pump starts operating after the solar kit signal is received from the user interface. If no signal is received, the solar circulation pump stops operating.

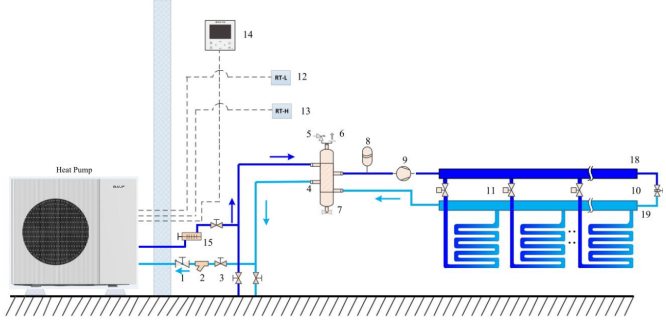
Caution: The maximum outlet water temperature can reach 80°C. Be careful of burns.

Note: Make sure that the three-way valve is installed correctly. For details, see section 7.3 "Wiring of Other Components." At very low ambient temperatures, the domestic hot water is heated entirely by the electric heater of the water tank. This ensures that the heat pump can be used under full load for space heating.

Application Solution 2

You can set the heating or cooling control function of a room thermostat on the wired controller. Three modes are available: mode set control, single-zone control, or dual-zone control.

Single-Zone Control



№	Name
	ODU
	Check valve
	Y type filter
	Stop valve
	Balance tank
	Pressure relief valve
	Automatic discharge valve
	Drain valve
	Expansion tank
	Zone-1 circulation pump
	Shunt valve
	Electric two-way valve
	Low-voltage room thermostat
	High-voltage room thermostat
	Wired controller
	Auxiliary electric heater on water side
	Collector
	Water separator

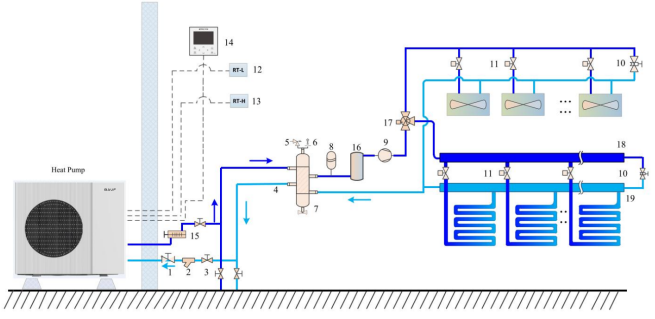
- **Heating mode**

In single-zone control mode, the room thermostat only turns on/off the unit, and the cooling or heating mode and water outlet temperature are set on the wired controller. When a voltage is detected on port HT1, the unit is on. When no voltage is detected on port HT1, the system is off.

- **Operation of the circulation pump**

When a voltage is detected on port HT1, the system is on and the circulation pump starts operating. When no voltage is detected on port HT1, the system is off and the circulation pump stops operating.

Mode Set Control



№	Name
Heat Pump	ODU
1	Check valve
2	Y type filter
3	Stop valve
4	Balance tank
5	Pressure relief valve
6	Automatic discharge valve
7	Drain valve
8	Expansion tank
9	Zone-1 circulation pump
10	Shunt valve
11	Electric two-way valve
12	Low-voltage room thermostat
13	High-voltage room thermostat
14	Wired controller
15	Auxiliary electric heater on water side
18	Collector
19	Water separator

- **Heating mode**

You can set the cooling or heating mode by using the room thermostat and set the water temperature on the user interface.

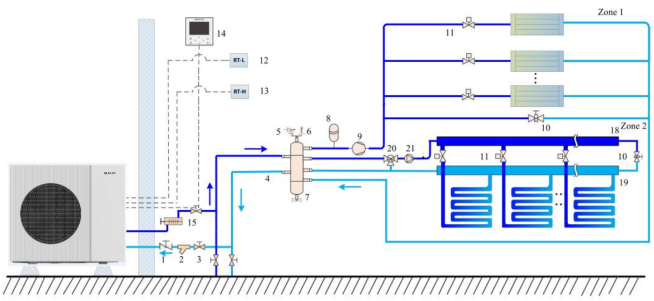
1. When an input voltage is detected on port CL1, the unit operates in cooling mode.
2. When an input voltage is detected on port HT1, the unit operates in heating mode.
3. When an input voltage is detected on both port HT1 and port CL1, the unit operates in cooling mode. 4. When no input voltage is detected on either port HT1 or port CL1, the unit stops operating.

- **Operation of the circulation pump**

1. When an input voltage is detected on port CL1, the system operates in cooling mode, the three-way valve SVb remains off, and the circulation pump starts operating.

2. When an input voltage is detected on port HT1 while no input voltage is detected on port CL1, the system operates in heating mode, the three-way valve SVb remains on, and the circulation pump starts operating.

Dual-Zone Control



№	Name
Heat Pump	ODU
1	Check valve
2	Y type filter
3	Stop valve
4	Balance tank
5	Pressure relief valve
6	Automatic discharge valve
7	Drain valve
8	Expansion tank
9	Zone-1 circulation pump
10	Shunt valve
11	Electric two-way valve
12	Low-voltage room thermostat
13	High-voltage room thermostat
14	Wired controller
15	Auxiliary electric heater on water side
18	Collector
19	Water separator
20	Mixing valve

- **Heating mode**

The IDUs in Zone 1 can operate in cooling or heating mode, while the IDUs in zone 2 can operate only in heating mode. During installation, connect only the HT1 and ACL terminals of all thermostats in zone 1. Connect only the CL1 and ACL terminals of thermostats in zone 2.

1. The on/off of IDUs in zone 1 is controlled by the room thermostat in zone 1. When a voltage is detected on port HT1 of the room thermostat in zone 1, the IDUs in zone 1 start operating. When no voltage is detected on port HT1, the IDUs in zone 1 are off. You can set the target temperature and running mode through the wired controller.

2. If you set to heating mode through the wired controller, the on/off of IDUs in zone 2 is controlled by the room thermostat in zone 2. When a voltage is detected on port CL1, the IDUs in zone 2 are on. When no voltage is detected on port CL1, the IDUs in zone 2 are off. You can set the target temperature on the user interface. The IDUs in zone 2 can operate only in heating mode. If you set to cooling mode through the wired controller, and when a voltage is detected on port CL1, the IDUs in zone 2 are off.

- **Operation of the circulation pump**

When the IDUs in zone 1 are on, the circulation pump starts operating.

When the IDUs in zone 1 are off, the circulation pump stops operating.
When the IDUs in zone 2 are on, the mixing valve remains on and the mixing pump starts operating. When the IDUs in zone 2 are off, the mixing valve remains off and the mixing pump stops operating.

Note: Compared with a heat sink or a fan coil, a floor heating circuit requires a lower water temperature in heating mode. To achieve different water temperatures for varied air-side products, use a water mixing station to adjust the water temperature according to the requirements of the floor heating circuit. The heat sink is connected directly to the unit water circuit, and the floor heating circuit is deployed after the water mixing station. The water mixing station is controlled by the unit.

Notes:

1. Make sure that the terminals of the three-way valve SVc or mixing valve are properly connected with a wired controller.

2. Connect thermostat wires to the correct terminals and properly configure the room thermostat on the controller. The wiring of the room thermostat must comply with method A, B, or C in section 7.3.3 "For room thermostat".

Notes:

1. The IDUs in zone 2 can operate only in heating mode. When you set to cooling mode on the user interface, the system remains off if the IDUs in zone 1 are off and a voltage is detected on port CL1 in zone 2. Thermostats in zone 1 and zone 2 must be wired correctly during installation.

2. The drain valve must be installed at the lowest point of the piping system.

Note: If a balance tank is used in the system, the volume of the balance tank needs to be greater than or equal to 25 L.

4. BEFORE UNIT INSTALLATION

Before Installation

Be sure to confirm the product model, name, and serial number.

Note: Only certified personnel can install, operate, and maintain the product.

Unit Transportation

1. When using a sling to transport the unit, pull up both ends of the sling at the same time to prevent the sling from becoming detached from the unit.

2. Keep both sides of the sling level.

3. After the unit is installed, pull one end of the sling to remove it from the unit.

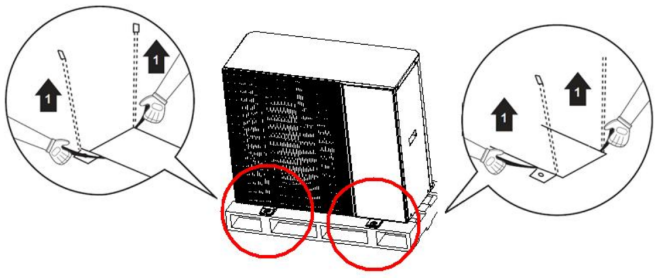


Figure 4.1

Notes:

- To avoid injury, do not touch the air inlet and aluminum fins of the unit.
- The unit is top-heavy. Prevent the device from falling due to improper inclination during transportation.

Unit Dimensions

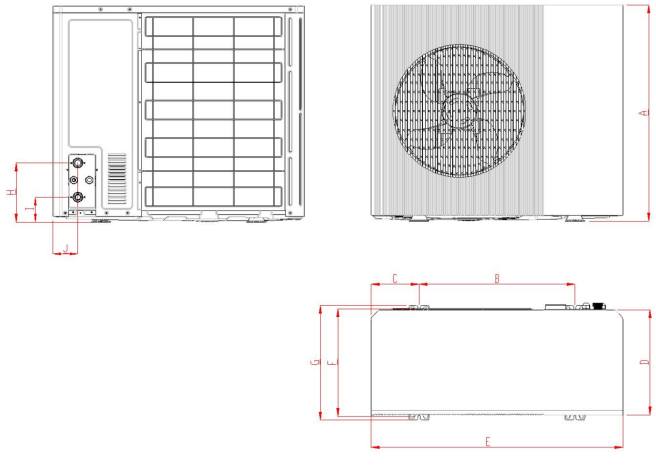


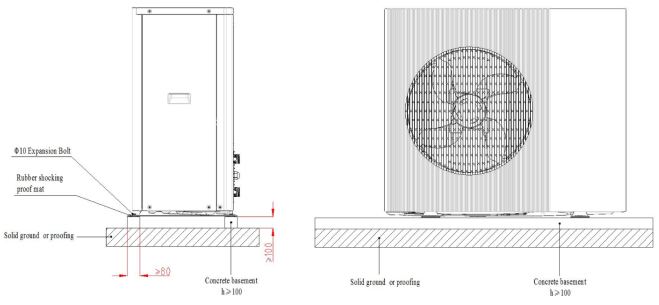
Figure 4.2

Unit: mm

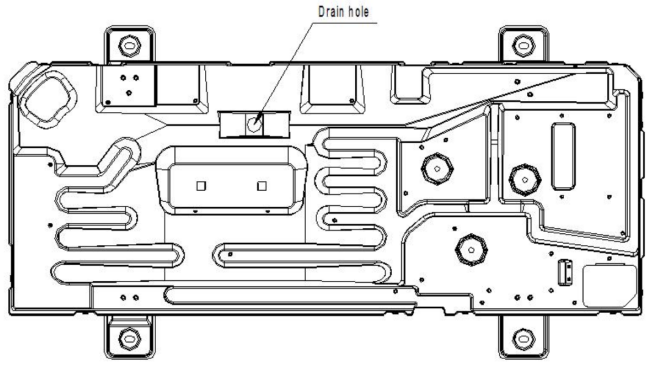
Mode	A	B	C	D	E	F	G	H	I	J
4/6/8/10kW	945	680	210	460	1100	470	500	260	110	110

Installation Requirements

- Check the strength and levelness of the installation floor to avoid vibration or noise when the device is in operation.
- Fix the device securely with foundation bolts according to the foundation diagram. (Prepare four sets of Φ10 expansion bolts, nuts, and washers, which are available on the market).
- Tighten the anchor bolts until they are 20 mm from the foundation surface.



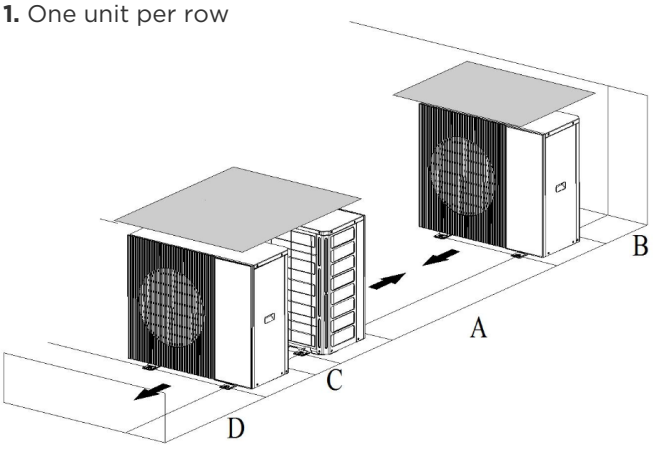
Drain Hole Position



Installation Space Requirements

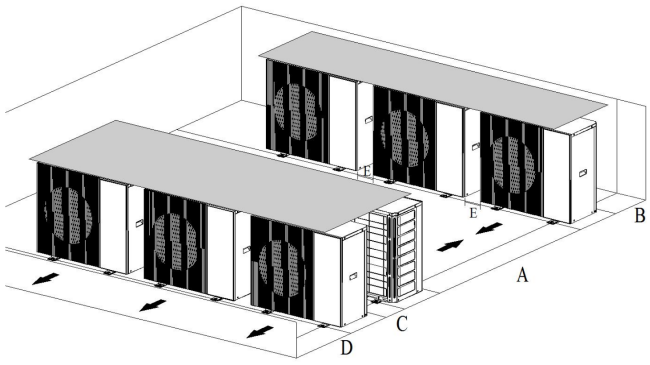
The following figures show the requirements when the units are installed in multiple rows.

1. One unit per row



Unit	A(mm)	B(mm)	C(mm)	D(mm)
4~10kW	≥3000	≥300	≥600	≥2000

2. Multiple units per row



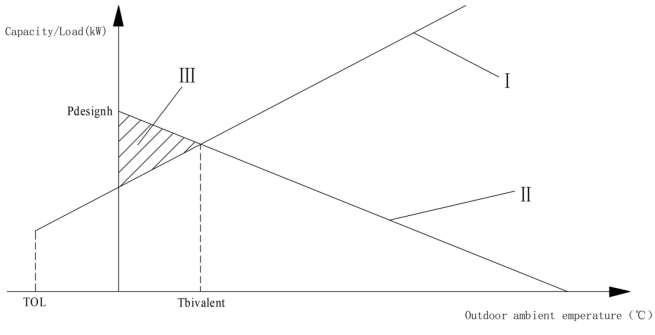
Unit	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)
4~10kW	≥3000	≥300	≥600	≥2000	≥500

Other Requirements

- These units can be combined with fan coil (FCUs), floor heating, low-temperature high-efficiency radiators, domestic hot water tanks (field supply), and solar kit (field supply).
- The unit can be powered on for operation only after a wired controller is equipped.
- If you select a backup electric heater, it can increase heating capacity when the outdoor temperature is low. The backup heater can also protect outdoor water pipes from freezing in winter in the event of a device failure.

Notes:

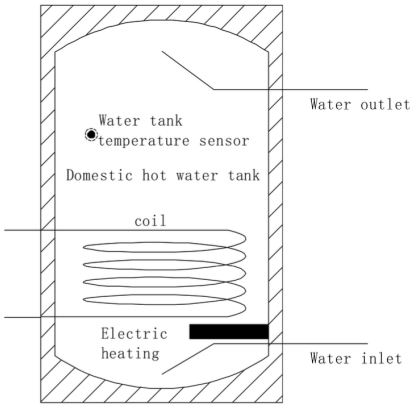
- The maximum length of the communication cable between the unit and the controller is 50 m.
- The power wire and communication wires must be laid in different pipes. Otherwise, electromagnetic interference may occur. The power and communication wires cannot come into contact with refrigerant pipes to prevent the high-temperature pipes from damaging the wires.
- Communication wires must be shielded cables.



I - Heat pump capacity
II - The required heating capacity depends on the location
III - The backup heater provides additional heating capacity
TOL - Operation temperature limit
Tbivalent - Bivalent temperature

Domestic hot water tank (field supply)

The unit can be connected to a domestic hot water tank (with or without a booster water heater). Different heat exchanger materials have different requirements for the heat transfer area of the water tank.



The electric heater of the water tank should be installed below the domestic hot water tank temp. sensor (TH12).

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

Model		4/6kW	8/10kW
Tank volume (L)	Recommended	100~250	150~300
Heat exchange area (m2) (stainless steel coil)	Minimum	1.4	1.4
Heat exchange area (m2) (enamel coil)	Minimum	2.0	2.0

Room thermostat (field supply)

A room thermostat can be connected to the unit and installed far away from heat sources.

Solar kit of a domestic hot water tank (field supply)

A solar kit can be connected to the device.

5. INSTALLATION POSITION SELECTION

Warning: Be sure to take appropriate measures to prevent the unit from being used as a shelter by small animals. If a small animal touches an electrical component, a fault, smoke, or fire may occur. Instruct customers to keep areas around the unit clean.

- Select an installation location that meets the following conditions and obtain customer approval:

- The place is well-ventilated.
- The unit operation does not disturb neighbors.
- The place is safe and can withstand the weight and vibration of the unit.
- The place is free from leaked flammable gases or products.
- The place is not a potentially explosive environment.
- The place can provide enough service space.
- The place allows for pipes and wires within allowed lengths.
- Water leakage from the unit will not cause damage to the site (such as clogged drains).
- The place keeps out the rain if possible.
- The environment is not enclosed.
- The place is not frequently used as a workplace. If construction work (such as polishing) will generate a large amount of dust, the device must be covered.
- No object or device is placed on top of the unit (top panel).
- Do not climb, sit or stand on top of the unit.
- The place is not near the sea or with corrosive gas.

- The device can be installed on level ground, a vertical wall, or horizontal roof, but should never be installed on a slope.

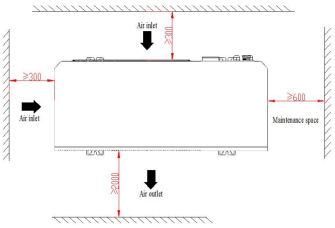
- If the device is exposed to strong winds, pay special attention to the following items:

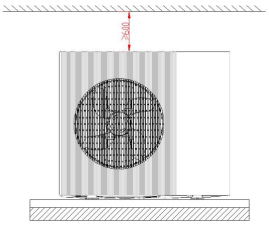
- Strong winds of 5 m/s or above blowing against the air outlet of the device can cause a short circuit (suction of exhausted air), which may cause the following consequences:

- The operating capacity is reduced.
- Frosting is accelerated in heating mode.
- The pressure rise may cause operation interruptions.
- The motor is burned.
- When strong winds continue to blow toward the front of the device, the fan will rotate rapidly until it breaks.

Under normal circumstances, the unit installation needs to meet the following requirements.

Unit: mm





Notes:

- Make sure that there is enough space for installation. Keep the side of the air outlet perpendicular to the wind direction.
- Arrange drainage ditches around the foundation to drain wastewater around the device.
- If water cannot be easily drained from the unit, install the unit on a foundation such as a concrete block (with a height of about 100 mm).
- If the unit is installed in areas with heavy snow, pay special attention to raising the foundation as much as possible.
- If the unit is installed on a building frame, add a waterproof plate (field supply) of about 100 mm to the bottom of the device to avoid drainage dripping, as shown in the figure below.

▪ Installation Position Selection in Cold Regions

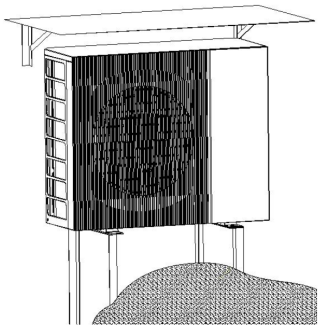
Note: Be sure to follow the instructions below when operating the unit in cold climates:

- To protect against wind, place the suction side of the unit toward a wall.

- Never install the unit with the suction side directly exposed to wind.

- To protect against wind, install a baffle on the air outlet side of the unit.

- In regions with heavy snowfall, an installation location where snow accumulation will not affect the unit is critical. If lateral snowfall is possible, be sure to protect the heat exchanger coil from being affected by snow accumulation and build a transverse ceiling if necessary.



1. Build a large canopy.

2. Build a base.

3. Mount the unit high enough from the ground to prevent it from getting buried in snow.

▪ Protection from the Sun

Because the outdoor temperature is measured by the temperature sensor, be sure to install the unit in a cool place or build a ceiling to avoid direct sunlight and solar heat. Otherwise, the unit may be protected from the high ambient temperature.

▪ Safety Area Requirements

This product contains refrigerant R290, which features a higher density than air. If leakage occurs, the refrigerant may accumulate near the ground.

The accumulation of refrigerant must not create a hazardous, explosive, suffocating, or toxic environment. Refrigerant must not enter the building through openings. Refrigerant must not accumulate in grooves.

Warning: If the device is unshielded, a snow-proof shed must be installed to:

(1) Prevent rain and snow from the heat exchanger. Otherwise, the heating capacity of the unit may reduce and the heat exchanger may freeze after a long term;

(2) Prevent the unit air thermistor from being exposed to sunlight and causing startup failure;

(3) Prevent freezing rain.

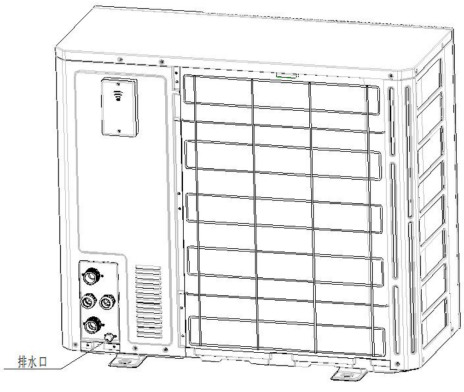
6. UNIT INSTALLATION

▪ Water Pipe Length Requirements

Table 6.1

Requirements	Value
Maximum allowable water pipe length between the three-way valve and the unit (only in systems with domestic hot water tanks installed)	3m
Maximum allowable water pipe length between the domestic hot water tank and the ODU (only in systems with domestic hot water tanks installed) The length of the temperature sensor cable provided with the device is 10 m.	8m
Maximum allowable water pipe length between the domestic hot water tank temperature sensor and the ODU. The length of the temperature sensor cable provided with the device is 10 m.	8m

Note: If no glycol exists in the system and the power supply or pump fails, all the water in the system needs to be drained when the water temperature is below 0°C in cold winter. (The unit is provided with a water outlet, as shown in the figure below).



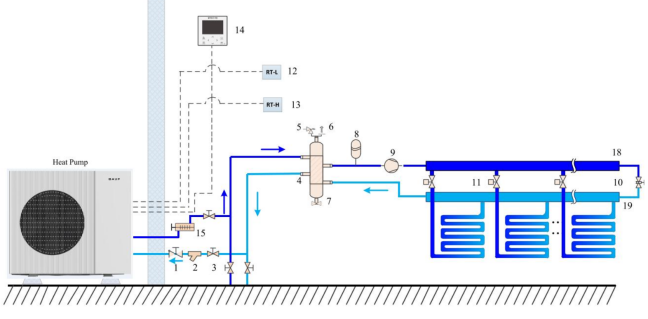
This is because static water within the system is likely to freeze and damage the system.

▪ Water Circuit Check

The device is connected to a water circuit through a water inlet and a water outlet. The water circuit can be checked only by licensed technicians in accordance with local laws and regulations.

This device can be used only in a closed water system. Using this device in an open water circuit may result in excessive corrosion of water pipes.

See the following example:



№	Name
Heat Pump	ODU
1	Check valve
2	Y type filter
3	Stop valve
4	Balance tank
5	Pressure relief valve
6	Automatic discharge valve
7	Drain valve
8	Expansion tank
9	Zone-1 circulation pump
10	Shunt valve
11	Electric two-way valve
12	Low-voltage room thermostat
13	High-voltage room thermostat
14	Wired controller
15	Auxiliary electric heater on water side
18	Collector
19	Water separator

Before continuing the installation, check the following items:

- The maximum water pressure is smaller than or equal to 2.5 bars.
- Depending on the settings of safety devices, the maximum water temperature is lower than or equal to 80°C.
- Use materials that are compatible with the water in the system and the materials used in the unit.
- Make sure that components installed in the pipes can withstand the water pressure and temperature.
- Drainage outlets are provided at all low points in the system to drain the circuit completely during maintenance.
- Discharge valves are provided at all high points in the system. The discharge valves are easy to maintain. An automatic air discharge device is deployed inside the unit.

▪ Water Volume and Expansion Tank Size

The unit is equipped with a 5L expansion tank with a default pre-set pressure of 1.5 bars. To ensure the normal operation of the device, you may need to adjust the pre-pressure of the expansion tank.

1. Check whether the total water volume in the installed system (excluding the water volume inside the unit) is at least 40 L.

Notes:
- In most applications, this minimum water volume can be met.
- In harsher environments or in rooms with high heat loads, additional water may be required.
- When the circulation in each space heating circuit is controlled by a remotely controlled valve, it is important to maintain this minimum water volume even when all valves are closed.

2. The volume of the expansion tank must match the total volume of the water system.

3. When adding an expansion tank, use the following formulas to calculate the needed volume:

Vb = 0.023*(V-170)
V – actual water system volume (unit: L)
Vb – active volume of expansion tank (unit: L)

Water Circuit Connection

The water circuit must be correctly connected according to the labels on the water inlet and outlet on the unit.

Warning: When connecting pipes, be careful not to use excessive force to deform the pipes of the unit. Deformed pipes can cause unit faults.
Problems can occur if air, moisture, or dust enters the water circuit. Therefore, always do as follows when connecting a water circuit:

- Use only clean pipes.
- When removing burrs, hold the pipe end down.
- Cover the pipe ends when passing the pipe through a wall to prevent dust and dirt from entering.
- Use a good thread sealant to seal joints. The sealant must be able to withstand pressure and temperature.
- When using a non-copper metal pipe, ensure that the materials are insulated from each other to prevent electrochemical corrosion.
- Use pipe materials that comply with relevant national laws and regulations.
- Because copper is a soft material, use appropriate tools when connecting the water circuit. Improper tools can damage pipes.
- Before connecting the water circuit, flush the water circuit system thoroughly to remove residues in the pipes.
- Install at least one filter in the water circuit system to filter impurities.

Note: This device can be used only in a closed water system. Using this device in an open water circuit may result in excessive corrosion of water pipes.

- Never use Zn coated parts in a water circuit. The water circuit inside the unit uses copper pipes. Zn coated parts may be excessively corroded.
- When a three-way valve is required in the water circuit, you are advised to use a ball-type three-way valve to ensure that the domestic hot water and floor heating water lines are completely separated.
- A water inlet check valve should be added to the inlet pipeline of the unit.
- If a pressure relief valve is installed in indoor pipes, the working pressure of the valve must be greater than that of the outdoor unit. It is recommended that the relief pressure of the indoor pressure relief valve be 3 bars.

Water Circuit Freezing Prevention

All internal hydraulic components use heat-insulation materials to reduce heat loss. Pipes on site must also use heat-insulation materials.

The unit software features a special function that uses the heat pump and backup heater (if any) to protect the entire system from freezing. When the temperature of the water flow in the system drops to a certain value, the device uses the heat pump, electric heater, or backup heater to heat the water. Only when the temperature rises to a certain value, the freezing protection function will be turned off.
When the power supply is disconnected, the above function cannot protect the device from freezing.

Note: If you will not use the device for a long time, keep the device powered. If you want to cut off the power supply, drain the water in the system pipes completely to prevent the water pump and pipe system from being frozen.

Water may enter the flow switch and cannot be drained. Then, it can freeze when the temperature gets low enough. Disassemble the flow switch, dry it, and then assemble it into the device again.

Water Injection

- Connect the water supply to the water supply valve and open the valve.
- Make sure that all automatic discharge valves are open (at least two turns).
- Supply water until the pressure gauge indicates a pressure of about 2.0 bars. Use automatic discharge valves to discharge air from the circuit as much as possible.

Tip: During water supply, air in the system may not be able to be discharged completely. The remaining air could be discharged from the automatic discharge valves after the system operates for hours. You may need to add water later.

- The water pressure indicated on the pressure gauge may vary based on the temperature (the pressure rises as the temperature rises). However, always keep the water pressure above 0.3 bars to prevent air from entering the circuit.
- The device may drain excess water through the pressure relief valve.
- The water quality shall comply with the EN 98/83 EC directive.
- See the EN 98/83 EC directive for detailed water quality conditions.

Water Pipe Insulation

The entire water circuit, including all water pipes and other pipes, must be insulated to prevent condensation when the device operates in cooling mode, prevent reducing heating and cooling capacity,

and prevent external water pipes from freezing in winter. The insulation materials need to reach at least the B1 fire protection class and comply with all applicable laws. The sealing material must be at least 13 mm thick and have a thermal conductivity coefficient of 0.039 W/mK to prevent the freezing of external water pipes.

If the outdoor ambient temperature is above 30°C and the humidity is above RH 80%, the sealing material needs to be at least 20 mm thick to avoid condensation on the seal surface.

7. ELECTRICAL WIRING

Note:

- The device should use a dedicated power supply, and the power voltage must comply with the rated voltage requirements. The minimum starting voltage of the unit must be kept above 90% of the rated voltage, the voltage must be within ±10% of the rated voltage range during operation, and the voltage difference between the phases should be within the range of ±2%.

- The device must be grounded. The power supply earth line must be connected to the external earth line reliably and effectively. All high-voltage external loads, if using metal or grounding terminals, must be grounded. Types of cables, layout and protective methods shall comply with electrical standard and requirements.

- Distribute and fix the wires of the unit according to relevant local laws and regulations and cabling specifications. Use copper wires only. Never squeeze bundled cables and ensure that cables do not come into contact with pipes or sharp edges. Make sure that no external force is applied to terminal joints.

- Wiring construction must be carried out by professional and certificated technicians in accordance with the circuit diagram and relevant local laws and regulations.

- Set an electric leakage protection device according to the requirements of the relevant national technical standards of electrical equipment. When installing the electric leakage protection device, make sure that it is compatible with the unit inverter that can withstand high-frequency electrical noise to avoid opening the protection device unnecessarily.

- The power cord and signal cable should be laid neatly and reasonably without interfering with each other, and cannot come into contact with the connection pipe and valve body.

- This device is not provided with a power cord when it is delivered. When selecting the power cord, use only copper wires according to the specified power cord specifications. Never try to connect two power cords into one.

- When the power cord is parallel with control signal cable, put them into separate conduits with proper spacing reserved.

- Turn off the power before any maintenance or wiring operation.

* **After all the lines are connected, check them carefully for any errors before connecting the power supply.**

Warning:

- For safety considerations, a circuit breaker and leakage protector (30 mA) must be installed.

- The unit must be grounded permanently and solidly. Otherwise, it may result in electric shock and serious personal injuries.

▪ Safety Device Requirements

1. Select the wire diameters (minimum value) individually for each unit based on the table 7-1 (Minimum cross-sectional area conductors) and table 7-2 (Unit parameters). In case the MCA exceeds 63A, the wire diameters should be selected according to the national wiring regulation.

2. Select circuit breaker that having a contact separation in all poles not less than 3 mm providing full disconnection, where MFA is used to select the current circuit breakers and residual current operation breakers:

Table 7.1 Minimum Cross-Sectional Area Conductors

Rated Current of Appliance (A)	Nominal Cross-Sectional Area (mm²)	
	Flexible cords	Cable for fixed wiring
≤2.5	0.5 and 0.75	1.0 and 2.5
>2.5 and ≤6	0.75 and 1.0	1.0 and 2.5
>6 and ≤10	1.0 and 1.5	1.0 and 2.5
>10 and ≤16	1.5 and 2.5	1.5 and 4
>16 and ≤25	2.5 and 4	2.5 and 6
>25 and ≤32	4 and 6	4 and 10
>32 and ≤40	6 and 10	6 and 16
>40 and ≤63	10 and 16	10 and 25

Table 7.2 Unit Parameters

Model	Power Supply				Power Current	
	Voltage (V)	Hz	Min.(V)	Max.(V)	MCA(A)	MFA(A)
4kW	220-240	50	198	264	15	20
6kW	220-240	50	198	264	15	20
8kW	220-240	50	198	264	26	32
10kW	220-240	50	198	264	26	32

Notes:

MCA: Max. Circuit Amps. (A)
MFA: Max. Fuse Amps. (A)

▪ Equipment Main Power Supply Wiring

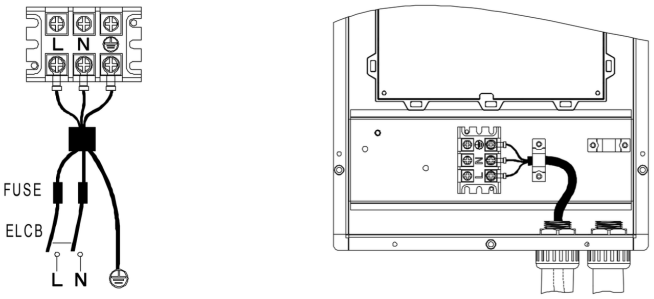
Power wiring size

Model	MCA(A)	Recommended cable diameter (mm²)
4kW	15	2.5
6kW	15	2.5
8kW	26	4
10kW	26	4

Notes:

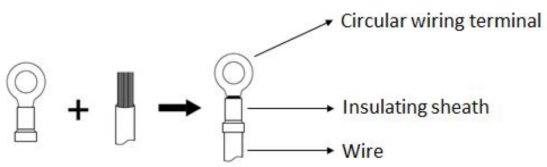
1. The power wiring in the table above is selected based on the maximum current of the unit;
2. Please use H07RN-F for the power wire.

2. Power wiring diagram



Notes:

1. Use circular wiring terminals with insulating sheath for connection to the power supply terminal board:



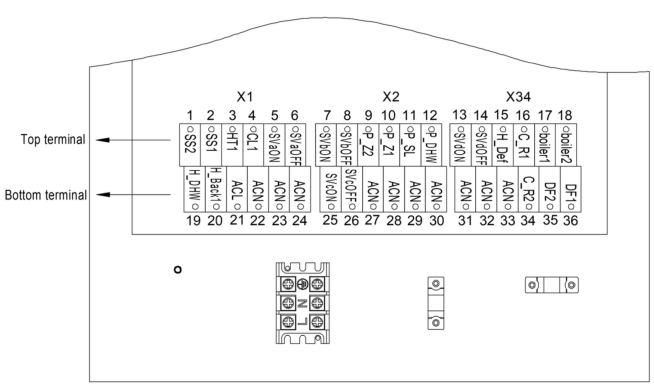
2. Use a proper screwdriver to fasten the terminal screws. A small screwdriver may damage the screw heads and not properly tighten the screws.

3. Overtightening the terminal screws can damage the screws.

4. Install a leakage protection circuit breaker and fuse on a power supply line.

5. Be sure to use specified wires for wiring, connect them properly, and secure them with wire holders so that external force does not affect the terminals.

▪ Wiring of Other Components



Port	No	Print	Connect to
X1	1/2	SS1 SS2	solar signal input (active 220-240VAC)
	3/21	HT1 ACL	room thermostat (heating mode)
	4/21	CL1 ACL	room thermostat (cooling mode)
	5/6/22	SVaON SVaOFF ACN	SV a (3-way valve)
	19/22	H_DHW	Control port for tank booster heater 1
	20/23	H Back1	Control port for internal backup heater 1
X2	7/8/23	SVbON SVbOFF ACN	Port for SV b (3-way valve)
	25/26/24	SVCON SVCOFF ACN	Port for SV c (3-way valve)
	9/27	P Z2 ACN	zone 2 pump
	10/28	P Z1 ACN	external pump
	11/29	P SL ACN	solar pump
	12/30	P_DHW ACN	DHW pipe pump
X34	13/14	SVdON SVdOFF	SV d (3-way valve)
	15/33	H Def ACN	Heater for defreezing (external)
	16/34	C_R1 C_R2	Running signal of compressor
	17/18	boiler1 boiler2	Control port for additional heat source
	35/36	DF1 DF2	Defrost signal

Notes:

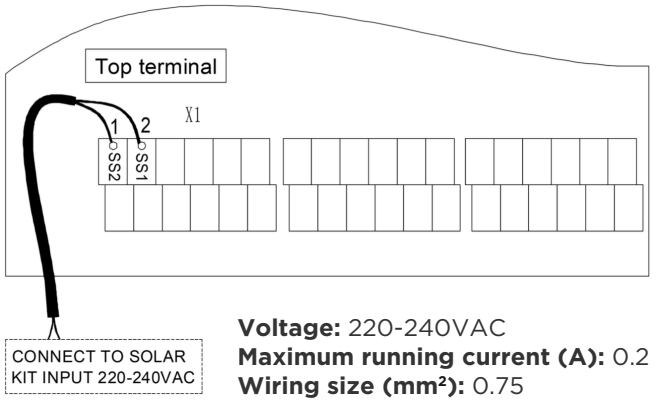
1. Port provide the control signal to the load. Two kind of control signal port:

Type 1: Dry connector without voltage.
Type 2: Port provide the signal with 220V voltage. 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.

2. Wiring steps (Refer to the following figure):

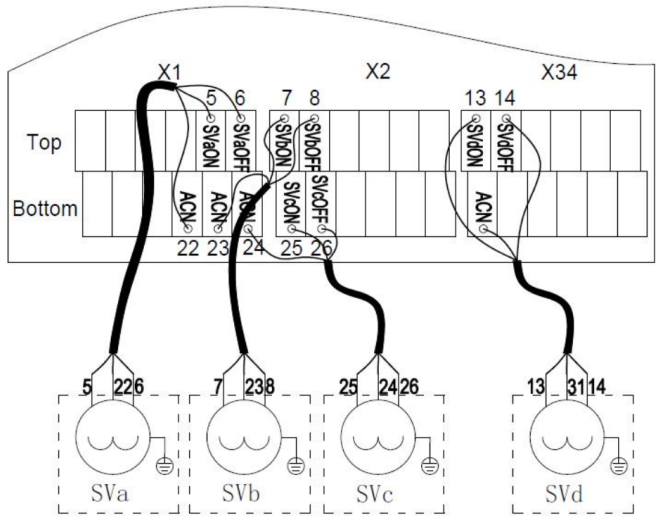
- Use a flat screwdriver pry the spring plate
- Insert the wire into the opening and remove the screwdriver

For solar energy input signal



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

For 3-way Value SVa, SVb and SVc/SVd



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

For Room Thermostat

Whether to connect to the room temperature controller can be set through the wired controller of the unit.

If it is set to not connect to the room temperature controller, the unit wired controller controls the air conditioning (cooling/heating) on/off and sets the operating water temperature.

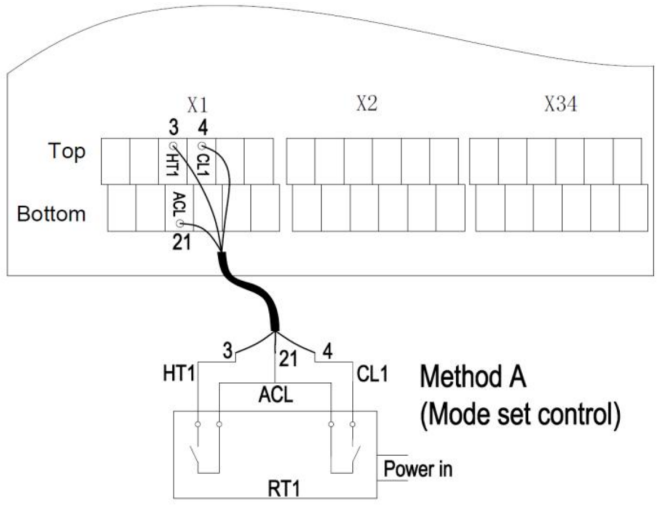
If it is set to connect to the room temperature controller, it can receive the operation mode and on/off command sent by the external temperature controller through the dry node interface.

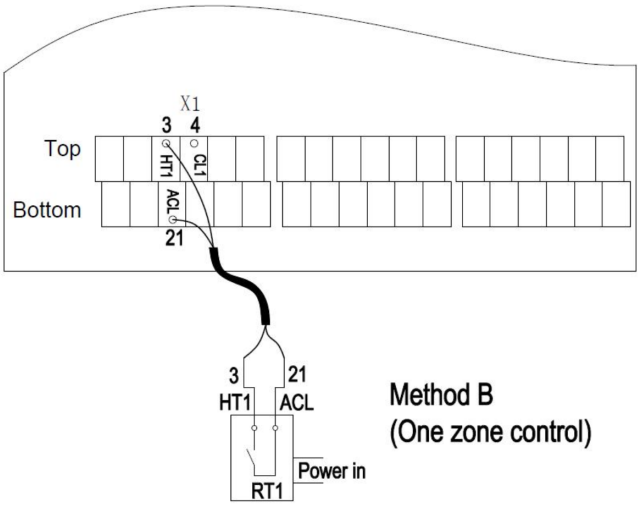
Note: There are two optional connect methods depending on the room thermostat type:

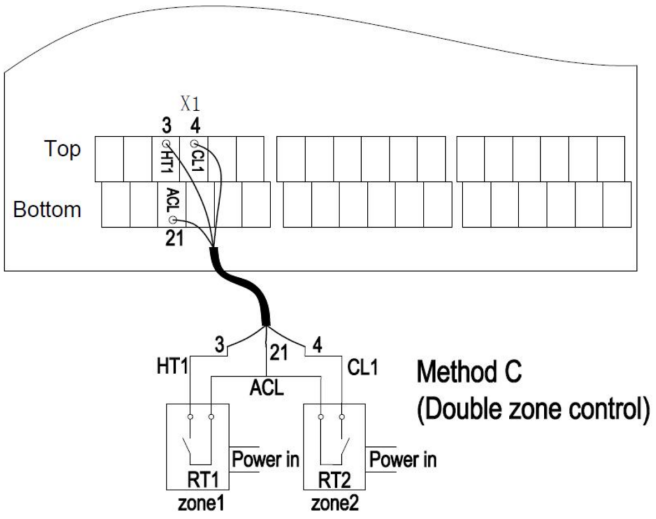
1. Room thermostat type 1 (High voltage)
2. Room thermostat type 2 (Low voltage)

Which type of room thermostat can be selected by setting the service parameters of the wired controller.

Room Thermostat Type 1 (High Voltage)







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

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

Method A (Mode set control)

Set the service parameters of the wired controller to: **Mode setting**

The room thermostat provides cooling and heating modes and on-off signals to the unit, but the water temperature is set by the wired controller:

A.1 When the switch signal between CL1 and ACL is closed, and the unit detects a voltage of 230VAC from port CL1, the unit will operate in the cooling mode.

A.2 When the switch signal between HT1 and ACL is closed, and the unit detects a voltage of 230VAC from port HT1, the unit will operate in the heating mode.

A.3 When the switch signals between HT1, ACL and CL1, ACL are both open, and the unit detects a voltage of 0VAC from port HT1 and CL1, the unit will turn off.

A.4 When the switch signals between HT1, ACL and CL1, ACL are both closed, and the unit detects a voltage of 230VAC both from port HT1 and CL1, the unit will operate in the cooling mode or the heating mode. (Can be set through service parameters)

Method B (One zone control)

Set the service parameters of the wired controller to: **One zone control**

The room thermostat only provides on/off signals to the unit, and the cooling/heating mode and water temperature are set by the wired controller (at this time, the signal from port CL1 is not received):

B.1 When the switch signal between HT1 and ACL is closed, and the unit detects a voltage of 230VAC from port HT1, the unit will be on.

B.2 When the switch signal between HT1 and ACL is open, and the unit detects a voltage of 0VAC from port HT1, the unit will be off.

Method C (Double zone control)

Set the service parameters of the wired controller to: **Double zone control**

The unit is connected to two room thermostats. One thermostat controls Zone 1 (which can cool/heat) and is connected to the unit's port HT1. The other thermostat controls Zone 2 (which can only run heating) and is connected to the unit's port CL1:

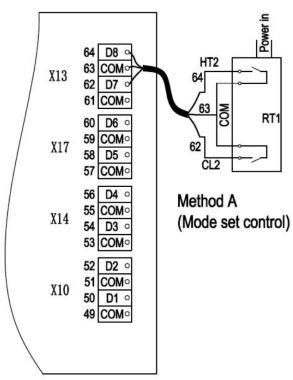
C.1 When the switch signal between HT1 and ACL is closed, and the unit detects a voltage of 230VAC from port HT1, the unit in zone 1 turns on (at this time, the operating mode and water temperature are set by the wired controller), and the related valves and water pumps open. When the switch signal between HT1 and ACL is open, and the unit detects a voltage of 0VAC from port HT1, the unit in zone 1 turns off.

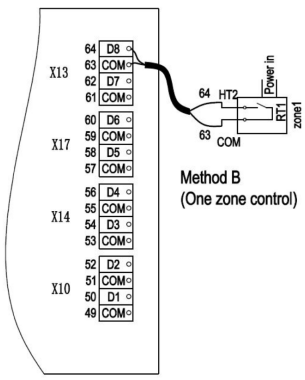
C.2 When the switch signal between CL1 and ACL is closed, and the unit detects a voltage of 230VAC from port CL1, if the wired controller is set to cooling mode at this time, the unit will not turn on; if the wired controller is set to heating mode at this time, the unit in zone 2 turns on, (At this time, the operating mode and water temperature are set by the wired controller), and the related valves and water pumps open. When the switch signal between CL1 and ACL is open, the unit detects a voltage of 0VAC from port CL1, the unit in zone 2 turns off.

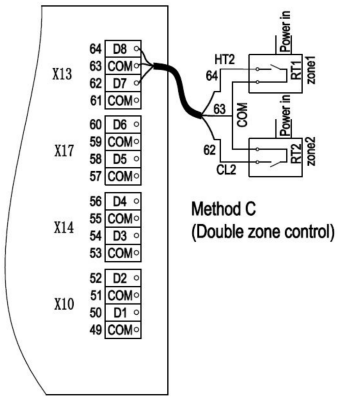
C.3 When the switch signals between HT1, ACL and CL1, ACL are both open, and the unit detects a voltage of 0VAC from port HT1 and CL1, the unit will turn off.

C.4 When the switch signals between HT1, ACL and CL1, ACL are both closed, and the unit detects a voltage of 230VAC both from port HT1 and CL1, both the units in zone 1 and zone 2 turn on.

Room Thermostat Type 2 (Low Voltage)







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

Method A (Mode set control)

Set the service parameters of the wired controller to: **Mode setting**

The room thermostat provides cooling and heating modes and on-off signals to the unit, but the water temperature is set by the wired controller:

A.1 When the switch signal between CL2 and COM is closed, and the unit detects a voltage of 12VDC from port CL2, the unit will operate in the cooling mode.

A.2 When the switch signal between HT2 and COM is closed, and the unit detects a voltage of 12VDC from port HT2, the unit will operate in the heating mode.

A.3 When the switch signals between HT2, COM and CL2, COM are both open, and the unit detects a voltage of 0VDC from port HT2 and CL2, the unit will turn off.

A.4 When the switch signals between HT2, COM and CL2, COM are both closed, and the unit detects a voltage of 12VDC both from port HT2 and CL2, the unit will operate in the cooling mode or heating mode.(Can be set through service parameters)

Method B (One zone control)

Set the service parameters of the wired controller to: **One zone control**

The room thermostat only provides on/off signals to the unit, and the cooling/heating mode and water temperature are set by the wire controller (at this time, the signal from port CL2 is not received):

B.1 When the switch signal between HT2 and COM is closed, and the unit detects a voltage of 12VDC from port HT2, the unit will be on.

B.2 When the switch signal between HT2 and COM is open, and the unit detects a voltage of 0VDC from port HT2, the unit will be off.

Method C (Double zone control)

Set the service parameters of the wired controller to: **Double zone control**

The unit is connected to two room thermostats. One thermostat controls Zone 1 (which can cool/heat) and is connected to the unit's port HT2. The other thermostat controls Zone 2 (which can only run heating) and is connected to the unit's port CL2:

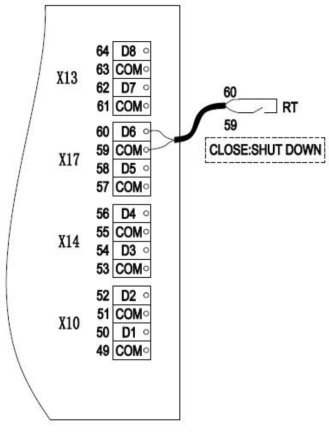
C.1 When the switch signal between HT2 and COM is closed, and the unit detects a voltage of 12VDC from port HT2, the unit in zone 1 turns on (at this time, the operating mode and water temperature are set by the wired controller), and the related valves and water pumps open. When the switch signal between HT2 and COM is open, and the unit detects a voltage of 0VDC from port HT2, the unit in zone 1 turns off.

C.2 When the switch signal between CL2 and COM is closed, and the unit detects a voltage of 12VDC from port CL2, if the wired controller is set to cooling mode at this time, the unit will not turn on; if the wired controller is set to heating mode at this time, the unit in zone 2 turns on (At this time, the operating mode and water temperature are set by the wired controller), and the related valves and water pumps open. When the switch signal between CL2 and COM is open, and the unit detects a voltage of 0VDC from port CL2, the unit in zone 2 turns off.

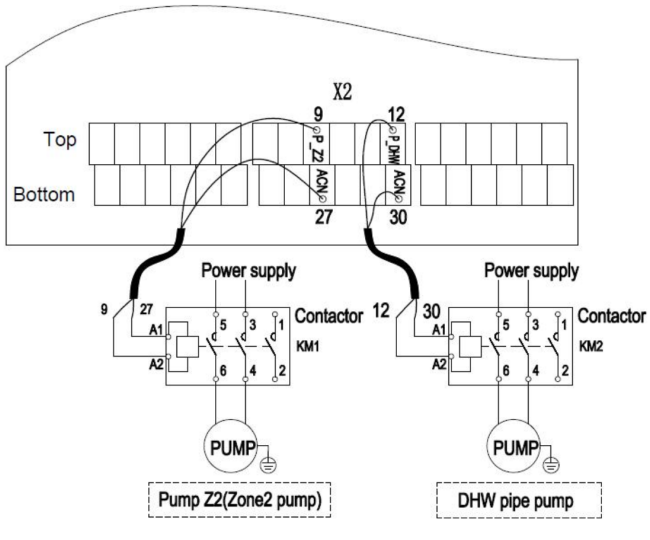
C.3 When the switch signals between HT2, COM and CL2, COM are both open, and the unit detects a voltage of 0VDC from port HT2 and CL2, the unit will turn off.

C.4 When the switch signals between HT2, COM and CL2, COM are both closed, and the units detect a voltage of 12VDC both from port HT2 and CL2, both the units in zone 1 and zone 2 turn on.

For Remote Shutdown

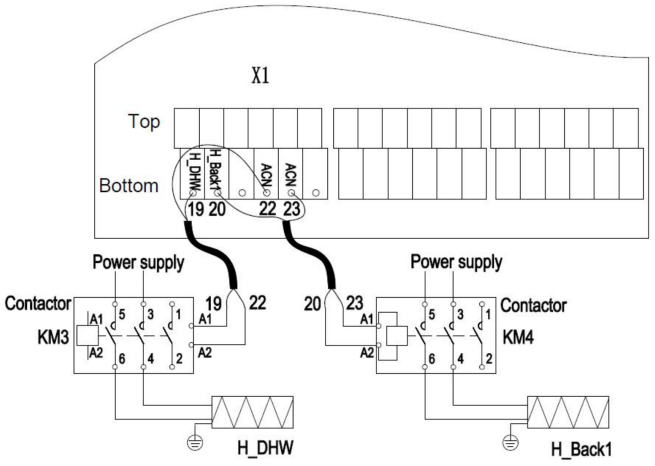


For Pump Z2 and DHW Pipe Pump



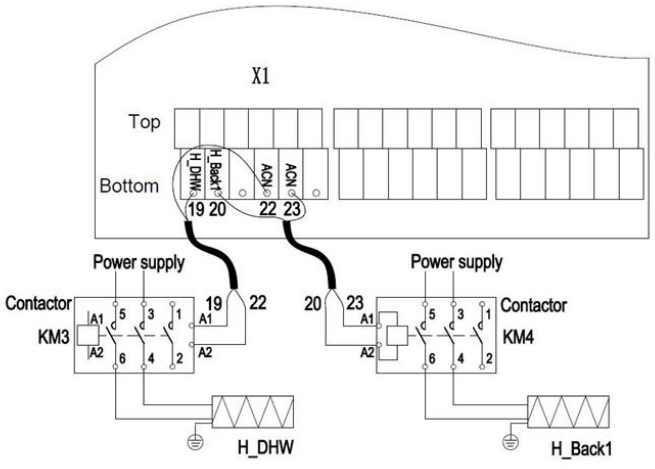
Voltage: 220-240VAC
Maximum running current (A): 0.2
Wiring size (mm²): 0.75
Control port signal type: Type 2

For Tank Booster Heater (H_DHW) and Backup Heater (H_Back1)



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

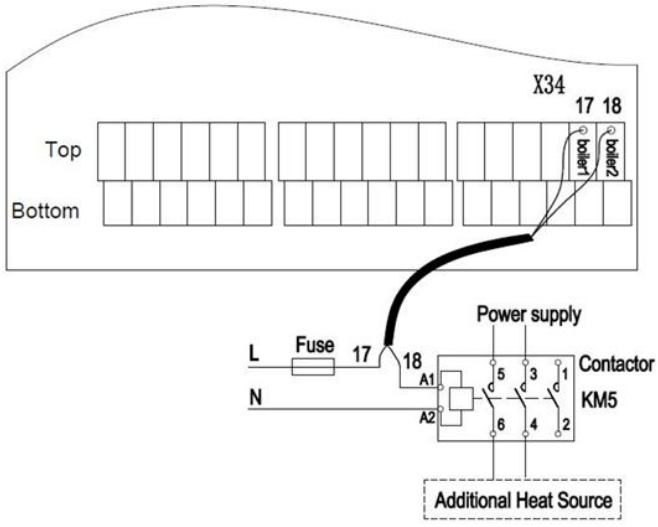
For Tank Booster Heater (H_DHW) and Backup Heater (H_Back1)



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

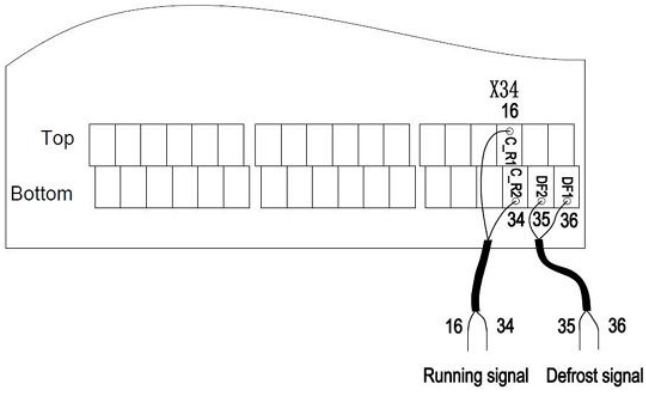
Note:
1. The unit only sends an ON/OFF signal to the heater contactor.
2. The unit can be connected to an external backup heater (H_Back1) as described in the picture above.
3. It is necessary to add fuse or circuit breaker to the electric heating power supply for protection.

For Additional Heat Source Control



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

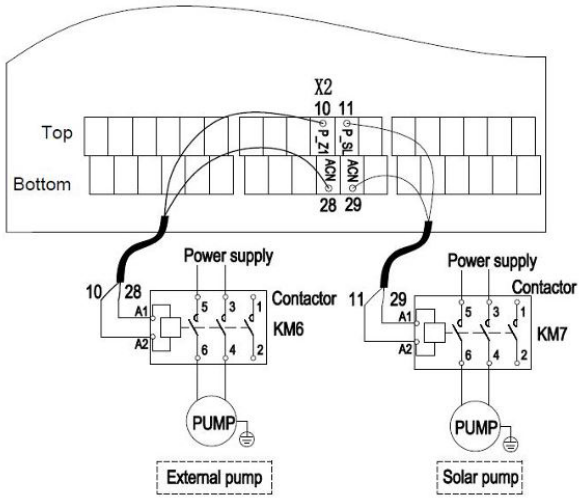
For Running Signal of Compressor and Defrosting Signal Output



Voltage: /
Maximum running current (A): 0.2
Wiring size (mm²): 0.5
Control port signal type: Type 1

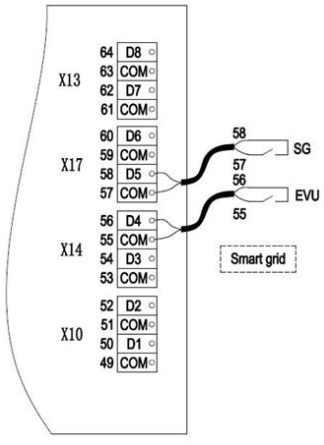
C_R1/C_R2 and DF1/DT2 only provide the switch signal. (Dry connector without voltage)

For Outside Circulation Pump P_Z1 (External pump) and Solar Pump



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

For Smart Grid



1. When SG signal is on, the unit operates as below: When DHW mode is turned on, the setting temperature will be changed to 70°C automatically, and the H-DHW operates as below: when Tt < 69°C, the H-DHW is on; when Tt ≥ 70°C, the H-DHW is off. The unit operates in cooling/heating mode as the normal logic.

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

3. When SG signal is off, and EVU signal is on, the DHW mode is off, the H-DHW is invalid, and the disinfect function is invalid. The max running time for cooling/heating is «EVU RUNNING TIME», and then the unit will be off.

8. CONFIGURATION AND COMMISSIONING

▪ Check Before Startup

Check the system before the initial operation.
Danger:
Before doing any wiring work, cut off the power supply.
After installing the unit and before closing the circuit breaker, check the following items:

• **Field wiring:** Ensure that the local panel is connected to the unit and valves (if applicable), or to the unit and room thermostats (if applicable) according to the instructions and wiring diagrams in section 7 «Electrical Wiring» as well as local laws and regulations.

• **Check of safety devices:** Check whether fuses, circuit breakers and locally installed protective devices are selected according to the requirements in «7.1 Safety Device Requirements». Make sure that no fuses, circuit breakers or protection devices are skipped.

• **Backup heater circuit breaker:** Ensure that the backup heater circuit breaker is enabled depending on the backup heater type. See the wiring diagram for more information.

• **Auxiliary heater circuit breaker:** Ensure that the auxiliary heater circuit breaker is enabled (only for units with the optional domestic hot water tank installed).

• **Grounding conductor:** Make sure that the grounding conductor is properly connected and the grounding terminal is tightened.

• **Internal wiring:** Visually inspect the electrical box for loose connections or damaged electrical components.

• **Installation:** Check whether the unit is installed correctly to avoid abnormal noise and vibration when the unit is started.

• **Damage ddevice:** Check inside the unit for damaged parts or pinched pipes.

• **Refrigerant leakage:** Check for refrigerant leakage inside the unit. In case of refrigerant leakage, contact the local distributor.

• **Power voltage:** Check the power voltage on your local power panel. The voltage must correspond to the voltage marked on the device label.

• **Discharge valves:** Make sure that the discharge valves are open (at least two turns).

• **Cut-off valve:** Make sure that the cut-off valve is fully open.

▪ Initial Startup at Low Ambient Temperature

Water must be gradually heated when the unit is initially started up and when the water temperature is low.

Otherwise, the concrete floor may crack due to rapid changes in temperature. For more details, contact the building contractor who poured the concrete.

▪ Commissioning

Notes:
AIR TO WATER HEATPUMP

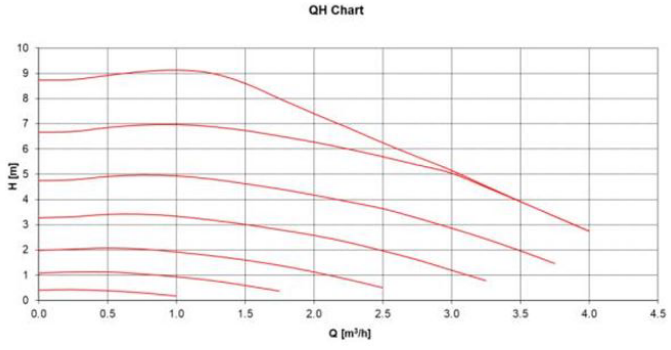
• Start commissioning 12 hours after the ODU is connected to the power supply.

• Start commissioning only after you confirm that all valves are open.

• Never run the device forcefully. (Otherwise, the protector recoils, which may cause danger.)

▪ Water Pump Settings

The pump is controlled by a digital low-voltage pulse-width modulating signal, which means that the rotational speed of the pump depends on the input signal. The speed varies with the configuration file. The figure below shows the relationship between the water pump lift and water flow.



9. HANDOVER TO THE CUSTOMER

Hand over the user manual to the customer, and explain the contents of the manual to the customer in detail.

Warning:

• Consulty our dealer about heat pump installation. Improper installation by yourself may result in water leakage, electric shock, and fire.

• Ask your dealer for improvement, repair, and maintenance. Incomplete improvement, maintenance, or repair may lead to electric shock or fire.

• To avoid electric shock, fire, or injury, cut off the power supply and call your dealer for instructions if you notice anything unusual, such as the smell of fire.

• Never get the wired controller wet.

• Never press wired controller buttons with a sharp or hard object.

Other wise, the wired controller may be damaged.

• When a fuse is blown,never replace it with a fuse with an incorrect rated current or any other conductor.
Using an electrical wire or copper wire may cause a device failure or fire.

• Exposing your body to air flow for a long time is not good for your health.

• Do not insert your finger, a stick, or any other object into the air inlet or outlet.
When the fan rotates at a high speed, it can injure you.

• Never use flammable sprays such as hair spray or paint near the device.
Otherwise, a fire may be caused.

• Never place anything into the air inlet or outlet.
Objects contacting the fan at a high speed may cause danger.

• Do not dispose of this product as unsorted municipal waste. Such waste must be collected separately for special treatment.
Use separate collection facilities instead of treating electrical appliances as unsorted municipal waste. For relevant information, contact your local authority.

• If electrical appliances are disposed of in landfills or dumps, hazardous materials can leak into ground and enter the food chain, harming your health and well-being.

• The refrigerant in a heat pump is safe and usually does not leak.
If refrigerant leaks into the room, it may explode.

• Turn off all combustible heating devices, ventilate the room, and contact the dealer where you purchased the device.
Do not use a heat pump until service personnel confirm that the refrigerant leakage has been repaired.

Notes:
• Do not use the heat pumpfor other purposes.
To avoid quality deterioration, do not use the device to cool precision instruments, food, plants, animals, or works of art.

• Before cleaning the device, be sure to stop operation, turn off the circuit breaker, or unplug the power cable.
Otherwise, electric shock or injury may occur.

• To avoid electric shock or fire, make sure that a leakage detector is installed.

• Be sure to ground the heat pump.
To avoid electric shock, be sure to ground the device and do not connect the earth line to a gas tube, water pipe, lightning rod, or telephone ground wire.

• To avoid injury, do not remove the fan cover of the ODU.

• Do not operate the heat pump with wet hands.
Otherwise, electric shock may occur.

• Do not touch heat exchanger fins.
These fins are sharp and may cut you.

• After using the device for a long time, please check the device brackets and accessories for damage.
Damaged brackets or accessories may cause the device to fall and injure people.

• If a device with a burner is used together with a heat pump, be sure to adequately ventilate the room to avoid oxygen deficiency.

• Arrange drain pipes to ensure smooth drainage.

• Never touch the internal parts of the controller.
Do not remove the front panel. Touching some internal parts is dangerous and may cause device faults.
• Do not perform maintenance on your own.
Contact your local dealer for maintenance.

• Neverexpose children, plants, or animals directly to the air flow.
Otherwise, the children, plants, or animals may be adversely affected.

• Do not let children sit or place any object on the unit.
Children may fall or the object may roll down, causing injury.

• Do not expose an appliance that generates open flames to the air flow of the unit or place it under the unit.
Otherwise, the appliance may cause incomplete combustion or deformation of the unit due to heat.

• Do not install the heat pump at any place where flammable gases may leak.
If flammable gas leaks and accumulates around the heat pump, a fire may occur.

• Young children should be supervised and prevented from playing with electrical appliances.

• The unit louver needs to be cleaned regularly to prevent clogging.
The louver is the heat dissipation outlet of the unit. If it is stuck, it can cause component overheating for a long time and shorten the service life of the components.

• The refrigerant circuit can be very hot. Keep cables far away from the copper pipe.

10. OPERATION AND PERFORMANCE

▪ Protecting Device

The pump is controlled by a digital low-voltage pulse-width modulating signal, which means that the rotational speed of the pump depends on the input signal. The speed varies with the configuration file. The figure below shows the relationship between the water pump lift and water flow.

When the heat pump is forced to run, this protecting device will stop the heat pump.
This protecting device can be activated under the following circumstances:

In cooling mode:
• The air inlet or outlet of the ODU is blocked.
• Strong wind keeps blowing towards the air outlet of the ODU

In heating mode:
• Too much waste accumulates in the water system filter.

Note: When the protecting device starts, turn off the manual power switch and restart it after the problem is solved.

▪ Power Failure

• In case of apower failure during the operation of the unit, stop all operations immediately.

• When the power supply recovers, the device will automatically restart if the auto-restart function is enabled.

▪ Heating Capacity

• In the heating process, the heat pump absorbs heat from the outdoor air and releases heat into the indoor water. When the outdoor temperature drops, the heating capacity decreases accordingly.

• When the outdoor temperature is too low, you are advised to use other heating equipment at the same time.

• In some extremely cold regions, an IDU equipped with an electric heater will provide better performance.

Compressor Protection

If the unit is restarted during operation, the compressor protection function will cause the compressor to start running after a few minutes.

Defrosting

• When operating in heating mode, the unit may frost sometimes. To improve efficiency, the unit will automatically start defrosting (about 2 to 10 minutes), and then drain the water.

• During defrost cycle, the fan motor of the unit stops running.

Fault Code List

• When a safety device is activated, the user interface will display the fault code.

• The table below lists all fault sand solutions.

• Turn the device off and on again to reset the fault.

• If the fault reset fails,contact your local dealer.

○ **Fault Description**
● **Cause**
☐ **Handling Method**

E000 ○ Water flow protection for the main control board.
● The water flow switch is disconnected.
☐ Check the water flow switch wiring.

E001 ○ Insufficient water flow of the main control board
● 1. The water flow detected by the pump is small
2. The water filter is blocked by dirt.
☐ 1. Check whether the valves are wide open,whether the cold water inlet pressure is too small, and whether the pump lift and flow meet requirements
2. Clean or replace the filter.

E003 ○ Inadequate water flow of the extension board.
● 1. The water flow detected by the pump is small.
2. The water filter is blocked by dirt.
☐ Check whether the valves are wide open, whether the cold water inlet pressure is too small, and whether the pump lift and flow meet requirements.

E004 ○ External interlocking.
● The external inter locking switch is disconnected.
☐ Check the external inter locking switch wires.

E005 ○ Communication fault of the refrigerant sensor.
● The refrigerant sensor is short-circuitedor disconnected.
☐ Check the wiring.

E006 ○ Refrigerant leakage alarm.
● An alarm signal is received from the refrigerant sensor.
☐ Check the leaks

E007 ○ Refrigerant sensor fault.
● The refrigerant sensor sends a fault signal.
☐ Check the refrigerant sensor.

E008 ○ Communication fault of the refrigerant sensor service life.
● The communication port of the refrigerant sensor service life is short-circuited or disconnected.
☐ Check the wiring.

E009 ○ Refrigerant sensor service life reminder.
● A service life signal (≥10years) is received from refrigerant sensor.
☐ Replace with a new refrigerant sensor.

E011 ○ Protection against too high heating outlet water temperature.
● 1. The water flow is too small.
2. There is too much air in the water system
3. The testing of the water outlet temperature sensor is inaccurate.
☐ 1. Check whether the water filter is blocked by dirt and whether the valve of the water circulating pipeline is open.
2. Check whether air is thoroughly expelled from the system.
3. Check whether the water outlet temperature sensor is damaged.

E012 ○ Protection against too low cooling outlet water temperature.
● 1. The water flow is too small.
2. There is too much air in the water system.
3. The testing of the water outlet temperature sensor is inaccurate.
☐ 1. Check whether the water filter is blocked by dirt and whether the valve of the water circulating pipeline is open.
2. Check whether air is thoroughly expelled from the system.
3. Check whether the water outlet temperature sensor is damaged.

E013 ○ Excessive temperature difference between the water inlet and outlet of the unit
● 1. The water flow is too small.
2. There is too much air in the water system.
3. The testing of the water inlet/outlet temperature sensor is inaccurate.
☐ 1. Check whether the water filter is blocked by dirt.
2. Check whether air is thoroughly expelled from the system.
3. Check whether the water outlet temperature sensor is damaged.

E014 ○ Protection against too high discharge temperature
1. The fluorine leaks.
● 2. Non-condensable gas existsin the system.
3. Ambient temperature sensor is wrongly located. Check whether the water outlet temperature sensor is damaged.
☐ 1. Add proper amount of refrigerant.
2. Vacuumize the system again and add some refrigerant.
3. Check and relocate the ambient temperature sensor.

E015 ○ Protection against too low cooling discharge temperature.
● 1. The fluorine leaks.
2. The plate heat exchanger leaks.
☐ 1. Add proper amount of refrigerant.
2. Check whether there is water in the plate heat exchanger.

E016 ○ Low pressure (gauge pressure) protection in heating mode.
● 1. The refrigerant leaks.
2. Throttle deviceis blocked.
3. Poor heat exchange.
☐ 1. Detect leaks and add refrigerant again.
2. Replace throttle device.
3. Clean the heat exchanger.

E017 ○ Low pressure (gauge pressure) protection in cooling mode.
● 1. The refrigerant leaks.
2. Throttle deviceis blocked.
3. The plate heat exchanger exhibits poor heat exchange performance.
☐ 1. Detect leaks and add refrigerant again.
2. Replace throttle device.
3. Check whether the water system is blocked by dirt.

E018 ○ High pressure protection of the system.
● 1. The water flow is small.
2. The water filter is blocked by dirt.
3. The condenser has accumulated scale deposits.
4. Refrigerant filter or throttle deviceis blocked.
☐ 1. Check whether the valves are wide open, whether the cold water inlet pressure is too small and whether pump lift and flow meet requirements.
2. Clean or replace the filter.
3. Clean the condenser.
4. Replace filter or throttle device.

E019 ○ Heating four-way valve exception.
● 1. The four-way valve is stuck
2. The four-way valve is inserted in correctly and in poor contact.
☐ 1. Check whether it is stuck.
2. Check the wirin.

E030 ○ Fan fault.
● It is detected that the actual speed of the fan is less than 100 rpm.
☐ Check the motor.

E031 ○ Open-phase protection of the power supply.
● There is an open phase of the unit's input power cord.
☐ Check the wiring of the unit's input power cord.

E032 ○ Inverse phase protection of the power supply.
● There is a misphase of the unit's input power cord.
☐ Check the wiring of the unit's input power cord.

E034 ○ Too low input voltage of the power supply.
● The input voltage is too low.
☐ Check the input voltage.

E035 ○ Too high input voltage of the power supply.
● The input voltage is too high.
☐ Check the input voltage.

E036 ○ Over-current protection of the entire unit.
● 1. The system's high voltage is too high.
2. The compressor is damaged.
☐ 1. Refer to the over voltage protection of the system.
2. Replace the compressor.

E037 ○ Excessive compressor current.
● 1. The system's high voltage is too high.
2. The compressor is damaged.
☐ 1. Refer to the over voltage protection of the system.
2. Replace the compressor.

E041 ○ Ambient temperature sensor fault(Ta).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E042 ○ Discharge temperature sensor fault(Tp).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E043 ○ Suction temperature sensor fault(Tx).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E046 ○ Coil temperature sensor fault(Te).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E047 ○ Water inlet temperature sensor fault(Ti).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E048 ○ Water outlet temperature sensorfault(To).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E049 ○ Total wateroutlet temperature sensor fault (Tot).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E050 ○ High pressure sensor fault.
● 1. The pressure sensor gets loose wires.
2. The pressure sensor is damaged.
☐ 1. Check the wiring of the pressure sensor wiring and tighten the loose wires.
2. Replace the pressure sensor.

E051 ○ Low pressure sensor fault.
● 1. The pressure sensor gets loose wires.
2. The pressure sensor is damaged.
☐ 1. Check the wiring of the pressure sensor wiring and tighten the loose wires.
2. Replace the pressure sensor.

E052 ○ Temperature sensor at the upper end of the balance water tank(Tbt1).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E053 ○ Temperature sensor at the lower end of the balance water tank(Tbt2).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E054 ○ Domestic water tank temperature(Tt).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E055 ○ Zone-2water outlet temperature sensor(To2).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E056 ○ Solar temperature sensor (Tsolar).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E057 ○ Indoor temperature sensor exception (wired controller).
● 1. The temperature sensor gets loose wires.
2. The temperature sensor is damaged.
☐ 1. Check the wiring of the temperature sensor and tighten the loose wires.
2. Replace the temperature sensor.

E061 ○ Communication fault between the master unit and wired controller.
● The communication cable between the unit and wired controller is disconnected.
☐ Check the communication cable, main board, and wired controller communication port for any damage.

E062 ○ Communication fault between the extension board and main control board.
● Communication disconnection between the extension board and main control board.
☐ Check the communication cable, main board/ extension board communication port for any damage.

E063 ○ Communication fault between the main control board and drive.
● Communication disconnection between the main control board and drive.
☐ Check the communication cable, main board, and drive communication port for any damage.

E064 ○ Communication fault between the master unit and slave unit 1.
● The communication between the master unit and slave unit 1 is disconnected.
☐ Check the communication cable and main board communication port for any damage.

E065 ○ Communication fault between the master unit and slave unit 2.
● The communication between the master unit and slave unit 2 is disconnected.
☐ Check the communication cable and main board communication port for any damage.

E066 ○ Communication fault between the master unit and slave unit 3.
● The communication between the master unit and slave unit 3 is disconnected.
☐ Check the communication cable and main board communication port for any damage.

E067 ○ Communication fault between the master unit and slave unit 4.
● The communication between the master unit and slave unit 4 is disconnected.
☐ Check the communication cable and main board communication port for any damage.

E068 ○ Communication fault between the master unit and slave unit 5.
● The communication between the master unit and slave unit 5 is disconnected.
☐ Check the communication cable and main board communication port for any damage.

E038 ○ Compressor drive fault.
1. The input voltage is too low or too high.
● 2. The compressor drive board is damaged.
3. . If it is powered on immediately after a power failure (the drive has not fully discharged), an alarm will occur.
☐ 1. Check the voltage.
2. Replace the compressor drive board.
3. Power it on after 1 minute has passed following a power failure.

E079 ○ System lock fault code.
● The system locks up frequently.
☐ Power it off and reset.

/ ○ Main control board/extension board, digital display and indicators off

● The weak current 5V/12Voutput ports and GND wire sare short-circuited.

☐ Check whether the short circuit is caused by communication cables, connections or shielding burrs.

11. TECHNICAL SPECIFICATIONS

Model	TICA 040KHLB	TICA 060KHLB	TICA 080KHLB	TICA 100KHLB
Power supply	220~240V -50Hz	220~240V -50Hz	220~240V -50Hz	220~240V -50Hz
Cooling(A35W18) Capacity	4300	5600	7000	8600
Cooling(A35W18) EER	5.2	4.7	4.95	4.50
Cooling(A35W7) Capacity	4100	5600	6800	7600
Cooling(A35W7) EER	3.42	3.01	3.21	3.04
Heating(A7W35) Capacity	4500	6200	8400	10000
Heating(A7W35) COP	5.42	5.25	5.15	5.05
Heating(A7W45) Capacity	4500	6000	8000	10000
Heating(A7W45) COP	4.20	4.05	3.90	3.65
Heating(A7W55) Capacity	4600	6200	8000	9500
Heating(A7W55) COP	3.40	3.35	3.30	3.20
Heating(A2W35) Capacity	4400	5600	7100	8200
Heating(A2W35) COP	4.10	3.90	3.85	3.65
Heating(A-7W35) Capacity	4500	5800	7200	8000
Heating(A-7W35) COP	3.20	2.95	3.10	2.85
SCOP Average climate,W35	A+++	A+++	A+++	A+++
SCOP Average climate,W55	A+++	A+++	A+++	A+++
Net weight	117	117	132	132
Gross weight	137	137	152	152
Net dimensions (W*H*D)	1100×945×458	1100×945×458	1100×945×458	1100×945×458
Packing dimens. (W*H*D)	1180×1115×600	1180×1115×600	1180×1115×600	1180×1115×600
Erp sound power level	55	55.5	56	57.5
Refrigerant Type/GWP	R290/3	R290/3	R290/3	R290/3
Refrigerant Charge	0.51	0.51	0.8	0.8

Model	TICA 040KHLB	TICA 060KHLB	TICA 080KHLB	TICA 100KHLB
Operating ambient temperature Cooling	5~46	5~46	5~46	5~46
Operating ambient temperature Heating	-25~43	-25~43	-25~43	-25~43
Operating ambient temperature DHW	-25~43	-25~43	-25~43	-25~43
Water setting temperature Cooling	5~25	5~25	5~25	5~25
Water setting temperature Heating	22~80	22~80	22~80	22~80
Water setting temperature DHW	20~75	20~75	20~75	20~75

12. SERVICE INFORMATION

1. Site check
Before operating appliances that use flammable refrigerant, perform safety check to minimize the risk of ignition.

2. Procedure
The operation must be performed under a controlled procedure so that the risk of flammable gases or vapors is minimized.

3. General work area
All maintenance personnel and others in the work area need to be informed of the nature of the work being done. The operation cannot be performed in an enclosed space. The area around the workspace should be separated. Flammable materials must be controlled for safety in the area.

4. Refrigerant check
Before and during the work, use appropriate refrigerant detectors to check the area to ensure that technicians are aware of the potentially toxic or flammable environment. Ensure that the used leakage detectors are suitable for all applicable refrigerants, that is, the detectors are free from sparking, adequately sealed, or intrinsically safe.

5. Fire extinguisher placement
When performing heat processing on the refrigeration system or related components, place appropriate fire extinguishers nearby. In the refrigerant injection area, prepare dry powder fire extinguishers or carbon dioxide fire extinguishers.

6. No ignition sources
When working on the refrigeration system and exposing any pipework that contains or has contained flammable refrigerants, do not use any source of ignition in a manner likely to create a risk of fire or explosion. All possible sources of ignition, including smoking, should be far enough from installation, repair, disassembly, and disposal sites, because flammable refrigerants may be released into the surrounding space during installation, repair, disassembly, and disposal. Before the work, check the area around the device for flammable hazards or risk of ignition. A sign of no smoking should be placed.

7. Ventilating area
Before entering the system or performing any high-temperature work, make sure that the area is in the open air or is well ventilated. A certain level of ventilation should be maintained during work. Ventilation should safely dissipate any released refrigerant, preferably venting it to the atmosphere.

8. Refrigeration equipment check
When replacing electrical components, make sure that the new components meet the requirements and are of correct specifications. Always follow the manufacturer's maintenance instructions. Any doubt, contact the manufacturer's technical department for assistance. Check the following items on equipment using flammable refrigerants.

9. Electrical equipment check
The repair and maintenance of electrical components should include preliminary safety checks and component inspections. In case of a fault that may endanger safety, do not supply power to the circuit until the fault has been properly dealt with. If the fault cannot be rectified immediately but the device operation is required, take appropriate temporary measures. In addition, inform the device owner of the situation so that all parties can be notified.

Preliminary safety check:
• Capacitor discharge must be done in a safe manner to avoid sparks.

• Never expose live parts and wires when charging, restoring, or flushing the system.

• Be sure to ground the device continuously.

10. Repair of sealed components
(a) To repair a sealed component, cut off all the power supply to the component before removing any sealing cover. If a power supply is necessary to the device during the repair, install a permanent leakage detection device at the most critical position to provide alerts of potentially hazardous conditions.

(b) Pay special attention to the following points to prevent the component protection rating from being affected when working on the enclosure and operating the electrical component, including damaged cables, excessive connections, non-conformance of wiring terminals to original specifications, damaged seals, and improperly installed connectors.

• Make sure that the device is securely installed.
• Make sure that seals or sealing materials do not degrade and can always prevent the entry of flammable air. New replacement components meet the manufacturer's specifications requirements.

Note:
Silicone sealants may inhibit the effectiveness of some types of leakage detection equipment. Intrinsically safe components do not need to be isolated before working on them.

11. Repair of intrinsically safe components
Never apply any permanent inductive or capacitive load on a circuit without ensuring that the voltage and current will not exceed the allowed ranges of the device. Only intrinsically safe components can operate in flammable environments. The test device should have correct rated values. Use only replacement parts specified by the manufacturer. Other components may cause refrigerant leakage in the atmosphere and fire.

12. Cables
Check whether cables are subject to abrasion, corrosion, excessive pressure, vibration, sharp edges, or other adverse environments. Also consider the impact of aging or lasting vibration of compressors or fans on cables.

13. Flammable refrigerant check
Check for refrigerant leakage in an environment free of potential sources of ignition. Do not use halogen probes (or any other detector that uses an open flame) for detection. For systems containing flammable refrigerants, the following leakage detection methods are acceptable:
Electronic leakage detectors can be used to detect refrigerant leakage, but they may not be sensitive enough for flammable refrigerants or may need to be

recalibrated. (Calibrate detection equipment in a refrigerant-free area.) Make sure that the leakage detector is not a potential source of ignition and is suitable for the refrigerant to be detected. The lower flammable limit (LFL) of the refrigerant needs to be set on the leakage detection equipment and expressed as a percentage. Calibrate with the used refrigerant and adjust the appropriate gas concentration test range (up to 25%).
The fluid used for leakage detection is suitable for most refrigerants. However, chlorine-containing solvents should be avoided because the chlorine may react with the refrigerant and corrode copper pipes.
If leakage is suspected, all open flames should be removed or extinguished from the site.
If welding is required at the position where leakage occurs, all refrigerant should be recycled or isolated (by stop valves) in a part far from the leakage. Oxygen-free nitrogen (OFN) needs to be introduced into the system before and during the brazing process.

14. Refrigerant discharge and vacuumizing
To operate the refrigerant circulating system for maintenance or other purposes, follow the normal work procedures. However, for flammable refrigerants, strictly follow the operating procedures below:

• Discharge the refrigerant.
• Flush the circulation loop with inert gas.
• Vacuumize the loop.
• Flush the loop with inert gas again.
• Open the circulation loop by cutting or brazing.

Recycle the refrigerant into proper cylinders. The manufacturer shall specify available inert gases. Never use compressed air or oxygen to flush a refrigerant system. To flush a refrigerant circuit, charge an inert gas to the vacuum system until the operating pressure is reached, discharge the inert gas to the atmosphere, and vacuumize the system. Repeat this process until no refrigerant exists inside the system. Then, discharge the gas till the system reaches atmospheric pressure for future work.
Make sure that the vacuum pump outlet is far from potential sources of ignition and is ventilated.

15. Refrigerant charge
Follow the requirements below in addition to the regular operating procedures:

• Always keep cylinders upright.
• Make sure that the refrigeration system is grounded before charging refrigerant to the system.
• Becareful not to overcharge the refrigeration system.
• Before recharging the system, be sure to test the pressure by using an inert gas. Perform leakage test for the system after the charging and before commissioning. Perform follow-up leakage test before you leave the site.

16. Scrapping
Before performing this procedure, the technician must be completely familiar with the device and all its features. The practice of safely recycling refrigerants is recommended. Before reusing recycled refrigerant, analyze the samples of the refrigerant and oil. Make sure that the power supply is available before the operation.

(a) Get familiar with the device and operations.
(b) Electrically isolate the system.
(c) Before the operation, make sure that:

• Mechanical equipment is available to handle refrigerant cylinders if required.

• All personal protective equipment is provided and properly used.

• There cycling process is always supervised by qualified personnel.

• There cycling equipment and gas cylinders comply with relevant standards.

(d) If possible, vacuumize the refrigerant system.

(e) If a vacuum system is unavailable, vacuumize it from multiple positions to discharge refrigerant from various parts of the system.

(f) Before refrigerant recycling, make sure that the cylinder is on the scale.

(g) Start the recycling machine and follow the manufacturer's instructions.

(h) Do not overfill the cylinder. Liquid loading must not exceed 80%.

(i) Never allow the cylinder to exceed its maximum operating pressure, even temporarily.

(j) After correctly filling the cylinder and completing the entire process, move the cylinder and device away from the site immediately and close all isolation valves on the device.

(k) The recycled refrigerant must be cleaned and inspected before it can be injected into other refrigeration systems.

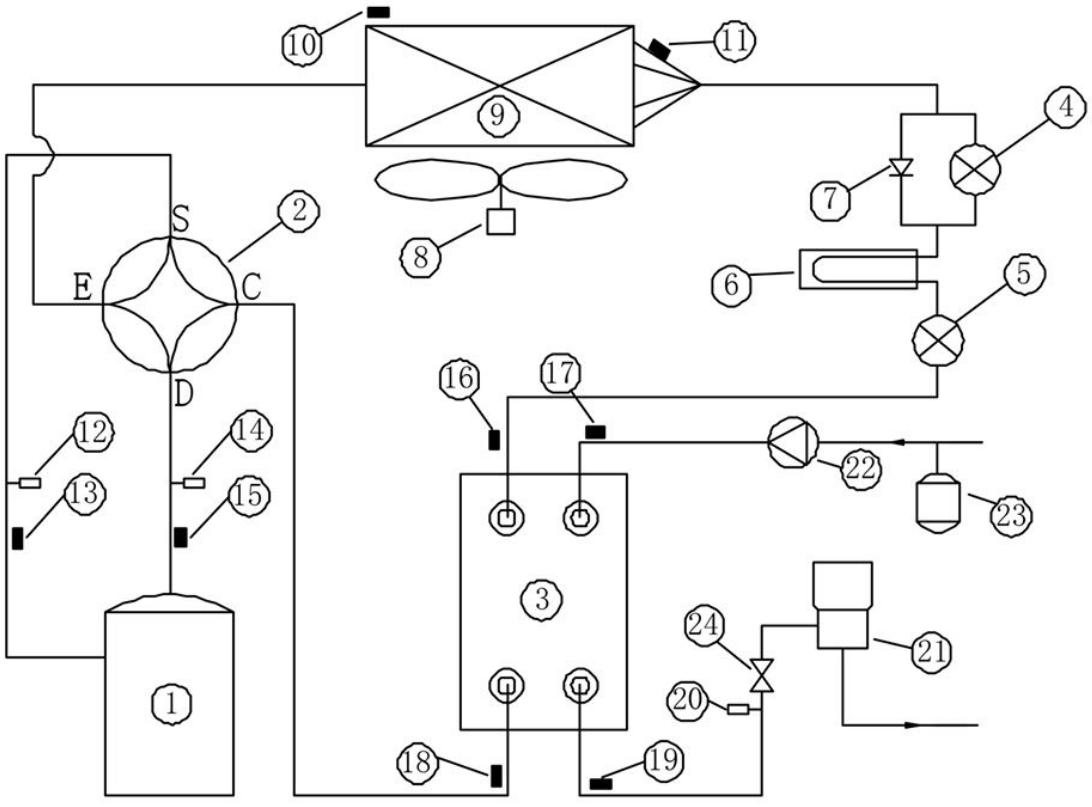
17. Labels
Attach a label to the device to indicate that the device is out of service and drained of refrigerant. Labels should be dated and signed. Make sure there is a label on the device stating that the device contains flammable refrigerants.

18. Recycling
When refrigerant needs to be removed from a system, either for repair or decommissioning, the good practice for safely removing all refrigerant is recommended. Use only dedicated cylinders to store refrigerant. Make sure that enough cylinders are available to store the refrigerant in the entire system. Use cylinders that are designed for refrigerant recycling, and attach a label on the dedicated cylinders to indicate the refrigerant. The cylinders should be equipped with pressure relief valves and stop valves and be in good condition. Empty cylinders need to be vacuumized and cooled before recycling if possible.
The recycling equipment needs to be in a good state, be provided with a set of instructions, and be suitable for recycling flammable refrigerants. Any doubt, contact the manufacturer. Additionally, a weighing instrument that is qualified and can be used normally is available. Hoses should be connected with leak-free detachable joints and maintained in good condition. Recycled refrigerant should be stored in applicable cylinders in accordance with local regulations and be disposed of according to the instructions for waste transportation. Never mix refrigerants in the recycling facilities, especially in the cylinders.
To remove the compressor or compressor lubricating

oil, ensure that the compressor is vacuumized to the proper level to avoid flammable refrigerant residual in the lubricating oil. Do not use open flames or other ignition sources to heat the compressor casing to accelerate this process. Safely drain the lubricating from the system.

19. Unit transportation, identification, and storage.
Transport the device containing flammable refrigerants in accordance with local regulations. Mark the device in accordance with local regulations.
Dispose of the device containing flammable refrigerants in accordance with local regulations.
Device/Appliance storage.
The storage of the device should comply with the manufacturer's instructions.
Storage of a large number of (unsold) devices. The protective devices in the storage warehouse should ensure that the mechanical damage of the devices will not lead to refrigerant leakage. The maximum number of devices that can be stored together is determined by local regulations.

Appendix System Diagram



№	Name
1	Compressor
2	Four-way valve
3	Plate heat exchanger
4	Heating EXV
5	Cooling EXV
6	Refrigerant radiator
7	Check valve
8	Fan motor
9	Condenser
10	Ambient temperature sensor
11	Coil temperature sensor
12	Low pressure sensor
13	Suction temperature sensor
14	High pressure sensor
15	Discharge temperature sensor
16	Liquid pipe temperature sensor
17	Water inlet temperature sensor
18	Gas pipe temperature sensor
19	Water outlet temperature sensor
20	Water flow switch
21	Water-gas separator
22	Water pump
23	Expansion tank
24	Pressure relief valve

FOR NOTES

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BAUF INSTALLER HEAT PUMP MONOBLOCK RHEIN R290