

DC Inverter Air to Water Heat Pump

ULTIMA (R290)

HLT40MONO-3
& HLT CONTROL BOX



Installation Manual

Before operating this product, please read the instructions carefully and keep this manual for future use.



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1. Product Specifications

1.1 Specifications

Model information			
Model		HLT40MONO-3	
Performance			
Min/max heating capacity (1)		kW	13.5~39.6
El. heating power input min/max (1)		kW	3.18~11.3
C.O.P min/max (1)		W/W	3.51~4.42
Min/max heating capacity (2)		kW	13.5~38.2
El. heating power input min/max (2)		kW	3.5~12.3
C.O.P min/max (2)		W/W	3.09~3.83
Min/max cooling capacity (3)		kW	13.4~36.2
El. cooling power input min/max (3)		kW	2.88~9.87
E.E.R. min/max (3)		W/W	3.66~4.92
Min/max cooling capacity (4) (A35/W7)		kW	6.4~25.8
El. cooling power input min/max (4)		kW	2.87~9.38
Min/max ambient working temp. in heating mode		°C	-23-45
Min/max ambient working temp. in cooling mode		°C	21-45
Flow temp. in heating mode		°C	20~75
Flow temp. in cooling mode		°C	7~25
Sound power level	Outdoor unit	dB (A)	65
	Indoor unit	dB (A)	/
Electrical heaters			
Heating cable - condense water		W	440
Compressor heater		W	30
Power supply			
Power supply - Outdoor unit	Outdoor unit	V / Hz / N	400V/50Hz/3N
	Fuse Outdoor unit	A	3p/40A/C
Power supply - Indoor unit	Indoor unit	V / Hz / N	230V/50Hz/1N
	Fuse Indoor unit	A	1p/6A/C
Components			
Refrigerant	type	/	R290
	charge	kg	4.2kg
	GWP	/	3
	t CO ₂	/	0.013
Hydraulics			
Minimum water flow		m ³ /h	4
Nominal water flow		m ³ /h	6.88
Hydraulic connections		inch	G2"
Dimensions and weight			
Dimensions net (L x D x H)	Outdoor unit	mm	1050*1170*1690
	Indoor unit	mm	390*135*480
Net weight	Outdoor unit	kg	348
	Indoor unit	kg	10

(1) Heating condition: water inlet/outlet temperature: 30 °C/35°C, Ambient temperature: DB 7 °C /WB 6 °C ;

(2) Heating condition: water inlet/outlet temperature: 40°C/45°C, Ambient temperature: DB 7 °C /WB 6 °C ;

(3) Cooling condition: water inlet/outlet temperature: 23 °C/18°C, Ambient temperature: DB 35 °C /WB 24 °C ;

(4) Cooling condition: water inlet/outlet temperature: 12°C/7°C, Ambient temperature: DB 35 °C /WB 24 °C ;

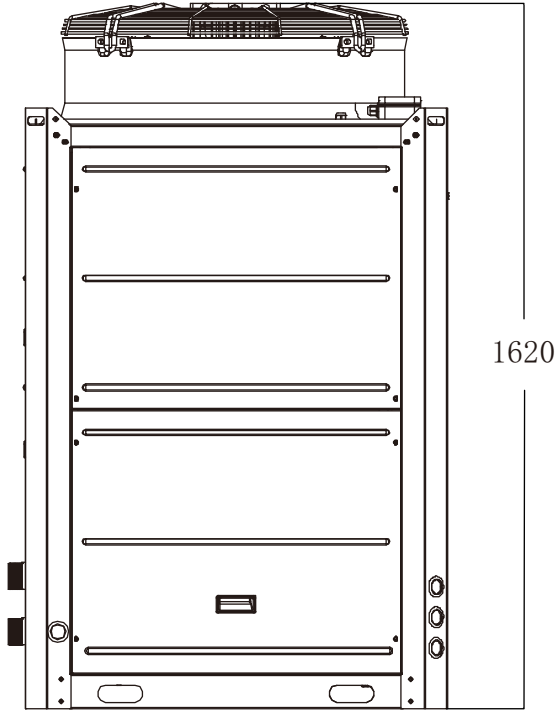
(5) The specifications are subject to change without prior notice. For actual specifications of unit, please refer to the stickers on the unit.

1. Product Specifications

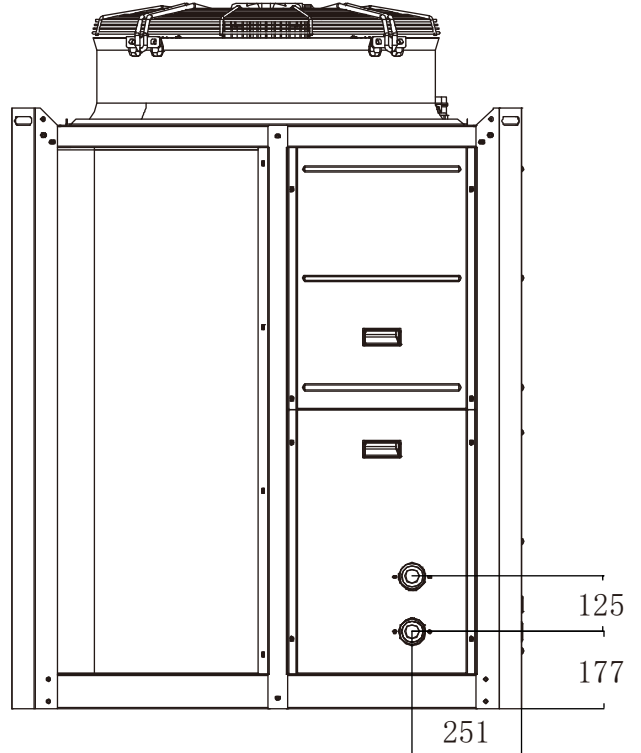
1.2 Dimensions

Outdoor unit - HLT40MONO-3

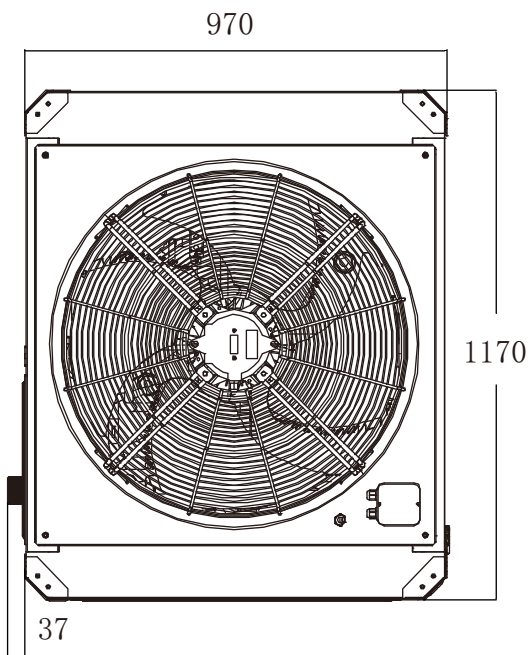
Unit:mm



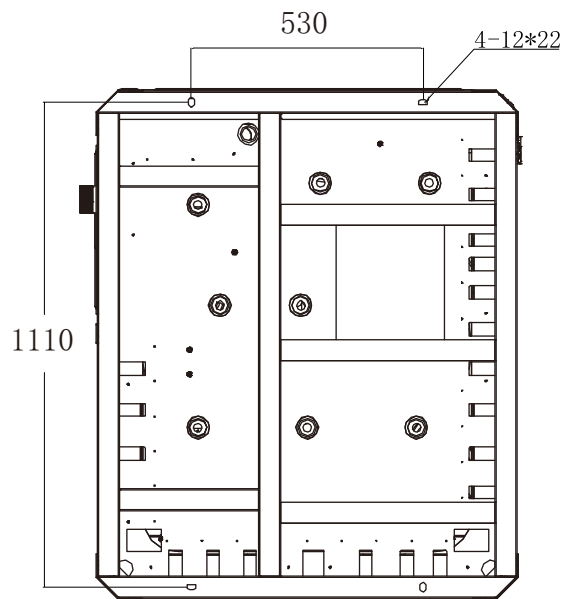
Front view



Side view



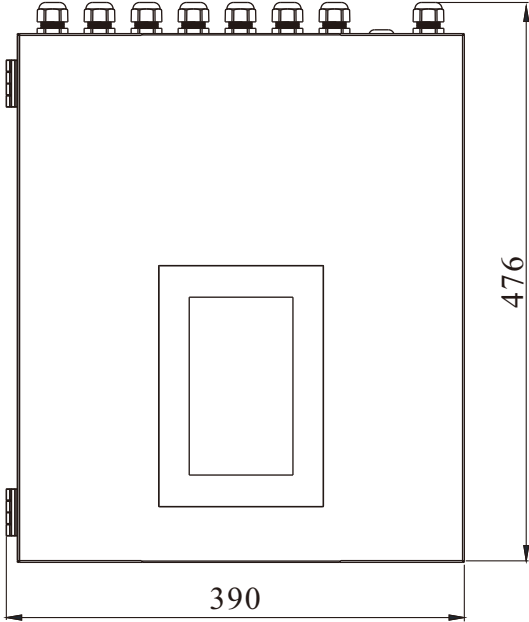
Top view



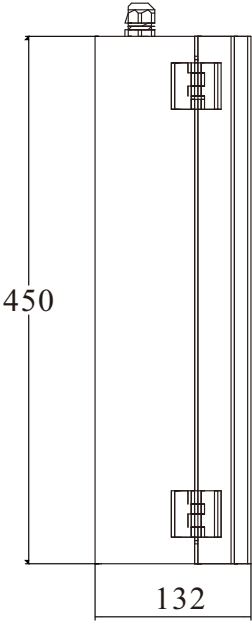
Bottom view

1. Product Specifications

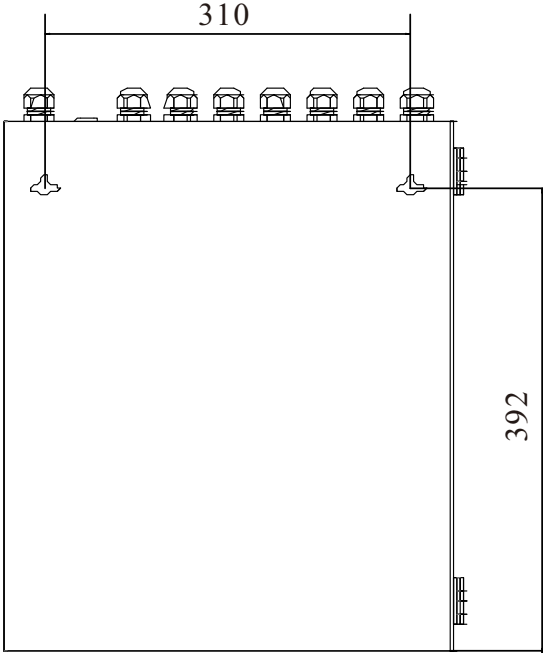
Indoor unit - CONTROL BOX



Front view



Side view

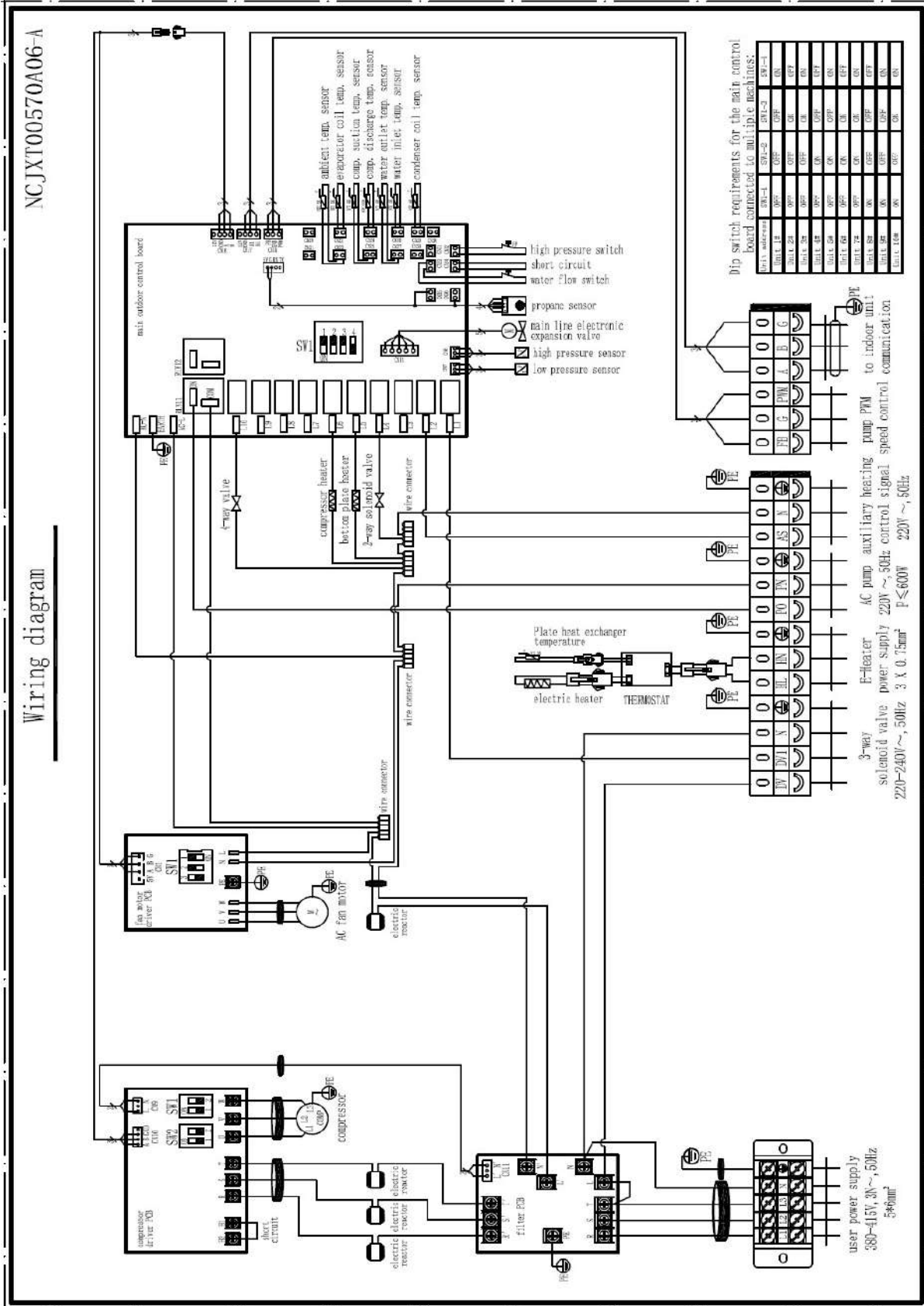


Back view

2. Product Data

2.1 Electrical Wiring Diagrams

Outdoor unit - HLT40MONO-3

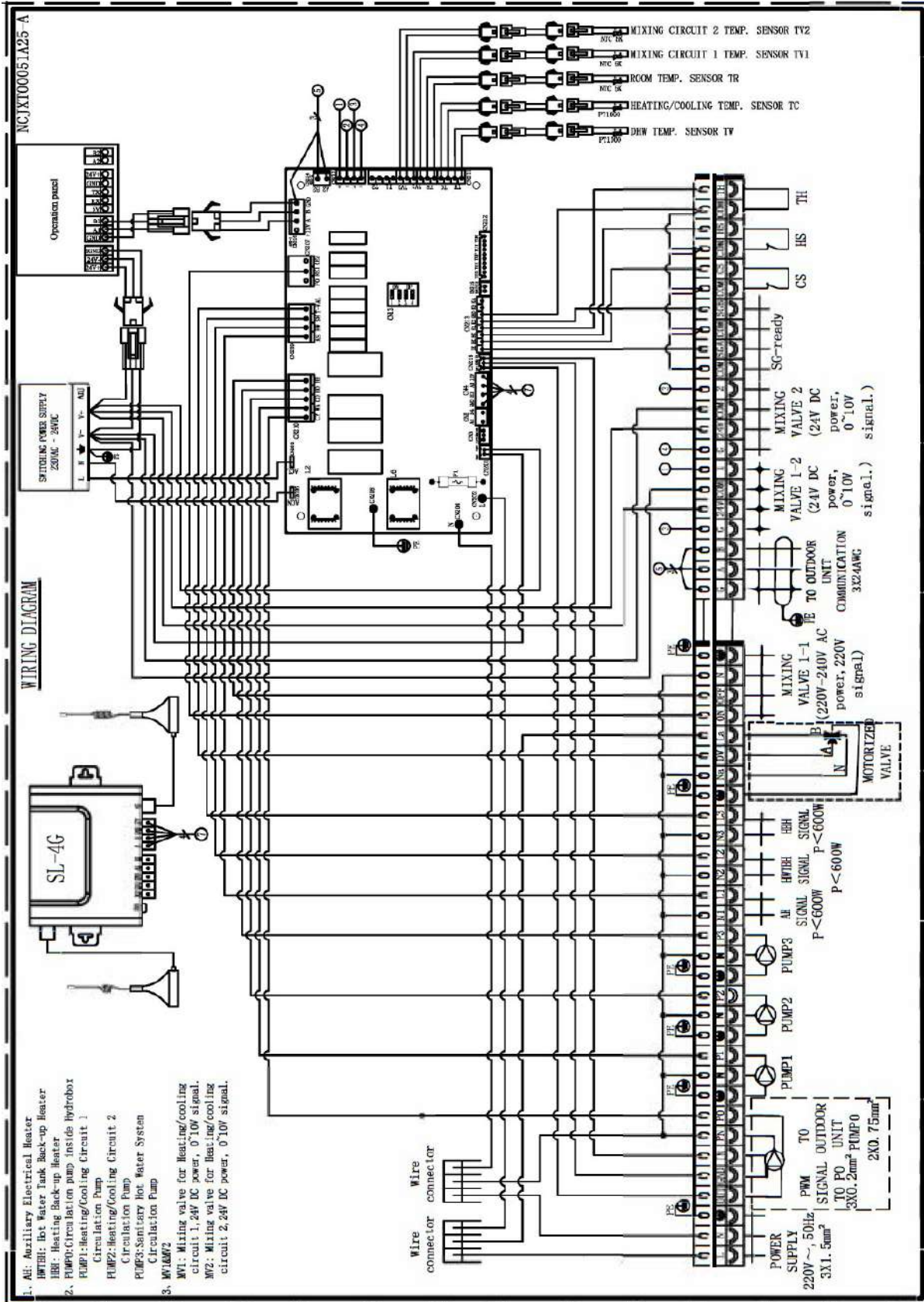


TAKE CARE!

The specifications are subject to change without prior notice.
 For actual specifications of the unit, please refer to the specification stickers on the unit.

2. Product Data

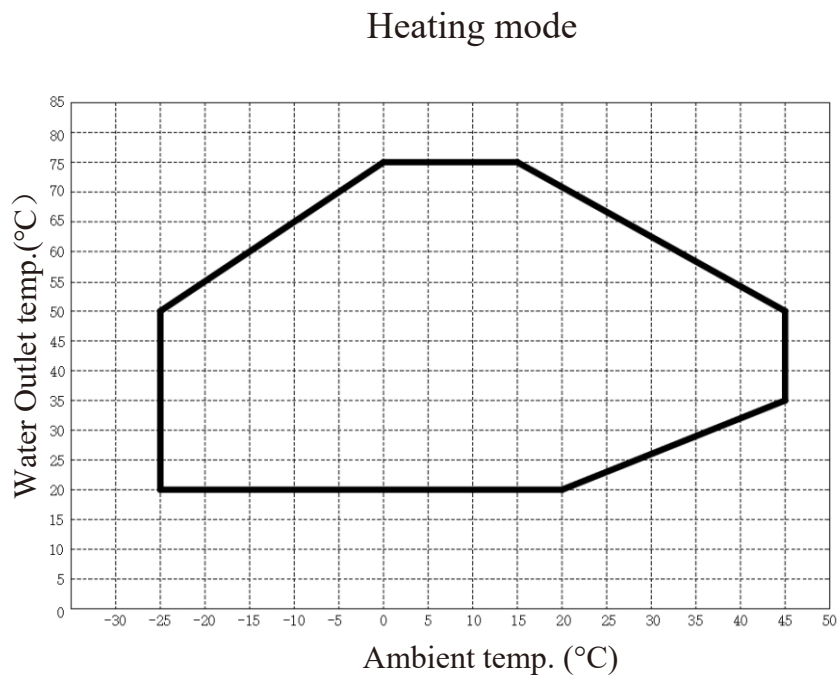
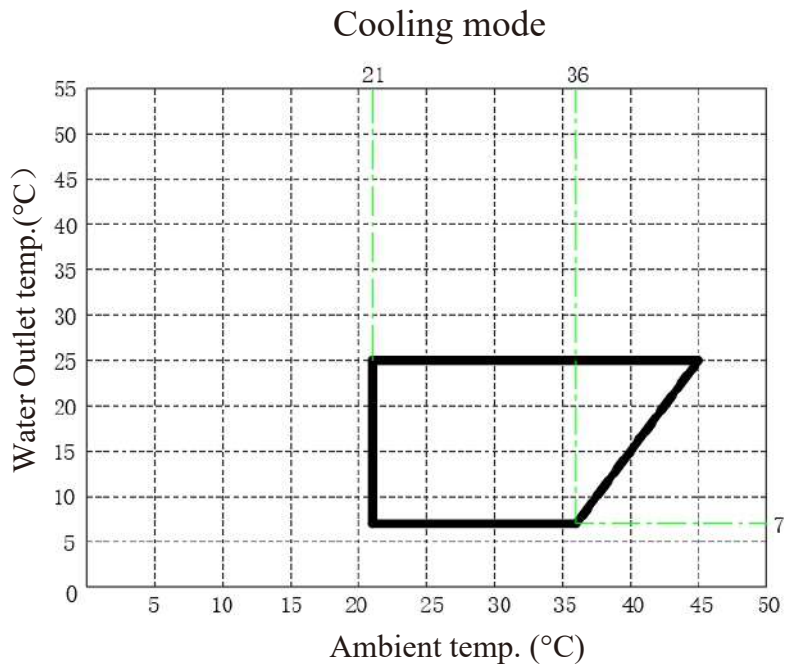
Indoor unit - CONTROL BOX



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2. Product Data

2.2 Operation temperature range



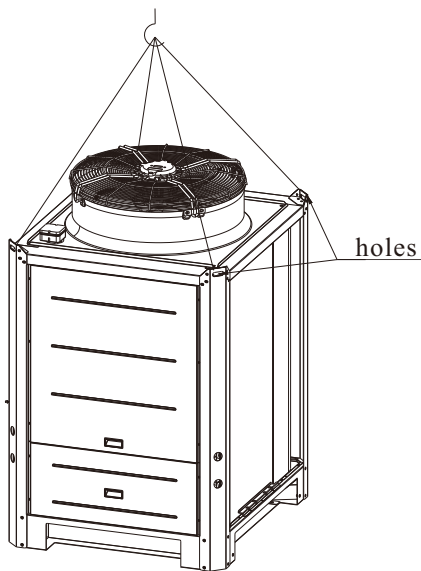
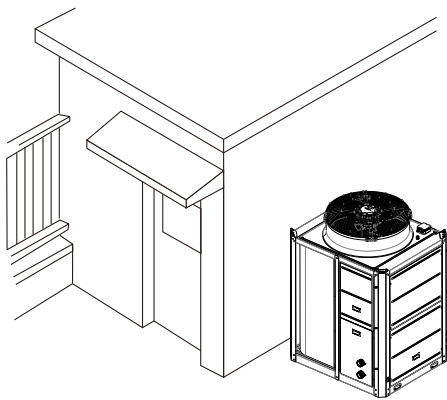
3. Installation

3.1 Selecting the Installation Site

3.1.1 Installation Conditions

Select a installation site that meets the following conditions:

1. Unit can have free air circulation.
2. The noise from the unit will not be a problem.
3. Condense water from the unit can be drained.
4. Unit has open space as shown in the drawing.
5. Stand of the unit must be at least 50cm high in cold areas, to avoid snow accumulation.

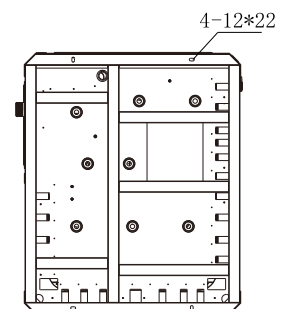


Pass two ropes through four holes of the heat pump and lift it with hook.

Lift of the unit : Rope used for lifting the unit should bear at least 3 times the weight of the unit. Hook should be fixed to the unit, and lifting angle must over 60°

Note : Don't stay under the unit when unit is being lifting up. Add soft material between rope and unit to avoid unit damage.

1. Fix the outdoor unit on the bracket.
2. Four M10 bolts pass through four holes of bracket and of the bottom plate installation holes.
3. Tighten nuts with a wrench.

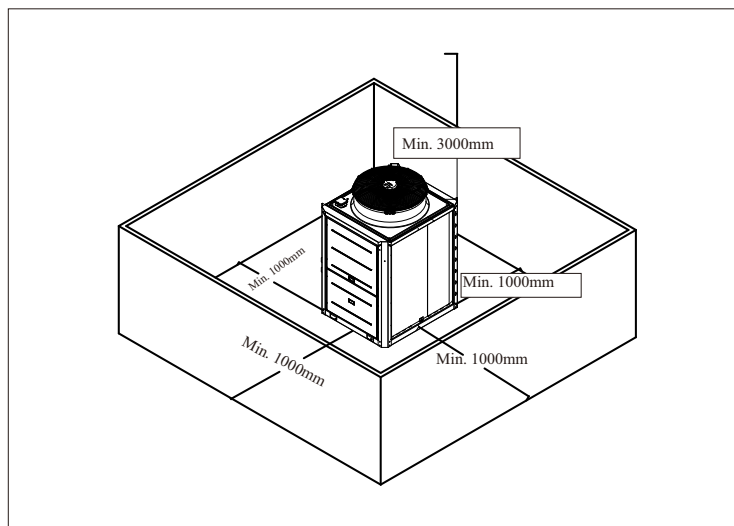


3. Installation

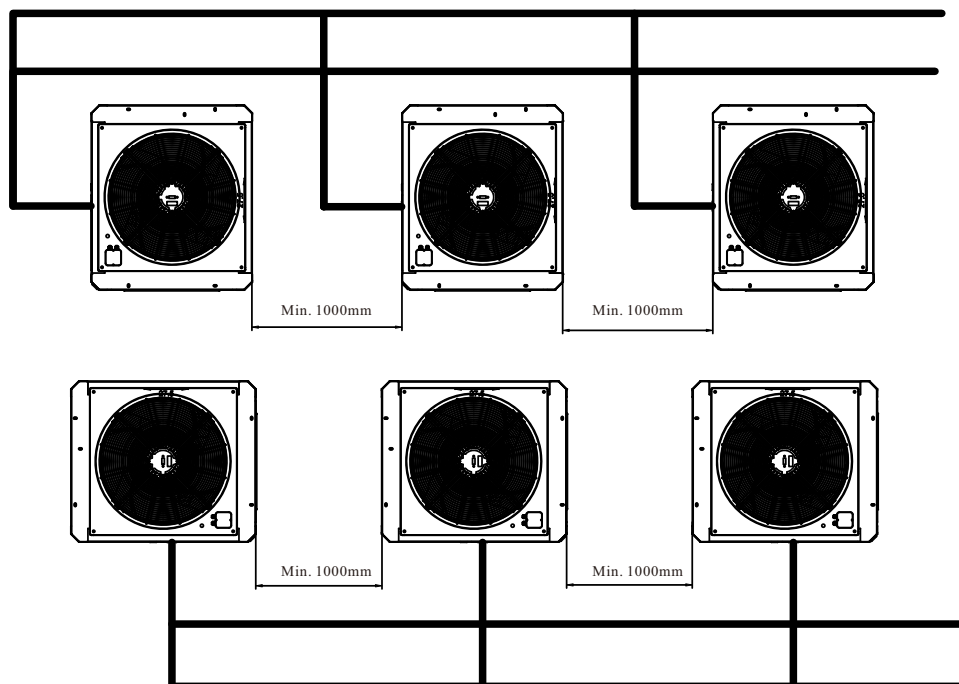
3.1.2 Installation space requirements

Single unit installation

Secure enough space around the unit as shown in the figures below.



Side-by-side installation



The unit must be installed on flat concrete blocks, or a dedicated mounting bracket.

4. System Design

4.1. Water Pipe Installation

4.1.1 Caution for water pipe installation

The installation should be done by qualified installer. Before installation, please make sure the power supply is cut off.

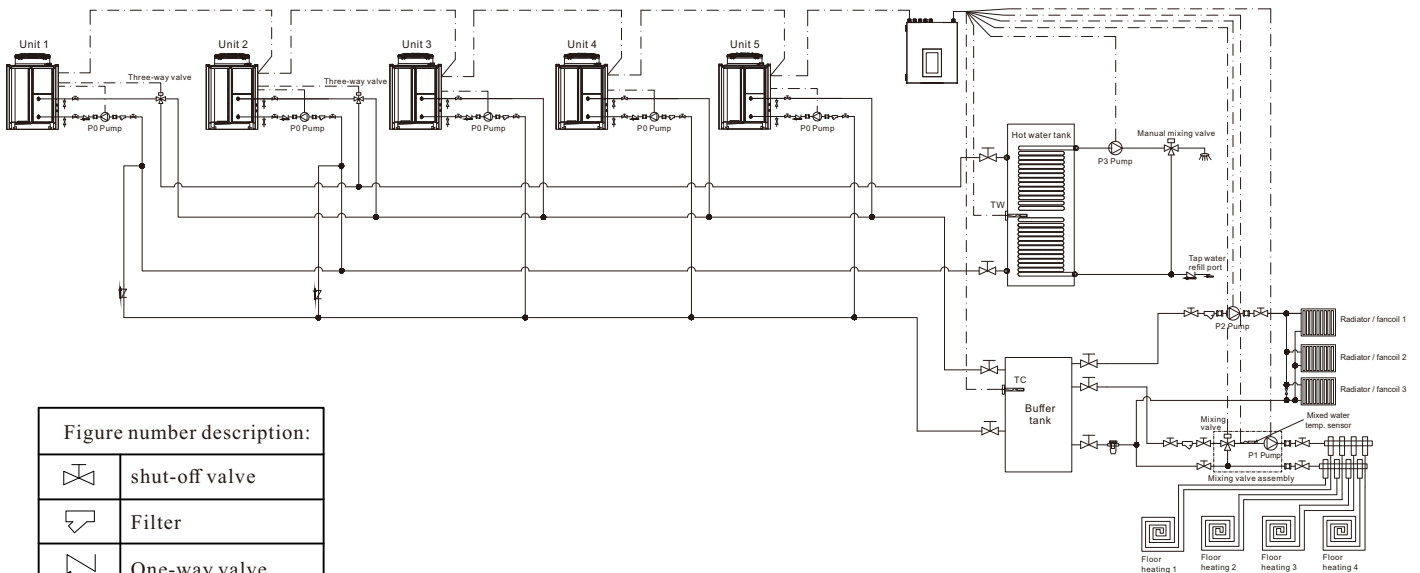
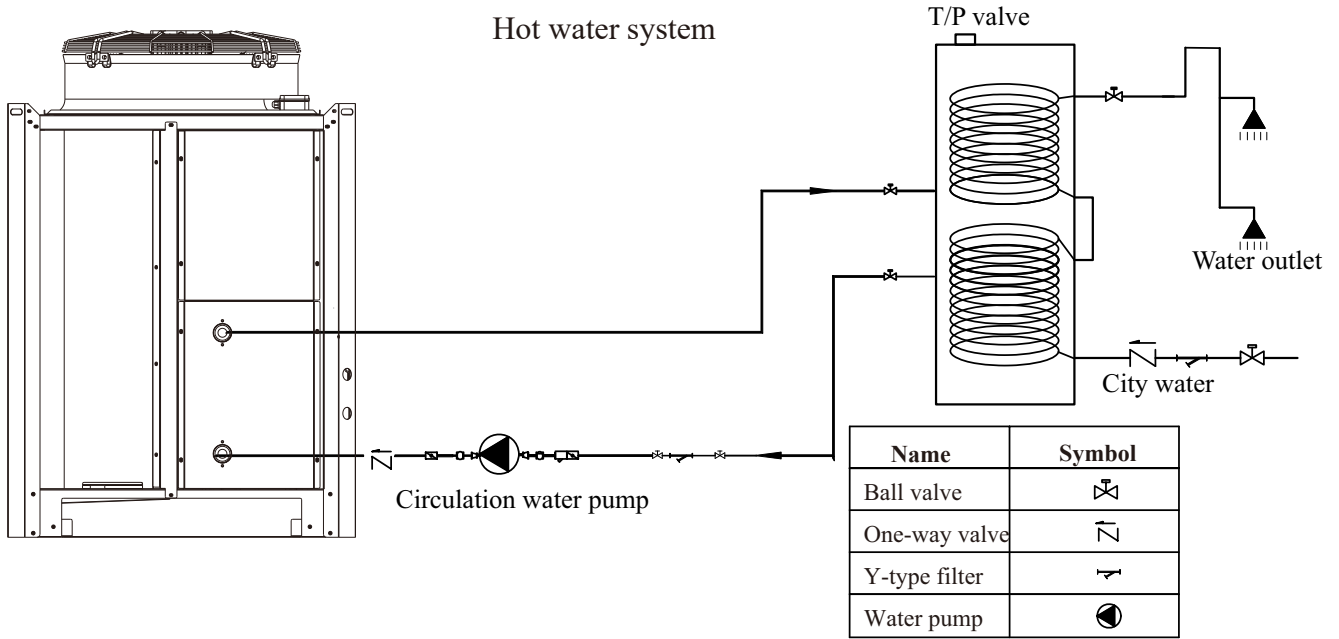


Figure number description:

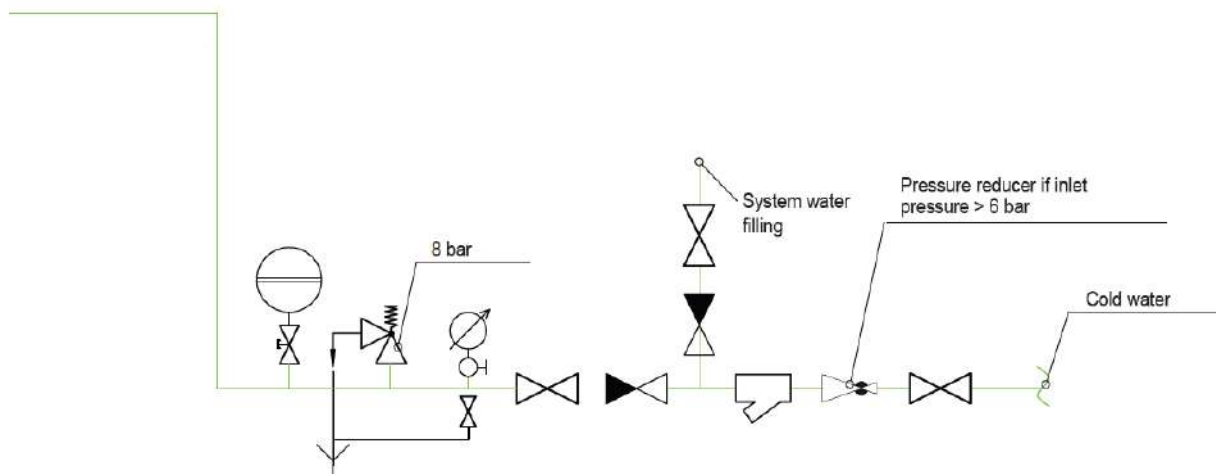
	shut-off valve
	Filter
	One-way valve
	Drain valve
	Soft connector
	Magnetic filter
	Control signal line

4. System Design

4.1.2 Installing the water pipes

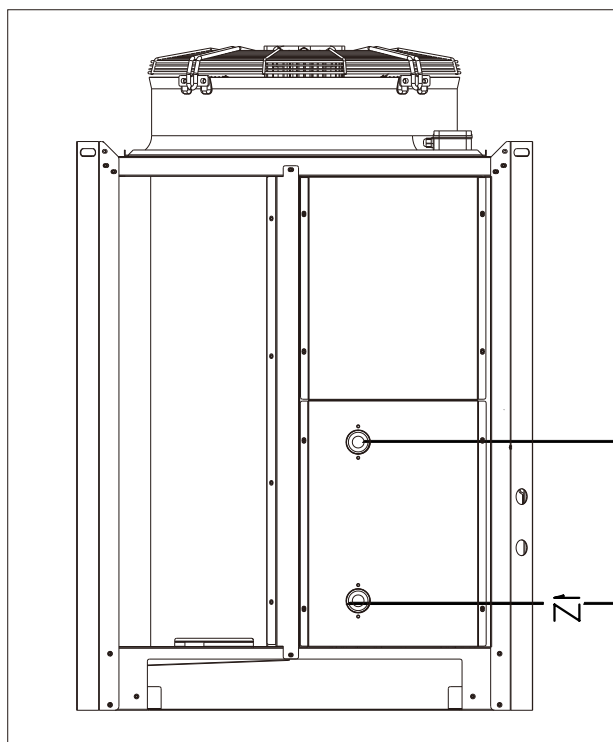
Installing the Filter

A mesh filter must be installed in front of the water inlet of the unit and water tank, to keep the water quality and collect impurity contained in the water. Take care to keep the water filter mesh towards the bottom. Ball valve is recommended to be installed at both sides of the filter, so as to clean or change the filter in a easier way.



Check valve

A check valve must be installed in front of the water inlet of the unit to prevent the refrigerant from flowing back into the room through the water inlet after the heat exchanger is damaged, the water outlet relies on the gas separator valve and exhaust valve to discharge the refrigerant. In addition, propane sensor, electric two-way valve, and pressure release valve are used to further ensure the gas safety. If a propane sensor is used, it is recommended that antifreeze should not be added in the water system, to prevent false triggering of propane sensor protection due to antifreeze deterioration.



4. System Design

4.2 Ensuring enough water in the water circuit

4.2.1 Required amount of water

Buffer tank is to be included in the system.

It should be installed between heat pump and distribution system, in order to:

1. Ensure heat pump unit has stable and enough water flow rate.
2. Store heat to minimize fluctuation of system heating/cooling load.
3. Extend the water volume of distribution system for proper working of heat pump unit.

Model	Minimum amount of water (ltr)
HLT40MONO-3	320

4.3 Inlet/Outlet pipe connection size and material

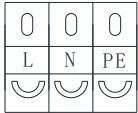
The table below shows the inlet/outlet pipe connection size

Model	Inlet pipe connection	Outlet pipe connection
HLT40MONO-3	2" Female screw	2" Female screw

5. Wiring Design

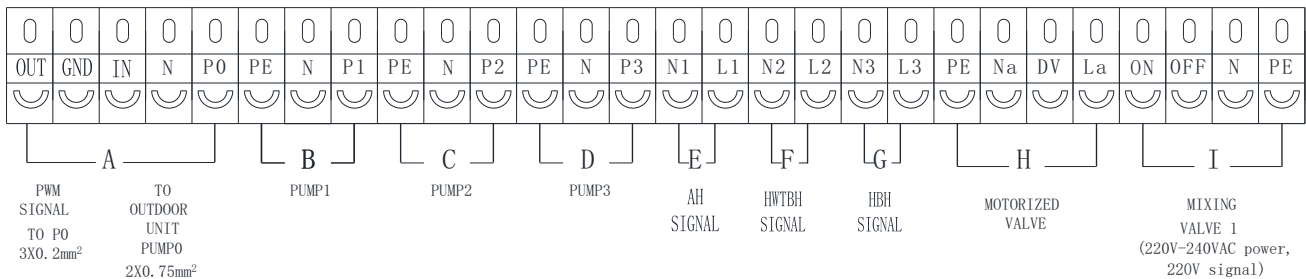
5.1 Indoor unit wiring

Indoor unit - CONTROL BOX



Main power supply
220-240V~, 50Hz
3x1.5mm²

Terminal block 1



A: Circulation pump for heating/cooling: ON/OFF signal of circulating pump. This port is an active output signal. It can not be operated directly with load, but only as output signal.

When connecting AC water pump, only P0/N/PE need to be connected.

When connecting DC water pump, all OUT/GND/IN/N/P0/PE terminals need to be connected.

B: Secondary pump 1: In the heating system, the ON/OFF signal of the circulating water pump of system 1. It can not be operated directly with load, but only as output signal.

C: Secondary pump 2: In the heating system, the ON/OFF signal of the circulating water pump of system 2. It can not be operated directly with load, but only as output signal.

D: Circulation pump for hot water: ON/OFF signal of circulating water pump at domestic hot water side of the unit. This port is an active output signal with an output of 220V/50HZ. It can not be operated directly with load, but only as output signal.

E&G: (Heating/cooling system)

External source for heating stage 1/External source for heating stage 2.

If there is an external standby heater for heating, it can be connected to these ports for controlled by the heat pump. It can not be operated directly with load, but only as output signal.

There are two priority levels for electric heater of heating: auxiliary electric heater AS, electric heater of heating SH. When there is a need of opening electric heater, it will open the one with high priority firstly;

5. Wiring Design

F: (DHW system)

External source for DHW stage 1.

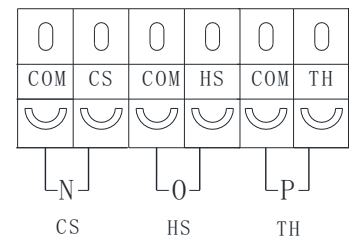
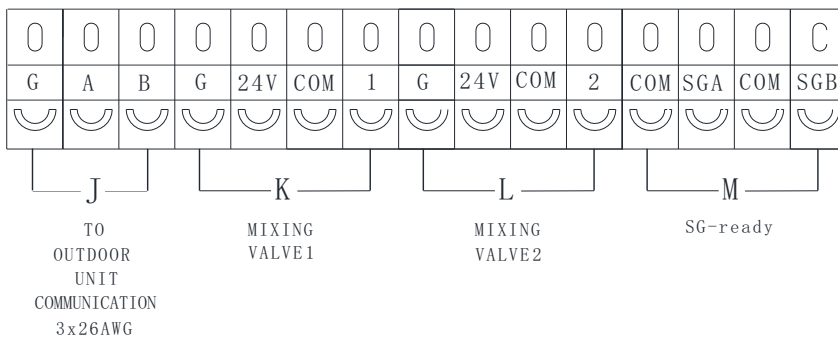
If there is an external standby heater for DHW, it can be connected to these ports for controlled by the heat pump. It can not be operated directly with load, but only as output signal.

H: Diverting valve output La = constant power (230VAC); Na = Neutral; DV = Signal output during heating mode (230VAC)

I: Mixing valve 1 regulation in heating/cooling system (220V-240V AC power, 220V signal)

Terminal block 2

Terminal block 3



J: Indoor and outdoor communication cable. Heat pump outdoor unit A-B-G cable need to be connected with the indoor controller G-A-B cable for communication.

K&L: (Heating/cooling system) Mixing valve 1. (Heating/cooling system) Mixing valve 2. Waterway regulation in heating/cooling system.

This port is an active signal DC24V (0-10V), which cannot be connected to active signals (such as current and voltage signals).

M: The “Smart Grid Readiness” function (abbr. “SG Ready”) increases the hot water production of the unit, in winter heating or DHW mode depending on the operating mode, increasing the hot water setpoint, when the electrical grid “Smart Grid” sends a signal to the unit control through a digital input.

N: Cooling signal terminal: Decide whether the heat pump starts cooling/heating according to the external signal switch.

O: Heating signal terminal: Decide whether the heat pump starts cooling/heating according to the external signal switch.

P: High temperature signal: Set the working mode of circulating water pump in the two systems. The high temperature of system 1 or system 2 is valid (only one system can be selected at the same time.) If system 1 is selected as high temperature system, then the high temperature function of system 1 is controlled by external signals, and whether to start the high temperature function is determined by the ON/OFF signal at the high temperature signal terminal.

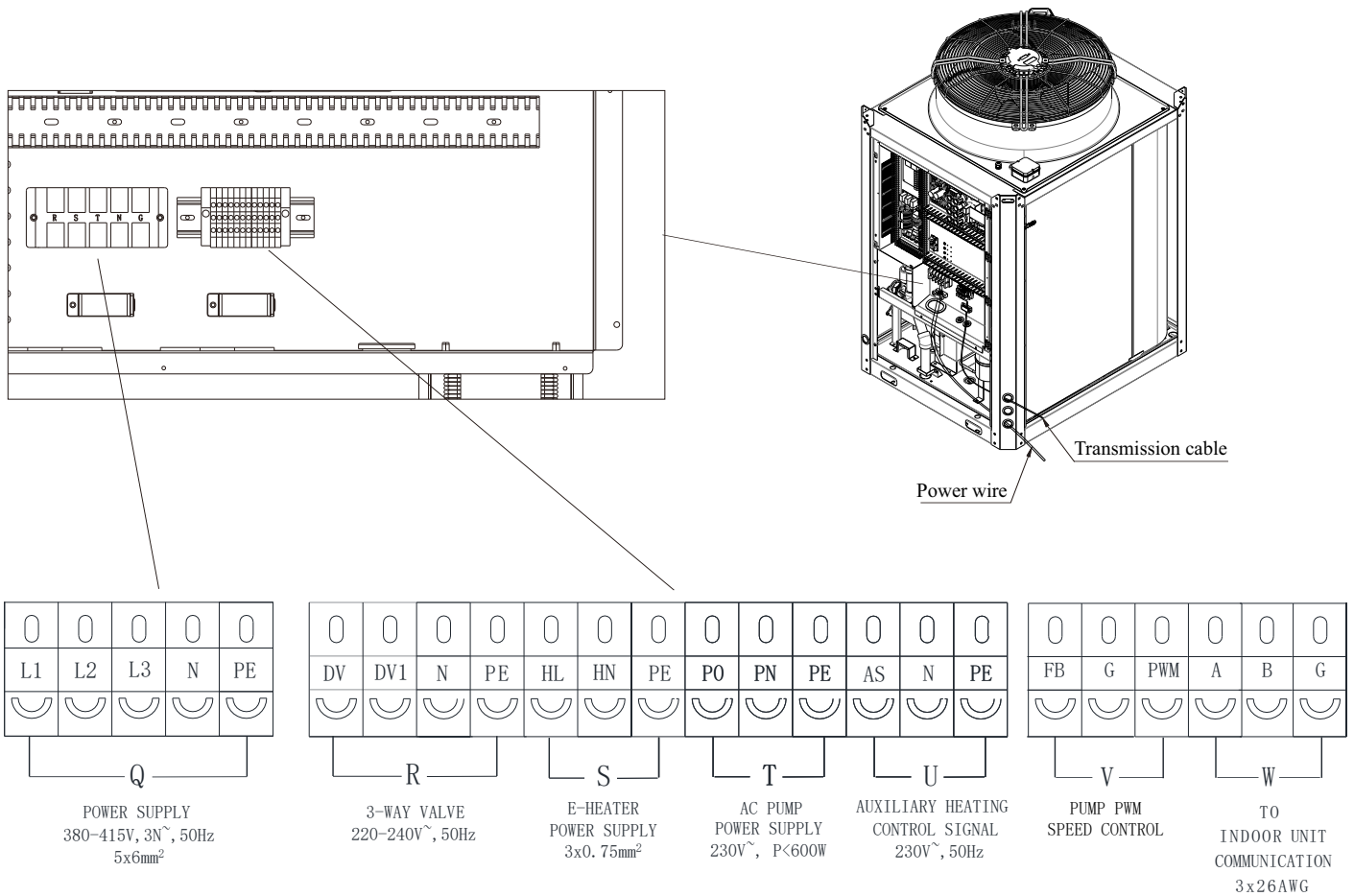
5. Wiring Design

5.2 Outdoor unit wiring

Outdoor unit - HLT40MONO-3

Terminal Block Arrangement

Remove the front panel of the control box, unscrew the four screws and pull the panel forward and then down.



Q: The main power supply to outdoor unit (380-415V, 3N~ AC power).

R: Power supply of diverting 3-way valve (DHW / Heating) in case of cascading. Each device in the cascade controls its own 3-way valve.

S: Emergency electric heater power supply. This heater must be connected to a separate power source than the main power source of the unit.

T: Power supply of AC circulating pump P0 in case of cascading. Each device in the cascade controls its own circulating pump.

5. Wiring Design

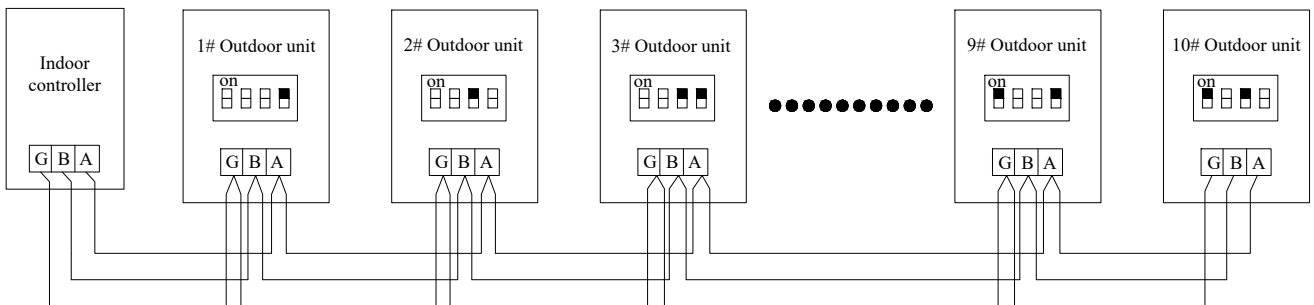
U: Electric heater control signal for cascade. With these contacts, the electric heater of each outdoor unit can be turned off/on with a control box.

V: If a DC circulation pump will be installed, its control is connected with the following contacts (in this case, the EEPROM needs to be adjusted)

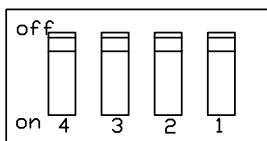
W: In case door and outdoor communication cable. Heat pump outdoor unit A14 -B-G cable need to be connected with the indoor controller A-B-G cable for communication. In the case of cascading, all devices in the system must be connected in series.

5.3 Cascade wiring

Communication for multiple units



DIP switch (SW1) is used to set the system number.



Outdoor unit main PCB--SW1

When multiple units work together, please set the dip switch as follows.

The Dip switch is detected only once when the unit is powered on. If you want to reset the dip switch, please cut off power first and reset dip switch, then power on the unit.

The value of DIP switch: OFF=0, ON=1.

5. Wiring Design

Multi - line dip code description

Unit address	Dip code1	Dip code2	Dip code3	Dip code4
Unit 1#	OFF	OFF	OFF	ON
Unit 2#	OFF	OFF	ON	OFF
Unit 3#	OFF	OFF	ON	ON
Unit 4#	OFF	ON	OFF	OFF
Unit 5#	OFF	ON	OFF	ON
Unit 6#	OFF	ON	ON	OFF
Unit 7#	OFF	ON	ON	ON
Unit 8#	ON	OFF	OFF	OFF
Unit 9#	ON	OFF	OFF	ON
Unit 10#	ON	OFF	ON	ON

Thank you for choosing our quality product. Please read this manual carefully before use and follow the instructions to operate the unit in order to prevent damages on the device or injuries to staff.

Specifications are subject to change with product improvements without prior notice. Please refer to the specification sticker on the unit for upgraded specifications.

NCSMS00928A00-A