



Technical Manual



Multifunctional Heat Pump R32

Installation, maintenance & use instructions

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1 General

Thank you for choosing a **NOBEL** heat pump. This is a heat pump capable of providing the ideal level of comfort for your home, always with a suitable hydraulic installation. The unit is an air source heat pump for space heating/cooling and sanitary water heater for houses, apartment blocks and small industrial premises. Outdoor air is used as a heat source creating free energy to heat your home.

This manual forms an essential part of the product and it must be given to the user. Read the warnings and recommendations in the manual carefully, as they contain important information on the safety, use and maintenance of the installation. This heat pump must be installed by qualified personnel only, in accordance with the legislation in force and following the manufacturers instructions.

The start-up of this heat pump and any maintenance operations must be carried out only by qualified personnel only.

Incorrect installation of this heat pump could result in damage to people, animals or property, and the manufacturer will not be held liable in such cases.

2 Safety warnings

2.1 Usage and installation warnings

The heat pump must be installed by personnel authorized by the Ministry of Industry, in compliance with the applicable laws and regulations. The precautions detailed here cover very important issues. Please be sure to follow them carefully. Read carefully this instruction manual and keep it in a safe, easily-accessible place. The manufacturer will not be liable for any damages caused by failure to follow these instructions.

This heat pump is suitable for use in both heating and cooling installations and can be combined with fan coils, underfloor heating/cooling, low-temperature radiators, and domestic hot water tanks (optional). It must be connected to a heating/cooling installation and/or a domestic hot water distribution network and compatible with its performance and power. Liable under any circumstances for damage caused by unsuitable, erroneous or irrational use. Remove all the packaging and check the contents are complete. In case of doubt, do not use the heat pump. Contact your supplier. Keep the packaging elements out of reach of children, as they can be dangerous.

Improper installation or placement of equipment or accessories may cause electrocution, short circuit, leakage, fire, or other damage to the equipment. Use only accessories or optional equipment designed specifically to work with the products presented in this manual. Do not modify, replace or disconnect any safety or control device without first consulting the manufacturer. When it is decided not to use any more the heat pump, disable the parts that could represent a potential hazard.

2.2 Personal safety warnings

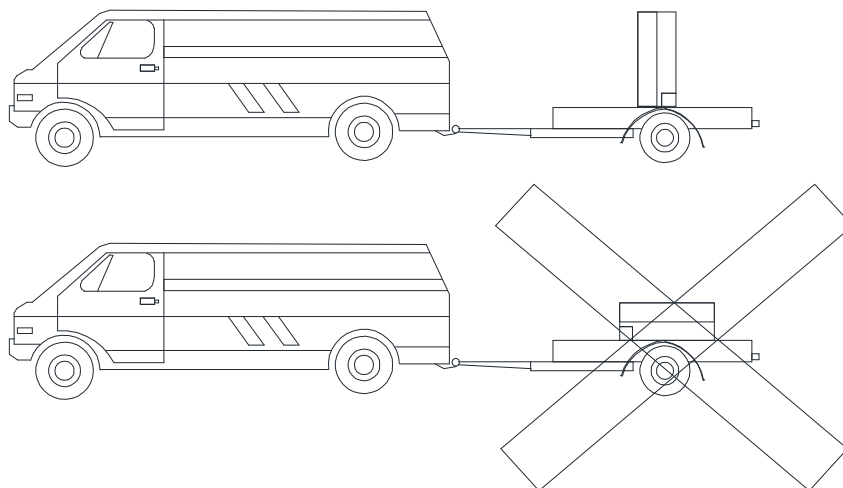
Always wear appropriate personal protective equipment (gloves, safety goggles, etc.) when performing installation and/or maintenance on the unit. Do not touch any switch with wet fingers. Touching a switch with wet fingers may cause electric shock. Before accessing the electrical components of the heat pump, disconnect the main power supply completely. Disconnect all electricity sources before dismantling the cover panel from the electric panel or before making any connections or accessing electrical parts.

To avoid electrocutions, be sure to turn off the power for 1 minute (or more) before servicing the electrical parts. Even after 1 minute, always measure the voltage at the terminals of the main circuit capacitors and other electrical parts before touching them and make sure that the voltage is equal to or less than 36 V AC/DC. When the cover panels are disassembled, the energised parts can be easily accessed. Never leave the unit unattended during installation or during maintenance work when the cover panel is removed. Do not touch the refrigerant pipes, water piping, or internal parts during and immediately after operation. Pipes and internal parts may be excessively hot or cold, depending on the use of the unit.

The hands may be burned by cold or heat in case of improperly touching pipes or internal parts. To avoid injury, wait until the pipes and internal parts return to their normal temperature. Alternatively, if access is required, be sure to wear appropriate safety gloves.

2.3 Transport, storage and handling warnings

The heat pump must be transported, handled and stored vertically. Tipping the machine may cause the compressor or other components damage.



Do not twist, loosen or pull the external electric cables of the heat pump.
Do not insert any sharp objects through the fan grille or into the fan itself.
Do not wash the interior of the heat pump with water as this may result in electric shock or fire. For any cleaning and /or maintenance operations, disconnect the main power supply.

2.4 Freeze protection warnings

The heat pump is a machine that is installed in the exterior of the house, so that it will be exposed to the extreme climatic conditions of cold in the periods of frost. Due to this, it is of paramount importance that this type of machine is protected against such frost. The freezing of the water inside the heat pump causes the heat pump to breakdown, with the subsequent interruption of its operation and major economic expenses involving its repair.

It is mandatory to use a safety system in the installation to prevent the freezing of the water in the machine. We propose the use of glycol in the water circuit of the heat pump, or some antifreeze valve system to empty the installation in conditions of low temperatures. Carefully read the Freeze Protection section in this manual for more detailed information on these systems. We will not cover damages caused by the lack of any of these antifreeze safety systems.

The electronic controller of the heat pump has a function for protection against the freezing of the water in its interior in periods of frost. For this function to remain active and on alert, the heat pump must be connected to the mains and have a power supply, even if it is switched off or not in use.

A water filter should be installed in the installation, in order to avoid obstructions in the water circuit of the heat pump. It must be installed in the return circuit of the heat pump and **MUST** be installed before filling and circulating the water through the installation. The water filter should be checked and cleaned, if necessary, at least once a year. IN new installations, however, it is advisable to check it within the first few months of its commissioning.

3 System description

The unit is a monoblock (single unit) air/water heat pump, specially designed for the colder climate. There is no need for bore holes and usually the system can be installed within 1 day.

The unit can both heat hot water effectively at high outdoor temperatures and give a high output to the heating system at low outdoor temperatures. If the outdoor temperature drops to a level lower than minus 0°C (factory setting), the auxiliary heater switches on to ensure the heat pump unit works normally. The unit is also capable of cooling in the summer. The heat pump controller is an intelligent wired system. The unit is rated as 6KW/9KW/12KW/18KW. The Material/components are chosen to provide a long service life and to fully withstand harsh outdoor conditions.

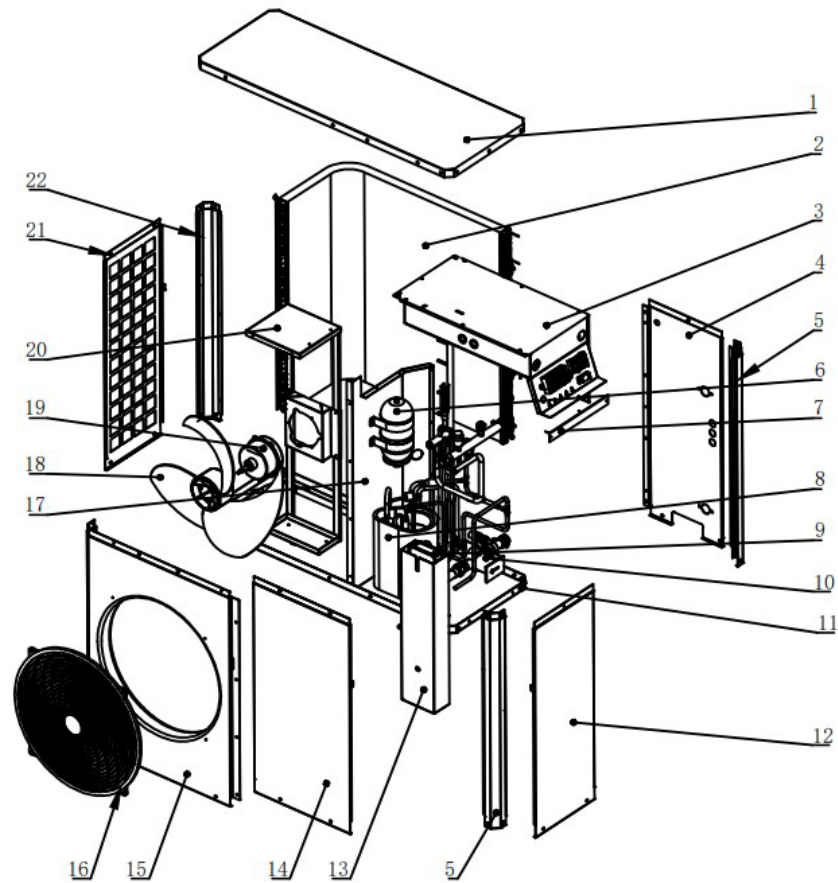
The unit has two different installation options:

- 1). Space heating/cooling + DHW (Domestic hot water)
- 2). Space heating/cooling only or DHW only

4 Technical specification

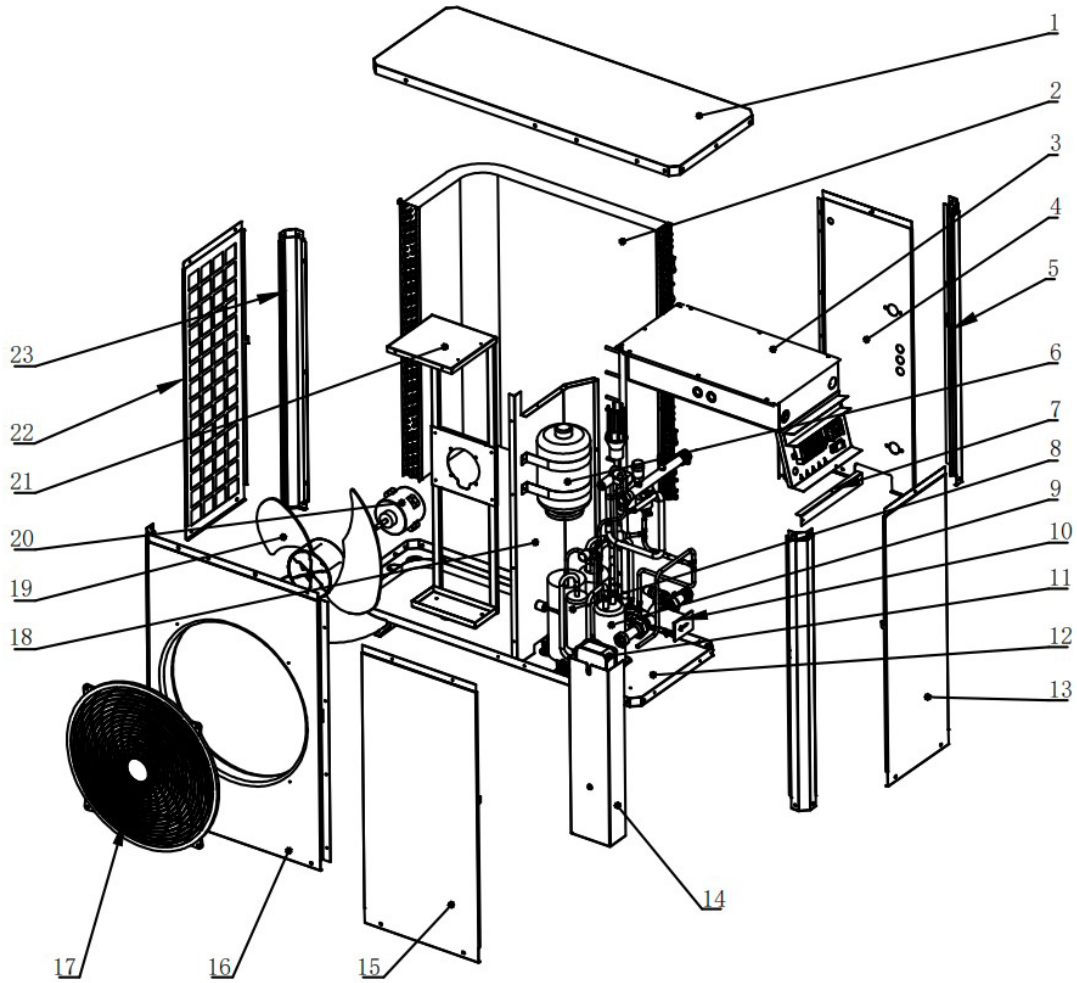
4.1 Internal View

NBL-HPM-NT-AC006-V1 / AC009-V1



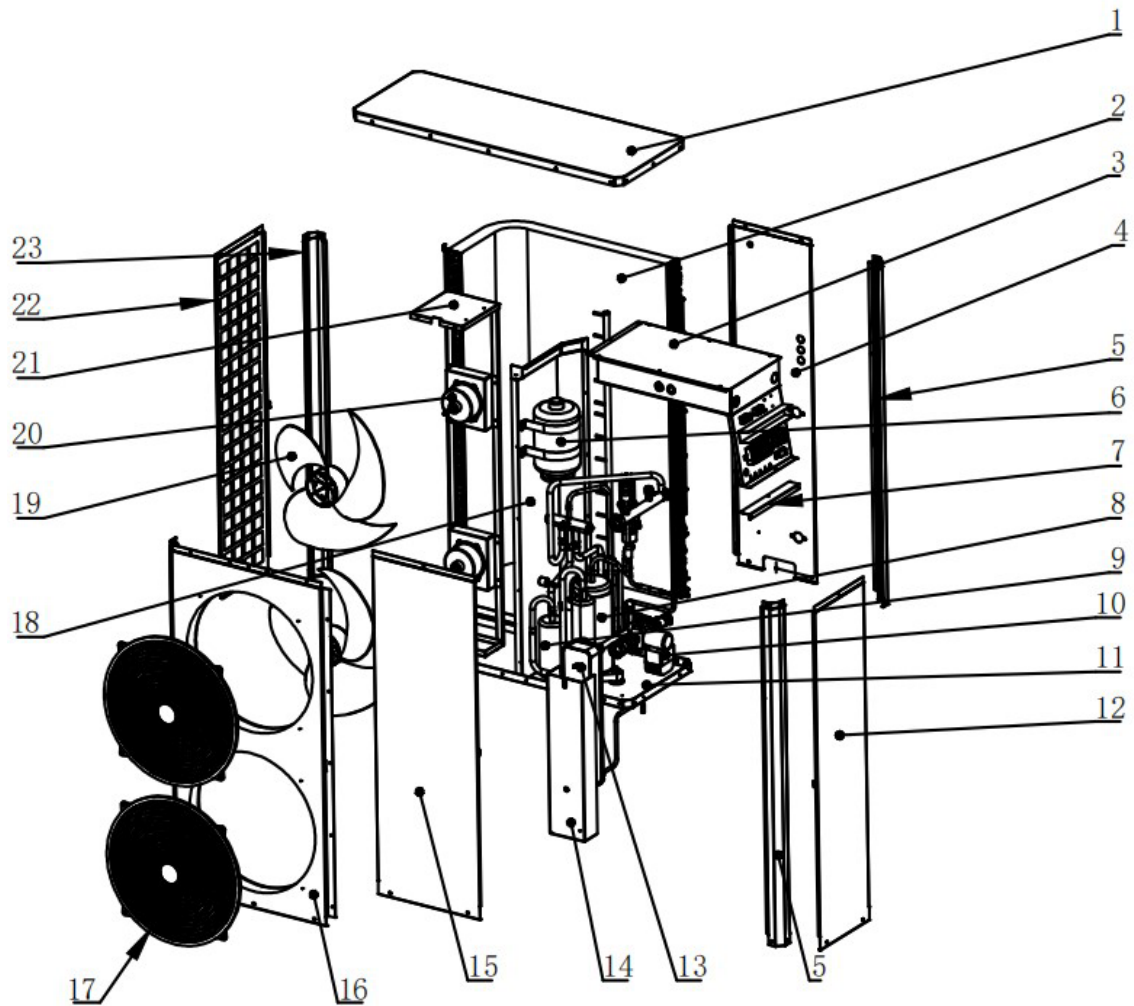
1	Top cover	Evaporator	2	Evaporator
3	Electrical box		4	Behind plate
5	Right side support		6	Expansion vessel
7	Electrical box support		8	Compressor
9	Plate type heat exchanger		10	Water pump
11	Base plate		12	Right side service plate
13	Plate type heat exchanger support		14	Front service plate
15	Front plate		16	Fan grille
17	Mid-support plate		18	Fan blade
19	Fan motor		20	Fan motor support
21	Left side pore plate		22	Left side support

NBL-HPM-NT-AC012-V1 / AC012-V3



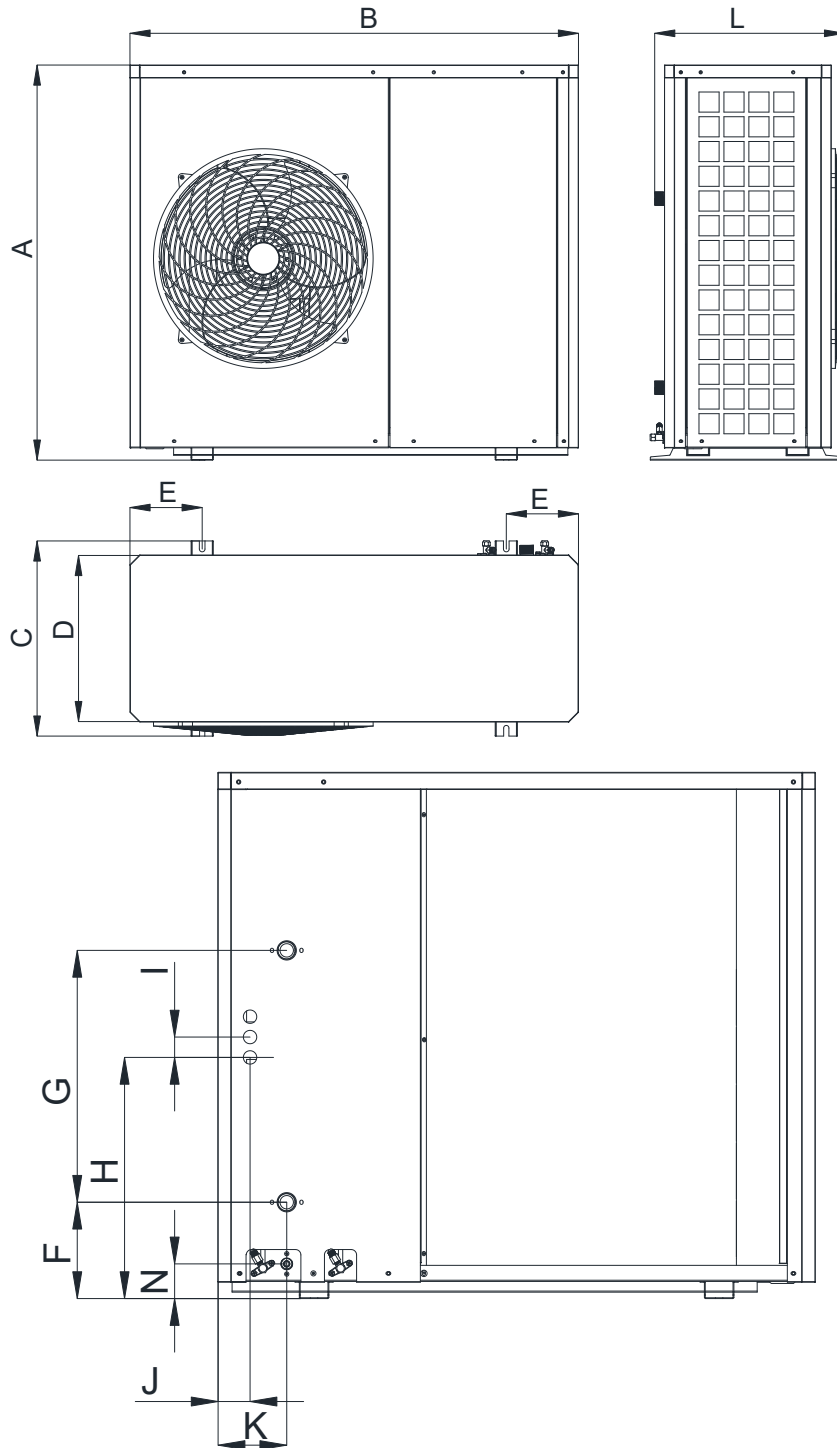
- | | | | | |
|----|---------------------------|------------|----|-----------------------------------|
| 1 | Top cover | Evaporator | 2 | Evaporator |
| 3 | Electrical box | | 4 | Behind plate |
| 5 | Right side support | | 6 | Expansion vessel |
| 7 | Electrical box support | | 8 | Compressor |
| 9 | Gas-liquid separator | | 10 | Water pump |
| 11 | Plate type heat exchanger | | 12 | Base plate |
| 13 | Right side service plate | | 14 | Plate type heat exchanger support |
| 15 | Front service plate | | 16 | Front plate |
| 17 | Fan grille | | 18 | Mid-support plate |
| 19 | Fan blade | | 20 | Fan motor |
| 21 | Fan motor support | | 22 | Left side pore plate |
| 23 | Left side support | | | |

NBL-HPM-NT-AC018-V1 / AC024-V3



1	Top cover Evaporator	2	Evaporator
3	Electrical box	4	Behind plate
5	Right side support	6	Expansion vessel
7	Electrical box support	8	Compressor
9	Gas-liquid separator	10	Water pump
11	Base plate	12	Right side service plate
13	Plate type heat exchanger	14	Plate type heat exchanger support
15	Front service plate	16	Front plate
17	Fan grille	18	Mid-support plate
19	Fan blade	20	Fan motor
21	Fan motor support	22	Left side pore plate
23	Left side support		

4.2 Dimensions (mm)



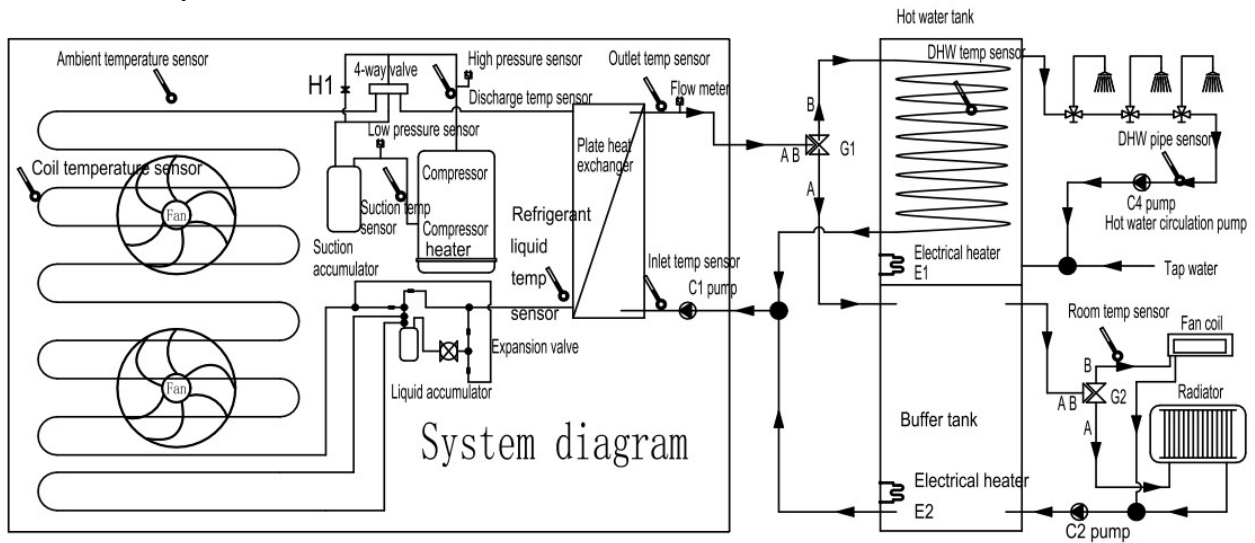
Units	A	B	C	D	E	F	G	H	I	J	K	L	N
6/9kW	898	1115	485	415	180	150	470	429	38	60	128	472	62.5
12kW	982	1115	485	415	180	180	470	450	38	60	128	472	62.5
18/23kW	1330	1115	485	415	180	180	470	770	38	60	128	472	62.5

4.3 Specification

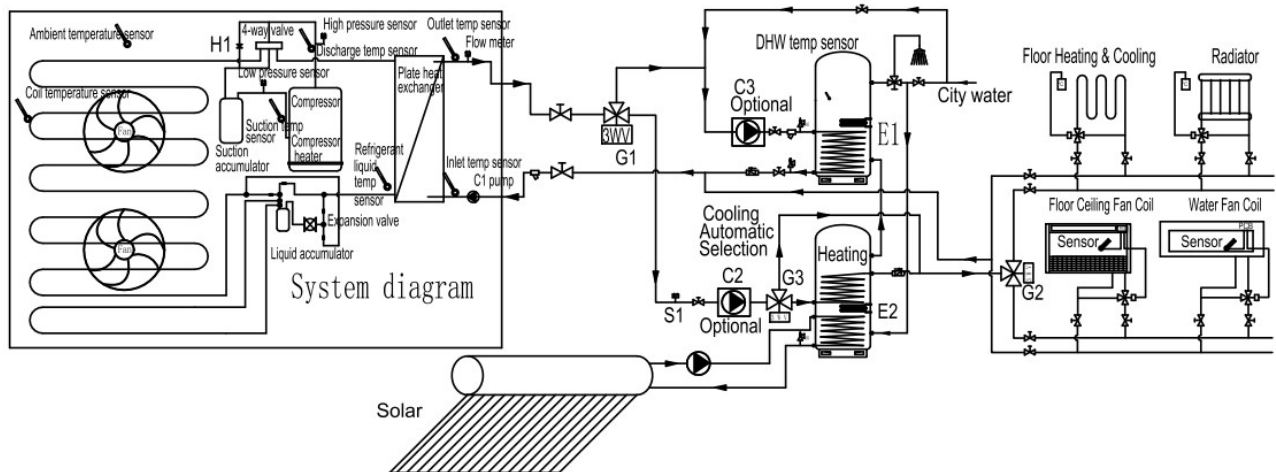
Model	In	NBL-HPM-NT-AC006-V1	NBL-HPM-NT-AC009-V1	NBL-HPM-NT-AC012-V1	NBL-HPM-NT-AC012-V3	NBL-HPM-NT-AC018-V1	NBL-HPM-NT-AC024-V3
Heating Capacity Range	kW	1.2-7.0	2-10	4-14	4-14	6-20	6.5-25
Rated Heating Capacity	kW	6.40	9.14	12.20	12.2	18.50	23.00
Rated Heating Input	kW	1.34	2.04	2.73	2.73	4.00	5.00
Rated Heating Current	A	5.83	8.87	11.87	4.61	17.39	8.44
COP	W/W	4.78	4.49	4.47	4.47	4.63	4.60
Rated Cooling Capacity	kW	6.25	8.99	11.00	11.00	17.82	21.00
Rated cooling Input	kW	1.54	2.41	3.08	3.08	4.92	5.66
Rated cooling Current	A	6.70	10.48	13.39	5.20	21.39	9.56
EER	W/W	4.05	3.73	3.57	3.57	3.62	3.71
Start Current	A	0.5	0.5	1.5	1.5	3.0	5.0
Rated voltage/Frequency/phase	V/Hz	230/50/1	230/50/1	230/50/1	380/50/3	230/50/1	380/50/3
Maximum input power	kW	2.76	3.45	3.95	4.00	6.21	7.10
Maximum input current	A	12	15	17	7	27	12
High pressure protect	MPa	4.50					
Low pressure protect	MPa	0.10					
Brand/Type of Compressor	/	Mitsubishi / Twin Rotary					
Refrigerant	/	R32	R32	R32	R32	R32	R32
Brand of Water pump		WILO or GRUNDFOS					
Defrost	/	Auto defrost with 4 way valve					
Waterproof grade	/	IPX4					
Noiseat 1m	dB(A)	51	54	54	54	56	58
Max water outlet temperature	C	60	60	60	60	60	60
Diameter of water connection	/	DN25	DN25	DN25	DN25	DN25	DN32
Rating water flow	m/h	1.1	1.6	2.1	2.1	3.1	4.0
Water pressure drop at rating flow	kPa	22	40	50	50	60	40
Min/Max heating water pressure	bar	0.5/3.0	0.5/3.0	0.5/3.0	0.5/3.0	0.5/3.0	0.5/3.0
Main board Fuse	A	10	10	10	10	10	10
Ambient operational temp.	C	-15~45	-15~45	-15~45	-15~45	-15~45	-15~45
Water operation temp.(DHW mode)	C	10~60	10~60	10~60	10~60	10~60	10~60
Water operation temp.(Heating mode)	C	10~60	10~60	10~60	10~60	10~60	10~60
Water operation temp.(cooling mode)	C	10~30	10~30	10~30	10~30	10~30	10~30
Net Dimensions (L/W/H)	mm	1115/415/8 98	1115/415/8 98	1115/415/9 82	1115/415/9 82	1115/415/1 332	1115/415/1 332
Net Weight	kg	80	82	125	125	175	180
Rated test conditions: Heating: DB/WB 7C/6C, In/Out: 30C/35C. Cooling: DB/WB: 35C/24C, In/Out: 23C/18C							

4.4 System Drawing

P88=1P65=1 System schematic



P88=0P65=0 System schematic



5 Installation

5.1 General points for installation engineer

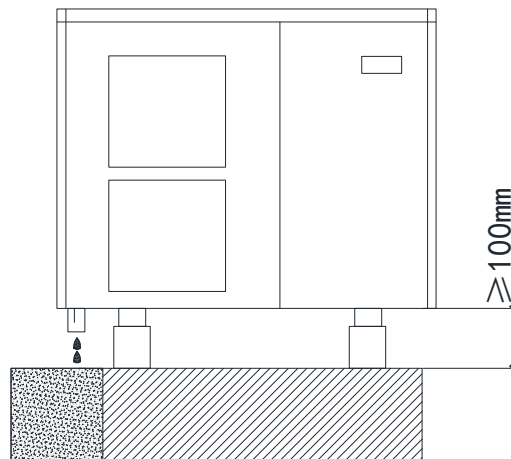
5.1.1 Preparation before installation

Make sure the site is large enough to hold all the equipment and has enough operation space. Measure the hoisting path to ensure that the path to the installation site is unobstructed and prevent the equipment from reaching the site during installation. Confirm that the power meter capacity and the wire capacity are sufficient and the phase (three-phase, two-phase) meets the requirements.

Plan the layout of the equipment according to the customer's site. And strive to have the shortest and the most straight water pipe and enough space for operation and maintenance. For the heat pump with side outlet wind, consider the local wind direction and choose a reasonable installation direction to avoid the wind direction being opposite. Current regulations require the heating installation to be inspected before it is commissioned. The inspection must be carried out by a suitably qualified person and should be documented. If the heat pump is replaced, the installation must be inspected again. In the event of installation with unvented (closed) heating systems, Make sure the line has an exhaust valve (the system comes with an automatic exhaust valve). If necessary, installation engineer may add additional exhaust valves to the line.

5.1.2 Sitting the heat pump

The heat pump should be firmly fixed to a base, preferably a concrete base. It is the most suitable that the right end is 5-10mm higher than the left end. As shown below:

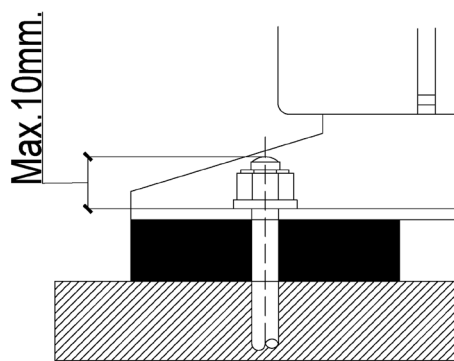


The receiving surface of the device must:

- Allow a solid fixation (preferably concrete).
- Fully support its weight.
- Have a permeable area below the condensate drainage hole (earth, gravel bed, sand, etc).

- Do not transmit any vibration to the home, recommending the installation of the anti-vibration dampers supplied with the heat pump.
In case of installing the device on wall mounts, it will be especially important to isolate the machine from the transmission of vibrations and noise inside the house, it may be necessary to install more suitable anti-vibration dampers for the wall mount in addition to those supplied with the heat pump. Nevertheless, the installation on the ground is the most advisable. Straighten the heat pump well to ensure that the condensate water cannot exit through any paths other than the intended drain hole.

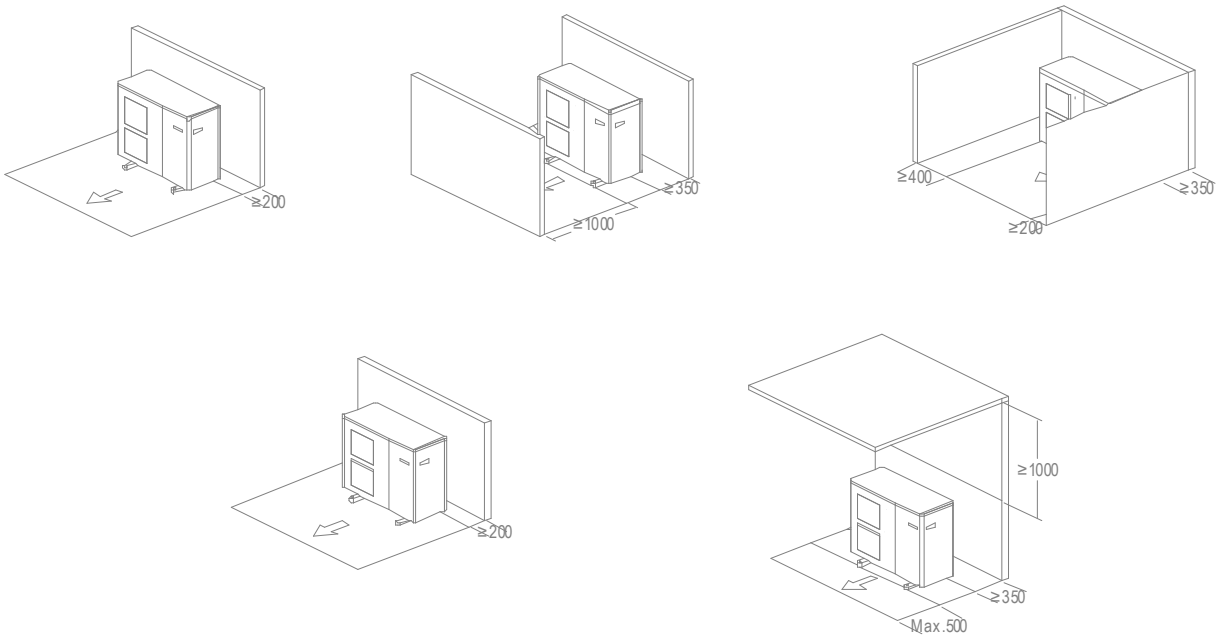
Fasten it firmly using 4 sets of M12 bolts suitable for the base material, with nuts and washers (available on the market). Make sure that the protruding distance of the bolt does not exceed 10mm inside the metallic support of the device(leg).



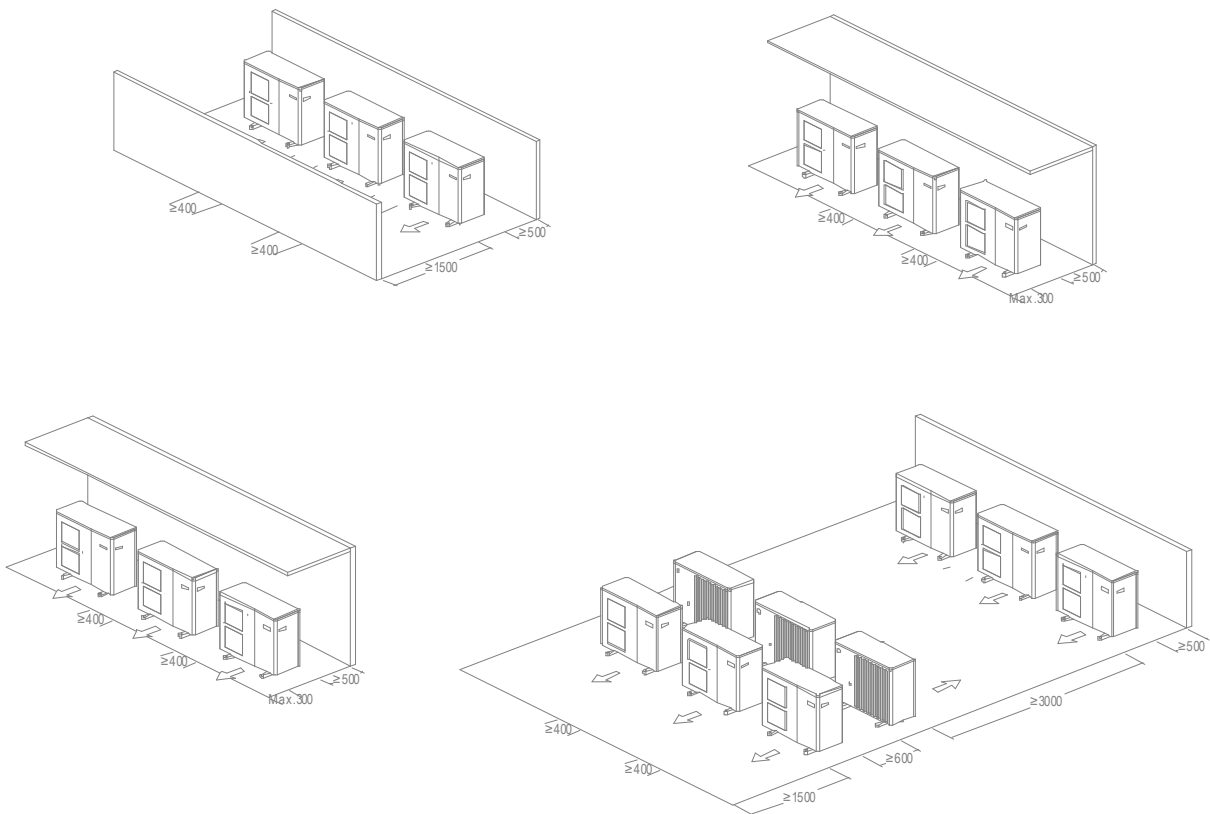
Antivibration damer

5.1.3 Location requirements between machine and building

The heat pump must be installed exclusively outside the home and, where possible, in a completely clear area. If a protection is needed around the appliance, it should have wide openings on the 4 sides and the installation separations indicated in the following figure must be respected. No obstacle should prevent the circulation of air through the evaporator and the fan outlet.



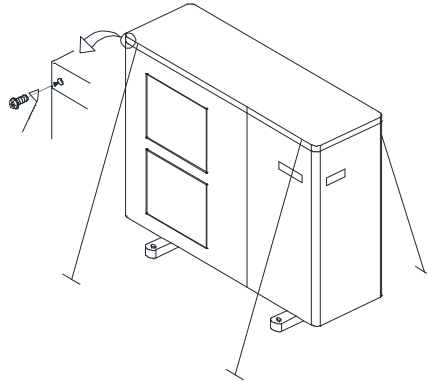
Minimum separations for the installation of a unit(mm)



Minimum separations for the installation of multiple units in the same location(mm)

Consult with the user before choosing the location of the device. It should not be placed next to sensitive walls, such as on the wall next to a bedroom. Make sure that the location of the heat pump is not disruptive to neighbors (sound level, air currents generated, low temperature of the air blown with risk of freezing plants in the path, etc.).

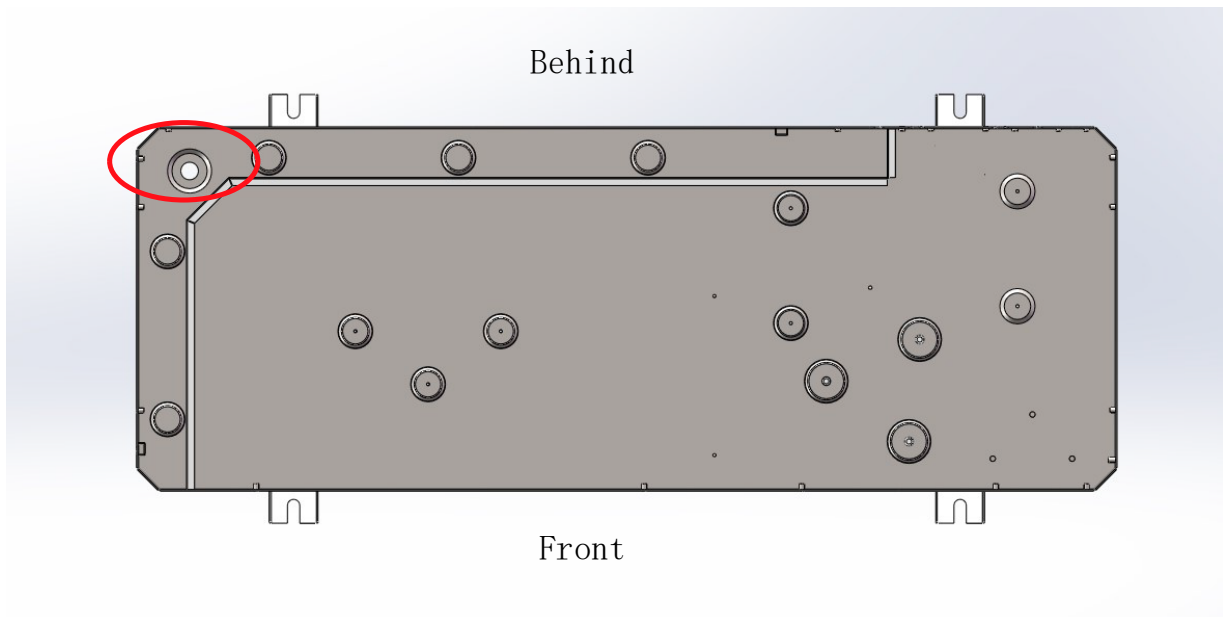
Choose a location that preferably has sunlight and is protected from strong and cold winds. If the heat pump is exposed to gusts of wind that make it possible to overturn it, it should be supported by suitable guys, as indicated in the figure.



The device must be sufficiently accessible for subsequent installation and maintenance work. Make sure that the passage of the hydraulic and electrical connections to the interior of the house is possible and comfortable. The spacing measures indicated in the figure above are those strictly necessary to ensure correct operation of the device; however, sometimes, it will be essential to provide more space for maintenance work. The heat pump is a device specially designed for outdoor installation. Nevertheless, avoid installing it in a place where it may be exposed to significant water stains or spills (e.g. under a faulty gutter, near gas outlets, etc.) . Move the appliance away from heat sources and flammable products. In areas where abundant and copious snowfalls occur, special care must be taken to protect the heat pump from possible obstructions due to accumulation of snow around it. The obstruction of the air inlet and/or outlet of the machine due to the accumulation of snow may cause malfunction of the unit and possible breakdowns. The heat pump must be raised at least 100 millimeters above the maximum expected snow level. In turn, the roof should be protected from accumulation of snow, by means of a roof projecting from the building or a similar structure.

5.1.4 Condensate drainage

In normal operation, the heat pump can evacuate large amounts of water, for which the heat pump provides a hole in the bottom of the appliance. Be sure not to obstruct this hole during the installation process of the appliance.



Preferably install the device in a well-drained place. To do this, it is advisable to provide a bed of gravel, sand or similar materials below said hole. If the drain hole of the heat pump is covered by a mounting base or by the floor, lift the unit to leave a free space of at least 100mm below it.

If it is installed on a terrace or facade, the condensate outlet must be led to a drain to avoid inconvenience and/or damage caused by the dripping of condensate water. If the installation is carried out in a region where the temperature can be below 0 for a long period of time

5.1.5 Accessories supplied

The following accessories are supplied in the interior of the heat pump. Before proceeding with the installation of the machine, make sure that you receive them and that they are in good condition.

Documentation:

Inside the machine, open the front door to find the documentation bag, where all the manuals and documents necessary for the use and installation of the heat pump are included.



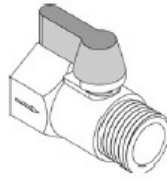
Controller:

It is supplied inside the machine and can be found by removing cover of the electronic boards. Before connecting the power supply to the machine, the controller should be installed inside the house. See 6.3.1 for the physical drawing

Drain valve:

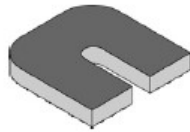
It is supplied inside the machine, tied with a flange to one leg of the compressor.

This key must be installed in the drain socket on the back of the heat pump before filling the water in the heating/cooling circuit.



4x Anti-vibration dampers:

Four units are supplied in a bag stuck on the back of the machine, next to the drain socket.



5.1.6 Controller

The unit is equipped with an external electronic controller that handles all functions necessary for heat pump operations. Defrosting, stop at max/min temperature, connection of the compressor heater as well as enabling the aux electrical heater, monitoring of motor protection and pressure sensors are all controlled.

The number of starts and the operating time after this power-on can also be read. The controller is set during installation and can be used during a service. Under normal operating conditions the home owner does not need to have access to the controller. The unit has an integrated electronic outlet water temperature sensor that limits the outlet temperature up to 60°C.

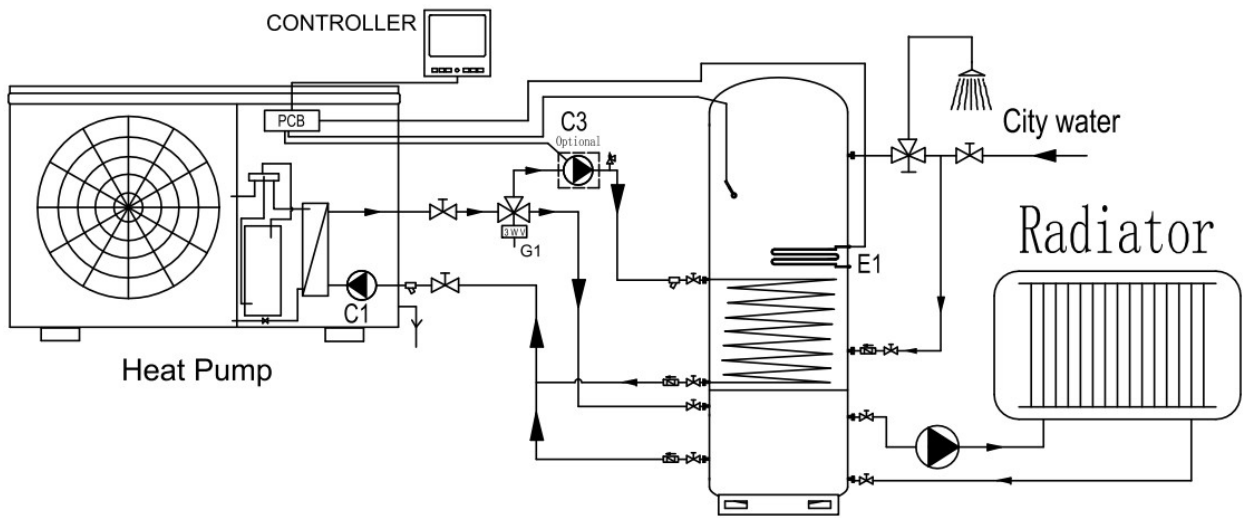
5.2 Installation design

The unit can be installed in several different ways.

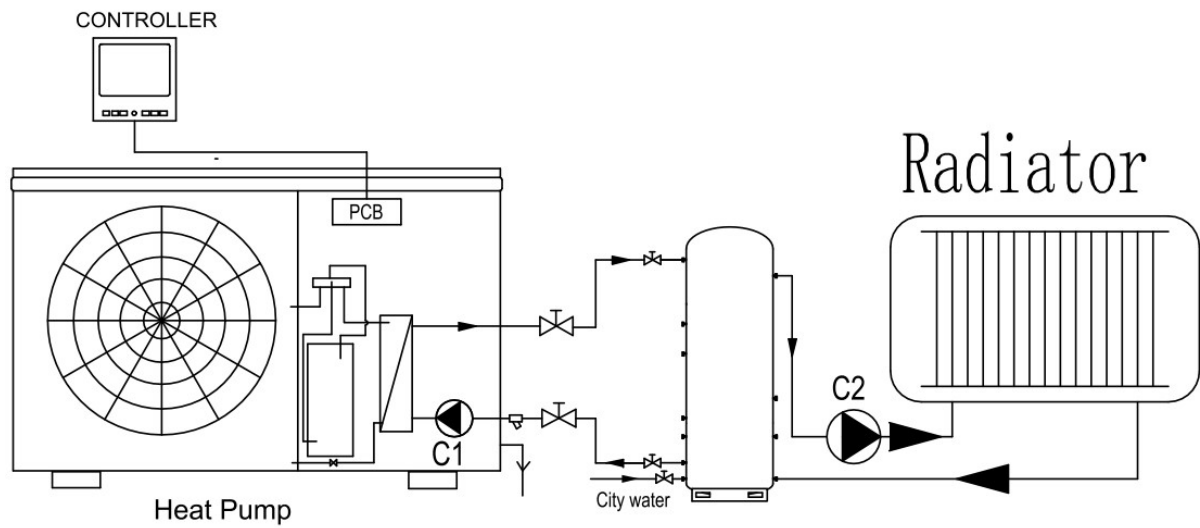
The safety equipment must be installed in accordance with current regulations for all installation options.

When connecting with the unit, the total water volume in the heat pump pipe system and buffer tank must be at least 10 liters per 1 kW of output.

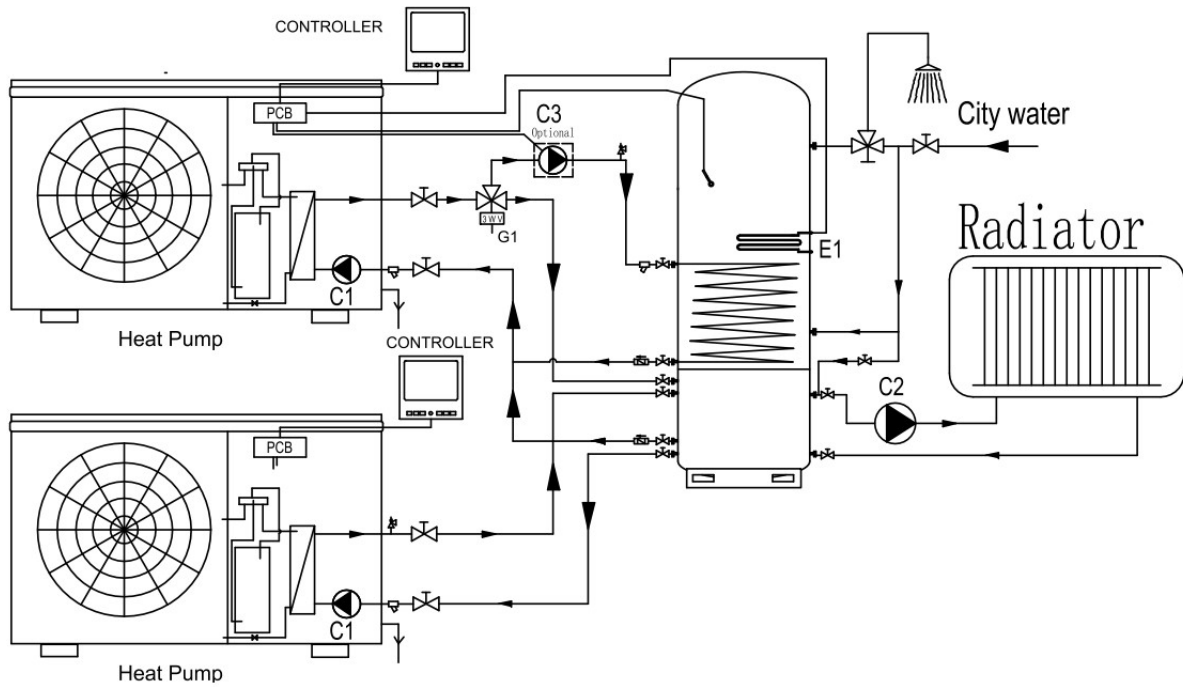
A) NBL-HPM-NT-AC006-V1 / AC009-V1 / AC012-V1/V3 / AC018-V1
Space Heating/Cooling + DHW



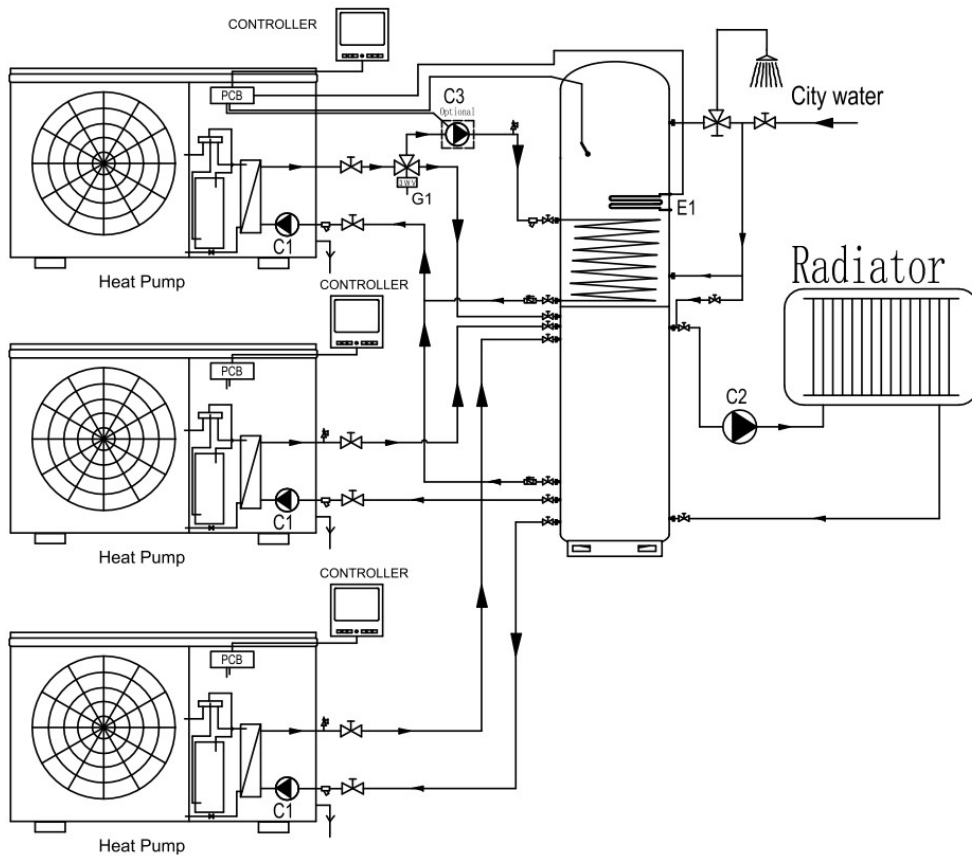
B) NBL-HPM-NT-AC006-V1 / AC009-V1 / AC012-V1/V3 / AC018-V1
Space Heating/Cooling Mode Only



C) 2xNBL-HPM-NT-AC006-V1 / AC009-V1 / AC012-V1/V3 / AC018-V1
Installation. Space Heating/Cooling + DHW

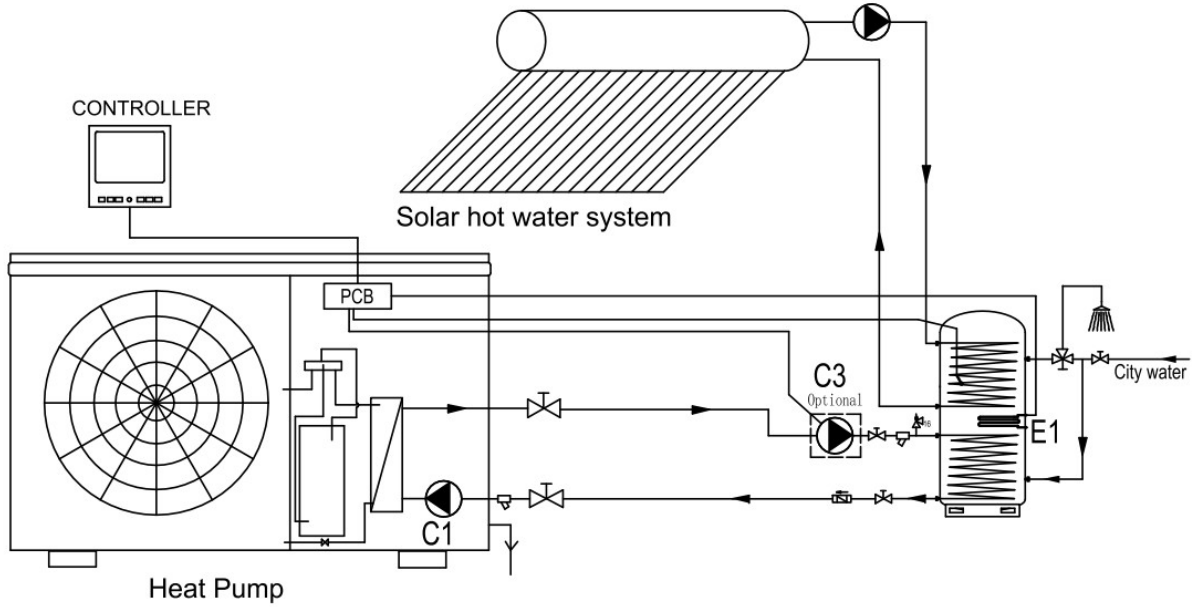


D) 3xNBL-HPM-NT-AC006-V1 / AC009-V1 / AC012-V1/V3 / AC018-V1
Installation. Space Heating/Cooling + DHW



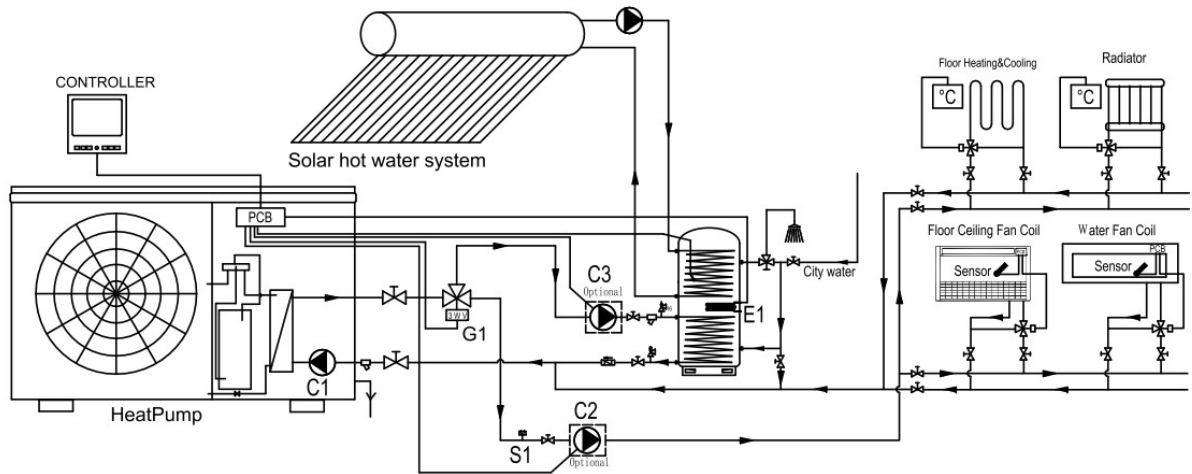
Solar Application 1

DHW with solar heating



Solar Application 2

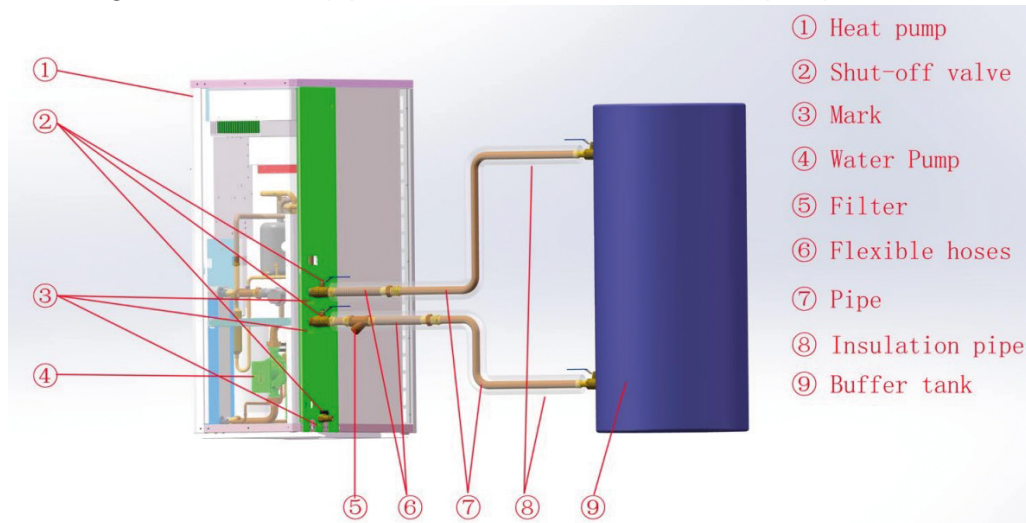
Multifunctional heat pump with solar assistant DHW



Heat pump automatically select to go or not go through solar water tank to save energy the most.

5.3 Pipe Connection

Schematic diagram of water pipe connection between heat pump and buffer tank.



For the pipe size is: diameter 28mm, 1 inch, and pipe joint specification is DN25, material can be copper or stainless steel. The pipe must be flushed before the heat pump is connected, so that any contaminants do not damage the components parts. The heating/cooling water inlet and outlet direction must be connected according to the marked areas on the heat pump. A water filter must be installed in the water circuit of the heat pump, in order to avoid obstructions or narrowing caused by dirt in the installation. The filter **MUST** be installed before filling the installation with water and in the return branch of the machine, to avoid the entry of dirty water into the heat exchanger (condenser).

The type of filter installed must be adapted to the particular characteristics of each installation (type and material of the water pipes, type of water used, water volume of the installation, etc.). The water filter should be checked and cleaned, if necessary, at least once a year. In new installation, however, it is advisable to check it within the first few months of its commissioning. A flexible damping pipe must be installed between the heat pump and the buffer tank to balance the height difference between the machine and the pipe and reduce the transmission of vibration. We recommend inserting cut-off valves between the installation piping and the heat pump to simplify maintenance tasks. Leave a free space around the heat pump for carrying out any maintenance and repair operations. Air vent valves and suitable devices should be fitted for the correct removal of air from the circuit during the filling stage. All water circuit piping **MUST** be insulated to prevent condensation during operation in cooling mode and reduction of the cooling and heating capacity, as well as to prevent freezing of outside pipes during winter.

The minimum insulation thickness of the pipes should be 19mm (0.039W/mK), preferably comprising a closed cell insulation or a vapour barrier.

In outdoor areas exposed to the sun, the insulation must be protected from the effects of degradation.

The water circulation pump must at all times be operational (even if unit is not running) to prevent any possible damage due to freezing. Even when in standby mode, the circulation pump is controlled directly from the unit, which takes the outdoor temperature and temperature in pipe into consideration to decide whether to circulate water within the system.

Important:

Even though the unit has anti-freeze protection, if the circulation pump fails or there is a problem with the power supply, there is still a risk of damage due to freezing. During the installation antifreeze fluid (Ethylene Glycol) is strongly recommended. If the air temp is ever lower than 0°C, it must use enough ethylene glycol.

5.4 Electrical Connection

The electrical installation of the heat pump and its electrical accessories should be carried out by qualified personnel, subject to the current installation regulations on the matter. The electrical installation must be connected so that the heat pump can be fully isolated and disconnected for the safe execution of any maintenance operations.

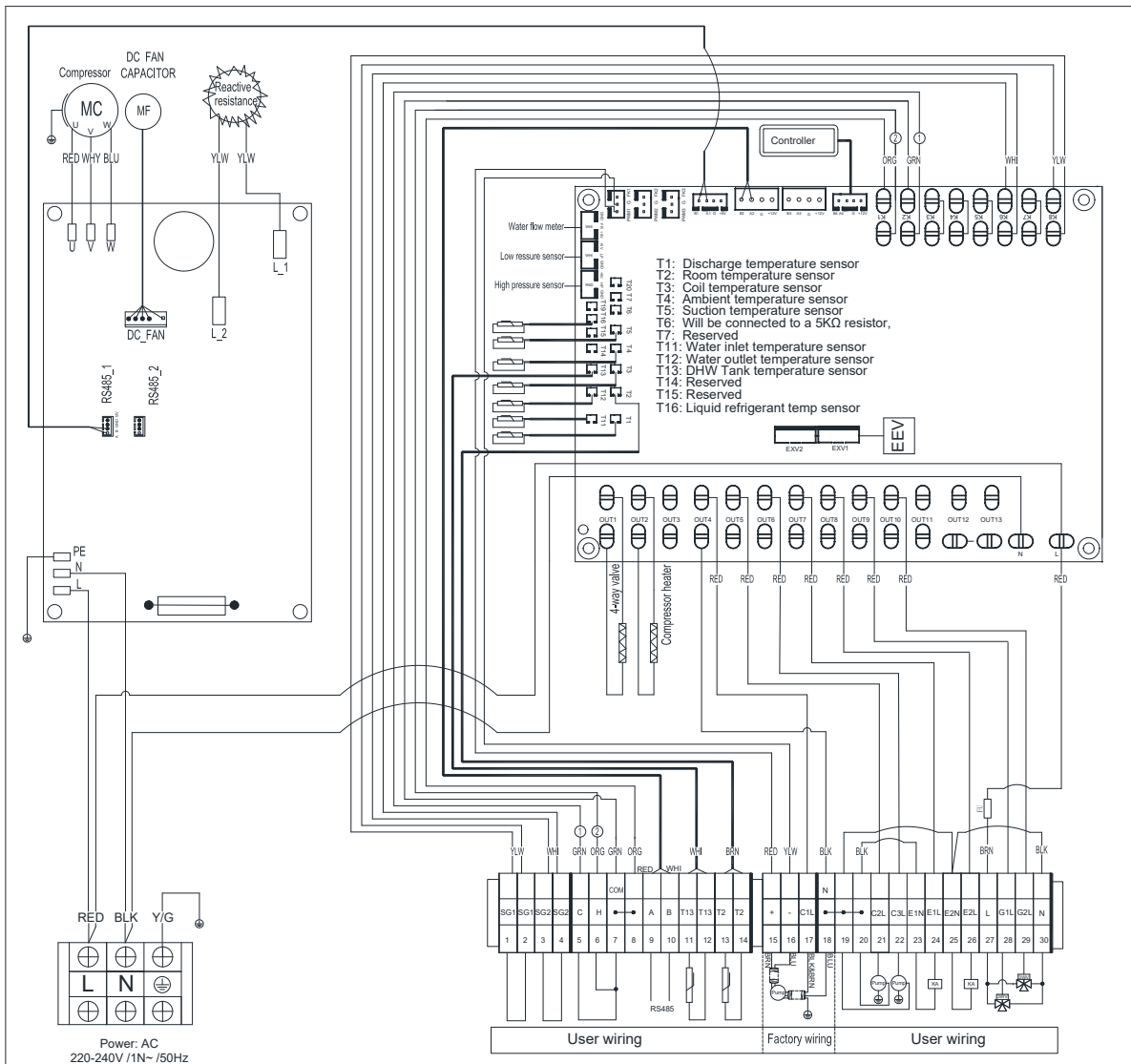
The machine has 2 holes with cable grommets in its back side to introduce all connection cables inside the machine. The cables exposed to the weather conditions of the exterior should be protected by means of protective raceways or pipes. Alternatively, they should be of a suitable category for use outdoors (H07RN-F type or higher). It is also advisable to keep the high-voltage cables (general supply, diverted valves, electrical heaters, circulation pumps, etc.) at a minimum distance of 25 mm low-voltage cables (controller board cable, temperature sensors, room sensor, etc.) and drive them through independent pipes.

IMPORTANT:

Before carrying out any work on the electrical installation of the heat pump, always ensure it is disconnected from the mains.

5.4.1 Wiring Diagram

NBL-HPM-NT-AC006-V1 / AC009-V1 / AC012-V1/V3

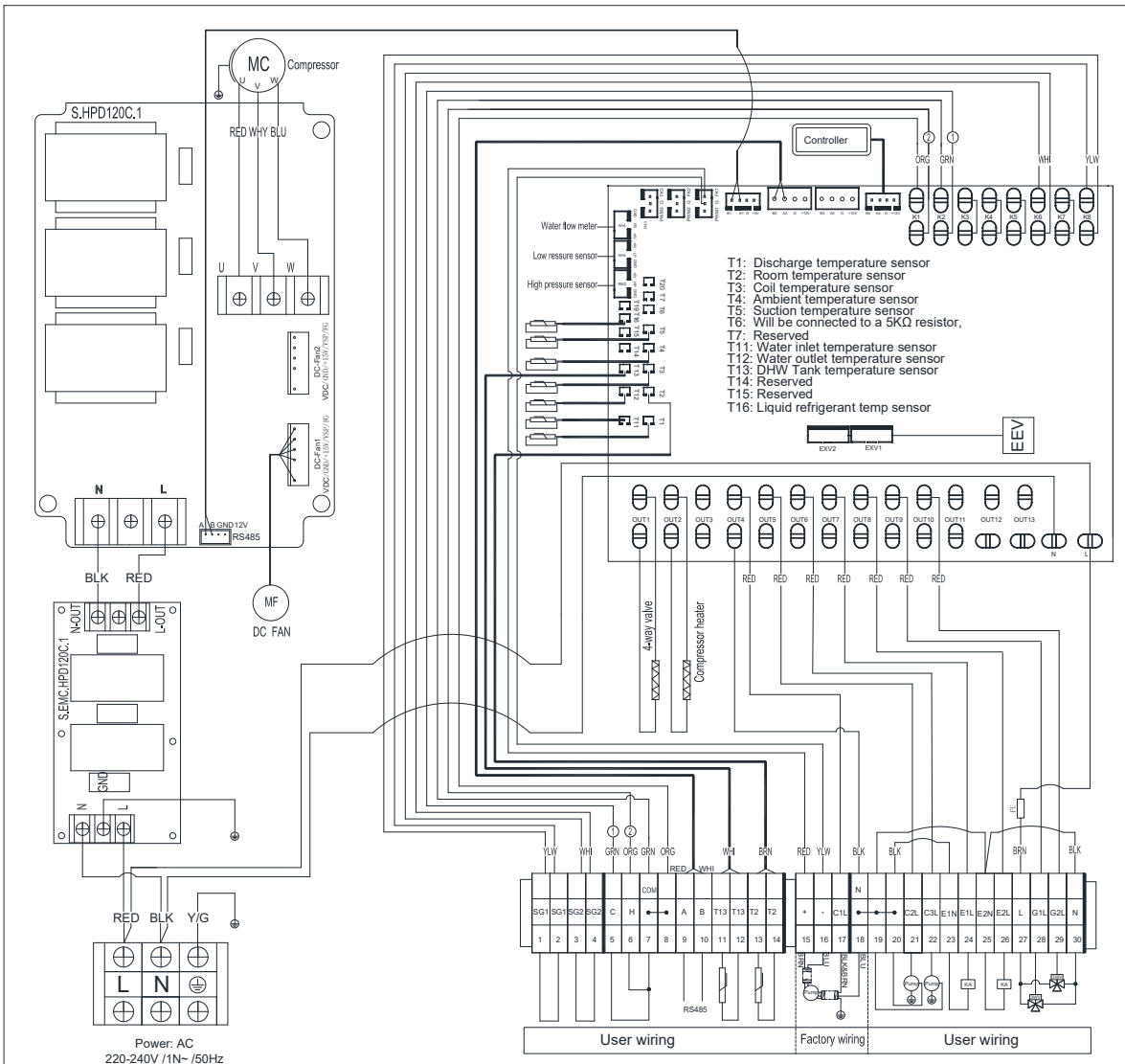


6/9/12KW ELECTRICAL DIAGRAM

- K1: Heating switch
- K2: Cooling switch
- K3: Reserve
- K4: Water flow switch
- K5: Reserve
- K6: SG2 contact without power
- K7: Reserve
- K8: SG1 contact without power

- E1: DHW Electrical heater
- E2: Buffer tank electrical heater
- C1: Built-in water pump
- C2: Auxiliary pump or indoor circulation pump
- C3: DHW auxiliary pump
- G1: DHW 3-way valve
- G2: Season 3-way valve(G2L:OFF:Cooling or G2L:ON:heating)
- SG1、SG2、H、C、COM: Input point is contact without power

NBL-HPM-NT-AC018-V1

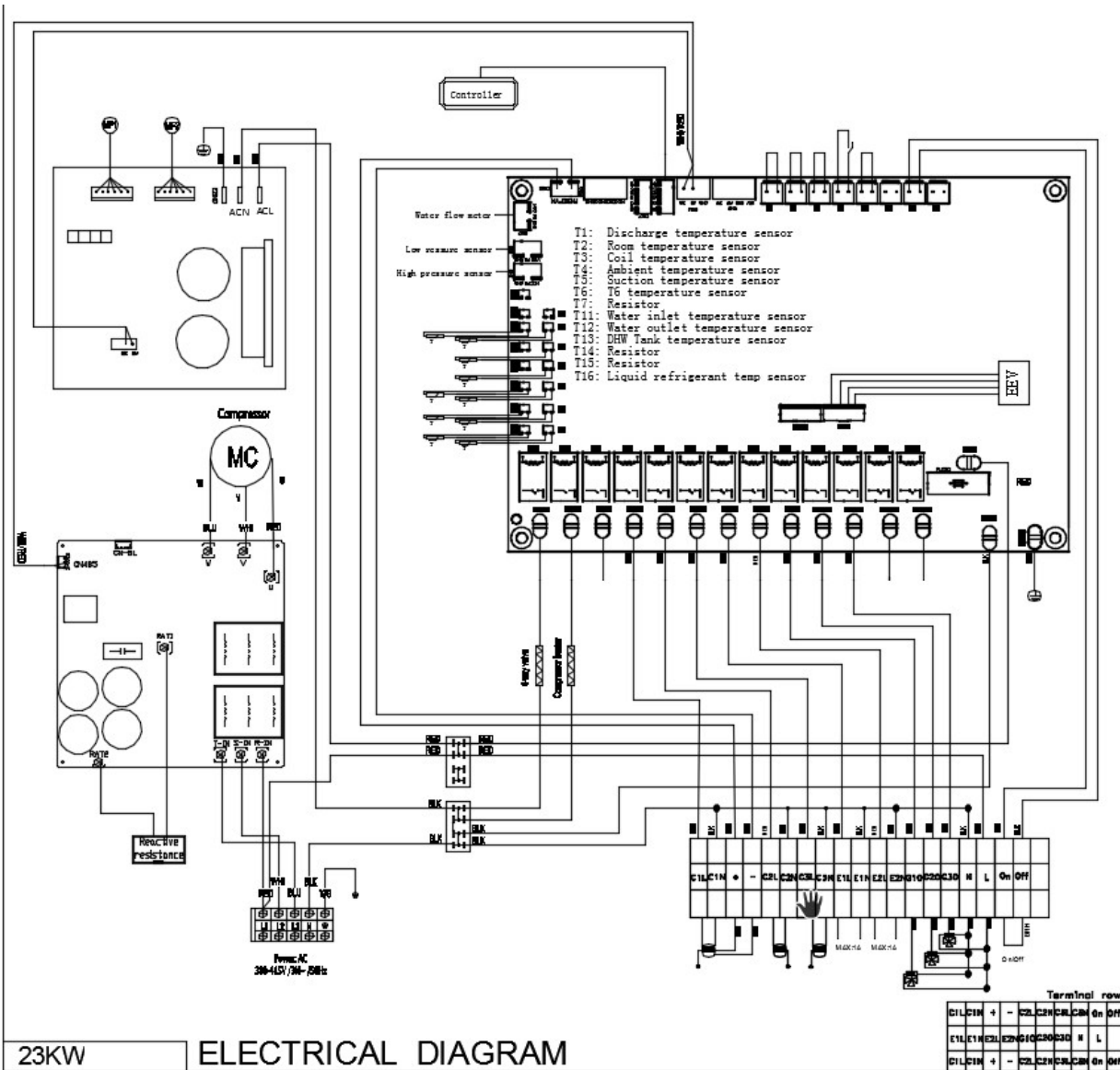


18KW ELECTRICAL DIAGRAM

- K1: Heating switch
- K2: Cooling switch
- K3: Reserve
- K4: Water flow switch
- K5: Reserve
- K6: SG2 contact without power
- K7: Reserve
- K8: SG1 contact without power

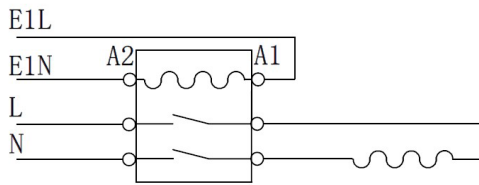
- E1: DHW Electrical heater
- E2: Buffer tank electrical heater
- C1: Built-in water pump
- C2: Auxiliary pump or indoor circulation pump
- C3: DHW auxiliary pump
- G1: DHW 3-way valve
- G2: Season 3-way valve(G2L:OFF:Cooling or G2L:ON:heating)
- SG1、SG2、H、C、COM: Input point is contact without power

NBL-HPM-NT-AC024-V3

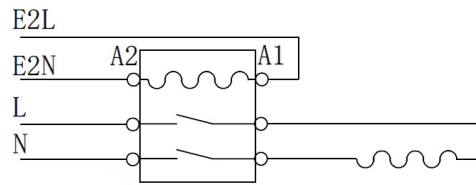


- | | |
|---|--|
| <p>K1: Heating switch</p> <p>K2: Cooling switch</p> <p>K3: Reserve</p> <p>K4: Water flow switch</p> <p>K5: Thermostat switch</p> <p>K6: Reserve</p> <p>K7: Reserve</p> <p>K8: Reserve</p> | <p>E1: DHW Electrical heater</p> <p>E2: Buffer tank electrical heater</p> <p>C1: Built-in water pump</p> <p>C2: Auxiliary pump or indoor circulation pump</p> <p>C3: DHW auxiliary pump</p> <p>G1: DHW 3-way valve</p> <p>G2: Season 3-way valve(G20:OFF:Cooling or G20:ON:heating)</p> <p>G3: Solar 3-way valve(Solar auxiliary AC heating)</p> |
|---|--|

5.4.2 Auxiliary electrical heater connection



E1: DHW Electrical Heater

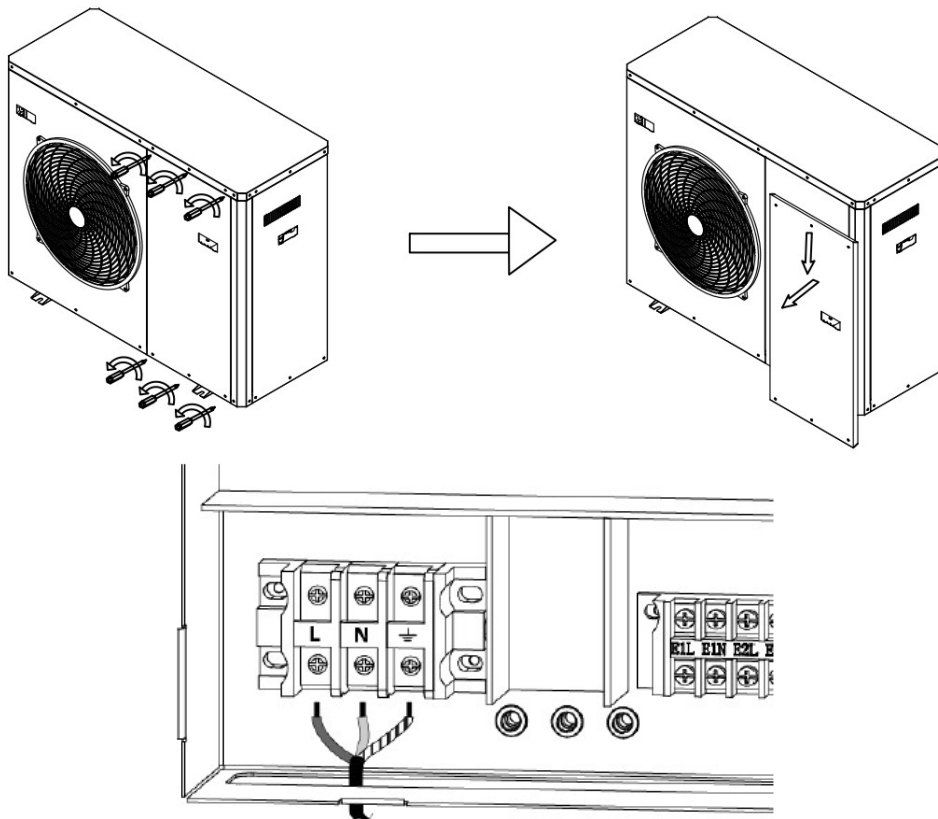


E2: AC Electrical Heater

5.4.3 Installation Drawing

Connection the main power supply

The heat pump is prepared for connection to 230V~ 50Hz in the terminals indicated in the figure (see wiring Diagram). Inside the machine, open the front door, and access to the electronic boards area to find the power supply terminals. **Make sure to make the earth connection.**



The dimension and type of the main supply cables must at all times comply with the rules and regulation in force. Nevertheless, the following table details some recommended features and dimensions, as a guide:

units	Power supply	Only heat pump			Include E1			Include E1 and E2		
		Max. (A)	Min. wire (mm ²)	Fuse (A)	Max. (A)	Min. wire (mm ²)	Fuse (A)	Max. (A)	Min. wire (mm ²)	Fuse (A)
6kW	220~240V/ 1 phase	13	2	16	3kW 26A	4	32	3+3kW 39A	10	50
9kW	220~240V/ 1 phase	15	2.5	25	3kW 28A	4	32	3+3kW 41A	10	50
12kW	220~240V/ 1 phase	17	2.5	25	3kW 30A	6	40	3+3kW 43A	10	50
18kW	220~240V/ 1 phase	27	4	32	3kW 40A	6	50	3+3kW 53A	10	63
12kW	380~415V/ 3 phase	7	1.5	10	3kW 12A	2	16	3+3kW 17A	2.5	25
23kW	380~415V/ 3 phase	12	2	16	6kW 21A	4	32	6+6kW 30A	4	32

Note: E1: DHW auxiliary electrical heater E2: heating auxiliary electrical heater

For the correct selection of the type and dimensions of machines main supply cable, it has take in account the electrical consumption of the optional accessories connected on the heat pump (auxiliary electrical heaters, circulating pumps,...). The are columns included in the above table indicating the maximum consumption for combinations of heat pump and the auxiliary electrical heater E1 and E2 (see wiring Diagram).

The electrical connection of the heat pump must be protected by an earth leakage circuit breaker (a high-speed switch of 30 mA (<0.1s)).

IMPORTANT:

Before carrying out any work on the electrical installation of the Heat pump, always ensure it is disconnected from the mains.

5.5 Commissioning

5.5.1 Preparations

1) Compressor Heater

As mentioned above, if the temperature is lower than 10°C, the compressor heater will heat the compressor for 3-10 minutes before the first start up.

2) Filling and Venting

The hydraulic installation must include a filling valve, air vent valves and the necessary hydraulic components for correctly filling it.

To fill the heat pump, open the filling valve until the pressure gauge located on the back of the machine shows a pressure of 1~1.5 bars. The heat pump has a manual air vent on the top of the heat exchangers (condenser) flow tube. Open it during the filling process and wait for the water to begin flowing out.

The air should also be bled from the rest of the installation using the air vent valves provided.

Filling should be performed slowly, thus helping the evacuation of air from the water circuit. Close the filling valve after filling.

To comfortably access the heat pump air vent valve, open the top cover and side panel of the heat pump.

IMPOTANT:

Switching on the heat pump with no water inside could result in serious damages.

5.5.2 Inspection before Start up

1) Mechanical Inspection:

- a. Check the cabinet and inside pipe system for possible damage during transportation.
- b. Check that the heating water circuit is filled and well vented. Check the pipe system for leaks.
- c. Check the Fan making sure it can move freely.

2) Electric System Inspection

- a. Check the power supply (voltage/frequency) matches the rating label and specification. (/)
- b. Check all the electrical connections for loose or damaged wires due to transportation.

3) Pipe Inspection

- a. Check all the valves, and water flow directions.
- b. Check for any possible leaks inside or outside of unit.
- c. Check the insulation of all the pipes.

5.5.3 Start up and Commissioning

- a. After the system inspection is finished, start up can begin.
- b. Connect the power supply; switch on the isolator to turn on the heat pump.
- c. The circulation pumps starts immediately. After 30 seconds, the fan motor starts. After another 10 seconds, compressor starts.
- d. Air is initially released from the hot water and venting may be necessary. If bubbling sounds can be heard from the heat pump, the circulation pump or radiators the entire -

system will require further venting. When the system is stable (correct pressure and all air eliminated) the automatic heating control system can be set as required.

- e. Check heating water inlet/outlet temperature difference after the system is stable.
- f. Check the compressor exhaust and suction temperature.
- g. Adjust the parameters according to different weather conditions and user requirements.

6 Controller manual

6.1 Electric Parts Control Program working theory

6.1.1 Compressor

After the compressor is shut down, it has a minimum interval of 3 minutes before the next start up.

The initial "power-up" does not require the protection of three minutes.

During defrost, compress on/off interval is based on the defrost parameters.

6.1.2 Start up / Shut down Cycle

When the heat pump switches on, the water circulation pump will start 30 seconds before compressor and the fan will start 5 seconds before compressor.

When the heat pump switches off, the water circulation pump shuts down 60 seconds after the compressor. The fan switches off 30 seconds after the compressor.

During defrost, the water circulation pump does not stop running.

6.1.3 2nd heat source starting

When parameter P81= 0, E2 is AC heating control port, When parameter P81 = 1, E2 is 2nd heat source control port.

6.1.3 DHW Auxiliary Electric Heater E1

The electric heater E1 is effective in the DHW mode. Electric heater E1 control: 【P81】 =0

Trigger conditions when outside temperature >P23

E1 Condition 1:

- 1) DHW set temperature > P35
- 2) DHW temperature ≤ DHW set temperature – P24
- 3) DHW temperature ≥ P35

Trigger conditions when outside temperature <P23

E1 Condition 1:

- 1) DHW set temperature > P35
- 2) DHW temperature ≤ DHW set temperature – P24
- 3) DHW temperature ≥ P35

E1 Condition 2:

- 1) DHW set temperature > P35
- 2) The compressor runs for P36 minutes
- 3) DHW temperature \geq P35

E1 Condition 3:

- 1) DHW set temperature < P35
- 2) The compressor runs for P36 minutes
- 3) DHW temperature < DHW set temperature – P24

Deactivation conditions when outside temperature < P23: E1 Condition: DHW temperature > DHW set temperature
Deactivation conditions when outside temperature > P23: E1 Condition 1:

- 1) DHW set temperature > P35
- 2) DHW temperature > DHW set temperature

E1 Condition 2:

- 1) DHW set temperature < P35
- 2) DHW temperature > DHW set temperature – P24.

6.1.4 Multifunctional port E2

The electric heater E2 is effective in the HEAT mode. Electric heater E2 control: 【P81】 =0

Trigger conditions when outside temperature < P22 E2 Condition:

Temperature_OUTLET < HEATING SET – P24

The compressor runs for P36 minutes

Deactivation conditions when outside temperature < P22 E2 Condition:

Temperature_OUTLET > HEATING SET

6.1.5 Motorized 3 way Valve G1

In DHW mode, the motorized 3 way valve is power on. In any other mode, it is power off.

6.1.6 DHW antifreeze

When DHW water tank temperature (T13) $\leq 5^{\circ}\text{C}$, system starts hot water antifreeze, start domestic hot water mode and compressor, When hot water temperature is 20°C or higher, withdraw DHW antifreeze. If the compressor starts over 30 minutes, withdraw DHW antifreeze.

6.1.7 AC antifreeze

Air conditioning inlet (T11) or outlet (T12) water temperature is 3°C or lower, system starts AC antifreeze, water pump C1 and C2 start, check ambient temperature one minute later.

- a) Ambient temperature $< 15^{\circ}\text{C}$, start compressor for heating
- b) Ambient temperature $\geq 15^{\circ}\text{C}$, only turn on water pump C1 and C2

When the input water temperature $\geq 10^{\circ}\text{C}$ or compressor operates over 30 minutes, withdraw AC antifreeze.

When anti-freezing, if water temperature reduced to 1°C or lower, machine will stop and error code E24 display.

6.2 Operating Mode Principle

1) Space Cooling Mode

Temperature setting range is $10\text{-}30^{\circ}\text{C}$, the factory setting is 12°C ;

2) Space Heating Mode

Temperature setting range is $10\text{-}60^{\circ}\text{C}$, the factory setting is 45°C ;

3) Hot Water Mode

Temperature setting range is $10\text{-}60^{\circ}\text{C}$ (The P35 value $\sim 60^{\circ}\text{C}$ is realized by an electric heater), the factory setting is 50°C ;

4) Defrost Cycle

Auto Defrost mode (normal defrosting)

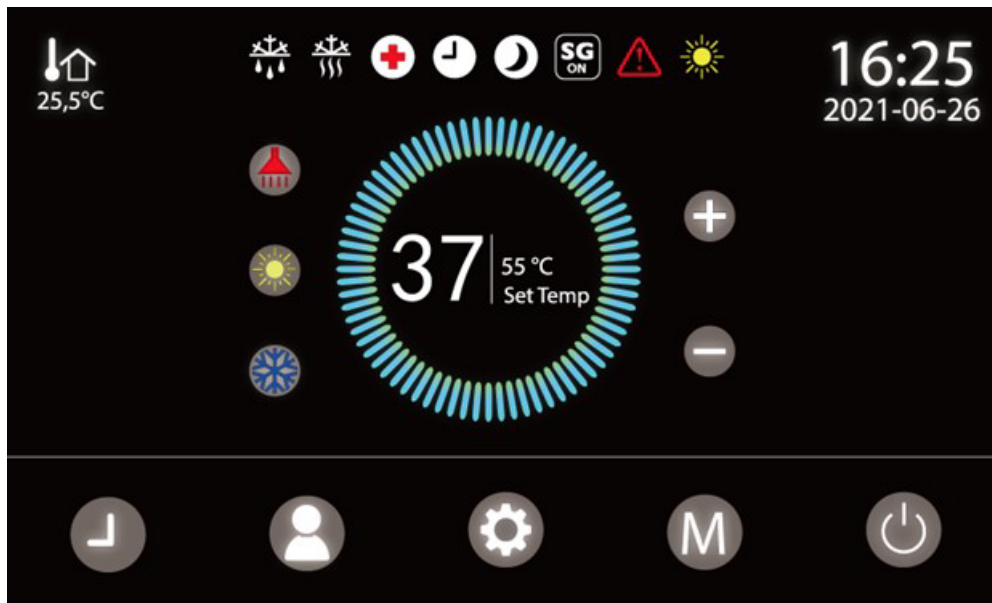
All heat pumps are fitted with intelligent defrost controls. A number of parameters are taken into account before defrost begins and ends. The parameters should be set as per factory settings or otherwise set out by an engineer. The defrost time will vary depending upon the conditions the heat pump is working in. The length between defrosts will either extend or contract depending upon the parameters set.

6.3 Wired controller

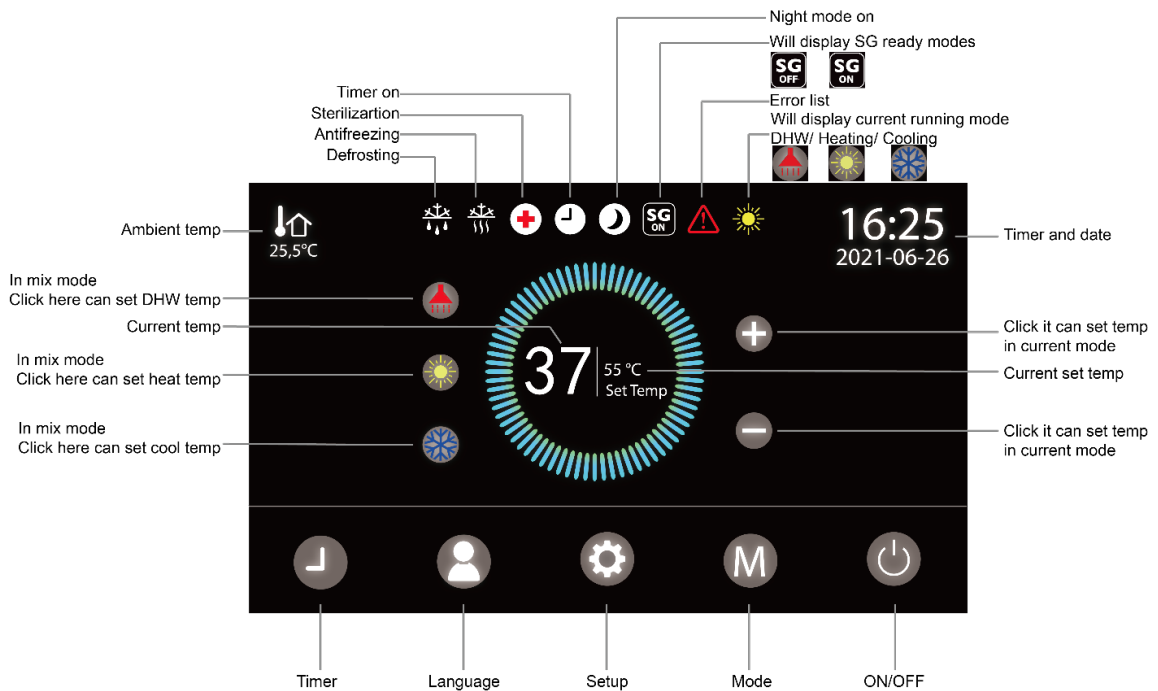
6.3.1 Controller




6.3.2 Main interface



6.3.3 Buttons definition and action



6.3.3-1 Turn on / off

Press ON/OFF button  for 3 seconds, can switch the heat pump ON or OFF.


6.3.3-2 Multi-language

Click language button , can select language.

6.3.3-3 Time and date setting

Click time and date button , can set time and date.

6.3.3-4 Change operating mode

Click mode button , can select operating modes.



The heat pump will be able to manage up to 5 different modes.

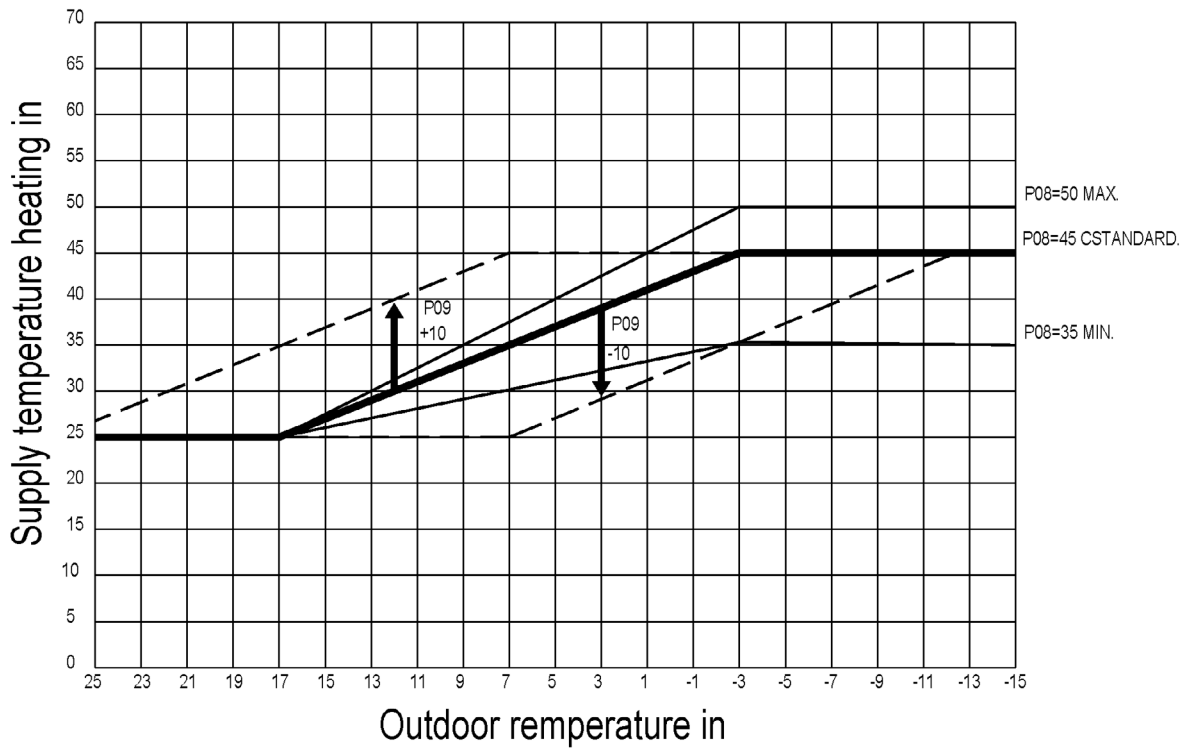
- (1) Cooling only;
- (2) Heating only;
- (3) DHW only;
- (4) Cooling + DHW;
- (5) Heating + DHW.
- (6) OTC

When selected cooling or heating plus DHW, DHW will be priority.

When selected DHW mode, only DHW operation, no cooling and heating.

Healthy sterilization is an independent automatic operation mode, if necessary, modify the parameters individually. If unnecessary, please modify the parameter P14=2.

Auto temp. is a mode for setting temperature per ambient temperature by heat pump automatically per below Auto heat curve.



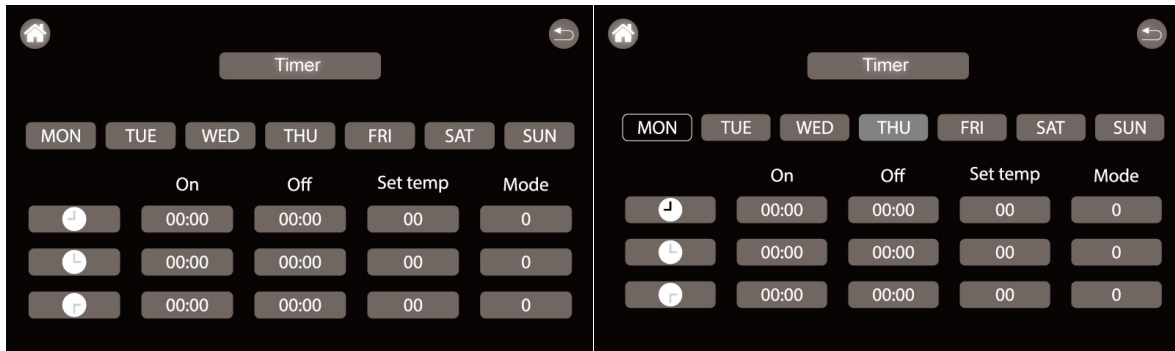
A.Auto temp. mode valid or not is up to parameter P18. If the data is set 0, means invalid, 1 means valid.

B.Auto heat curve shifting is decided by parameter P09, positive value means move up, negative value means move down. (-10° C ~10° C).


C.Auto heat curve highest temp is decided by parameter P08, from 30~50, default 45. When the parameter is 45, the AU highest target temp is 45° C

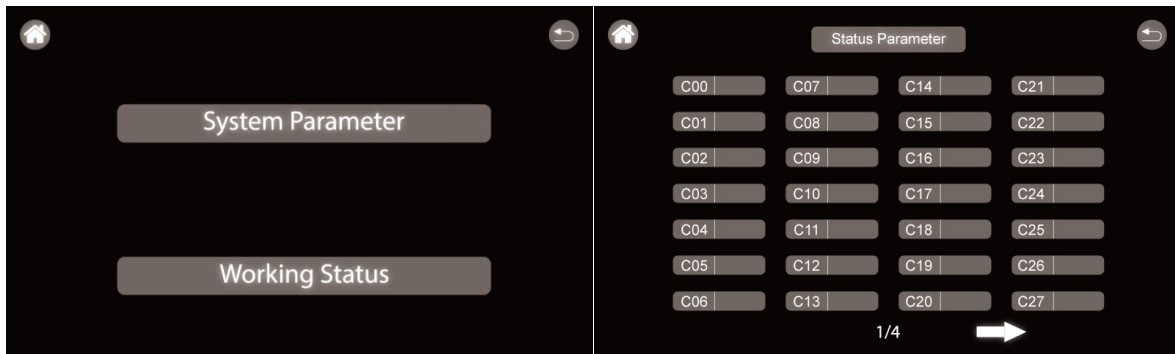
6.3.3-5 Timing

Click timer button , can set operating time range for heat pump .



6.3.3-5 Parameters modification

Click mode button , and select button <system parameter>. Input password “99” , and can modify parameters.



Note: Parameters are not suggested to be modified to avoid taking failure to heat pump. If necessary, please contact professional technician to operate the modification. Please refer to below parameter list for parameters set.

No	Name	Range	Default (6KW)	Default (9KW)	Default (12KW)	Default (12KWT)	Default (18KW)	Default (23KWT)
P00	ON/OFF	0: OFF; 1: ON	0	0	0	0	0	0
P01	Working mode	1~5 1-DHW 2-A/C Heating 3-A/C cooling 4-DHW+A/C Heating 5-DHW+A/C Cooling	1	1	1	1	1	1
P02	Heating target temp	10~70℃	45	45	45	45	45	45
P03	Cooling target temp	7~25℃	12	12	12	12	12	12
P04	DHW target temp	10~70℃ (Value≥P35 , Only electric heater operation)	45	45	45	45	45	45
P05	Room target temp	18~35℃	21	21	21	21	21	21
P06	A/C temperature difference	1~15℃	5	5	5	5	5	5
P07	DHW temperature difference	1~15℃	5	5	5	5	5	5
P08	A/C heating AU curve max temp value (weather compensation curve AU)	35~60℃	45	45	45	45	45	45
P09	A/C heating AU curve offset value (weather compensation curve AU)	-10~10℃	0	0	0	0	0	0
P10	Sterilisation Interval days	1~99 days	7	7	7	7	7	7
P11	Sterilisation start time	0~23 (time)	23	23	23	23	23	23


P12	Sterilisation running time	5~99min	10	10	10	10	10	10
P13	Sterilisation temperature	50~75℃	70	70	70	70	70	70
P14	Sterilisation mode select	0-Auto 1-Manual 2-OFF	0	0	0	0	0	0
P15	Night mode starting point	0~23 (time)	22	22	22	22	22	22
P16	Night mode ending point	0~23 (time)	6	6	6	6	6	6
P17	Night mode validation	0-OFF 1-ON	0	0	0	0	0	0
P18	DHW AU validation	0-OFF 1-ON	0	0	0	0	0	0
P19	A/C AU validation	0-OFF 1-ON	0	0	0	0	0	0
P20	Water pump working mode	0-No stop, 1-1-Stop when reach temp, 2-Running 1minute every 15minutes	0	0	0	0	0	0
P21	Water pump anti-freeze interval	5~50min	30	30	30	30	30	30
P22	Ambient temp to active A/C electrical heater	-30~20℃	0	0	0	0	0	0
P23	Ambient temp to active DHW electrical heater	-30~20℃	0	0	0	0	0	0
P24	Electrical heater active temp offset value	1~15℃	2	2	2	2	2	2
P25	A/C anti-freeze temperature	-15~5℃	3	3	3	3	3	3
P26	Defrost interval multiple times control	0~4 0-no defrost,1~4 defrost interval time multiple rate	1	1	1	1	1	1
P27	First Defrost interval	15~99min	35	35	35	35	35	35
P28	Defrost selection	0-Auto 1-Manual defrost (Default to 0 when defrosting is complete)	0	0	0	0	0	0
P29	Coil temperature to active defrost	-8~5℃	0	0	0	0	0	0
P30	Coil temperature to stop defrost	5~30℃	20	20	20	20	20	20
P31	The max defrost time	2~20min	12	12	12	12	12	12
P32	EEV control mode	0-no 1-Checking table 2-manual 3- suction superheat 4-Discharge superheat	3	3	3	3	3	3
P33	EEV manually initial open steps (heating)	50~480(Only valid when P32=2)	400	400	400	400	400	400
P34	EEV manually initial open steps (cooling)	50~480(Only valid when P32=2)	400	400	400	400	400	400
P35	In DHW mode, highest water temperature for compressor running	0~75℃	70	70	70	70	70	70
P36	Time interval between compressor and E1 startup (reserved)	0~999min	0	0	0	0	0	0
P37	Temperature difference for adjustable DC fan speed (heating)	2~15℃	6	6	6	6	6	6
P38	Temperature difference for adjustable DC fan speed (cooling)	3~18℃	8	8	8	8	8	8
P39	Choose compressor model (reserved)	0~999	358	59	53	/	78	69
P40	Compressor frequency setting	0- Manual 1-Auto	1	1	1	1	1	1
P41	Compressor oil return frequency	10~100 Hz (When P40=0)	50	50	50	50	50	50
P42	Compressor frequency limiting current	1~50A	11	12	16	5	27	7
P43	Compressor frequency reduction current	1~50A	13	13	18	6	28	9
P44	Compressor shutdown current	1~50A	15	16	20	8	31	10
P45	Maximum running frequency	50~120 Hz	90	90	90	90	85	85
P46	Minimum running frequency	0~90 Hz	25	25	25	25	25	25
P47	Defrost running frequency	30~90 Hz	60	60	50	50	60	60
P48	DHW maximum frequency	2~10 (Max frequency X 20~100%)	10	10	10	10	10	10
P49	Discharge superheat percentage coefficient	0~99 (display value multiply 0.1)	0.2	0.2	0.2	0.2	0.2	0.2
P50	Discharge superheat differential coefficient	0~99	1	1	1	1	1	1

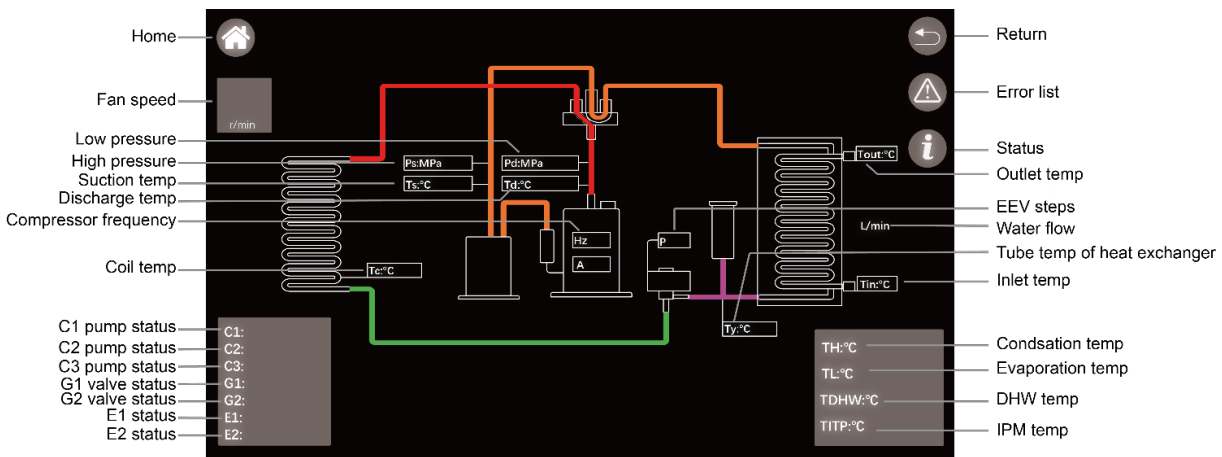
P51	High pressure value to limit compressor frequency rising	2.0~4.5MPa (display value multiply 0.1)	30	30	30	30	30	30
P52	High pressure value to cancel compressor frequency limit	2.0~4.5MPa (display value multiply 0.1)	29	29	29	29	29	29
P53	Protection pressure (High)	2.5~5.0MPa (display value multiply 0.1)	32	32	32	32	32	32
P54	Protection pressure (Low)	0.01~1.0MPa (display value multiply 0.01)	0.1	0.1	0.1	0.1	0.1	0.1
P55	High pressure protection recovery pressure difference	0.2~1.5MPa (display value multiply 0.1)	5	5	5	5	5	5
P56	Low pressure protection recovery Pressure difference	0.01~1.0MPa (display value multiply 0.01)	0.15	0.15	0.15	0.15	0.15	0.15
P57	Discharge protection temperature	110~125℃	105	105	105	105	105	105
P58	Temperature differential for Adjustable water pump 1 speed	3~8℃	5	5	5	5	5	5
P59	PWM water pump minimum running speed	2~8 (stands for 20% to 80% of the speed)	8	8	8	8	8	8
P60	DC motor maximum running speed	500-1500RPM (display value multiply 10)	80	85	90	90	85	85
P61	minimum water flow	3~80L/min, Step 1	12	16	18	18	22	22
P62	Definition of A/C function	0-Cooling + heating 1-Only cooling 2-Only Heating	0	0	0	0	0	0
P63	DHW validation	0-No 1- Yes.	1	1	1	1	1	1
P64	EEV minimum open step	0-480	70	70	90	90	70	70
P65	Function definition for water pump C2	0-Auxiliary pump, 1- Indoor circulating pump	0	0	0	0	0	0
P66	Selected heat source	0- Air source. 1- Water source (Reserved)	0	0	0	0	0	0
P67	Room thermostat (reserved)	0- OFF , 1- ON	0	0	0	0	0	0
P68	Flow switch selection	0-Water flow switch, 1-Water flow sensor	0	0	0	0	0	0
P69	Fan motor type	0-AC motor 1-First DC motor 2-Second DC motor. 3-Two DC motor	1	1	1	1	3	3
P70	Auto restart	0-OFF, 1-ON	1	1	1	1	1	1
P71	DC motor speed control	0- Manual, 1- Auto	1	1	1	1	1	1
P72	DC motor fixed speed	0-1500rpm (display value multiply 10)	0	0	0	0	0	0
P73	Pressure controller type	0-Pressure sensor 1-Pressure switch	0	0	0	0	0	0
P74	EVI EEV control mode	0-no 1-checking 2- manual 3-auto	3	3	3	3	3	3
P75	EVI EEV manually initial open steps(heating)	40~480	40	40	40	40	40	40
P76	EVI EEV manually initial open steps(cooling)	40~480	40	40	40	40	40	40
P77	EVI Target superheat (heating)	-5~10℃	0	0	0	0	0	0
P78	EVI Target superheat (cooling)	-5~10℃	0	0	0	0	0	0
P79	WIFI data upload interval	30~9999 S	300	300	300	300	300	300
P80	Reserved	0-10 (display value multiply 0.1)	10	10	6	6	6	6
P81	E1/E2 function definition	0 = auxiliary electric heating, 1 = secondary heat source, 2 = equipped with other electric heating, 3 = equipped with boiler	0	0	0	0	0	0
P82	Starting air temp for second heat source(ambient temperature ≤15℃, heat pump stops)	-30~20℃	-15	-15	-15	-15	-15	-15
P83	DHW circulation pump mode (C3 pump P88=1)	0-No; 1-Timer; 2-Temperature; 3-Timer + Temperature	3	3	3	3	3	3
P84	Temp Difference For DHW Pump (C3 pump P88=1)	4~20℃	5	5	5	5	5	5
P85	Defrost ambient	0~20℃	8	8	8	8	8	8

	temperature							
P86	Defrost ambient temperature and coil temperature difference ΔT_1 (Ambient temperature $\geq 7^\circ\text{C}$)	0~20°C	8	8	8	8	8	8
P87	Factory default	0- No 1-Yes	0	0	0	0	0	0
P88	C3 pump selection	0- Auxiliary circulation pump 1- DHW circulation pump	0	0	0	0	0	0
P89	Suction superheat percentage coefficient	0~20	5	5	5	5	5	5
P90	Suction superheat differential coefficient	0~20	1	1	1	1	1	1
P91	Defrost ambient temperature and coil temperature difference ΔT_2 (Ambient temperature $< 7^\circ\text{C}$)	0~20°C	8	8	8	8	8	8
P92	Target suction superheat (Heating) (Ambient temperature ≤ -5)	-20~50°C (display value multiply 0.1)	3.5	3.5	3.5	3.5	3.5	3.5
P93	Target suction superheat (Heating) (-5 \geq Ambient temperature $> +5$)	-20~50°C (display value multiply 0.1)	3.5	3.5	3.5	3.5	3.5	3.5
P94	Target suction superheat (Heating) (+5 \geq Ambient temperature $> +25$)	-20~50°C (display value multiply 0.1)	2.0	2.0	2.0	2.0	2.0	2.0
P95	Target suction superheat (Cooling)	-20~50°C (display value multiply 0.1)	3.0	3.0	3.0	3.0	3.0	3.0
P96	Target suction superheat (Heating) (+45 \geq Ambient temperature $> +25$)	-20~50°C (display value multiply 0.1)	0.5	0.5	0.5	0.5	0.5	0.5
P97	When P40=0, compressor frequency set value	10~100Hz	50	50	50	50	50	50
P98	The control signal of G1 valve is reversed	0 normal / 1 reversed	0	0	0	0	0	0
P99	The control signal of G2 valve is reversed	0 normal / 1 reversed	0	0	0	0	0	0
P100	The control signal of G3 valve is reversed	0 normal / 1 reversed	0	0	0	0	0	0
P101	EEV steps for defrosting	0~480	480	480	480	480	480	480
P102	Temperature difference protection value of inlet and outlet water	8~20	120	120	120	120	120	120
P103	EEV initial opening hold time	0~300	60	60	60	60	60	60
P104	Initial compressor frequency for AC heating/cooling capacity calculation	20~60	50	50	50	50	50	50
P105	Compressor starting frequency A	20~60	30	30	30	30	30	30
P106	Compressor starting frequency A running time	0~300	60	60	60	60	60	60
P107	PRt calculation valume	1~100	3	3	3	3	3	3
P108	R485 monitoring address	1	1	1	1	1	1	1
P109	Discharge temp. value 1 to limit compressor frequency	80~125	100	100	100	100	100	100
P110	Discharge temp. value 2 to limit compressor frequency	80~125	97	97	97	97	97	97
P111	Discharge temp. value 3 to limit compressor frequency	80~125	95	95	95	95	95	95
P112	EEV adjustment temp. when discharge temp. is too high	80~125	100	100	100	100	100	100
P113	EEV adjustment time when discharge temp. is too high	1~120	30	30	30	30	30	30

P114	Compressor frequency reduction percentage after set temp. reached	0~60%	30	30	5	5	30	30
P115	Outlet temp. too high protection value	70~90	83	83	83	83	83	83


6.3.3-6 Working status checking

Click mode button , and select button <working status and error>, can check “Refrigerant circuit” and “Hydraulic circuit” to know the performance data and working status.



Working status

6.3.3-6 System protection and error list checking

Click Error list button  in “Working status” you can check the historical error.

Code	Meaning	Remark
E01	Outdoor air temp sensor error	Outdoor air temp sensor open circuit or short circuit
E02	Coil temp sensor error	Coil temperature sensor open circuit or short circuit
E03	Suction temp sensor error	Suction temp sensor open circuit or short circuit
E04	EVI inlet temp sensor error	EVI inlet temp sensor open circuit or short circuit
E05	EVI outlet temp sensor error	EVI outlet temp sensor open circuit or short circuit
E06	Discharge temp sensor error	Discharge temp sensor open circuit or short circuit
E07	DHW temp sensor error	DHW temp sensor open circuit or short circuit
E08	Outlet temp sensor error	Outlet temp sensor open circuit or short circuit
E09	Inlet temp sensor error	Inlet temp sensor open circuit or short circuit
E10	Liquid refrigerant temp sensor error	Sensor open circuit or short circuit
E11	High pressure sensor error	1.sensor fault 2.open circuit or short circuit 3. PCB fault
E12	Low pressure sensor error	1.sensor fault 2.open circuit or short circuit 3. PCB fault
E13	High pressure protection	1.refrigerant volume too much 2.throttling part error, 3.pressure sensor error
E14	Low pressure protection	1.refrigerant volume too little 2.throttling part error, 3 pressure sensor error
E15	Water flow error	1.Water flow volume too small 2. Water flow switch error
E16	Communication error	Main board and controller communication error
E17	Discharge temp too high protection	1.refrigerant volume too little. 2.throttling part error
E18-19	Reserved	

E20	IPM abnormal protect	See Appendix C for detailed code
E21	Reserved	
E22	Water temp differential too big	Check water pump and water pipe filter
E23	DHW anti-freeze twice	The antifreeze function in DHW mode has been activated twice in 60 minutes
E24	AC anti-freeze twice	The antifreeze function in A/C mode has been activated twice in 90 minutes
E25	Reserved	
E26	T6 temp sensor error	T6 temp sensor open circuit or short circuit
E27	Ambient temperature exceeds upper limit	ambient temperature > 45°C
E28	Inlet water temp. too high (Cooling)	cooling: inlet water temp > 40°C, Use with caution or turn off.
E29	Room temp sensor error	temp sensor open circuit or short circuit
E30-31	Reserved	
E32	Outlet water temp. too high (heating)	Outlet temp > 75°C. Check water pump and water pipe filter
E33-35	Reserved	
E36	DC fan board communication failure	Check communication wire
E37-39	Reserved	
E40	Outlet water temp. too low (cooling)	Outlet temp < 5°C. Check water pump and water pipe filter
E41-43	Reserved	
E44	1# DC motor error	Check motor wire or Motor fault
E45	2# DC motor error	Check motor wire or Motor fault
E46-49	Reserved	
E50	Coil high temp protection	1.refrigerant volume too much, 2.throttling part error,3.Coil temp sensor error.
E51-57		
E58	Ambient temperature exceeds lower limit	ambient temperature < 【P82】
E59	Ambient temperature exceeds lower limit	temperature of inlet and outlet water is inversely connected or the four-way valve is abnormal
E60-98	Reserved	
E99	Inverter model communication failure	Main board and inverter board Communication error

6.3.4 Night mode

(1) Night mode valid or not is up to parameter P17. If the data is set 0, means off, 1 means on. The night mode starting time is decided by data P16. Ending time is decided by data P17.

(2) With night mode, hot water mode will run with the current setting temp +3° C, room heating run with current setting -2°C. Room cooling run with current setting +2° C. Outdoor fan runs at low speed.

6.3.5 Communication with controller

Controller is connected with heat pump RS485-1 by 4 wires, (must in order) max 100m. **6.3.6 Definition of abbreviation displayed in the controller**

Displayed in 《main interface》	
Tr	Room temperature
Ts	Room temperature setting
To	Ambient temperature
Displayed in 《refrigerant circuit》	
Ts	Suction temperature
Td	Discharge temperature

T out	Water outlet temperature
T in	Water inlet temperature
Tc	Coil temperature
Ty	Tube temperature of heat exchanger
Outdoor temp.	Outdoor temperature
Room temp.	Room temperature
Ps	Low pressure
Pd	High pressure
P	EEV steps
A	Compressor current
HZ	Compressor frequency
TH	Condensation temperature
TL	Evaporation temperature
TIPM	IPM temperature
Displayed in «hydraulic circuit»	
Tt	DHW tank temperature
T out	Water outlet temperature
T in	Water inlet temperature
T6	Solar tank temperature or DHW pipe temperature

7 Maintenance

7.1 Maintenance and Cleaning for User

It is good practice to inspect your heat pump regularly. Maintenance should be carried out at least annually to maintain a good lifespan of your heat pump.

- Regularly clean the Y type filters every 6 months to ensure that the system is clean and to avoid blockage to the system.
- Units should be kept clean (no leaves or dirt) and no obstructions should be placed in front of or behind the unit. Good ventilation and regular cleaning (3-6 months) of the evaporator will help maintain efficiency.
- Ensure the unit has power in the winter whether the unit is used or not.
- Check the power unit and electrical system.
- Check the water system, safety valves and exhaust devices are working properly so as not to pump air into the system causing reduced circulation.
- Check water pump is functioning properly. Make sure the water pipeline and pipe fittings are not leaking.
- Clear evaporator of any debris.
- Check the various components of the unit work properly. Inspect the pipe joints and valves branch have inflated oil, to ensure no leakage of the refrigerant unit.
- Chemically flush the plate heat exchanger after every 3 years.
- Check refrigerant gas content if necessary.
- Check water in/out temperature difference, making it meets the guidelines of 3 to 7.

8 How To Get The Most Out Of Your Heat Pump

It is important to understand that you should operate heat pumps differently to conventional heating systems such as gas boilers. Below are some points you should be aware of:

- Since heat pumps produce water at a lower temperature (than gas boilers), it is important to remember the heat up time of your property is slower.
- The lower water temperature the heat pump produces, the more efficient it is.
- The higher the ambient temperature (outside temperature), the more efficient the heat pump is.
- The heat pump has a simple job, and that is to maintain the water tanks at the set temperature.
- Its a good idea to let your heat pump maintain your water tank temperatures 24 hours a day during the winter. This will enable your central heating controller to call for heat in the home at any time. During the summer you can set the timer on the heat pump controller for your hot water requirements.

With the above in mind, you could decide between the following:

Option 1. You could decide to operate your heat pump during the day time (when temperatures are higher). At the same time you could set the water temperature lower. This will basically charge your home during the day so in the evening the home is warm and the heat pump simply maintains the heat. This is not controlled by the heat pump controller, it is controlled by your central heating controller.

Option 2. You could operate your central heating controller in a similar way to a conventional boiler. You must set the program at least 1 hour before you need your property to be warm. The downside to this is that you may need to set the water that the heat pump produces to a higher temperature.

Option 3. You could decide to operate your home with back ground heat. This means you are always (24 hours a day) putting a trickle heat in your home.

In all cases it is recommended to maintain a minimum temperature in your home (e.g. 14°C to 16°C) during the evening. This is controlled by your central heating controller.

There is no right way to operate your heat pump. We cannot tell you which is the most efficient way to operate it since every home is different. What we can say is that you should look for the best way to heat your home that suits your lifestyle.

Nowadays with low cost energy monitors, you can easily find the most cost effective way to heat your home. We hope you enjoy your Heat Pump.

Appendix I: WIFI operation

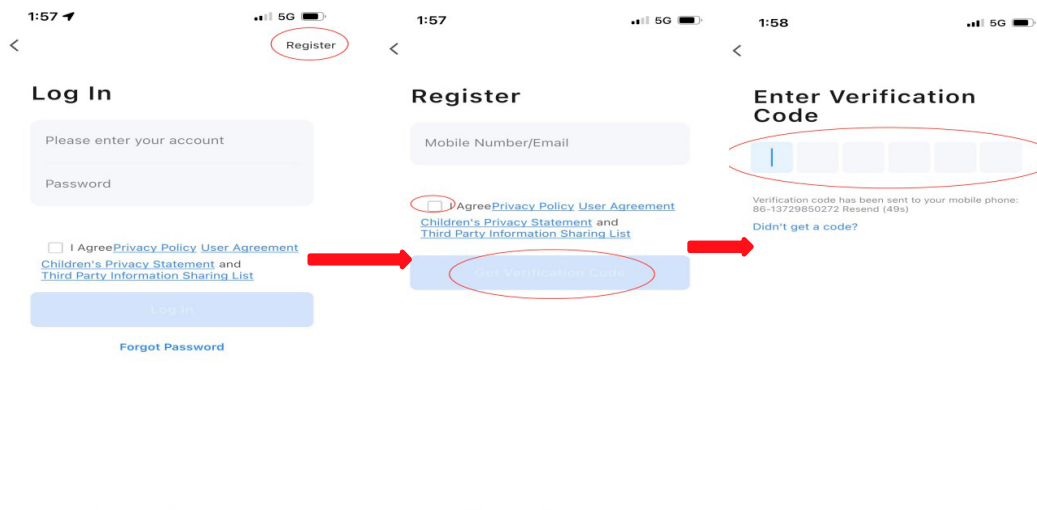
1. APP download

Please go to APP store or Google market and search “Smart Life”, download and install the APP, then start it.





2. Register

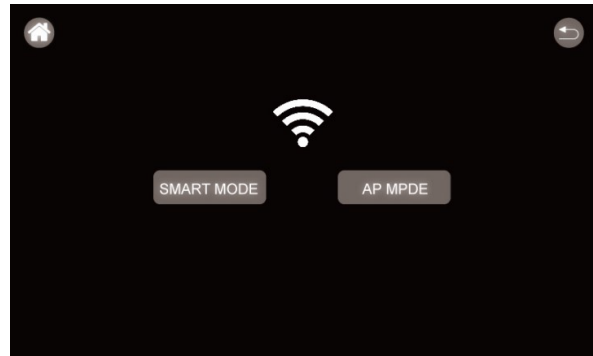
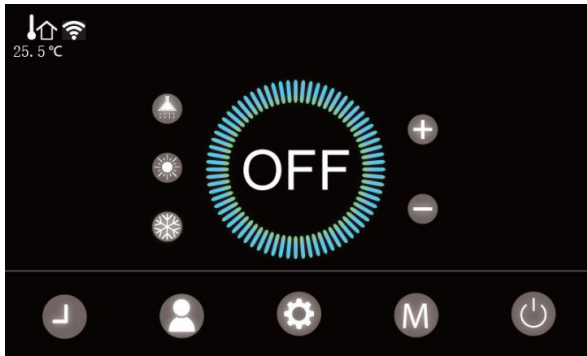
If you are new user, you will need registering: Register→Input your mobile phone number/Email→Check the agreement→Get verification code→Enter the verification code→Set the password→Complete.



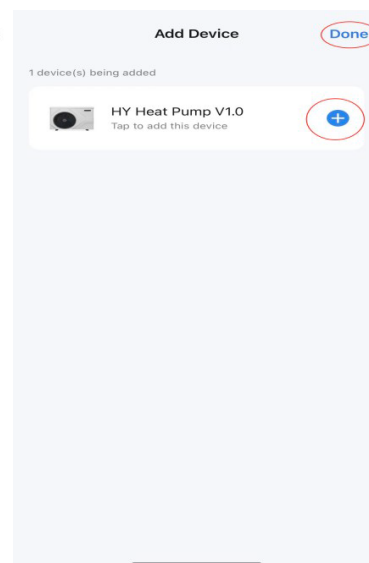
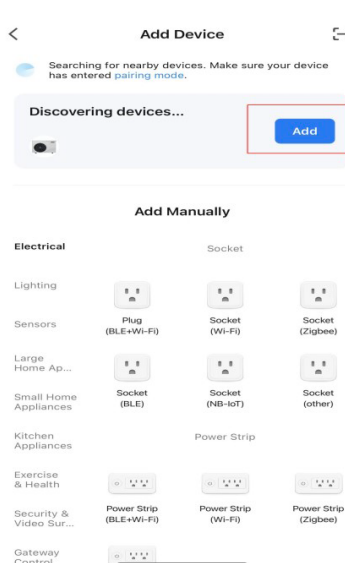
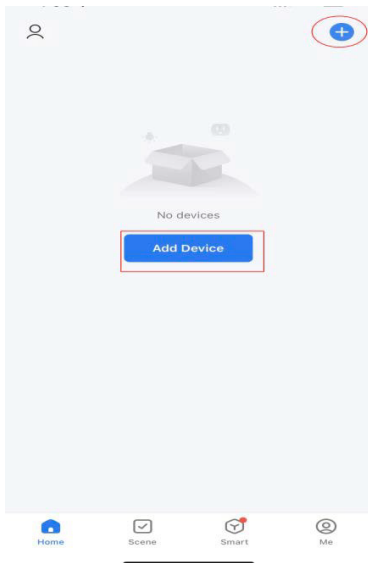
3. Add device

Step 1: Activate the pairing mode on your heat pump controller according to the following: click  for 3 seconds to enter following page. Click «Smart mode» to activate WiFi. The  symbol flash quickly.

Note: The blinking will stop when the APP is connected to WiFi.



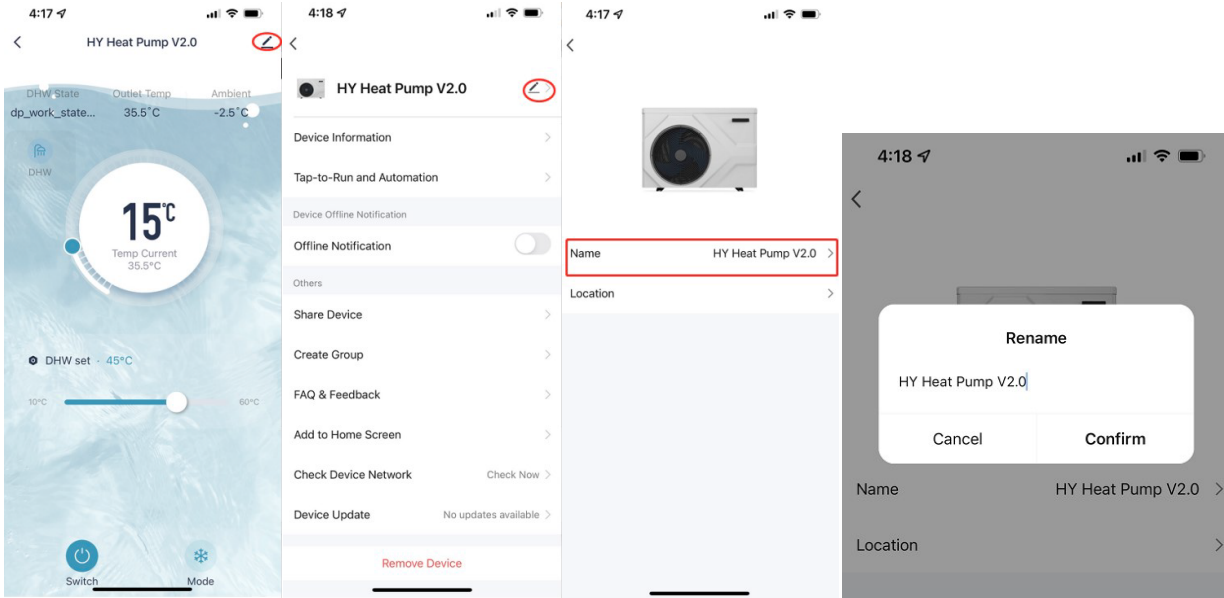
Step 2: Now activate the pairing. Choose the WiFi network to use, enter its password and click «Next».



ATTENTION: The «Comfort_Life» application only supports 2.4GHz WiFi networks.

If your WiFi network uses the 5GHz frequency, go to the interface of your home WiFi network to create a second 2.4GHz WiFi network (available for most Internet Boxes, routers and WiFi access point).

Step 3: If the pairing was successful, you can rename your heat pump per below pictures.

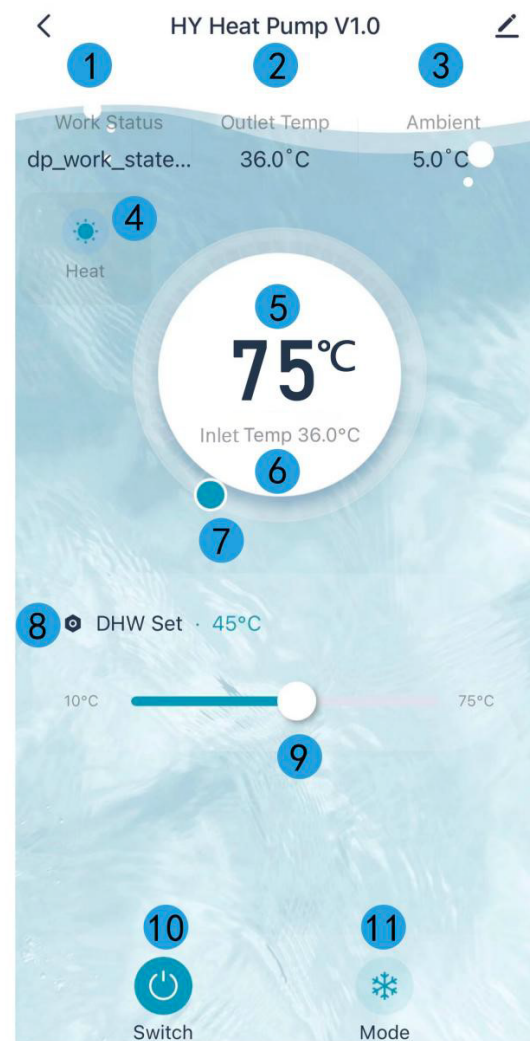


Note: Operating factory default in the controller can remove device from APP remotely: turning off the heat pump, and change parameter P87=1 (factory default) in the controller.

4. Controlling

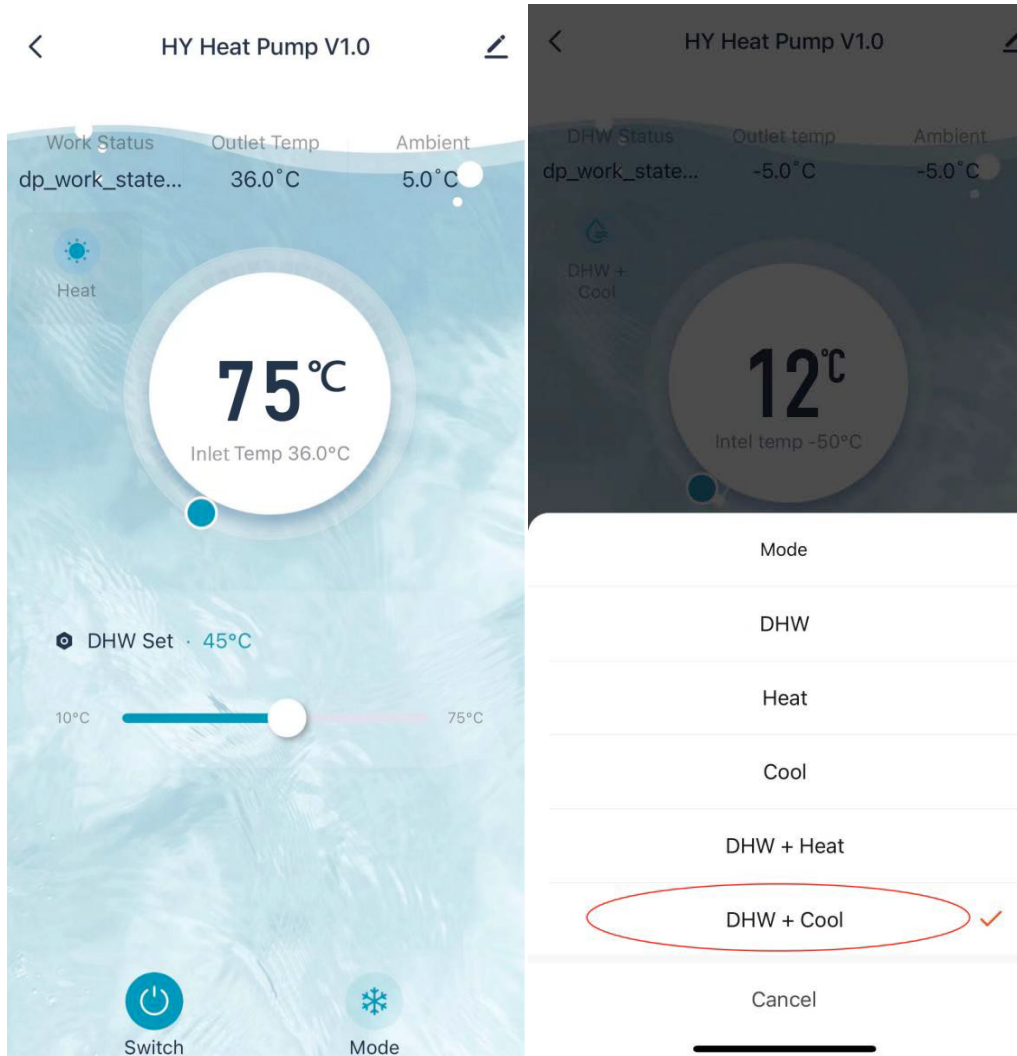
Interface as below shown. You can now control your heat pump from your smartphone.

- 1 Work Status
- 2 Outlet Temp
- 3 Ambient Temp
- 4 Working Mode
- 5 A/C Setting Temp
- 6 Inlet Temp
- 7 Change the A/C Setting Temp
- 8 DHW Tank Temp
- 9 Change the DHW Setting Temp
- 10 Switch
- 11 Mode



1) Choice of operating modes

You can choose between DHW, Heat, Cool, Heat + DHW, Cool + DHW modes.





Multifunctional Heat Pump R32

*House Heating and Cooling,
Residential Hot Water*



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