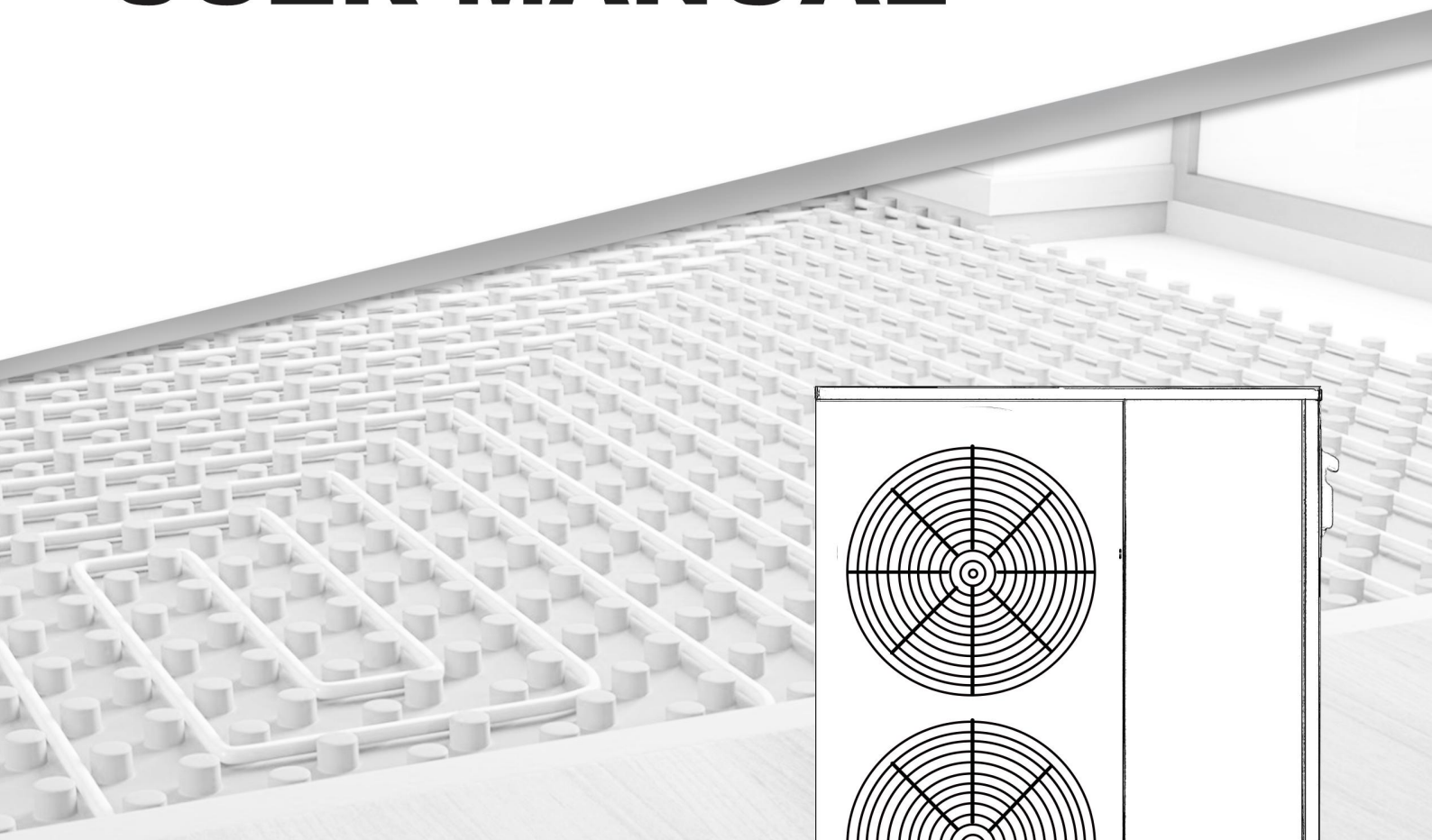
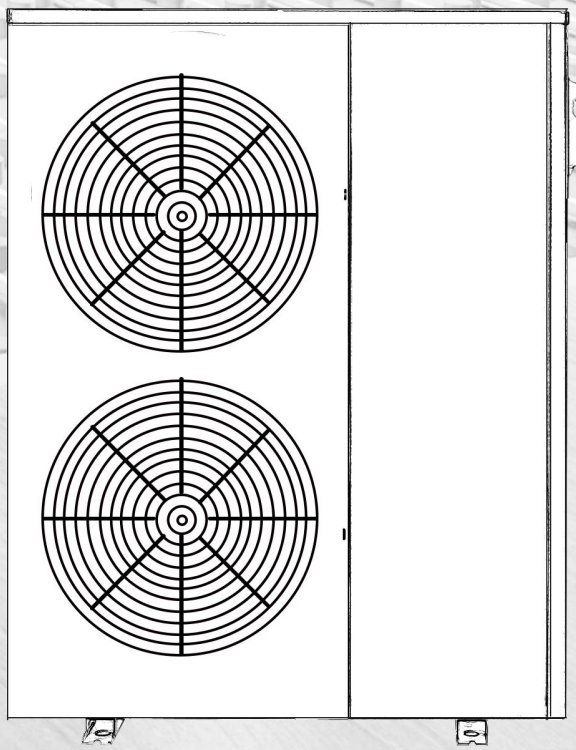
USER MANUAL





Air Source Heat Pump Expert

CONTENT

Please Read the Manual Carefully before Operation

Please read this manual carefully before installation

- The heat pump unit must be installed by the professional technician.
- Please install the heat pump and connect the water pipes in accordance with this manual strictly.
- For safety consideration, please make sure to re-check that everything before the power on.
- If the machine with any improvement, the content is subject to change without notification.

I. Prologue

Thanks for choosing our R32 Inverter +EVI heat pumps for your heating , cooling and sanitary hot water solutions!

Please read this manual carefully before installation and operation! This manual contains the information about installation, electrical debugging, operation, and maintenance. The following items should be focused:

1. Before installation, please confirm if your local voltage supplying matches with the voltage which showed on the machine's nameplate and if the carrying capacity of the power supply, wires and plug bases are suitable for the range of this machine's input power.

2. Users are not allowed to change the power line or plug base by themselves. All wiring works must be carried out by a qualified electrician, please 100% be sure to connect the earth line correctly. If the earth wiring is not connected correctly, it may cause electric shock accidents.

3. After the completion of the construction of all wiring work, please make sure to recheck that everything is well connected before power on.

4. Installing the machine in the place which the combustible gas may leak is strictly forbidden.

5. Do not put your hands or foreign matters into the air outlet of heat pump unit, otherwise it will be dangerous to the people and equipment nearby.

6. In order to obtain a better energy-saving efficiency, the unit should be installed in a place with well-ventilated.

ATTENTIONS:

1. Please make sure the water circulation system filled with enough water before the machine starts working.

2. When the machine is under operating, all valves of the water systems must be in the open positions.

3. If without inlet water or with a long time stopped using, when re-boot the machine, please refer to the item of attentions 1.

4. A removable filter must be installed at the water inlet and please clean the valve periodically depend on your locate water quality (every 2 or 3 months).

5. The maximum water temperature is 55℃, at hot water heating mode, please adjust the water

temperature to a appropriate temperature (The most comfortable water temperature for shower is 38C-42C , if the water temperature above 50℃ , there might be with danger of burning skin!)

6. The maintenance of the machine must be carried out by professional electricians.

7. When the unit get powered off, please discharge all the water inside the water circulation system. Otherwise the heat exchanger might be frozen at cold ambient temperatures.

8. Please confirm the installation location of the main controller. When installing the main controller, be sure to install it in a waterproof place, and the installation must be firm.

9. Please install with leakage protection switch. Check whether a leakage protection switch of suitable power is installed between the unit and the power supply, if the leakage protection switch is not installed, it may cause electric shock or fire.

10. Check the water flow and pressure of the circulating water of the equipment when the equipment is at normal use, it must be ensured to prevent the unit from being protected and running short of water.

11. Do not move the detector freely. The temperature detector must not be separated from the water tank temperature detection blind pipe to avoid overheating of the unit heater and might cause the unit damaged.

12. The unit's maintenance and repairing by non-professional technicians to repair or adjust the advanced factory controlling setting of the unit by themselves are not allowed, please contact the local service providers or distributors for the operation.

13. The fuse selection must match with the unit. It is forbidden to use corresponding fuse which is not suitable. Otherwise it may cause system errors or cause a fire.

14. Prevent the unit from fire. Do not spray flammable spray directly to the unit, otherwise it may cause a fire accident.

15. Please cut off the manual power switch immediately when an abnormality (with burnt smell) occurs, stop any further operation, and contact the local service providers or distributors.

If the abnormal operation continues, it may cause electric shock or fire.

16. Emergency measures after out of water or electricity supplying,

In cold areas, please do not cut off the water and power supply to avoid freezing the heat exchanger and the water circulation system. In the event of a power failure, please drain all the cold water out of the heat exchanger and the whole water circulation system, otherwise the heat exchanger will be damaged by freezing and the unit cannot be used normally.

It is recommended with a condensed water drain pipe installed during engineering installation to prevent a large amount of condensate water from flowing to the ground during drainage and causing large areas of water to accumulate.

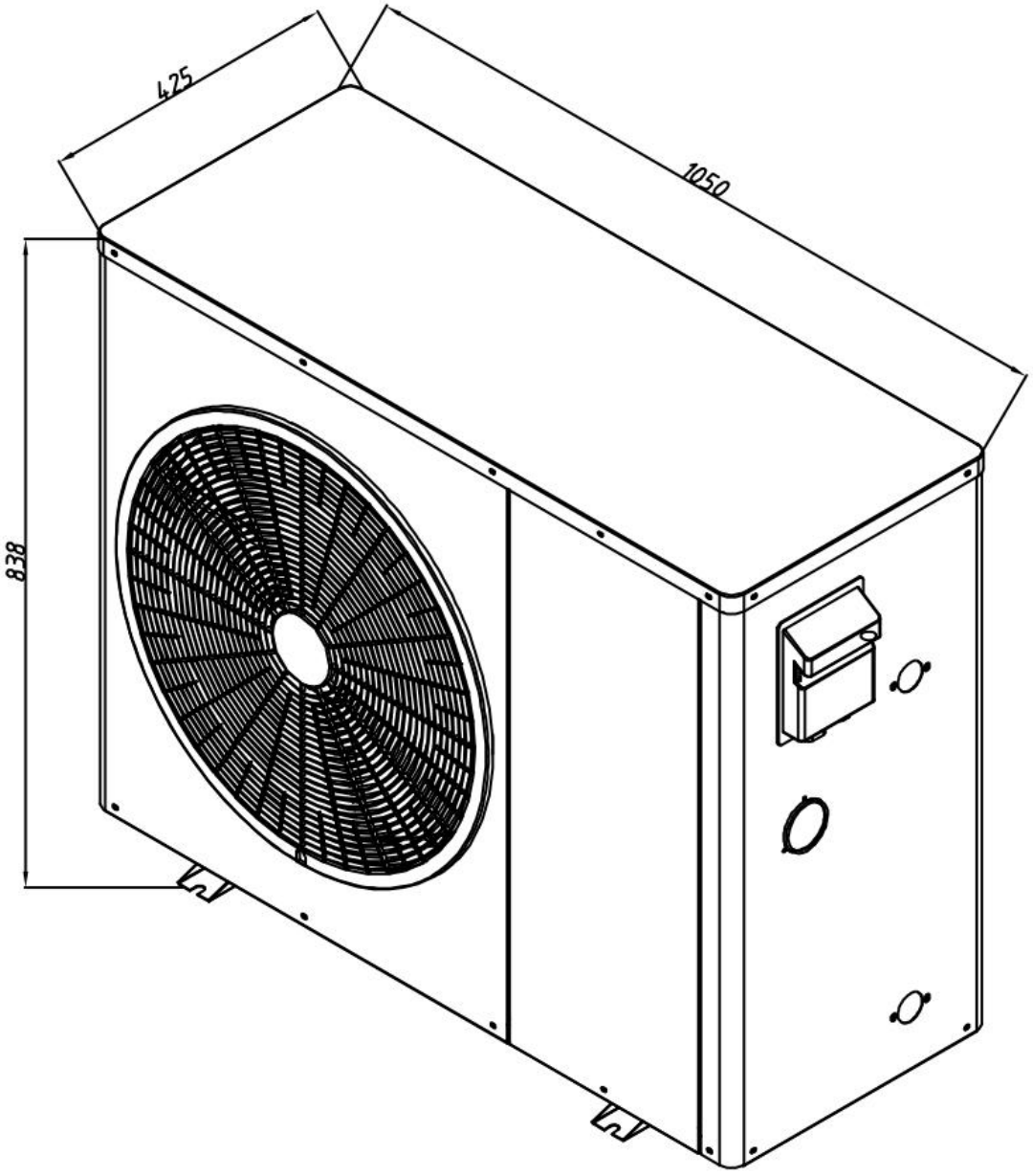
II. Main instruction of product

1. Parameter

Model	Size(L*W*H mm)	Net Weight(KG)	Power Supply
NL-BKDX30-95II/R32	1050x470x838	100	220V-Inverter-1N
NL-BKDX40-150II/R32	1050x470x1343	130	380V-Inverter-3N
NL-BKDX50-200II/R32	1050x470x1343	150	380V-Inverter-3N

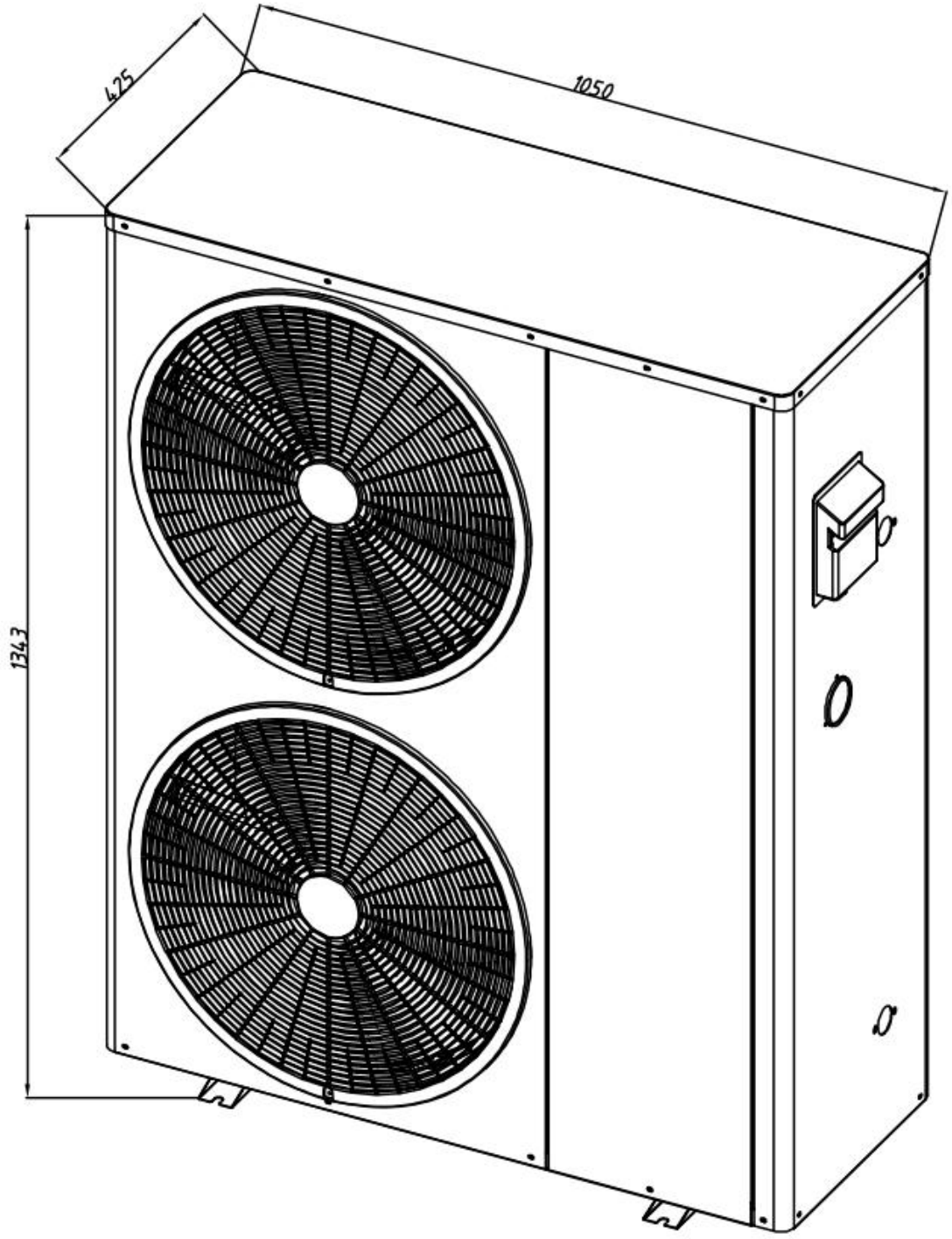
2. Appearance

NL-BKDX30-95II/R32



NL-BKDX40-150II/R32

NL-BKDX50-200II/R32



3.Specifications

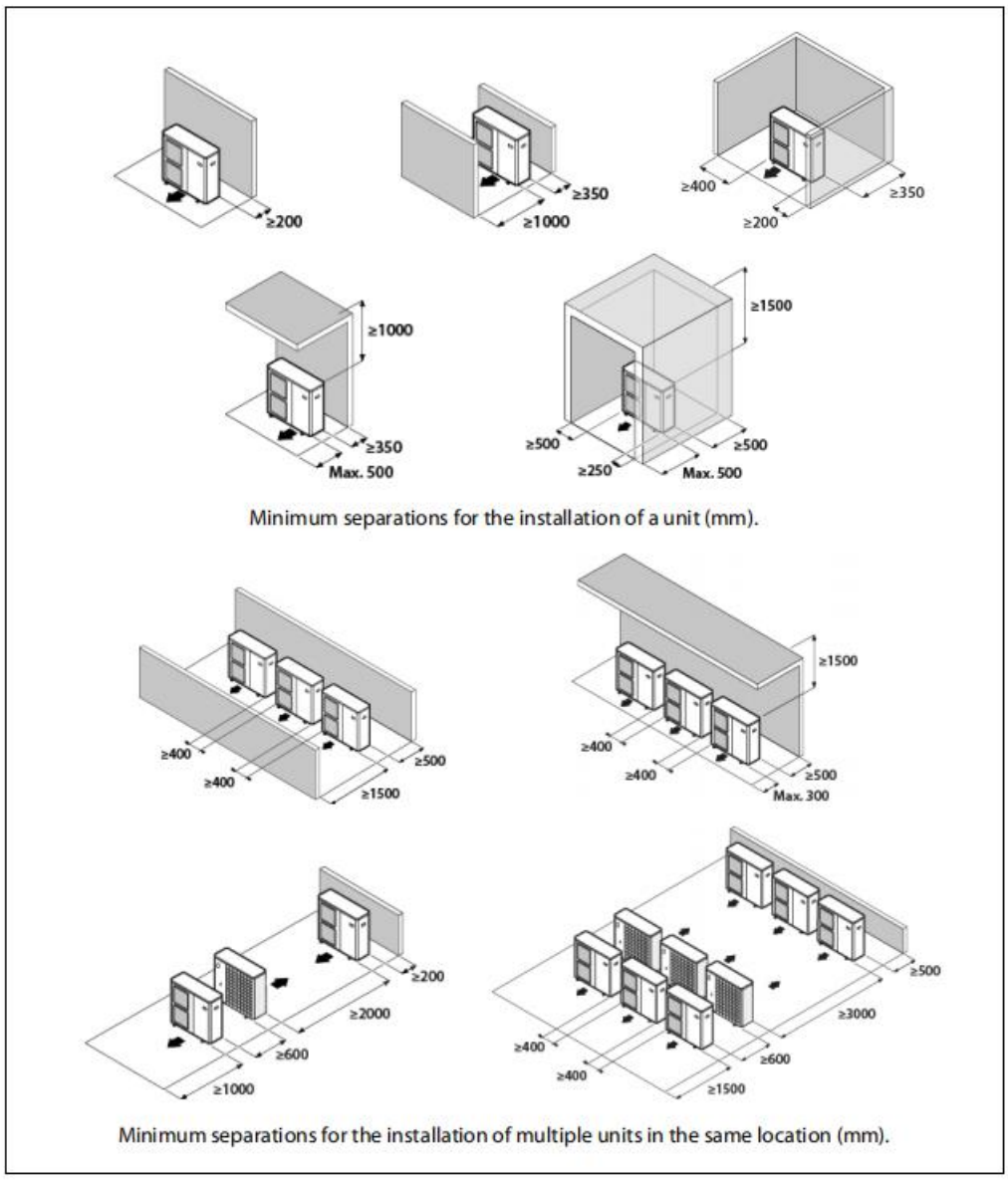
Unit	**R32 DC Inverter + EVI All In One Heat Pump**		
Model	NL-BKDX30-95II/R32	NL-BKDX40-150II/R32	NL-BKDX50-200II/R32
Waterproofing grade	IPX4	IPX4	IPX4
Leakage protection	Ⅰ Class	Ⅰ Class	Ⅰ Class
Power source	220V-Inverter-1N	380V-Inverter-50Hz	380V-Inverter-50Hz
Hot water capacity	2500-9500W	3800-16000W	5500-21000W
Heating capacity	2800-10000W	3500-15500W	4500-20000W
Cooling capacity	2500-7500W	3800-11000W	4800-14500W
Heating input power	1000-3200W	1500-5000W	2000-5500W
Hot water input power	1000-3200W	1500-5000W	2000-5500W
Cooling input power	1000-3200W	1500-5000W	2000-5500W
Auxiliary element power	3000W	3000W	3000W
Auxiliary element current	14A	14A	14A
Rated input power	2500W	3650W	4500W
Rated current	11.0A	6.7A	7.8A
Water pump	WILO RS15/6	WILO RS25/8	WILO RS25/8
Max water pump head	6 meters	8 meters	8 meters
Expansion tank	2L	5L	5L
Rated water flow	1.7m^3/h	2.7m^3/h	3.5m^3/h
Refrigerant	R32/1300g	R32/2150g	R32/2300g
Net weight	100kg	130kg	150kg
Noise	≤49dB(A)	≤50dB(A)	≤52dB(A)
Inlet/outlet gas max working pressure	4.2MPa	4.2MPa	4.2MPa
High/low pressure max working pressure	4.2MPa	4.2MPa	4.2MPa
Heat exchanger max working pressure	4.2MPa	4.2MPa	4.2MPa

III. Installation

1.Heat pump installation

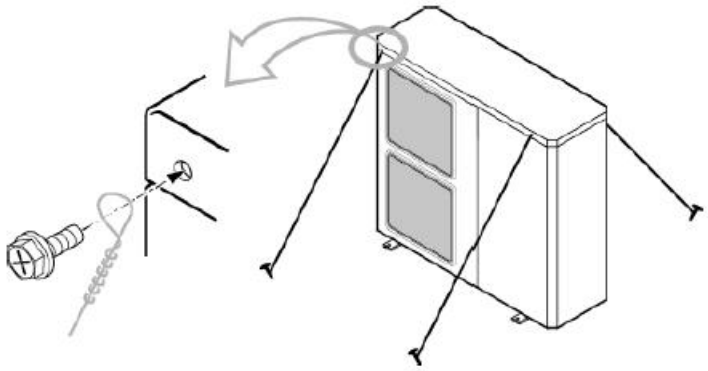
(1) Installation location

◆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.



◆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 neighbor (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.

（2）Hydraulic installation

◆The hydraulic installation must be made by qualified installer.

2.1 Selection circulation pipeline：The water flow velocity inside the water pipe is generally required to be 0.8-1.5m/s. The maximum water flow velocity cannot exceed 2m/s.

Determine the diameter of the water pipe according to the rated water flow of the machine. As shown in the table below：

Water flow（m³/h）	≤1	1-2	2-3	3-4	4-5
Recommended pipe diameter(mm)(flow velocity 1.2m/s)	DN20	DN25	DN32	DN40	DN40
Minimum pipe diameter(mm) (flow velocity1.8m/s)	DN15	DN20	DN25	DN32	DN32

2.2 Calculation of water pipe resistance：H max=P1+P2

◆ Water pressure drop inside the machine. Can be found on the machine's nameplate.

◆ Water pressure drop in piping system. If the water flow velocity is 1.2m/s, the resistance of the straight pipe is 0.6 Pa/m, and the resistance of each elbow is 2Pa.If the water flow velocity is 1.8m/s, the resistance of the straight pipe is 1.25 Pa/m, and the resistance of each elbow is 4.5Pa.

2.3 Pump selection

◆According to the rated flow of the machine and the calculated water pressure drop.To decide if you need to install an additional circulating water pump.

2.4 Installation of floor heating

◆The water flow speed in the fool heating pipe is not less than 0.25m/s, and the general design is 0.25-0.5m/s.

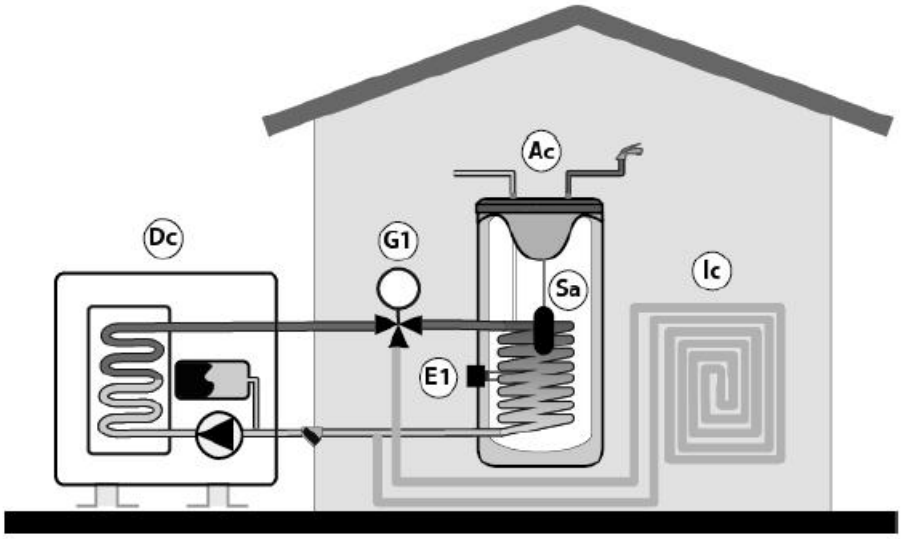
◆The distance between the pipes is 150-200mm;

◆The length of each loop does not exceed 80m,and the general designed is about 40-70m. The length difference between different loops does not exceed 10m.

（3）Installing a DHW tank

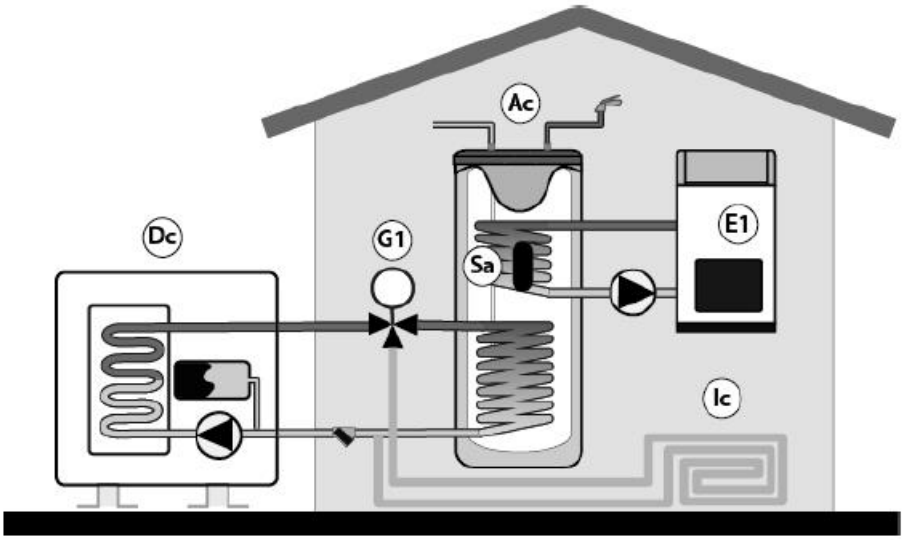
◆The heat pump may include (optionally) in its installation a tank for the production of domestic hot water. The hydraulic installation of the tank must be made by qualified personnel, subject to the applicable installation legislation and attached instructions of the tank.

◆To combine an DHW tank with the heat pump, insert the DHW tank sensor supplied with it into the tank sensor housing. In addition, a 3-way valve (G1) must be installed between the external machine and the DHW + heating/cooling installation, by means of what, the electronic controller diverts the water from the heat pump to the DHW production or to the heating/cooling installation, depending on whether there is demand for DHW.



◆In addition,optionally,a backup heater (E1) can be installed, by means of what DHW temperatures higher than 50℃ can be obtained.

As alternative to the backup heater, the heat pump optionally allows the connection of a conventional source of energy (as a gas boiler, oil boiler, etc.) as back up for DHW production, by means of the same electrical connection E1. For it, the DHW tank must be provided with an auxiliary coil exchanger and/or any intermediate system of exchange that allows the hydraulic connection of the above mentioned backup source of energy.



To perform the electrical installation of the DHW tank sensor, the 3-way valve (G1), and the backup heater or boiler(E1), read the “Electrical Connections” section of this manual carefully.

(4) Main components and working principle of water circulation system

4.1 pump: push the water circulate in the water circulation system to realize the heat exchange between

the heat pump and the water terminus.

4.2 Filter: Collect impurities in the water system to prevent impurities from entering the heat pump and the water terminus's heat exchanger to cause blockage.

4.3 Buffer tank: Increase the amount of water in the system,reduce the change rate of water temperature, improve comfort; balance the different temperature difference and flow demand between the heat pump and the water terminus.

4.4 Safety valve: keep the pressure of the water system not exceeding the maximum limit.

4.5 Expansion vessel: balance the pressure of the water system when the volume of water changes.

4.6 vent: remove the air in the water system and ensure that the water cycle is normal.

（5）Estimate the heat demand for room heating

Q=K*qn*S

Q Total heat demand for housing

K Additional factor

qn Heat demand per square metre

S Heating area

5.1 qn experience values for different houses

Apartment（W/m²）		Single house（W/m²）	
Living room	100-130	Living room	120-150
Bedroom	110-140	Bedroom	120-150
Study room	100-120	Study room	110-130

5.2 Additional factor

Ratio of heating area to total room area	>0.55	0.4-0.55	0.25-0.4	<0.25
Additional factor K	1.0	1.25	1.35	1.5

The rated heating capacity of the heat pump must be ≥Q.

（6）Calculation and selection of buffer tank

6.1 Minimum water volume in the water system

Considering the comfort of heating, it is best not to reduce the temperature of the water supply by more than 5℃ during the defrosting in winter. The general defrosting time is about 4 minutes.

Mmin=Q*T*2*1000/(60*5*1.163）

Mmin Minimum water volume in the water system（L）

Q The rated heating capacity of the heat pump(KW)

T The defrosting time（minute）

M2　Total volume of other parts in the system except the buffer tank

6.2 The volume of the buffer tank must be ≥Mmin-M2

6.3 If M2>Mmin,It is not necessary to install a buffer tank。

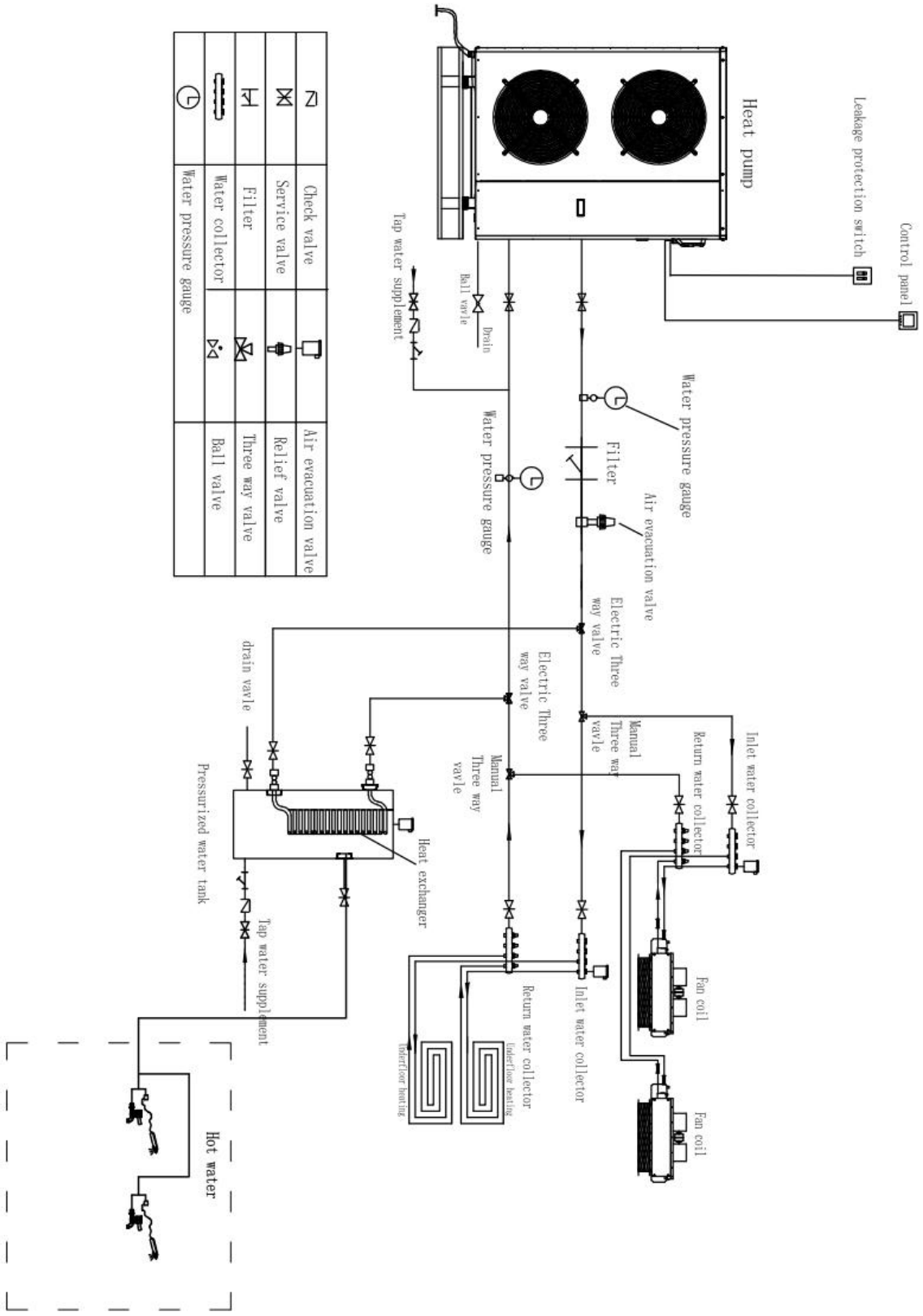
6.4 For the correct operation of the heat pump, a minimum water volume must be ensured in the installation, as well as　a minimum flow in the hydraulic circuit of the machine.
If the minimum circulation flow is not reached by the heat pump, it will be blocked, and an alarm code will be displayed on the controller display. According to the different capacity model installed, these volume will be:

	8KW	11KW	16KW
Minimum volume(l)	100	150	200
Minimum flow rate(l/min)	10	15	20

6.5 If the water volume of the installation is lower than this value, install a buffer tank in the heating/cooling circuit. To avoid condensation and premature deterioration of the buffer tank, make sure that all hydraulic fittings and connections are properly insulated, especially when the tank is to be used in Cooling mode.

6.6 In multi-zone installations managed by thermostatic or similar valves, some method must be provided to maintain the minimum flow rates indicated above, even when all zones are closed (bypass valve, etc.).

2.Connection diagram



3.Circuit connection

Attentions

◆Construction wiring must be installed by a professional technician for construction in accordance with the circuit diagram.

◆Appliance installation wiring should be installed in accordance with national wiring rules.

◆Before installation, please confirm whether your local voltage is match with the voltage showed on the machine's nameplate and whether the carrying capacity of the power supply, wires and sockets are suitable for this machine's input power.

◆The power source wire diameter is selected by the nameplate maximum current.

◆The regulation of insurance tube: according to the reality.

◆Users are not allowed to change the power cord, wiring work must be carried out by qualified electricians, and to ensure that the machine metal parts has a good connection with grounding, the machine shall not be allowed to change the grounding method. 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)).

◆The power connection must be equipped with the unit matching and at least 3mm contact with the power from the all-pole disconnect device and leakage protection device.

◆If the power soft wire is damaged, it must be replaced by the manufacturer, its service department, or similar professional to avoid danger.

◆Do not insert hands or foreign objects into the outlet of the unit, which will lead to the danger of personnel and equipment.

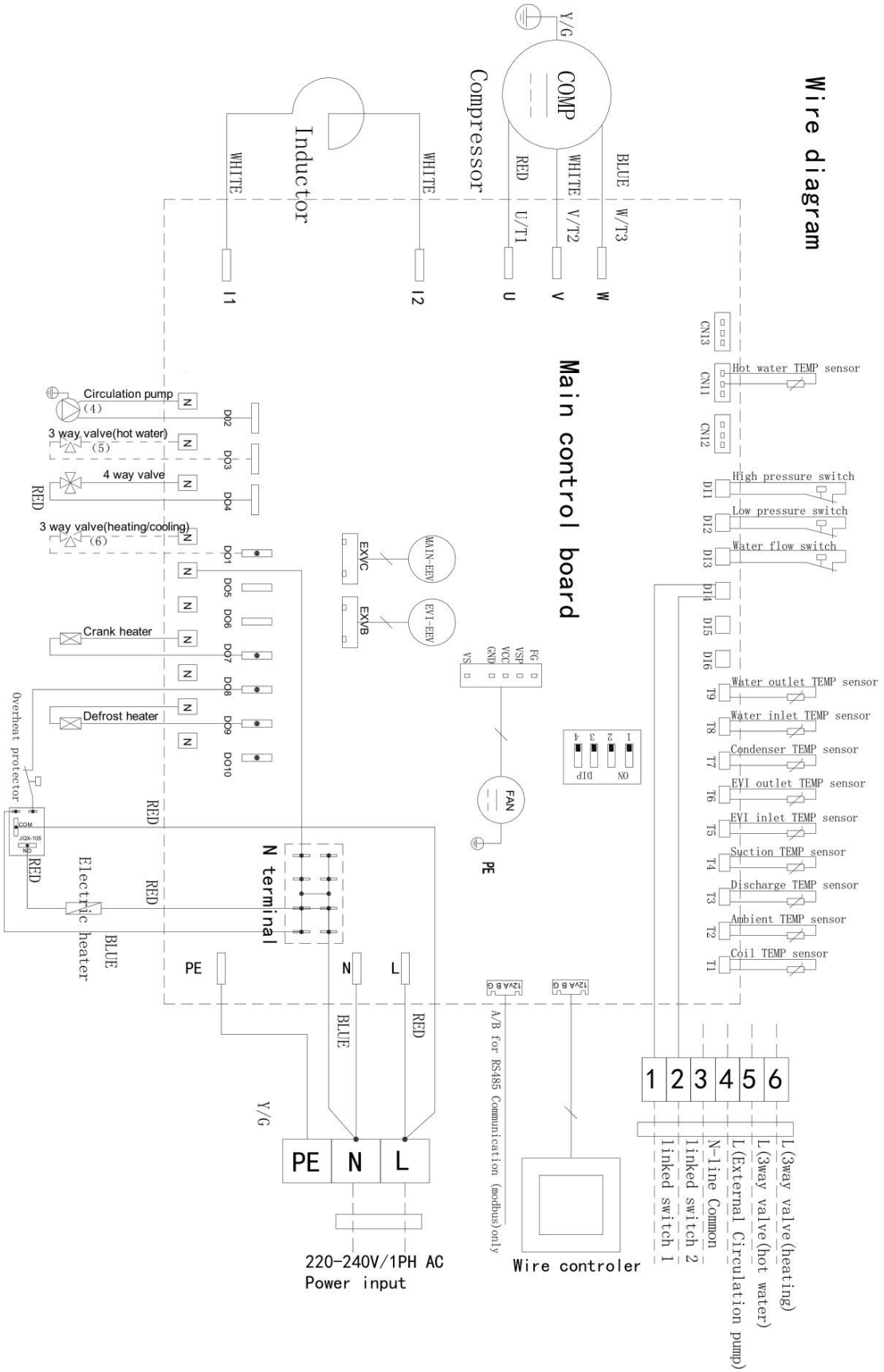
◆The remote controller is fixed by screw and installed indoor with the height above 1.5M. It is forbidden to install in the environment where the humidity, rain, acidity, corrosivity and light illuminate directly.

◆The water quality of the unit must meet the national standard of domestic water consumption, otherwise it will cause the machine damage, the company does not bear any responsibility.

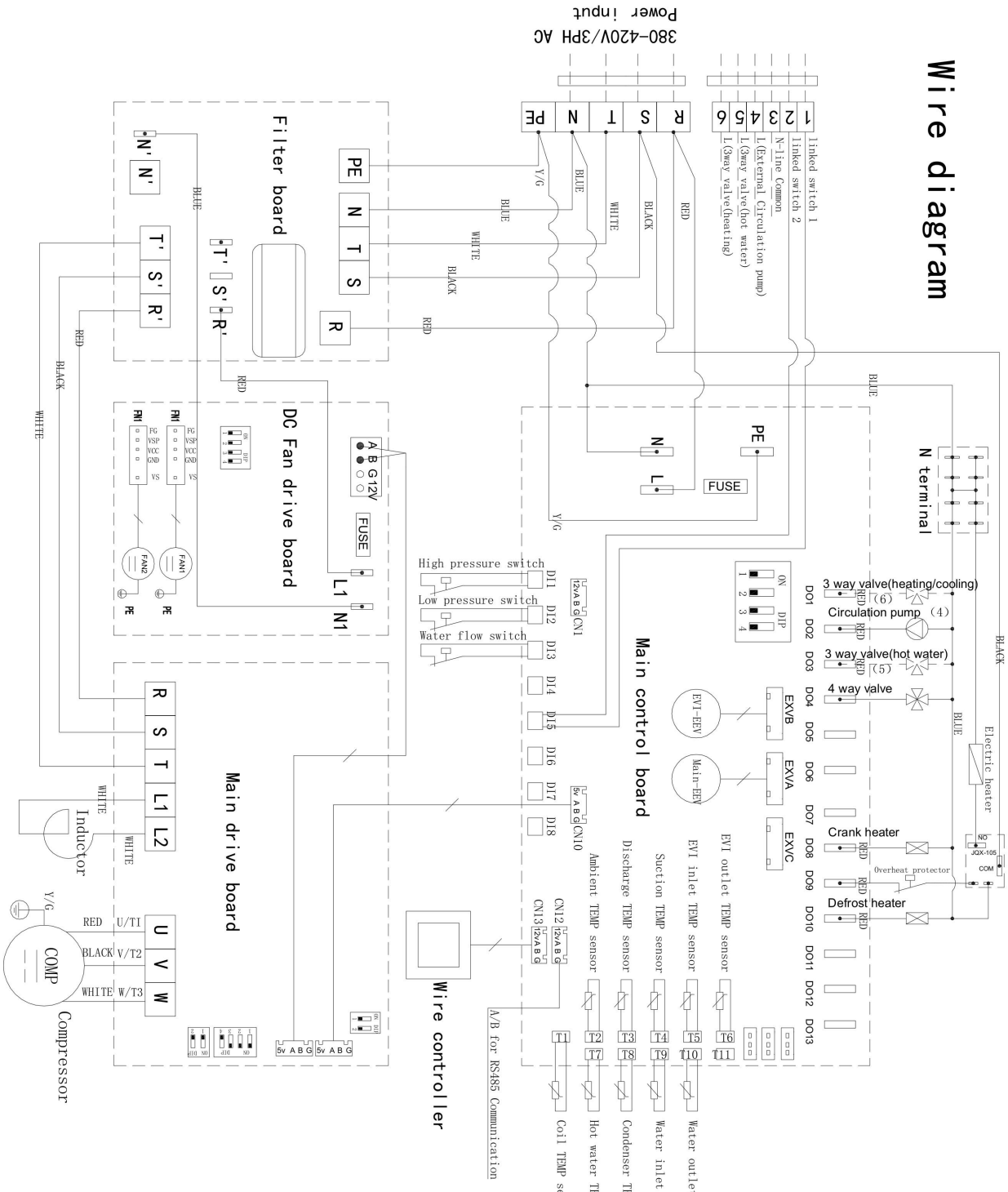
IMPOTTANT: Before carrying out any work on the electrical installation of the heatpump, always ensure it is disconnected from the mains.

4.Circuit diagram

NL-BKDX30-95II/R32 (220V)



NL-BKDX40-150II/R32 (380V)　　NL-BKDX50-200II/R32 (380V)



IV. Trial running

1.Trial running must after all the installation completed.

2.Please confirm the following matters before the trial operation, put "√"in the boxes after confirmation

- ▲ Unit is installed correctly ☐
- ▲ Power supply meets unit's rated power source need ☐
- ▲ Piping and wiring are correctly installed ☐
- ▲ Unit air inlet/outlet well-ventilated ☐
- ▲ Drain off water is done well ☐
- ▲ Leakage protective device act effectively ☐
- ▲ Pipe thermal insulation ☐
- ▲ Grounding wire connected correctly ☐

3.After check and ensure correct, then power on. If the control panel display nothing, that should recheck and tight the line of control panel. The control panel should display time, setting temperature and the current temperature.

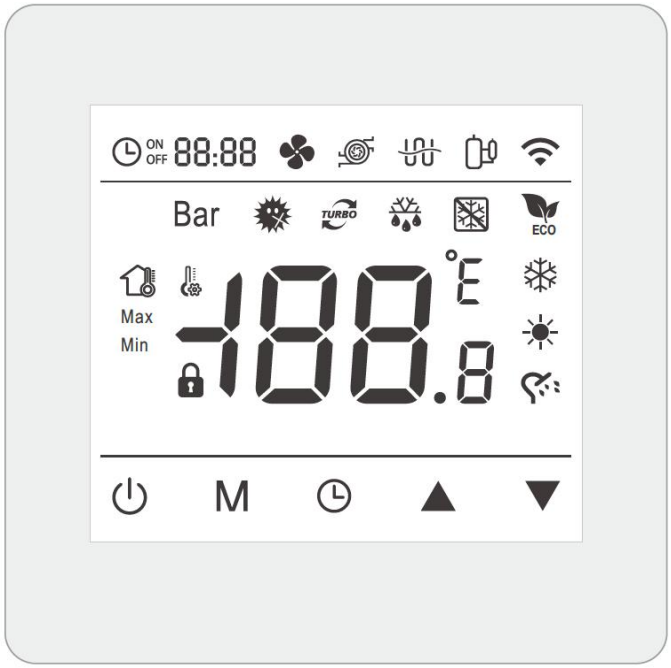
4.Discharge the air out of the pipelines , and then press ON/OFF button, the unit work under the setting temperature, unit's trial running would check the following:

- ▲ First time to run the device, check the current normal or not;
- ▲ The function keys on operation panel are normal or not;
- ▲ The indicator light is normal or not;
- ▲ The whole circulating hot water system has water leakage or not;
- ▲ The condensed water discharge is normal or not;
- ▲ System's pressure is normal or not (according to the high water temperature or low pressure);
- ▲ Whether there is abnormal sound and vibration during operation;
- ▲ The wind, sound and condensate of the unit affect the neighborhood or not;
- ▲ Whether there is leakage of refrigerant.

V. Operation panel instruction

1. Wire Controller Display

1) Display Icon



2) Wire Controller Interface Description

Symbol	Definition	Symbol	Definition
⏻	ON/OFF key		WIFI indication
M	Mode key		Compressor operation
	Time setting		Electric heating operation
▲	Up key		Water pump operation
▼	Down key		Fan operation
	Cooling mode		Silent mode
	Heating mode	TURBO	Strong mode

	Hot water mode		Defrosting mode
ECO	ECO mode		Antifreeze mode
	Floor drying mode		Lock key
188.8 °E		Temperature display area	
ON OFF 88:88		Clock/timing area	

3) Operating instructions

1.ON/OFF key：

When heat pump shutdown, press to start up the unit

When heat pump start up, press to shutdown the unit

2.Mode key M

When heat pump under start up state, press M more than 3 second to switch machine operation mode, Can be switched among: cooling 、heating 、hot water 、 cooling + hot water 、heating + hot water 5 modes.

3.Up key ▲ and Down key ▼

A.Used for flipping query and modifying parameter values ;

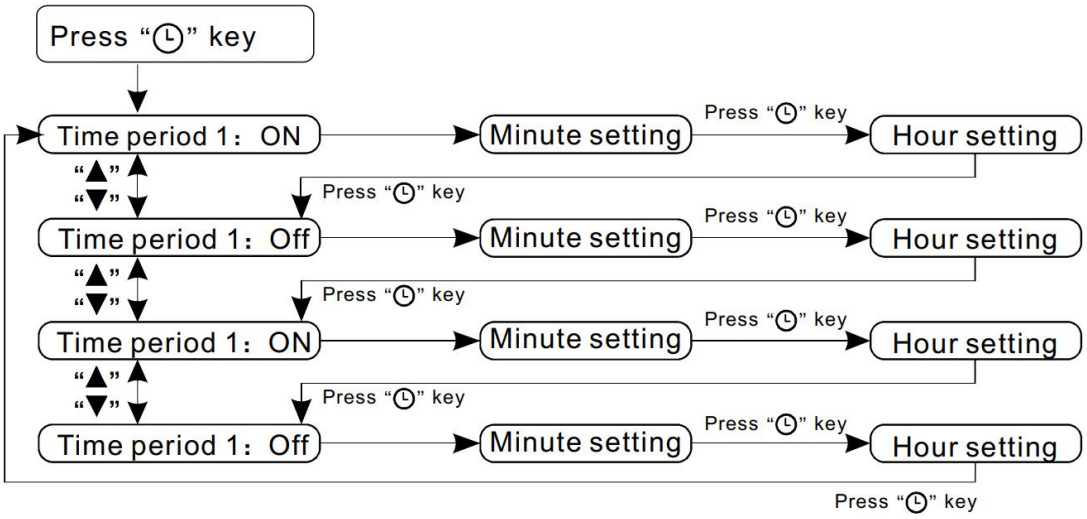
B.Combine with M key to enter query and set parameters ;

C.When heat pump under start up state, press ▲ or ▼ key to set the temperature of the current mode.

4.Clock/timing key

When heat pump under shutdown state, Press any key except and , for display the current time, long press to enter the timing on / off setting state, press ▲or▼ key to modify the timing time, In the setting, press M key to return to the previous setting, press key to confirm and switch to the next step; In the timing setting state, press and hold the key to cancel all timing settings.

The specific operation process is as follows:



5.Screen lock function

Without any key operation for 60 seconds, the wired controller will automatically enter the locking, and the icon will light up.

Continuously press the ▲+▼ button for 3 seconds to unlock the wired controller

This function is available only when parameter 12 at the parameter table is set to 1

6.Running auxiliary functions:

A.Under the power-on status, press and hold ▲+▼ for 3 seconds to turn on the boost mode and the energy-saving operating mode,

Press M again to confirm and exit the operation status, press M + ⏲ and hold for 3 seconds to cancel the auxiliary running mode and resume to the standard operation status.

B.defrosted anti-freezing

At the space heating status, continuously press ⏻ to enter the forced defrosting operation.

C.Floor drying function:

Turn on the heat pump unit and at the space heating operation status, press the ⏲ + ▲key at the same time for 3 seconds to turn on the floor drying function, which maintains the heating operation for 7 days

(Firstly, the outlet water temperature is automatically set to 25°C for 72 hours+, then automatically set to 35°C for 48 hours +, finally set to 40°C for 48 hours to end)

When this function is running, you can press and hold M + ▲ 3 seconds to cancel at any time.

D.Antifreeze under cooling mode operation:

The unit under cooling operation mode, when the compressor has been running for 10 minutes, and if

the temperature of the inner coil is detected ≤-2℃ for 2 minutes continuously, the unit will report an anti-freezing protection system protection, then the compressor will stop, and the water pump will keep running. When the temperature of the inner coil is ≥6℃, it will automatically reset. The unit would shut down to antifreeze:

(1) When the outdoor ambient temperature T4≤4℃ and the inlet water temperature≤4℃, the system enters the first-level antifreeze status, and the water pump would automatically turn on until outdoor ambient temperature T4≥6℃, or when the inlet water temperature ≥8℃, exit the first level anti-freezing protection;

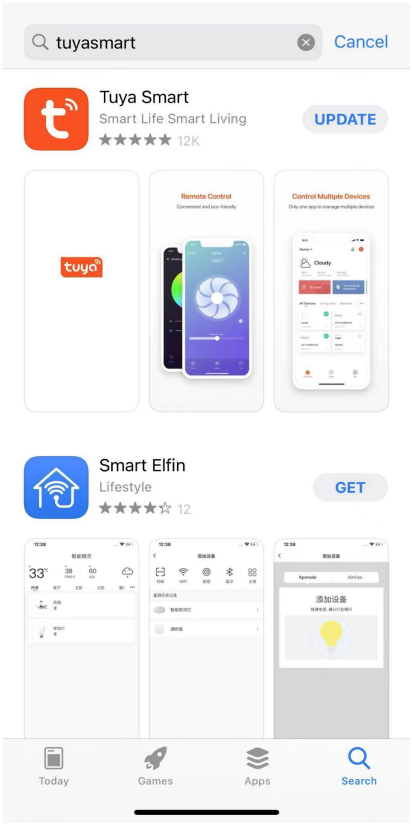
(2) When the outdoor temperature T4≤4℃, and inlet water temperature ≤2℃, the system enters the secondary antifreeze status, and automatically turns on heating until the outdoor ambient temperature T4≥6℃, or the inlet water temperature ≥15℃, exit the secondary antifreeze protection;

Note:

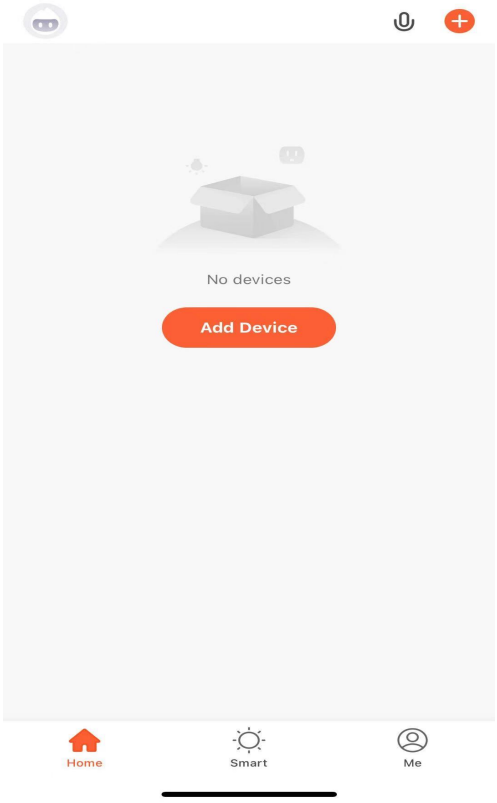
When the heat pump unit is outside with low ambient temperature <2℃, please keep the power on, the built-in antifreeze function of the machine can operate normally to protect the machine from being damaged by freezing.

7.WIFI connection (Press "▼" for 3 seconds, the "wifi" Start flashing. If "wifi" slakes, press "▼" to active. The "wifi" is always on, it means successfully matched. It is recommended to turn on Bluetooth and then connect to wifi)

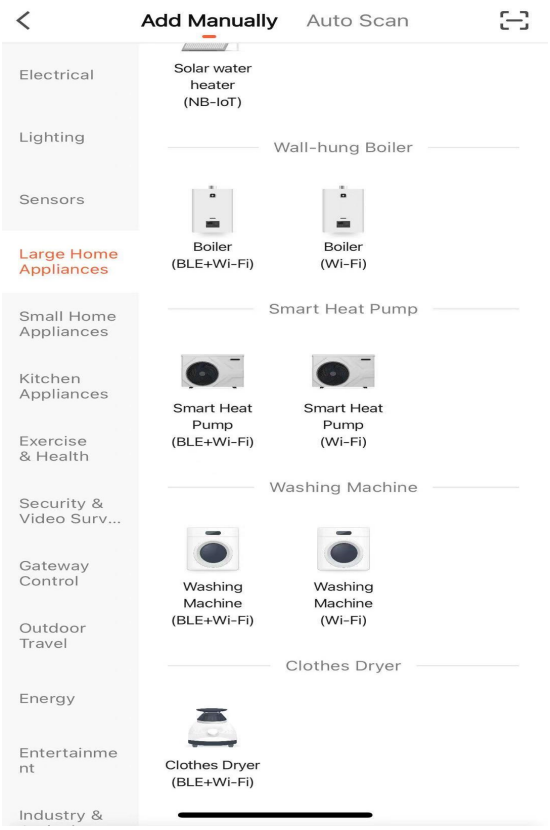
1) Search the "Tuya Smart" in store



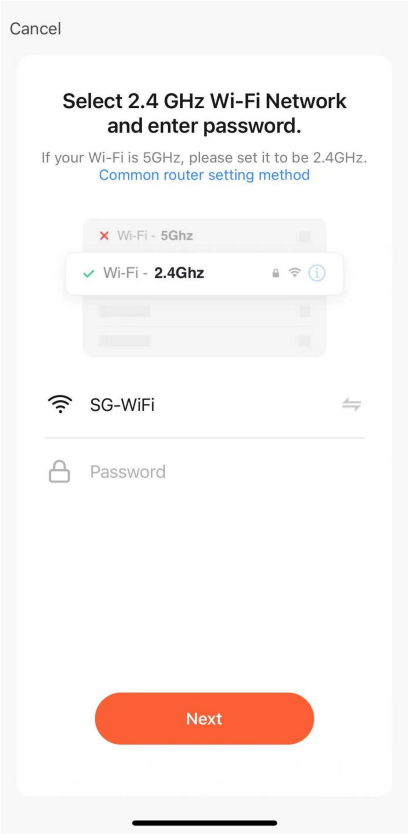
2) Open Tuya Smart APP and choose to add device



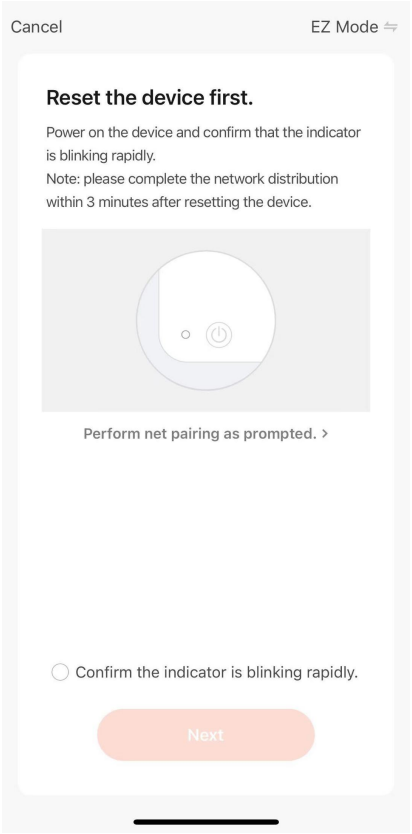
3) Choose large home appliances/smart heat pump(wifi)



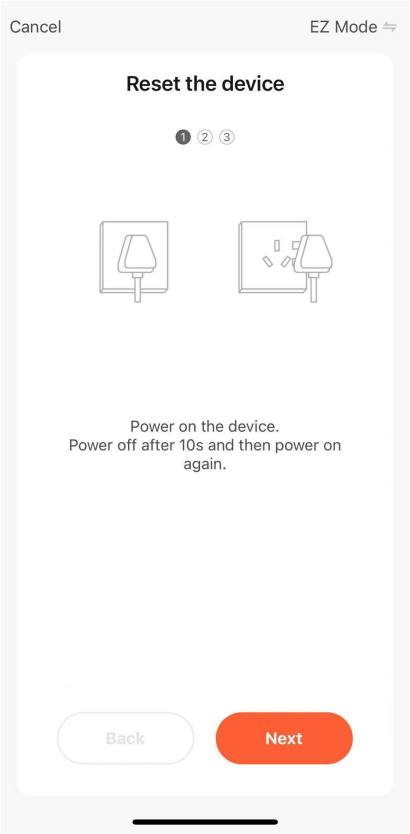
4)Input wifi password,then go to next



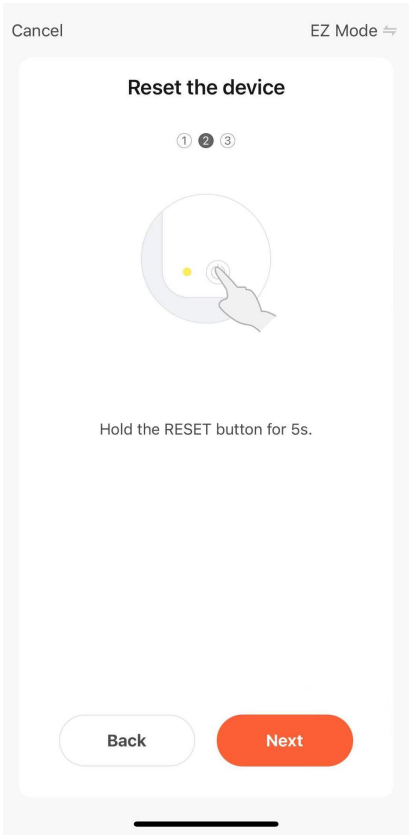
5)perform net pairing as prompted



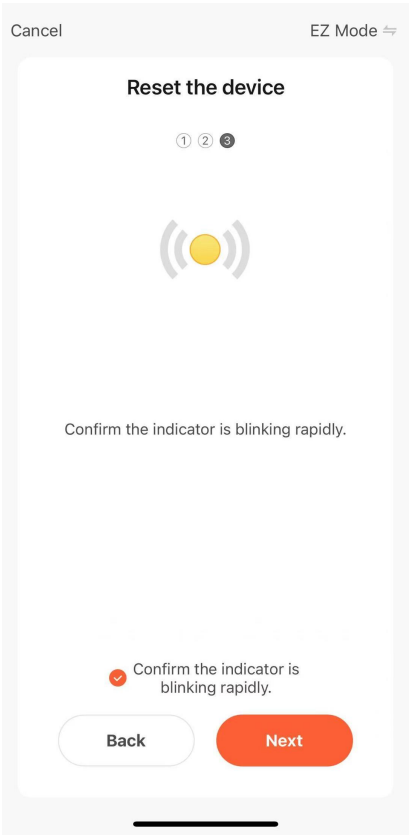
6)As the app steps, then next



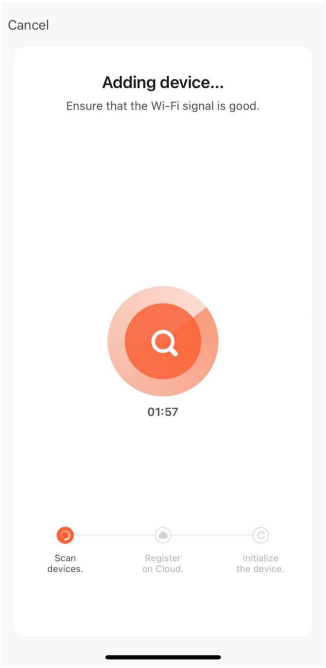
7)hold the reset button for 5S



8)Confirm that the indicator on the display of the main unit flashes and press Next



9)The App will automatically search for the connectable heat pump host for connection. After the connection is completed, you can operate the basic functions of the device on the APP, switch the machine, mode settings, water temperature adjustment, etc.



4) System parameter query table

Press and hold the M + ▼ key at the same time for 3 seconds to enter the operating parameter query. After entering the parameter query state, press ▲or ▼to switch to display the operating parameters.

In the parameter query state, press the switch or automatically exit after 20 seconds without operation. The parameter description is as follows

No.	Name	Unit	Maximum value	Description
D01	Compressor operating frequency	Hz	0-150	
D02	Compressor operating current	A	0-30	
D03	Exhaust refrigerant temperature	℃	-15-999	
D04	Return refrigerant temperature	℃	-30-999	
D05	Evaporator coil temperature	℃	-30-999	
D06	Outdoor ambient temperature	℃	-30-999	
D07	Inlet water temperature	℃	-15-999	
D08	Outlet water temperature	℃	-15-999	
D09	Main electronic expansion valve steps	P	0-500	
D10	DC-link voltage	V	0-500	
D11	Module temperature	℃	-15-999	
D12	EVI inlet temperature	℃	-30-999	
D13	EVI outlet temperature	℃	-30-999	
D14	EVI expansion valve steps	P	0-500	
D15	High pressure sensor pressure	Mpa*100	0-100	1.1MPa shows 110
D16	Low pressure sensor pressure	Mpa*100	0-100	1.1MPa shows 110
D17	Fan speed	Rpm	0-999	
D18	Inlet temperature of internal heat exchanger	-30-999	-30-999	
D19	Outlet temperature of internal heat exchanger	-30-999	-30-999	
D20	Bypass electric valve status	℃	0/1	
D21	EVI valve status	℃	0/1	
D22	Floor drying time	h	0-168	
D23	Indoor ambient temperature	℃	-30-999	
D24	Indoor coil temperature	℃	-30-999	
D25	Motherboard software version number			
D26	Motherboard software check code			
D27	Driver software version number			
D28	Variable frequency driver input current			
D29	Grid input voltage			
D30	Fault history 1			
D31	Fault history 2			
D32	Fault history 3			
D33	Fault history 4			
D34	Fault history 5			

5) Controller parameters query and setting table

No	Setting data description	Unit	Range	Defaults	Remarks
1	Power-off memory mode	-	On=1 OFF=0	1	
2	Temperature unit conversion	-	C=0 F=1	0	C: Celsius temperature; F: Fahrenheit temperature
3	Fan coil	-	0: invalid 1: valid	1	When this setting is 0, the cooling mode is invalid.
4	Link switch	-	0: invalid 1: valid	1	When the fan selection is invalid, it will be automatically adjusted to 0
5	Heating mode	-	0: fan coil 1: floor heating	1	At 0, the linkage is effective, at 1, the linkage is only effective for cooling
6	Energy saving function	-	0: invalid 1: valid	0	
7	Emergency mode	-	0: invalid; 1: valid	1	
8	Electric heating start outer ring temperature	℃	-21 To 10	-15	When set to -21 degrees, the electric heating function is turned off (protection function)
9	Water pump anti-rust function	-	0: invalid 1: valid	0	The pump runs regularly during standby
10	Heating high water temperature	℃	40-80	46	
11	Cooling low water temperature	℃	10-20	12	
12	Lock key		0: invalid 1: valid	0	
13	Heating mode symbol		0: invalid 1: valid	1	
14	DHW mode symbol		0: invalid 1: valid	1	
15	DHW+cooling mode symbol		0: invalid 1: valid	1	
16	DHW+Heating mode symbol		0: invalid 1: valid	1	

17	Cooling minimum set temperature	℃	6-20	10	
18	Heating max set temperature	℃	20-60	55	
19	Stop operating temperature when heating reaches the temperature point	℃	-5-5	1	
20	Stop operating temperature when cooling reaches the temperature point	℃	-5-5	-1	
21	Starting temperature point of heating mode	℃	-10-10	-3	
22	Starting temperature point of cooling mode	℃	-5-5	3	
23	Hot water maximum set temperature	℃	20-90	60	
24	Reserved				
25	Reserved				
26	Reserved				
27	Cumulative heating time setting value minute	Min	1-120	45	
28	Setting the maximum defrost time for defrosting operation	Min	1-25	8	
29	Exit defrost temperature	℃	1-25	12	
30	Reserved				
31	Reserved				
32	Reserved				
33	Reserved				
34	Reserved				
35	Maximum heating frequency (Hz)	Hz	30-120	90	
36	Maximum cooling frequency (Hz)	Hz	30-120	80	
37	Minimum heating frequency (Hz)	Hz	30-60	30	
38	Minimum cooling frequency (Hz)	Hz	30-60	30	
39	Maximum opening of main electronic expansion valve	Pulse	0-480	480	
40	Maximum opening of auxiliary electronic expansion valve	Pulse	0-480	450	
41	Minimum opening of main electronic expansion valve	Pulse	0-480	70	
42	Minimum opening of auxiliary electronic expansion valve	Pulse	0-480	80	
43	Ambient temperature of enthalpy	℃	-21-20	-2	When set to -21 degrees, the enthalpy

	increase solenoid valve opening				increase function is closed
44	Opening frequency of enthalpy increase solenoid valve	Hz	30-100	40	
45	Water pump operating way after reaching temperature	-	0-2	1	0-continuous operation; 1-Open for 1min and stop for 3min; 2-Reserved;
46	Heating return refrigerant target over-heat value 1	-	-99-100	30	
47	Cooling return refrigerant target over-heat value 1	℃	-99-100	50	
48	Cooling return refrigerant target over-heat value 2	℃	-99-100	50	
49	Economizer target over-heat value	-	-99-100	8	
50	Reserved				
51	Reserved				
52	Reserved				
53	Reserved				
54	Four-way valve power method	-	1=Electricity for heating 0=cooling power	0	
55	Hot water three-way valve	-	1=enable 0=disable	1	
56	Target low pressure value	Kpa		5	

Notice The above operating parameters have been adjusted to the best state according to the laboratory test results before leaving the factory. If there is no special requirement, please do not adjust the above parameter values to prevent the machine from being unable to operate normally or even being damaged due to parameter changes.

6) Fault code table

No.	Error meaning	Code	Remark
1	Under/over voltage protection	P1	
2	Over current protection	P2	
3	Outdoor fan module protection	P3	
4	Refrigerant exhaust temperature too high protection	P4	
5	Cooling mode anti-overcooling protection	P5	
6	Heating mode anti-overcooling protection	P6	
7	Outdoor temperature is too high or too low protection	P7	
8	Over-temperature protection of refrigeration coil	P8	
9	Abnormal temperature difference between suction and exhaust or abnormal compression ratio	P9	
10	Module protection	P0	

11	Inverter compressor failure	PA	
12	Insufficient refrigerant	PC	
13	Wire controller communication failure	E0	
14	Phase sequence protection failure	E1	
15	Inner coil temperature sensor failure	E2	
16	Outer coil temperature sensor failure	E3	
17	High pressure sensor failure	E4	
18	Low pressure sensor failure	E5	
19	Four-way valve reversal failed	E6	
20	Outdoor temperature sensor failure	E7	
21	Refrigerant exhaust temperature sensor failure	E8	
22	Inverter driver/module failure	E9	
23	Current sensor failure	EA	
24	Outdoor unit communication failure	EC	
25	Wire controller EEPROM failure	Ed	
26	Outdoor unit EEPROM failure	EE	
27	Outdoor fan failure	EF	
28	Refrigerant return temperature sensor failure	EH	
29	Voltage sensor failure	EU	
30	The temperature sensor at the inlet of the sub-cooler is faulty	F0	
31	The temperature sensor at the outlet of the sub-cooler is faulty	F1	
32	High pressure protection	H1	
33	Low pressure protection	H2	
34	Inlet water temperature sensor failure	d2	
35	Out water temperature sensor failure	d4	
36	Water flow switch protection	d1	
37	Inlet and outlet water temperature difference protection	d5	
38	Anti-freezing in winter failure 1	d6	
39	Anti-freezing in winter failure 2	d7	
40	Water temperature over/under protection	d8	
41	Floor drying function is on	Hd	
42	Hardware overcurrent-1	J1	
43	Inverter module overheat-3	J2	
44	PFC hardware overheating-4	J3	
45	PFC instantaneous overcurrent-5	J4	
46	Speed lost-7	J5	
47	DC bus overvoltage-8	J6	
48	DC bus undervoltage-9	J7	
49	Output phase loss -10	J8	
50	Motor low speed overcurrent-11	J9	
51	Co-directional speed protection-17	JA	
52	Inverter output instantaneous over current -21	JH	
53	Input voltage is too high -23	JC	

54	Input voltage is too low-24	JL	
55	Inverter current effective value overcurrent-27	JE	
56	Input phase loss-29	JF	
57	Over speed protection -30	JJ	
58	Motor high-speed over current -31	U1	
59	PFC hardware overcurrent-38	U2	
60	Non-operation transient current is too large -39	U3	
61	DC fan 1 failure-41	U4	
62	DC fan 2 failure-47	U5	
63	IGBT short circuit protection-42	U6	
64	Communication failure-43	U7	
65	The input power is abnormal -44	U8	
66	New I2t instantaneous over current -45	U9	
67	New current effective value over current -46	UA	
68	Abnormal running output current -51	UH	
69	Other failures	UC	
70	Water tank temperature sensor failure	d3	

VI. Maintenance & Repair

- **Daily inspection**

1. Check whether the key of the controller is sensitive or a fault code displayed
2. Before power on, please check the temperature parameters, switch status, and load output.

A. There shouldn't have a big difference between the temperature displayed and the real ambient temperature.
B. It is the normal status that the high-voltage and low-voltage switches are often closed, and the water flow switches are often open.
C. Load display off

3. Check whether the voltage is normal before operating.
4.After starting up, check whether the water pressure is normal, listen to whether working with abnormal noise. After running smoothly, please check whether the current is in accordance with the nameplate.
5. Check whether the parameters are within the normal range after running.

- **Maintenance of the main components.**

1.Compressor: open the box, check whether the terminals are fixed tightly without rusty, and check whether the resistance of three-phase winding is the same.
2. Fins: check whether the evaporator fin is blocked, and clean it timely.
3. Heat exchanger: check whether there are scales, and clean the scales timely.
4.The motor has been lubricated and sealed in advance before left the factory, therefore lubrication is not

needed during maintenance.
5.After a long time of operation, the heat transfer surface of the waterside heat exchanger will be deposited with calcium oxide and other minerals because of the high-temperature water outlet. If these minerals fouling too much on the heat transfer surface, it will affect heat transfer performance, so please regularly clean it.

- **Maintenance of main electrical parts**

1.Air switch, AC contactor and relay inspection: whether the terminal is tight, rusty and burnt. Close the switch and check whether the input and output of each phase are connected;
2.Whether the AC contactor and relay coil are sensitive and on-off closed completely.
3.Capacitance: check whether it bulges or leaks oil
4. Motherboard: check whether the power light is on, whether the fuse is burnt out, and whether there are black burnt spots on the board.
5.Transformer: check whether the primary voltage and secondary voltage are consistent with the nameplate
6.Periodically inspect the electrical connection and monitor the operating voltage, operating current, and phase balance. Regularly check the reliability of the electrical components, replace the expired and unreliable parts timely.

- **Maintenance of main waterway parts.**

1. Water supply device: check whether the water supply pressure is more than 2kg and the check valve is stuck
2. Filter device: check whether the filter is dirty and blocked, and clean it regularly
3. Exhaust device: check whether it can exhaust normally. If it cannot exhaust normally, remove and clean the inside of filter.
4. Water pump device: check whether it runs smoothly, whether the rotation direction is correct.
5.Descaling for DHW, the closed water pipeline is no need of descaling.
6.To supplement pipes must add Y-filter to prevent blocks of condenser or pipeline; Descaling material can be formic acid, citric acid, and acetic acid, etc. acid or fluoride sanitizers can't be used, because they will corrode waterside heat exchanger (material is stainless steel)

- **Refill refrigerant**

Whether need to refill the refrigerant depend on the value of exhaust/suction pressure. The air-tight test should be done. In case of leakage or replacements of the components of the circulate system,in accordance with the following two situations to refill the refrigerant.

1. The refrigerant leak completely

If this happens, you must use 40Kgf/cm2r high-pressure nitrogen or a small amount of refrigerant to do leak detection. Before repair welding, the gas in the system must be drained. Before refill the refrigerant, the system must be thoroughly dried and vacuum.

a、Connecting the vacuuming pipe to the refrigerant injection needle valve of the low-pressure side. Use a vacuum pump to evacuate the system for more than 15 minutes. Then confirm if the vacuum gauge shows at －1.0×105Pa（－76cmHg）.

b、After achieving the required vacuum effect, filling the refrigerant to the system with a refrigerant bottle. On the nameplate and main technical parameters, we have marked the suitable refrigerant. Make sure to fill the refrigerant at the low-pressure side of the system.

c、The refilling refrigerant quantity subject to the ambient temperature. If you do not meet the required filling quantity and cannot filling longer, you can turn on the machine, then starting filling continuously from the low-pressure side, in the meantime must prevent damage from the liquid refrigerant.

2. Refill the Refrigerant

Connecting the refrigerant bottle at the refrigerant injection needle valve of the low-pressure side and connecting the pressure gauge at the low-pressure side. Then turn on the machine, filling the refrigerant into the system slowly, and inspect the high and low pressure.

▲Warning: When doing leakage hunting and air-tight test, only high-pressure nitrogen and refrigerant is allowed to use. Filling oxygen, acetylene, or other flammable or toxic gases is strictly forbidden.

- **System anti-freezing**

1. After power failure, the unit will not start automatically, then the antifreeze function cannot be started.
2. If it is not needed in a short time, antifreeze can be added into the water system
3. If he machine is not used for a long time,please drain all the water in the system, and then disconnect power supply（ Drain water from the lowest position of water pump and heat exchanger)
4. Know clearly how to choose antifreeze and its volume.

- **If the unit has been shut down for a long time, the following preparations should be made when it starts up again.**

1. Thoroughly inspect and clean the unit
2. Clean the water pipe system
3. Check water pump, regulating valve and other equipment of water pipe system etc.
4. Check whether all the wire connections are tight and correct.
5. Please power on and preheat machine for more than 12 hours.
6.Do not add water to the system during preheat. After preheat, let the water pump heat up first, and then start to supplement water.

- **Replacement of spare parts.**

If the spare parts are damaged or need to be replaced. Original spare parts should be used.Any other

different replacement is not allowed.
Please contact us to buy original parts(out of warranty)

.● System maintenance

Malfunction analyze and eliminating

Phenomenon	Reason		Check	Clear
Machine does not work	Power cut/outage		Measure the voltage of circuitry	Wait for power resume
	The operation panel has display, but machine can not turn on, key failure	Operation panel lines not connected	Check the circuitry	connect
		Operation panel damaged	Substitution method	Replace operation panel
		disturbed	Check the source of interference	Clear the source of interference
			If the line lengthened by the non-shielded cable	Replace the line(use shielded cable)
		Low voltage	Check the circuitry voltage	Replace the line or increase voltage stabilizer
		PCB damaged	Substitution method	Replace PCB
Machine does not work	operation panel no display	Transformer damaged	Measure with multi-meter	Replace transformer
		Operation panel lines not connected well	Check the circuitry	Welding with soldering iron
		Operation panel damaged	Substitution method	Replace operation panel
		PCB damaged	Substitution method	Replace PCB
		disturbed	Check the source of interference	Clear the source of interference
			If the line lengthened by the non-shielded cable	Replace the line(use shielded cable)
Fan does not work	Fan blade is stuck		Check the fan blade	Clear foreign body
	The sub High pressure(fan uninstall) system' pressure over high	sub high pressure switch damaged	Check the sub high pressure	Replace(short it)
		Too much refrigerant	Check the pressure	Discharge some refrigerant
		Water system dirty	Check if filter is installed	Clean water system and install filter
			Check water system	Clean water system

		Lack of water flow	Check filter	Clean filter
		Water pump damaged	Check water pump	Replace water pump
		Water flow of water pump is small	Measure the water flow of water pump	Change a bigger water pump
	Without power supply	Power cut off	Measure the circuitry voltage	Wait for power supply
		Circuit breaker	Check the circuitry	Connect the circuitry
		PCB damaged (no output)	Measure the output voltage	Replace PCB
		Transformer damaged	Measure the winding and output voltage	Replace transformer
	Capacitor damaged	Capability become smaller	Check the capability of the capacitor	Replace the capacitor
		open circuit	Measure with multi-meter	Replace the capacitor
		short circuit	Measure with multi-meter	Replace the capacitor
	Motor damaged	Motor winding open circuit	measure the winding	Replace the motor
		Motor winding short circuit	measure the winding	measure the winding
		Motor winding grounding	measure the winding	measure the winding
The compressor does not work	Compressor wiring terminal without power supply(PCB no output)	The machine is power off	Check the operation panel	Power on
		Setting temperature is lower than water	Check setting temperature	Reset
		PCB damaged	Substitution method	Replace PCB
		Transformer damaged	Substitution method	Replace transformer
		Power cut	Measure the circuitry voltage	Wait for power supply
Compressor does not work	Capacitor damaged		Check the capability of the capacitor	Replace the capacitor
	External overload protector damaged		Measure protector resistance	Replace
	Built-in protector	Too much refrigerant	Measure pressure, current and water temperature	Discharge some refrigerant

	Built-in protector	Too little refrigerant	Measure pressure, current and water temperature parameter	Refill refrigerant
		The voltage is low	Measure voltage	Change the lines or increase voltage regulator
		Compressor cylinder jammed	Measure pressure, current and water parameter water temperature	Shunt capacitor, fill refrigeration oil
		Compressor oil shortage, noisy, excessive	Listen to the noisy and test the compressor	fill refrigeration oil
Not defrosting	Defrosting temperature sensor reinstall after broken	Short circuit	Test the resistance	Replace sensor
		Open circuit	Test the resistance	Replace sensor
		Resistance variation	Test the resistance	Replace sensor
	Defrosting temperature sensor loose		Check the sensor	refit
	No frost at the installation site of the defrosting temperature sensor		Visual inspection	Adjust the installation site
	Defrosting detection time is too long		Check the defrosting time	Reset the time
	Defrosting condition setting inappropriate		Setting defrosting temperature too high	Adjust the temperature
	Four way valve does not work	Four way valve coil damage	Measure the winding	Replace the coil
		Four way valve stuck	Knock the four way valve	Replace four way valve
	Four way valve blow-by	Touch and feel for way valve's temp. Measure current and voltage		Replace four way valve
	PCB damaged	Force to defrost, check whether PCB have power output.		Replace PCB

Heat Pump Application Expert

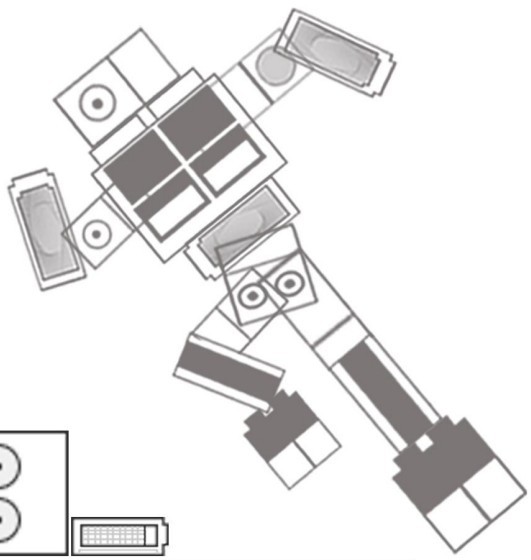
Floor Heating

Radiator

Fan Coil Unit

Shower

Sanitary Hot Water



Constantly innovate and achieve excellent quality!