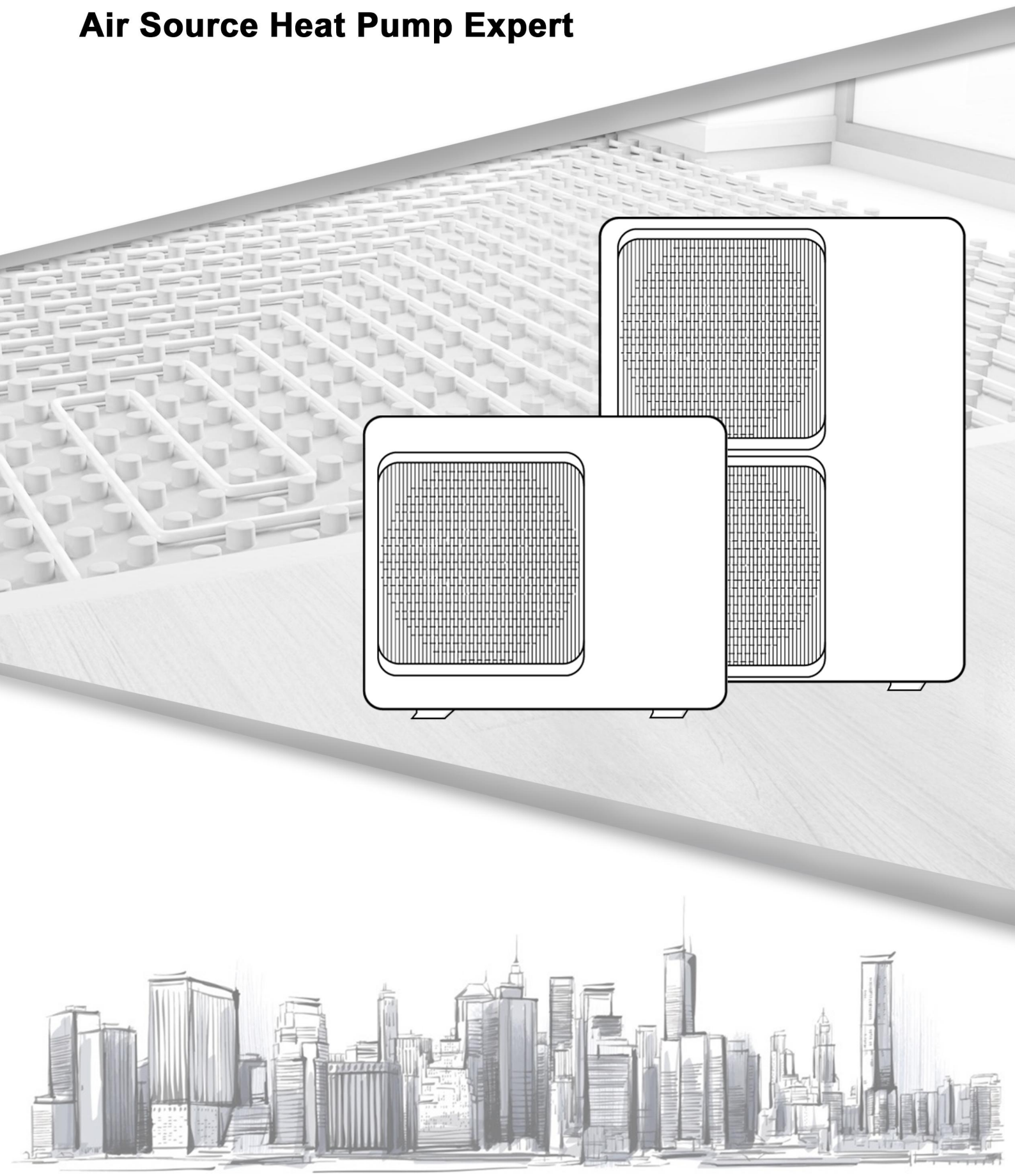
USER MANUAL

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 brand new R290 full inverter & EVI 3 in 1 heat pump for your heating , cooling and domestic 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 80℃, 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.

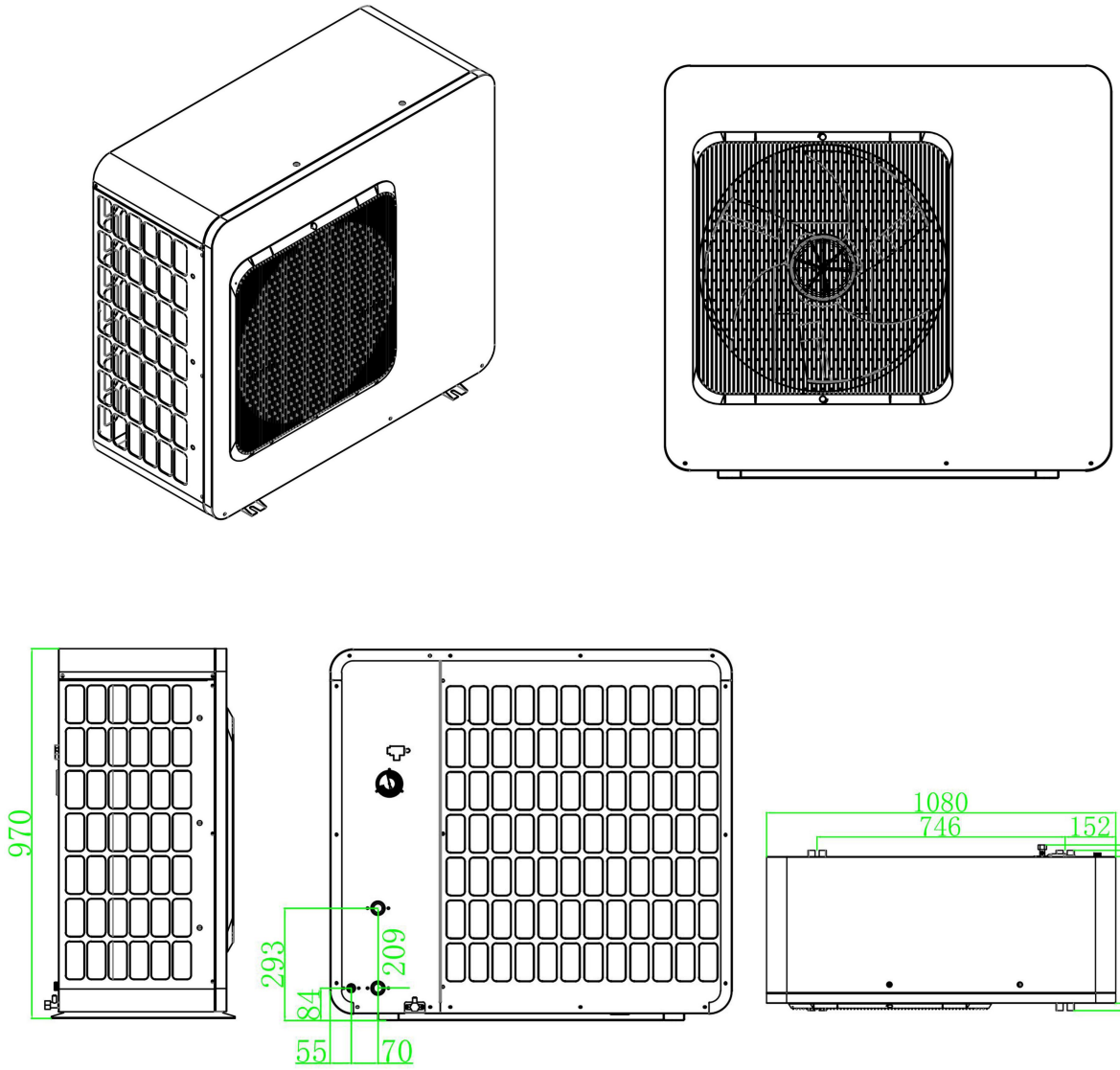
II. Main instruction of product

1. Parameter

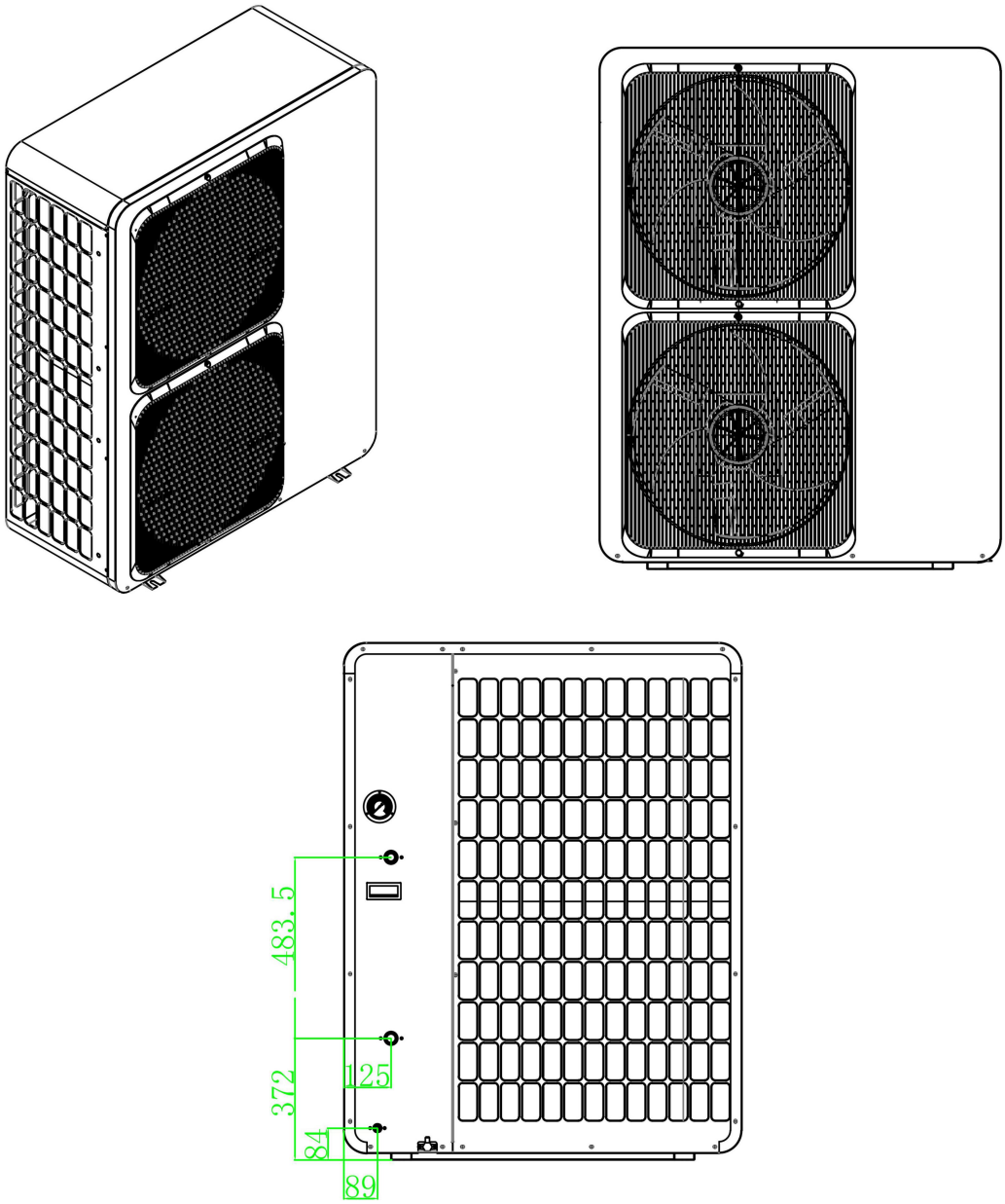
Model	Size(L*W*H mm)	Net Weight(KG)	Power Supply
HD(W) NX 08-29/32EA	1080x499x970	105	220V&380V- Inverter- 1N&3N
HD(W) NX 11-29/32EA	1080x499x970	112	220V&380V- Inverter- 1N&3N
HD(W) NX 14-29/32EA	1080x499x1365	145	220V&380V- Inverter- 1N&3N
HD(W) NX 19-29/32EA	1080x499x1365	150	220V&380V- Inverter- 1N&3N

2. Appearance

HD(W) NX 08-29/32EA & HD(W) NX 11-29/32EA Net Size.



HD(W) NX 14-29/32EA & HD(W) NX 19-29/32EA Net Size.



3.Specifications

Unit	**Brand New R290 Full Inverter 3 in 1 Heat Pump**			
Model	HD(W) NX 08-29/32EA		HD(W) NX 11-29/32EA	
Waterproofing grade	IPX4		IPX4	
Leakage protection	Class I		Class I	
Power source	220V-Inverter-1N	380V-Inverter-3N	220V-Inverter-1N	380V-Inverter-3N
Heating capacity(A7C/W35C)	10000W		12800W	
Input power(A7C/W35C)	2410W		2970W	
DHW capacity(A7C/W55C)	9500W		11300W	
Input power(A7C/W55C)	3150W		3600W	
Cooling capacity(A35C/W18C)	10000W		11000W	
Input power(A35C/W18C)	2950W		3600W	
Auxiliary element power	3000W		3000W	
Auxiliary element current	14A	7.5A	14A	7.5A
Max input power (module)	4200W	5000W	4200W	5000W
Max input current (module)	30A	25A	30A	25A
Inlet/Outlet diameter	1 Inch	1 Inch	1 Inch	1 Inch
Water pump	SHIMGE APF25		SHIMGE APF25	
Max water pump head	12 meters		12 meters	
Expansion tank	5L		5L	
Rated water flow	1.7 m3/h		2.1 m3/h	
Refrigerant	R290		R290	
Net weight	105kg		112kg	
Noise	≤51dB(A)		≤51dB(A)	
Inlet/outlet gas max working pressure	3.7MPa		3.7MPa	
High/low pressure max working pressure	3.7MPa		3.7MPa	
Heat exchanger max working pressure	3.7MPa		3.7MPa	

Note: the testing condition is based on heat pump input only without the additional heater input.

Unit	**Brand New R290 Full Inverter 3 in 1 Heat Pump**			
Model	HD(W) NX 14-29/32EA		HD(W) NX 19-29/32EA	
Waterproofing grade	IPX4		IPX4	
Leakage protection	Class I		Class I	
Power source	220V-Inverter-1N	380V-Inverter-3N	220V-Inverter-1N	380V-Inverter-3N
Heating capacity(A7C/W35C)	16000W		19000W	
Input power(A7C/W35C)	3750W		4530W	
DHW capacity(A7C/W55C)	15500W		16800W	
Input power(A7C/W55C)	5000W		5500W	
Cooling capacity(A35C/W18C)	14000W		16500W	
Input power(A35C/W18C)	4260W		5400W	
Auxiliary element power	3000W		3000W	
Auxiliary element current	14A	7.5A	14A	7.5A
Max input power (module)	6000W	5000W	6000W	5000W
Max input current (module)	50A	25A	50A	25A
Inlet/Outlet diameter	1 Inch	1 Inch	1 Inch	1 Inch
Water pump	SHIMGE APF25		SHIMGE APF25	
Max water pump head	12 meters		12 meters	
Expansion tank	5L		5L	
Rated water flow	2.7 m3/h		3.1 m3/h	
Refrigerant	R290		R290	
Net weight	145kg		150kg	
Noise	≤53dB(A)		≤53dB(A)	
Inlet/outlet gas max working pressure	3.7MPa		3.7MPa	
High/low pressure max working pressure	3.7MPa		3.7MPa	
Heat exchanger max working pressure	3.7MPa		3.7MPa	

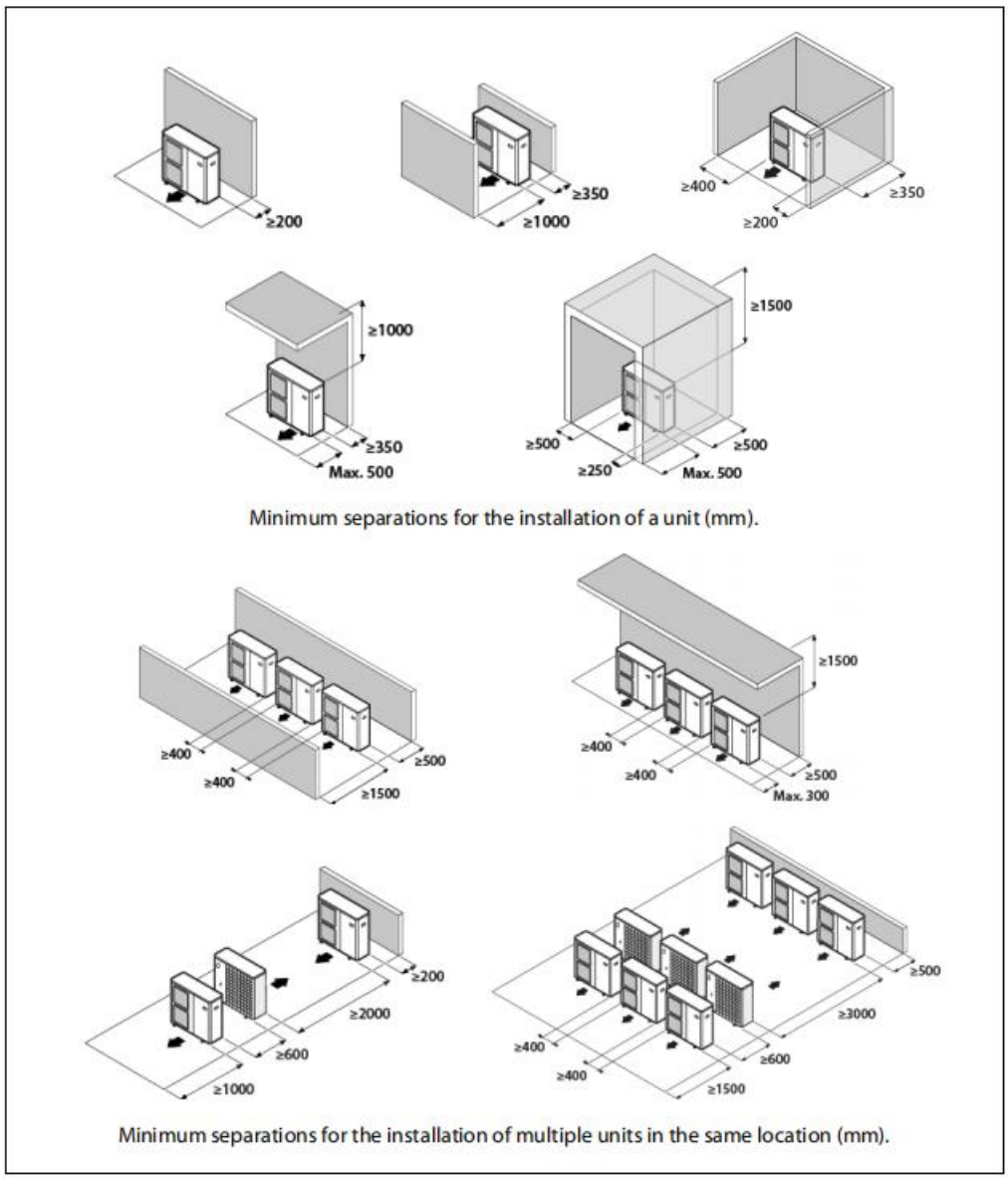
Note: the testing condition is based on heat pump input only without the additional heater input.

III. Installation

1.Heat pump installation

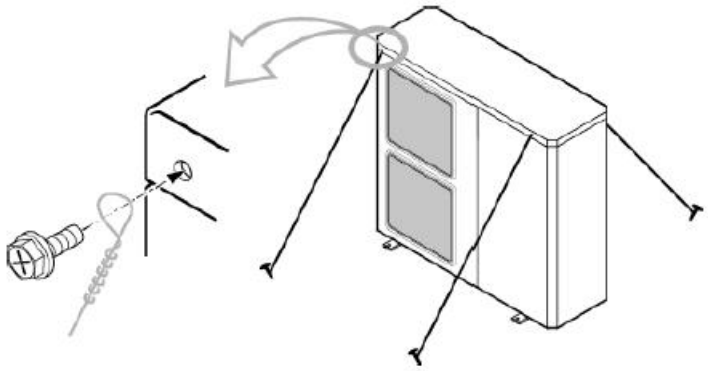
(1) Installation location

◆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.

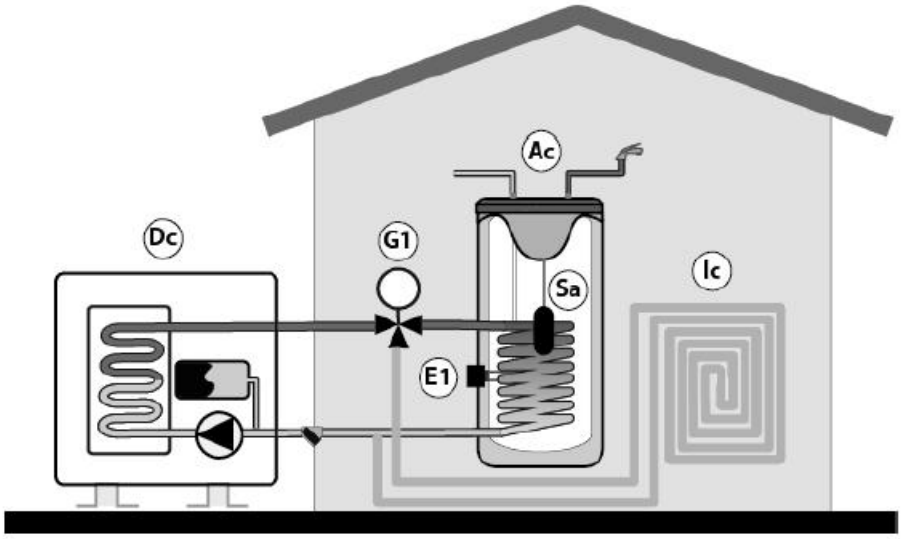
◆The distance between the pipes is 150-200mm;

◆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

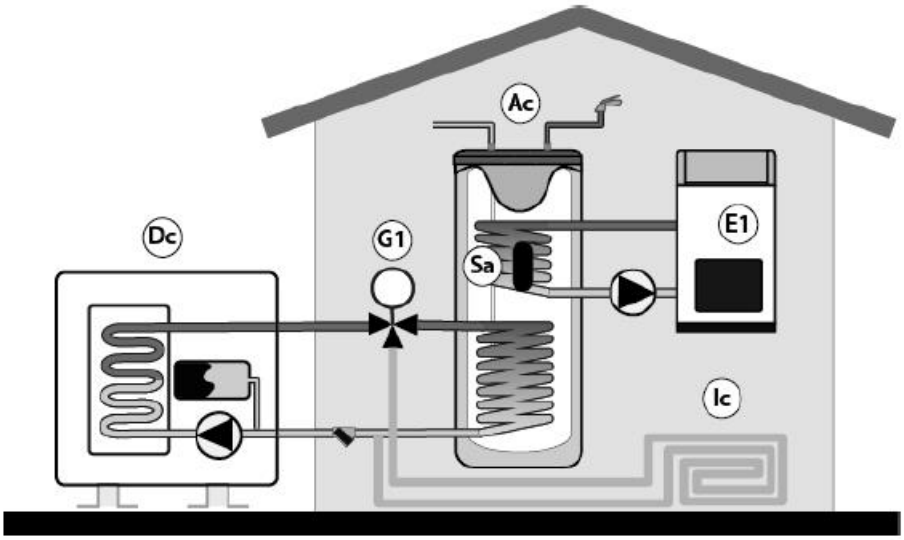
◆The heat pump may include (optionally) in its installation a tank for the production of domestic hot water. The hydraulic installation of the tank must be made by qualified personnel, subject to the applicable installation legislation and attached instructions of the tank.

◆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.

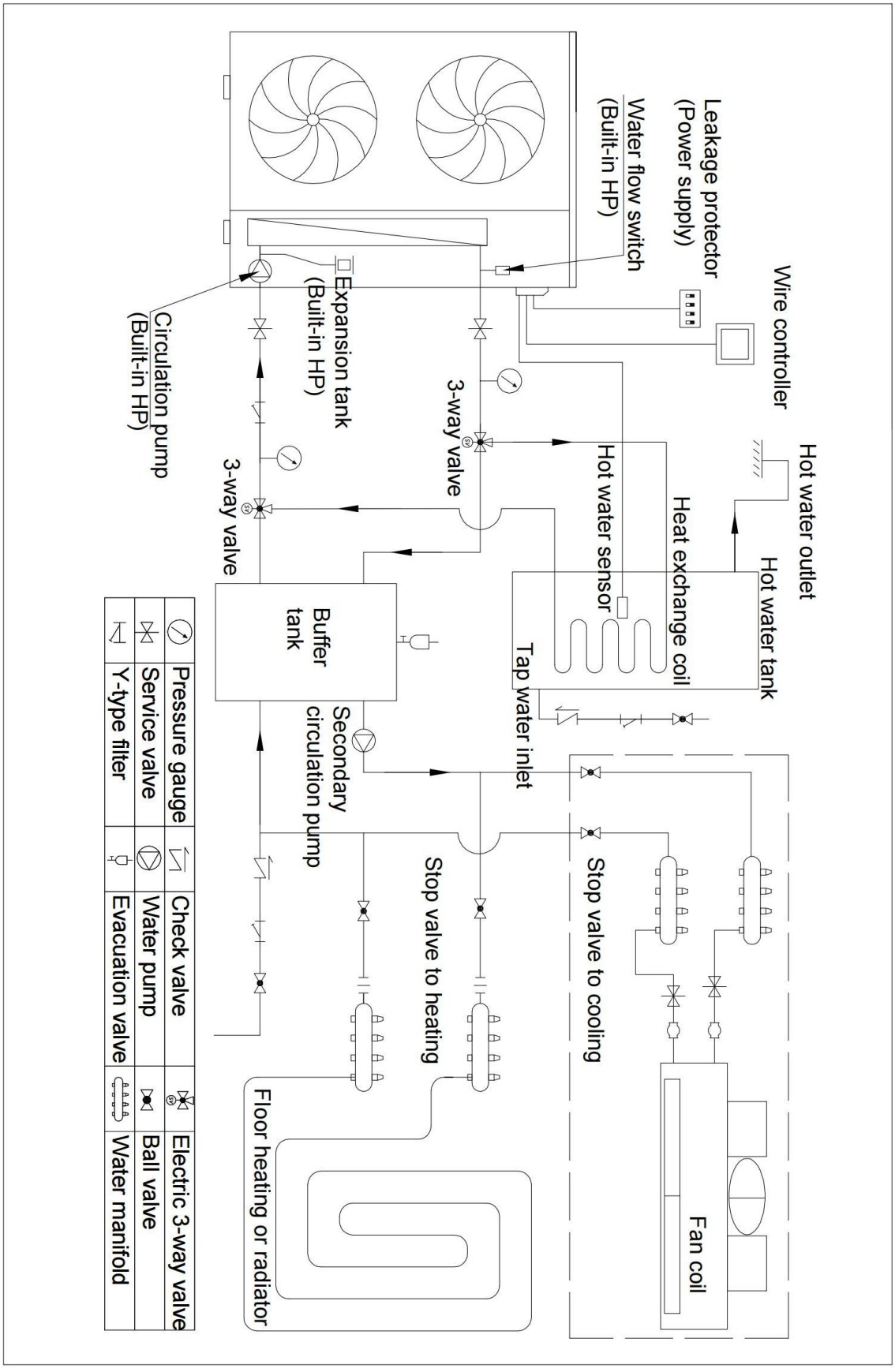
If the minimum circulation flow is not reached by the heat pump, it will be blocked, and an alarm code will be displayed on the controller display. According to the different capacity model installed, these volume will be:

	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.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 heat pump, always ensure it is disconnected from the mains.

IV. Trial running

1.Trial running must be 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 ☐

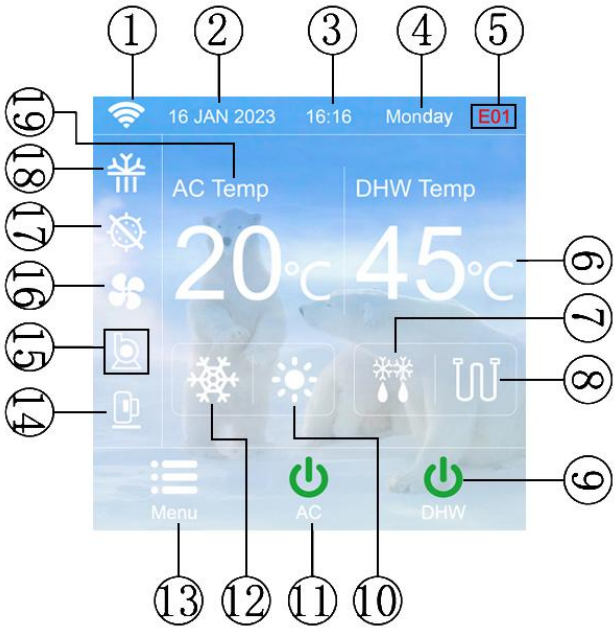
3.After check and ensure correct, then power on. If the control panel display nothing, that should recheck and tight the line of control panel. The control panel should display time, setting temperature and the current temperature.

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



2.Definition

(1) WIFI display: turn on (green); turn off (gray).
(2) Date display: light up (white).
(3) Clock display: light up (white).
(4) Week display: light up (white).
(5) Fault display (query button): light up (red),then click to check detailed fault information.
when there is no fault, there is no display content.
(6) DHW temperature display (target temperature setting button): light up (white), and click to enter the temperature setting page.
(7) Defrost display (forced defrost button): normal defrost lights up (green), click to enter forced defrost, then lights up (red).
(8) Electric heating display (manual electric heating button): normally turn on electric heating then light up (green),click to enter manual electric heating,then light up (red).
(9) DHW function on/off button: turn on (green); turn off (gray).
(10) Heating mode button: turn on (green); turn off (gray).
(11) AC function on/off button: turn on (green); turn off (gray).
(12) Cooling mode button: turn on (green); turn off (gray).
(cooling and heating cannot be effective at the same time).
(13) Menu button: light up (white), click to enter the menu.
(14) Compressor display: turn on (white); turn off (gray).
(15) External DHW circulation water pump: turn on (white); turn off (gray).
(16) Fan display: turn on (white); turn off (gray).
(17) Sterilization display: turn on (white); turn off (gray).
(18) Anti-freezing display: turn on (white); turn off (gray).
(19) AC temperature display (target temperature setting button): light up (white); click to enter the temperature setting page;

3. Working mode

3.1 Cooling mode,

3.2 Heating mode,

3.3 DHW mode,

3.4 Cooling+DHW mode,

3.5 Heating+DHW mode.

4. Temperature setting

4.1 AC temperature setting

Turn on the AC mode,select cooling or heating mode,then click the AC temperature number, enter the temperature setting interface as shown below;

4.2 Click the + or - button to adjust the target temperature value, and then click the temperature number again to confirm and save and exit the temperature setting.

Cooling temperature range: 10~26°C;

Heating temperature range: 10~75°C (AU); (automatic temperature curve)

AU explains: water temperature will be changed by the environment automatically.

4.3 DHW temperature setting

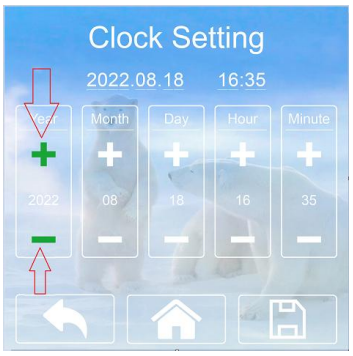
Turn on DHW mode, click the hot water temperature number to enter the temperature setting interface as shown in the figure below;

click the + or - button to adjust the target temperature value, and then click the temperature number again to confirm and save and exit the temperature setting.

Hot water temperature range: 10~70°C (AU);

5. Time adjustment

Click Menu to enter the menu interface,click Clock Settings to enter the time adjustment interface,click + and - to adjust the appropriate time, and then click save.



6.Timer setting

6.1 Click menu to enter the interface,click timer settings to enter the timer setting interface, click the [○] button to enter the corresponding time period setting:

6.2 Click the left and right arrow keys on the right side of the [Day] to adjust the boot date,

6.3 Click the left and right arrow keys to the right side of [Turn ON Time] to adjust the turn on time,

6.4 Click the left and right arrow keys to the right side of [Turn OFF Time] to adjust the shutdown time,

6.5 Click the [Cool],[Heat] and [DHW] icons to select the working mode first (Only can choose one for cooling or heating mode),

6.5 Click the left and right arrow keys on the right side of the mode to adjust the set temperature, After the adjustment, click save to take effect.

7.Display setting

7.1 Click menu to enter the setting interface,

7.2 Click Display Setting to enter the display setting interface,select different languages and adjust the brightness of the wire controller on the display Setting page.

Remarks: 6 languages can be selected.

8.WIFI setting

8.1 Click Menu to enter the menu interface.

8.2 Click WIFI setting to enter the WIFI setting interface.

choose whether to reset WIFI on the WIFI Setting page.

9.Working Status Inquiry (check table 1)

9.1 Click Menu to enter the menu interface.

9.2 Click Working Status to enter the operation status query page.

9.3 Click the up or down key to check different operating parameters.

10.Factory setting (check table 2)

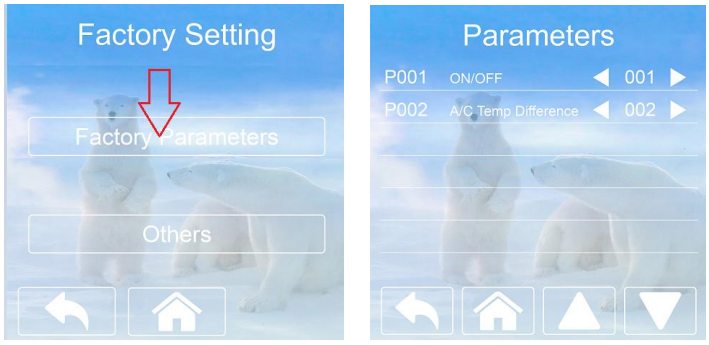
10.1 Click Menu to enter the setting interface.

10.2 Click Factory Setting to enter the factory setting page,enter the password verification page.

10.3 Enter the correct password to enter the Factory Setting page.

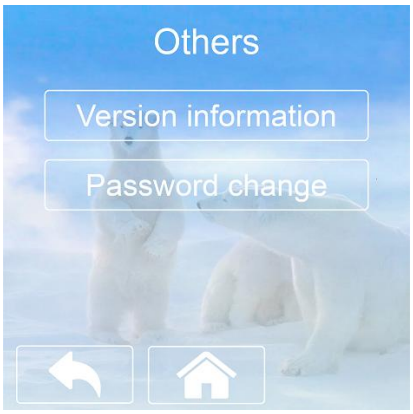
10.4 Click Factory Setting to enter the factory setting page.

10.5 Click the up or down key to find the parameter to be set, and click the left or right arrow next to the parameter to change the parameter value.



10.6 Click Others to enter the setting page.

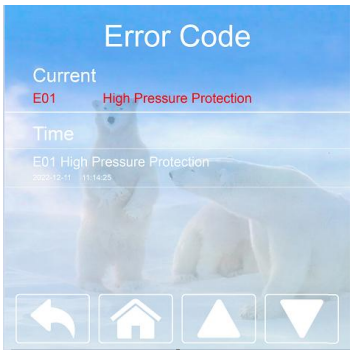
10.7 Click Version Information to check the software version number.



10.8 Click Password Change on Others to enter the setting page, enter the password modification page, and click save after the password is set

11.Error query

Click the red words to enter the error list.



12.DHW pipeline circulation pump setting

12.1 Click the water pump icon to enter the setting interface of the DHW pipeline circulating water pump.

12.2 Click the [○] button to enter the corresponding time period setting:

12.3 Click the left and right arrow keys to the right side of [Day] to adjust the start-up date;

10.4 Click the left and right arrow keys to the right side of [Turn ON Time] to adjust the start-up time;

10.5 Click the left and right arrow keys to the right side of [Turn OFF Time] to adjust the shutdown time;

10.6 Click the left and right arrow keys to the right side of the [water pump] to adjust the set temperature

(Setting 0 degrees means timer water return, if the power on and off time is both set to 00:00, it means water return is based on the temperature different, if there is time value and temperature value, then it is timer and temperature difference to set the water return).
After the adjustment, click save to take effect.

Table 1 (System parameter query table)

No.	Name	Range/Meaning	Data Accuracy	Status
C00	External coil temperature	-30~97℃	0.5℃	Inquire
C01	Exhaust gas temperature	-30~128℃	0.5℃	Inquire
C02	Ambient temperature	-30~97℃	0.5℃	Inquire
C03	Return gas temperature	-30~97℃	0.5℃	Inquire
C04	EVI inlet temperature	-30~97℃	0.5℃	Inquire
C05	EVI outlet temperature	-30~97℃	0.5℃	Inquire
C06	Internal coil temperature	-30~97℃	0.5℃	Inquire
C07	Inlet temperature	-30~97℃	0.5℃	Inquire
C08	water temperature	-30~97℃	0.5°C	Inquire
C09	domestic hot water temperature	-30~97℃	0.5°C	Inquire
C10	hot water pipe temperature	-30~97℃	0.5°C	Inquire
C11	Room temperature	-30~97℃	0.5°C	Inquire
C12	Solar temperature	-30~97℃	0.5°C	Inquire
C13	Outer water flow rate	0~120L/min	1	Inquire
C14	Inner water flow rate	0~120L/min	1	Inquire
C15	Actual overheat degree of main expansion valve	-30~97℃	0.5°C	Inquire
C16	Actual overheat degree of injection enthalpy valve	-30~97℃	0.5°C	Inquire
C17	high pressure	0-5.0MPa	0.1	Inquire
C18	low pressure	0-2.0MPa	0.1	Inquire
C19	High voltage switch status	1(connected);0(disconnect)	1	Inquire
C20	Low voltage switch status	1(connected);0(disconnect)	1	Inquire
C21	Temperature control switch status	1(connected);0(disconnect)	1	Inquire

C22	Internal water flow switch status	1(connected);0(disconnect)	1	Inquire
C23	Outer water flow switch status	1(connected);0(disconnect)	1	Inquire
C24	Cooling switch status	1(connected);0(disconnect)	1	Inquire
C25	Heating switch status	1(connected);0(disconnect)	1	Inquire
C26	Phase sequence state	1(normal);0(wrong phase or lack of phase)	1	Inquire
C27	defrost state	1(defrosting);0(no defrost symbol)	1	Inquire
C28	Sterilize state	1(sterilizing);0(not sterilizing)	1	Inquire
C29	Antifreeze state	1(antifreezing);0(not antifreezing)	1	Inquire
C30	compressor	Display mechanical operating frequency	1	Inquire
C31	outdoor fan1	display speed	1	Inquire
C32	outdoor fan2	display speed	1	Inquire
C33	water pump1 state	1:run;0:stop	1	Inquire
C34	water pump2 state	1:run;0:stop	1	Inquire
C35	water pump3 state	1:run;0:stop	1	Inquire
C36	water pump4 state	1:run;0:stop	1	Inquire
C37	water pump5 state	1:run;0:stop	1	Inquire
C38	bypass valve	1:run;0:stop	1	Inquire
C39	EVI electromagnetic valve	1:run;0:stop	1	Inquire
C40	Four-way valve status	1:run;0:stop	1	Inquire
C41	Air conditioner electric heating status	1:run;0:stop	1	Inquire
C42	Domestic hot water electric heating status	1:run;0:stop	1	Inquire
C43	Crankshaft heater status	1:run;0:stop	1	Inquire
C44	Three-way valve 1 state	1:run;0:stop	1	Inquire
C45	Three-way valve 2 state	1:run;0:stop	1	Inquire
C46	Three-way valve 3 state	1:run;0:stop	1	Inquire
C47	Main expansion valve opening	0-500	1	Inquire
C48	Enthalpy injection expansion valve opening	0-500	1	Inquire
C49	Compressor start and stop times	0-1000	1	Inquire
C50	Compressor running time	0-1000h	1	Inquire
C51	Current working mode	0-AC cooling, 1-AC heating, 2-DHW	1	Inquire
C52	Total defrosting times		1	Inquire
C53	Compressor target frequency		1	Inquire
C54	Compressor input current		0.1A	Inquire
C55	Outdoor unit module temp.		0.5°C	Inquire

C56	Inverter running code1		1	Inquire
C57	Inverter running code2		1	Inquire
C58	Inverter running code3		1	Inquire
C59	Compressor Error Codes		1	Inquire
C60	IPM fan	1:run;0:stop	1	Inquire
C61	Tc		1	
C62	Ts		1	
C63	P		1	
C64	Main board program version	0-9999	1	Inquire
C65	Driver module program version	0-9999	1	Inquire

Table 2 (Controller parameters query and setting table)

No	Setting data description	Range	Default	Remark
P00	On-off	1 - Power on 0 - Power off	0	
P01	Mode	0 AC cooling 1 AC heating 2 DHW 3 Cooling+DHW 4 Heating+DHW	1	
P02	Heating target temperature	10~75℃ (AU)	45℃	
P03	Cooling target temperature	10~25℃	12℃	
P04	Domestic hot water target temperature	10~70℃ (AU)	50℃	
P05	Indoor target temperature	18~35℃	21℃	
P06	AC water temperature difference	1~15℃	2℃	
P07	DHW water temperature difference	2~15℃	3℃	
P08	Domestic hot water AU option	0-Disabled 1-enable	0	
P09	Hot water max frequency	2~10	10	
P10	Sterilization interval days	1~99 days	7	
P11	Sterilization start time	0~23:00	1	
P12	Sterilization running time	5~99 point	10	
P13	Sterilization temperature	50~75°C	70	
P14	Force sterilization	0-No execution 1-Execution 2-Sterilization function is invalid	0	
P15	Domestic hot water function selection	0-invalid 1-valid	1	
P16	Hot water circulation pump working mode	1 timing	3	

		2 temperature difference 3 timing + temperature difference		
P17	Hot water circulating pump starting temperature difference	4~20℃	5°C	
P18	Heating AU maximum temperature	35~50℃	45℃	
P19	Heating AU offset temperature	-15~15℃	0℃	
P20	Air conditioner heating AU switch	0-Disabled 1-enable	0	
P21	Night run mode starting time	0~23 hours	22	
P22	Night run mode stop time	0~23 hours	6	
P23	Night run mode active option	0-Disabled 1-enable	0	
P24	Water pump working mode	0 (Never stop) 1 (stop at temperature) 2 (stop for 15 minutes, open for 1 minute)	0	
P25	Water pump antifreeze time	5~50 minutes	30	
P26	Water pump speed regulation temperature difference	3~8℃	5℃	
P27	PWM water pump minimum speed	2~8,correspond20~80%speed	4	
P28	Ambient temperature of electric auxiliary heat start of air conditioner	-30~20°C	0	
P29	Hot water and electric auxiliary heat start ambient temperature	-30~20°C	0	
P30	Electric heating stop offset temperature	1~15°C	2	
P31	E2 connection port function definition	0: electric heating; 1: second heat source	0	
P32	Second heat source starting temperature	-30~20°C	-15°C	
P33	Air conditioner antifreeze temperature	-15~5°C	3	

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.

Table 3 (Error code table)

No.	Error meaning	Code	Remark
1	Outdoor air temp sensor error	E1	Outdoor air temp sensor open circuit or short circuit
2	Coil temp sensor error	E2	Coil temperature sensor open circuit or short circuit
3	Suction temp sensor error	E3	Suction temp sensor open circuit or short circuit
4	Discharge temp sensor error	E4	Discharge temp sensor open circuit or short circuit
5	Liquid refrigerant temp sensor error	E5	Sensor open circuit or short circuit

6	EVI inlet temp sensor error	E6	EVI inlet temp sensor open circuit or short circuit
7	EVI outlet temp sensor error	E7	EVI outlet temp sensor open circuit or short circuit
8	DHW temp sensor error	E8	DHW temp sensor open circuit or short circuit
9	A/C outlet temp sensor error	E9	A/C outlet temp sensor open circuit or short circuit
10	A/C inlet temp sensor error	E10	A/C inlet temp sensor open circuit or short circuit
11	Indoor air temp sensor error	E11	Indoor air temp sensor open circuit or short circuit
12	Solar temp sensor error	E12	Solar temp sensor open circuit or short circuit
13	DHW pipe temp sensor error	E13	DHW pipe temp sensor open circuit or short circuit
14	High pressure sensor error	E14	1.sensor fault 2.open circuit or short circuit 3. PCB fault
15	Low pressure sensor error	E15	1.sensor fault 2.open circuit or short circuit 3. PCB fault
16	High pressure protection	E16	1.refrigerant volume too much 2.throttling part error, 3.high pressure switch error
17	Low pressure protection	E17	1.refrigerant volume too little 2.throttling part error,
18	Inside Water flow error	E18	1.Water flow volume too small 2. Water flow switch error
19	Outside Water flow error	E19	1.Water flow volume too small 2. Water flow switch error
20	Communication error	E20	Communication wire open or PCB or Wired controller fault
21	Communication error(IPM and PCB)	E21	Communication wire open or PCB or IPM fault
22	Discharge high temp protection	E22	1.refrigerant volume too little。2.throttling part error
23	Coil high temp protection	E23	1. refrigerant volume too much, 2.throttling part error,
24	Over current protection(PCB)	E24	AC current value over the setting value
25	IPM high temp protection	E25	IPM module temp higher than setting value (heat sink)
26	Power voltage protection(PCB)	E26	Voltage is too high or too low, heat pump will recover when voltage be normal (165~265VAC)
27	Over current protection (IPM)	E27	IPM current over (bus current)
28	IPM error	E28	IPM fault
29	AC mode anti-freeze function error	E29	The anti-freeze function in AC mode has been activated twice in 90 minutes
30	Temp differential too big of inlet and outlet	E30	System water flow is too small, inlet and outlet water temperature different is over 10℃
31	DHW mode anti-freeze function error	E31	The anti-freeze function in DHW mode has been activated twice in 60 minutes
32	pressure protection twice in 30 minutes	E32	High or low pressure protection twice in 30minutes
33	Compressor fail to start up	E33	Compressor cannot start properly or software error (Rotating speed)
34	Compressor over current (IPM)	E34	Compressor current too high (wires current)
35	Miss phase	E35	Power supply error(input side)
36	IPM current sensor error	E36	Sensor fault
37	IPM high temp protection	E37	IPM temperature too high
38	PFC error	E38	PFC fault
39	DC voltage too high	E39	DC voltage higher than 395V
40	DC voltage too low	E40	DC voltage lower than 300V
41	Power voltage protection(IPM)	E41	IPM Voltage is too high or too low
42	Over current protection (IPM)	E42	IPM current is too high

43	Power voltage test error	E43	IPM fault
44	DSP and PFC communication error	E44	IPM fault
45	IPM temp sensor error	E45	IPM temp sensor fault
46	DSP communication error	E46	IPM fault
47	IPM module high temp protection	E47	Module temperature is too high
48	1# EC motor error	E48	Motor fault
49	2# EC motor error	E49	Motor fault
50	Voltage protection(15V)	E50	Voltage is too high or too low
51	Model does not match with boards	E51	Compressor driver and main board code unplugging switch do not match
52	Compressor over heating protection (DN3 open circuit)	E52	1.refrigerant volume too little 2.throtting part error

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