DC Inverter Air Source Heat Pump

Instruction Manual

Model number: GT-SKR020KBDC-M290
GT-SKR030KBDC-M290
GT-SKR040KBDC-M290
GT-SKR040KBDC-M290T
GT-SKR050KBDC-M290T

- Please read the manual carefully before installation and maintenance.
- Please keep this manual well for future reference.

CONTENTS

Part I: General Information

1.1 Caution

1. Ensure proper operation on the unit.
2. The unit must be installed and repaired by qualified technicians.
3. Install a leakage protection switch near by the unit.
4. Do not use any damaged cable and switch to avoid any leakage.
5. Do not open the electrical box without shutting off power supply.
6. Along transportation, don't incline the unit more than 45°in any direction.
7. Before maintenance, please shut off the power to the unit.
8. The unit is designed for outdoor installation, do not install it in a closed space without good ventilation.
9. Do not install the unit nearby inflammable or explosive goods.
10. Do not block the air inlet or outlet of the unit.
11. If there is no glycol (anti-freeze) between heat pump and buffer tank, when there is no power supply or water circulation pump failure, drain the water inside hydraulic system.
12. This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
13. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
14. The appliance shall be installed in accordance with national wiring regulations.
15. An all-pole disconnection device which has at least 3mm clearances in all poles, and have a leakage current that may exceed 10mA, the residual current device (RCD) having a rated residual operating current not exceeding 30mA, and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
16. Keep safety distance between the unit and other equipment or structures according local norm, and ensure that adequate space for maintenance or service operations.
17. Power supply: the diameter of electrical cables must be suitable for the unit and the power supply

voltage must correspond with the value indicated on the units. All units must be earthed in conformity with legislation in force in the country concerned.

 18. Please attention that hot water produced by the unit is not to be used for drink.

1.2 Warning

1. Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
2. The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)
3. Do not pierce or burn.
4. Be aware that refrigerants may not contain an odour.
5. Spaces where refrigerant pipes shall be compliance with national gas regulations.
6. Servicing shall be performed only as recommended by the manufacturer.
7. The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
8. All working procedure that affects safety means shall only be carried by competent persons.

1.3 Requirements

1. **Transport of equipment containing flammable refrigerants**

   Compliance with the transport regulations
2. **Marking of equipment using signs**

   Compliance with local regulations
3. **Disposal of equipment using flammable refrigerants**

   Compliance with national regulations
4. **Storage of equipment/appliances**

   The storage of equipment should be in accordance with the manufacturer’s instructions.
5. **Storage of packed (unsold) equipment**

   Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.

   The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.
6. **Information on servicing**

1) Checks to the area

   Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to

ensure that the risk of ignition is minimized. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

2) Work procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

3) General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

4) Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

5) Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

6) No ignition sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

7) Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

8) Checks to the refrigeration equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If

in doubt consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

– The charge size is in accordance with the room size within which the refrigerant containing parts are installed;

– The ventilation machinery and outlets are operating adequately and are not obstructed;

– If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

– Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

– Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

9) Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

• That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

• That there no live electrical components and wiring are exposed while charging, recovering or purging the system;

• That there is continuity of earth bonding.

7. Repairs to sealed components

1) During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

2) Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected.

This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose

of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE: The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

8. Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

9. Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

10. Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

11. Leak detection methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed.

Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/ extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

12. Removal and evacuation

When breaking into the refrigerant circuit to make repairs – or for any other purpose conventional procedures shall be used. However, it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:

• Remove refrigerant;

• Purge the circuit with inert gas;

• Evacuate;

• Purge again with inert gas;

• Open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task.

Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

13. Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

– Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.

– Cylinders shall be kept upright.

– Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.

– Label the system when charging is complete (if not already).

– Extreme care shall be taken not to overfill the refrigeration system.

Prior to recharging the system, it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

14. Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before

the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure ensure that:

• Mechanical handling equipment is available, if required, for handling refrigerant cylinders;

• All personal protective equipment is available and being used correctly;

• The recovery process is supervised at all times by a competent person;

• Recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with manufacturer's instructions.

h) Do not overfill cylinders. (No more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

15. Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

16. Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing

scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

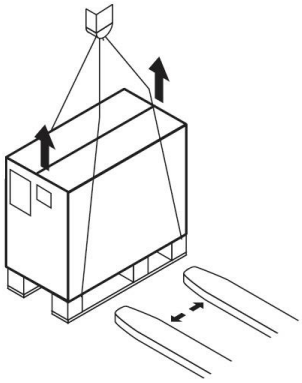
If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Part II Installation

2.1 Transportation

Along transportation, don't incline the unit more than 45°in any direction.

The unit in its packaging can be transported with a lift truck or hand truck.



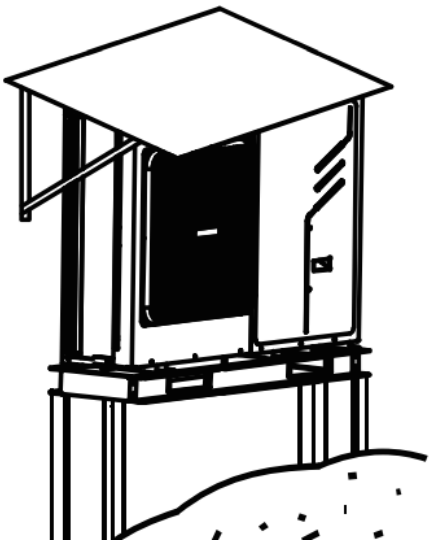
2.2 Installation site requirement

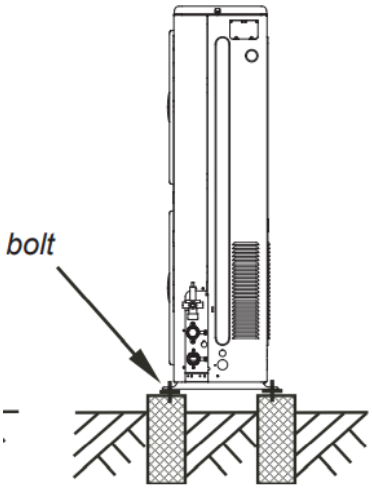
This unit is designed for outdoor installation, do not install it in a closed space.

Please consider the condition as following factors when selecting installation site.

- The installation site should be large enough and well ventilation.
- The installation site should be convenient for water drainage.
- Select a smooth, horizontal site where it can support the weight of the unit.
- Do not install the unit where there is pollution, accumulation, fallen leaves or bad ventilation.
- Don't install the unit near inflammable or explosive goods.

- Install shockproof pad under the unit.
- Recommended to install a canopy above the machine to prevent snow from falling on the evaporator, which will reduce the efficiency of the heat pump and increase the difficulty of frosting.
- Recommended that the pedestal of the unit is higher than 30cm to avoid snow or ice on the ground to reach the machine, or affect condensation water discharge of the unit and cause icing in the unit.
- Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.



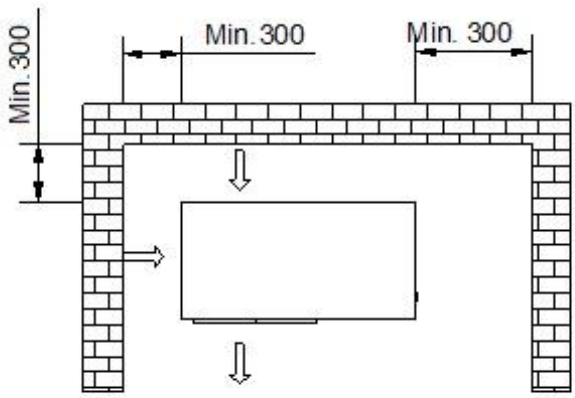


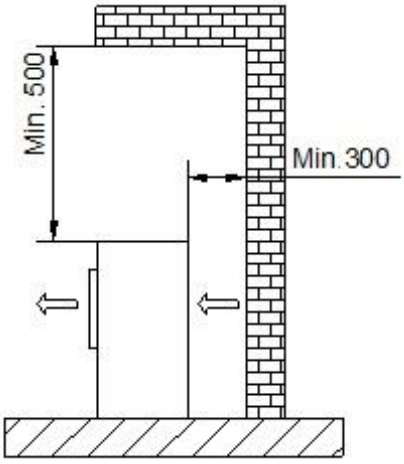
2.3 Minimum distance to wall

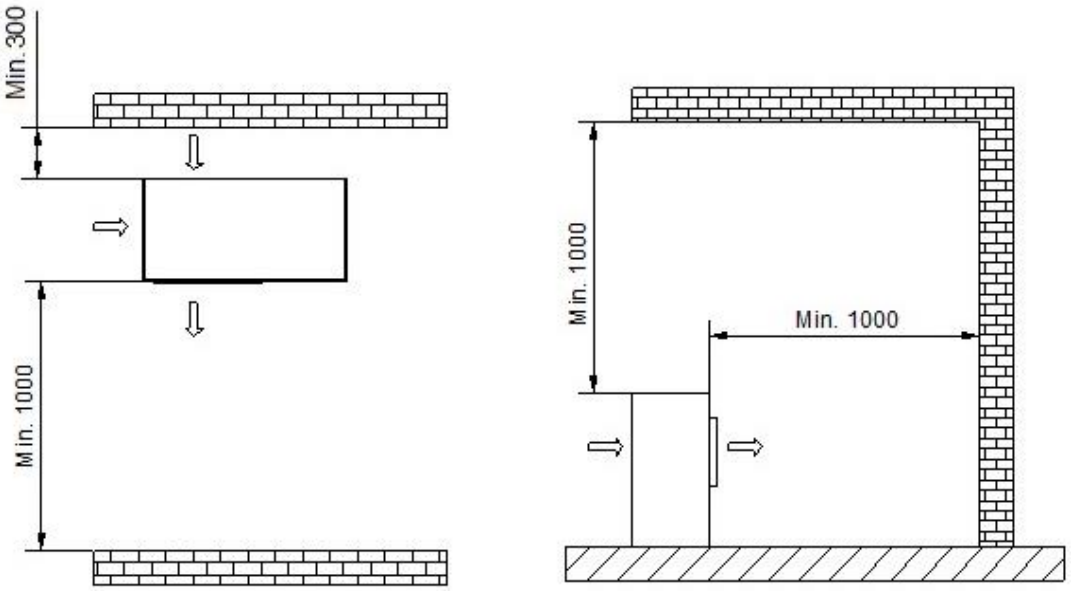
Air discharge

Minimum 1000mm to obstacles obstructing the air discharge.

Minimum 3000mm to footpaths and patios due to the formation of ice, even when outside temperatures are above 0 °C



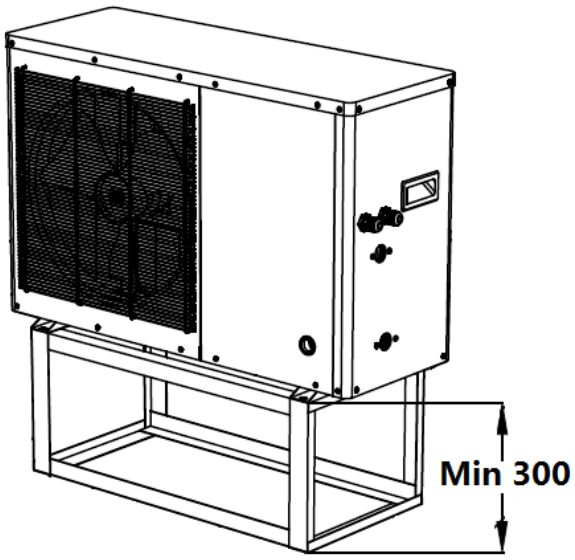




2.4 Clearance between outdoor module and ground

The minimum installation height must be 300mm.

A canopy must be constructed over the outdoor module in areas with heavy snowfall.



2.5 Hydraulic system installation

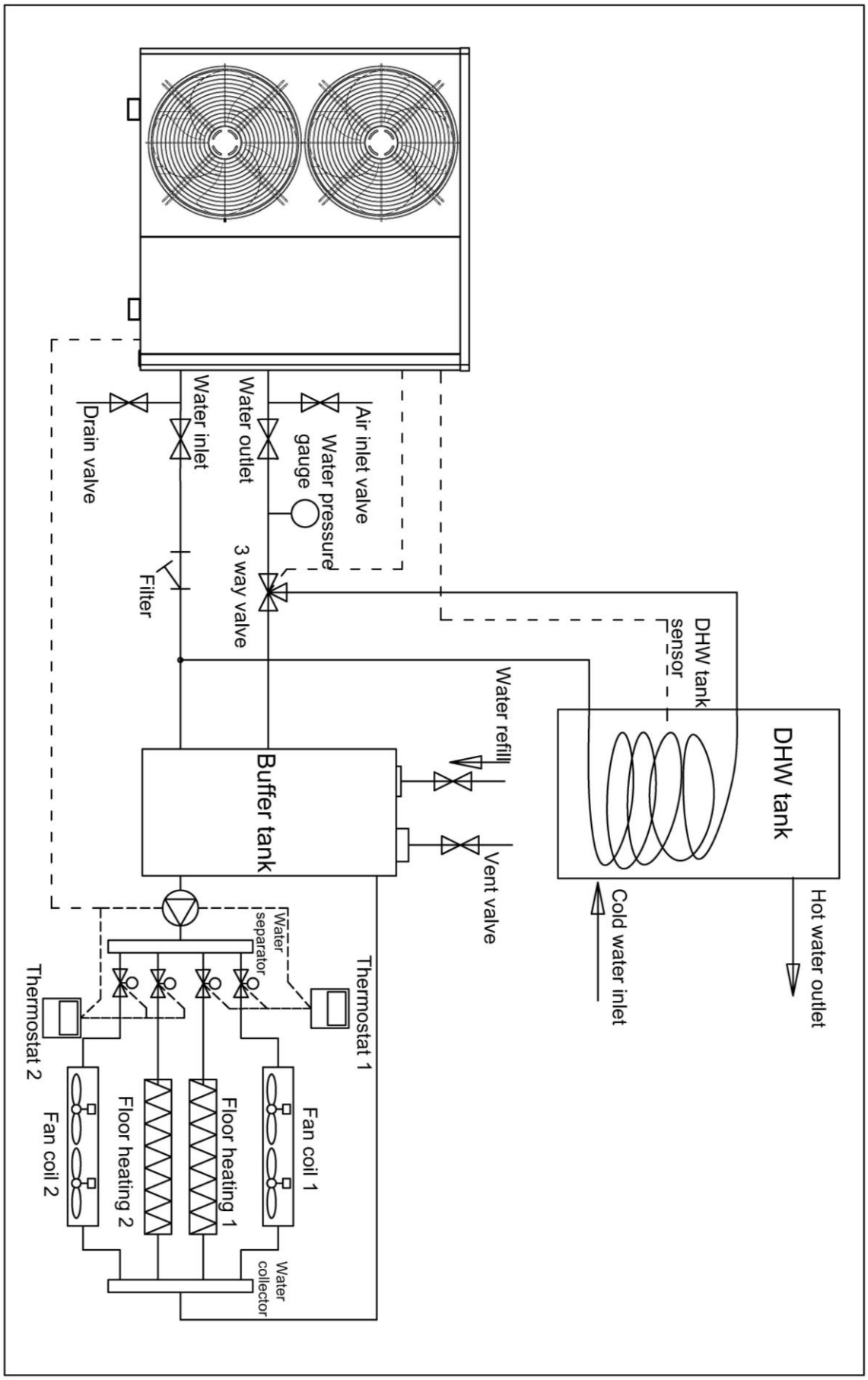
1. If sand and clay settle in the plate heat exchanger, circulation of chilled water may be blocked, and thus leading to freezing accidents, so water must be filtered.
2. The maximum water pressure cannot exceed 3 bar.
3. The maximum water temperature is 75°C according to safety device setting.
4. Drain taps must be provided at all low points of the system to permit complete drainage of the circuit during maintenance.
5. Air vents must be provided at all high points of the system. The vents should be located at points that are easily accessible for servicing. An automatic air purge is provided inside the unit. Check that this air

purge valve is not tightened too much so that automatic release of air in the water circuit remains possible.

6. The hydraulic system must be equipped with expansion vessel.
7. The complete water circuit including all piping, must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity as well as prevention of freezing of the outside water piping during winter.
8. Depending on the expected lowest outdoor temperature, make sure the water system is filled with a concentration of glycol. If no glycol is added, the water must be drained out when there is a power failure.
9. Water quality requirements of plate heat exchanger.

Water quality	Suspended solids	< 5mg/L
	Total hardness	< 0.6mmol/L
	Oxygen content	< 0.1mg/L
	PH value	>7-8.5

2.6 Recommended hydraulic connection



2.7 Electrical connection

1. Ensure proper operation of the unit, the unit must be installed and repaired by qualified technicians.
2. Install a leakage protection switch near by the unit.
3. Do not use any damaged cable and switch.
4. Do not open the electrical box without shutting off all power to the unit.

- All the wiring must meet the local electrical safety norm and performed by qualified electricians.
- Ensure that the heat pump water heater is well connected to the earth, do not disconnect the earth connection of the power in any condition.
- Provide a separate power supply which meets rated requirements for the unit.
- When the unit connects to the electricity network, there must be a short-circuit protection.
- Choose the suitable cable when use the power outdoor.
- Do not control the unit on or off by the main power switch.
- After finish installation, check before connect the unit to the power.
- Connect the signal (power) from PCB to water circulation pump.(Remark: Monobloc heat pumps are already inbuilt circulation pump inside the unit)

The Specification of Power

Following information is for reference, please subject to the local safety norm.

Type	GT-SKR020KB DC-M290	GT-SKR030KB DC-M290	GT-SKR040KB DC-M290	GT-SKR040KB DC-M290T	GT-SKR050KB DC-M290T
Power supply	220-240V/1Ph	220-240V/1Ph	220-240V/1Ph	380-415V/3Ph	380-415V/3Ph
Circuit Breaker	25A	32A	32A	32A	32A
Power cables	2.5 mm2	4.0 mm2	4.0 mm2	2.5 mm2	2.5 mm2
Ground cables	2.5 mm2	2.5 mm2	2.5 mm2	2.5 mm2	2.5 mm2
Rated current	13.5A	18.2A	26.5A	9.5A	14A
Max startup current	6.4A	8.3A	12A	4.2A	6.3A

Type	GT-SKR020KB DC-M290	GT-SKR030KB DC-M290	GT-SKR040KB DC-M290	GT-SKR040KB DC-M290T	GT-SKR050KB DC-M290T
Compressor oil	HAF68 630	HAF68 630	HAF68 630	HAF68 630	HAF68 630
Water heat exchanger material	SS316	SS316	SS316	SS316	SS316
Water heat exchanger capacity	6.4kW	8.3kW	12.0kW	12.0kW	16.3kW
Max water pressure drop	22.2KPa	22.5KP	26.3KP	26.3KP	31.7KP

2.8 Trial operation

- The unit should only be operated by qualified technician.
- Please drain air inside hydraulic system before operation.
- The unit is designed according to the conditions as follows: the range of ambient temperature is -25℃～43℃ and the range of water pressure is 0.15～0.8Mpa.

2.8.1 Preparation

The following items should be checked before startup:

a. The heat pump should be connected completely.

b. All valves that could impair the proper flow of the heating water in the heating circuit must be open.

c. The air inlet and air outlet paths must be cleared.

d. The ventilator must turn in the direction indicated by the arrow.

e. The settings of the heat pump controller must be adapted to the heating system in accordance with the controller's operating instructions.

f. Ensure the condensate outflow functions.

g. Drain the air inside hydraulic system.

2.8.2 Trial run

- Turn on the power, start up the unit by the controller, after 30 seconds, the unit (compressor) start to work, then observe whether the unit works normally.
- When you restart the unit, the compressor will start up after three minutes to protect the compressor.

2.8.3 Caution

When following happen during trial operation, please stop the unit immediately and cut off the power and contact with our authorized agent or maintenance technician.

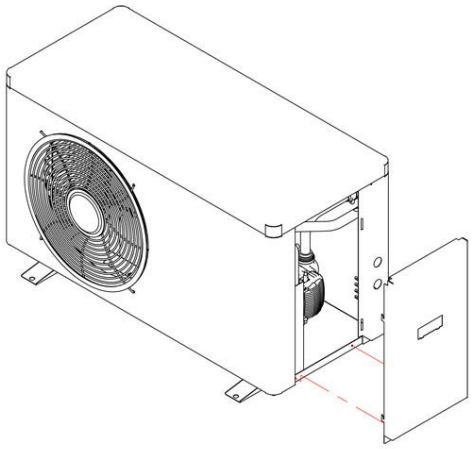
Fuse blown or protection activated frequently.

- The wire and switches are heated abnormally.
- Abnormal sounds coming from the unit.
- Abnormal smell comes out of the unit.
- Electricity leakage.

Part III Control System

3.1 Controller position

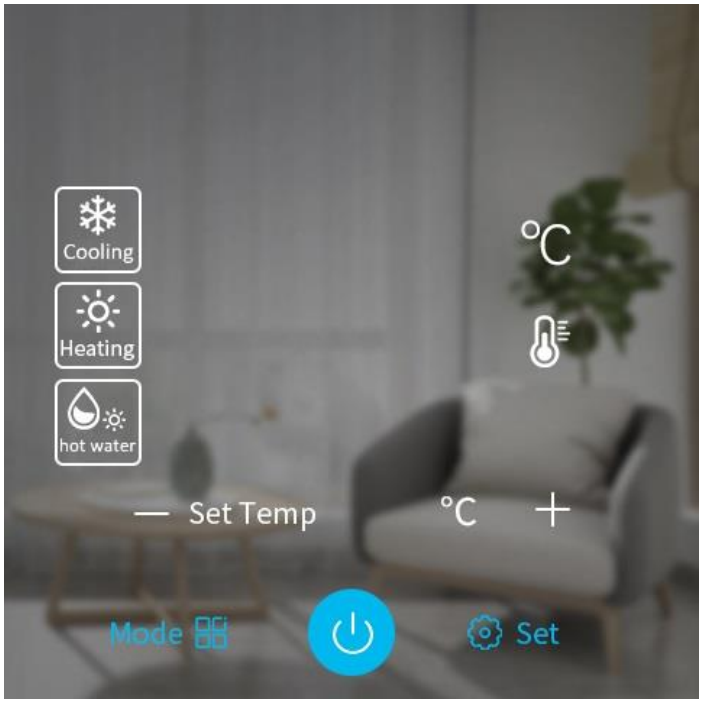
The controller is installed inside the unit before factory, open the front panel as following picture, you will find the controller.



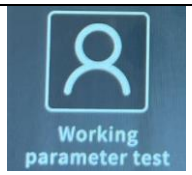
There is 8 meters cable for the controller, it is allowable to move the controller to outside the unit, but avoid a place with sunshine and rain.

3.2 Controller introduction

3.2.1 Operation panel



3.2.2 Icon description

No.	Icon name	Icon	Description
1	ON/OFF		Turn on/off the unit
2	FUNCTION		Switch working mode
3	UP		Set temperature up
4	DOWN		Set temperature down
5	SET		Enter setting
6	WORKING PARAMETER SETTING		Enter working parameter setting
7	FORCED DEFROSTING		Turn on/off forced defrosting
8	FORCED POWER-ON HEATING		Forced power-on heating
9	CURVE HEATING MODE		Turn on/off curve heating mode
10	RESTORE FACTORY SETTING		Restore factory setting
11	ONLY FOR TECHNICIAN OPERATION		Please keep it in off status

12	CAPABILITY TEST		Enter capacity test
13	COMMODITY INSPECTION		Enter commodity inspection
14	SWITCH FAHRENHEIT / CELSIUS		Switch Fahrenheit / Celsius
15	PARAMETER SETTING		Enter parameter setting
16	TIMER SWITCH		Set timer
17	TROUBLESHOOTING		Check error code list
18	REMOTE CONTROLLER INFORMATION		Check controller information
19	PARAMETER QUERY		Parameter query
20	Remove WIFI connection		Remove WIFI connection

Note: After power is on, need to press the power button above the controller to turn on. Slide to unlock after locking.

1. ON/OFF

In unlock status, click icon  to turn on/off the unit.

2. FUNCTION

In main menu, click icon 

to switch working mode.

3. UP/DOWN

Click icon  or  to adjust the set temperature of the current mode.

4. SET

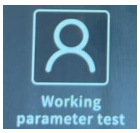
Click icon 

to enter parameter and other settings.

5. TIME

Click the time in upper left corner of the screen, and enter the current time, click OK to confirm.

3.2.3 Working parameter setting

In set menu, click icon 

to enter working parameter setting.

❖ **Force defrosting**

In working parameter setting menu, click icon 

to turn on/off forced defrosting.

❖ **Force power-on heating**

In working parameter setting menu, click icon 

to forced power-on heating.

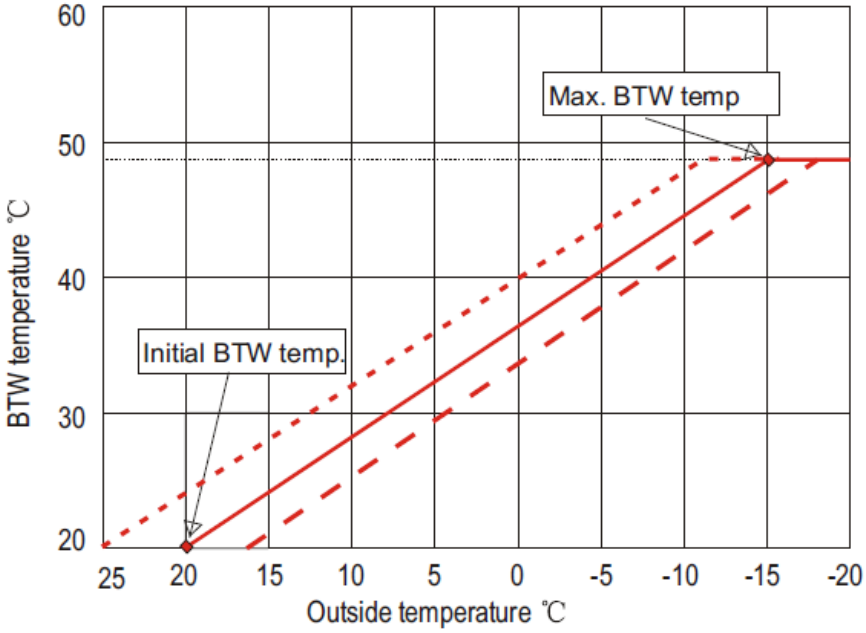
❖ **Curve heating mode**

In working parameter setting menu, click icon 

to turn on/off curve heating mode.

In curve heating mode, the unit runs according to heating curve.

The heating curve is the relationship between the heating system supply temperature and the outside air temperature. In the case of a heating curve, it is done automatically thanks to the weather-based control, which adjusts the supply temperature based on the outside temperature.



Item	Description	Default value	Unit	Range
b17	Set room temp	25	℃	15~25℃
b18	Initial BTW temp	20	℃	15~25℃
b19	Max. BTW temp	43	℃	24~50℃

Target buffer tank temp = Initial BTW temp + (Max BTM temp - Initial BTW temp) / 35 x (Set room temp - Outside temp)

For example, Set room temp = 25° C, Max BTW temp = 43° C, Initial BTW temp = 20° C

a. When outside temp=20° C, Target buffer tank temp = 20+(43-20)/35x(25-20)=23° C

b. When outside temp=0° C, Target buffer tank temp = 20+(43-20)/35x(25-0)=36° C

c. When outside temp=-15° C, Target buffer tank temp = 20+(43-20)/35x(25+15)=46° C

When Air temperature sensor failure, in OFF status, in DHW mode, and in cooling mode, the unit doesn't run according to heating curve.

When the unit is working in ECO mode, it only works according to the heating curve, can't set temperature by controller or App.

❖ **Restore factory setting**

In working parameter setting menu, click icon 

to restore factory setting.

❖ **Capability test**

In working parameter setting menu, click icon 

to enter capability test mode.

❖ **Commodity inspection**

In working parameter setting menu, click icon 

to enter commodity inspection mode.

❖ **Switch Fahrenheit/Celsius**

In working parameter setting menu, click icon 

to switch Fahrenheit/Celsius.

❖ **Parameter setting (only for technician operation)**

In working parameter setting menu, click icon 

, enter password 6666 to enter parameter setting.

Item	Description	Default value	Unit	Range	Remark
01	Water Temp. Difference for Heating/DHW	3	℃	0~15	
02	Water Temp. Difference for Cooling	3	℃	0~15	
03	Maximum heating water temperature setting	75	℃	20~75	
04	Minimum heating water temperature setting	15	℃	10~20	
05	Maximum cooling water temperature setting	32	℃	20~60	
06	Minimum cooling water temperature setting	8	℃	8~20	
07	Select water circulation pump	0	℃	0~2	0: AC pump 1: APF25-10-130E 2: APF25-12-130E
08	Circulation Pump operation Mode	2		0~2	0: Run 2 min. every b09 min. 1: Run as compressor run 2: Always run
09	Interval Running interval of	5	min	0~99	

	circulation pump				
10	Water Inlet/ outlet temperature difference protection	40	℃	5~40	
11	Operation Mode	1		0~3	0: heating 1: heating + DHW 2: heating + cooling 3: heating + cooling + DHW After setting, it needs to be powered off to take effect.
12	Power failure memory	1		0~1	0: off 1: on
13	Ambient Temp. to start E-heater	-15		-30~20	
14	Ambient Temp. to start EVI	8		0~10	
15	Fan motor type	0		0~3	0: DC 1: single speed 2: double speed 3: three speed Power off is required after setting up to take effect.
16	Temperature compensation	1		0~1	0: no 1: yes
17	Translation temp. of heating Curve	25	℃	15~25	
18	Starting Temp. of heating curve	20	℃	15~25	
19	Maximum temp. of heating curve	43	℃	24~50	
20	Continuous Time Compensation for Defrosting Condition 1	0	min	-30～50	
21	Continuous Time Compensation for Defrosting Condition 2	0	min	-30～50	
22	Coil Temp. 1 of entering defrosting	0	℃	-30～30	
23	Coil Temp. 1 of entering defrosting	0	℃	-30～30	
24	Maximum defrosting time setting	12	min	6～16	
25	Coil Temp. 1 of exit defrosting	EE	℃	12～25	
26	Coil Temp. 1 of exit defrosting	5	℃	4～11	
27	Anti-legionella Cycle	144	h	0~9999	When set to 0, this function is not available

28	Water temp. of anti-legionella	70	℃	1~99	
29	Maximum DHW setting	55	℃		
30	Target exhaust superheat for main EEV in heating	EE	℃	0~10	
31	Target exhaust superheat for main EEV in cooling	EE	℃	0~10	
32	Main EEV adjustment interval	EE	s	30~90	
33	Minimum main EEV opening in cooling	EE	P	50~480	
34	Minimum main EEV opening in heating	EE	P	50~480	
35	Main EEV's target superheat for heating	EE	℃	0~10	
36	Main EEV's target superheat for Cooling	EE	℃	0~10	
37	Spare	0			
38	Target superheat for EVI	EE	℃	0~15	
39	EVI EEV adjustment interval	EE	s	30~90	
40	Spare				
41	Spare				
42	Low fan motor speed	EE		200~1000	
43	Medium fan motor speed	EE		200~1000	
44	High fan motor speed	EE		200~1000	
45	Maximum operation outdoor temperature setting in heating	55	℃	10~60	
46	Minimum operation outdoor temperature setting in heating	-25	℃	-35~10	
47	Spare	0			
48	spare	0		1~13	
49	Spare	0		1~13	
50	Spare	0		1~10	
51	Spare	0		1~10	
52	Spare	0		0~1	
53	Spare	0	℃	0~5	
54	Spare	0			
55	Cascade quantities	1		1~8	
56	Select cascade unit to display	1		1~8	
57	Spare	0			

58	Spare	0			
59	Spare	0			cure
60	Adjust frequency and EEV opening manual on/off	0		0~1	0: off 1: on
61	Adjust frequency opening manual	60	HZ	0~95	Default value is current running frequency
62	Manual adjust main EEV opening	300	HZ	0~480	Default value is current running frequency
63	Manual adjust EVI EEV opening	100	P	0~480	Default value is current running frequency
64	DC fan motor speed	850	P	400~1000	Default value is current running frequency
65	Spare				
66	Spare				
67	Spare				
68	Spare				
69	Controlled by city power grid or not	0		0-1	0: Uncontrolled 1: Controlled
70	During peak electricity demand, the allowable heat pump operating time can be set after stop running 2 hours	60	min	3~240	
71	Setting temperature in DHW mode during free electricity	54	℃	20~55	
72	Setting temperature of heating mode during free electricity	72	℃	15~75	
73	Manual control of DC water circulation pump or not	0		0-1	0: automatically 1: manual
74	Set water flow of circulation pump manual		m3/h	0-50	The prerequisite is to set B07=1 or 2

❖ **Timer switch**

In set menu, click icon 

to set timer. After setting the timer on/off time, select the timer.

❖ **Check error code list**

In set menu, click icon 

to check error code list.

❖ **Remote controller information**

In set menu, click icon 

to check controller information.

❖ **Parameter query**

In set menu, click icon 

to enter parameter query.

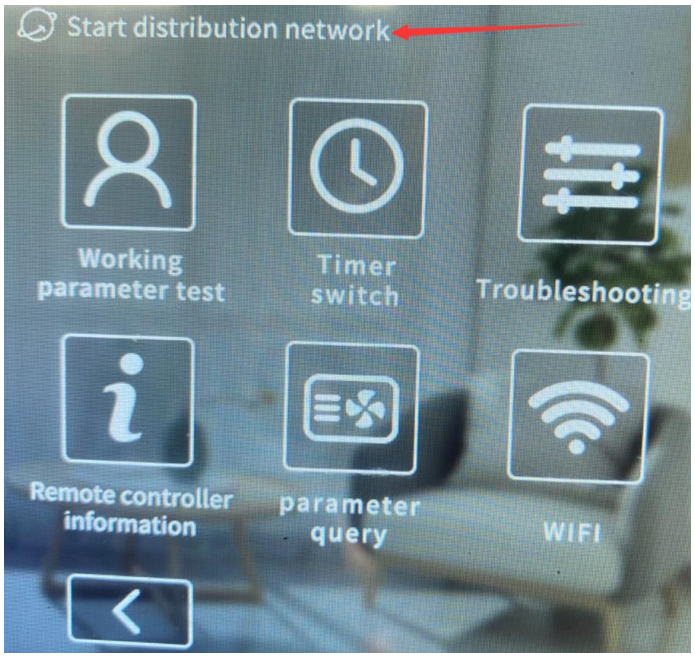
Item	Description	Unit	Range	Remark
C0	DHW temperature	℃	-30～105	
C1	Compressor frequency	Hz	-30～105	
C2	Compressor Phase Current	A	-30～105	
C3	DC Bus Voltage	V	-30～105	*10
C4	IPM Module Temperature	℃	-30～105	
C5	ACVoltage	V	-30～105	*10
C6	AC Current	A	-30～105	
C7	Compressor power Input	W	-30～105	*100
C8	Fan Motor Speed	RPM	-30～105	*10
C9	Target superheat of main freon system suction	℃	-30～105	/10
C10	Actual average superheat of main Freon system suction	℃	-30～105	
C11	Main EEV opening	P	-30～105	*10
C12	EVI EEV opening	P	-30～105	*10
C13	High Pressure	℃	-30～105	*100
C14	Saturation evaporation temperature of high pressure	℃	-30～105	
C15	Superheat temperature of exhaust	℃	-30～105	
C16	Low pressure of main Freon system	Kpa	-30～105	*100
C17	Saturation evaporation temperature of low pressure	℃	-30～105	

C18	EVI superheat temperature (setting)	℃	-30～105	
C19	EVI Superheat temperature (actual)	℃	-30～105	
C20	Low pressure of EVI system	Kpa	-30～105	
C21	EVI inlet temperature	℃	-30～105	Low pressure saturated evaporation temperature
C22	EVI outlet temperature	℃	-30～140	EVI suction temperature
C23	Exhaust temperature	℃	-30～105	
C24	Coil temperature for heating	℃	-30～105	
C25	Outdoor air temperature	℃	-30～105	
C26	Buffer tank temperature	℃	-30～105	
C27	Spare	℃	-30～105	
C28	Water inlet temperature	℃	-30～105	
C29	Water outlet temperature	℃	-30～105	
C30	Suction temperature		0: OFF; 1: ON	
C31	Cascade on/off selection		0: OFF; 1: ON	
C32	Cascade on/off state		0: OFF; 1: ON	
C33	Water circulation pump state			
C34	Fault record 1			
C35	Fault record 2			
C36	Fault record 3			
C37	Fault record 4			
C38	Fault record 5			
C39	Target proportion of water circulation pump			
C40	Actual water flow	m3/h	0-50	*10
C41	Main PCB program verification code			
C42	Main PCB EE verification code			
C43	Control panel verification code			
C44	Inverter program verification code			
C45	Inverter EE verification code			

❖ **WIFI control**

In set menu, press icon 

for 3 seconds till “Start distribution network” appears in the upper left corner of the display.

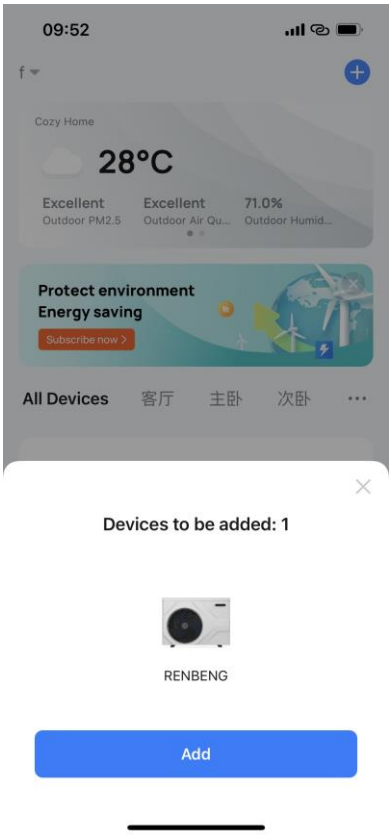


1. Connect the mobile phone to WIFI, turn on the Bluetooth of the mobile phone, and open the Positioning of the mobile phone.

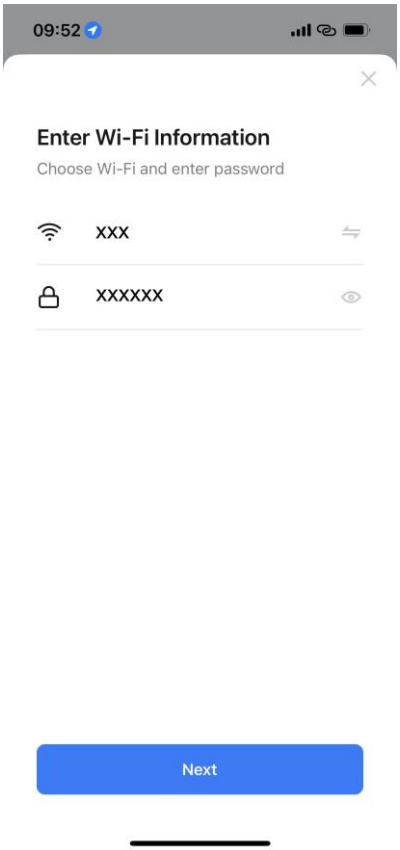
2. Scan the QR code, or search the App of “Smart Life” at the APP Store on mobile phone, download and install the App, will display on your mobile phone.

3. Complete registration step by step if new user.

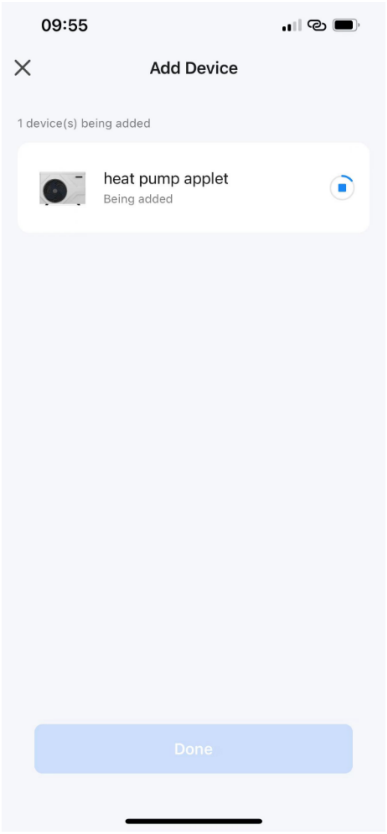
4. Power on the screen of controller of heat pump, App will automatically discover the device, click “Add”.

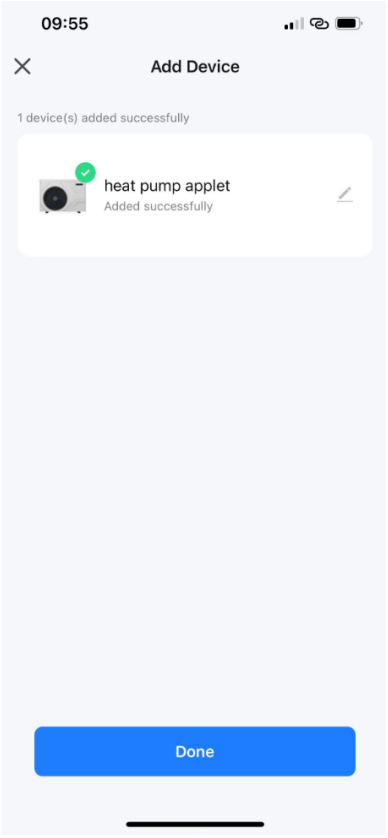


5. Enter the WIFI account and password that connected to the mobile phone, click “Next”.

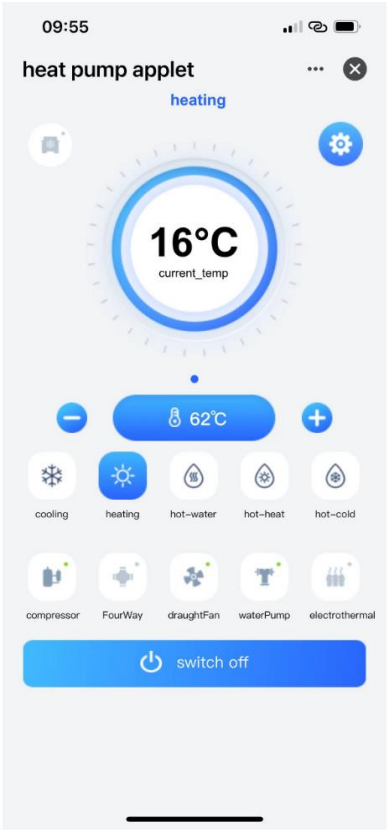


6. The device automatically configures the network and is added successfully.





7. After the device is added, select the device on the home page to control the heat pump.

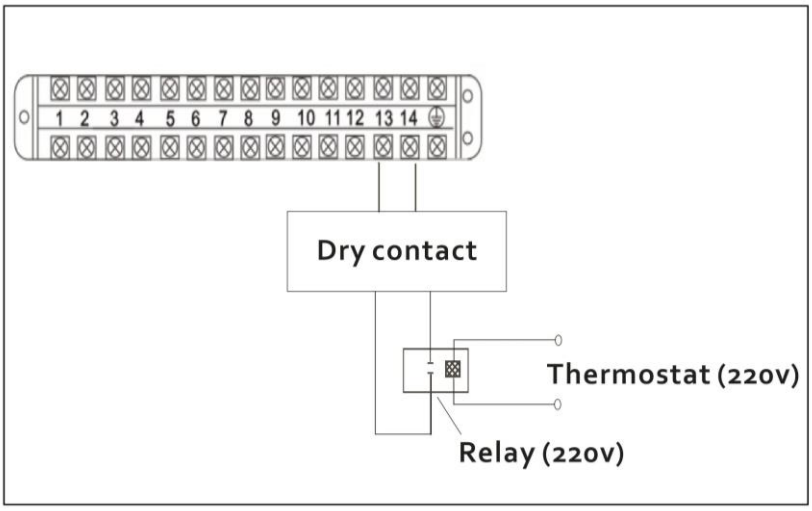


❖ **Dry contact**

The dry contact should be short-circuited when not in use. Otherwise, the controller will fail in heating/cooling mode.

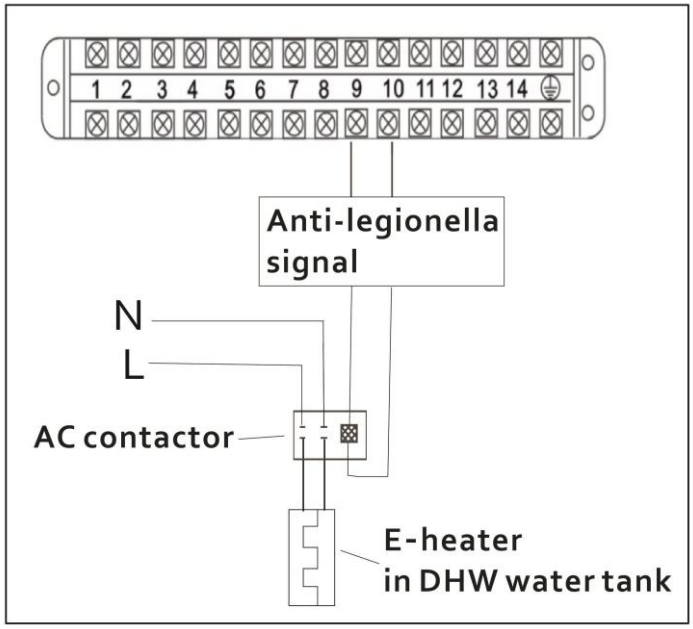
When the dry contact is connected to a thermostat, in heating/cooling mode, the unit will stop or startup according to the signal of the thermostat.

If the thermostat is a live device, installing a relay is required. Otherwise, it will burn out the PCB.



❖ **Anti-legionella function**

When connect the E-heater in DHW water tank to the Anti-legionella signal port, installing an AC contactor is required. Otherwise, it will burn out the PCB.



Parameter	Description	Default value	Unit	Range	Remark
27	Anti-legionella Cycle	144	h	0~9999	When set to 0, this function is not available
28	Water temp. of anti-legionella	70	℃	1~99	

❖ **Cascade operation**

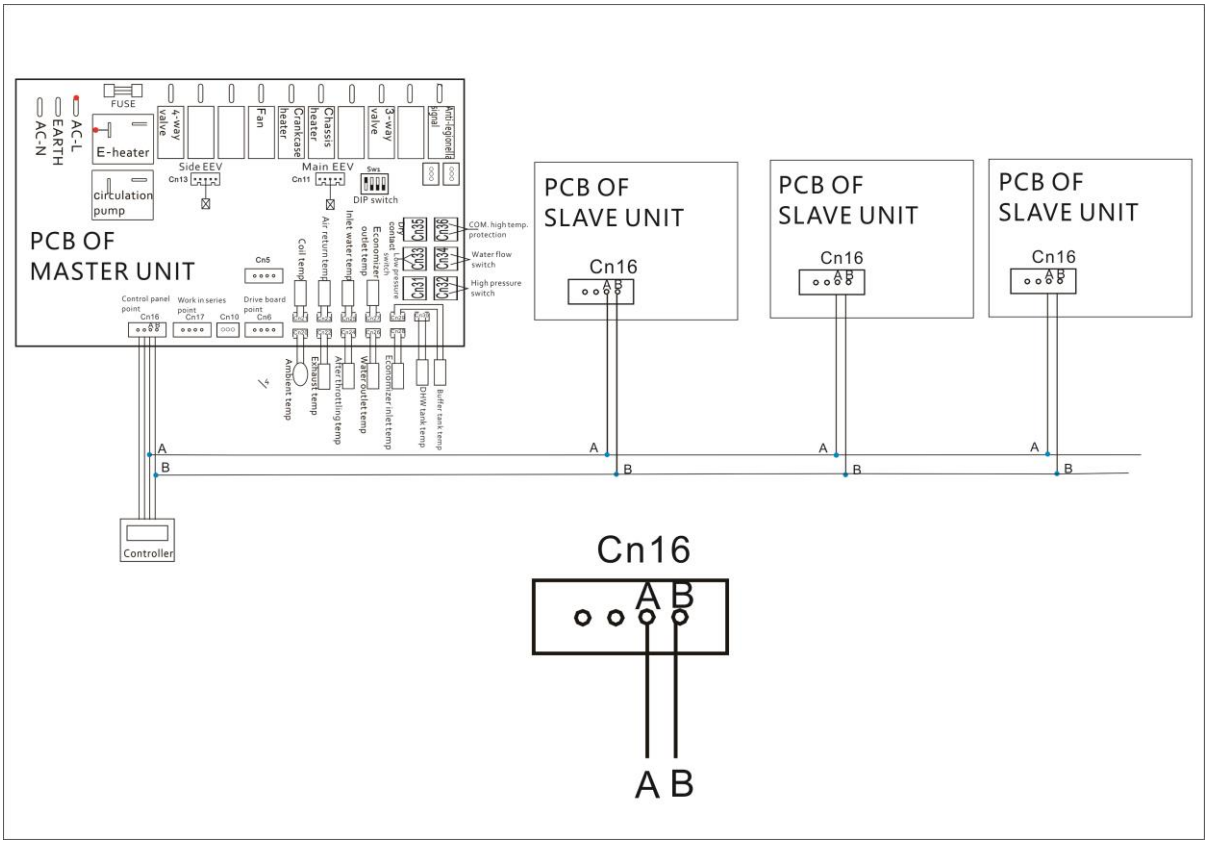
Multiple heat pumps can be connected to work in cascade, maximum can be 8 units, the master unit controls all slave units.

1. Take the controller (of all machines) out from port CN16 on PCB. Connect **signal wire** to CN16.
2. Set master and slave units address

   When several units work in series, every unit must be set address by switch bit (SW1) on PCB as following form.

Bit switch	Unit address						
	#1(master)	#2(slave)	#3(slave)	#4(slave)	#5(slave)	#6(slave)	#7(slave)
1	ON	OFF	OFF	OFF	ON	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	ON	OFF	OFF	OFF	ON
4	OFF	OFF	OFF	ON	ON	ON	ON

3. Use signal cable to connect to work in PCB board, each unit is equipped with a 5-meter cable.



4. After connecting cables, set cascade quantities of heat pumps in parameter 55 by control panel.
5. Check status of every unit by selecting on parameter 56. For example, if want to check the parameter of slave 2, set parameter 56=2

❖ **SG ready**

1. Connector on PCB

   CN7 is for EVU signal of the power grid. CN8 is for SG signal of the power grid.

2. Parameters

Parameter	Description	Default value	Unit	Range	Remark
69	Controlled by city power grid or not	0		0-1	0: Uncontrolled 1: Controlled
70	During peak electricity demand, the allowable heat pump operating time can be set after stop running 2 hours	60	min	3~240	
71	Setting temperature in DHW mode during free electricity	54	℃	20~55	
72	Setting temperature of heating mode during free electricity	72	℃	15~75	

3. SG READY control

   When parameter 69 set to 1, the heat pump can receive input signal from power grid.

Operation mode	EVU (CN7)	SG (CN8)	Description
Mode 1	1	0	Switch off heat pump for 120 mins, and switch on heat pump for (parameter 70) mins. Repeat this cycle.
Mode 2	0	0	Switch on heat pump for 115 mins, and switch off for 10 mins. Repeat this cycle.
Mode 3	0	1	Switch on until reach (parameter 71) at DHW mode, (parameter 72) at Heating mode. Auxiliary heating isn't allowed to be turned on.
Mode 4	1	1	Switch on until reach (parameter 71) at DHW mode, (parameter 72) at Heating mode. Auxiliary heating is allowed to be turned on.

Remarks: 1 is ON, 0 is OFF.

Part IV Maintenance

Before performing any maintenance on the unit, you should turn the unit off first and shut off the power.

A well-maintained heat pump could save your energy costs and make the unit durable, but must be done by a qualified technician. Below are some tips for your reference to help your heat pump gives you optimum performance.

1. Turn the power off when the unit is being maintained.
2. Do not use petrol, naphtha, dissolvent and any other chemicals on the unit, otherwise, it may damage the surface. External heat pump parts can be wiped with a damp cloth and domestic cleaner.
3. Avoid leaning or putting objects on the device.
4. Keep dry and drafty round the unit. Clean heat exchangers regularly (usually once per 1～2 months) to keep a good heat exchange efficiency.
5. If the unit will be shut down for a long time, you should drain the water in the pipe, turn the power off and cover it with protective cover, check it roundly before you start it again.
6. It is advised to use the phosphoric acid whose temperature is about 50～60℃ and consistency is 15% to clean the heat exchanger of the unit. First start the circulation pump to clean it for 3 hours, and then flush it with tap water for three times. Do not use any amyctic detergent to clean the heat exchanger and the tank.
7. Change the installation place

   If the customer wants to change the site, please contact with the dealer or the local Customer Service for help.

8. Cleaning and maintenance

   Regular maintenance is essential to ensure optimal use of the unit. Doing maintenance the wrong way can reduce the performance of the unit and shorten the life of the system.

   The frequency of regular maintenance should be guaranteed at least 1 time/year.

   To be safe, the unit must be shut down and the power supply must be shut off, before cleaning.

   If necessary, the temperature sensor can be dismounted before the unit is cleaned, But it must be installed back after the cleaning is finished.

9. External maintenance

   Check around the heat pump unit regularly to make sure the inlet grille is not blocked by leaves, snow or other things;

   at least once a year to clean the heat exchanger inlet grille, if the unit is located in dirty environment, need to be cleaned often to ensure that the unit runs well. Make sure that there is not too much frost or snow covering the heat pump unit in colder times;

   Regularly check the unit for loose, damaged or broken parts, if there is and note liminate these hidden dangers, the unit may cause injury and loss of personal, goods and property.

   Regularly check the water circuit system for leaks, if there are leaks, they should be repaired immediately;>Regularly check the refrigerant circuit for leakage, if there is any leakage, there frigerant recovery equipment should be applied to recover the remaining refrigerant the system, repair and re-test it before filling it into the unit.

Part V Trouble Shooting

Type	Code	Description	Remark
Failure	F0	Communication failure between main PCB and driver board	1. The signal cable between PCB and driver board is open circuit, short circuit or wrong line sequence. Repair or replace the signal line. 2. The PCB is damaged. Replace it. 3. The drive board is damaged. Replace it.
	F1	Communication failure between controller and main PCB	1. The signal line between controller and PCB is open circuit, short circuit or wrong line sequence. Repair or replace the signal line. 2. There is interference near the unit. Remove the interference or change a installation site. 2. The controller is damaged. Replace it. 3. The PCB is damaged. Replace it.
	F2	Abnormal start of compressor (Open-phase, phase stagger)	1. Phase stagger of the compressor leads, two phases of them are exchanged. 2. Open-phase of the compressor leads. Reconnect them. 3. The drive board is damaged. Replace it.
	F3	Out of step of compressor	1. Poor connection of compressor leads. Reconnect them. 2. The drive board is damaged. Replace it.
	F4	IPM module failure	1.Poor heat dissipation of aluminum radiator 2.The drive board is damaged. Replace it.
	F6	Outdoor DC fan failure	1. Power cables not connected properly 2.The outdoor DC fan is damaged. Replace it. 3. The drive board is damaged. Replace it.
	E0	Inlet water temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	E1	Outlet temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	E2	After throttling temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.

	E3	Air suction temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	E4	Outdoor coil temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	E5	Outdoor environment temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	E6	Exhaust temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	E7	EVI return circuit air return temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	EA	Economizer inlet temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	EB	Indoor environment temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	EC	Economizer outlet temp sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	ED	Buffer tank sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	EH	DHW water tank sensor failure	1. The sensor isn't connected well. Reconnect it. 2. The sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	EE	Main board EE failure	1. The software of the PCB isn't matched. 2. The PCB is damaged. Replace it.
	EF	Driver board EE failure	1. The software of the drive board isn't matched. 2. The drive board is damaged. Replace it.

Protection1 (Display on screen)	P7	High pressure switch protection	1. Insufficient water flow: a. The water piping is blocked. Check the water piping and clean the Y-type filter. b. There is air in water pipes. Vacuumize it. c. The power of circulation pump is insufficient. Change to a bigger one. d. Scaling of heat exchanger. Clean heat exchanger 2. The high pressure switch is damaged. Replace it. 3. The fluorine system is blocked. Fix it. 4. The PCB is damaged. Replace it.
	P8	Low pressure switch protection	1. Refrigerant leakage. Check leakage and repair, vacuumize it and charge refrigerant according to rated label. 2. The refrigerant is insufficient. Charge refrigerant according to rated label. 3. The low pressure switch is damaged. Replace it. 4. The electronic expansion valve is damaged. Replace electronic expansion valve. 5. The surface of the evaporator is dirty. Clean the evaporator. 6. The fan motor is damaged. Replace the fan motor. 7. The PCB is damaged. Replace it.
	PC	Water flow switch protection	1. Check the water flow switch is reliably connected. 2. There's air in water inlet pipes. Open the exhaust port of the circulating pump for vacuum. 3. The water flow switch is damaged. Replace it. 4. The water flow is insufficient. Clean the Y-type filter and ensure that the circulation pipeline is smooth. 5. If the circulating pump does not work, check if the power output of the circulating pump on PCB is normal or not. 6. The circulation pump is damaged. Repair or replace it. 7. The PCB is damaged. Replace it.
	PU	DC circulation pump failure	1. Circulation pump control signal cable is loose. 2. Circulation pump is damaged.
	H1	Temperature difference between water inlet and water outlet is too big	1. Insufficient water flow: a. The water piping is blocked. Check the water piping and clean the Y-type filter.

			b. There is air in the water piping. Vacuumize it. c. The power of circulation pump is insufficient. Change to a larger one. d. The circulating pump is damaged. Repair or replace it. 2. The temperature sensor falls off or is damaged. Re-fix or replace the temperature sensor.
Protection2 (Check in the background)	F5	Overheat protection of compressor	1. Check if the refrigerant is sufficient. Check for leakage, and replenish refrigerant. 2. The protection switch is damaged. Replace it. 3. The PCB is damaged. Replace it.
	P1	AC current protection of outdoor unit	1. The fan is damaged. Replace it. 2. The drive board is damaged. Replace it.
	P2	Current protection of compressor	1. Open-phase of the compressor leads. Reconnect them. 2. The drive board is damaged. Replace it.
	P3	AC voltage too high / too low protection of outdoor unit	1. Check the power supply. 2. The drive board is damaged. Replace it.
	P4	DC bus voltage too high / too low protection	1. Check the power supply. 2. The drive board is damaged. Replace it.
	P5	IPM overheat protection	1. Poor ventilation of the heatsink of drive board. 2. The drive board is damaged. Replace it.
	P6	Overheat protection of exhaust temperature	1. Compressor overheat protection. Check if the refrigerant is sufficient. Check for leakage, and replenish refrigerant. 2. The exhaust temperature sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.
	P9	Overheat protection of outer coil in cooling	1. The air intake of the evaporator is blocked. 2. The fan doesn’t work or the speed is slow, check the fan motor or driver board. 3. The coil temperature sensor is damaged. Replace it. 4. 3. The PCB is damaged. Replace it.
	PH	Environment temperature is too high in heating	1. The ambient temperature is higher than the protection setting value. 2. The ambient temperature sensor is damaged. Replace it.

			3. The PCB is damaged. Replace it.
	PL	Environment temperature is too low in cooling	1. Ambient temperature is lower than 0℃ when cooling. 2. The ambient temperature sensor is damaged. Replace it. 3. The PCB is damaged. Replace it.

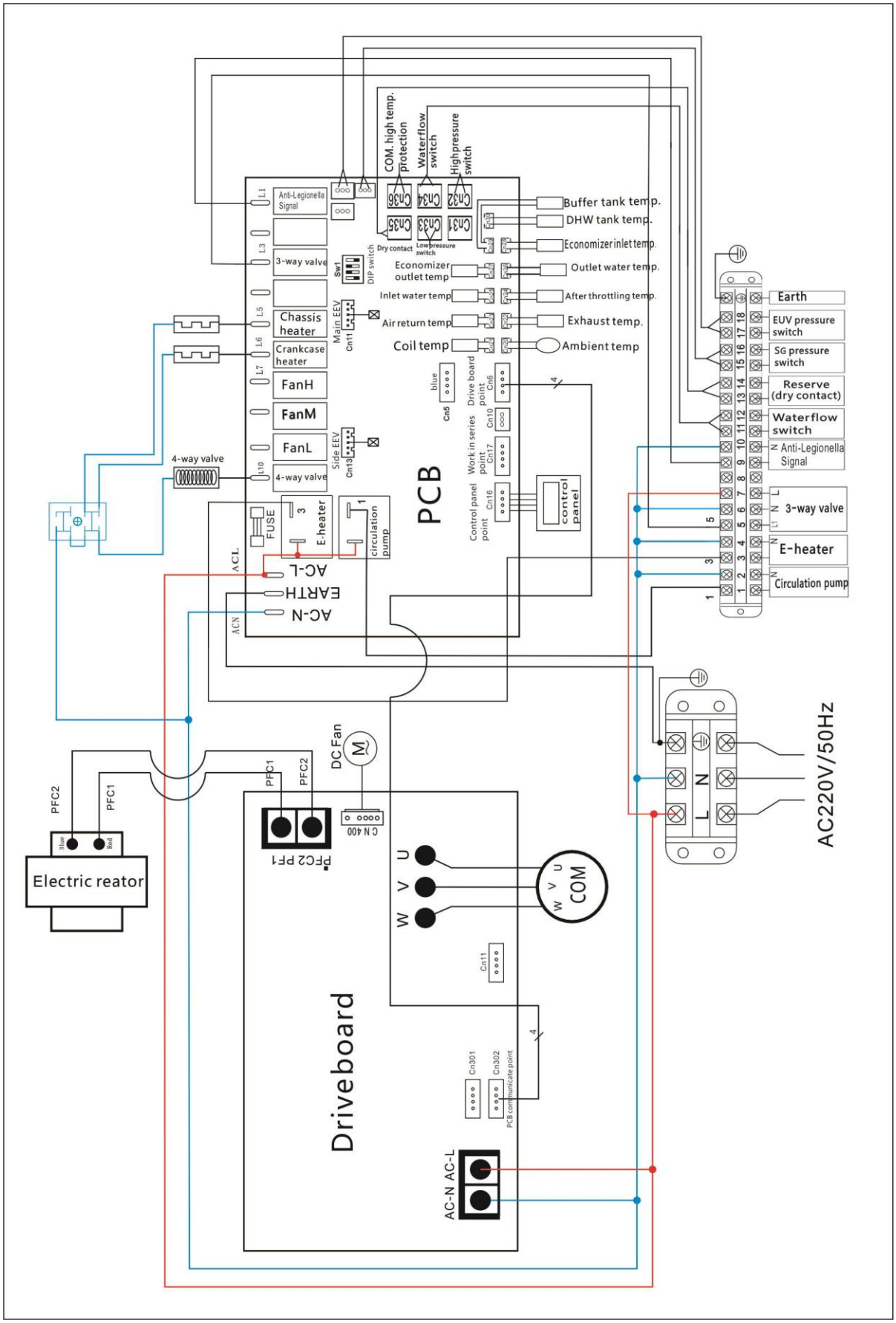
The possible reasons and treatment of common failure.

Fault Condition	Possible Causes	Treatment
The unit doesn't work	◇Power fault ◇Bad connection to the power ◇Fuse blow	◇Turn off the switch, check the Power source ◇Find the causes and renovate them ◇Replace the fuse
The pump is working but too noisy and the water is not cycled	◇Lack water In the system ◇There is air in the water circulation ◇Any valve in the system is not open ◇Filter stoppage	◇Check the water make-up device and fill in with water ◇Discharge the air in water system ◇Open all valves ◇Clean filters
Low heating capacity	◇Inadequate refrigerant ◇bad insulation of the water system ◇Drying filter stoppage ◇Air side heat exchanger is un-efficient ◇Inadequate water-flow	◇Leak hunting and fill in standard quantity of refrigerant ◇Improve the heat insulation ◇Replace the drying filter ◇Clean the heat exchanger ◇Clean the water filter
The compressor doesn't work	◇Power failure ◇Compressor contactor destroyed ◇Poor connection ◇Overheating protection ◇water outlet temperature is too high ◇Inadequate water-flow	◇Check it and solve the problems ◇Replace contactor ◇Check and renovate it ◇Check and solve the problems ◇Reset a proper temperature ◇Clean the water filter and discharge the air in the water system
The compressor works but too noisy	◇Liquid refrigerant goes into the compressor ◇interior components destroyed ◇Inadequate refrigeration oil	◇Check the expansion valve ◇Replace the compressor ◇Add in adequate refrigeration oil
The fan doesn't work	◇Capacitor damaged ◇The fans are not fixed well ◇The electromotor burned out	◇Replace it ◇Fix it well again ◇Replace the electromotor

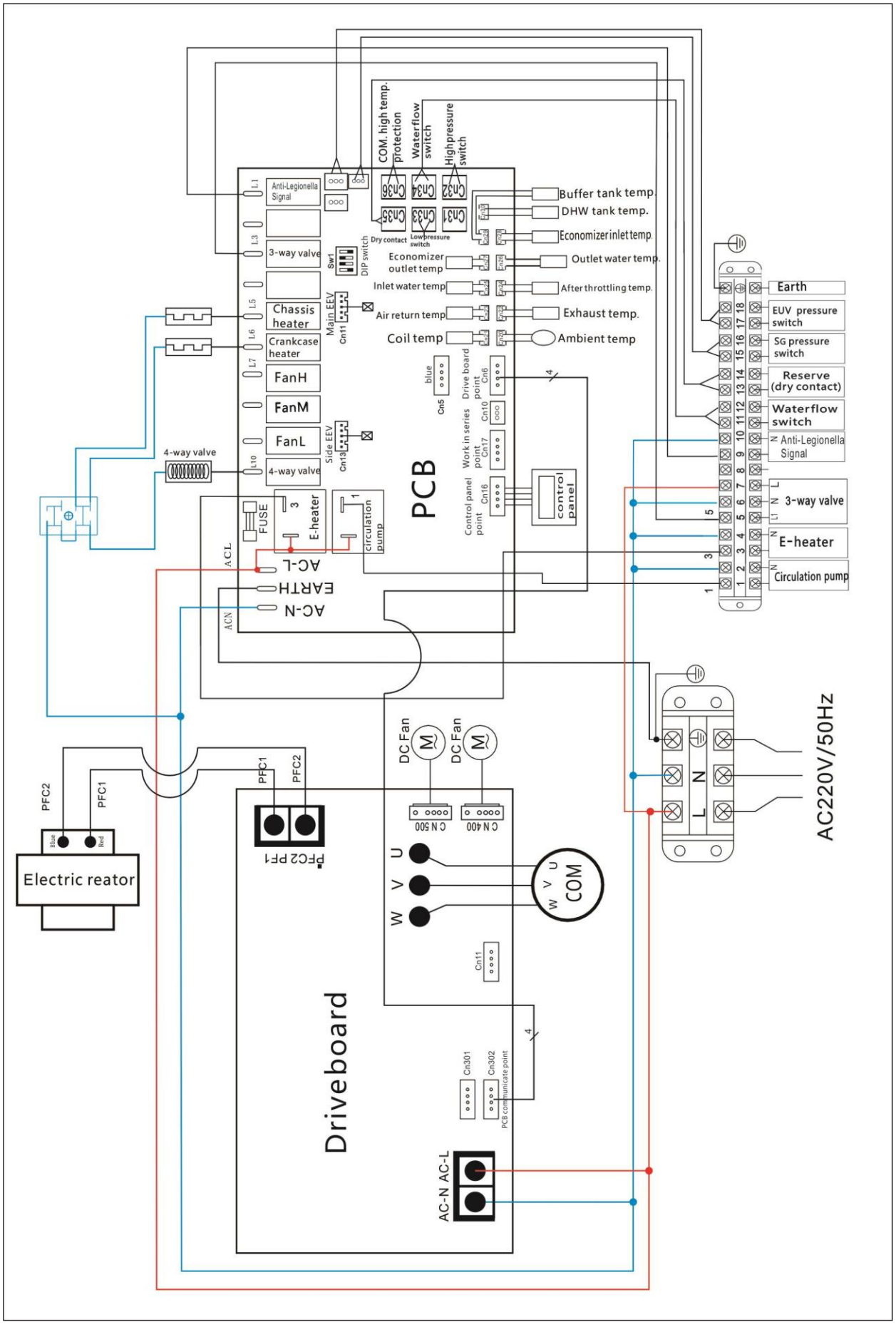
	◇Contactor destroyed	◇Replace the Contactor
Compressor works but not heating	◇Refrigerant leakage ◇Compressor fault	◇Leak hunting and fill in standard quantity of refrigerant ◇Replace the compressor
Low water-flow protection	◇Hydraulic switch destroyed ◇Inadequate water-flow	◇Replace the switch ◇Clean the filter and discharge the air
Excessive discharge pressure	◇Too much refrigerant ◇Non-condensable gas in the Refrigeration cycle ◇Inadequate water-flow	◇Draw off the superfluous refrigerant ◇Drive the gas out ◇Check the circulation and increase the flow
Low suction pressure	◇Drying filter stoppage ◇Lack of refrigerant ◇Excessive pressure drop in the heat exchanger	◇Replace the filter ◇Leak hunting and fill in standard quantity of refrigerant ◇Check the opening of electronic expansion valve

Part VI Wiring Diagram

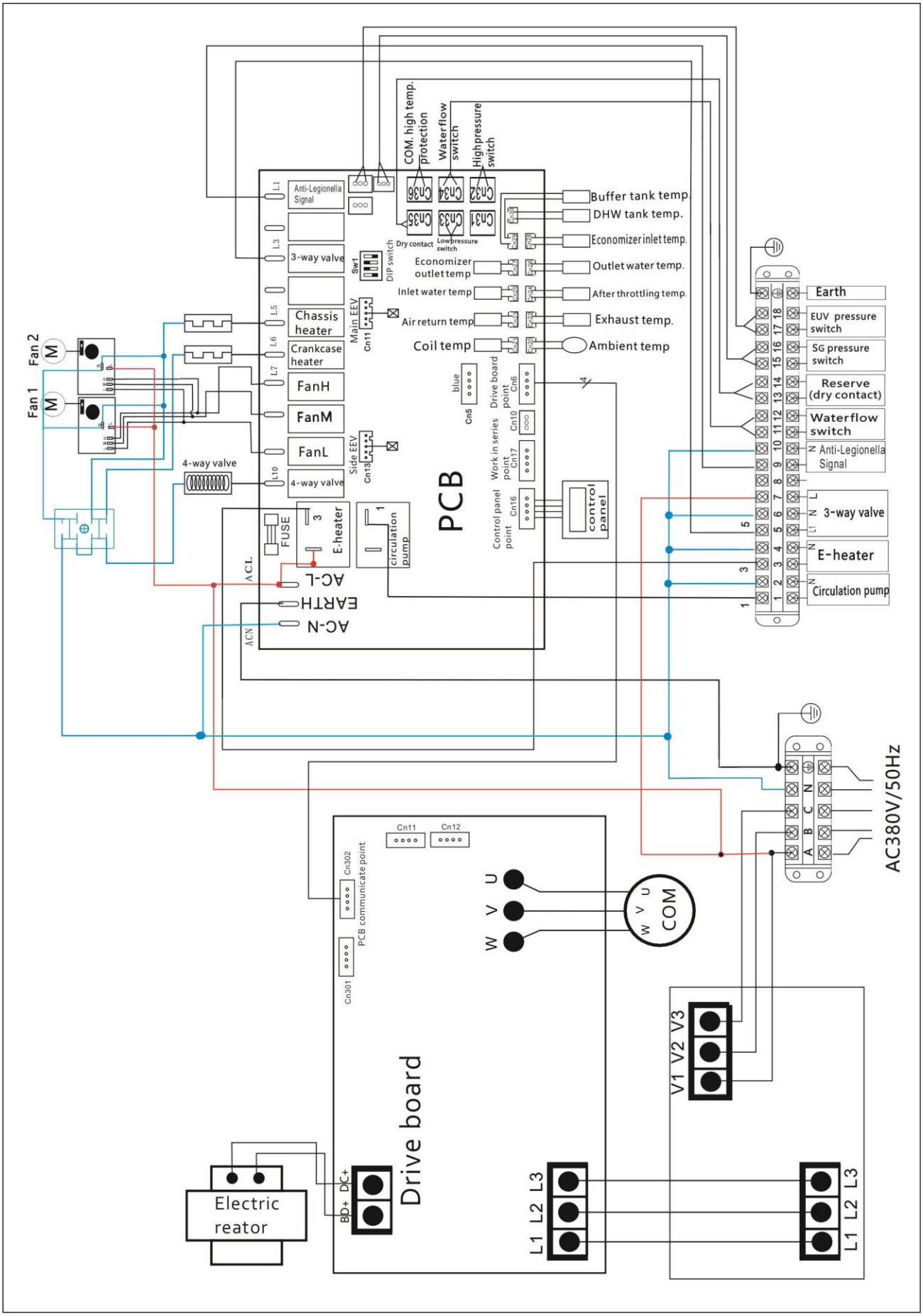
GT-SKR020KBDC-M290, GT-SKR030KBDC-M290



GT-SKR040KBDC-M290



GT-SKR040KBDC-M290T, GT-SKR050KBDC-M290T


COM. high temp. protection
Waterflow switch
Highpressure switch
Anti-Legionella Signal
3-way valve
Chassis heater
Crankcase heater
FanH
FanM
FanL
4-way valve
Fan 1
Fan 2
Dry contact
Low pressure switch
DIP switch
Sw1
Main EEV
Cn11
Side EEV
Cn13
Buffer tank temp.
DHW tank temp.
Economizer inlet temp.
Outlet water temp.
After throttling temp.
Exhaust temp.
Ambient temp
Economizer outlet temp
Inlet water temp
Air return temp
Coil temp
blue
Cn5
Drive board point
Cn6
Work in series point
Cn10
Cn17
Control panel point
Cn16
control panel
PCB
FUSE
E-heater
circulation pump
AC-L
EARTH
AC-N
ACL
ACN
Earth
EUV pressure switch
SG pressure switch
Reserve (dry contact)
Waterflow switch
Anti-Legionella Signal
3-way valve
E-heater
Circulation pump
AC380V/50Hz
Cn11
Cn12
Cn302
PCB communicate point
Cn301
Drive board
BD+ DC+
Electric reator
W V U
V1 V2 V3
L1 L2 L3
L1 L2 L3

Disposal

Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.

Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging you health and well-being.

There won’t be a further notice if anything changes as the unit improved.
If there is anything difference with rating label, please subject to the rating label on the unit.