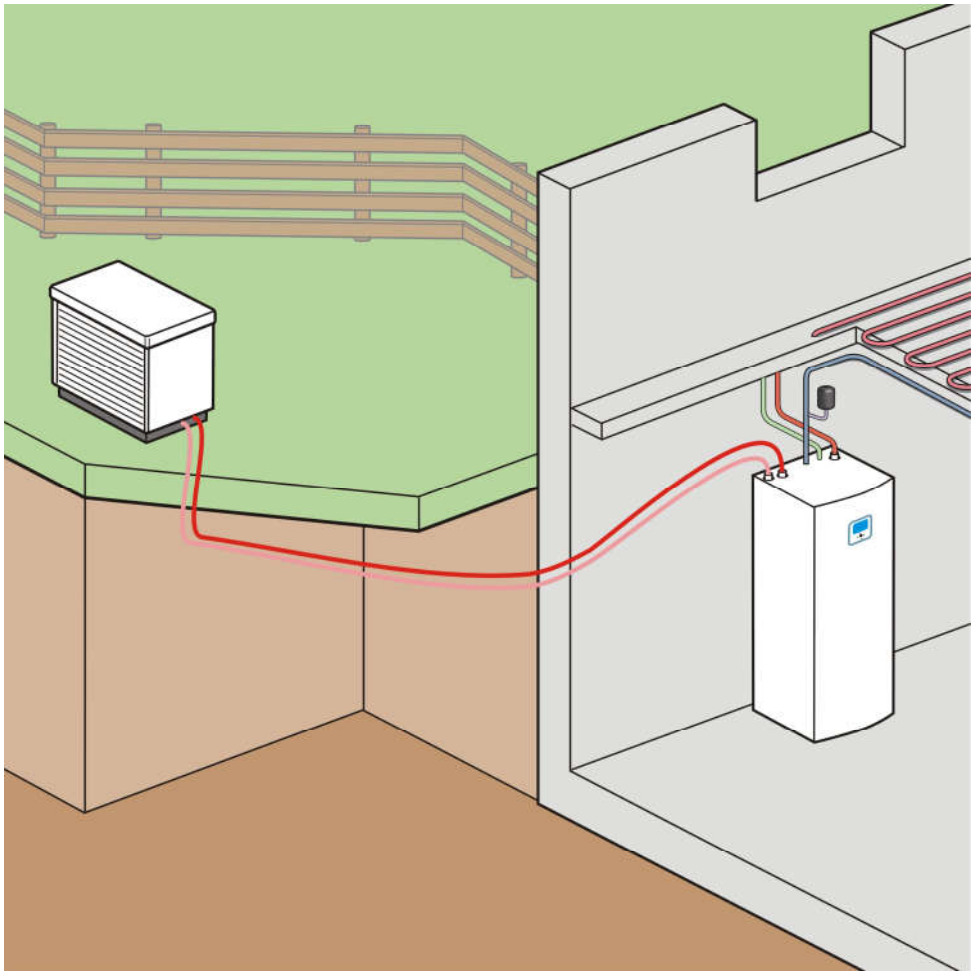
Air to Water Heat Pump

DC Inverter Split with Tank

Service Manual



Before operation this product, please read the instructions carefully and save this manual for future.

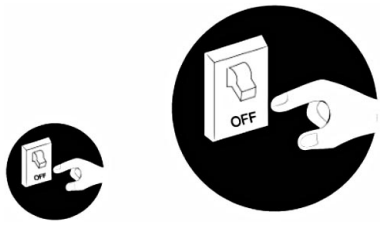
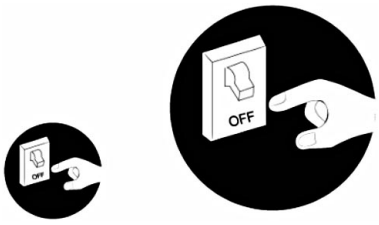
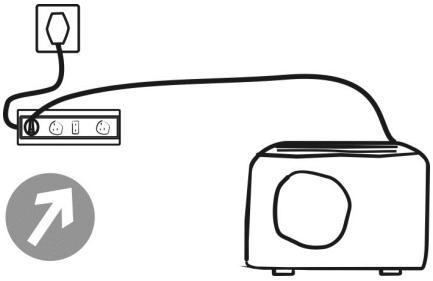
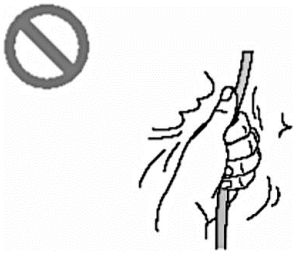
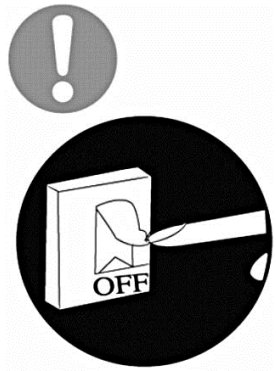
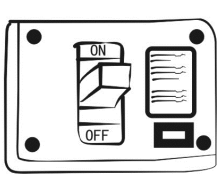
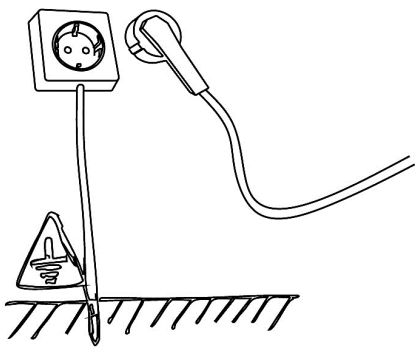
1 Safety precautions

IMPORTANT

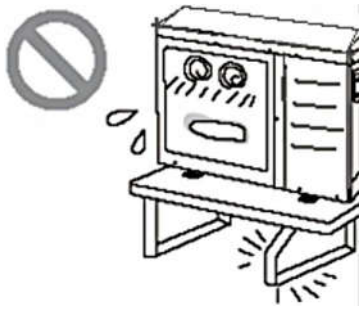
If heat pump is not running in the winter, it is necessary to keep power supply connected for Anti-freeze protection.
In cold weather (≤ 0°C), if heat pump is no longer needed, do drain out all the water inside the system.

1.1 Safety precautions

- Warning **- suggestion** **- prohibition**

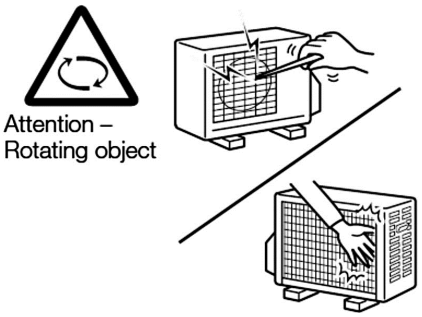
Once abnormality like burning smell occurs, please cut off the power supply immediately and then contact with service center.  **If the abnormality still exists, the unit may be damaged and electric shock or fire may result.**	**Be sure to pull out the power plug and drain the indoor unit and water tank when unit is not in use for a long time. Otherwise, the accumulated dust may cause overheating fire or freeze of water tank or coaxial heater exchanger in winter.**  	**Make sure to use a dedicated power line for the heat pump only. Do not add other appliances to the line.** 
Before installation, please see if the voltage of local place accords with that on nameplate of unit and capacity of power supply, power cord or socket is suitable for input power of this unit. 	**Don't operate the unit with wet hand.**  **Otherwise, it may cause electric shock.**	**Never damage the electric wire or use the one which is not specified.**  **Otherwise, it may cause Overheating or fire.**
Before cleaning please cut off the power supply. Otherwise, it may cause electric shock or damage.  	**The power supply must adopt special circuit with leakage switch and enough capacity. It is mandatory to use a suitable circuit-breaker for the heat pump and make sure the power supply to the heater corresponds to the specifications. Otherwise the unit might be damaged.**  	**The unit must be earthed to avoid any risks caused by insulation defects.** 

Please note whether the installation stand is firm enough or not.

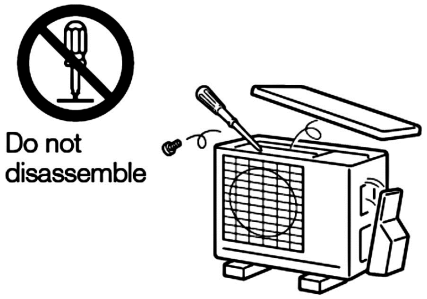


If damaged, it may cause fall of the unit and injury of people.

Never insert any foreign matter into unit to avoid damage. And never insert your hands into the air outlet of outdoor unit.



Don't attempt to repair the unit by yourself.

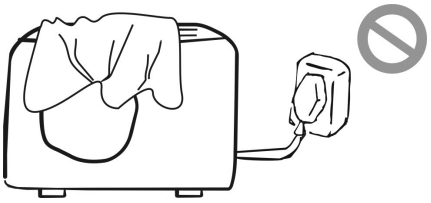


Improper repair may cause electric shock or fire, so you should contact the service center to repair.

Don't step on the top of the unit or place anything on it.

There is the danger of fall of things or people.

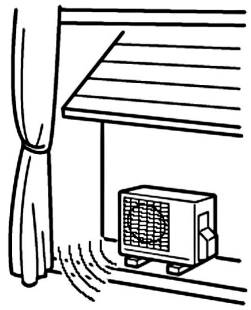
Never block the air inlet and outlet of unit.



It may reduce efficiency or cause stop of the unit and even fire.

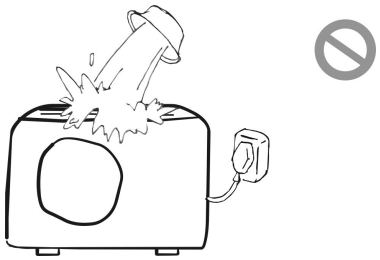
Keep pressurized spray, gas holder and so on away from the unit above 1m. It may cause fire or explosion.

Select an installation place where noise and vibration when operation do not bother your neighbors.

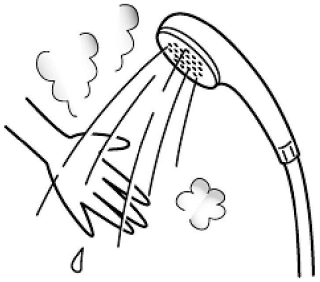


Remove any snow from the units after snowfalls.

Make sure no water or other liquid drips into the electric box of the unit Otherwise the unit might be damaged.

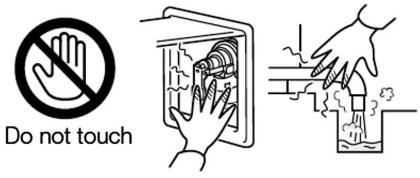


Check the water temperature before supplying any hot water or taking a shower. Could result in being burnt.



Do not touch the faucet while hot water is being supplied.
Could result in being burnt by hot water

Do not touch the relief valve, drainage pipe, drain outlet or drain elbow when inspecting the relief valve or while draining hot water.



2 Working principle Heat Pump (refrigerant circuit):

2.1 refrigerant system

The refrigerant system consists of 5 main components:DC inverter type compressor, 4-way-valve, heat exchanger (condenser, refrigerant to water), electronic expansion valve, evaporator(air to refrigerant).

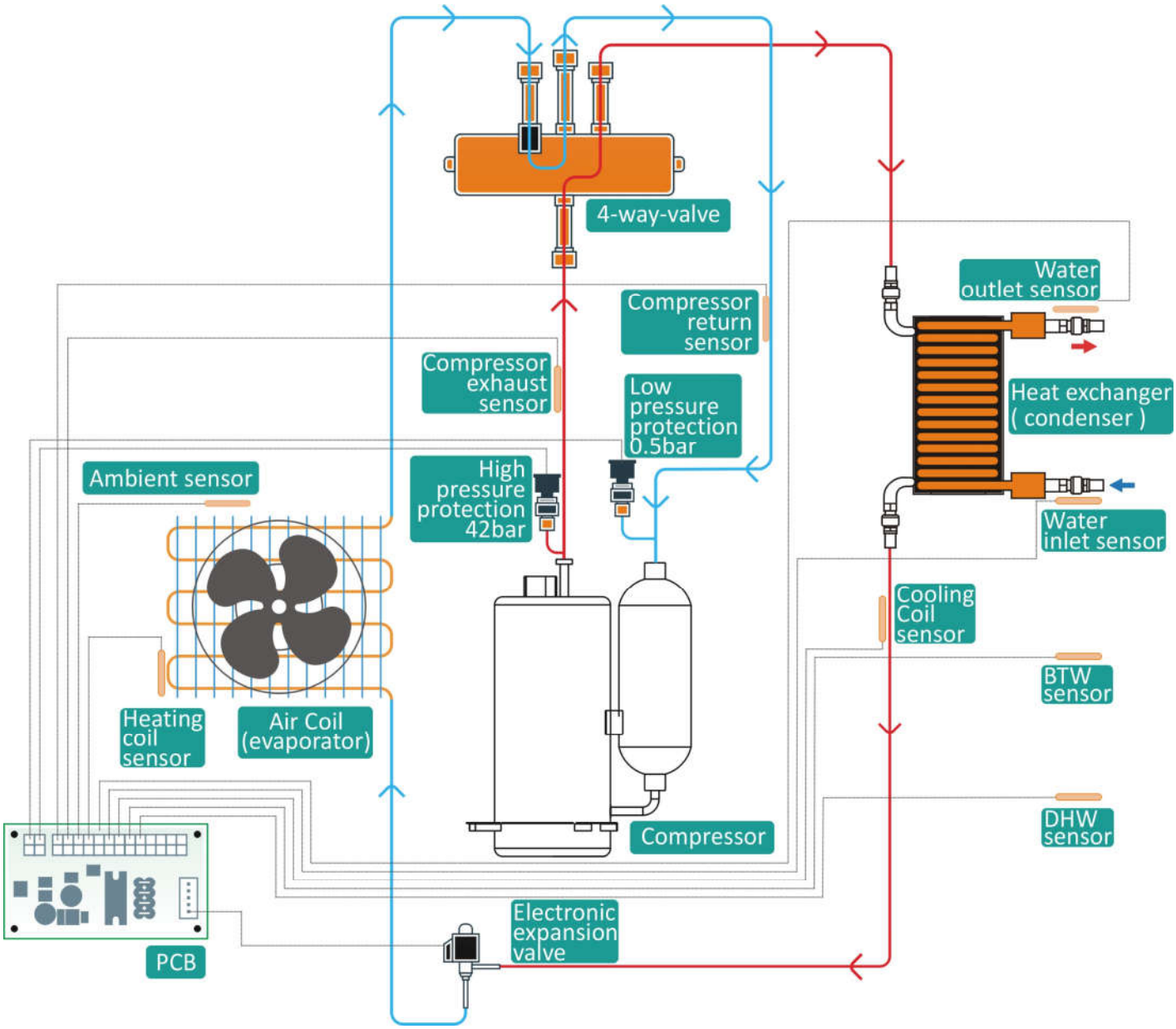
Heat pump can absorb the heating from air source. This makes the heat pump a very environmentally friendly and economically sound alternative for space heating.

* evaporator (air coil): low temperature, low pressure refrigerant go through evaporator to boil and turn from liquid to gas.
* compressor: compressor absorb refrigerant in gas status, and compress to high temperature, high pressure status.
* condenser (heat exchanger): refrigerant release heat energy to heat exchanger. refrigerant temperature reduce, and it return from gas to liquid status.

The heat energy is absorbed by water, circulated by a circulation pump to TANK or HOUSE HEAT systems.

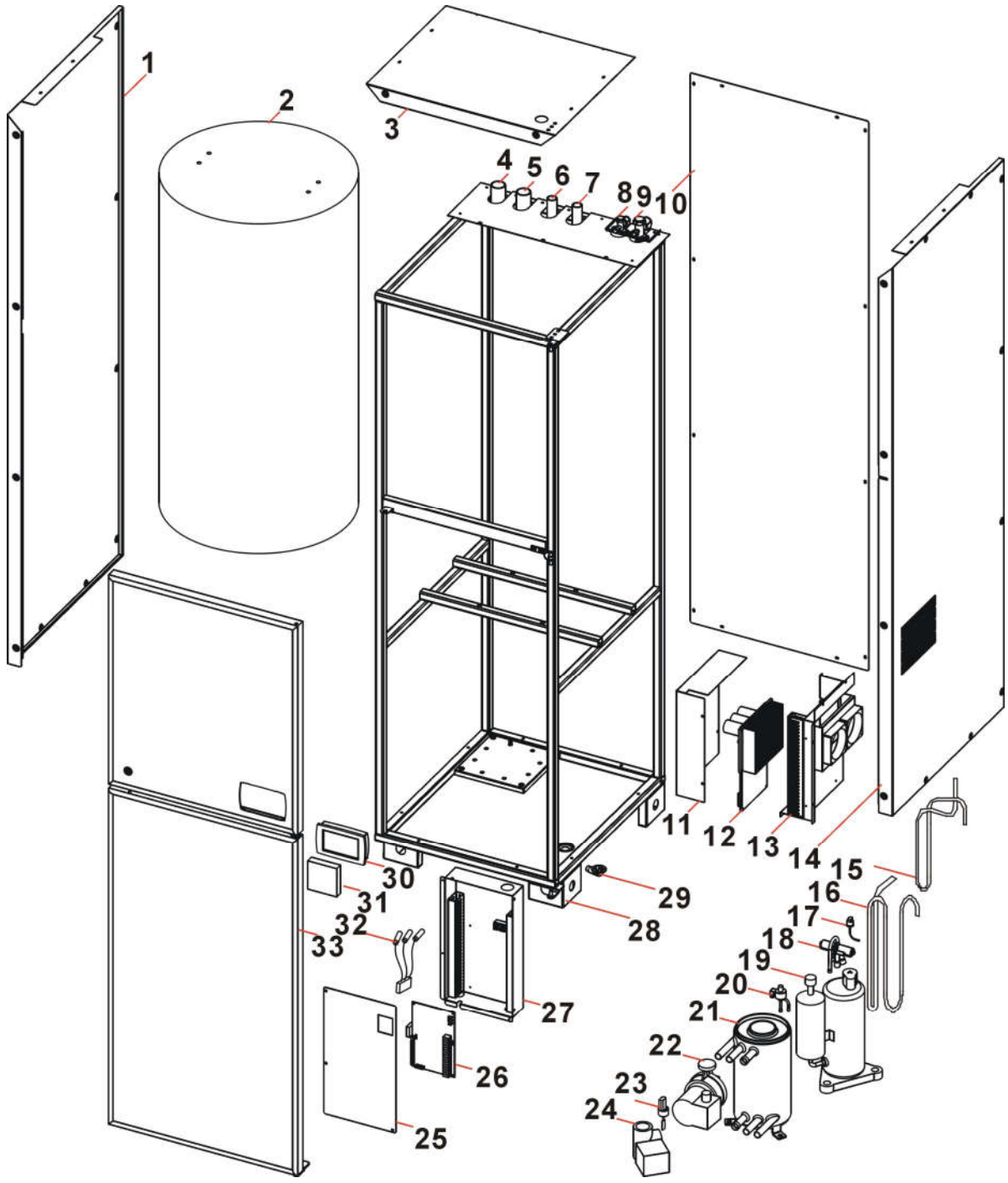
* EEV: refrigerant go through the electronic expansion valve, where its pressure is reduced.

Refrigerant system install 1 high pressure switch (42bar), 1 low pressure switch (0.5bar).



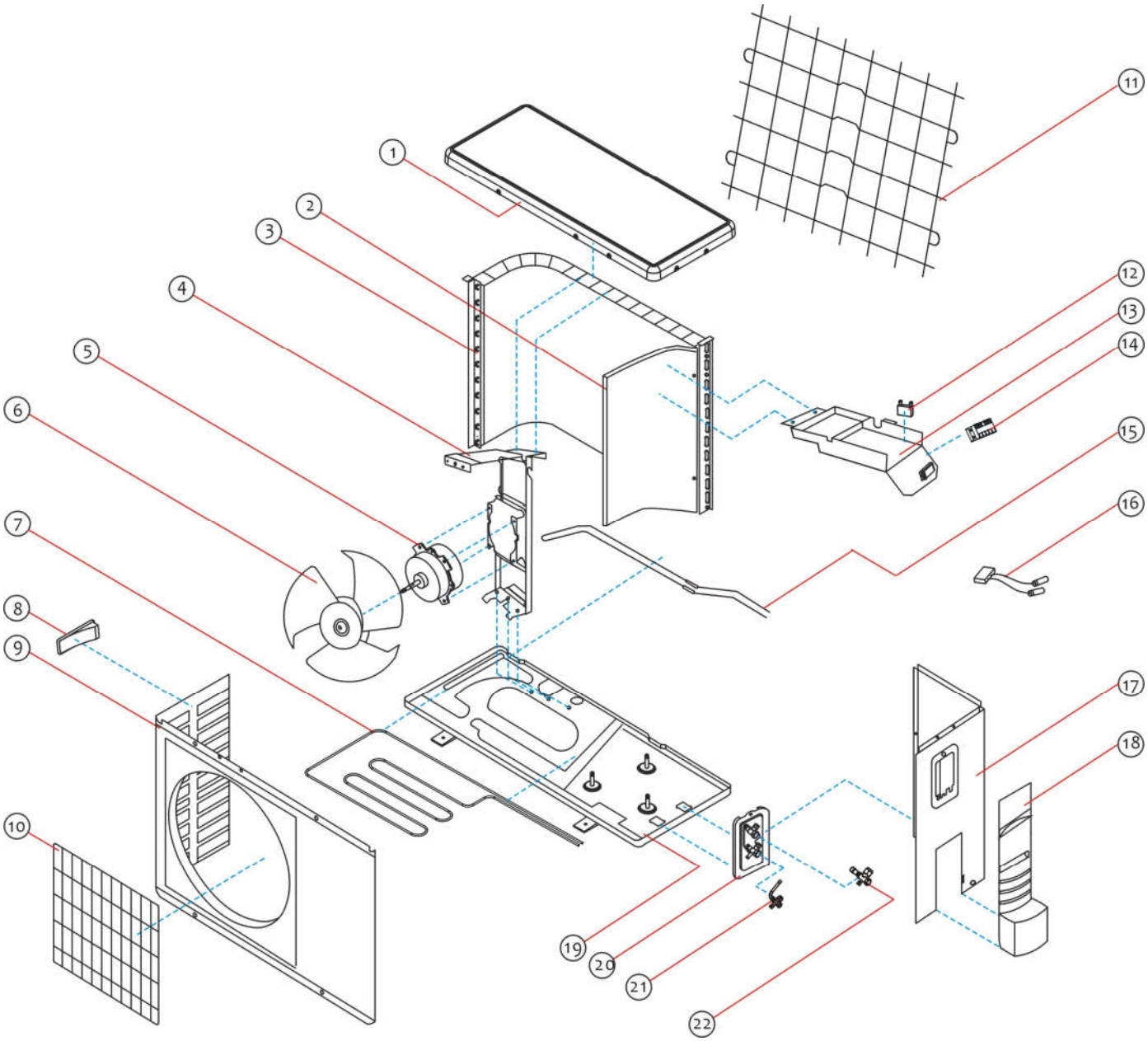
3 Explored view

3.1 indoor unit explored view with 180L tank



1	Left plate		12	IPM		23	Water-flow-switch
2	Sanitary hot water tank		13	Electrical control box 1		24	3-way-water-valve
3	Top plate		14	Right plate		25	Cover for electric. control box 2
4	Inlet heating connector		15	Copper exhaust pipe		26	Function PCB
5	Outlet heating Connector		16	Copper return pipe		27	Electrical control box 2
6	Hot water outlet		17	Pressure switch		28	Body frame
7	Cold water inlet		18	4-way-valve		29	Drain connector
8	Liquid valve		19	compressor		30	controller
9	Gas valve		20	Electronic expansion valve		31	WIFI box
10	back plate		21	Water heat exchanger		32	sensor
11	Cover for electric. control box 1		22	Water pump		33	Front door

3.2 Outdoor unit explored view

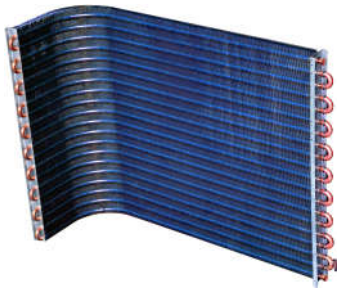


1	Top panel		12	Motor capacitor
2	Separate panel		13	Electrical control box
3	Evaporator		14	terminal
4	Motor bracket		15	Evaporator bottom heater
5	Motor		16	Sensor
6	Fan blade		17	Right panel
7	Evaporator bottom heater		18	Right handle
8	Left handle		19	Bottom plate
9	Front panel		20	Valve plate
10	Front protection net		21	Liquid connector
11	Near net		22	Gas connector

3.3 main components

compressor

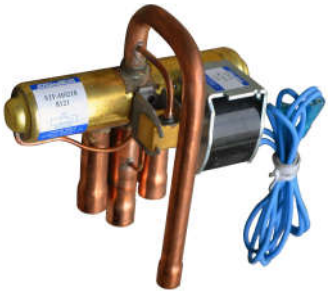
Shell tube heat exchanger



evaporator

Pressure protection

Electronic expansion valve



4-way-valve

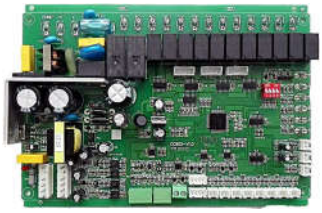
Fan blade

Motor

sensor

Driver PCB

Filtering PCB (for 1 phase)



Function PCB

reactance

WIFI box

Wire controller

Water flow switch

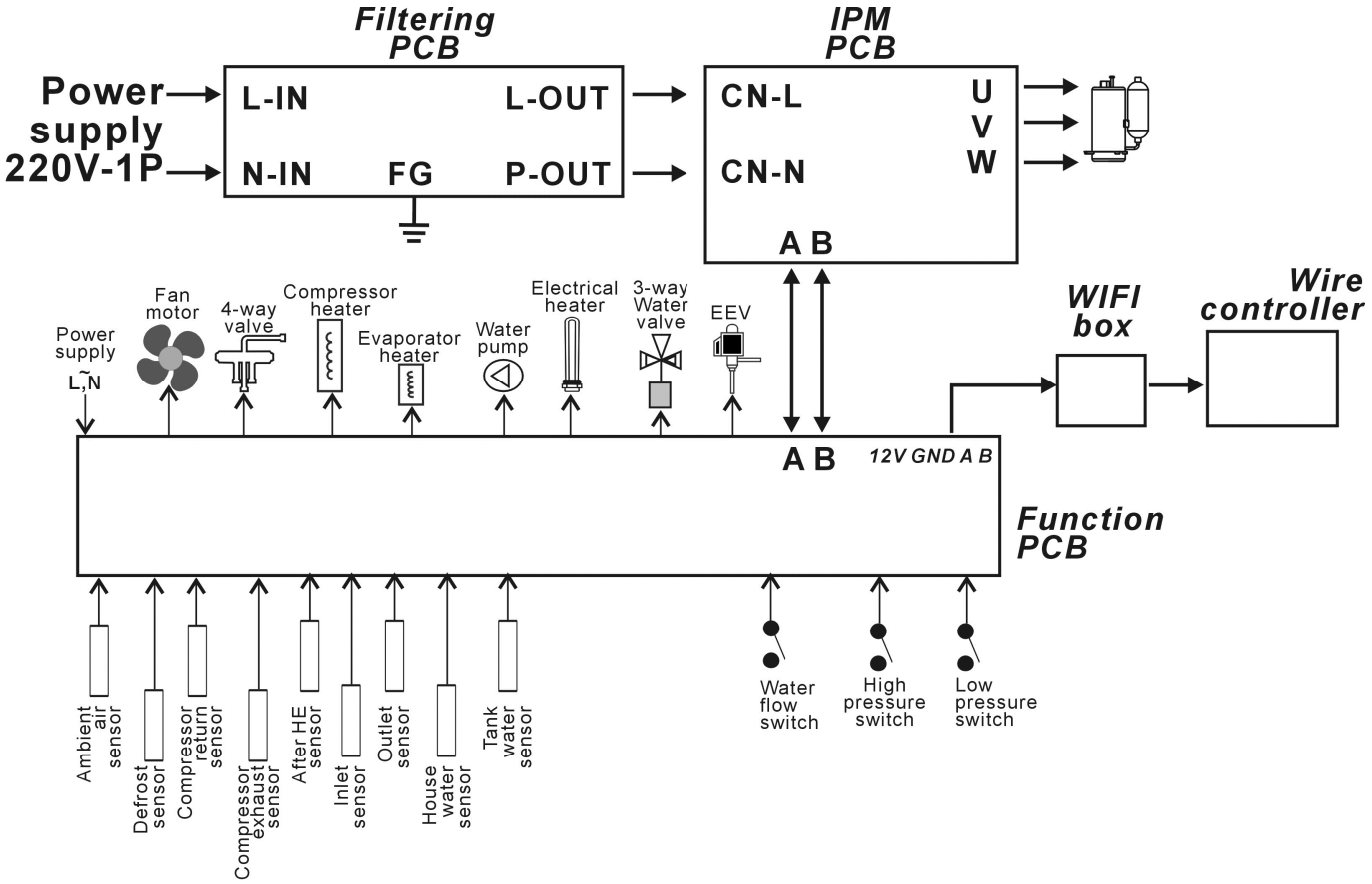
3-way-water-valve

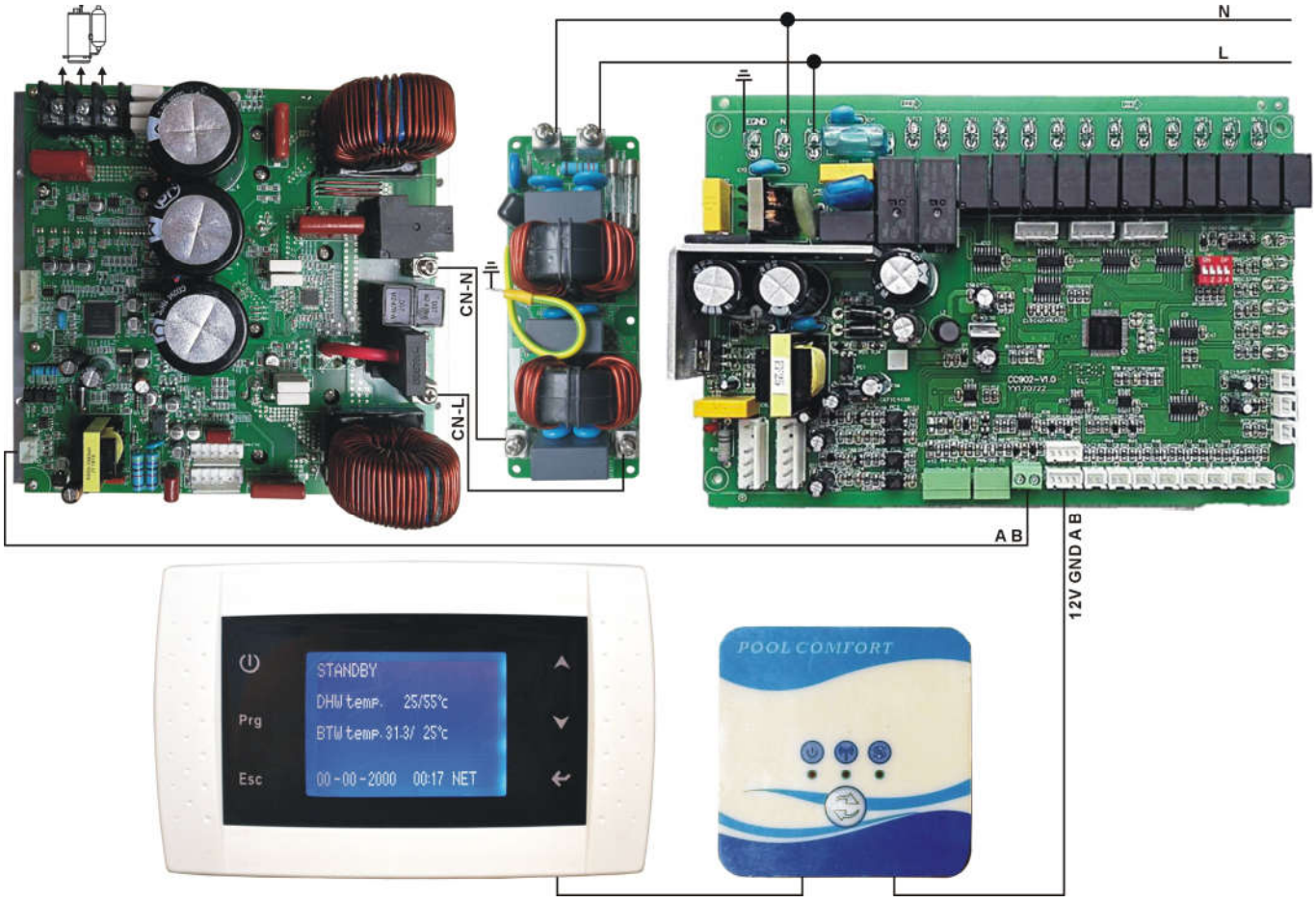
Water pump

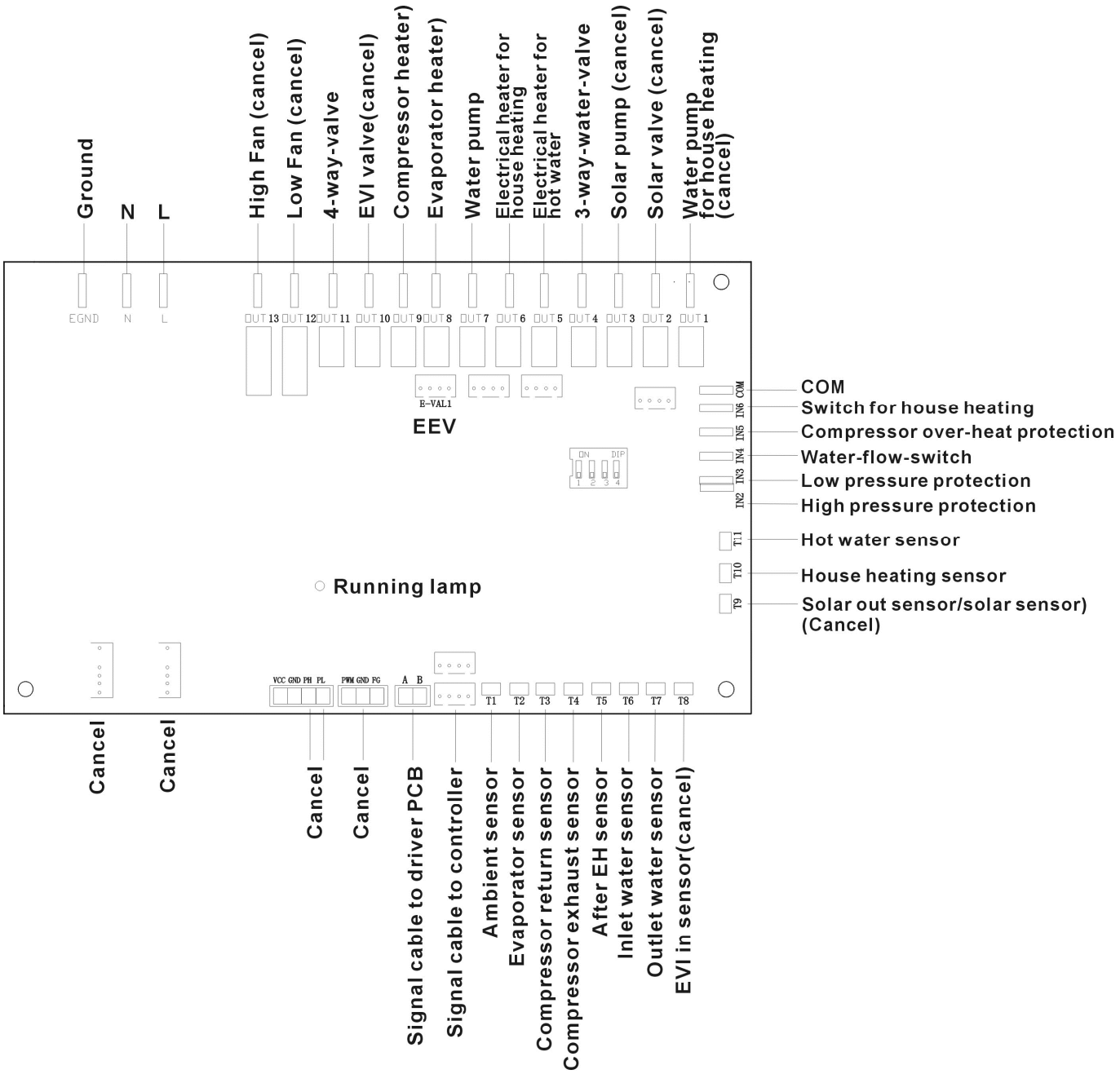
Compressor heater

Evaporator bottom heater

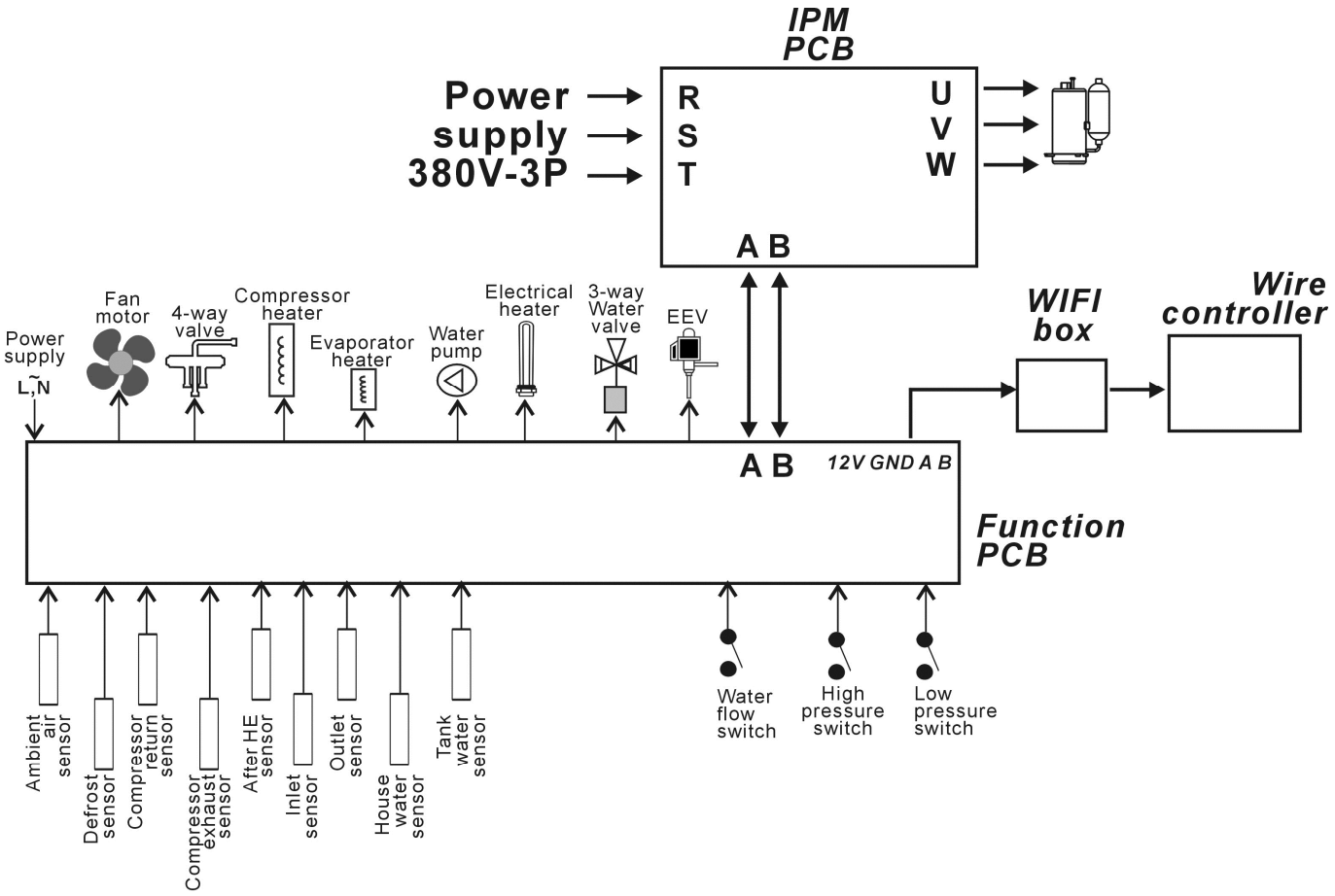
3.4 principle of Circuit board (for 1 phase)

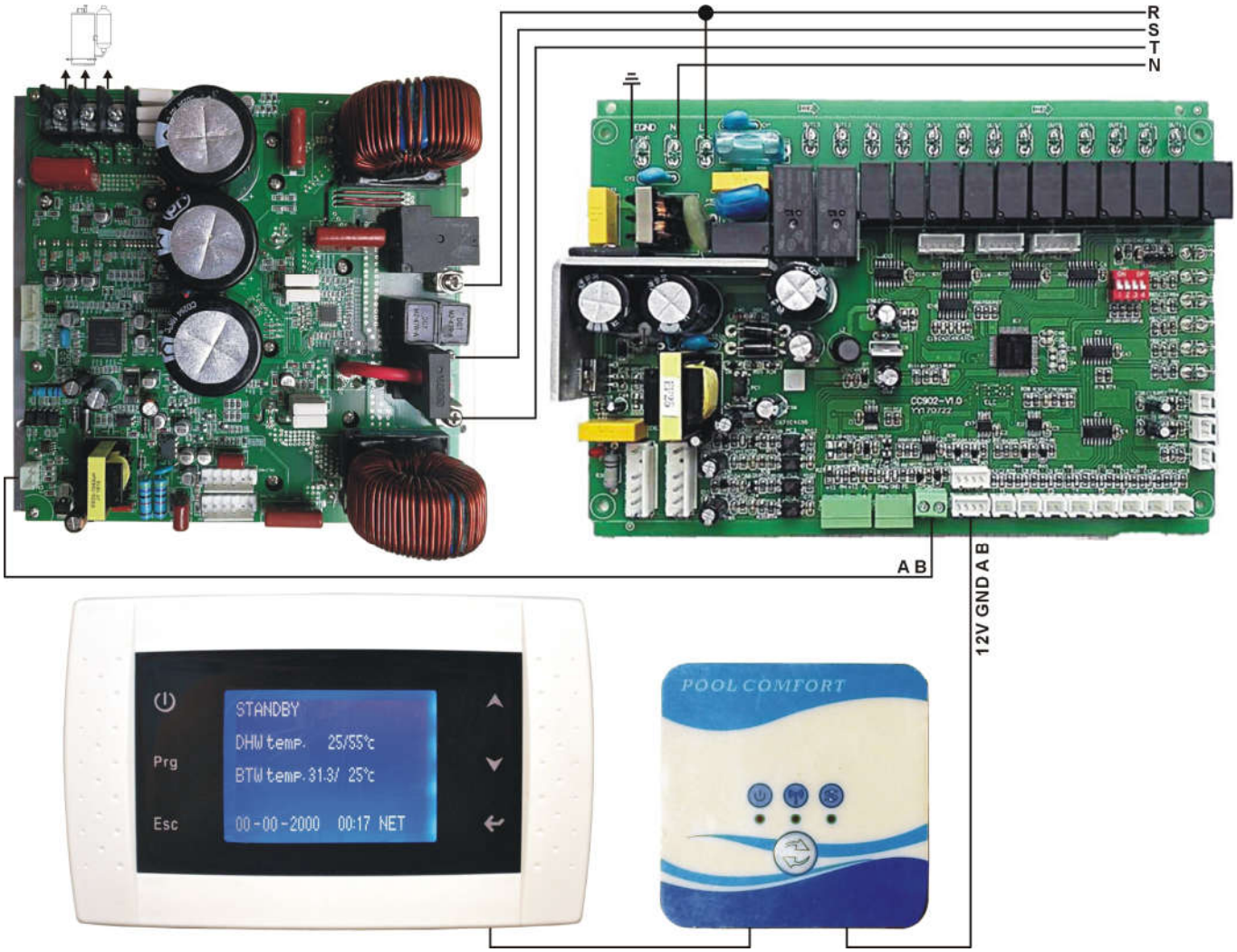





Ground
N
L
High Fan (cancel)
Low Fan (cancel)
4-way-valve
EVI valve(cancel)
Compressor heater)
Evaporator heater)
Water pump
Electrical heater for house heating
Electrical heater for hot water
3-way-water-valve
Solar pump (cancel)
Solar valve (cancel)
Water pump for house heating (cancel)
EGND
N
L
OUT 13
OUT 12
OUT 11
OUT 10
OUT 9
OUT 8
OUT 7
OUT 6
OUT 5
OUT 4
OUT 3
OUT 2
OUT 1
E-VAL1
EEV
ON
DIP
1 2 3 4
COM
IN6
IN5
IN4
IN3
IN2
T.1
T10
T9
COM
Switch for house heating
Compressor over-heat protection
Water-flow-switch
Low pressure protection
High pressure protection
Hot water sensor
House heating sensor
Solar out sensor/solar sensor) (Cancel)
Running lamp
VCC GND PH PL
PWM GND FG
A B
T1
T2
T3
T4
T5
T6
T7
T8
Cancel
Cancel
Cancel
Cancel
Signal cable to driver PCB
Signal cable to controller
Ambient sensor
Evaporator sensor
Compressor return sensor
Compressor exhaust sensor
After EH sensor
Inlet water sensor
Outlet water sensor
EVI in sensor(cancel)

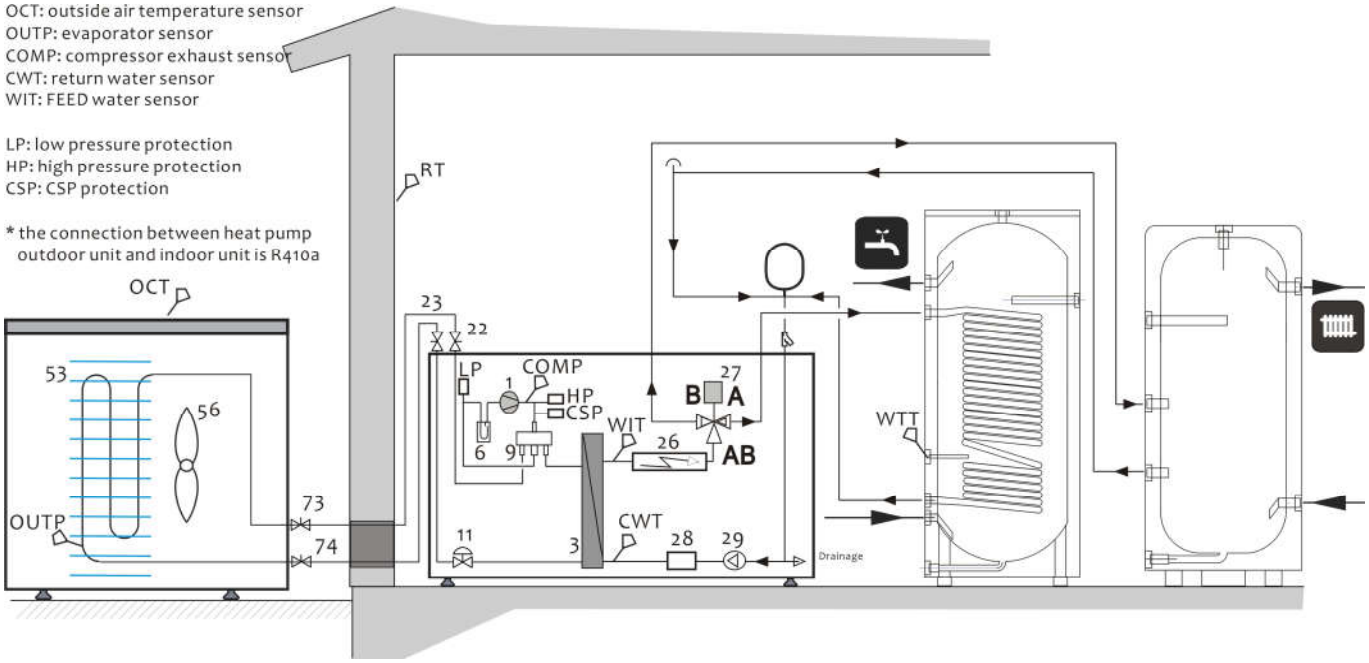
3.5 principle of Circuit board (for 3 phase)





4. Applications

4.1 application: supply sanitary hot water, house heating



Recommended installation order:

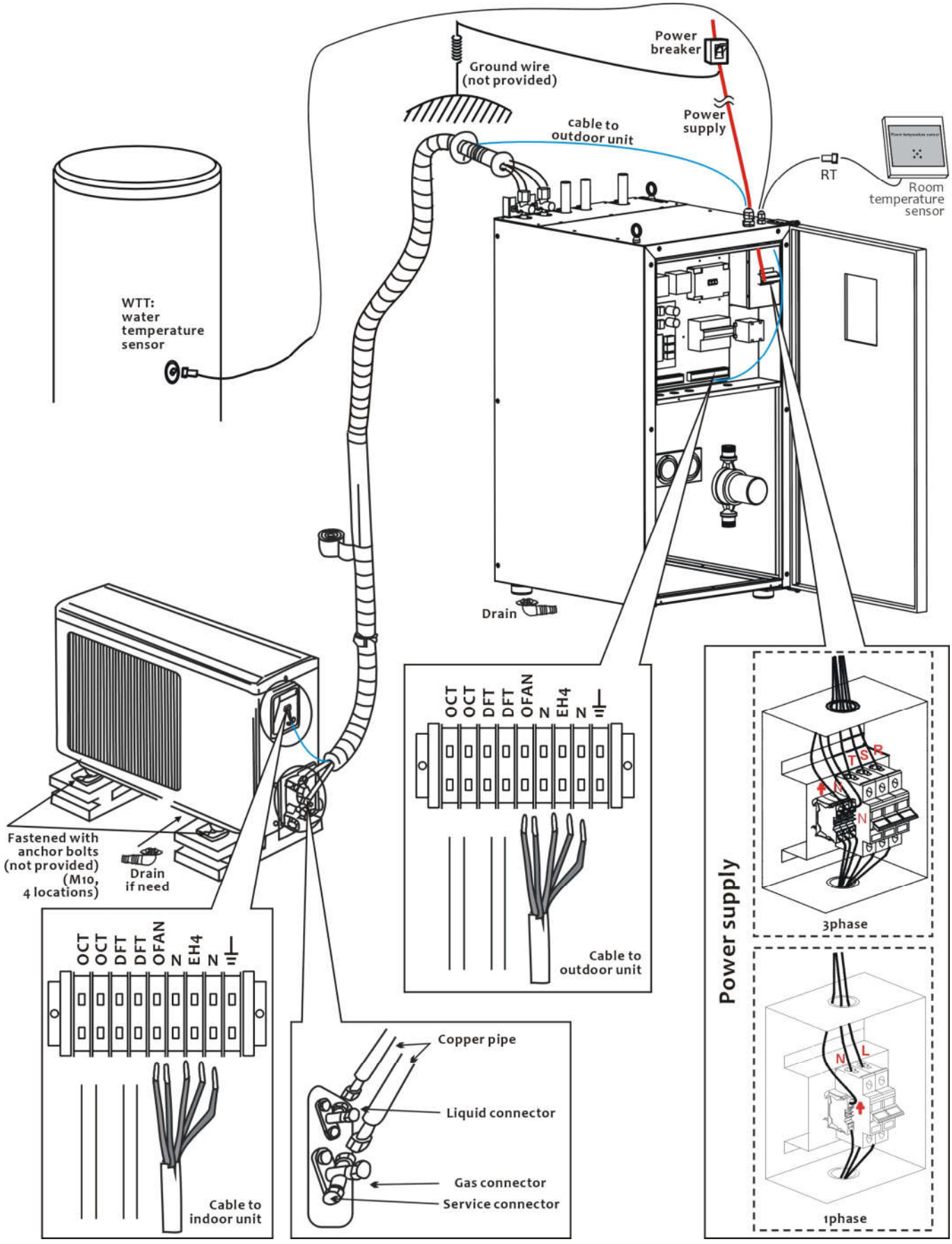
1. Connect copper connective pipe between indoor unit and outdoor unit.
2. Connect indoor unit to the climate system, cold and hot water lines as well as any external heat sources.
3. Connect the load monitor, outdoor temperature sensor; any centralized load control and external contacts as well as the cable between outdoor units. .
4. Connect power supply to outdoor unit. .

Installation requirements

	10kW	12kW	16kW
Max pressure for house heating	5 Bar		
Highest recommended FEED / return temperature at dimensioned outdoor temperature	55/45**°C**		
Max water outlet temperature with electrical heater	+65**°C**		
Max FEED line temperature with compressor	+58**°C**		
Min supply temperature cooling	+7**°C**		
Max supply temperature cooling	+25**°C**		
Max water flow for heat pump	0.8l/s	1.1l/s	1.3l/s
Min water flow for heat pump	0.4l/s	0.5l/s	0.6l/s

5. Installation

5.1 installation plan



5.2 Installation Outdoor Unit

Outdoor unit can be transported either vertically or horizontally. However it must be stored vertically and in dry conditions.

5.2.1 Select the Installation Place of Outdoor Unit

* The outdoor unit should be installed on a solid wall and fastened securely.

* The outdoor units should be installed close to the house, on a terrace, on the façade or in a garden. They are designed to operate in the rain but can also be installed under cover as long as there is sufficient ventilation. There should be no obstacles to hinder the free circulation of air to the exchanger inlet and outlet (see installation diagrams below).

* The emplacement of the outdoor unit should be carefully chosen and protected from prevailing winds in order for it to be compatible with environmental requirements: integration into the site, noise level.

* We particularly recommend:

  • Not placing the outdoor unit close to sleeping areas

  • Not placing it opposite a glazed wall

  • Avoiding proximity to a terrace

* Moreover, we recommend positioning the unit above the average depth of snowfall in the region in which it is installed.

* It is necessary to provide clearance all around the appliance to carry out connection, commissioning and maintenance operations.

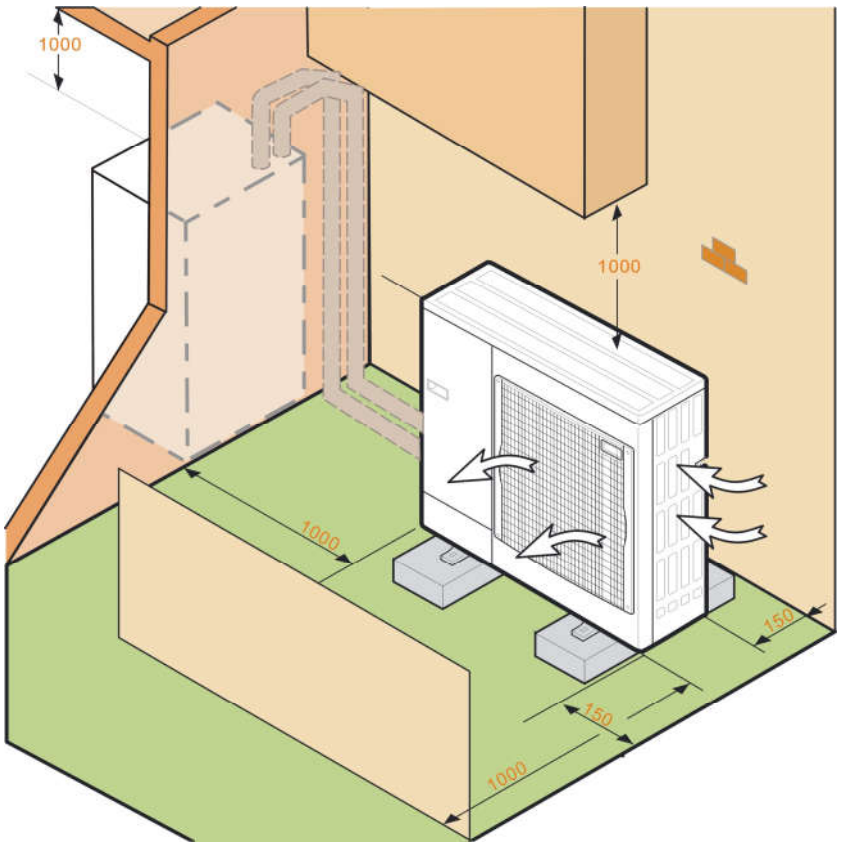
* The following procedure must be observed before connecting the pipes or electric cables.

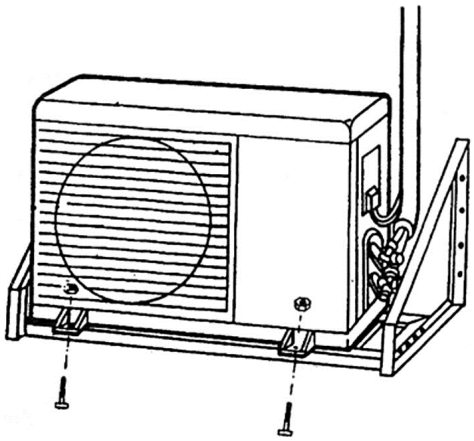
1) Decide which the best position on the wall is and leave enough space to be able to carry out maintenance easily.

2) Fasten the outdoor unit support to the wall using screw anchors which are particularly suited to that type of wall.

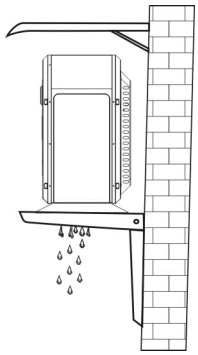
3) Use a larger quantity of screw anchors than normally required for the weight they have to bear: during operation the machine vibrates and Has to remain fastened in the same position for years without the screws becoming loose.

4) Mount the outdoor unit on the support using the four bolts supplied.





* Please install the drain connector to the unit when necessary. In some cold areas (temperature below 0°C), please don't use the drain connector; otherwise it may clogged by ice.



5.3 Indoor Unit Installation

* It is recommended that indoor unit is installed in a room with existing floor drainage, most suitably in a utility room or boiler room.
* The surface must be firm, preferably a concrete floor or foundation.
* Install indoor unit with its back to an outside wall, ideally in a room where noise does not matter. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem.
* The unit can be aligned using the adjustable feet.
* Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.
* Ensure that there is approx. 500 mm free space in front of and 220 mm above the product for any future service.

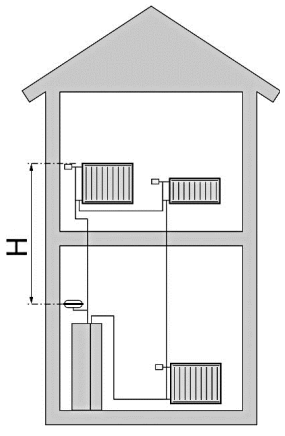
Dimensioning expansion tank

The expansion tank’s volume must be at least 5 % of the total volume.
Example table

Total volume (l)	Volume Expansion tank (l)
280	14
320	16
360	18

Initial pressure and max height difference

The initial pressure of the pressure expansion tank must be dimensioned according to the maximum height (H) between the tank and the highest positioned radiator, see figure. An initial pressure of 0.5 bars means a maximum permitted height difference of 5 m.
If the standard initial pressure in the pressure tank is not high enough it can be increased by filling via the valve in the expansion tank.
Any change in the initial pressure affects the ability of the expansion tank to handle the expansion of the water.



5.4 Refrigeration Connection

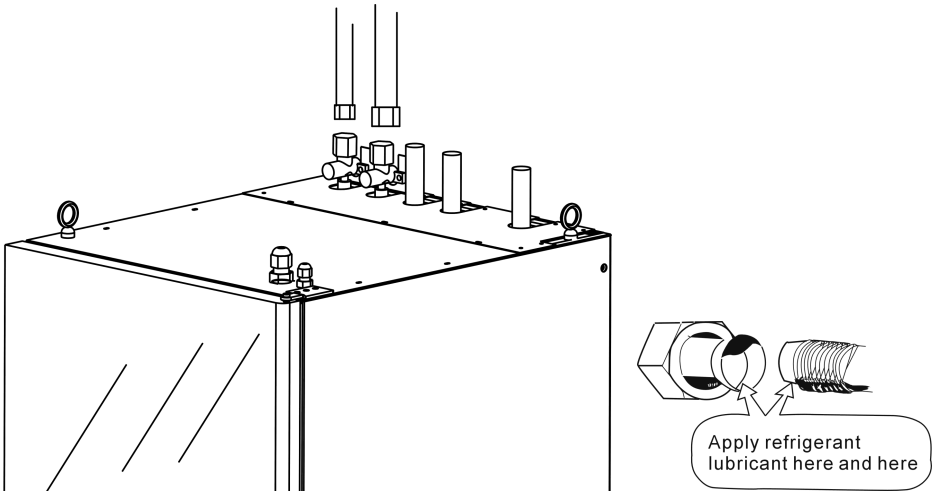
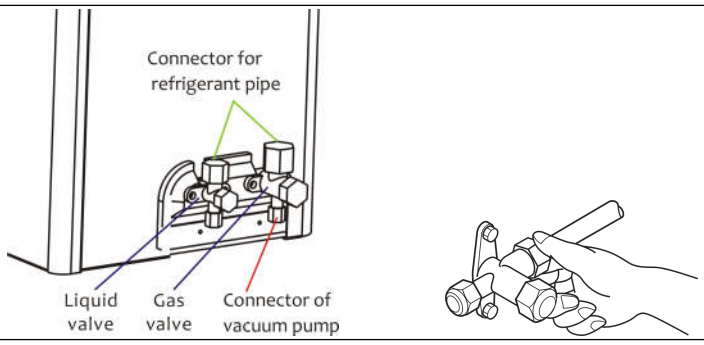
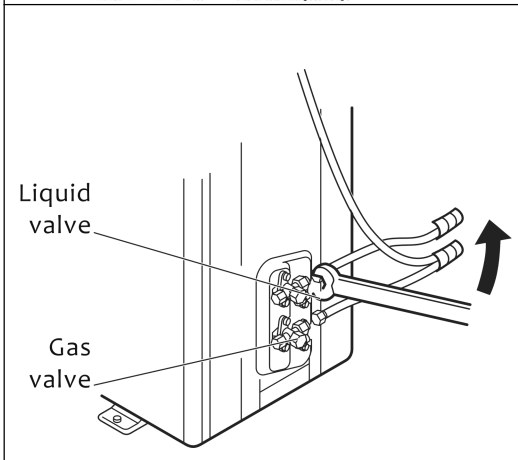
5.4.1 Refrigeration connection

The commissioning of heat pump includes operations on the refrigeration circuit. Appliances must be installed, commissioned, maintained and repaired by qualified, authorized personnel, pursuant to the requirements of prevailing directives, laws and regulations and in accordance with the codes of practice of the profession.

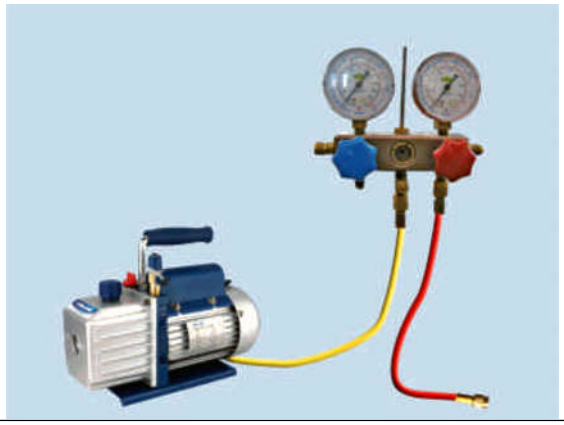
*** Before shipped out from manufacturer, the indoor unit has been filled with refrigerant. Additional refrigerant may be filled when copper pipe is more than 5 meters. Outdoor unit do not have refrigerant inside.**

*** Check the liquid valve and the gas valve of the outdoor unit. The valves shall be completely shut off.**

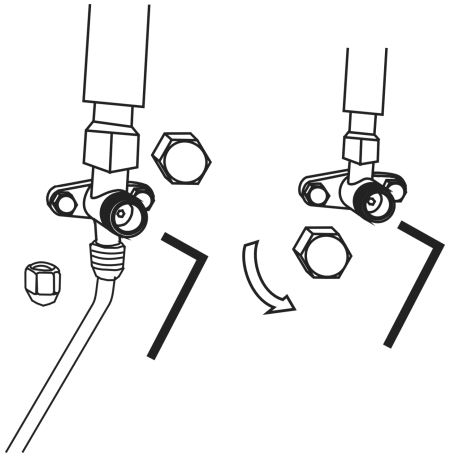
5.4.2 Refrigeration connection step

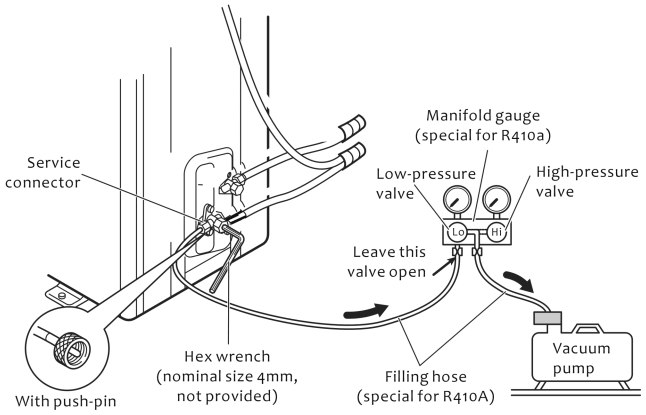
1. Connect the copper pipe to indoor unit.	
2. Wipe the quick connectors with clean cloth to prohibit dust and impurity entering the pipes. Align the centre of the pipe and fully screw in the angular nuts with Finger. connect other side of copper pipe to outdoor unit	  

4. A vacuum pump and manifold gauge are needed.
Connect the pressure gauge to the vacuum pump.
Use Vacuum pump to remove the air from outdoor unit and copper pipe.



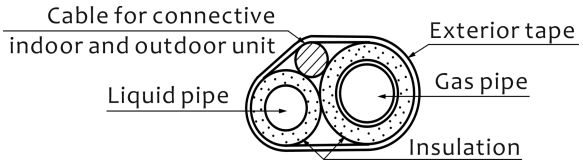
6. Use a 4mm hex wrench to open two valves of outdoor unit.



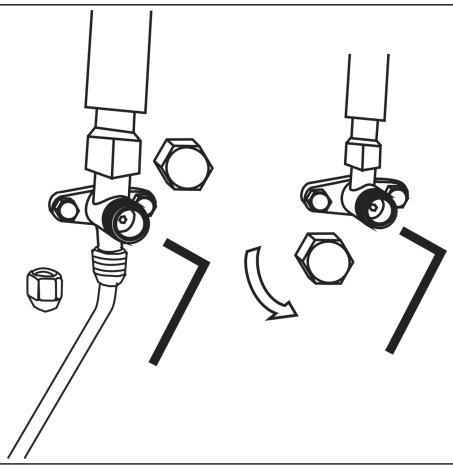


5. When vacuuming the outdoor unit and copper pipe, please turn on gas/liquid valve on outdoor unit ; but do not turn on gas/liquid valve on indoor unit, otherwise refrigerant leakage. Vacuum the unit for at least 15 minutes till negative value shown on the pressure gauge, and close the manifold gauge.

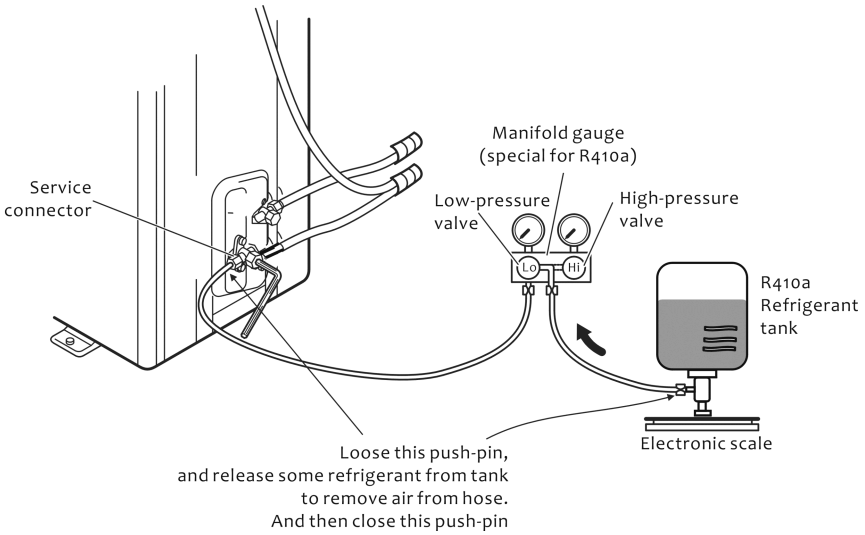
7. Remove the service pipe of pressure gauge. Put copper nut back. Tighten them with a wrench.
Connect the electric cable as per wiring diagram, and bundle it with the connecting pipe.



6. Use a 4mm hex wrench to open two valves of outdoor unit.



8. After confirming that there is no leakage from the system, when the compressor is not in operation, charge additional R410a refrigerant with specified amount to the unit through the service connector on liquid valve.
Be sure to charge the specified amount of refrigerant in liquid state to the liquid pipe. Since R410a is a mixed refrigerant, adding it in gas form may cause the refrigerant composition to change, preventing normal operation.



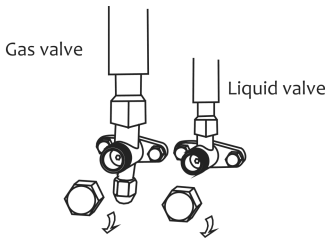
5.4.3 Return refrigeration

If heat pump want to disconnect. Please return refrigerant R410a from outdoor unit back to indoor unit as following:

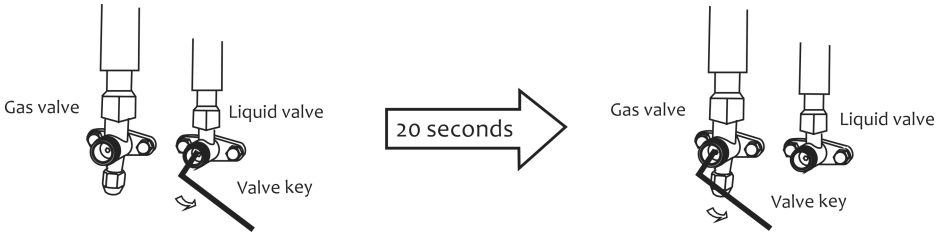
Run heat pump on ROOMCOOL operation mode.

4-way-valve switch ON, circulation pump switch ON, compressor start, fan start.

1. Remove the cap of two valves on indoor unit with the spanner.

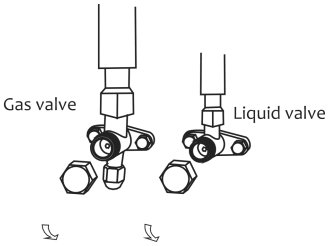


2. Tighten the core of the liquid valve (the smaller one) with valve key at first. After about 20 seconds, you can hear a special sound from compressor; tighten the core of the gas (the bigger one) with valve key.

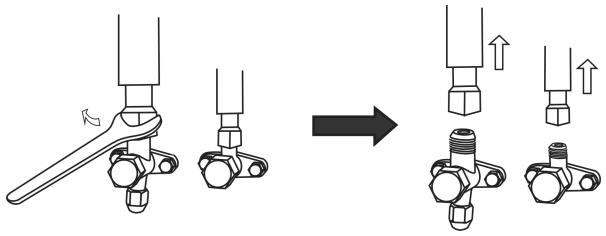


3. Press  **to stop heat pump**.

4. Tighten the cap of two valves.



6. Loose the nut of the connect pipe to the outdoor unit valve with 2 spanner, disconnect the connect pipe and the two valves.



5.4.4 Maximum distances and quantity of refrigerant fluid to be loaded

	5kW	7kW	10kW	12kW	15kW	18kW
Ø gas pipe	**1/2 "**	**5/8"**	**5/8"**	**3/4"**	**3/4"**	**3/4"**
Ø liquid pipe	**1/4 "**	**3/8"**	**3/8"**	**1/2"**	**1/2"**	**1/2"**
max pipe length	**20 m**	**20 m**	**20 m**	**20 m**	**20 m**	**20 m**

IMPORTANT

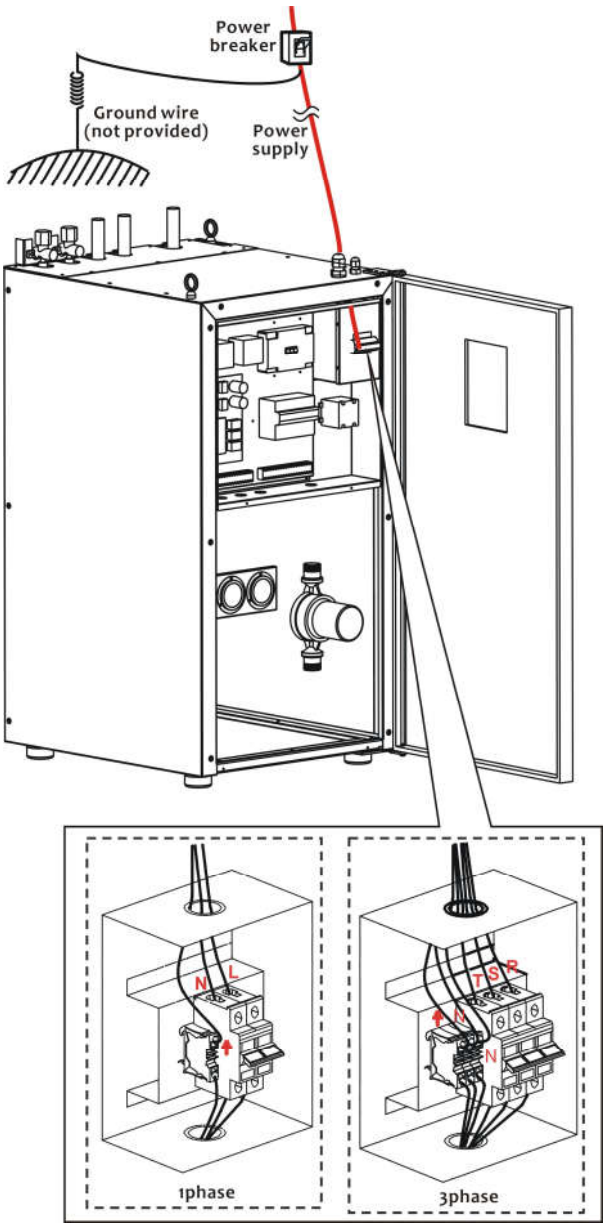
The refrigerant R410a inside heat pump is suitable for 5 meter copper pipe. If the refrigerant link between outdoor unit and indoor unit is more than 5 meter,
Please fill 10g per meter for 5kW, 7kW; 30g per meter for 9kW, 12kW, 15kW, 18kW.

5.5 Electrical connection

IMPORTANT

Electrical installation and service must be carried out under the supervision of a qualified electrician. Electrical installation and wiring must be carried out in accordance with the stipulations in force: maximum amperage on the outdoor unit (thermodynamic unit). See the table below, distance of the appliance from the original power supply, upstream protection, and neutral operating conditions.

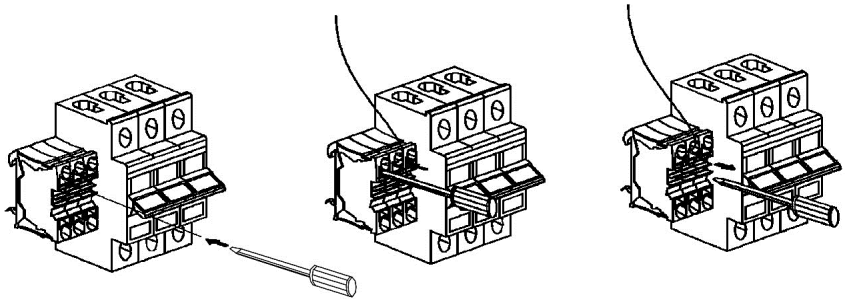
1.It is recommended to use a suitable breaker for the heat pump and make sure the power supply to the heater Corresponds to the specifications. Otherwise the unit might be damaged.
2.The power supply to the heat pump unit must be grounded.
3.Cable should be fixed tightly, to ensure it won't get loosen.



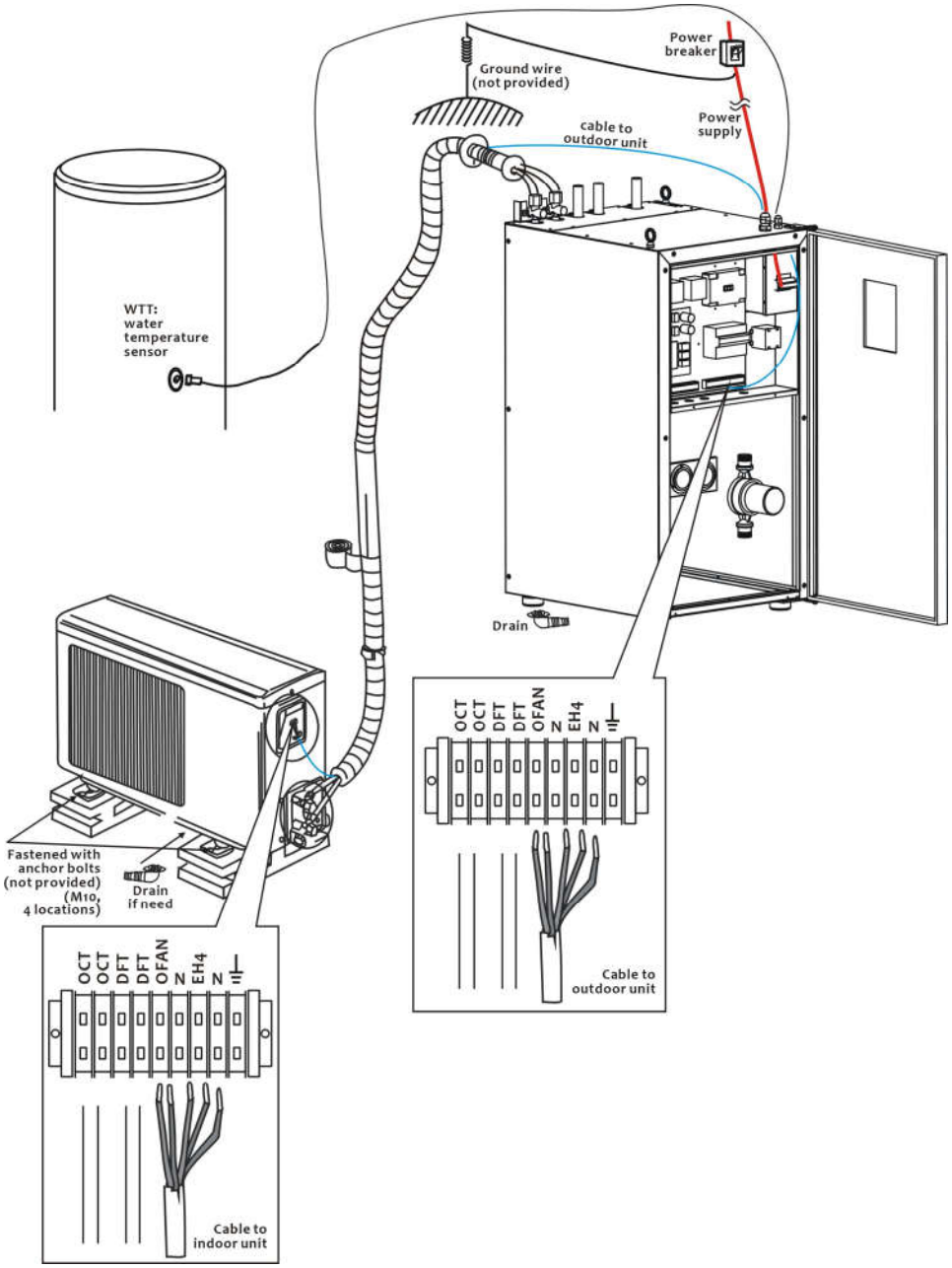
Connecting power supply

Incoming power supply cable is connected
to terminal block from top cable clamp. The cable must be dimensioned according
to the applicable norms.

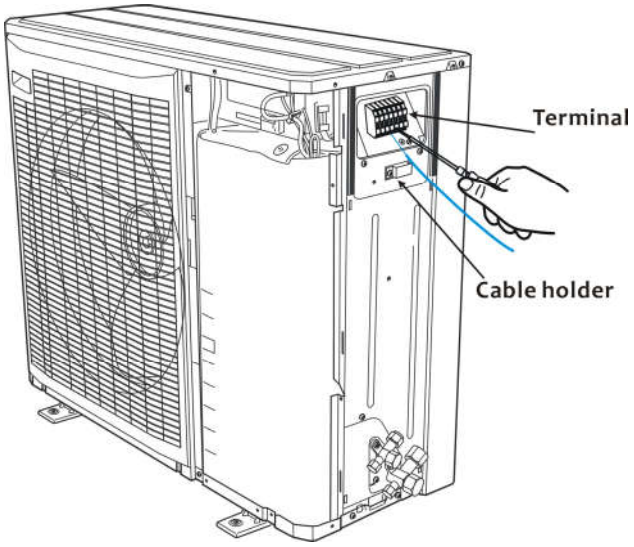
Connect the power cable as following:



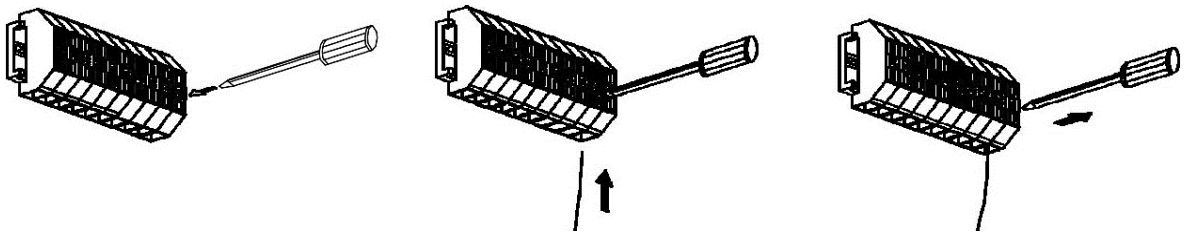
Connecting signal supply from indoor unit to outdoor unit



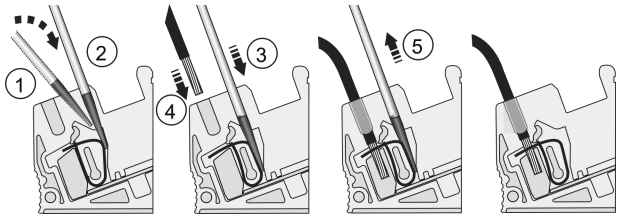
Connect cable on outdoor unit



Connect cable on indoor unit



When the cable is connected to terminal, a screwdriver is used to open the terminal, see figure :



5.6 Pipe connection

5.6.1 General

Pipe installation must be carried out in accordance with current norms and directives. Heat pump can operate with a return temperature of up to 50°C and outgoing temperature from the unit of 55°C.
Heat pump is not equipped with shut off valves; these must be installed outside the heat pump to facilitate any future servicing.
Heat pump can be connected to the radiator system, floor heating system and/or fan coil units.
Install the safety valve and manometer.

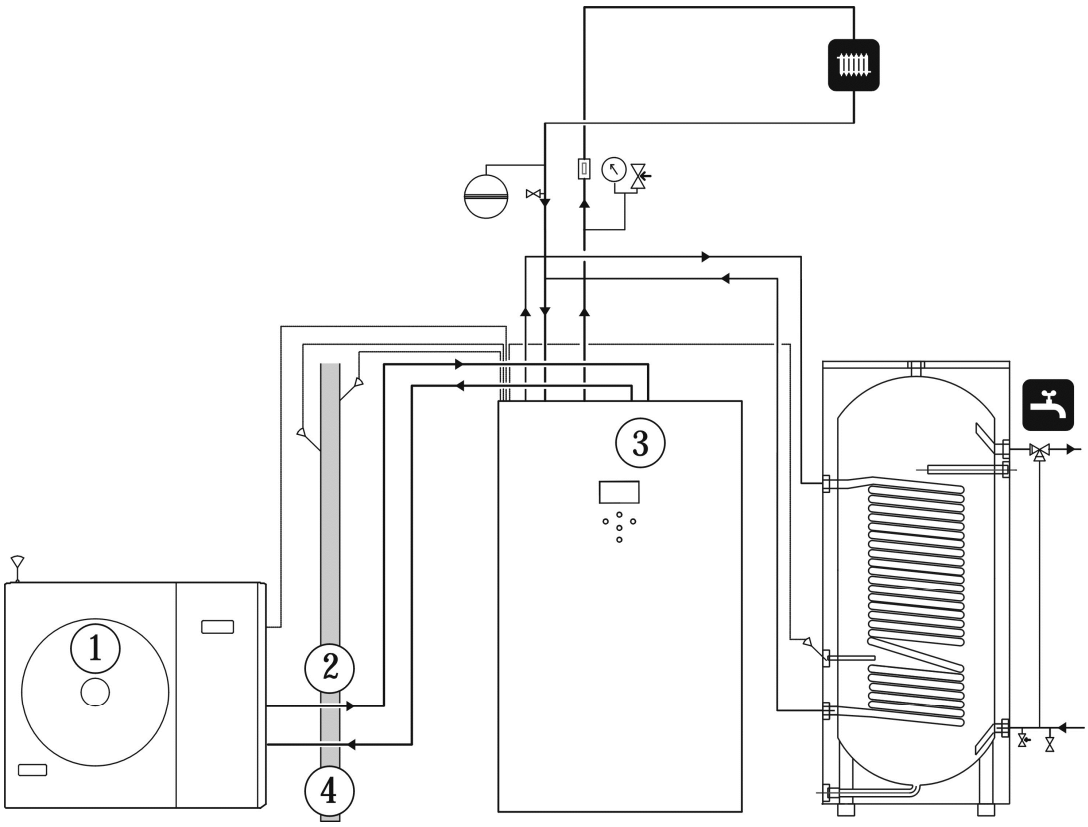
Indoor module is equipped with circulation pump, water-flow-switch, 3-way-water-vave, electrical heater backup.

Note: this heat pump is split type with refrigeration link between outdoor unit and indoor module, it is not necessary to add glycol to the installation.

Buffer tank:
The installation of buffer tank is recommended for installations.
It is intended:

- Increase the water volume in an installation in order to limit the short-cycle operation of the compressor. The greater the water volume, the lower the number of start-ups of the compressor and the longer its useful life.
- Guarantee on energy reserve for the defrosting phases.

Example of heat pump installations
- Heat pump split compact - DHW production by independent tank - Buffer tank for house heating



Connection of extra circulation pump

When connecting additional circulation pump, to achieve a higher flow capacity, see alternative "Underfloor heating systems" on page 25. Respective maximum flows must not be exceeded.

Connecting the hot water tank

The water tank must be supplied with necessary set of valves.

* There must be a mixing valve if the temperature exceeds 60 °C.

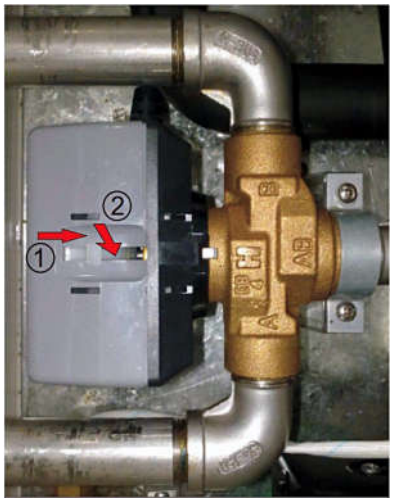
* The safety valve must have a maximum 10.0 bar opening pressure and be installed on the incoming domestic water line according to outline diagram. The entire length of the overflow water pipe from the safety valves must be inclined to prevent water pockets and must also be frost proof.

* See section Dockings on page 23 for outline diagram.

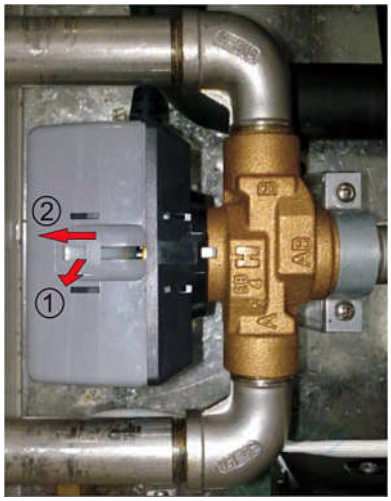
5.6.2 Filling and venting the heating medium system

1. Check the water system for leakage.
2. Connect the filling pump and return line on the heating system's service connections as shown in figure.
3. Close the valve between the service connections.
4. Open the valves on the service connections (AV1, AV2).
5. Pushing the white manual lever down to bottom. (This has already been done when the machine leaves factory), then three way valve's water tank port is closed (the "B" port), room heat port is open (the "A" port).
6. Start the filling pump, and fill until there is fluid in the return pipe.
7. Open up Power ON from control panel to start machine, then heat medium water pump is running, the valve will return to the up position when power is restored.
8. Firmly pushing the white manual lever down to midway and in. in this position both the 'A' and 'B' ports are open.
9. The filling pump and the heating medium pump are now operational. The fluid should circulate via the container with tap water until it emerges from the return hose without being mixed with air.

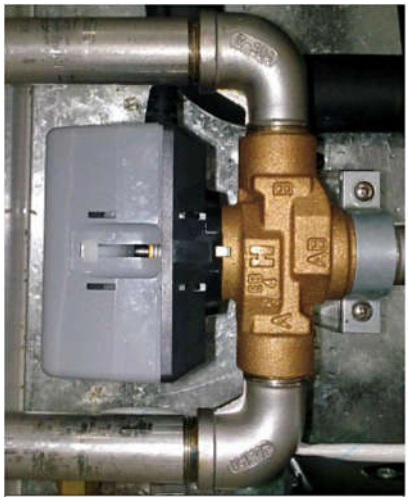
10. Stop machine, heat medium water pump stop running. Depressing the white manual lever lightly and then pulling the lever out, pushing the while manual lever down to bottom position, and then "A" port open, "B" port is closed.
11. Stop the filling pump and clean the particle filter.
12. Start the filling pump; open the valve between the service connections.
13. Close the valve on the service connection's return line. Now pressurize the system (to max 3 bars) with the filling pump.
14. Close the valve (AV2) on the service connection.
15. Stop the filling pump.
16. Select the auto operating mode using the operating mode button.



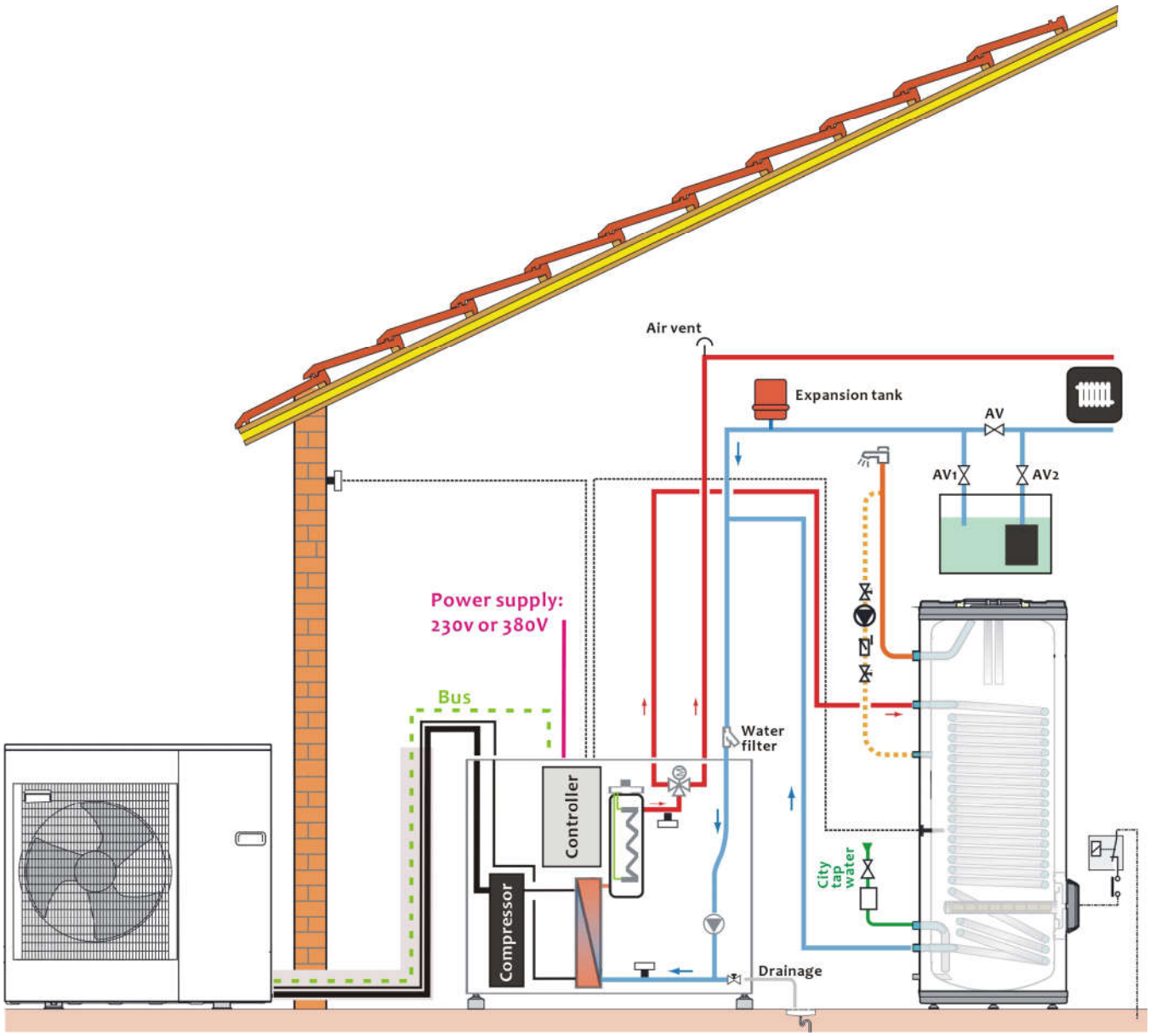
Push the white gear onto the position of middle, and then use your thumb to press it inside, this time both port A and port B are in open state.



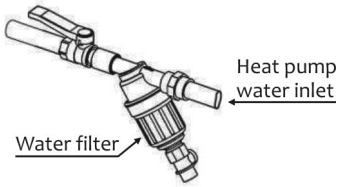
Please use screwdriver to unclench the white gear of the three way valve.



Then the white fear will move back to the original position. The three way valve will turn to port B automatically.



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

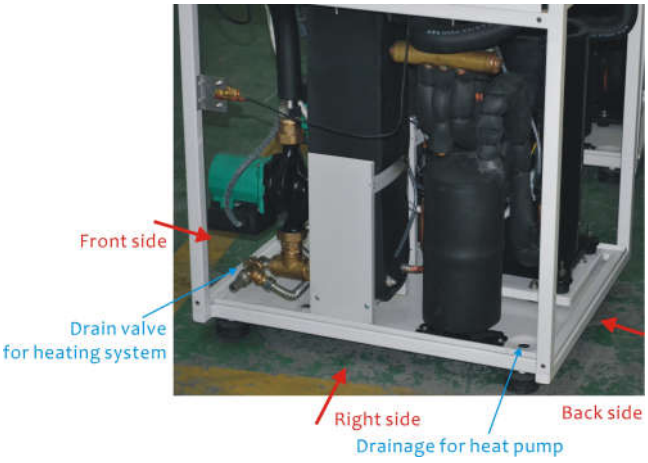


5.6.3 Drainage

1) drain of heating system

Close the shut-off valves in heating medium system. Open the drain valve. A small amount of water runs out.

2) drain chassis of heat pump



6 Wire controller

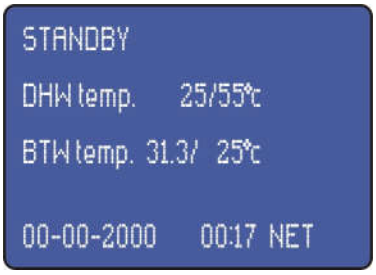
6.1 description of wire controller

ON/OFF button: hold 2s to ON/OFF unit	
menu button :	1) press to menu 2) Hold 5s to manual disinfection
return button :	1) press to previous menu 2) Hold 5s to force defrost
UP button :	1) change parameter 2) page up
DOWN button :	1) change parameter 2) page down
confirm button :	1) enter next menu 2) enter parameter modification 3) Hold 5s to lock/unlock key

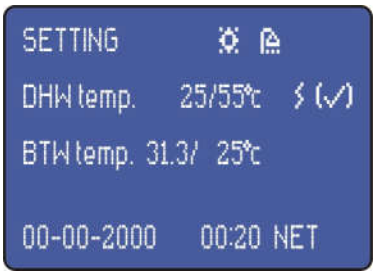
6.2 Display of current operating mode

During normal operation, the screen will display following information:

* STANBY -> unit operation mode
* DHW temp. 25/55°c -> DHW sensor / DHW setpoint
* BTW temp. 31.3/ 25°c -> BTW sensor / DHW setpoint
* 00-00-2000 00:17 NET -> data clock WIFI connected



Press  to start/stop heat pump.



 DHW symbol (HOT WATER mode)

 BTW symbol (HOUSE mode)

If heat pump set STANDBY mode for long time during winter, please remove out all the water the heating system to avoid any damage caused by freezing.

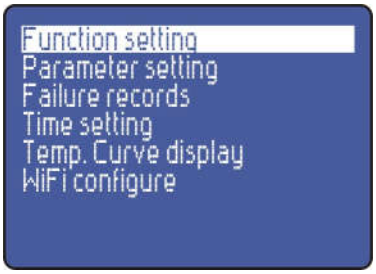
6.3 Main Menu

Press  to MAIN MENU.

Press  or  to navigate other menu.

Press  to enter to next menu.

Press  to previous menu.



6.4 Sub-Menu Mode select

DHW : HOT WATER mode On/Off
BTW : HOUSE mode Cooling / Auto heating / Heating / Off

Compressor start/stop by DHW sensor for DHW mode.
Compressor start/stop by BTW sensor for BTW mode.

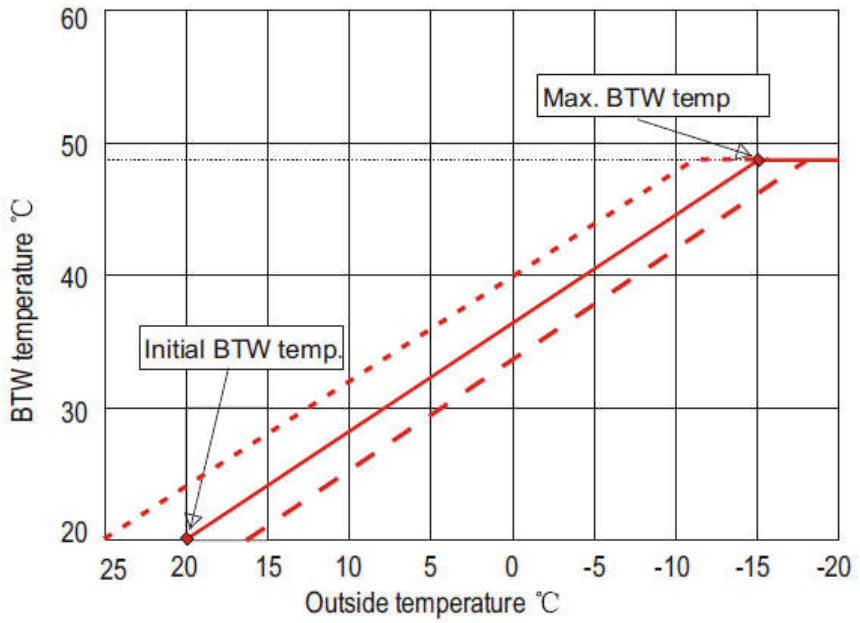
DHW setting range : 30°c ~ 55°c

HOUSE heating range : 18°c ~ 60°c

HOUSE cooling range : 8°c ~ 28°c

Auto heating : heat-curve function.

Initial BTW temp.	Starting temperature for heat-curve
Max. BTW temp.	Max. Temperature for heat-curve

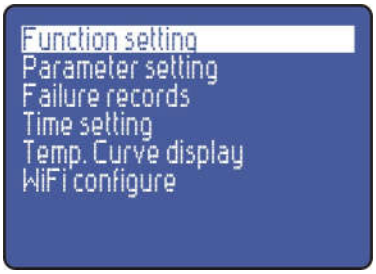


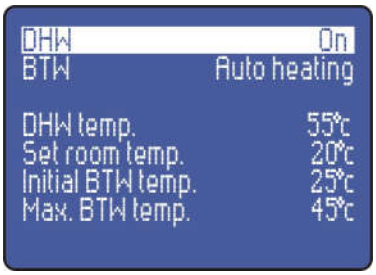
BTW Setpoint adjusted by ***Set room temp***, ***initial BTW temp.***, ***Max. BTW temp.***, and ambient sensor.

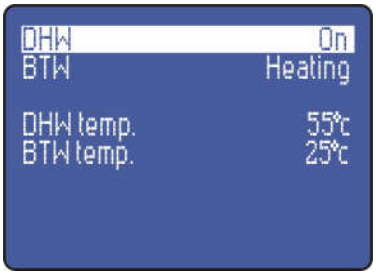
Setpoint = *initial BTW temp* + (*Max. BTW temp* - *initial BTW temp*) / 35 x (*Set room temp* - ambient sensor)

For example : Set room temp = 20°c
Initial BTW temp = 20°c
Max. BTW temp = 48°c

Then
When ambient sensor = 20°c, setpoint = 20+(48-20)/35x(20-20) = 20°c
When ambient sensor = 0°c, setpoint = 20+(48-20)/35x(20-0) = 36°c
When ambient sensor = -15°c, setpoint = 20+(48-20)/35x(20+15) = 48°c





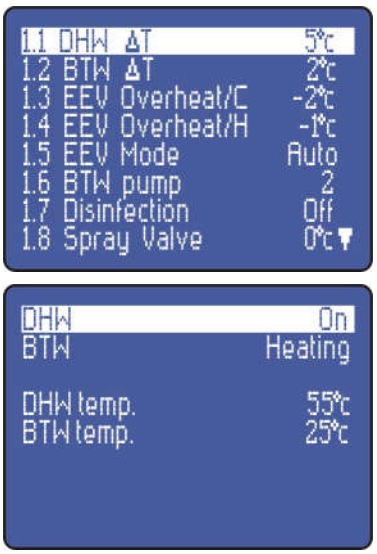


6.4.1 DHW (Hot water) mode: display

4-way-valve turn OFF, 3-way-water-valve turn ON,
water pump turn ON.

Fan speed adjust by ambient sensor.
Ambient temperature low, fan speed increase.
Ambient temperature high, fan speed reduce.

Compressor stop when DHW sensor ≥ setpoint
Compressor start when DHW sensor ≤ setpoint - ***DHW ⊿T***



6.4.2 BTW (Cooling) mode: display

4-way-valve turn ON, 3-way-water-valve turn OFF,
water pump turn ON.

Fan speed adjust by ambient sensor.
Ambient temperature low, fan speed reduce.
Ambient temperature high, fan speed increase.

Compressor stop when BTW sensor ≤ setpoint
Compressor start when BTW sensor ≥ setpoint + ***DHW ⊿T***

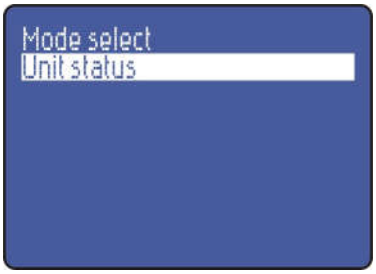
6.4.3 BTW (Heating) mode: display

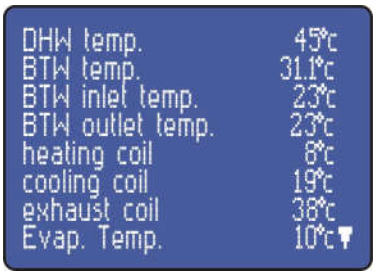
4-way-valve turn OFF, 3-way-water-valve turn OFF,
water pump turn ON.

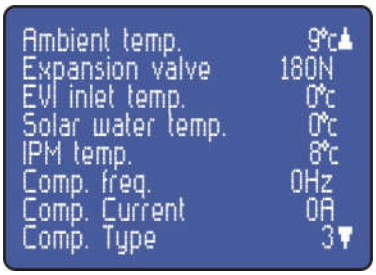
Fan speed adjust by ambient sensor.
Ambient temperature low, fan speed increase.
Ambient temperature high, fan speed reduce.

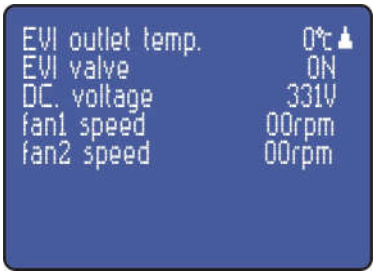
Compressor stop when BTW sensor ≥ setpoint
Compressor start when BTW sensor ≤ setpoint - ***BTW ⊿T***

6.5 Sub-Menu Unit status



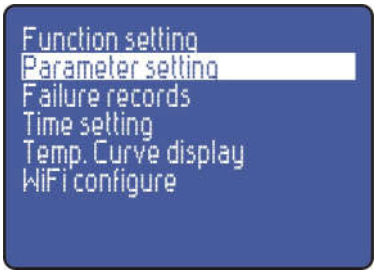


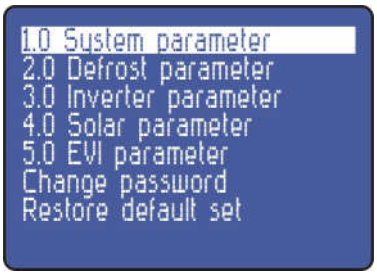


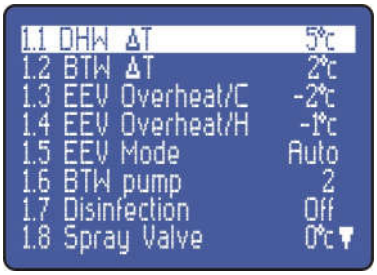


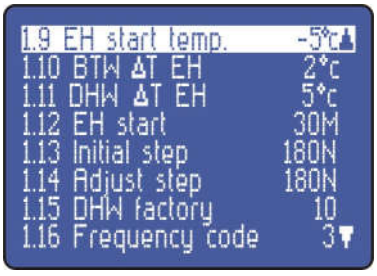
DHW temp.	hot water sensor
BTW temp.	HOUSE sensor
BTW inlet temp.	Inlet sensor
BTW outlet temp.	Outlet sensor
Heating coil	Evaporator sensor (defrosting)
Cooling coil	Cooling coil sensor
Exhaust coil	Compressor exhaust sensor
Evap. temp.	Compressor return sensor
Ambient temp.	Ambient air sensor
Expansion valve	Current step of EEV
EVI inlet temp.	Cancel at this unit
Solar water temp.	Cancel at this unit
IPM temp.	IPM PCB temperature
Comp. Current	Compressor running Amp
Comp. Type	Compressor adjust type
EVI outlet temp.	Cancel at this unit
EVI valve	Cancel at this unit
DC. Voltage	DC voltage
Fan1 speed	1st DC brushless motor speed
Fan2 speed	2nd DC brushless motor speed

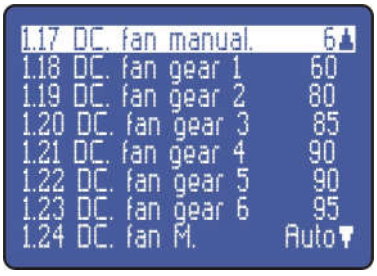
6.6 Sub-Menu Parameter setting











1.1 DHW △T	Temperature different of hot water
1.2 BTW △T	Temperature different of HOUSE
1.3 EEV overheat/C	Heating target superheat
1.4 EEV overheat/H	Cooling target superheat
1.5 EEV Mode	Auto/Manual
1.6 BTW pump	Water pump mode at BTW mode 0 : continue 1 : stop 2 : Intermittent operation
1.7 Disinfection	ON/OFF
1.8 Spray valve	Cancel at this unit
1.9 EH start temp.	Start ambient temp. to turn ON EH
1.10 BTW △T EH	Temp. different to start BTW EH
1.11 DHW △T EH	Temp. different to start DHW EH
1.12 EH start	DHW EH delay 30minutes to start
1.13 Initial step	EEV initial step
1.14 Adjust step	EEV manual step
1.15 DHW factor	Frequency add for DHW
1.16 frequency code	Compressor frequency code
1.17 DC. fan manual	DC fan motor select 6 speed

6.6.1 EEV step

6.6.1.1 EEV step for DHW, BTW Heating

PCB check ***P1.13 Initial step***, ambient sensor, begin target Hz to calculate begin EEV step P0 (480 ≥ P0 70)
P0 = 60 + (***P1.13 Initial step*** - 60) * F / 62 * (0.825 + 0.025t)

For example :
P1.13 Initial step = 150P, begin target frequency F = 62Hz, ambient sensor = 16°C
Then P0 = 60 + (150 - 60) * 62 / 62 * (0.825 + 0.025 * 16) = 170P

6.6.1.2 EEV step for BTW Cooling

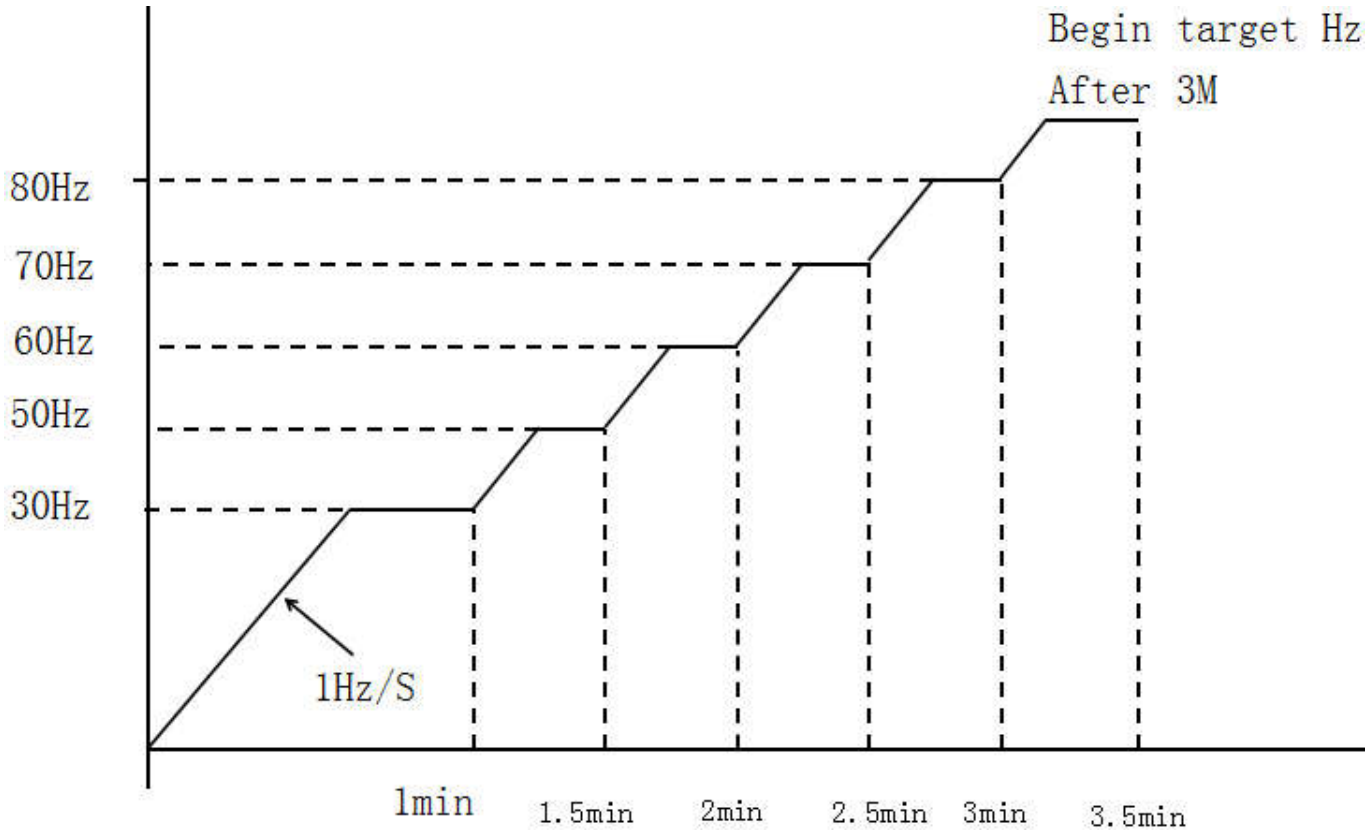
PCB check ***P1.13 Initial step***, begin target Hz to calculate begin EEV step P0 (480 ≥ P0 65)
P0 = 60 + (***P1.13 Initial step*** + 40) * F / 65

For example :
P1.13 Initial step = 150P, begin target frequency F = 56Hz
Then P0 = 60 + (150 +40) * 56 / 65 = 224P

6.6.2 Frequency at BTW Heating

6.6.2.1 compressor frequency when compressor start

When compressor start, Inverter compressor frequency increase to 55Hz in 1 minute,
if 2 minute later, calculated begin target frequency > 55Hz, and more than next step, then compressor frequency increase 10Hz every 30 seconds.
Compressor run calculated Hz Hz after 3 minutes.



6.6.2.2 Compressor MAX frequency table by P1.16 frequency code

P1.16	Ambient sensor Ta (°C)	Ta≥6	3≤Ta<6	0≤Ta<3	-3≤Ta<0	-6≤Ta<-3	Ta<-6
1	Max frequency F_{max} (Hz)	56	62	68	74	80	86
2	Max frequency F_{max} (Hz)	60	65	70	75	80	86
3	Max frequency F_{max} (Hz)	62	66	72	76	81	86
4	Max frequency F_{max} (Hz)	68	72	76	79	82	86
5	Max frequency F_{max} (Hz)	70	73	76	79	82	86
6	Max frequency F_{max} (Hz)	76	80	84	88	92	96
7	Max frequency F_{max} (Hz)	62	68	75	82	88	96
8	Max frequency F_{max} (Hz)	60	66	72	78	84	90

6.6.2.3 begin target Frequency

Begin target frequency decide by △T = BTW sensor - setpoint.

If △T > 4°C, then begin target frequency = F_{max}

If 2°C ≤ △T ≤ 4°C, then begin target frequency = 55Hz.

6.6.2.4 Frequency Calculation

△T = BTW sensor - setpoint
△T' : previous 1 minutes temperature different
F : running Hz
△F : Hz different

When △T > 4°C, then F = F_{max}

When setpoint - 4°C ≤ BTW sensor < setpoint - 1°C, then

* △F = 2 * △T - 12 * (△T' - △T) (|△F|≤10Hz)

* F = F + △F (20≤F≤F_{max})

6.6.3 Frequency at DHW

P1.16	Ambient sensor Ta (°C)	Ta≥30	20≤Ta<30	12≤Ta<20	4≤Ta<12	-5≤Ta<4	Ta<-5
1	Fmax (Hz)	36	40	48	56	65	76
2	Fmax (Hz)	40	43	52	60	70	80
3	Fmax (Hz)	40	44	54	62	72	80
4	Fmax (Hz)	45	48	58	68	74	80
5	Fmax (Hz)	45	50	60	70	75	80
6	Fmax (Hz)	50	54	65	76	80	80
7	Fmax (Hz)	40	44	54	62	72	80
8	Fmax (Hz)	40	43	52	60	70	80

P1.15 DHW factor, range 1~10

F = F_{max} * P1.15 DHW factor / 10

For example: F_{max} = 62 , P1.15 = 7, then F = 62 * 7 / 10 = 62 * 0.7 = 43Hz

6.6.4 Frequency at BTW Cooling

P1.16	Ambient sensor Ta (°C)	Ta≥43	38≤Ta<43	38≤Ta<32	32≤Ta<26	26≤Ta<20	Ta<20
1	Fmax (Hz)	52	56	59	56	52	48
2	Fmax (Hz)	56	60	63	60	56	52
3	Fmax (Hz)	58	62	65	62	58	54
4	Fmax (Hz)	62	66	70	66	62	58
5	Fmax (Hz)	64	68	72	68	64	60
6	Fmax (Hz)	68	72	78	72	68	64
7	Fmax (Hz)	58	62	65	62	58	54
8	Fmax (Hz)	56	60	63	60	56	52

6.6.4.1 begin target Frequency

Begin target frequency decide by △T = setpoint - BTW sensor

If △T > 4°C, then begin target frequency = F_{max}

If 2°C ≤ △T ≤ 4°C, then begin target frequency = 55Hz.

6.6.4.2 Frequency Calculation

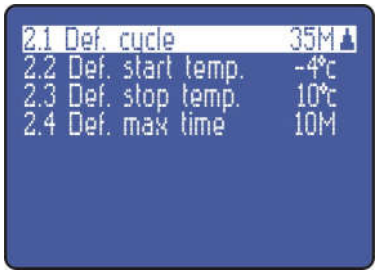
When △T > 4°C, then F = F_{max}

When setpoint - 1°C ≤ BTW sensor < setpoint + 4°C, then

* △F = 2 * △T - 12 * (△T' - △T) (|△F|≤10Hz)

* F = F + △F (20≤F≤F_{max})

6.7 Sub-Menu Defrost parameter



2.1 Def. cycle	defrost period
2.2 Def. start temp.	defrost start temperature
2.3 Def. stop temp.	Defrost stop temperature
2.4 Def. max time	Max. Deforst running time

6.7.1 force defrost

When ambient sensor ≤ 15°C, hold 

button to force defrost.
Compressor run 10 minute (*2.4 Def. max time*)

6.7.2 Defrost

Defrost start condition:

During heating operation, When ambient sensor ≤ 15°C, compressor running 35 minute (*2.1 Def. cycle*), and heating coil sensor ≤ -4°C (*2.2 Def. start temp.*), then defrost start.

Action of Defrost start:

Compressor and fan stop, but water pump run normally.
4-way-valve turn ON 25 second.
Compressor start 30 second.

Defrosting stop condition:

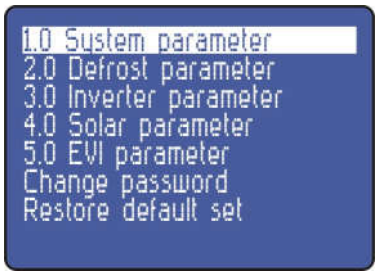
compressor running 10 minute (*2.4 Def. max time*), or heating coil sensor ≥ 10°C (*2.3 Def. stop temp.*), then defrost stop.

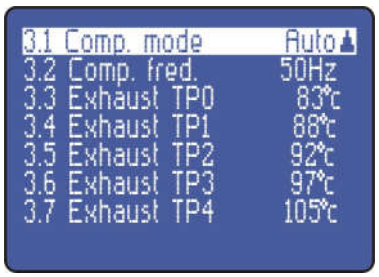
Action of Defrost start:

Compressor stop, fan run.
4-way-valve turn OFF 5 second.
Compressor start 30 second.

6.8 Sub-Menu Inverter parameter

3.1 Comp. mode	Auto
3.2 Comp. fred.	Only valid at 3.1 = manual
3.3 Exhaust TP0	Compressor exhaust protection TP0
3.4 Exhaust TP1	Compressor exhaust protection TP1
3.5 Exhaust TP2	Compressor exhaust protection TP2
3.6 Exhaust TP3	Compressor exhaust protection TP3
3.7 Exhaust TP4	Compressor exhaust protection TP4





Protection by frequency

Frequency reduced by Compressor over-heat protection

Compressor exhaust sensor Te	Hz reduce adjusted	EEV step adjusted
3.3 Exhaust TP0, when Te ≥ 83°C	Keep 1 minute, Hz normally control	Keep same
3.4 Exhaust TP1, when Te ≥ 88°C	Hz can reduce, do not increase	EEV step increase > 2P
3.5 Exhaust TP2, when Te ≥ 92°C	Hz reduce by 1Hz/8s to keep at min. frequency	EEV step increase > 4P
3.6 Exhaust TP3, when Te ≥ 97°C	Hz reduce by 1Hz/4s to keep at min. frequency	EEV step increase > 6P
3.7 Exhaust TP4, when Te ≥ 105°C	Unit stop, and resume 3 minutes when Te < 90°C	--

Frequency reduced by heating coil over-heat protection

At BTW Cooling mode, if heating coil sensor too high, frequency change by blew table:

Heating coil sensor Th	Hz reduce adjusted
Th ≥ 64°C	Stop unit, if 3 minutes later Th< 50°C, then resume operation
Th ≥ 60°C	Frequency reduce 1Hz/2S to min Hz
Th ≥ 56°C	Frequency do not increase, allow reduce
Th < 56°C	Resume to normal operation

Frequency reduced by Amp

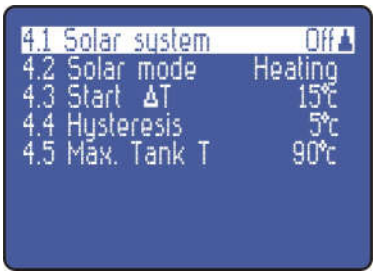
1) Limit frequency	2) Reduce	3) Stop unit
20A	22A	25A
Frequency do not increase	Frequency 1Hz/1S reduce to min Hz	Stop unit, give error alarm

Frequency reduced by IPM radiator sensor

IPM radiator temperature Tr		Control
BTW Cooling, defrost	BTW Heating, Hot water	
Tr ≥ 85°C	Tr ≥ 75°C	Stop unit
Tr ≥ 75°C	Tr ≥ 66°C	Frequency 1Hz/10S reduce to min. Hz
Tr ≥ 70°C	Tr ≥ 60°C	Frequency do not increase, allow to reduce
Tr ≥ 65°C	Tr ≥ 55°C	Frequency normal control

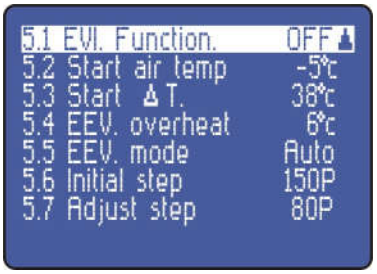
6.9 Sub-Menu Solar parameter

This unit do not support solar



6.10 Sub-Menu EVI parameter

This unit do not support EVI



6.11 Sub-Menu WiFi configure

the internet access module install at Wifi Box.
WiFi Box connect to server by your current WIFI.
Install WiFi Box where can access your current WIFI.
You have to put your Mobile and WiFi Box at same place during installation.

6.11.1 App installation

Scan below to install App on your phone.

Smart Life

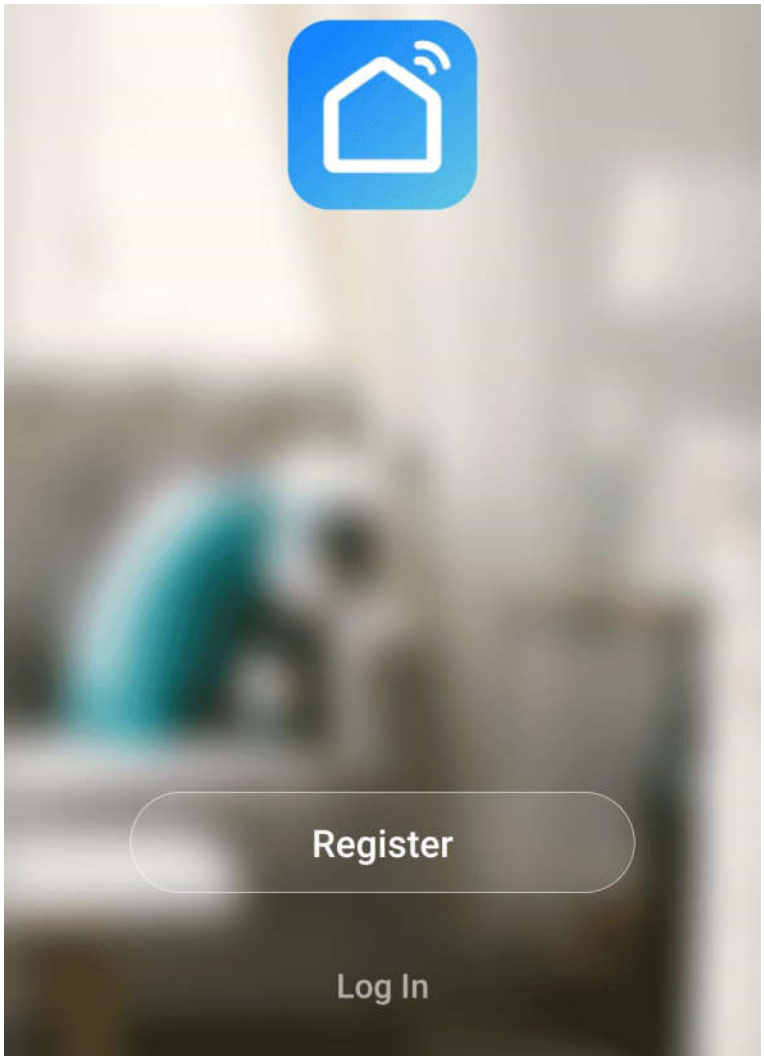
Maybe the installation request to install another App in advance.
You can delete it after installation finish.

应用宝

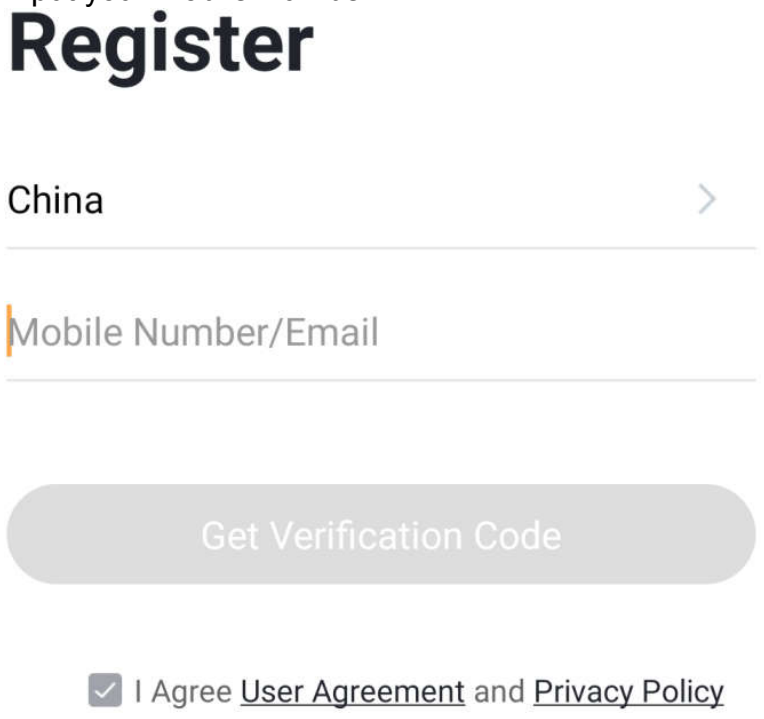
Smart Life will request GPS location at your mobile.

6.11.2 register

Click Register button

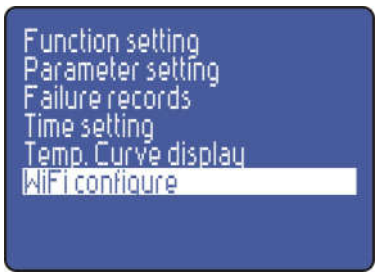


Input your Mobile Number



6.11.3 Add Device

WiFi configure by SmartConfig or AP.Config

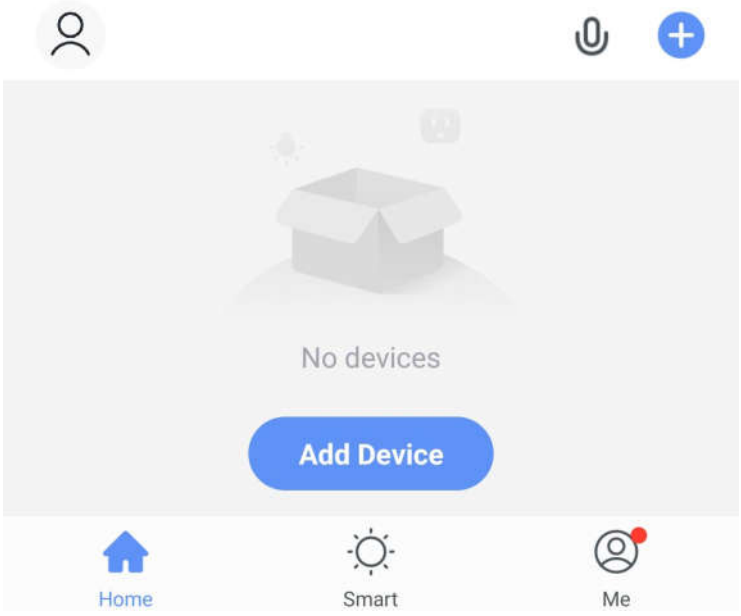


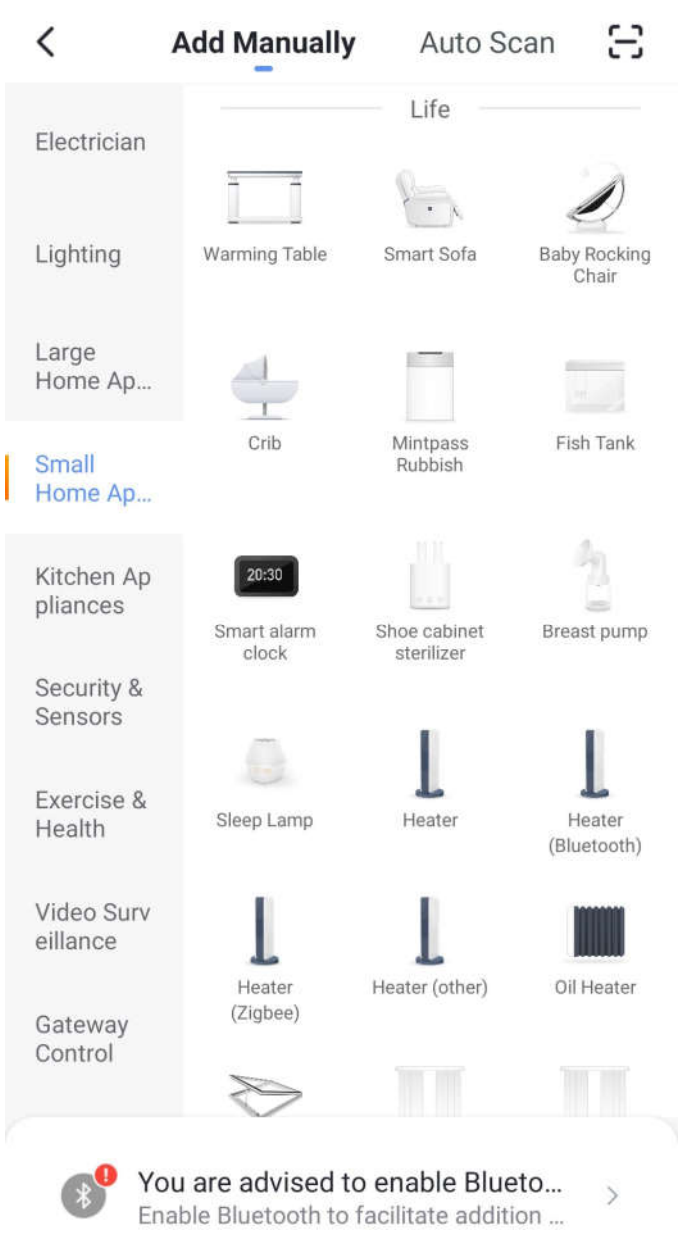
Hold  button 3S, then  flash.

If WIFI connection success, then  light ON

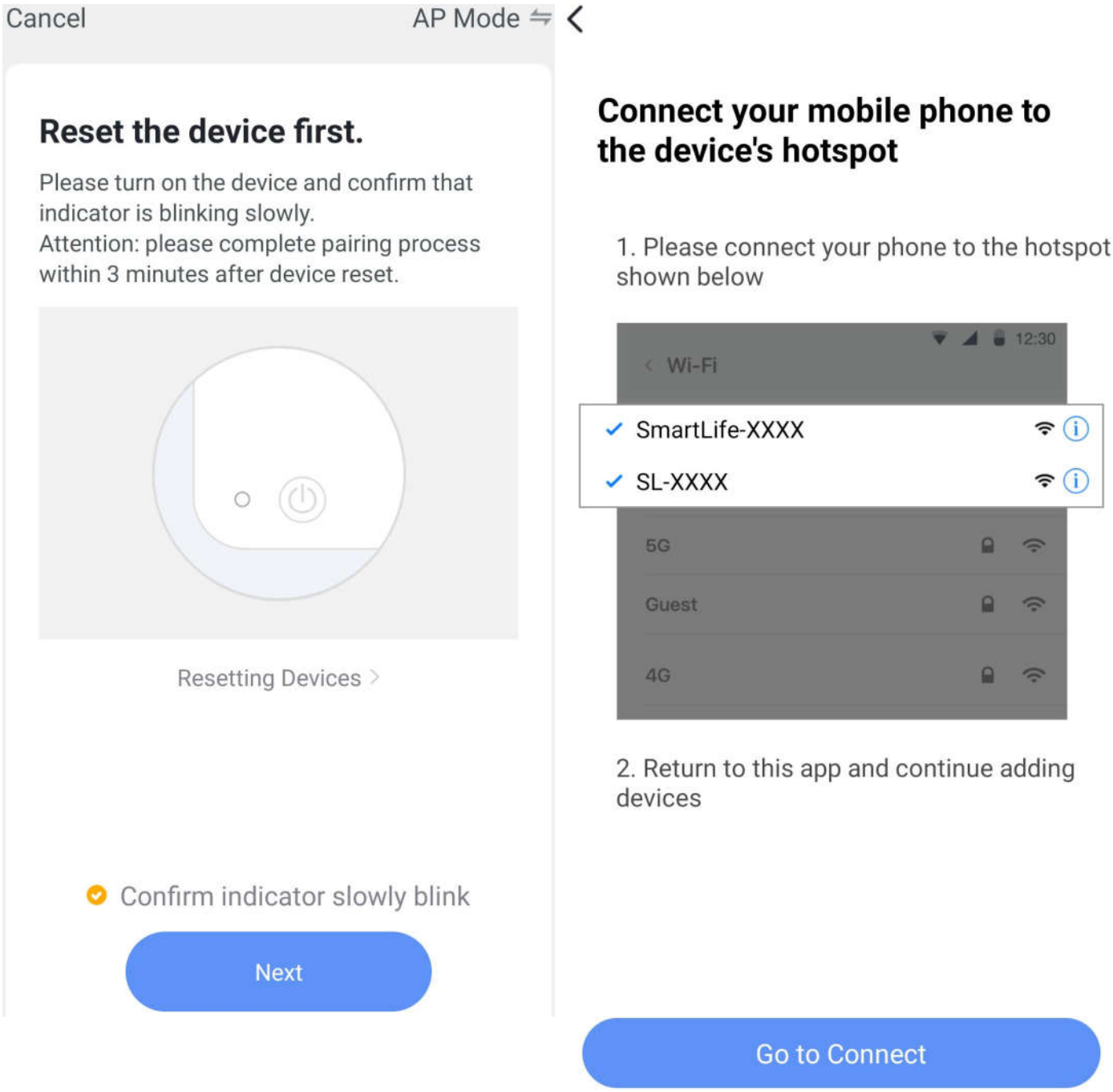
Click Add Device

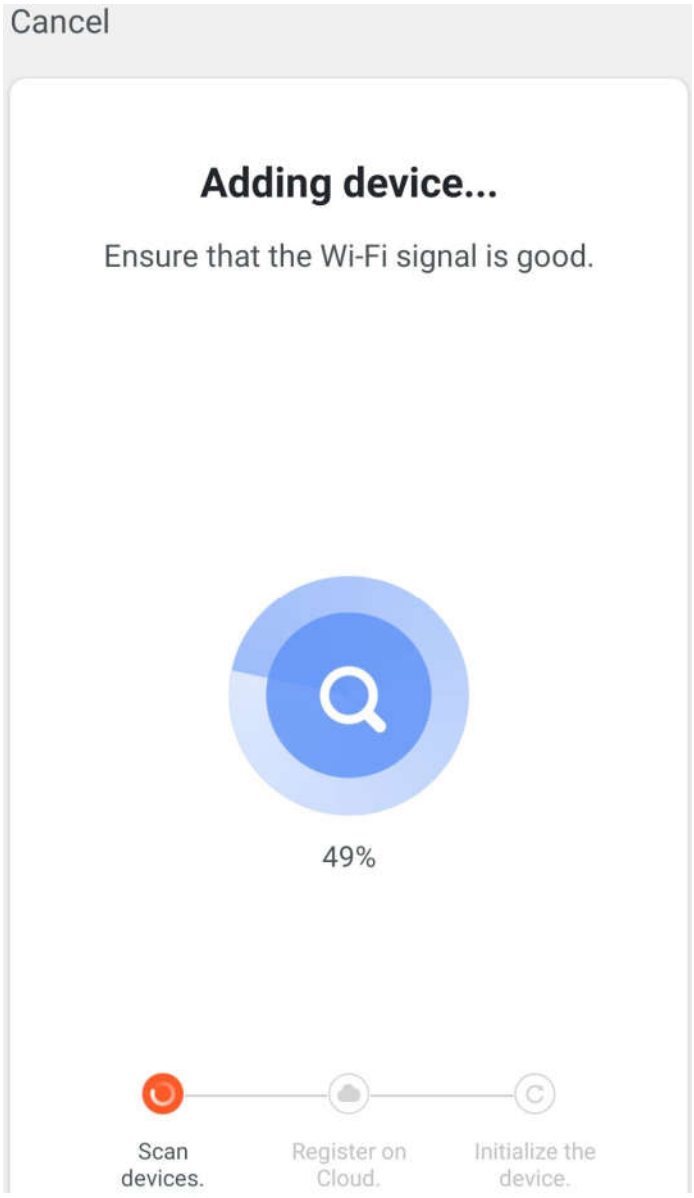
Choose Small Home Appliance -> Heater

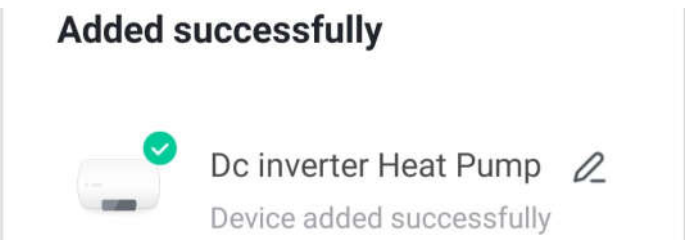




Choose your WiFi, password



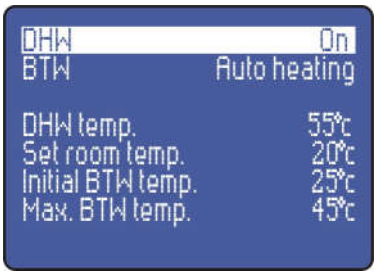

Cancel
Adding device...
Ensure that the Wi-Fi signal is good.
49%
Scan devices.
Register on Cloud.
Initialize the device.

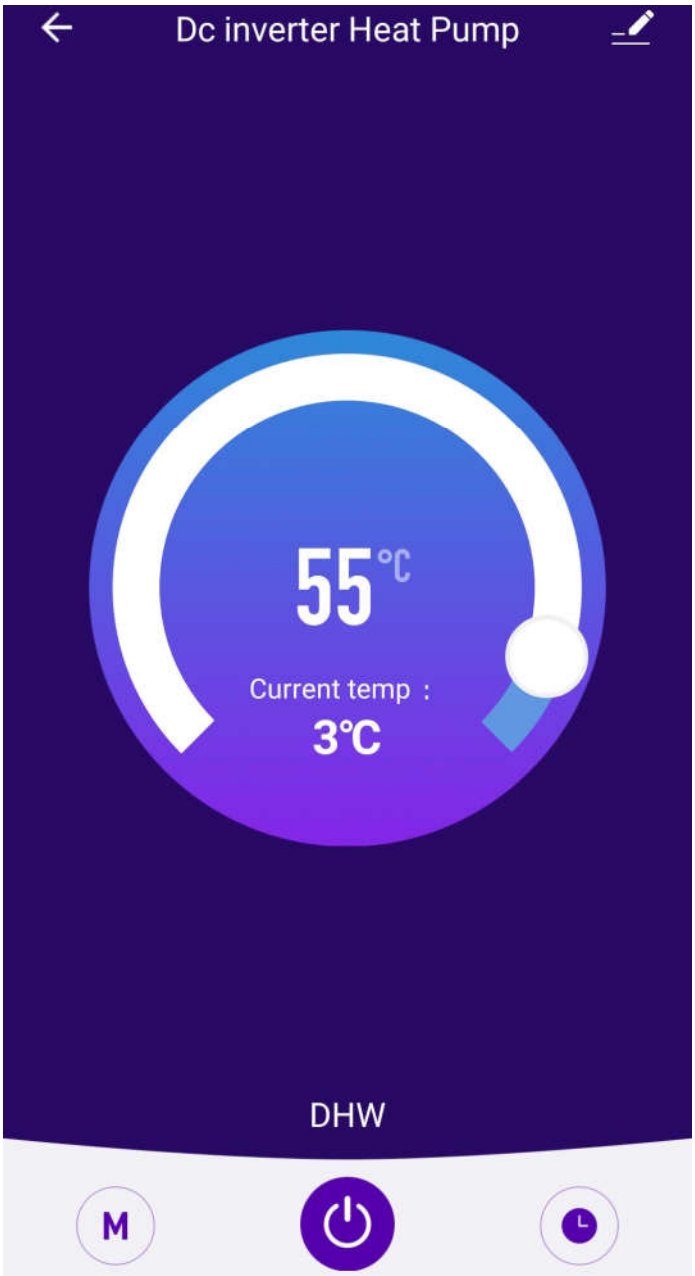

Added successfully
Dc inverter Heat Pump
Device added successfully

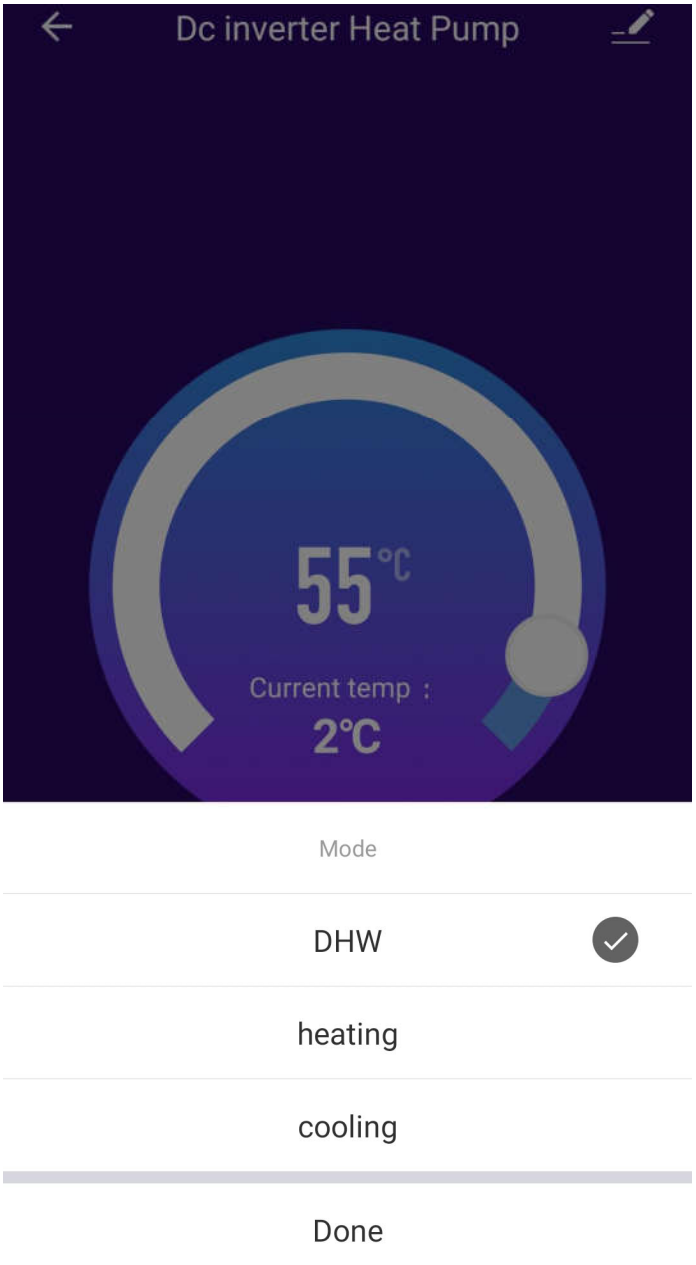
You can Turn On/Off unit, change setpoint

App only support:
* DHW only
* BTW only (cooling, heating)

App do not support:
* DHW, heating, Cooling







6.12 Part operation

6.12.1 electrical heater for BTW:

BTW EH turn ON by follow condition:
* BTW EH turn ON during defrost.
* BTW EH turn ON during anti-freeze protection
* ambient sensor ≤ ***P1.9 EH start temp.*** in BTW Heating mode.
* BTW sensor ≤ BTW setpoint - ***BTW ⊿T (P1.2)*** + ***BTW EH ⊿T (P1.10)***

BTW EH turn OFF by follow condition:
* at BTW Heating mode, ambient sensor > ***P1.9 EH start temp.*** + 2°C
* BTW sensor ≥ setpoint

6.12.2 electrical heater for DHW:

DHW EH turn ON by all condition:
* at DHW mode, compressor run 30 minutes (P1.12 EH start)
* DHW sensor ≤ DHW setpoint - (***P1.1 DHW ⊿T*** + ***P1.11 DHW ⊿T EH***)

DHW EH turn OFF by any condition:
* DHW sensor ≥ DHW setpoint

high temperature disinfection, DHW EH is forced to turn ON.

Screen show  when DHW heater turn ON.

6.12.3 four-way-valve:

four-way-valve turn OFF at heating mode. Turn ON at cooling mode, defrost.

6.12.4 compressor heater:

When ambient sensor < 15°C, and compressor stop, then compressor heater turn ON.
When ambient sensor > 17°C, or compressor start, then compressor heater turn OFF.

6.12.5 evaporator heater:

When ambient sensor < 9°C, and HEATING, HOT WATER, defrosting, standby, and outlet sensor ≤ 4°C,
then this heater turn ON.
When ambient sensor > 9°C, or COOLING mode, or outlet sensor ≥ 8°C, then this heater turn OFF.

6.12.6 three-way-water-valve:

3-way-water-valve turn ON at BHW mode.
3-way-water-valve turn OFF at other mode, unit OFF.

OM HEAT/TANK COOL mode, turn OFF on TANK WATER.

6.12.7 water pump:

Water pump run 5 minutes in advance before compressor start.
Water pump continue to run 5 minutes after compressor stop.
Water pump continue to run during defrost.

When water temperature reach setpoint, If BTW turn CLOSE, then water pump operate by above.

When water temperature reach setpoint, If BTW turn OPEN, then water pump operate by below:
BTW Pump (P1.6) = 0, water pump continue to run when water temperature reach setpoint.
BTW Pump (P1.6) = 1, water pump stop 5 minutes after compressor stop.
BTW Pump (P1.6) = 2, water pump operate by ambient sensor when water temperature reach setpoint:

* When ambient sensor > 2°c, then water pump stop.
* When -2°c < ambient sensor < 2°c, then water pump stop 20 minutes, run 10 minutes, cycle.
* When -6°c < ambient sensor < -2°c, then water pump stop 15 minutes, run 15 minutes, cycle.
* When -10°c < ambient sensor < -6°c, then water pump stop 10 minutes, run 20 minutes, cycle.
* When ambient sensor < -10°c, then water pump continue to run.
* When ambient sensor malfunction, then water pump stop 15 minutes, run 15 minutes, cycle.

6.12.8 high temperature disinfection function (when DHW mode selected):

During disinfection, screen show 
High temperature disinfection cycle 7 days;
When entering high temperature disinfection, the unit turn ON DHW EH;
When DHW sensor ≥65°C, and continue 15 minutes ≥ 65°C, then exit disinfection;
If DHW < 65°C for 3 hours, then disinfection is forced to exit;
When DHW mode selected, hold 

button 10 seconds, then forced to disinfection;

6.12.9 Anti-freeze protection :

When heat pump is at standby status.
(1) when inlet sensor ≤ 8°C and ambient sensor ≤ 2°C, then water pump run ;
When inlet sensor ≥ 15°C or ambient sensor > 4°C, exit protection
(2) when inlet sensor ≤ 2°C and ambient temperature ≤ 0°C, then heat pump run ;
When return water sensor ≥ 15°C, or ambient temperature > 1°C, exit protection

7. Error messages :

Heat pump is equipped with regulation and safety components; when a regulation component is defective or a safety is activated, a message is posted like it's illustrated below; see the explanation of these messages in the paragraph "Error codes ". Call your installation contractor for help.

When error occur, screen show 

Error code		Running lamp
Err00	Communication error	
Err01	Inlet sensor malfunction	1 flash 1 OFF
Err02	Outlet sensor malfunction	2 flash 1 OFF
Err06	Water-flow-switch protection	12 flash 1 OFF
Err04	Order of power supply	13 flash 1 OFF
Err05	inlet & outlet sensor temperature different > 18 °C	16 flash 1 OFF
Err07	Heating coil sensor ≥ 70°c in COOLING mode	17 flash 1 OFF
Err08	DHW sensor malfunction	3 flash 1 OFF
Err09	BTW sensor malfunction	4 flash 1 OFF
Err10	High pressure protection	10 flash 1 OFF
Err11	Low pressure protection	11 flash 1 OFF
Err12	Outlet temperature too high	14 flash 1 OFF
Err13	Outlet temperature too low	19 flash 1 OFF
Err14	Compressor return sensor malfunction	7 flash 1 OFF
Err15	Compressor exhaust sensor malfunction	8 flash 1 OFF
Err16	Compressor over-heat protection	22 flash 1 OFF
Err18 / Err19	Anti-freeze protection DHW / BTW	21 flash 1 OFF
Err20	Ambient sensor malfunction	9 flash 1 OFF
Err21	Heating coil sensor malfunction (for defrost)	5 flash 1 OFF
Err22	Cooling coil sensor malfunction	6 flash 1 OFF
Err23	Ambient temperature too high	18 flash 1 OFF
Err31	Ambient temperature too low	
Err32	PCB Communication error	
Err33	EVI in sensor malfunction	
Err34	EVI out sensor malfunction	
Err35	Solar sensor malfunction	
E24	IPM PCB Communication error	
E25	IPM PCB abnormal protection	
E26	Radiator of IPM PCB over-heat protection	
E27	Compressor over-current protection	
E28	IPM PCB sensor malfunction	
E29	Compressor over-load protection	
E30	Water inlet temperature too low during defrost	

8. Wiring diagram (for 3phase)