



# **R32 FULL INVERTER HEAT PUMP USER MANUAL**

Please read this manual carefully before using and keep it in a safe place.





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## **I. Foreword**

### **WARNING**

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. 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).

Do not pierce or burn.

Be aware that refrigerants may not contain an odour

Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

### **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 completed prior to conducting work on the system.

### **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.

### **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.

### **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. Technician should also be suitable licensed and comply with local laws.

**Presence of fire extinguisher**

If any hot work is to be conducted on the refrigerating 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.

**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.

**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.

**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.

## **Repairs to sealed components**

**DD.5.1** 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.

**DD.5.2** 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 the apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded to the point 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.

## **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.

*NOTE The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment.*

*Intrinsically safe components do not have to be isolated prior to working on them.*

## **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.

## **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.

## **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.

## **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 pipework are to take place.

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

## **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.

### **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.

### **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.

### **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 are 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.

#### The symbol description of the device

	WARNING	The symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	WARNING	The symbol shows that this appliance uses a low burning velocity material. Please keep away from fire source.
	CAUTION	This symbol shows that the operation manual should be read carefully.
	CAUTION	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION	This symbol shows that information is available such as the operating manual or installation manual.

## II. Unit Parameters

### 1. Appearance



### 2. Statement

To keep users under safe working condition and property safety, please follow the instructions below.

- Unit must be installed by a professional and electrically connected by a licensed person
- Wrong operation may result in injury or damage;
- Please install the unit in compliance with local laws, regulations and standards;
- Confirm power voltage and frequency;
- The unit is only used with grounding sockets;
- Independent switch must be offered with the unit.

### 3. The following safety factors need to be considered:

- Please read the following warnings before installation;
- Be sure to check the details that need attention, including safety factors;
- After reading the installation instructions, be sure to save them for future reference.

#### **Warning**

- Make sure that the unit is installed safely and reliably.
- If the unit is not secure or not installed, it may cause damage. The minimum support weight required for installation is 21g/mm<sup>2</sup>.
- If the unit was installed in a closed area or limited space, please consider the size of room and ventilation to prevent suffocation caused by refrigerant leakage.

- Use a specific wire and fasten it to terminal block so that the connection will prevent pressure from being applied to parts.

- Wrong wiring will cause fire.

Only a licensed person should connect power wire accurately according to wiring diagram on the manual to avoid burnout of the unit or fire.

- Be sure to use correct material during installing.

Wrong parts or wrong materials may result in fire, electric shock, or falling of the unit.

- Install on the ground safely, please read installation instructions.

Improper installation may result in fire, electric shock, falling of the unit, or water leaking.

- Use professional tools for doing electrical work.

If power supply capacity is insufficient or circuit is not completed, it may cause fire or electric shock.

- The unit must have grounding device.

If power supply does not have grounding device, be sure not to connect the unit.

- The unit should be only removed and repaired by professional technician.

Improper movement or maintenance of the unit may cause water leakage, electric shock, or fire.

Please find a professional technician to do.

- Don't unplug or plug power during operation. It may cause fire or electric shock.

- Don't touch or operate the unit when your hands are wet. It may cause fire or electric shock.

- Don't place heaters or other electrical appliances near the power wire. It may cause fire or electric shock.

- The water must not be poured directly from the unit. Do not let water to permeate into the electrical components.

#### 4. Warning

- **Do not install the unit in a location where there may be flammable gas.**

- **If there is flammable gas around the unit, it will cause explosion.**

According to the instruction to carry out drainage system and pipeline work. If drainage system or pipeline is defective, water leakage will occur. And it should be disposed immediately to prevent other household products from getting wet and damage.

- **Do not clean the unit while power is on. Turn off power at main isolator before cleaning the unit. If not it may result in injury from a high-speed fan or electric shock.**
- **Stop operating the unit once there is a problem or an fault code.**

Please turn off power and stop running the unit. Otherwise it may cause electric shock or fire.

- **Be careful when the unit is not packed or not installed.**

Pay attention to sharp edges and fins of heat exchanger.

- **After installation or repair, please confirm refrigerant is not leaking.**

If refrigerant is not enough, the unit will not work properly.

- **The installation of external unit must be flat and firm.**

Avoid abnormal vibration and noise.

- **Don't put your fingers into fan and evaporator.**

High speed running fan will result in serious injury.

- **This device is not designed for people who is physically or mentally weak (including children) and who does not have experience and knowledge of heating and cooling system. Unless it is used under direction and supervision of professional technician, or has received training on the using of this unit. Children must use it under supervision of an adult to ensure that they use the unit safely. If power wire is damaged, it must be replaced by a professional technician to avoid danger.**

### III. System Specification

#### 1. Specification

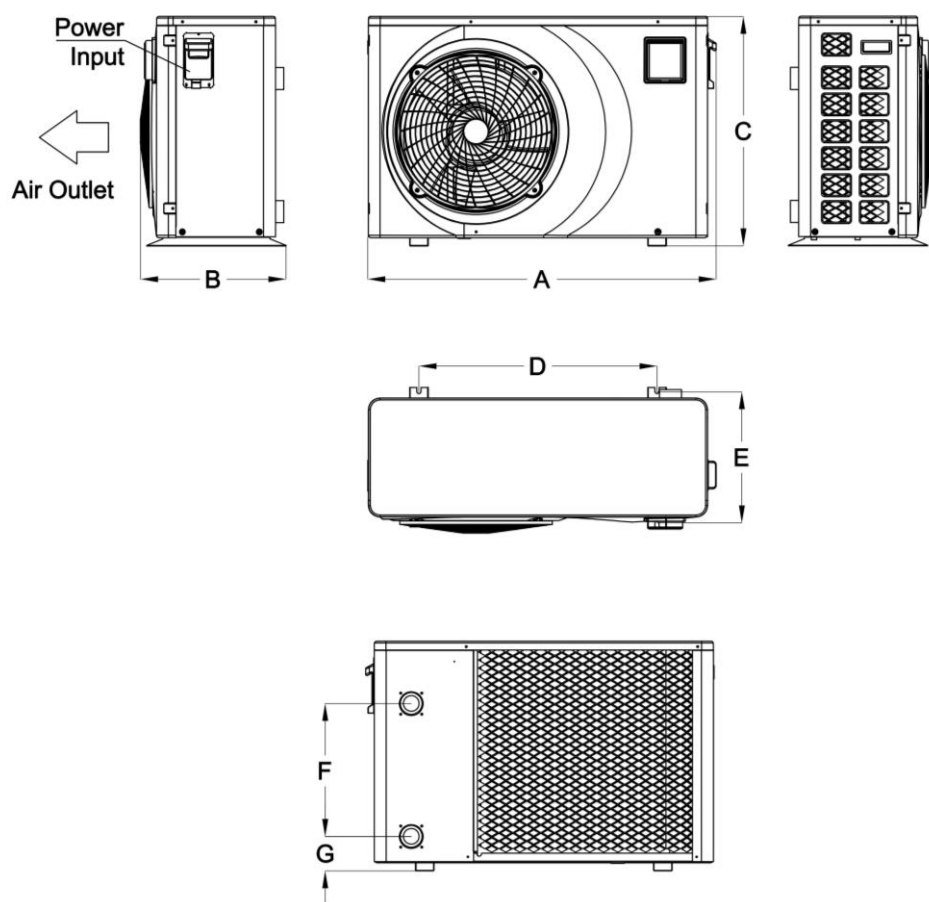
Model		EFI Ultra 9.5	EFI Ultra 11.5	EFI Ultra 15
Ambient Temperature: (DB/WB) 27°C/24.3°C; Water Inlet/Outlet Temperature: 26°C/28°C.				
Heating capacity (kW)		1.8~9.48	2.8~11.51	3.48~15.3
Power input (kW)		0.11~1.44	0.17~1.74	0.22~2.35
COP		16.4~6.6	16.5~6.6	15.9~6.5
Boost mode	Heating capacity (kW)	9.48	11.51	15.3
	COP	6.6	6.6	6.5
Smart mode	Heating capacity (kW)	7.8	9.1	11.55
	COP	9.02	9.32	9.18
Silent mode	Heating capacity (kW)	3.5	5.5	7.35
	COP	14.2	13.8	13.6
Ambient Temperature: (DB/WB) 15°C/12°C; Water Inlet Temperature: 26°C.				
Heating capacity (kW)		1.51~7.89	2.2~8.21	2.96~11.14
Power input (kW)		0.18~1.52	0.27~1.61	0.36~2.19
COP		8.3~5.2	8.1~5.1	8.3~5.1
Boost mode	Heating capacity (kW)	7.9	8.23	11.15
	COP	5.2	5.1	5.1
Smart mode	Heating capacity (kW)	6.1	6.58	8.65
	COP	6.22	6.19	6.2
Silent mode	Heating capacity (kW)	2.5	4.37	5.55
	COP	7.58	7.53	7.55
Power supply		220-240V / 50Hz		
Max power input (kW)		1.75	2.3	3.2
Max current(A)		7.95	10.5	14.5
Heating water temperature range		15°C~40°C		
Running ambient temperature range		-10°C~43°C		
Advised swimming pool size		20m³~40m³	25m³~50m³	30m³~60m³
Refrigerant		R32		
Compressor		MITSUBISHI ELECTRIC ( DC inverter)		
Air side heat exchanger		Hydrophilic fin exchanger		
Water side heat exchanger		Titanium tube heat exchanger		
Water Flow LPM (Litres Per Minute)		60-90	70-105	85-120
Net dimension LxWxH (mm)		910x370x620	1000x415x660	
Water pipe connection (mm)		40/50		
Net weight (kg)		39	44	47
Noise level dB(A)		33~47	33~47	34~48
Max./Min. Water operating pressure (Mpa)		0.6/0.1		
Max./Min. Water inlet pressure (Mpa)		0.6/0.1		
Fuse specification		65TS/25A/250VAC	65TS/30A/250VAC	

Model		EFI Ultra 21	EFI Ultra 25
Ambient Temperature: (DB/WB) 27°C/24.3°C; Water Inlet/Outlet Temperature: 26°C/28°C.			
Heating capacity (kW)		4.72~21.21	5.05~25.28
Power input (kW)		0.29~3.26	0.31~3.89
COP		16.2~6.5	16.2~6.5
Boost mode	Heating capacity (kW)	21.21	25.28
	COP	6.5	6.5
Smart mode	Heating capacity (kW)	17	20.4
	COP	9.35	8.9
Silent mode	Heating capacity (kW)	10.2	12.3
	COP	13.1	13.6
Ambient Temperature: (DB/WB) 15°C/12°C; Water Inlet Temperature: 26°C.			
Heating capacity (kW)		3.51- 14.21	3.81- 17.08
Power input (kW)		0.43~2.78	0.48~3.35
COP		8.1~5.1	8~5.1
Boost mode	Heating capacity (kW)	14.2	17.1
	COP	5.1	5.1
Smart mode	Heating capacity (kW)	11.2	13.5
	COP	6.2	6.21
Silent mode	Heating capacity (kW)	7.5	8.3
	COP	7.5	7.52
Power supply		220-240V / 50Hz	
Max power input (kW)		4.1	4.49
Max current(A)		18.8	19.52
Heating water temperature range		15°C~40°C	
Running ambient temperature range		-10°C~43°C	
Advised swimming pool size		45m³~80m³	55m³~90m³
Refrigerant		R32	
Compressor		MITSUBISHI ELECTRIC ( DC inverter )	
Air side heat exchanger		Hydrophilic fin exchanger	
Water side heat exchanger		Titanium tube heat exchanger	
Water Flow LPM (Litres Per Minute)		120-160	135-185
Net dimension LxWxH (mm)		1130×470×775	
Water pipe connection (mm)		40/50	
Net weight (kg)		75	85
Noise level dB(A)		35~50	35~50
Max./Min. Water operating pressure (Mpa)		0.6/0.1	
Max./Min. Water inlet pressure (Mpa)		0.6/0.1	
Fuse specification		65TS/30A/250VAC	

The technical specification of our heat pumps is provided for information purpose only. We reserve the right to make change without notice in advance.

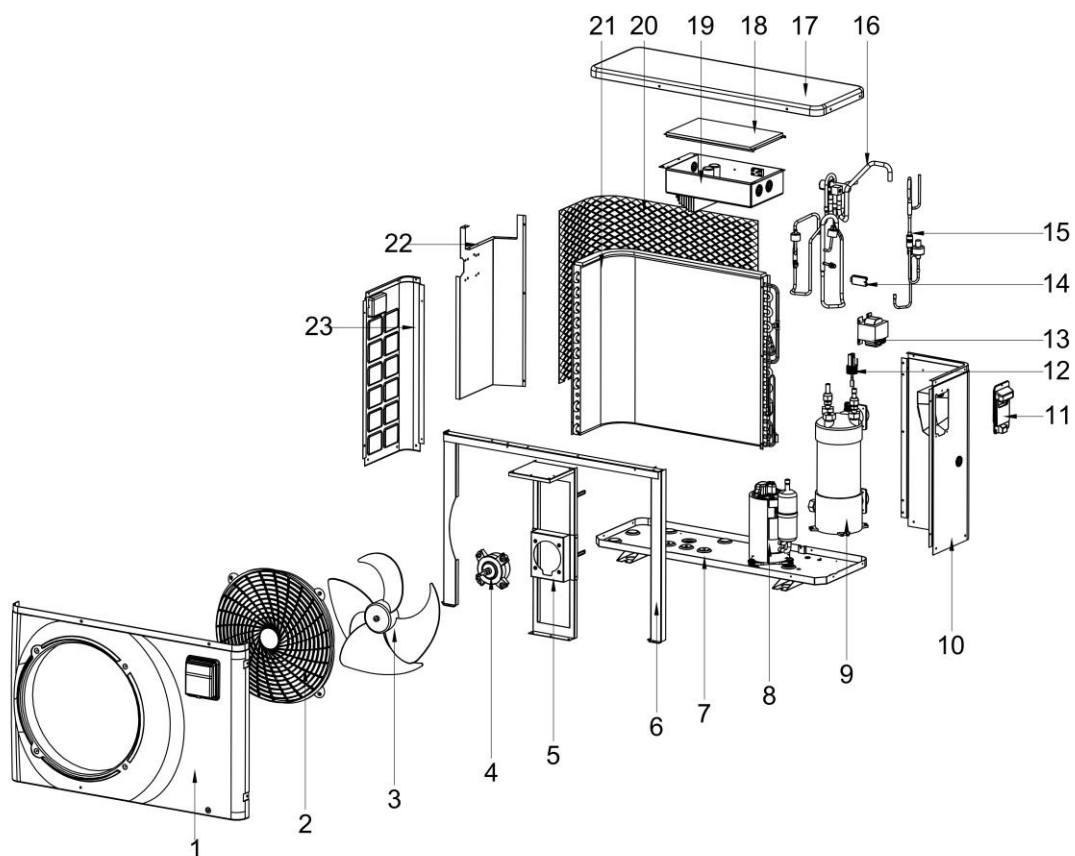
1. Noise at 1 m, at 4 m and at 10 m in accordance with Directives EN ISO 3741 and EN ISO 354
2. Calculate according to an in-ground private swimming pool covered with bubble

## 2. Unit Dimensions



Model	A	B	C	D	E	F	G
EFI Ultra 9.5	910	370	620	590	330	280	98
EFI Ultra 11.5	1000	415	660	680	375	380	98
EFI Ultra 15							
EFI Ultra 21	1130	470	775	680	655	390	110
EFI Ultra 25						470	

### 3. Explosion View



1	Front plate	9	Titanium heat exchanger	17	Top cover
2	Fan motor cover	10	Right plate	18	Electrical box cover
3	Fan	11	Handle	19	Electrical box
4	Motor	12	Water flow switch	20	Protection net
5	Motor support	13	Inductor	21	Evaporator
6	Fixed plate	14	Ambient sensor	22	Middle plate
7	Chassis	15	Filter component	23	Left plate
8	Compressor	16	Four-way valve		



## IV. Installation Instructions

**WARNING:** Installation must be carried out by a qualified licensed technician.

This section is provided for information purpose only and must be checked and adapted if necessary according to actual installation condition.

### 1. Pre-Requirements

Needed equipment for installation of heat pump:

Suitable power supply cable for unit's power.

A by-pass kit and an assembly of PVC Pipe & fittings, PVC Type P Solvent & Primer

40mm to 50mm PVC Class 9 Pressure Pipe

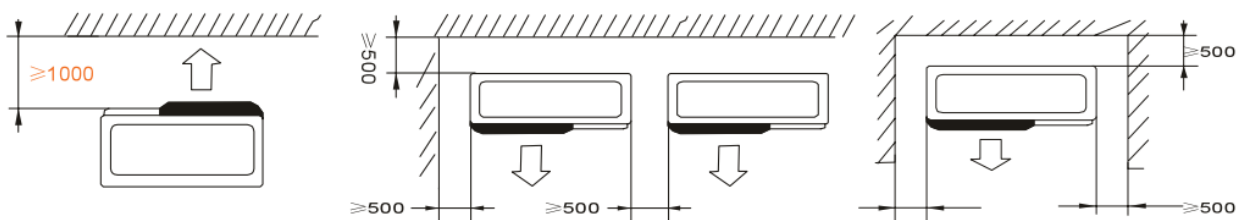
If planning wall installation consult with your profession for suitable fasteners and support brackets. Be sure to consult with your builder before installing on wall surfaces.

### 2. Location

Please comply with the following rules about heat pump location choosing.

1. The unit's location must be convenient for operation and maintenance in the future.
2. It must be installed flat concrete floor. The floor should be stable to support the weight of the unit.
3. A water drainage device must be provided close to the unit in order to protect the area where it is installed.
4. If necessary, mounting pads could be used to support the weight of unit.
5. Confirm the unit is under well-ventilated condition; air outlet port is not facing to the windows of nearby buildings and the outlet air cannot be returned. In addition, provide enough space around the unit for repair and maintenance.
6. The unit must not be installed in an area exposed to oil, flammable gases, corrosive products, sulphurous compounds or close to high frequency equipment.
7. To prevent mud splashes, do not install the unit near road or track.
8. To avoid noise to neighbours, please make sure the unit is installed in less noise sensitivity area or good sound isolation area.
9. Keep the unit as far as possible away from children.
10. Installation space

Unit: mm



Anything could not be placed within at least 1m in front of heat pump.

Leave at least 500mm of empty space around the sides and rear of heat pump.

Do not put any stuff on or in front of heat pump!

### **3. Installation Layout**

#### **INSTALLATION**

##### **Installation information**

The following information given here is not an instruction, but simply meant to give the user a better understanding of the installation.

##### **Condition of installation**

The following information given here is not an instruction, but simply meant to give the user a better understanding of the installation.

##### **Installation place**

Install the swimming pool heat pump on a flat, horizontal, and stable surface. Maintain 1 M of open space in front of the discharge grids and 3 M on the outlet side of the ventilator. And reserve enough space to allow access to temperature controller.

Make sure that the discharged air will not be breathed in.

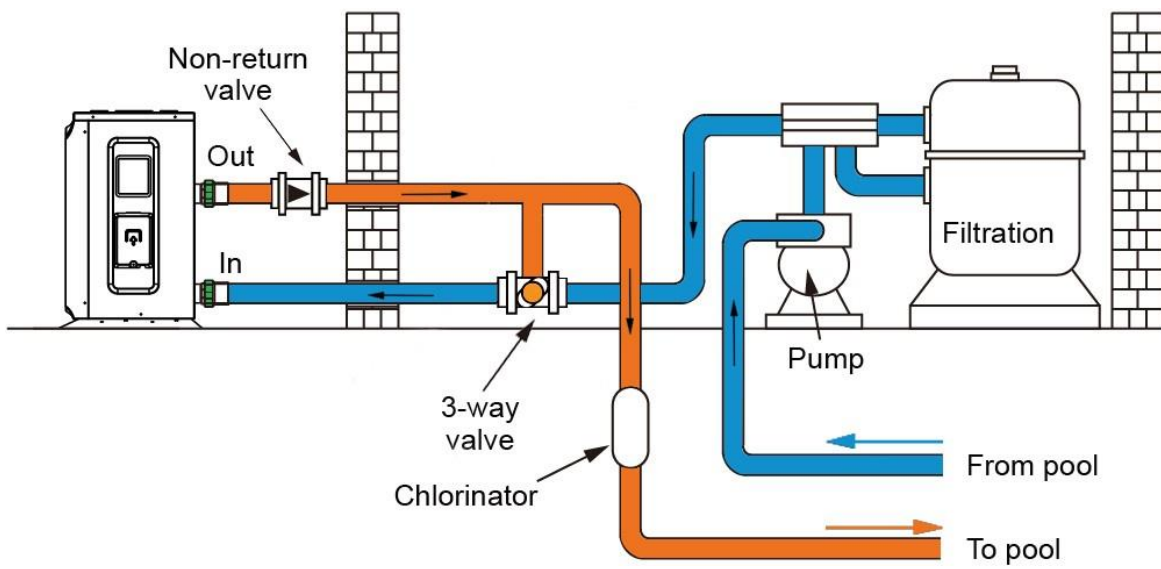
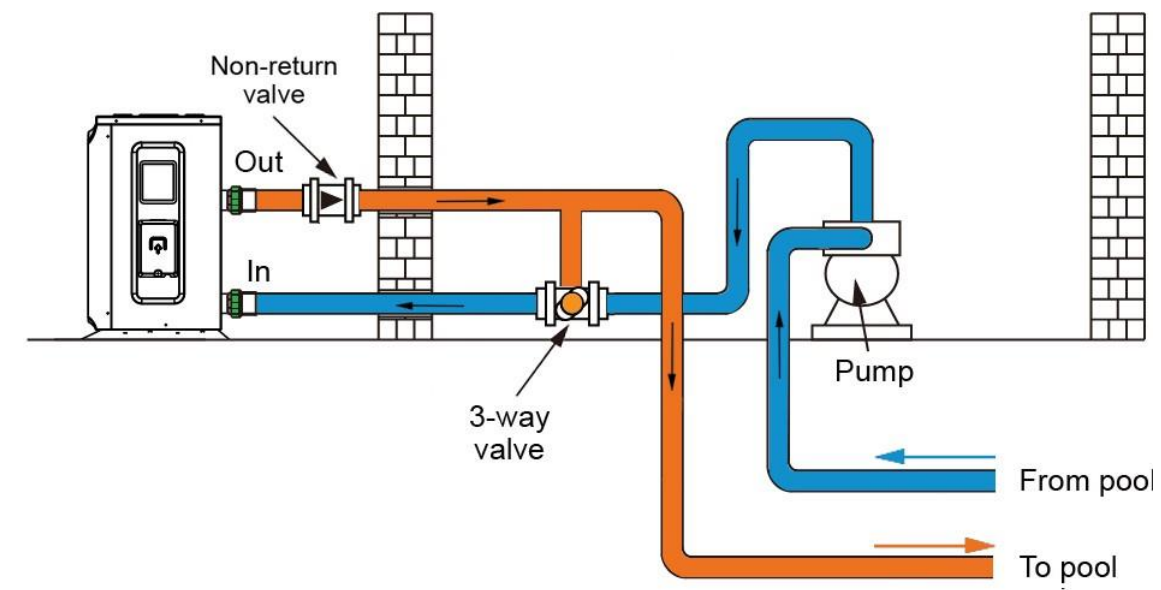
##### **To perfect your installation**

- Avoid directing the flow of ventilated air towards a sensitive noise zone, such as room window.
- Avoid positioning pool heat pump on a surface that can transmit vibrations to dwelling.
- Try to avoid placing appliance under a tree or exposed to water or mud, which would be likely to complicate maintenance.

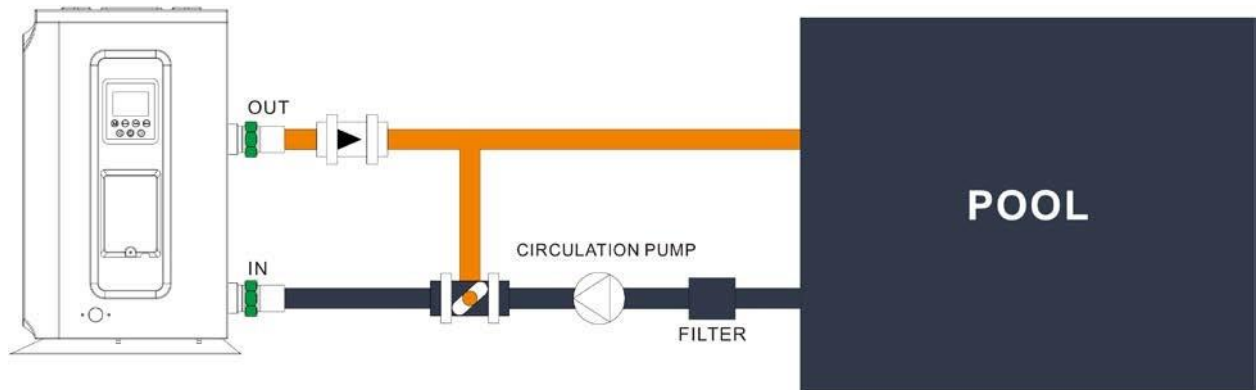
##### **Water connection**

Water connection The heat pump is connected to a filtration circuit with a by-pass. It is imperative that the by-pass is placed after the pump and the filter & before any other items such as salt chlorinators or injectors.

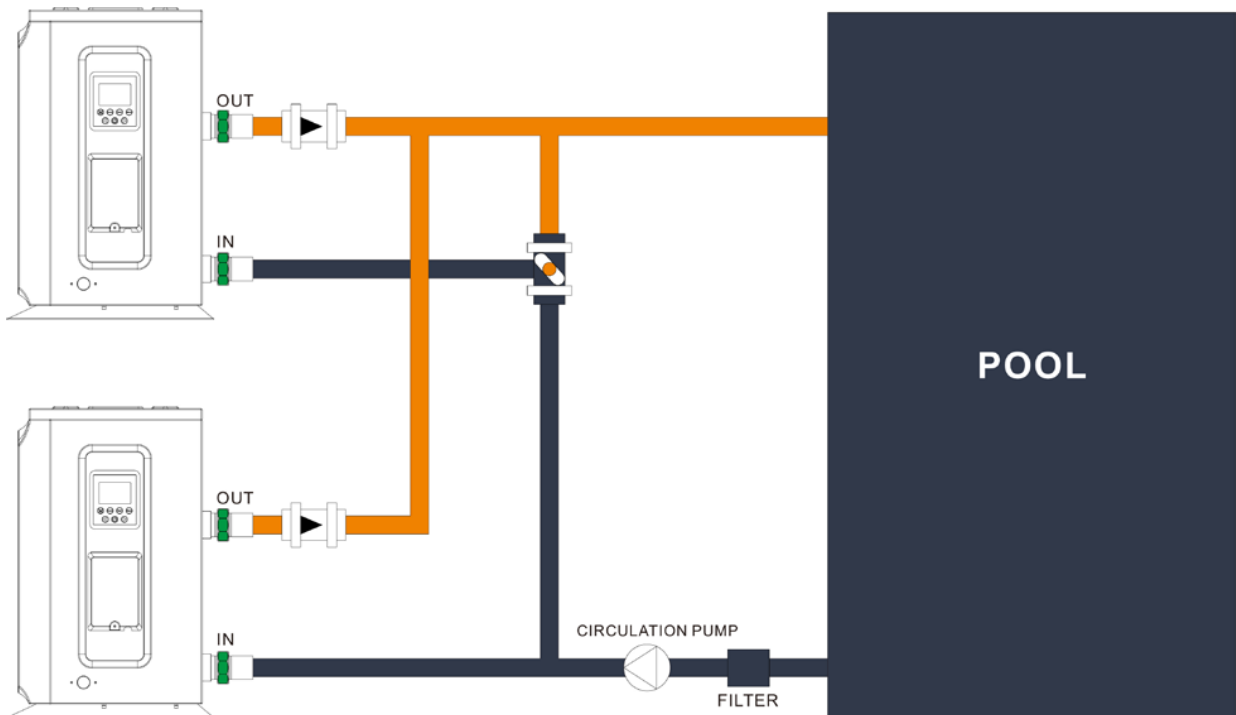
The by-pass generally consists of a 3 Way valve and a Non Return. This makes it possible to regulate the water flow which passes through the heat pump and ensures no reverse flow through the heater.



## SINGLE INSTALLATION DIAGRAM



## SERIAL INSTALLATION DIAGRAM

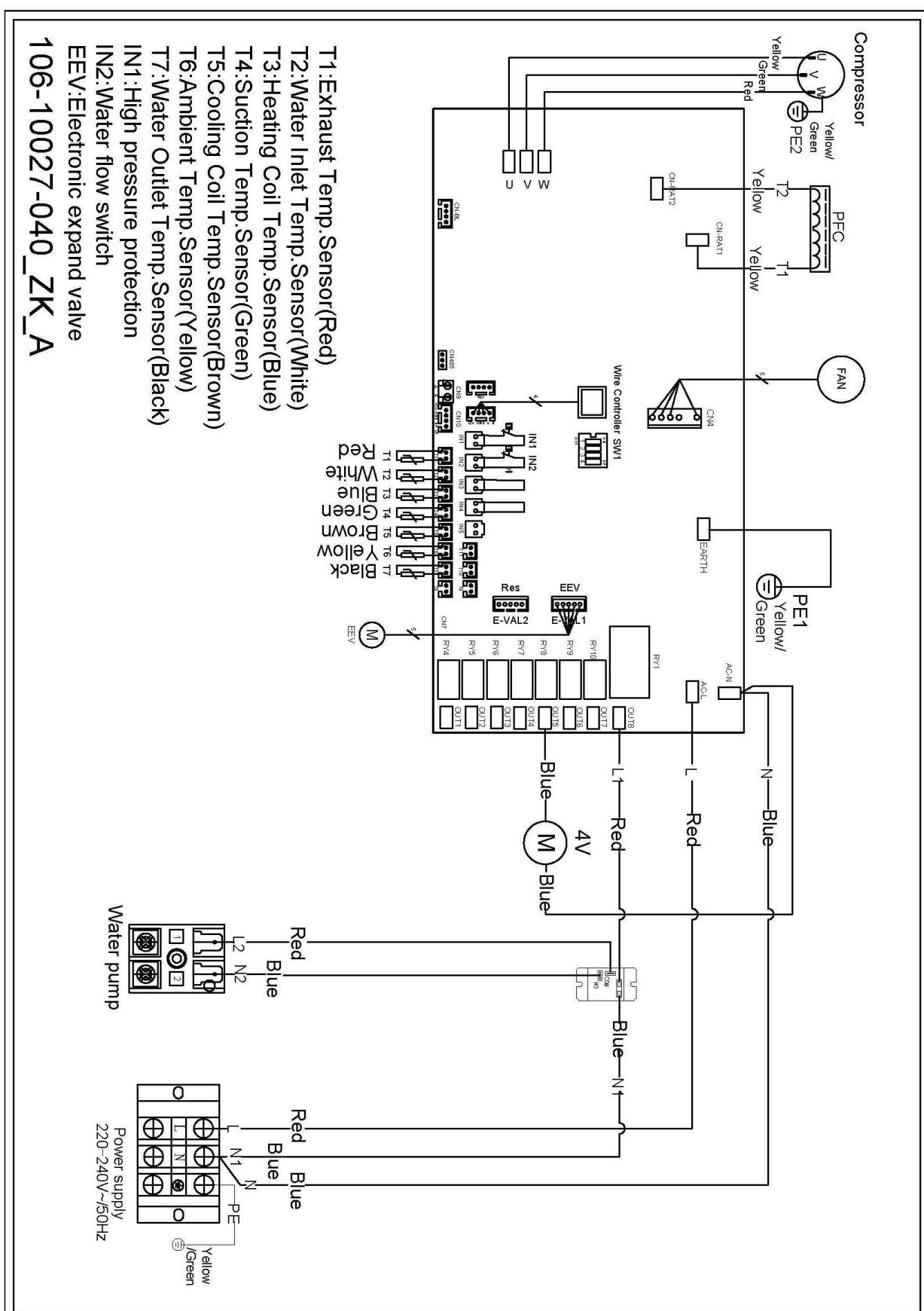


#### 4. Electrical Connection

Model	Power Supply Wires		
	Electricity Supply	Cable Diameter	Specification
EFI Ultra 9.5	220-240V/50Hz	3×2.5mm <sup>2</sup>	AWG 14
EFI Ultra 11.5		3×2.5mm <sup>2</sup>	AWG 14
EFI Ultra 15		3×2.5mm <sup>2</sup>	AWG 14
EFI Ultra 21		3×4.0mm <sup>2</sup>	AWG 12
EFI Ultra 25		3×4.0mm <sup>2</sup>	AWG 12

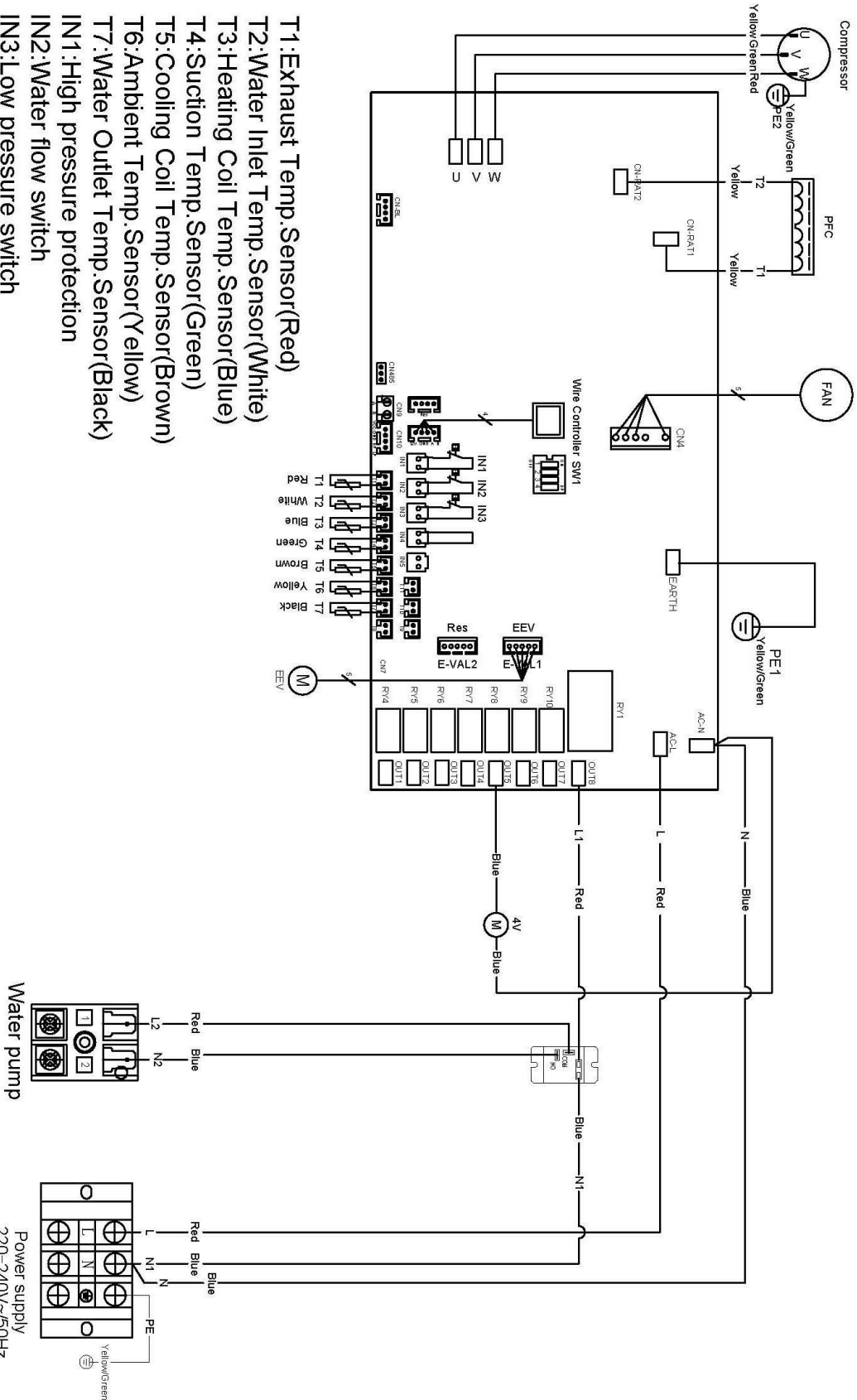
 **WARNING:** Power supply of heat pump must be disconnected before any operation.

- Please comply with the following instruction to connect heat pump.
- **Step 1:** Detach electrical side panel by a screwdriver to access electrical terminal block.
- **Step 2:** Insert cable into heat pump unit port.
- **Step 3:** Connect power supply cable to terminal block according to the diagram below.



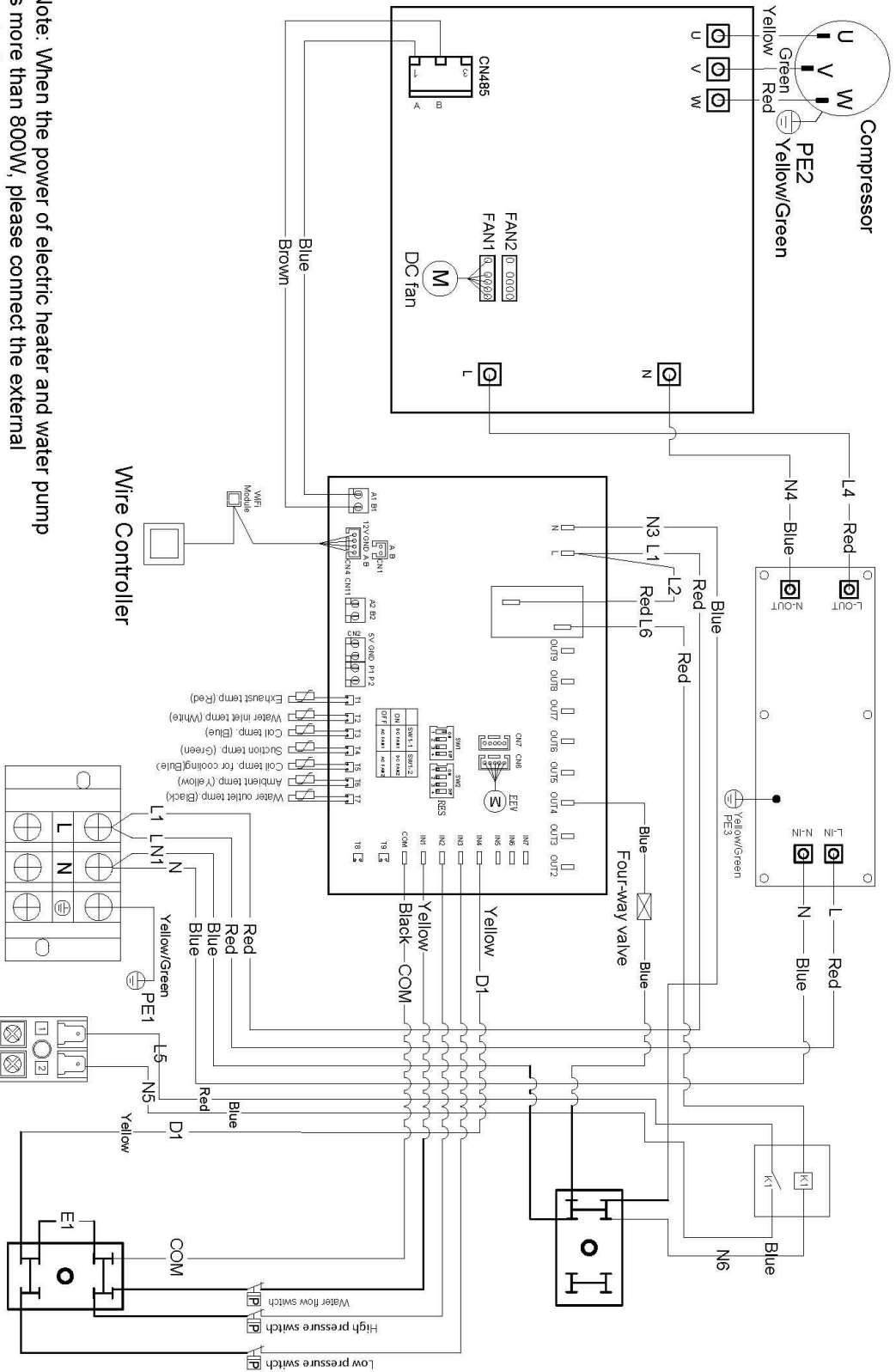
- T1: Exhaust Temp. Sensor (Red)  
 T2: Water Inlet Temp. Sensor (White)  
 T3: Heating Coil Temp. Sensor (Blue)  
 T4: Suction Temp. Sensor (Green)  
 T5: Cooling Coil Temp. Sensor (Brown)  
 T6: Ambient Temp. Sensor (Yellow)  
 T7: Water Outlet Temp. Sensor (Black)  
 IN1: High pressure protection  
 IN2: Water flow switch  
 IN3: Low pressure switch  
 EEV: Electronic expand valve

106-10027-042\_ZK\_A



106-10027-001\_A\_ZK

Note: When the power of electric heater and water pump is more than 800W, please connect the external contactor.





## V. Running Test

### 1. Inspection Before Running Test

- a. Running test can begin after completing all installation;
- b. Before running test, confirm below items and write √ in block;
  - Correct unit installation    ☐
  - Power supply voltage is the same as unit rated voltage    ☐
  - Correct piping and wiring    ☐
  - Air inlet & outlet port of unit is unblocked    ☐
  - Drainage and venting is unblocked and no water leaking    ☐
  - Leakage protector is working    ☐
  - Piping insulation is working    ☐
  - Ground wire is connected correctly    ☐
- c. All wiring and piping should be connected well and carefully checked.
- d. Emptying all air within pipes and water tank, press “on-off” button on control panel to run the unit at setting temperature;
- e. Items need to be checked during running test:
  - During the first running, unit current is normal or not;
  - Each function button on control panel is normal or not;
  - Display screen is normal or not;
  - Are there any leakage in the whole heating circulation system;
  - Condensate drain is normal or not;
  - Is there any abnormal sound or vibration during running?





## 2. Control Function Description

### CHICO Wire Controller






#### 2.1 Control Panel Diagram



#### 2.2 Basic Icons



Icons	Description	Icons	Description
	Heating Mode		Cooling Mode
	Timer		Defrosting
<b>Set Temp.</b>	Target Temperature	<b>Water Temp.</b>	Current Temperature

#### 2.3 Key Operating Instruction

- 1)  On/Off Key:
  - Click On/Off key on the main interface to turn on or off the unit.
  - Click On/Off key on the other interface to return directly to the main interface.
- 2)  Up Key and  Down Key .
  - In the main interface, click to modify the setting temperature.
  - In the parameter checking interface, click  and  to turn the page up or down.

3) “” Return Key.

- Click to return to the previous interface.


4) “” Up Key and “” Down Key.

- In the parameter checking interface, click “” and “” to turn the page up or down.

5) “” On/Off Key.

- Click On/Off key on the main interface to turn on or off the unit.

6) “” Mode Key.

- Click “” on the main interface to switch between cooling and heating modes.

7) “” Query Key.


- Click “” on the main interface to enter main menu.



- Machine status: Click it to enter the unit state parameter query.


Machine status		
Code	Description	Display Range
1	Inlet water temp.	-20~99℃
2	Outlet water temp.	-20~99℃
3	Ambient temp.	-20~99℃

4	Exhaust temp.	0~125℃
5	Suction temp.	-20~99℃
6	Outer coil temp.	-20~99℃
7	Inner coil temp.	-20~99℃
8	Main EEV steps	0-480
9	Reserved	0
10	Compressor current	
11	Radiator temp.	
12	DC bus voltage	
13	Cmp.Frequency	
14	DC fan1 actual speed	According to actual model
15	DC fan2 actual speed	According to actual model

- System parameter: Click it and enter the code "814", then click  to query or modify the system parameters.

System Parameter			
Code	Parameter	Adjustment Range	Initial Value
1	Return temp. difference	1~18℃ (2~36°F)	1℃ (2°F)
2	Cooling set temp.	8℃~35℃ (46~95°F)	27℃ (81°F)
3	Heating set temp.	5℃~40℃ (41~104°F)	27℃ (81°F)
4	Temp. compensation	-5℃~15℃ (-10~30°F)	0℃ (0°F)
5	Def. cycle	20min~90min	45min
6	Def. start temp.	-9℃~-1℃ (16~30°F)	-3℃ (27°F)
7	Def. max time	5min~20min	8min
8	Def. exit temp.	1℃~40℃ (33~104°F)	15℃ (68°F)
9	Def. ambient and coil $\Delta T$	0℃~15℃ (0~30°F)	5℃ (10°F)
10	Def. ambient temp.	0℃~20℃ (32~68°F)	17℃ (63°F)
11	EEV working cycle	20s~90s	25s
12	Smart/Powerful superheat	-5℃~10℃ (-10~20°F)	According to the actual model
13	EEV Exhaust temp.	70℃~125℃ (158~257°F)	95℃ (203°F)

14	Def. EEV steps	20~450	According to the actual model
15	EEV Min. step	5~15 (*10)	According to the actual model
16	EEV mode	Auto/Manual	Auto
17	EEV manual step	20~450	350
18	Cooling mode superheat	-5℃~10℃ (-10~20°F)	According to the actual model
19	Reserved		
20	Cooling EEV mode	Super-cooling/Temperature	Super-cooling
21	Water pump mode	1: No stop at constant temp 2: Top at constant temp. 3: Intermittent running	3
22	Fan mode	Auto/Manual	Auto
23	Fan manual speed	0-99 (*10)	80 (*10)
24	EH start ambient temp.	-10℃~20℃ (14~50°F)	0℃ (32°F)
25	Def. EH function	Yes/None	Yes
26	Low temp. protection	-30℃~0℃	-20℃

- Factory parameter: Click it and enter the code "4180", then click  query or modify the factory parameters.

Factory parameter			
Setting Code	Parameter	Adjustment Range	Initial Value
F1	Frequency set_1	20~120Hz	20 Hz
F2	Frequency set_2	20~120Hz	24 Hz
F3	Frequency set_3	20~120Hz	28 Hz
F4	Frequency set_4	20~120Hz	32 Hz
F5	Frequency set_5	20~120Hz	36 Hz
F6	Frequency set_6	20~120Hz	40 Hz
F7	Frequency set_7	20~120Hz	44 Hz
F8	Frequency set_8	20~120Hz	46 Hz
F9	Frequency set_9	20~120Hz	58 Hz
F10	Frequency set_10	20~120Hz	68 Hz
F11	Exhaust temp. set_1	50~125℃ (122~257°F)	95℃(203°F)
F12	Exhaust temp. set_2	50~125℃ (122~257°F)	100℃(212°F)
F13	Exhaust temp. set_3	50~125℃ (122~257°F)	105℃(221°F)
F14	Exhaust temp. set_4	50~125℃ (122~257°F)	110℃(230°F)
F15	Exhaust temp. set_5	80~125℃ (176~257°F)	115℃(248°F)
F16	DC fan speed_1	0~99 RPM	52 (*10)
F17	DC fan speed_2	0~99 RPM	58 (*10)
F18	DC fan speed_3	0~99 RPM	64 (*10)
F19	DC fan speed_4	0~99 RPM	72 (*10)

F20	DC fan speed_5	0~99 RPM	78 (*10)
F21	DC fan speed_6	0~99 RPM	84 (*10)
F22	Silent mode superheat	-5~10℃ (-10~20°F)	According to the actual model
F23	Machine type	0:Heating & Cooling 1:Heating ONLY 2:Cooling ONLY	0
F24	Constant temp. superheat	-5~10℃ (-10~20°F)	According to the actual model
F25	Frequency set_11	20~120Hz	70 Hz
F26	Frequency set_12	20~120Hz	74 Hz
F27	Frequency set_13	20~120Hz	78 Hz
F28	Frequency set_14	20~120Hz	82 Hz
F29	Frequency set_15	20~120Hz	84 Hz
F30	Frequency set_16	20~120Hz	86 Hz
F31	Frequency set_17	20~120Hz	88 Hz
F32	Frequency set_18	20~120Hz	90 Hz

- Timer Setting.



## 8) Date and Clock Setting.



- In the clock setting interface, click "Confirm" to confirm the time settings.

9) "SILENT" Function Key.

- Click "SILENT" on the main interface to switch powerful mode, smart mode, and silent mode.

## 2.4 System Protection and Error Code

Error Code	Error Description	Remarks
Er 03	Water flow switch failure	
Er 04	Anti-freezing in winter	
Er 05	High pressure failure	
Er 06	Low pressure failure	
Er 09	Communication failure between main control board and wire controller	
Er 10	Communication failure of inverter module (Alarm when the communication between the external board and the driver board is disconnected)	
Er 12	Exhaust over heat protection	
Er 15	Water Inlet temperature sensor failure	
Er 16	External coil temperature sensor failure	
Er 18	Exhaust temperature sensor failure	
Er 19	DC fan failure	
Er 20	Inverter module abnormal protection	
Er 21	Ambient temperature sensor failure	
Er 23	Outlet water low temp. Protection	
Er 27	Water outlet temperature sensor failure	
Er 28	CT over current protection	
Er 29	Water inlet temperature sensor failure	
Er 32	Outlet Water Over Heat Protection	
Er 33	Heating Coil Over Heat Protection	
Er 42	Internal coil temperature sensor failure	

- E20 fault will display the following error codes at the same time, the error codes will switch every 3 seconds. Among them, error codes 1-128 appear in priority. When error codes 1-128 don't appear, then it will show error codes 257-384. If two or more error codes appear at the same time, then display error codes accumulation. For example, 16 and 32 occur at the same time, it will show 48.

Error Code	Name	Description	Solution suggestion
1	IPM over-current	There is something wrong with IPM module	Replace inverter module
2	Compressor synchronization is abnormal	Compressor failure	Replace compressor
4	reserved	--	--
8	Compressor output phase absence	Compressor wiring is disconnected or the connection is poor	Check compressor input wiring
16	Low DC bus voltage	Input voltage is too low , PFC module failure,	Check the input voltage, replace inverter module
32	High DC bus voltage	Input voltage is too high, PFC Module failure	Replace inverter module
64	Radiator over temperature	Fan motor failure, air duct blockage	Check fan motor, air duct
128	Radiator temperature failure	Radiator sensor is damaged	Replace inverter module
257	Communication failure	Inverter module doesn't receive message from main controller	Check the connection between main controller and inverter module
258	AC Input phase absence	Input phase is absent (Three phase module is effective)	Check input circuit
260	AC Input over-current	Input three phase imbalance (three phase module is effective)	Check input three-phase voltage
264	Low voltage of AC Input	Input voltage is too low	Check input voltage
272	High pressure protection	Reserved	
288	IPM over-temperature protection	Fan motor failure, air duct blocked	Check fan motor and air duct
320	High compressor peak current	1.Compressor current is too high. 2.The driver program doesn't match with compressor	Replace inverter module
384	PFC module over-temperature	Temperature of PFC Module is too high	

## 2.5 Other Malfunctions and Solutions (No display on wire controller)

Malfunctions	Observation	Reasons	Solution
Heat pump is not running	Wire controller shows no display	No power supply	Check whether cable and circuit breaker are connected
	Wire controller displays the actual time	Heat pump under standby status	Start up heat pump to run.




	Wire controller displays the actual water temperature	1. Water temperature is reaching set value, heat pump under constant temperature status 2. Heat pump just starts to run 3. Under defrosting	1. Verify water temperature setting 2. Start up heat pump after a few minutes 3. Wire controller should display "Defrosting"
Water temperature is cooling when heat pump runs under heating mode	Wire controller displays actual water temperature and no error code displays	1. Chose the wrong mode 2. Figures show defects 3. Controller defect	1. Adjust the mode 2. Replace the defect wire controller, and then check the status after changing the running mode, verifying the water inlet and outlet temperature 3. Replace or repair the heat pump
Short running	Wire controller displays actual water temperature, no error code displays	1. Fan can't run 2. Not enough air ventilation 3. Not enough refrigerant	1. Check the cable connections between the motor and fan, if necessary, they should be replaced 2. Check the location of the heat pump, and eliminate all obstacles to assure a good air ventilation 3 Replace or repair the heat pump
water stains	Water stains on heat pump unit	1. Condensed water 2. Water leakage	1. No action 2. Check the titanium heat exchanger carefully if it shows any defects

Too much ice on evaporator	Too much ice on evaporator		<p>1. Check the location of heat pump, and eliminate all obstacles to assure a good air ventilation</p> <p>2. Replace or repair the heat pump</p>
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## VI. Wi-Fi Module and APP User Manual



### 1. Display




"" Network distribution button: long press 3S to enter the default network distribution mode; After powering on for 10 seconds, you can press the button for 5 consecutive seconds within 5 seconds to enter the compatible network mode.

"" power indication: when power is on, "" corresponds to the lower indicator light;

"" WIFI status: After WIFI is connected, "" corresponding to the lower indicator light is always on;

"" communication instructions: when entering the default distribution network, "" flashes quickly corresponding to the lower indicator;

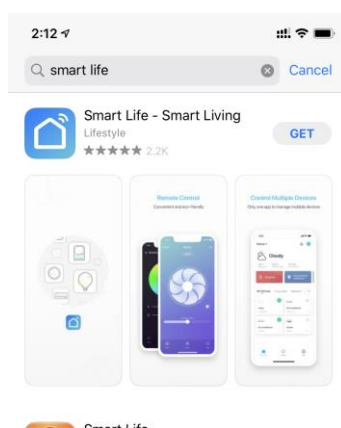
When entering compatible distribution network, "  " flashes slowly corresponding to the lower indicator light;

After the distribution network connection is successful, the corresponding indicator light below "  " represents the main control power on and off status.

## 2. Wi-Fi Function

### 2.1 Software Installation


- Method 1: Search "Smart life" in your APP store ,install "  ".Click "GET" to install.



- Method 2: Scan the QR code below.



### 2.2 Software startup

- After installation,click "  " on your desktop to start up Smart Life.

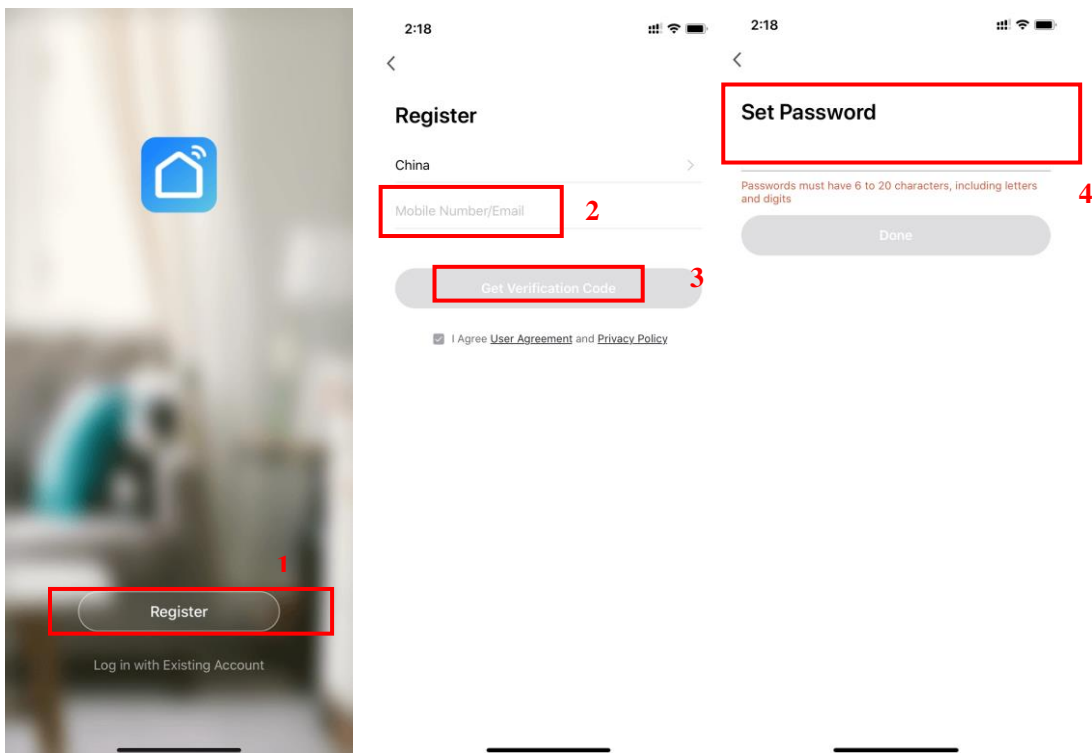


Smart Life

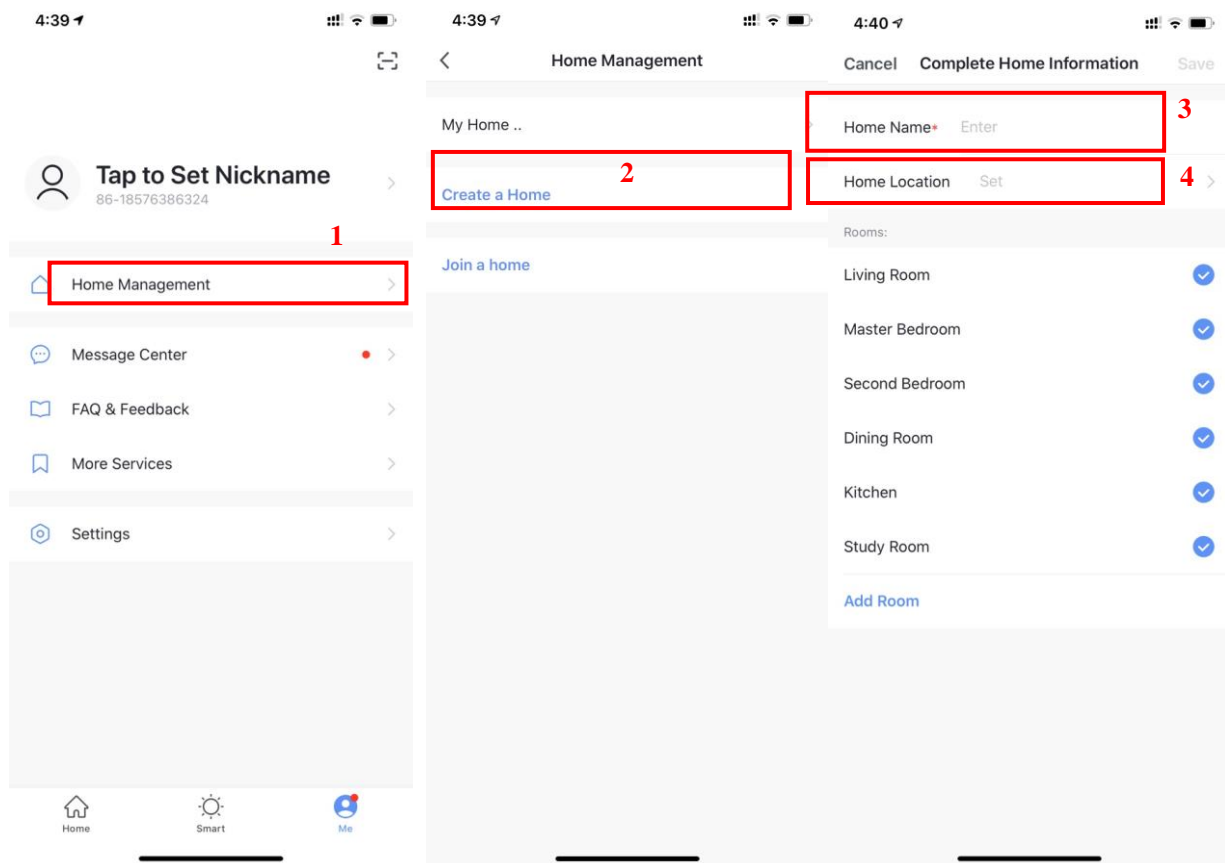
## 2.3 Software registration and configuration

### 2.3.1 Registration

- Users don't have account can click "Register" to create an account: Register → Enter your phone number → Get Verification Code → Enter Verification Code → Set Code,

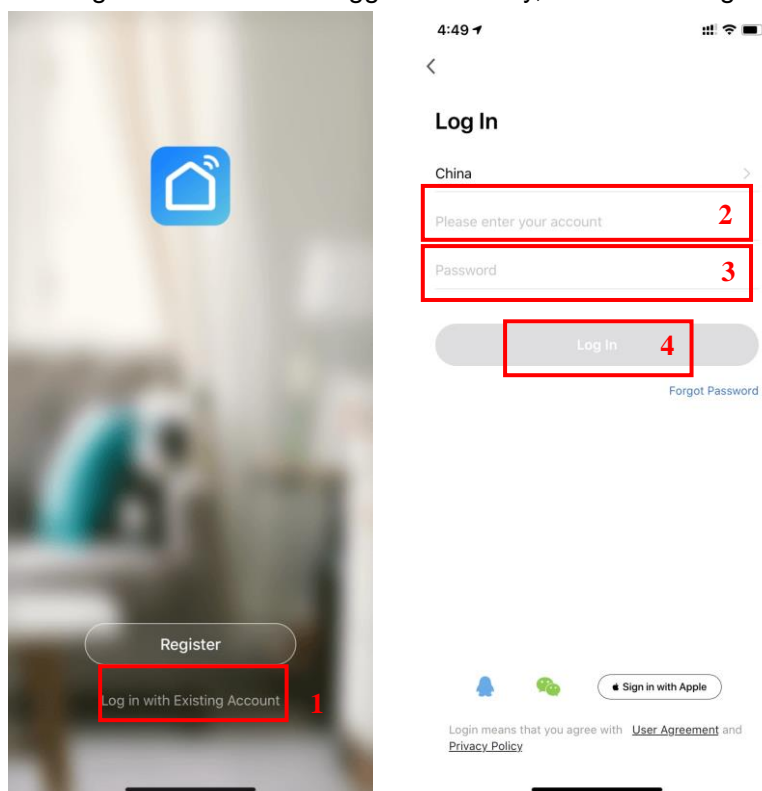


- After registration, you need to Create a Home: Create a Home → Set Home Name → Set Home Location → Add Rooms.

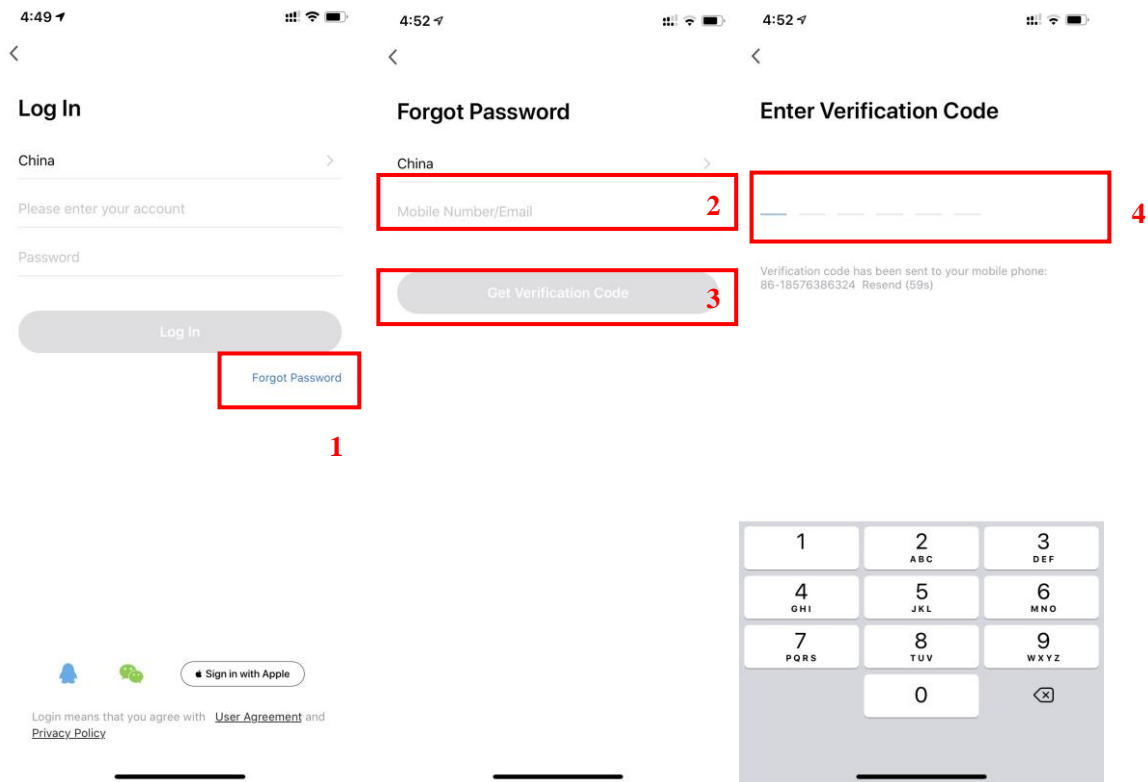


### 2.3.2 Account ID+ Password Login

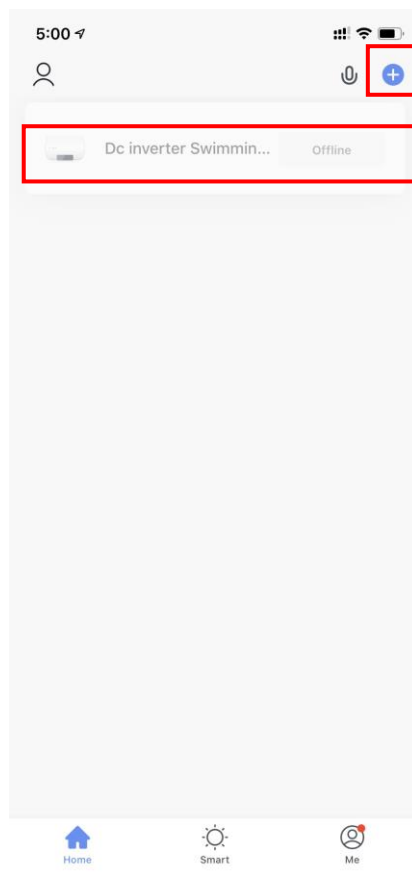
- Existing accounts can be logged in directly, in the following order.



If you forget your password you can choose to login with your verification code and select "Forget Password" : Enter your phone number → Get verification code .



- After creating a home or logged in, enter the main interface of APP.



Note:

Click the device to check the status, and you can set the operating mode, ON/OFF, timer.


Click “+” to add devices.

### 2.3.3 WIFI Module configuration steps:



- **Method 1**(Intelligent distribution network mode):

- ◆ **Step 1:**

- ✓ When power is on, if there is no distribution network, it will automatically connect through

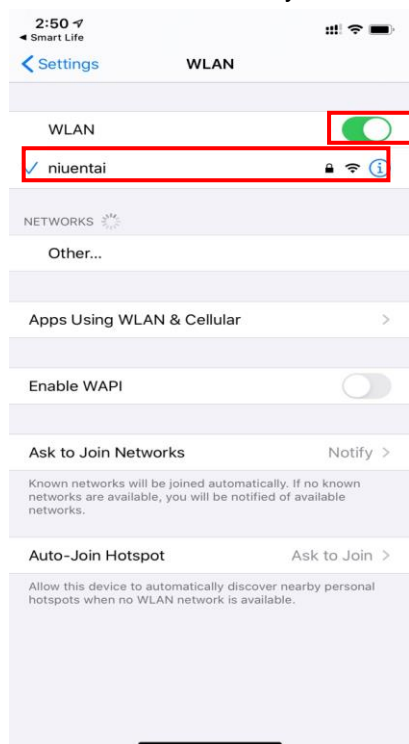
the default distribution network by default. At this moment, the indicator light under “” flashes rapidly (2 times per second), mobile phone can connect it.

- ✓ Manually enter the intelligent distribution network mode: 10s after power on, long press on

“” for 3s to enter the intelligent distribution network mode, the indicator light under “” flashes rapidly (2 times per second), mobile phone can connect it.

- ◆ **Step 2:**

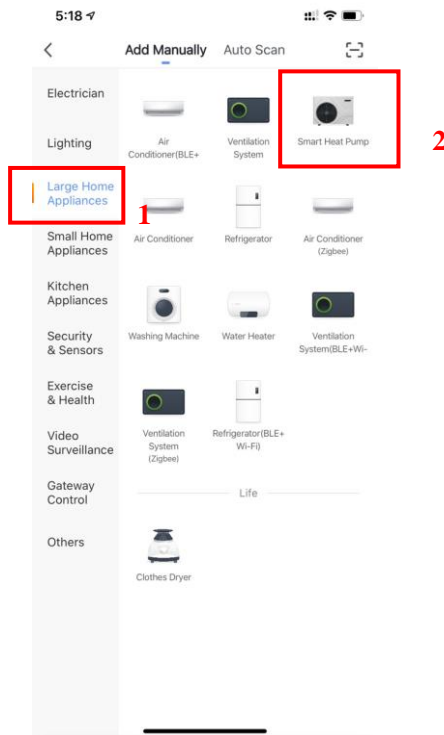
- ✓ Turn on the phone's WIFI function and connect to the WIFI hotspot. The WIFI hotspot must be able to connect to the Internet normally;



- ◆ **Step 3:**

- ✓ Open the "smart life" APP, log in into the main interface, click on the top right corner “+” or

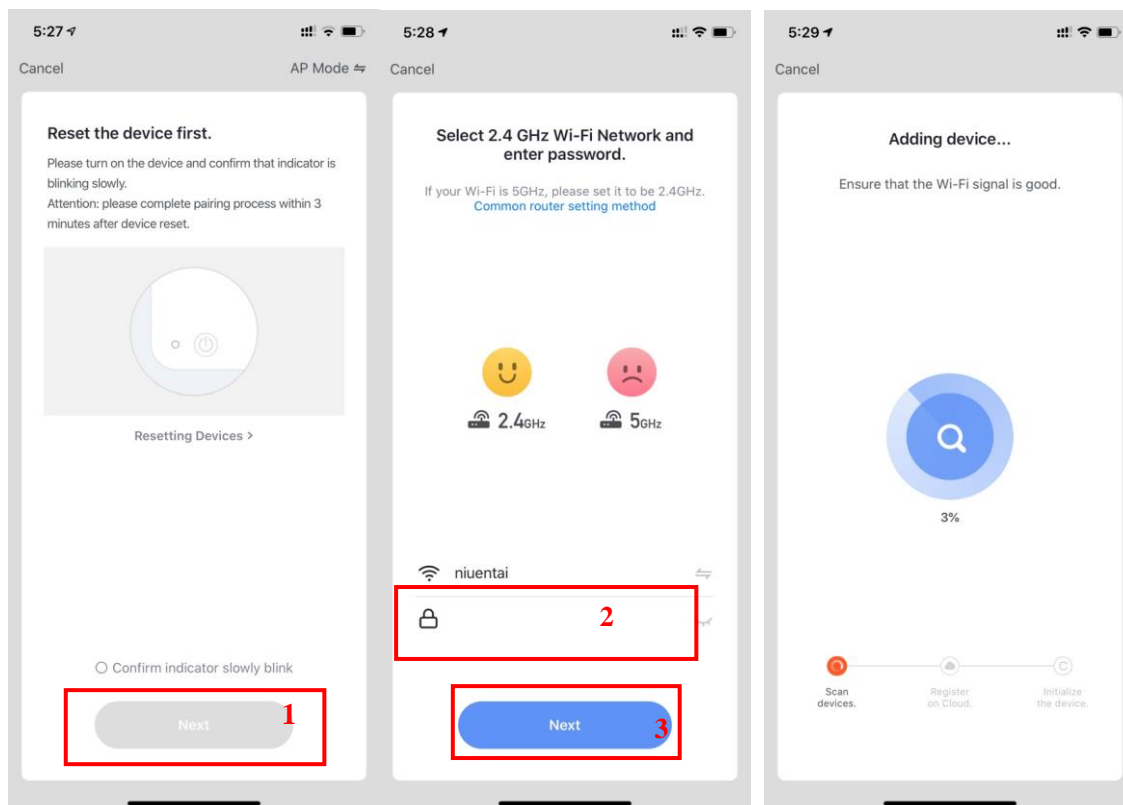
"add equipment" of the interface, enter the equipment type selection, the "Large Home Appliances", select "Smart Heat Pump" equipment and add equipment into the interface.



◆ **Step 4:**

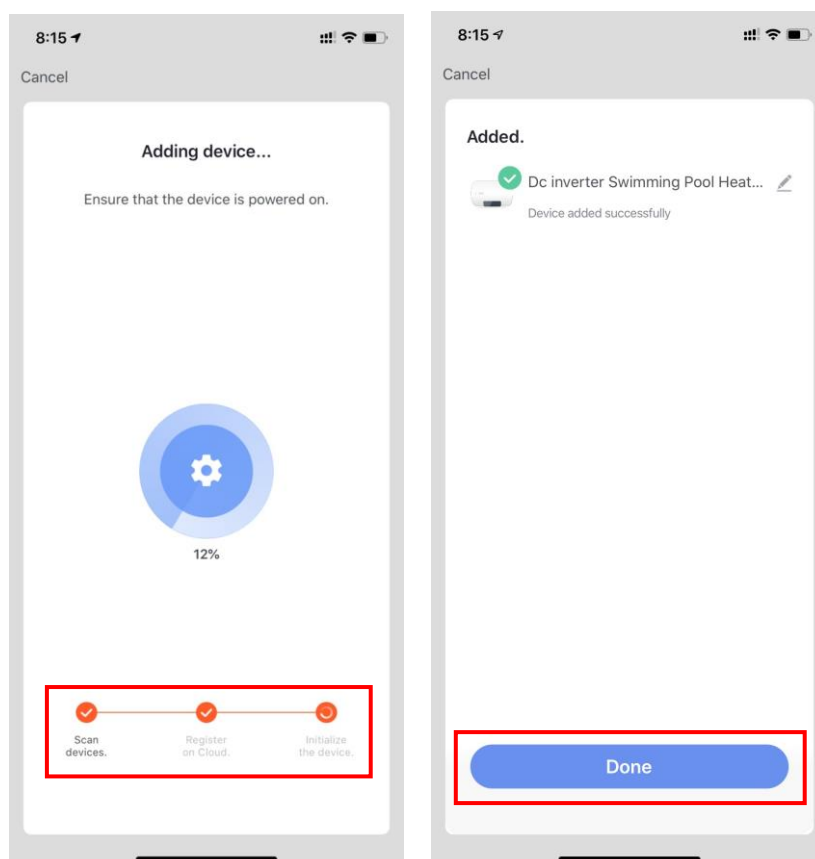
- ✓ After selecting "Smart Heat Pump", enter the interface of "Add Equipment", and confirm that the line controller has selected the intelligent network distribution mode. After the indicator light under "📶" flashes rapidly, click "Confirm indicator rapidly blink".
- ✓ Enter the WIFI connection interface, enter the WIFI password of the mobile phone (it must be the same as the WIFI of the mobile phone), click "Next", and then directly enter the connected state of the device







◆ **Step 5:**

- When “Scan devices”, “Register on Cloud”, “Initialize the device” are all completed, connection succeed.




- **Method 2** (Compatible with network configuration mode):

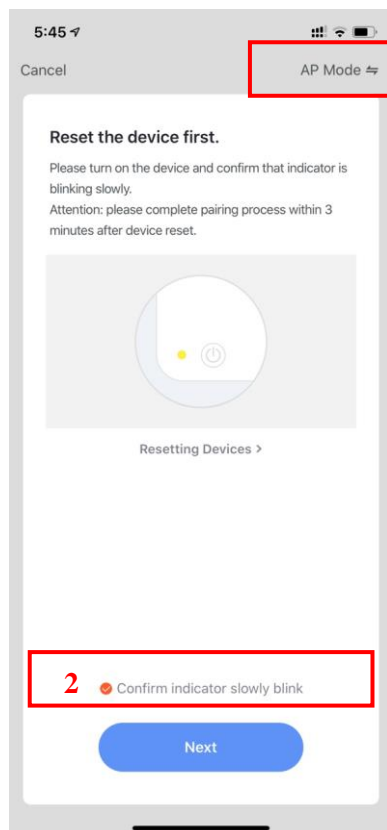
- ◆ **Step 1**

- ✓ Manually enter compatible network mode: 10s after power on, click “” 5 times within 5s to enter compatible with network configuration mode. The indicator under “” flashes slowly (1 time every 3s), mobile phone can connect it;

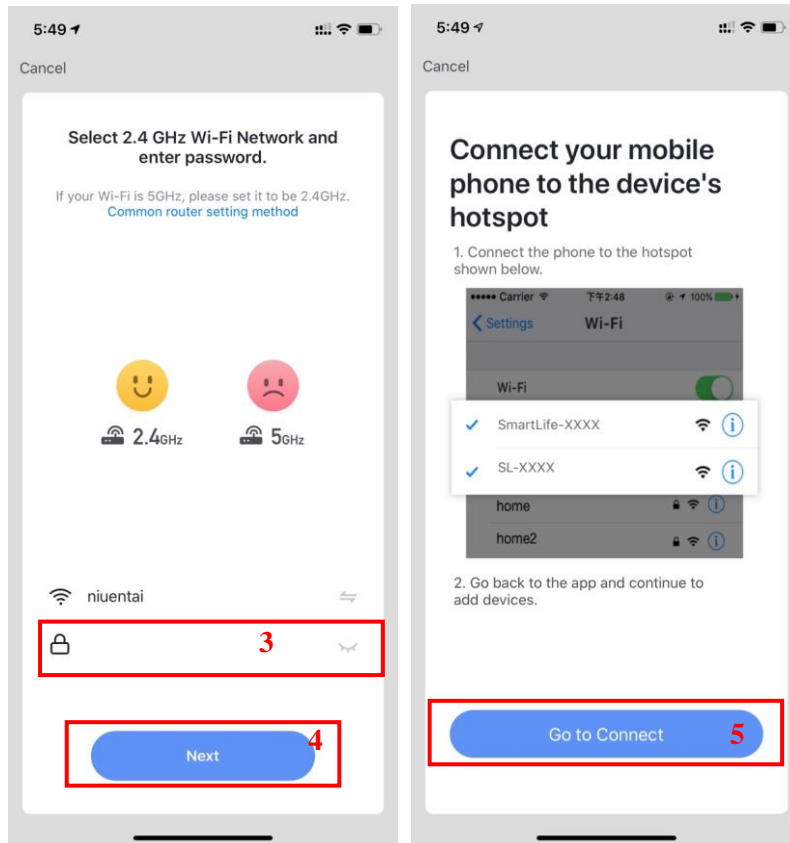
- ◆ **Step 2&3 are the same** with intelligent distribution network **above**.

- ◆ **Step 4:**

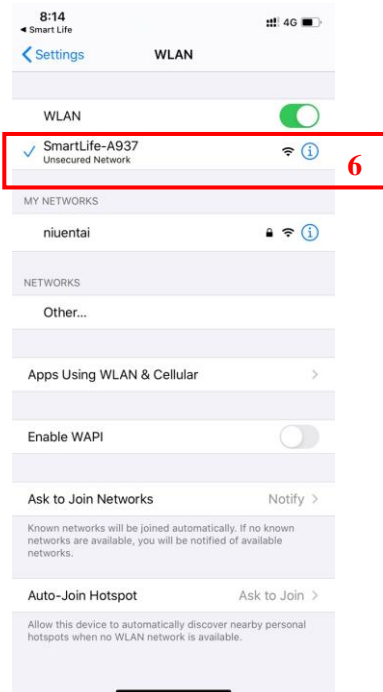
- ✓ After entering the add device interface, click "AP Mode" in the upper right corner; Enter the AP mode to add the device interface, confirm that the compatible network distribution mode has been selected (“” icon flashes), and click "Confirm indicator rapidly blink".



- ✓ The interface of WiFi connection will pop up, enter the WiFi password of the mobile phone (it must be the same as the WiFi of the mobile phone), click "Next", "Connect your mobile phone to the device's hotspot" will pop up, and click "Go to Connect".;



- ✓ Enter the mobile phone WiFi connection interface, find the “SmartLife\_XXXX” connection, and the APP will automatically enter the device connection state.

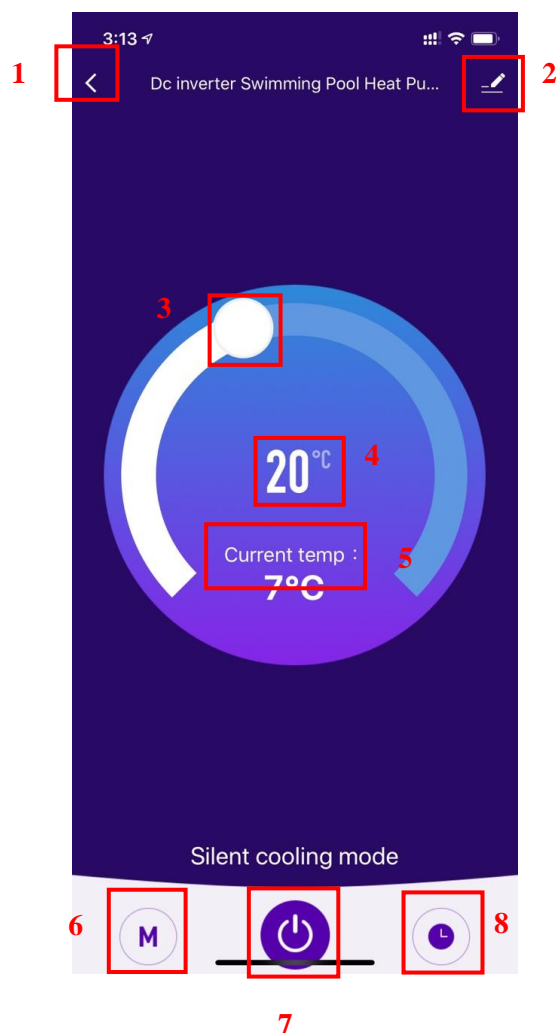


◆ **Step 5 is the same** with intelligent distribution network **above**.

- ✓ Note: If the connection is failed, please enter the compatible network mode manually and reconnect according to the above steps.

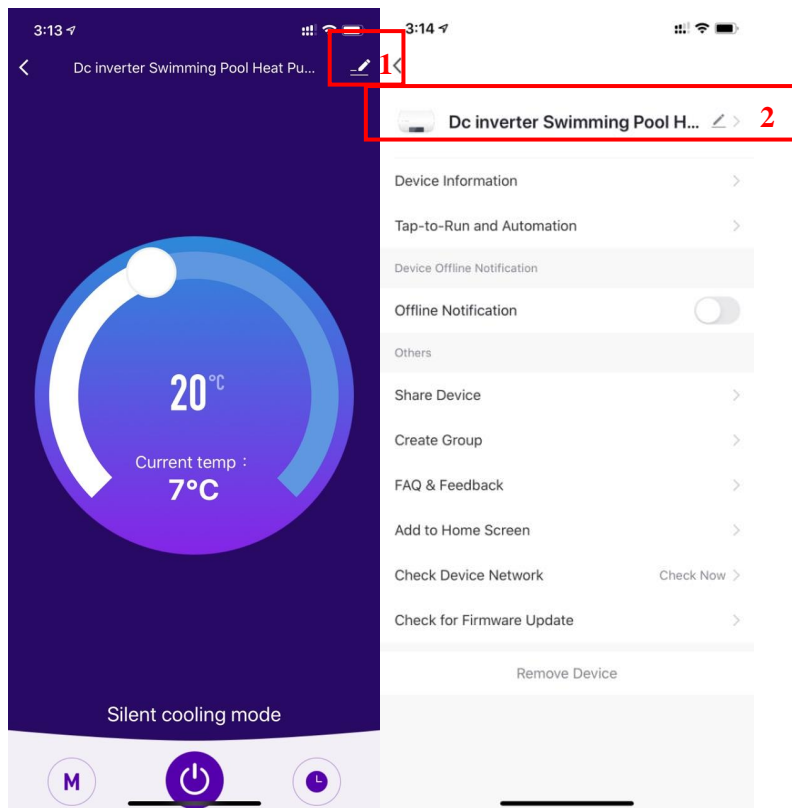
## 2.4 Software function operation

- After the device is bound successfully, enter the operation interface of “Smart heat pump”(Device name, modifiable)
- In the main interface of “Smart Life”, click “Smart heat pump” to enter the operation interface.



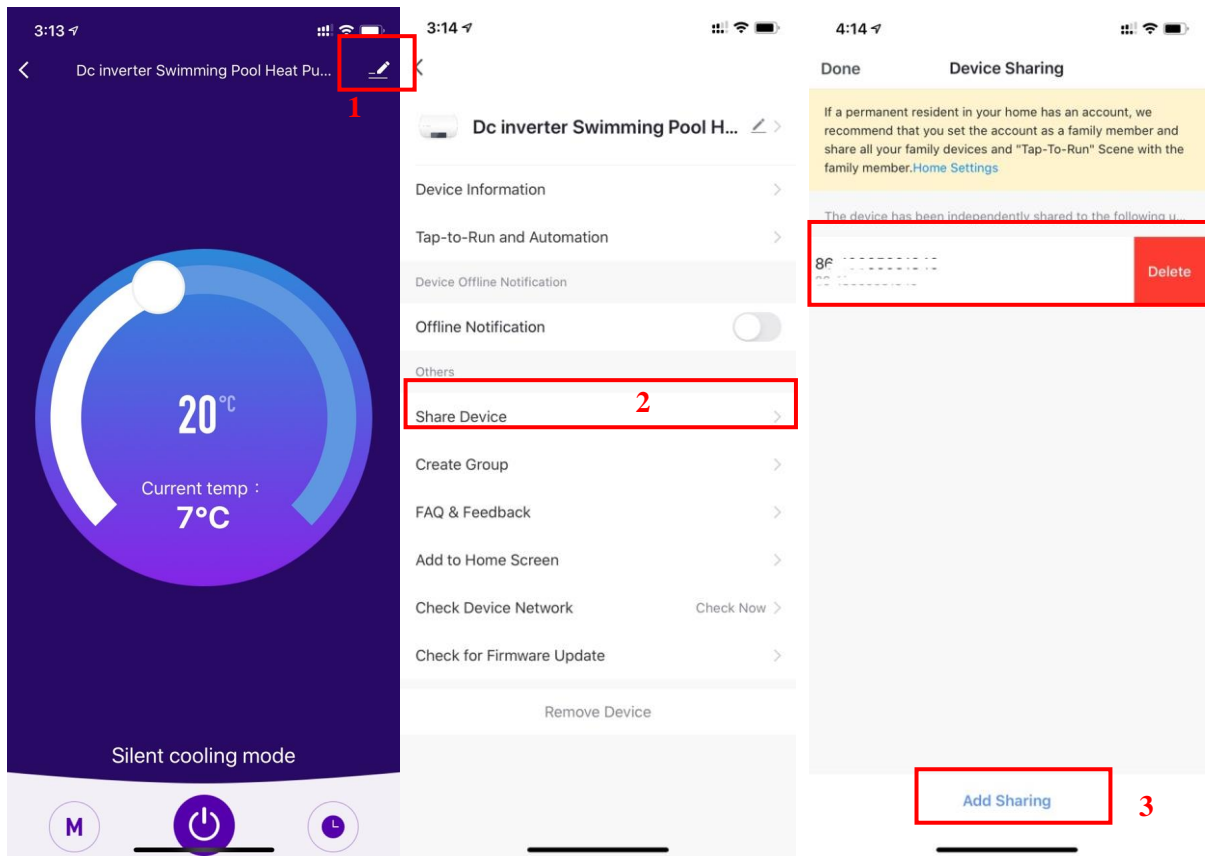
1. Back
2. More: You can change device name, select device installation location, check networking status, add Shared users, create device cluster, view device information, and more.
3. Setting temperature adjustment: The white circle slides counterclockwise to reduce the temperature, but clockwise to increase the temperature.
4. Target temperature
5. Current temperature
6. Mode switching: Click to select the mode to be switched.
7. ON/OFF
8. Timing: Click to add timing off/on time.
  - Modify device name
    - ◆ Click in the following order to enter device details , and click "Device Name" to rename the

device.

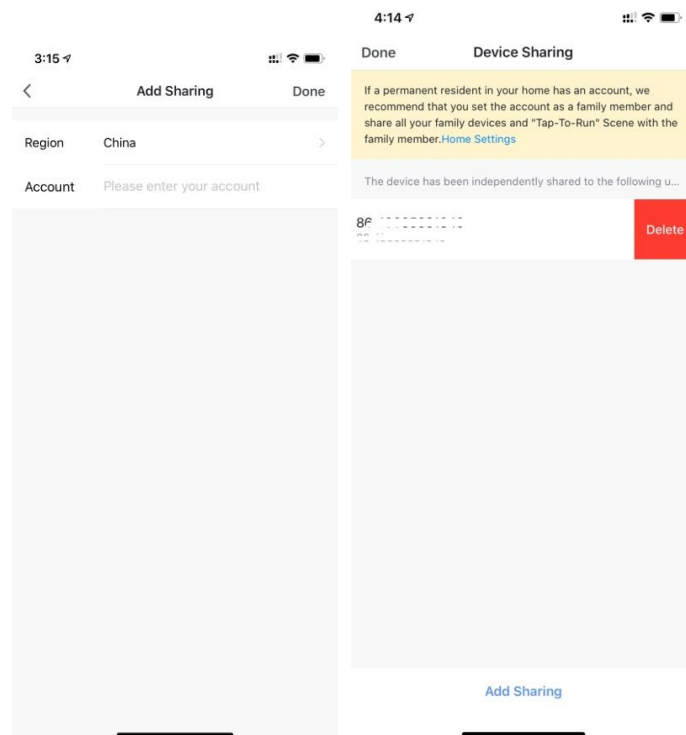


- **Device sharing**

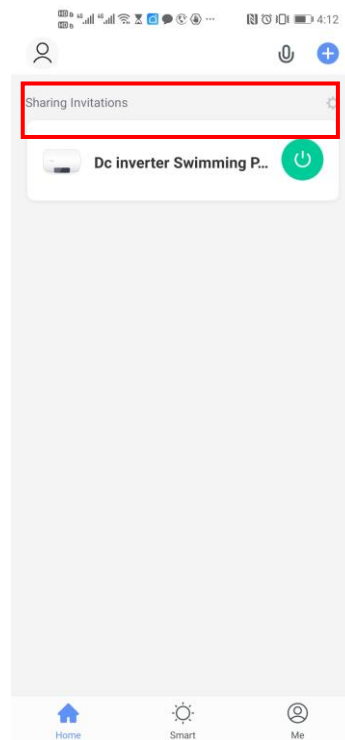
- ◆ To share a bound device, the user should do so in the following order.
- ◆ After successful sharing, the list will be added to show the person Shared
- ◆ If you want to delete the account you shared to, cross the selected account to the left, and delete it.
- ◆ The user interface is as follows




- ◆ Enter the account of the Shared, click "Done", and the share success list shows the newly added account of the Shared.

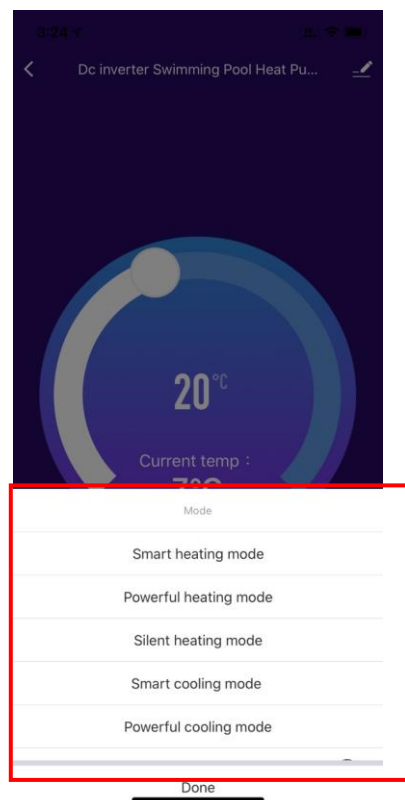


- ◆ The interface of the person to be Shared is as follows. The received shared device is displayed. Click it to operate and control the device.




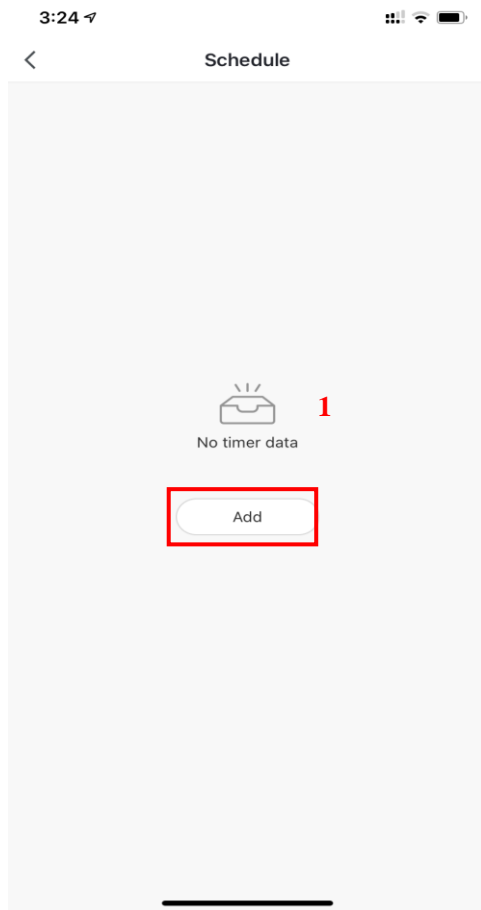
- **Mode settings**

- ◆ click“” on the main interface to switch modes,select what you need.



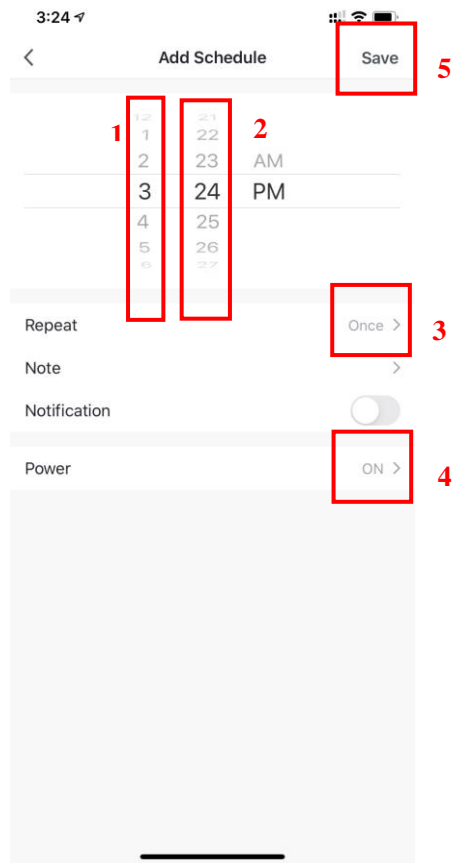
- **timer setting**

- ◆ Click “” on the main interface to enter timer setting interface, as shown below,click to add timer.



- ◆ After entering timer setting,swipe up/down to set timer,set up repeat weeks and on/off,then click “save” to save your settings as follows.









- ① Hours
- ② Minutes
- ③ Set the repetition
- ④ Set power ON/OFF
- ⑤ Save your modification

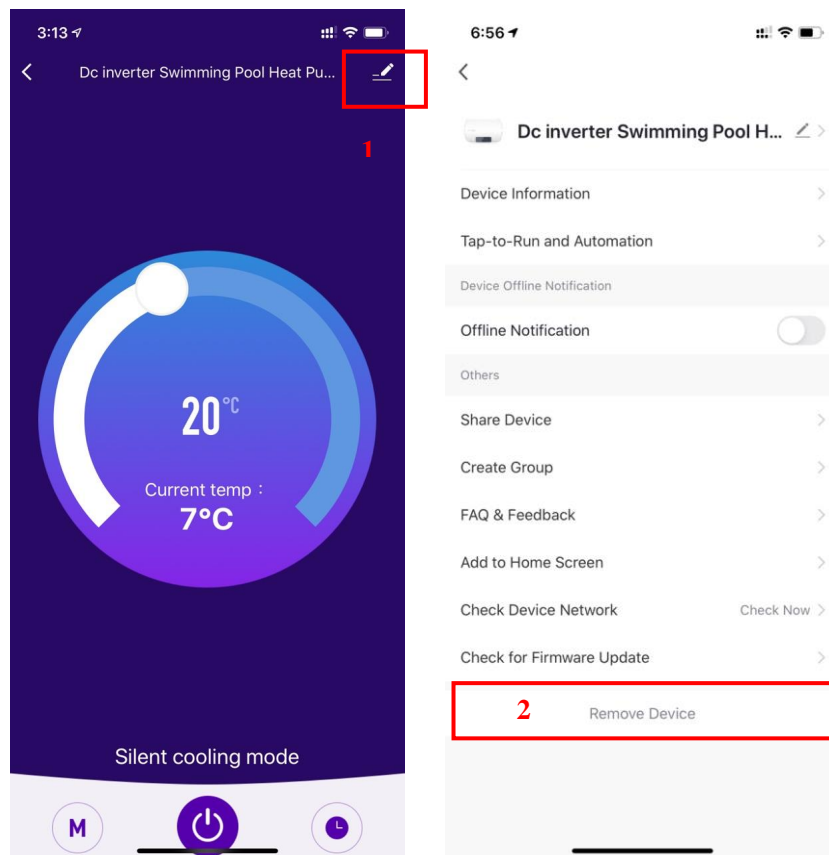
## 2.5 Device removal

- By Wi-Fi module

- ◆ When you need to remove the device, long press on “” for 3s to removed the device and enter intelligent distribution mode again. The indicator light under “” flashes rapidly for 3min, The network can be rematched ,or quit it if no operation within 3 minutes.

- By APP

- ◆ Click “” on the top right corner of the main interface to enter the device details interface, and click “device removal” to enter intelligent distribution mode. Indicator light under “” flashes rapidly for 3min, The network can be reconfigured within 3 minutes, and the network can be quit if it is not connected within 3 minutes. The specific operations are shown as follows.



## VII. Maintenance

- (1) You should check the water supply system regularly to avoid the air entering into water system and occurrence of low water flow, it would reduce the performance and reliability of the heat pump.
- (2) Clean your pools and filtration system regularly to avoid the damage of the unit because of a dirty or clogged filter.
- (3) Discharge the water from the bottom of the water pump if the heat pump will stop running for a long time (specially in winter).
- (4) On any other moment, check the water flow to confirm there is enough water before the unit starts to run again.
- (5) After the unit is conditioned in winter, it is preferred to cover the unit with the special winter heat pump cover.

