SWIMMING POOL HEAT PUMP

Installation & Instruction Manual

NEXUS

IMPORTANT NOTE:

Thank you very much for purchasing our product. Before using your device, please read this manual carefully and keep it for future reference.

CONTENT

1. FOREWORD

1.1. Read the Manual Before Operation

WARNING

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

① This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given super-vision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision. Please install the device in compliance with local laws, regulations and standards;

② If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly.

③ The appliance shall be installed in accordance with national wiring regulations.

④ An all-pole disconnection device which has at least 3mm clearances in all poles, and have a leakage current that may exceed 10mA, the residual current device (RCD) having a rated residual operating current not exceeding 30mA, and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

Initial safety checks shall include:

① That capacitors are discharged: this shall be done in a safe manner to avoid the possibility of sparking;

② That no live electrical components and wiring are exposed while charging, recovering, or purging the system;

③ 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 fire is minimized. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

Work procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of 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 the work being carried out. Work in confined spaces shall be avoided.

Checking for the 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.

Presence of a 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 CO_2 fire extinguisher adjacent to the charging area.

No ignition sources

No person carrying out work in relation to a refrigeration system that involves exposing any pipework 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, removal, 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:

① The charge size is in accordance with the room size within which the refrigerant containing parts are installed;

② The ventilation machinery and outlets are operating adequately and are not obstructed;

③ If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

④ Marking of the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

⑤ Refrigeration pipes 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 that are inherently resistant to being corroded or are suitably protected against being so corroded.

Checks to electrical devices

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

Initial safety checks shall include:

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

Repairs to sealed components

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

② Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that 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 potentially 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 pipework.
If a leak is suspected, all naked flames shall be removed/extinguished.
If leakage of refrigerant is found which requires brazing, all the refrigerants 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:

① Remove refrigerant

② Purge the circuit with inert gas

③ Evacuate

④ Purge again with inert gas

⑤ 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 the 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 the atmospheric pressure to enable work to take place. This operation is 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:

① Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them. Cylinders shall be kept upright.

② Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.

③ Label the system when charging is complete (if not already).

④ 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 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.

① Become familiar with the equipment and its operation.

② Isolate system electrically.

③ 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.

④ Pump down refrigerant system, if possible.

⑤ If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

⑥ Make sure that the cylinder is situated on the scales before recovery takes place.

⑦ Start the recovery machine and operate following the manufacturer's instructions.

⑧ Do not overfill cylinders. (No more than 80 % volume liquid charge).

⑨ Do not exceed the maximum working pressure of the cylinder, even temporarily.

⑩ When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from the site promptly and all isolation valves on the equipment are closed off.

⑪ Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

Labeling

Equipment shall be labeled stating that it has been decommissioned 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 refrigerants from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for

that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with a 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 the 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.

1.2. The Symbol Description of the Device

The precautions listed here are divided into the following types. They are quite important, so be sure to follow them carefully. Meanings of DANGER, WARNING, CAUTION and NOTE symbols. As shown in table 1.2-1.

Table 1.2-1 Symbol Description

Symbols	Meaning	Description
	**GENERAL WARNING**	All information marked with this symbol is important and should be viewed carefully. Otherwise, it may cause injury or even death.
	**FLAMMABLE WARNING**	The symbol shows that this appliance uses flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.

Symbols	Meaning	Description
	**ELECTRIC SHOCK WARNING**	This symbol shows that there might be an electric shock if the appliance still connects the power during cleaning, examination and repair.
	**GENERAL CAUTION**	All information marked with this symbol is a reminder and should be noted.
	**ANTI-FREEZE CAUTION**	This symbol shows anti-freezing protection. It is necessary to prevent the freezing of heat exchanger or water pipes, the power of device can not be shut off in the ambient temperature lower than 35.6℉. All the water in the device and plumbing system must be drained out if the device will be turned off for a long time.
	**MANUAL READING CAUTION**	This symbol shows that the operation manual should be read carefully.
	**RECYCLING CAUTION**	This symbol shows that when you intend to discard this device, it must be sent to an appropriate facility for recovery and recycling.

1.3. Statement

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

① Wrong operation may result in injury or damage;

② Please install the unit in compliance with local laws, regulations and standards;

③ Confirm power voltage and frequency;

④ The unit is only used with grounding sockets;

⑤ Independent switch must be offered with the unit.

1.4. Safety Factors

The following safety factors need to be considered:

① Please read the following warnings before installation;

② Be sure to check the details that need attention, including safety factors;

③ 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/mm².
- 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.

① Use a specific wire and fasten it to terminal block so that the connection will prevent pressure from being applied to parts.

② Wrong wiring will cause fire. Please connect power wire accurately according to wiring diagram on the manual to avoid burnout of the unit or fire.

③ Be sure to use correct material during installing. Wrong parts or wrong materials may result in fire, electric shock, or falling of the unit.

④ Install on the ground safely, please read installation instructions. Improper installation may result in fire, electric shock, falling of the unit, or water leaking.

⑤ 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.

⑥ The unit must have grounding device. If power supply does not have grounding device, be sure not to connect the unit.

⑦ 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.

⑧ Don't unplug or plug power during operation. It may cause fire or electric shock.

⑨ Don't touch or operate the unit when your hands are wet. It may cause fire or electric shock.

⑩ Don't place heaters or other electrical appliances near the power wire. It may cause fire or electric shock.

⑪ The water must not be poured directly from the unit. Do not let water to permeate into the electrical components.

WARNING

① Do not install the unit in a location where there may be flammable gas.

② 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.

③ Do not clean the unit while power is on. Turn off power before cleaning the unit. If not it may result in injury from a high-speed fan or electric shock.

④ 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.

⑤ Be careful when the unit is not packed or not installed. Pay attention to sharp edges and fins of heat exchanger.

⑥ After installation or repair, please confirm refrigerant is not leaking. If refrigerant is not enough, the unit will not work properly.

⑦ The installation of external unit must be flat and firm. Avoid abnormal vibration and noise.

⑧ Don't put your fingers into fan and evaporator. High speed running fan will result in serious injury.

1.5. Device Running Range

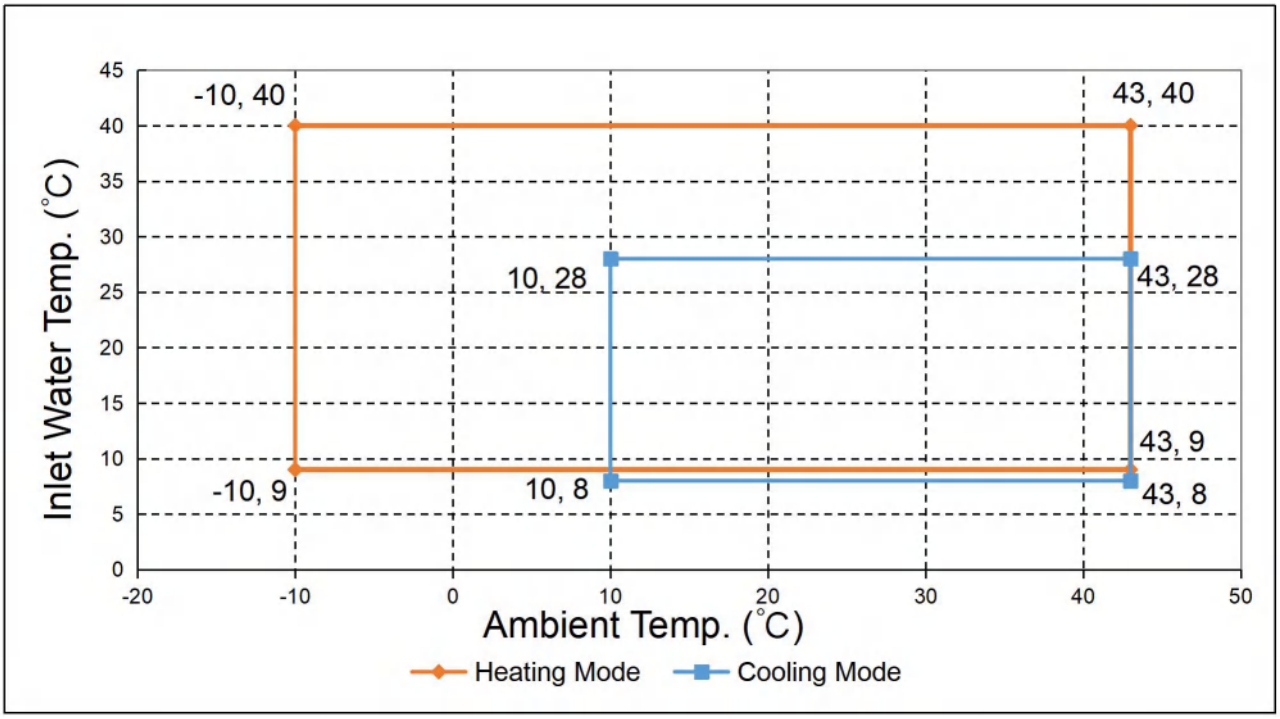


Figure 1.5-1 Running Range

Please make sure that the device runs within the ambient temperature and water inlet temperature range. If the device runs outside the temperature range, damage may occur.

2. OVERVIEW OF THE DEVICE

2.1. Accessories Supplied with the Device

After unpacking, please check if you have all the following components. Refer to figure 2.1-1 and table 2.1-1.

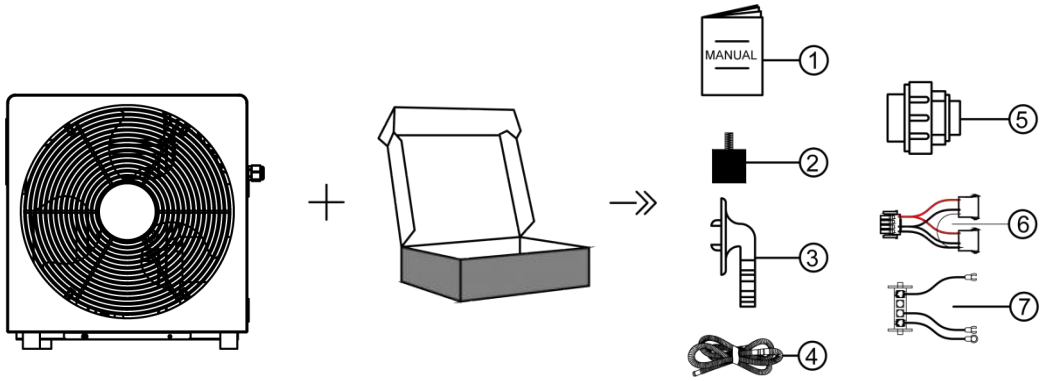


Figure 2.1-1 Accessories

Table 2.1-1 Accessories List

No.	Components	Quantity	No.	Components	Quantity
①	User Manual	1	⑤	Water Pipe Joint	2
②	Rubber Pad	4	⑥	Power Cable Splitter	1
③	Drain Connector	1	⑦	Power Cable Adapter	1
④	Drain Pipe	1			

Note: If the power connector of the device does not match the actual installation terminal, please use the power cable adapter (No. ⑦) to connect it.

2.2. Dimensions of the Device

Dimensions with installed NEXUS rubber pads

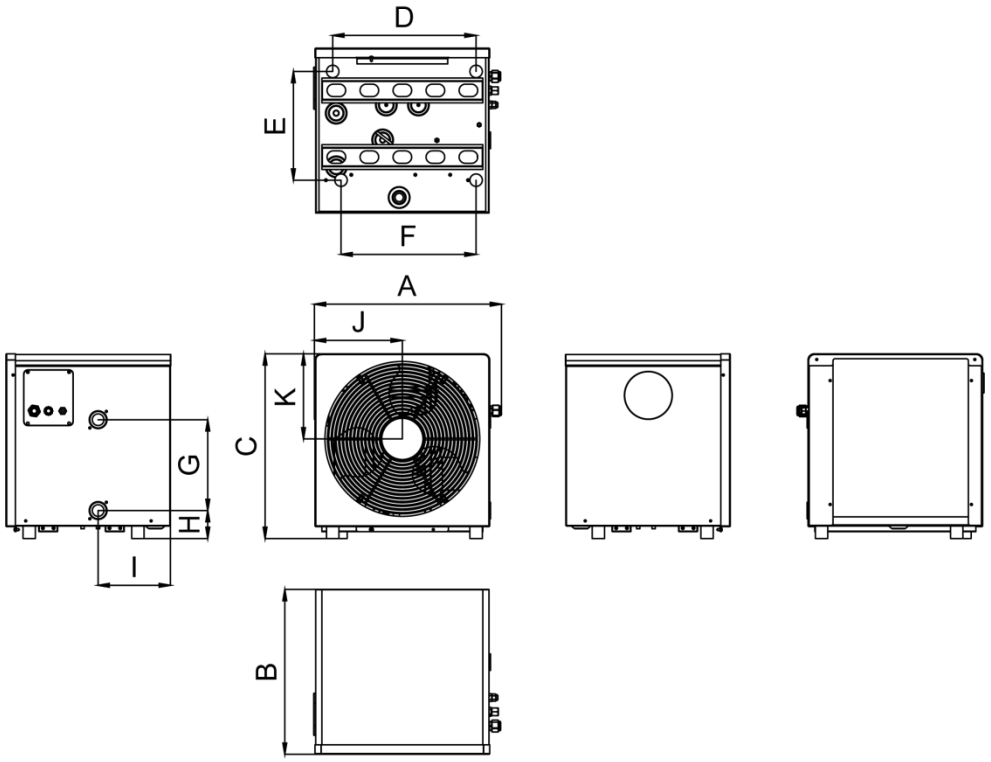


Figure 2.2-1 Dimensions with Installed NEXUS Rubber Pads

Table 2.2-1 Dimensions with Installed NEXUS Rubber Pads (Unit: mm)

Model	A	B	C	D	E	F	G	H	I	J	K
NEXUS 5	453	399	447	348	263	328	220	86	175	213	206

Dimensions with installed NEXUS rubber blocks

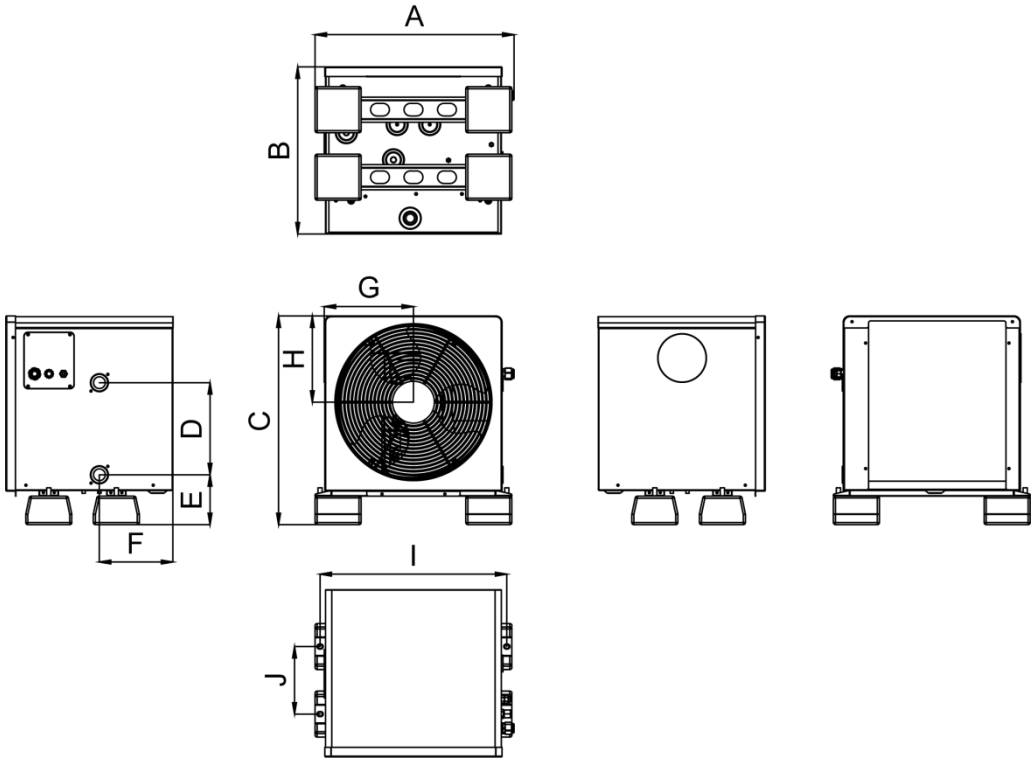


Figure 2.2-2 Dimensions with Installed NEXUS Rubber Blocks

Table 2.2-2 Dimensions with Installed NEXUS Rubber Blocks (Unit: mm)

Model	A	B	C	D	E	F	G	H	I	J
NEXUS 5	559	399	499	220	119	175	213	206	449	161

2.3. Main Parts of the Device

Model: NEXUS 5

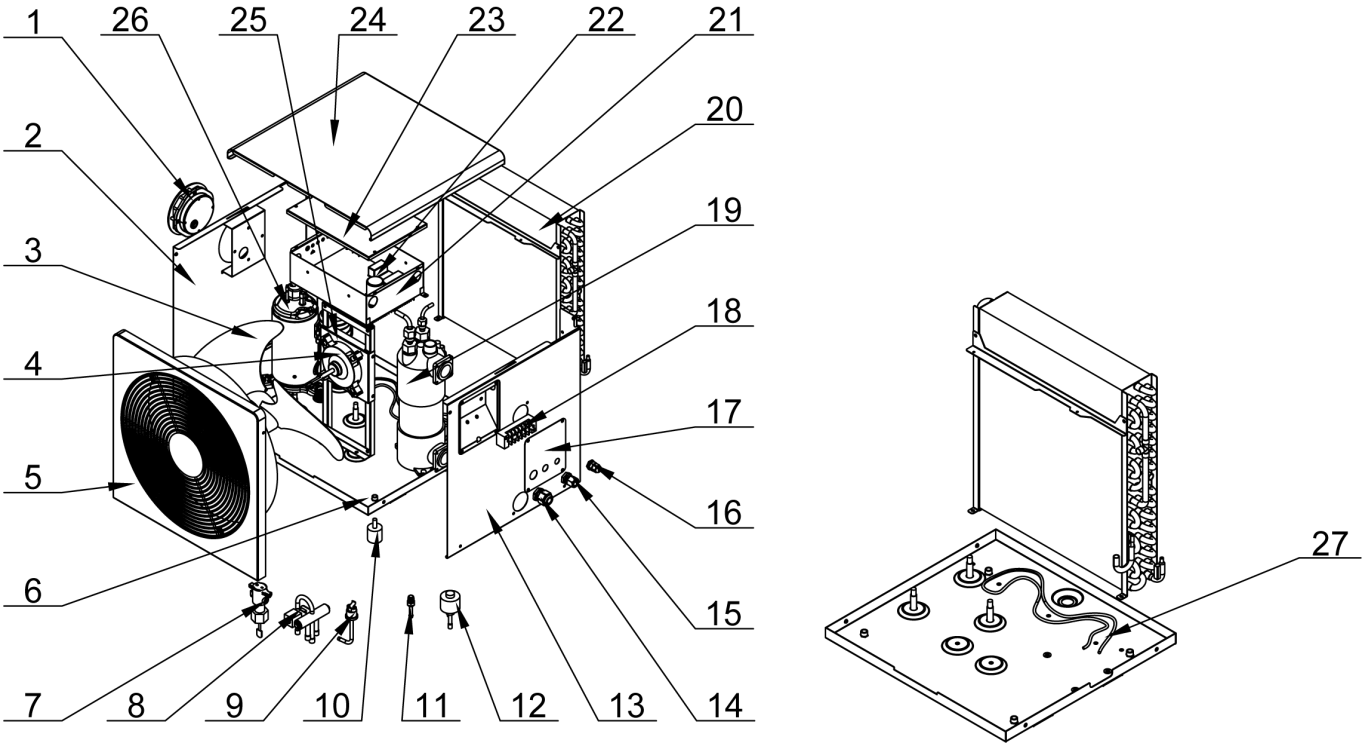


Figure 2.3-1 Exploded View

Table 2.3-1 Main Parts List

1	Wire Controller	10	Rubber Pad	19	Titanium Heat Exchanger
2	Left Plate	11	Needle Valve	20	Finned Heat Exchanger
3	Fan Blade	12	EEV	21	Electrical Box
4	DC Fan Motor	13	Right Plate	22	Main Board
5	Front Plate	14	PG13.5 Connector	23	Electrical Box Cover
6	Chassis	15	PG9 Connector	24	Top Cover
7	Water Flow Switch	16	PG7 Connector	25	Motor Support
8	4-Way Valve	17	Junction Box Cover	26	Compressor
9	Low Pressure Switch	18	7-Pole Terminal Board	27	Chassis Heating Band

2.4. Parameters of the Device

Table 2.4-1 Parameters

Model:	NEXUS 5
Heating Time (Water Temp.: 15℃ to 38℃, Water Volume: 1600L, Without Electric Heater)	36 hours (Ambient Temp.: 0℃)
	18 hours (Ambient Temp.: 15℃)
	12 hours (Ambient Temp.: 26℃)
Heating Water Temp. Range (℃)	9~40
Cooling Water Temp. Range (℃)	8~28
Heating Operating Ambient Temp. Range (℃)	-10~43
Cooling Operating Ambient Temp. Range (℃)	10~43
[Swimming Pool Heating] Ambient: 26℃, Humidity: 80%, Water Inlet/Outlet: 26℃/28℃	
Heating Capacity (kW)	1.90~5.16
Power Input (kW)	0.15~0.89
COP	13.00~5.80
[Swimming Pool Heating] Ambient: 15℃, Humidity: 70%, Inlet/Outlet: 26℃/28℃	
Heating Capacity (kW)	1.40~3.67
Power Input (kW)	0.19~0.97
COP	7.20~3.80
[Swimming Pool Heating] Ambient: 0℃, Humidity: 70%, Inlet/Outlet: 26℃/28℃	
Heating Capacity (kW)	0.92~2.36
Power Input (kW)	0.17~0.72
COP	5.40~3.30
[Swimming Pool Heating] Ambient: -10℃, Humidity: 70%, Inlet/Outlet: 26℃/28℃	
Heating Capacity (kW)	0.69~1.80
Power Input (kW)	0.17~0.72
COP	4.00~2.50
[Swimming Pool Cooling] Ambient: 35℃, Humidity: 40%, Water Inlet/Outlet: 27℃/-℃	
Cooling Capacity (kW)	1.52~2.89
Power Input (kW)	0.31~1.04
EER	4.90~2.78
Power Supply	220-240V~/50Hz

Model:	NEXUS 5
Rated Power Input (kW)	1.5
Rated Current (A)	6.8
Main Board Fuse	15A, 250V
Sound Pressure Level at 1m [dB(A)]	<48
Sound Pressure Level at 10m [dB(A)]	<32
Compressor Brand/Type	GMCC/Rotary
Water Heat Exchanger	Titanium Heat Exchanger
Water Pressure Drop (kPa)	12
Water Flow (m^3/h)	2.5
Refrigerant	R32
Display	LED Controller
Wi-Fi Function	Yes
Water Pipe Connection (mm)	Φ33.4
Net Weight (kg)	24
Water Proof Level	IPX4
Electric Shock Proof	Class Ⅰ

3. INSTALLATION AND CONNECTION

⚠ **WARNING:** The device must be installed by a professional team. The users are not qualified to install by themselves, otherwise the device might be damaged and risky for users' safety.
This section is provided for information purposes only and must be checked and adapted if necessary according to the actual installation conditions.

3.1. Transportation

1. When storing or moving the device, the device should be at the upright position.

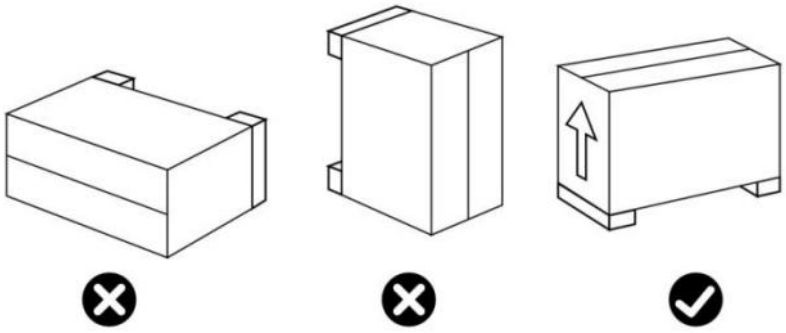


Figure 3.1-1 Placement Attention

2. When moving the device, do not lift the water joint, otherwise, the titanium heat exchanger inside the device may be damaged.

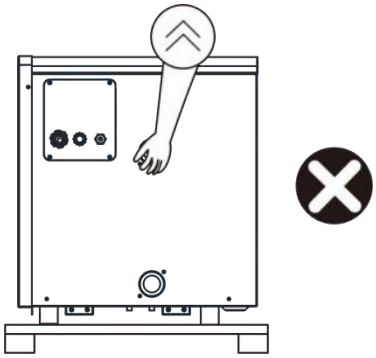


Figure 3.1-2 Moving Attention

3.2. Installation Instruction

3.2.1. Pre-Requirements

Materials necessary for the installation of your device:

① Power supply cable should be suitable for the device's power requirements.

② A pass-by kit and an assembly of PVC tubing should be suitable for your installation as well as stripper, PVC adhesive and sandpaper.

③ Please use the rubber pads in the accessories to stabilize the device.

④ We recommend that you connect the unit to your installation by means of flexible PVC pipes in order to reduce the transmission of vibrations.

⑤ Suitable fastening studs may be used to raise the device. Prevent snow from burying the device.

3.2.2. Installation Layout

Notice: The filter must be cleaned regularly to ensure that water in the system is clean and avoid blocking the filter. It is necessary that the drainage valve is fixed on the lower water pipe. If the device is not running during winter, please disconnect the power supply and drain water. If the ambient temperature around the device is below 0℃, and you need to use the device, please keep the device powered on.

The installation diagram is shown in the following figure:

Installation Solution 1: Install Heat Pump to SPA Pool/Swimming Pool.

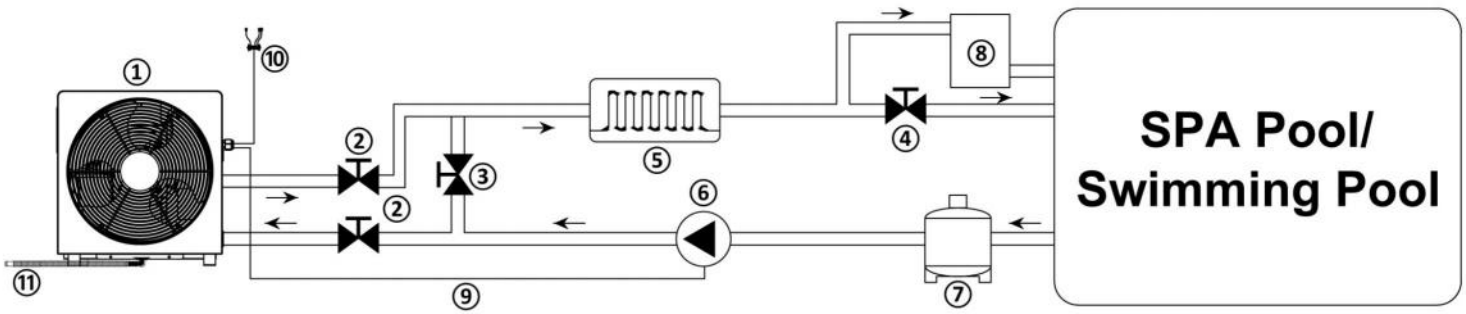


Figure 3.3-1 Installation Diagram (With SPA Pool/Swimming Pool)

Table 3.3-1 Installation Parts (With SPA Pool/Swimming Pool)

No.	Item	Quantity	No.	Item	Quantity
①	Heat Pump	1	⑦	Filter	1
②	Stop Valve	2	⑧	Ozone/UV	1
③	Bypass Valve	1	⑨	Water Pump Power Cable	1
④	Diverter Valve	1	⑩	Power Cable Adapter	1
⑤	Electric Heater	1	⑪	Condensate Water Pipe	1
⑥	Water Pump	1			

Installation Solution 2: Install Heat Pump into SPA Tub.

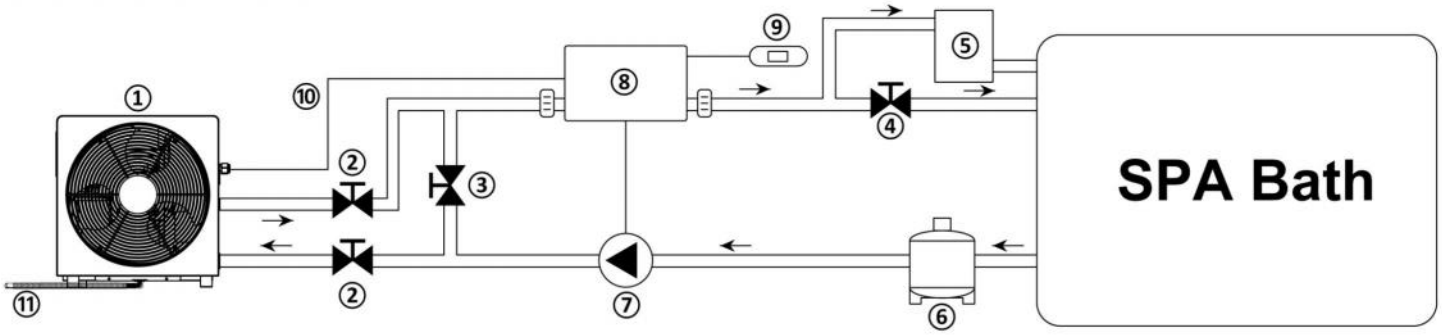


Figure 3.3.2 Installation Diagram (With SPA Tub)

Table 3.3.2 Installation Parts (With SPA Tub)

No.	Item	Quantity	No.	Item	Quantity
①	Heat Pump	1	⑦	Water Pump	1
②	Stop Valve	2	⑧	SPA Control System	1
③	Bypass Valve	1	⑨	Display of SPA Tub	1
④	Diverter Valve	1	⑩	Heat Pump Power Cable	1
⑤	Ozone/UV	1	⑪	Condensate Water Pipe	1
⑥	Filter	1			

3.2.3. Device Installation

① Install rubber pads/rubber blocks on the 4 feet of the device.

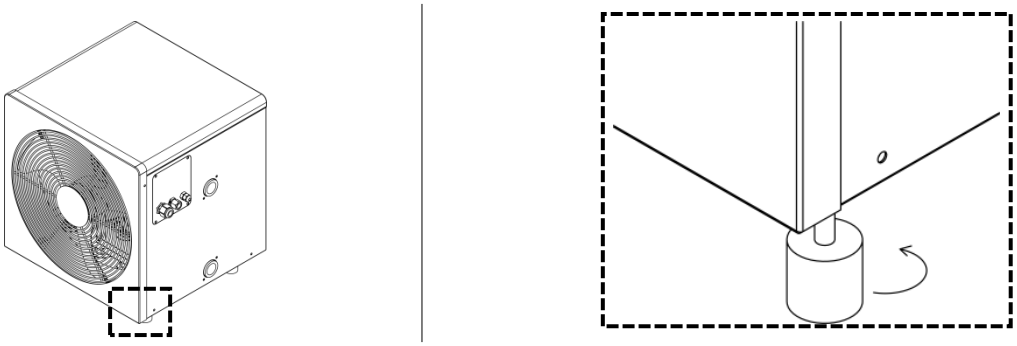


Figure 3.2-2 Install Rubber Pads

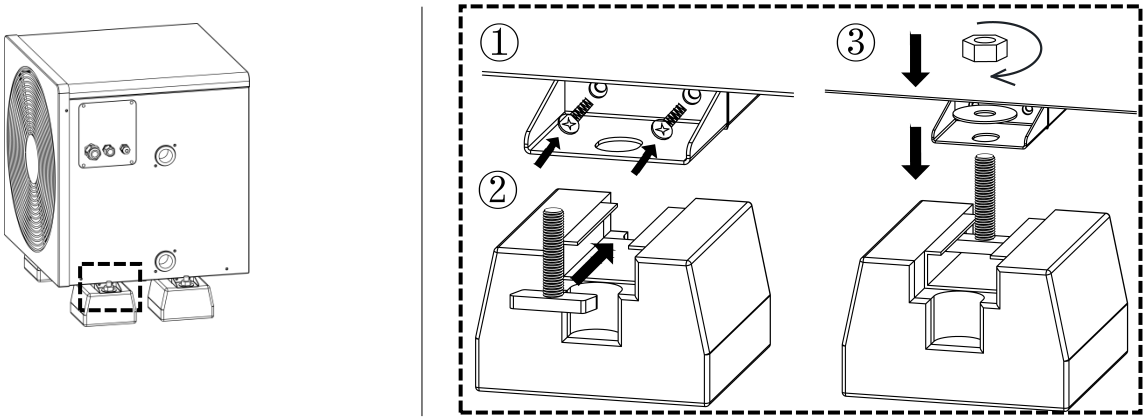


Figure 3.2-3 Install Rubber Blocks

② A water pump is necessary (Supplied by the user). The recommended pump specification: refer to table 2.4-1.

③ When the device is running, there will be condensation water discharged from the bottom, please pay attention to it. Please insert the drainage pipe (accessory) into the hole and clip it well, then connect a pipe to drain the condensation water. The condensate drain outlet is at the bottom of the device, and the condensate pipe must be lower than the condensate drain outlet.

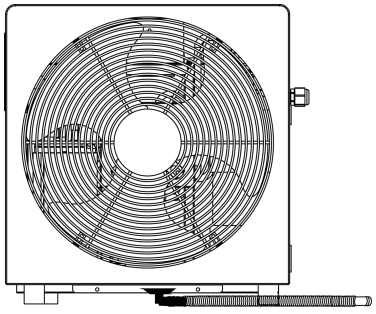


Figure 3.2-4 Condensate Pipe Connection Instruction

3.2.4. Location and Space

Please comply with the following rules concerning the choice of device location.

① The device's future location must be easily accessible for convenient operation and maintenance.

② The device must be installed on a stable and firm surface.

③ A water drainage device must be provided close to the device in order to protect the area where it is installed.

④ If necessary, the device may be raised by using suitable mounting pads designed to support its weight.

⑤ Check that the device is properly ventilated, the air outlet is not facing the windows of neighboring buildings and the exhaust air cannot return. In addition, provide sufficient space around the device for servicing and maintenance operations.

⑥ The device must not be installed in an area exposed to oil, flammable gases, corrosive products, sulfur compounds or close to high frequency equipment.

⑦ To prevent mud splashes, do not install the device near a road or track.

⑧ To avoid causing a nuisance to neighbors, make sure the device is installed so that it is positioned towards the area that is least sensitive to noise.

⑨ Keep the device as much as possible out of the reach of children.

⑩ Installation space:

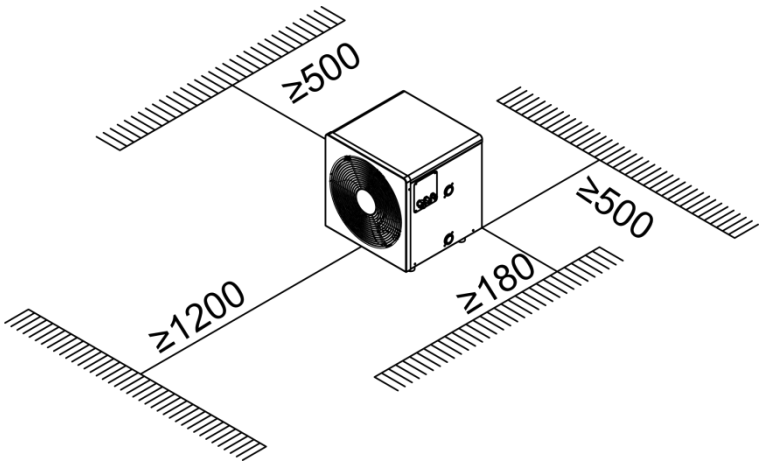


Figure 3.2-5 Installation Space (Unit: mm)

- Do not leave any debris on the top of the device.
- There should be no obstacles within the distance shown in figure 3.2-5.

3.2.5. Electrical Installation

To function safely and maintain the integrity of your electrical system, the device must be connected to a general electricity supply in accordance with the following regulations:

① Upstream, the general electricity supply must be protected by a 30mA differential switch.

② The device must be connected to a suitable D-curve circuit breaker in accordance with current standards and regulations in the country where the system is installed.

③ The electricity supply cable must be adapted to match the device's rated power and the length of wiring required by the installation. The cable must be suitable for outdoor use.

④ For a three-phase system, it is essential to connect the phases in the correct sequence. If the phases are inverted, the device's compressor will not work.

⑤ In places open to the public, it is mandatory to install an emergency stop button close to the device.

Table 3.2-1 Power Cable Selection

Model	Power Supply Cables	
	Electricity Supply	Cable Diameter
NEXUS 5	220-240V~/ 50Hz	3G 1.5mm²

Note: The device power cable specification can undertake the current when the device uses the water pump output functions at the same time.

3.2.6. Electrical Connection

WARNING: Power supply of device must be disconnected before any operation.

Please comply with the following instruction to connect device.

Step 1: Detach electrical side panel by a screwdriver to access electrical terminal block.

Step 2: Insert cable into device port.

Step 3: Connect the cables to the terminal block according to the actual installation solution.

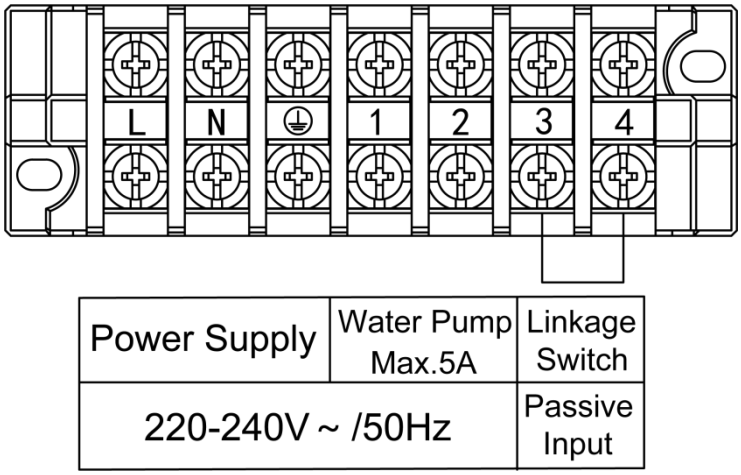


Figure 3.2-6 Terminal Board Wiring

Power Supply: These three terminals are for providing power for the heat pump.

Water Pump (1 and 2): These two terminals are for providing power for the water pump (Maximum current ≤ 5A). If the water pump current > 5A, please add an external contactor.

Linkage Switch (3 and 4): These two terminals are for other switch/device to control on/off of the device.

3.2.6.1. Electrical Connection for Installation Solution

Installation Solution 1: Install Heat Pump to SPA Pool/Swimming Pool.

Connect the power supply and water pump, ignore the linkage switch.

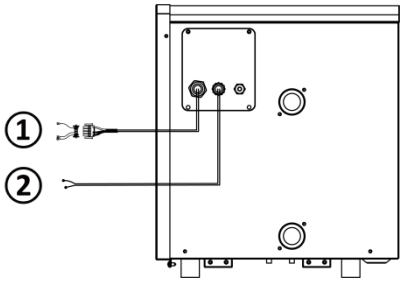


Figure 3.2-7 Cable Connection

Table 3.2-2 Cable Connection

No.	Item
①	Heat Pump Power Cable
②	Water Pump Power Cable

Installation Solution 2: Install SPA Heat Pump into SPA Tub.

Connect the power supply, ignore the water pump connector and the linkage switch.

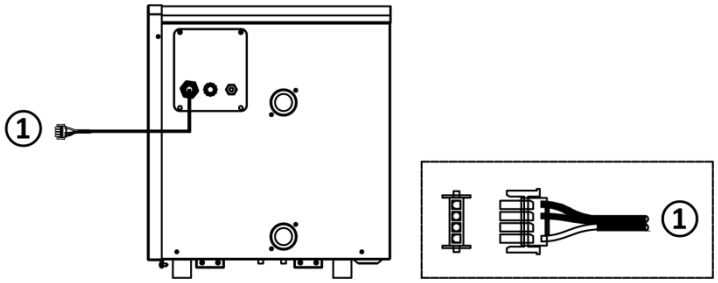


Figure 3.2-8 Cable Connection

Table 3.2-3 Cable Connection

No.	Item
①	Heat Pump Power Cable

If the power ports are not enough, please use the power cable splitter (in the accessory box) to connect, as shown below:

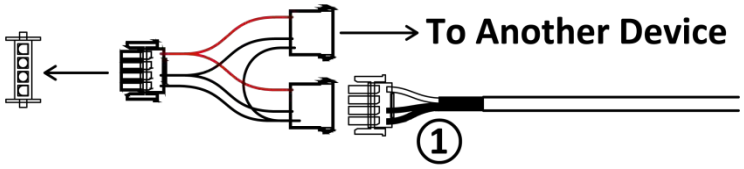


Figure 3.2-9 Power Cable Splitter Connection

After the connection is completed, the heat pump and SPA control system need to be set according to different modes.

Heating mode: The set temperature of the heat pump should be the same with the set temperature of the SPA control system.

Cooling mode: The heat pump should be set according to the actual target temperature, and the target temperature of the SPA control system should be set to the maximum (40℃).

Note: It is a normal phenomenon that there is a 1~2℃ temperature difference between the display of the heat pump and the display of the SPA tub.

3.3. Trial After Installation

WARNING: Please check all the wiring carefully before turning on the device.

3.3.1. Inspection Before Trial Running

Before running test, confirm below items and write √ in block;

Table 3.4-1 Items

☐	Correct device installation
☐	Power supply voltage is the same as device rated voltage
☐	Correct piping and wiring
☐	Air inlet & outlet port of device is unblocked
☐	Drainage and venting is unblocked and no water leaking
☐	Power leakage protector can work normally
☐	Ground wire is connected correctly
☐	Connect the drain connector and drain pipe

3.3.2. Trial Running

Step 1: Running test can begin after completing all installation;

Step 2: All wiring and piping should be connected well and carefully checked, then fill bath/pool with water before power is switched on;

Step 3: Press “ON-OFF” key on control panel to run the device and set temperature;

Step 4: Items need to be checked during running test:

① During the first running, device current is normal or not;

② Each function key on control panel is normal or not;

③ Display screen is normal or not;

④ Are there any leakage in the whole water system;

⑤ Condensate drain is normal or not;

⑥ Are there any abnormal sound or vibration during running?

4. CONTROLLER OPERATION GUIDANCE

4.1. Control Panel Diagram

Figure 4.1-1 Wire Controller Interface

Table 4.1-1 Basic Icons

Symbol	Name	Symbol	Name	Symbol	Name
	Mode		Locked		Defrosting
	Time		Timer		Powerful Mode
	Up		Fault		Smart Mode
	Down		Automatic Mode		Silent Mode
	ON-OFF		Cooling Mode		
	Wi-Fi		Heating Mode		

Note: "  " flashing means the device is anti-freezing.

4.2. Key Operating Instruction

Table 4.2-1 Operation Guide

No.	Items	Operation Ways
1	Unlock/Lock	Press and hold the "  " key for 3 seconds on the main interface to unlock/lock, and it will automatically lock the keys if there is no operation within 60 seconds (the screen will not turn off).
2	ON/OFF	In the main interface, after unlock, press the "  " key to power on/off.
3	Heating/Cooling/Auto Mode Switch	With the power on, press the "  " key to switch between "  ", "  ", and "  " modes.
4	Frequency Mode Switch	Press and hold the "  " key for 3 seconds when the device is on to switch between "  ", "  ", and "  " modes.
5	Target Temperature Setting	In the power on interface, press "  " or "  " key to adjust the current mode setting temperature, and if no operation is performed within 60 seconds, it will automatically return to the main interface.
6	Check System Parameters	In the main interface, press and hold the "  " key for 3 seconds to enter the device system parameter query, cooperate with the "  " and "  " keys for parameter browsing, and press the "  " key to exit the parameter query. If no operation is performed within 60 seconds, it will automatically return to the main interface.
7	Celsius/Fahrenheit Switch	When device is off, press "  "and"  " keys for 3 seconds in main interface to switch Celsius/Fahrenheit.
8	Forced Defrosting	In heating mode, press and hold the "  "and "  " keys for 3 seconds to enter the forced defrosting mode. When entering the defrosting, showing flashes "  ".

No.	Items	Operation Ways
9	Restore Factory Setting	In the shutdown state, hold down the "  " + "  " + "  " +"  " keys for 3 seconds to restore factory setting by wire control. In this case, the buzzer will ring twice, and all parameter values will change to default values.
10	Time Setting	Press the "  " key to enter the clock setting. First, the hour flashes, indicating that the hour value of the current time can be adjusted through "  " and "  " keys. Every time you press the "  " key for plus one hour, every time you press the "  " key for minus one hour. If you hold down the "  " key or "  " key, the hours will be incremented or decremented automatically. After setting the hour value, press "  " key again; At this time, the minute flashes, indicating that the minute value of the current time can be adjusted through the "  " and "  "key. After setting the minute value, press "  " key again to finish.
11	Timer Setting	Press and hold the "  " key for 3 seconds to enter the timer setting: Enter timer selection, the hour of "timer on 1" will flash, collect "  " and "  " keys can set hour; press "  " key again to switch to the minute of "timer on1", press "  " and "  " keys can set minute; Press "  " key again to set "timer off 1" in the same way. Other time period setting in turn and so on; A total of 2 timers can be set. Press "  " key can save and exit; Back to main interface, it will show the number of scheduled time periods;
12	Cancel Timer Setting	If the "Timer On" and "Timer Off" are the same, the timer setting of the current time period is canceled.

4.3. System Parameters

Table 4.3-1 System Parameters

Codes	Meanings
1	Water Inlet Temperature
2	Water Outlet Temperature
3	Ambient Temperature
4	Exhaust Temperature
5	Suction Temperature
6	Heating Coil Temperature
7	Cooling Coil Temperature
8	Main EEV Steps
9	EEV Steps for EVI
10	Compressor Current
A11	IPM Temperature
A12	DC Bus Voltage Value
A13	Actual Speed of Compressor
A14	Actual Speed of DC Fan
A16	Main Board Version Number
A17	Fault Record 1 (Latest)
A18	Fault Record 2
A19	Fault Record 3
A20	Fault Record 4
A21	Wire Controller Version Number

4.4. Fault Codes

- **Fault code and solution**

In the running process of device, the device may be faulted if the following code is displayed, please turn off power switch of the device and turn on power switch of device again after 30 seconds. The code is no longer displayed, that means the device could be used again. If the code is displayed again, please contact our company for trouble shooting.

Table 4.4-1 Fault Codes

Codes	Fault Details
E01	Exhaust temperature sensor fault
E05	Finned coil temperature sensor fault
E09	Suction temperature sensor fault
E18	Water outlet temperature sensor fault
E19	Water inlet temperature sensor fault
E21	Communication fault between display and main Board
E22	Ambient temperature sensor fault
E25	Water flow protection
E28	EEPROM fault of the main board
P02	High pressure protection
P06	Low pressure protection
P11	Over high exhaust temperature protection
P15	Large difference between water inlet and out temperature protection
P16	Over low outlet water temperature protection when cooling
P25	Low ambient temperature protection
P26	Water outlet temperature too high/too low protection
P27	Finned coil over temperature protection
r01	Compressor over-current
r02	Compressor start failure
r03	DC fan abnormality
r05	IPM module overheat protection
r06	AC input over-current
r10	DC bus over-voltage
r11	DC bus under-voltage
r12	AC input over-voltage
r13	AC input under-voltage
r16	EEPROM fault of the inverter module
r23	Compressor phase loss
r25	Hardware over-current

4.5. Trouble Shooting

Table 4.5-1 Trouble Shooting

No.	Fault Name	Fault Analysis	Solutions
1	**E25** Water flow protection	1. The connection between water flow switch and main board is poor. 2. The water flow switch is installed wrong. 3. Water flow switch failure. 4. Main board failure. 5. Low water flow. 5.1 The water system is blocked. 5.2 Water pump is not suitable. 5.3 Water pipe is small. 5.4 The water flow switch is stuck and cannot be reset. 6. No water flow. 6.1 The valve is not open. 6.2 The water pump is not working. 6.3 Water pump failure.	1. Reconnect the water flow switch cable. 2. Install the water flow switch in the correct way. 3. Replace the water flow switch. 4. Replace the main board. 5.1 Clean or replace the blocked part. 5.2 Change the pump according to the water flow and water head. 5.3 Change the water pipe. 5.4 Reset the water flow switch manually. 6.1 Open the valve. 6.2 Turn on the water pump. 6.3 Replace the water pump.
2	**P02** High pressure protection	1. Loose wiring or poor connection of high pressure switch. 2. There is something wrong with high pressure switch. 3. Main board is broken. 4. Poor condensing. 4.1 Water temp. is too high (over range operation). 4.2 Low water flow. 4.2.1 The valve in water system is not open. 4.2.2 Waterway blockage, may appear in the heat exchanger or valve part. 4.2.3 Improper water pump selection. 4.2.4 The water pump is broken. 5. Refrigerant system blockage, may appear in the throttle part. 6. Refrigerant system is mixed with air, maybe the vacuum is not enough.	1. Reconnect the wire. 2. Replace the high pressure switch. 3. Replace the main board. 4.1 Operate within the allowable range. 4.2.1 Open the valve. 4.2.2 Clean the blocked part or replace it. 4.2.3 Change the pump according to the water flow and water head. 4.2.4 Replace the water pump. 5. Clean or replace the clogged part. 6. Vacuumize and refill the refrigerant.

No.	Fault Name	Fault Analysis	Solutions
3	**P06** Low pressure protection	1. The connection between low pressure switch and main board is poor. 2. There is something wrong with low pressure switch. 3. Main board is broken. 4. Poor evaporation effect. 4.1 Improper installation position. 4.2 Dust, foreign body blockage on the finned heat exchanger, etc. 4.3 Low ambient temp.. 4.4 Fan motor failure causes abnormal air inlet. 5. Refrigerant road blockage, may appear in the throttle part. 6. Leakage happen, and refrigerant is not enough.	1. Reconnect the low pressure switch cable. 2. Replace the low pressure switch. 3. Replace the main board. 4.1 Readjust the position, the distance of the device from the wall should not be too close. 4.2 Clean up the dust and dirty matter on the finned heat exchanger. 4.3 Operate within the allowable ambient temp. range. 4.4 Replace the fan motor. 5. Replace the blocked part. 6. Repair the leakage, and refill the refrigerant according to the nameplate.
4	**E21** Communication fault	1. The connection between wire controller and main board is poor. 2. Wire controller fault. 3. Main board fault (Er 10 appears only for this reason). 4. Communication wire and strong electricity wire put together, resulting in power interference communication.	1. Reconnect the wire controller cable. 2. Replace the wire controller. 3. Replace the main board. 4. Communication wire is placed separately from the strong electricity wire.
5	**P11, P27** Refrigerant system temperature protection	1. Temp. sensor fault. 2. Water flow switch fault. 3. Leakage happen, and refrigerant is not enough. 4. Low water flow. 4.1 The water system is blocked. 4.2 Water pump is not suitable. 4.3 Water pipe is small. 4.4 The water flow switch is stuck and cannot be reset. 5. No water flow. 5.1 The valve is not open. 5.2 The water pump is not working. 5.3 Water pump is broken.	1. Replace the temp. sensor. 2. Replace the water flow switch. 3. Repair the leakage, and refill the refrigerant according to the nameplate. 4.1 Clean or replace the blocked part. 4.2 Change the pump according to the water flow and water head. 4.3 Change the water pipe. 4.4 Reset the water flow switch manually. 5.1 Open the valve. 5.2 Turn on the pump. 5.3 Replace the water pump.

No.	Fault Name	Fault Analysis	Solutions
6	**E01, E05, E09, E18, E19, E22** Temperature sensor fault	1. The connection between the temp. sensor and the main board is poor. 2. Temp. sensor is broken. 3. The sensor resistance on the main board fault.	1. Reconnect the temp. sensor cable. 2. Replace the temp. sensor. 3. Replace the main board.
7	**r03** DC fan motor fault	1. Loose wiring or poor connection of fan motor. 2. The fan motor is blocked. 3. Main board fault.	1. Reconnect the fan motor cable. 2. Clean out the blockage from the fan motor or replace the fan motor. 3. Replace the main board.
8	**P15, P16, P26** Water system temperature protection	1. Temp. sensor fault. 2. Low water flow. 2.1 The valve in water system is not open. 2.2 Waterway blockage, may appear in the heat exchanger or valve part. 2.3 Improper water pump selection. 2.4 The water pump is broken. 2.5 Water pipe size is too small. 3. Heat exchanger is fouling.	1. Replace the temp. sensor. 2.1 Clean or replace the blocked part. 2.2 Change the pump according to the water flow and water head. 2.3 Change the water pipe. 2.4 Reset the water flow switch manually. 2.5 Choose the suitable water pipe size. 3. Clean the dirt of the heat exchanger surface.
9	**P25** Low ambient temperature protection	1. The ambient temp. sensor fault. 2. Exceeding the ambient temp. operating range.	1. Replace the temp. sensor. 2. Operate within reasonable limits (refer to table 2.4-1).
10	**r06** Input current fault	Input current abnormality.	Operate within a reasonable power supply range (refer to table 2.4-1).
11	**r10, r11, r12, r13** Input voltage fault	Input voltage abnormality.	Operate within a reasonable power supply range (refer to table 2.4-1).
12	**E28, r16** EEPROM fault	Parameter initialization error.	Restore factory setting.
13	**r01** Compressor over-current	1. The compressor cables are incorrectly wired. 2. Input power supply abnormality. 3. Inverter module fault. 4. Refrigerant charge is excessive. 5. Compressor is damaged.	1. Correct the cable wiring. 2. Operate within a reasonable power supply range (refer to table 2.4-1). 3. Replace the main board. 4. Drain and recharge refrigerant. 5. Replace the compressor.

No.	Fault Name	Fault Analysis	Solutions
14	**r02** Compressor start failure	1. The compressor cables are wired incorrectly or short-circuited. 2. Inverter module fault. 3. Compressor is damaged.	1. Replace the cable and rewire. 2. Replace the main board. 3. Replace the compressor.
15	**r23** Compressor phase loss	1. Compressor cables open circuit. 2. Inverter module fault. 3. Compressor is damaged.	1. Replace the cable and rewire. 2. Replace the main board. 3. Replace the compressor.
16	**r15** IPM module overheat protection	1. Ambient temperature is too high. 2. Poor heat dissipation of the inverter module. 3. Inverter module fault.	1. Operate within reasonable limits (refer to table 2.4-1). 2. Maintain good ventilation. 3. Replace the main board.
17	**r25** Hardware over-current	1. Inverter module fault. 2. Input power abnormality.	1. Replace the main board. 2. Operate within reasonable power supply range (refer to table 2.4-1).

Other Malfunctions and Solutions (No display on LED wire controller):

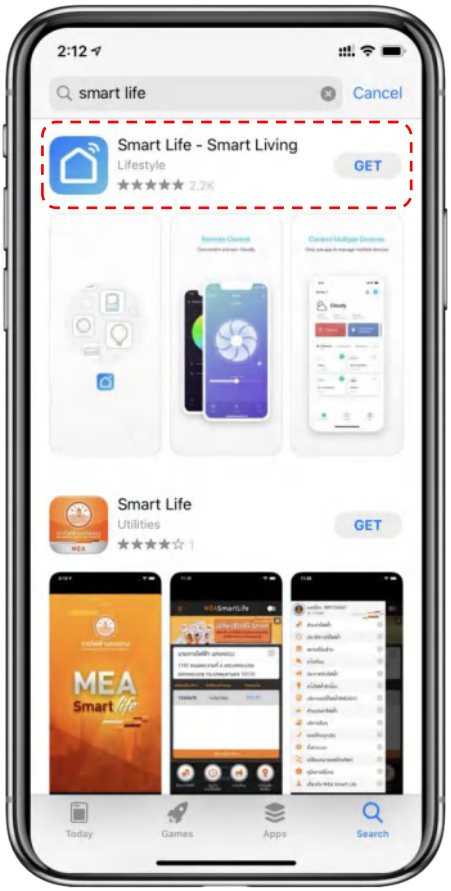
Table 4.5-3 Other Malfunctions

Phenomenons	Causes	Solutions
Device is not running	1. Power outage. 2. Power switch is not powered on. 3. Power switch fuse is burned-out. 4. Timer is not up. 5. Linkage switch is not short-circuited.	1. Please wait for power supply recovery. 2. Power on it. 3. Replace the fuse. 4. Please wait or cancel timer setting. 5. Short-circuit linkage switch.
Device is not running after starting up	1. Compressor protection time interval is not up. 2. Water temperature of the device does not reach starting up water temperature value.	1. Please wait patiently for the end of protection time (About 3 minutes). 2. Normal phenomenon and wait for water temperature to reach.
Device is running normally, but water temp. is low	1. Improper temperature setting. 2. Air inlet is blocked. 3. Poor insulation. 4. Ambient temperature is too low. 5. Incorrect operation mode setting.	1. Set up proper temperature. 2. Clear air inlet obstruction. 3. Add insulation measures. 4. Wait for the ambient temperature to rise or add more heat source. 5. Switch to the correct mode.
Device is running automatically	Reach timing to start up.	Please shutdown manually or cancel timer if needn't start up.

4.6. Wi-Fi Setting

4.6.1. Software Installation

① Method 1: Search “Smart Life” in your APP store, install “ ”. Click “GET” to install.



② Method 2: Scan the QR code below.

For IOS and Android Users

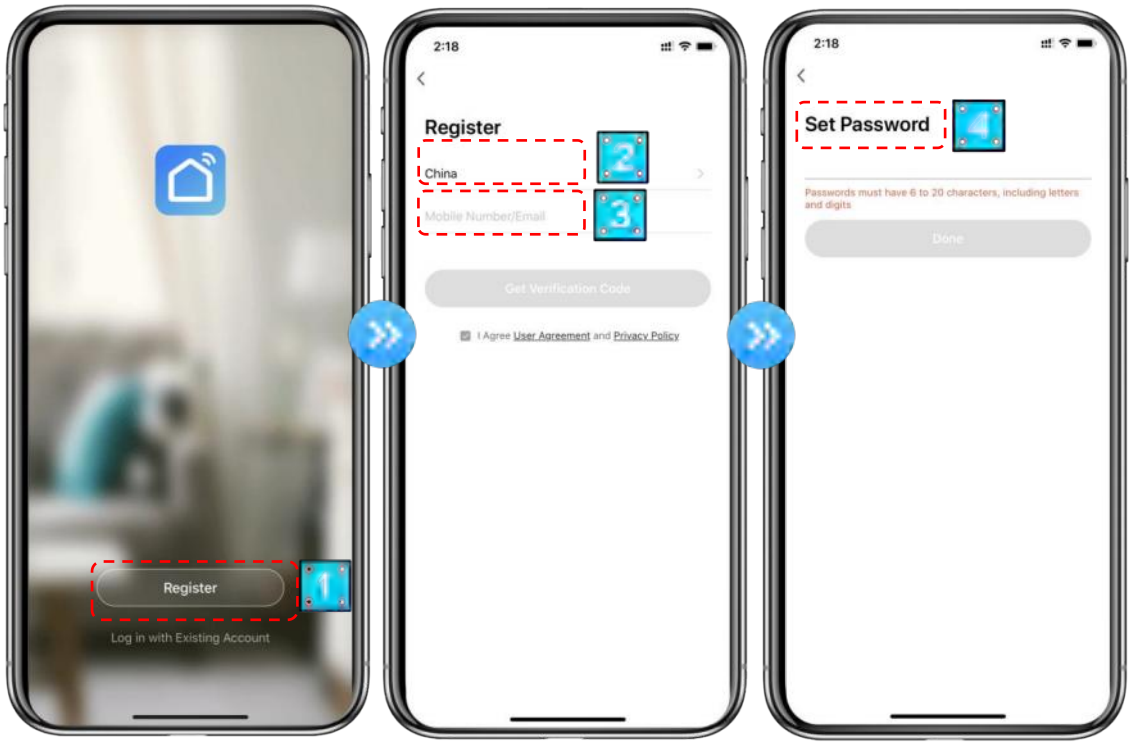
4.6.2. Software Startup

After installation, click “ ” on your desktop to start up “Smart Life”.

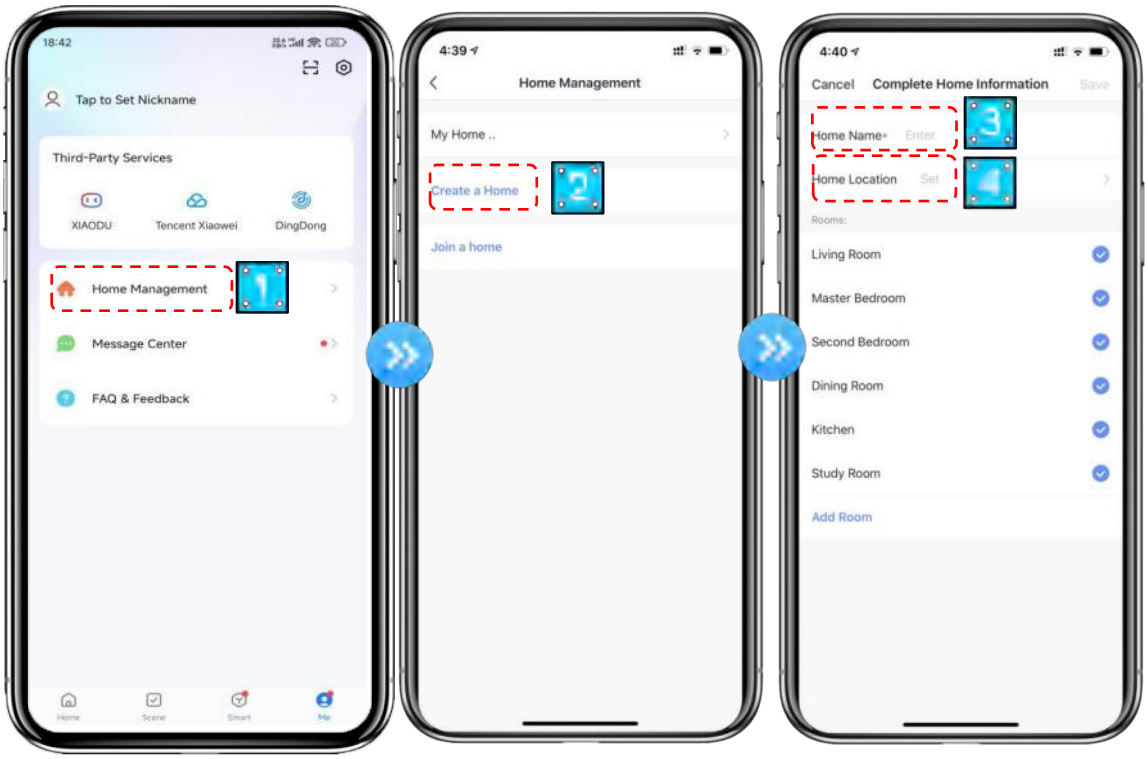
4.6.3. Software Registration and Configuration

1. Registration

① 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;

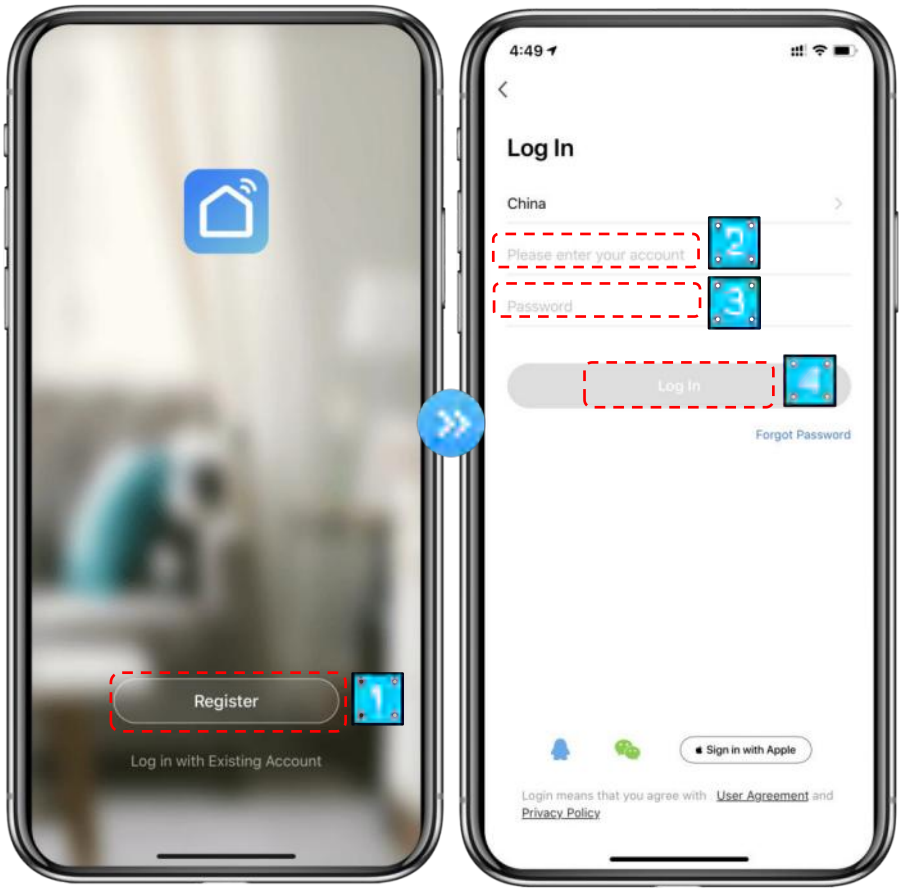


② After registration, you need to Create a Home: Create a Home Set Home Name Set Home Location Add Rooms.

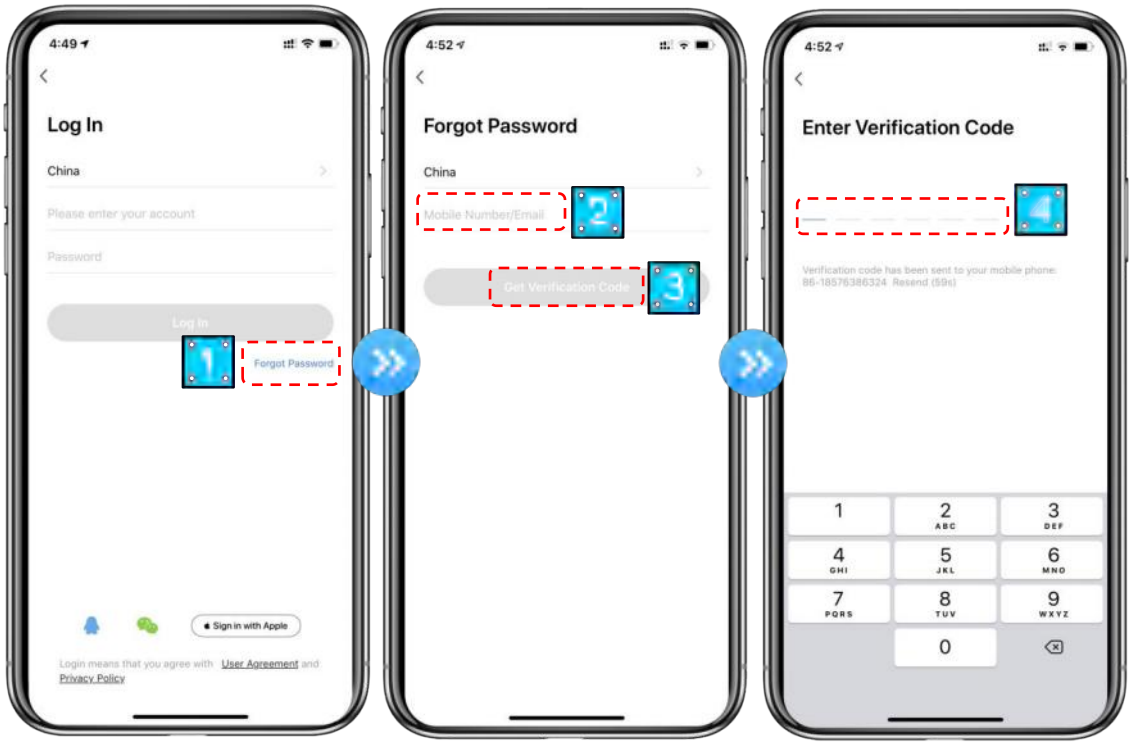


2. Account ID+ Password Login

① Existing accounts can be logged in directly, in the following order.

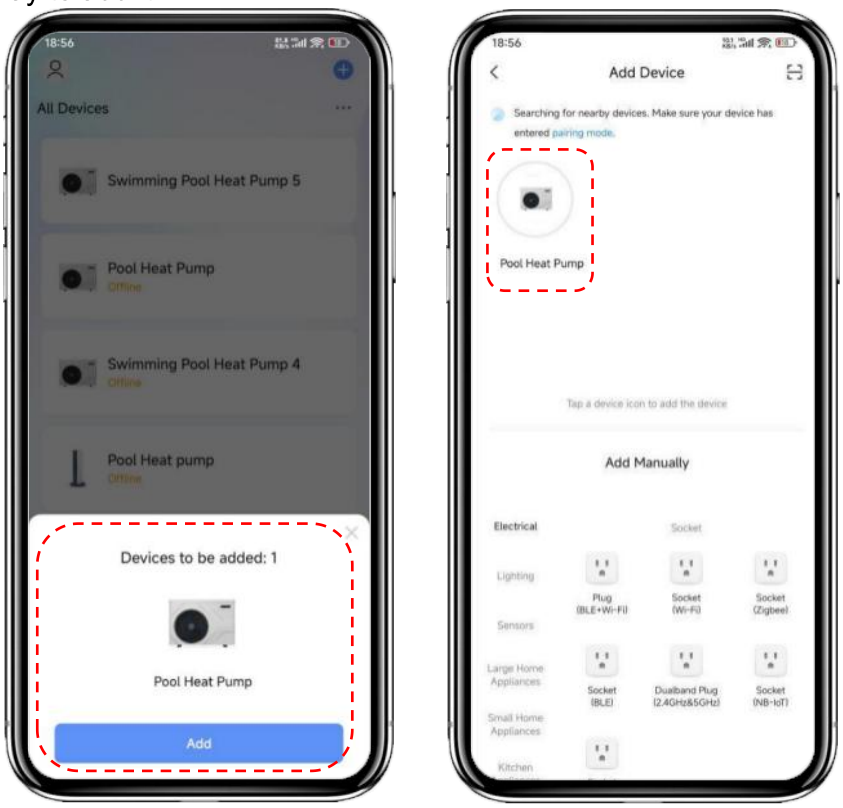


② If you forget your password you can choose to login with your verification code and select “Forget Password”: Enter your phone number Get verification code.



③ After creating a home or logged in, enter the main interface of APP.

Tips: First let the wired controller enter the network configuration state, and then enter the APP. There is a quick way to add it.



Note:

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

Click “＋” to add devices.

3. Wi-Fi Module Configuration Steps:

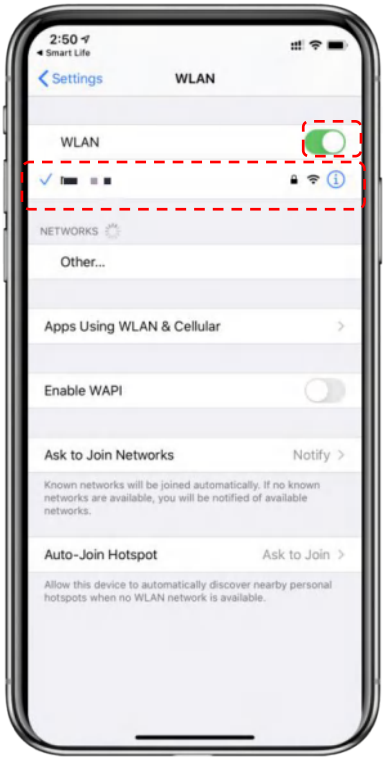
Method 1

Step 1:

Blink Quickly Mode: When power is on, press and hold the "  " and "  " keys at the same time for 3 seconds to enter the distribution network. The "  " icon will flash quickly.

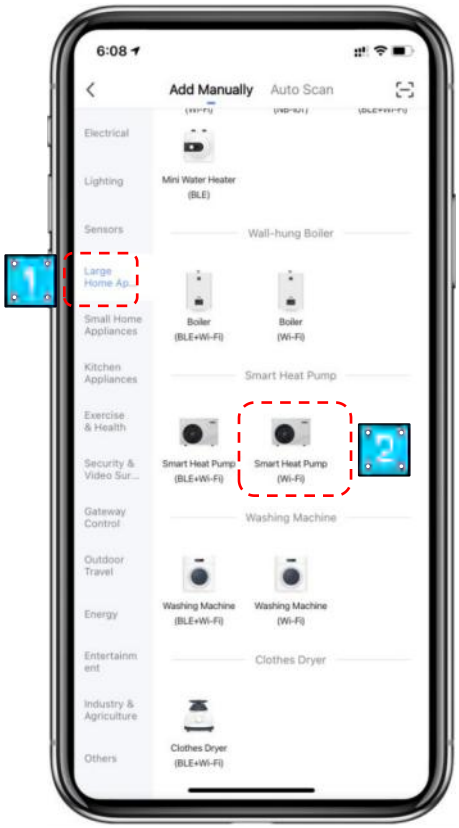
Step 2:

Turn on the phone's Wi-Fi function and connect to the Wi-Fi hot-spot. The Wi-Fi hot-spot 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.



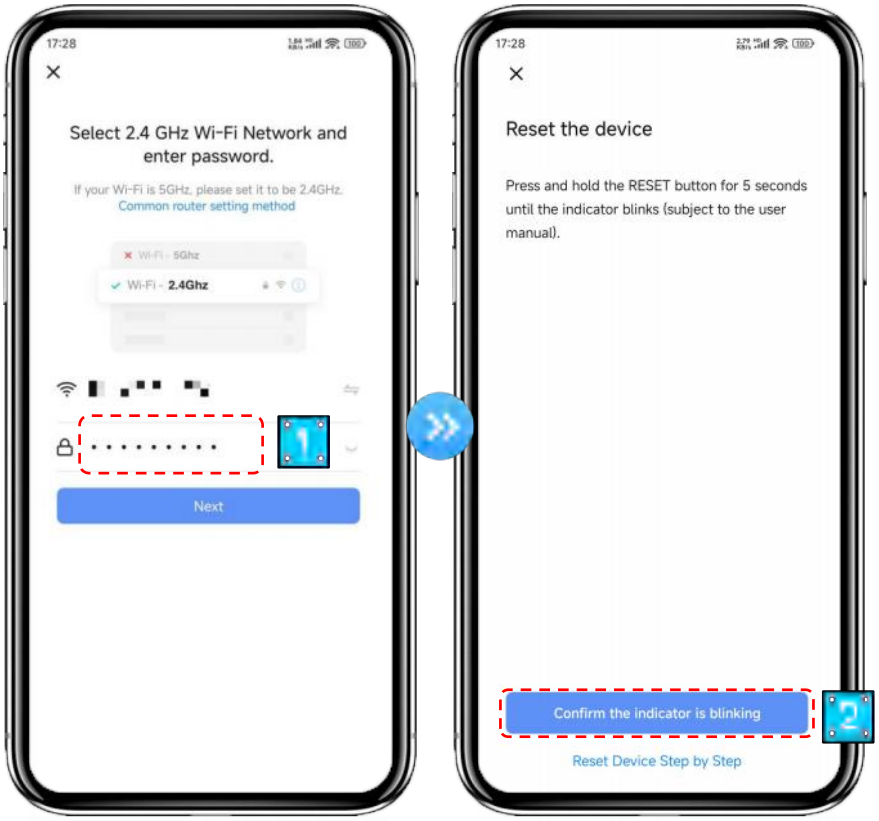
Step 4:

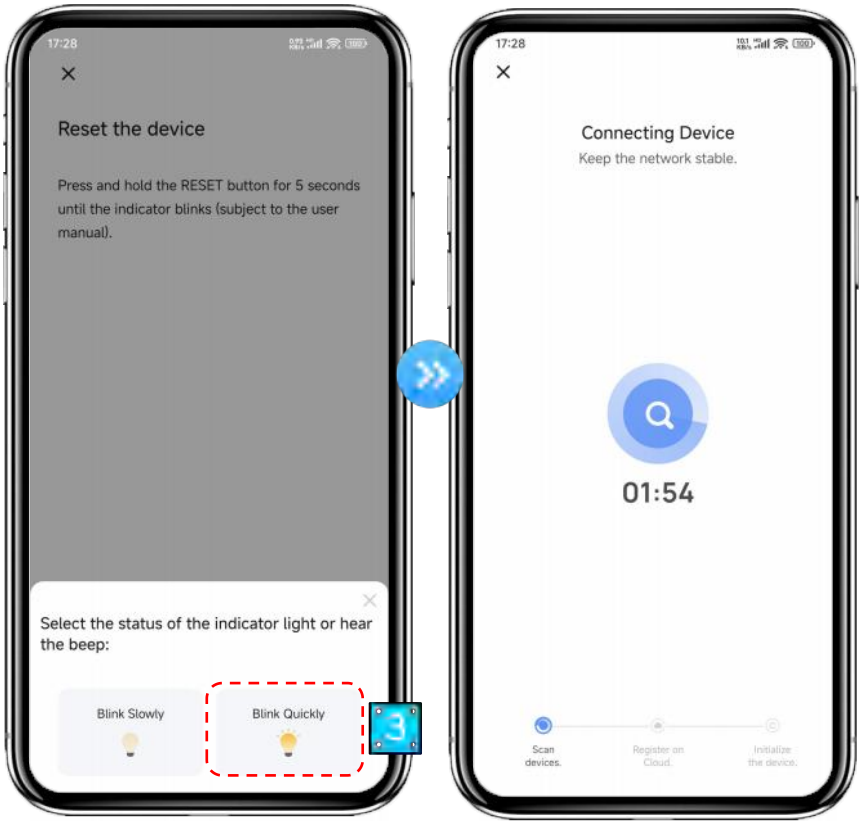
After selecting "Smart Heat Pump", enter the interface of "Add Equipment", and confirm that the wire controller has selected the “Blink Quickly”. After the indicator light under "  " flashes quickly.

① Enter the Wi-Fi connection interface, enter the Wi-Fi password of the mobile phone (it must be the same as the Wi-Fi of the mobile phone connection), click "Next".

② Then click "Confirm the indicator is blinking" .

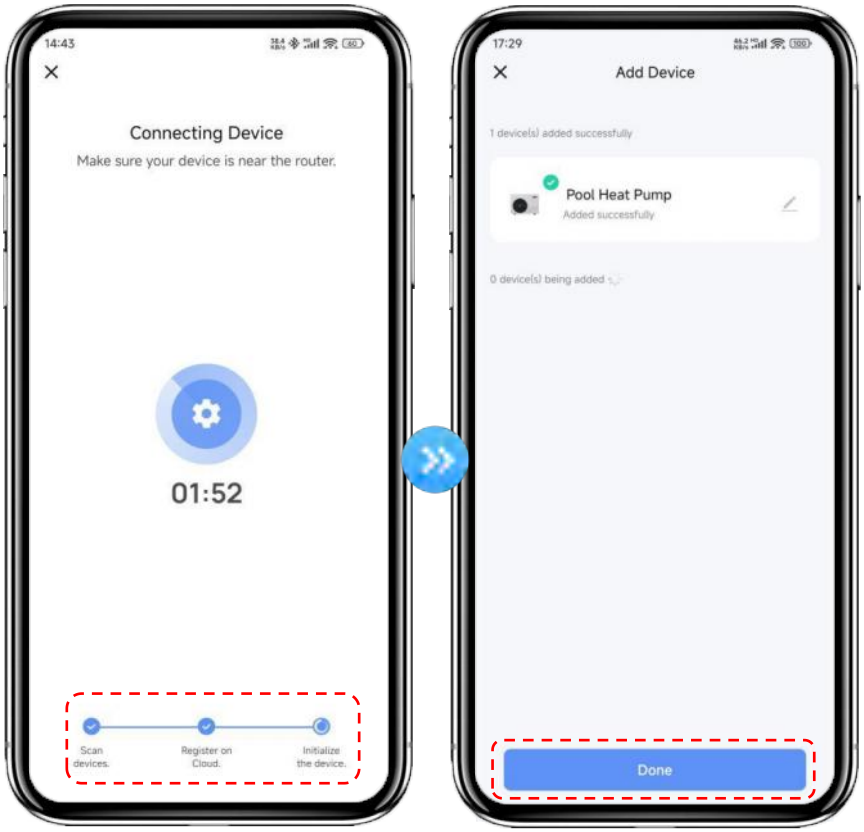
③ Click “Blink Quickly” to enter the connected status of the device.





Step 5:

When “Scan Devices”, “Register on Cloud”, “Initialize the Device” are all completed, connect succeeds.



Method 2

Step 1:

Blink Slowly Mode: Press and hold the "  " and "  " keys at the same time for 3 seconds to enter the distribution network. The "  " icon will flash slowly.

Step 2&3:

Same with Blink Quickly Mode above.

Step 4:

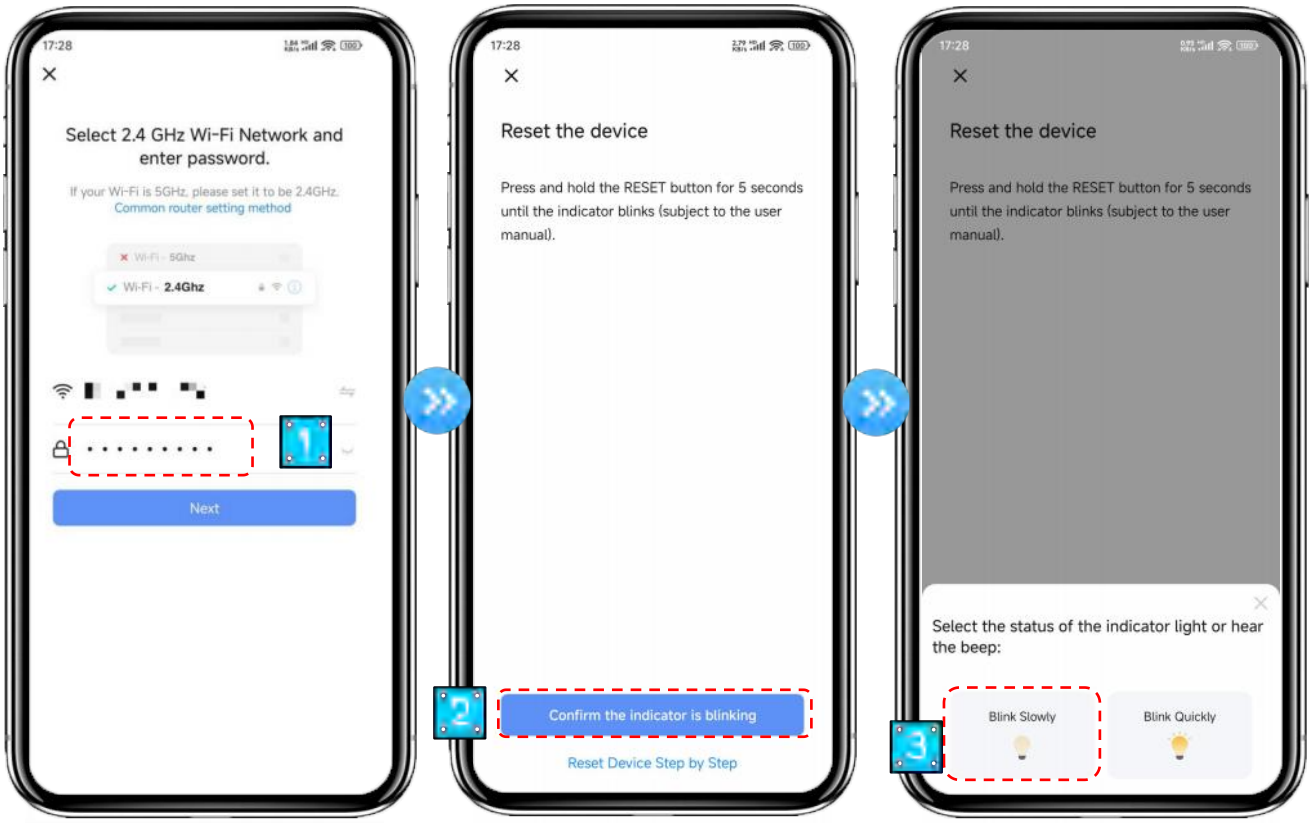
After selecting "Smart Heat Pump", enter the interface of "Add Equipment", and confirm that the wire controller has selected the “Blink Slowly”. After the indicator light under "  " flashes slowly.

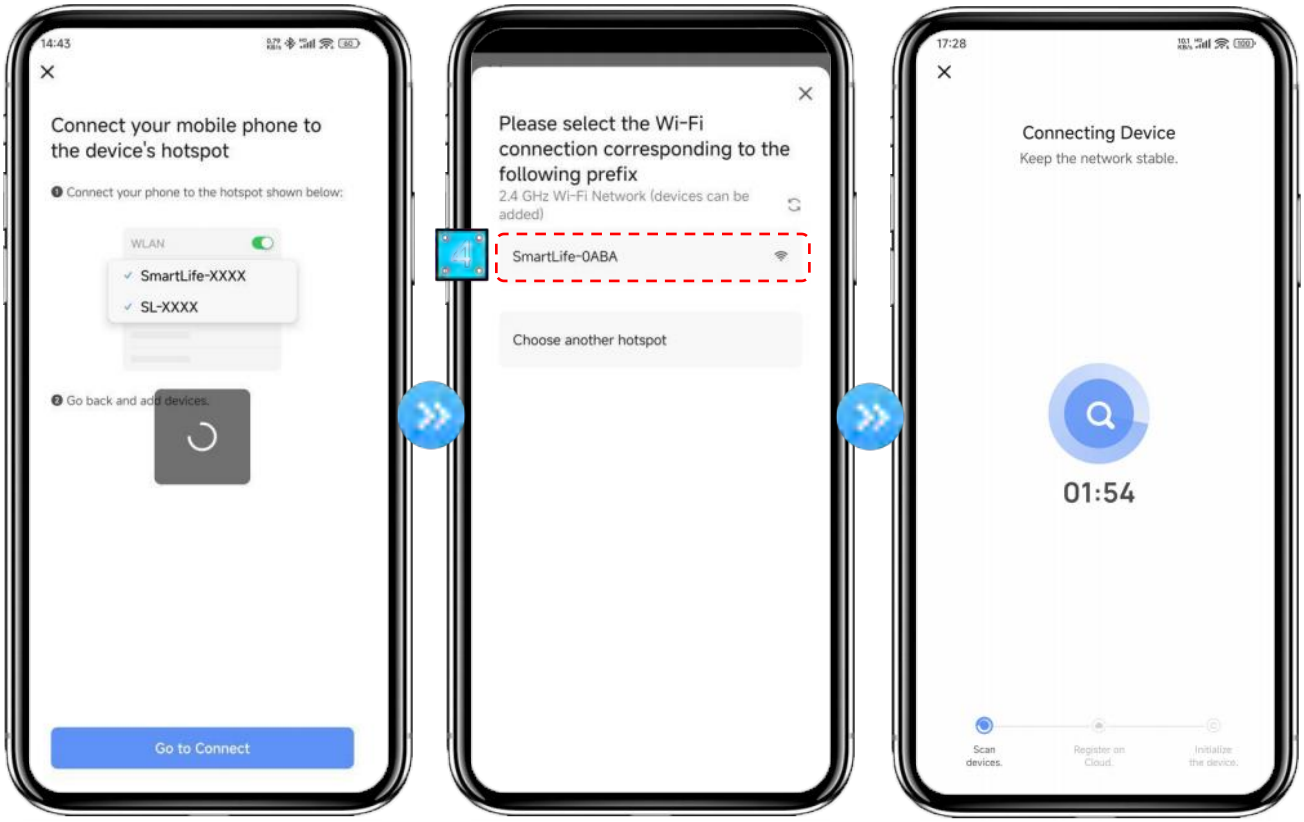
① Enter the Wi-Fi connection interface, enter the Wi-Fi password of the mobile phone (it must be the same as the Wi-Fi of the mobile phone connection), click "Next".

② Then click "Confirm the indicator is blinking".

③ Click “Blink Slowly” to enter the device's hotspot connection stage.

④ Click on the Wi-Fi named "Smartlife-xxxx", and the APP will automatically enter the device connection state.





Step 5: Same as Blink Quickly Mode above.
Note: If the connection is failed, please enter the Blink Slowly mode manually and reconnect according to the above steps.

4.6.4. 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 Target temp.

④ Current temp.

⑤ Target temp. adjustment: Click “+” or “-” to adjust the target temp.

⑥ ON/OFF

⑦ Mode switching: Click to select the mode to be switched

⑧ State: Check the device system parameters

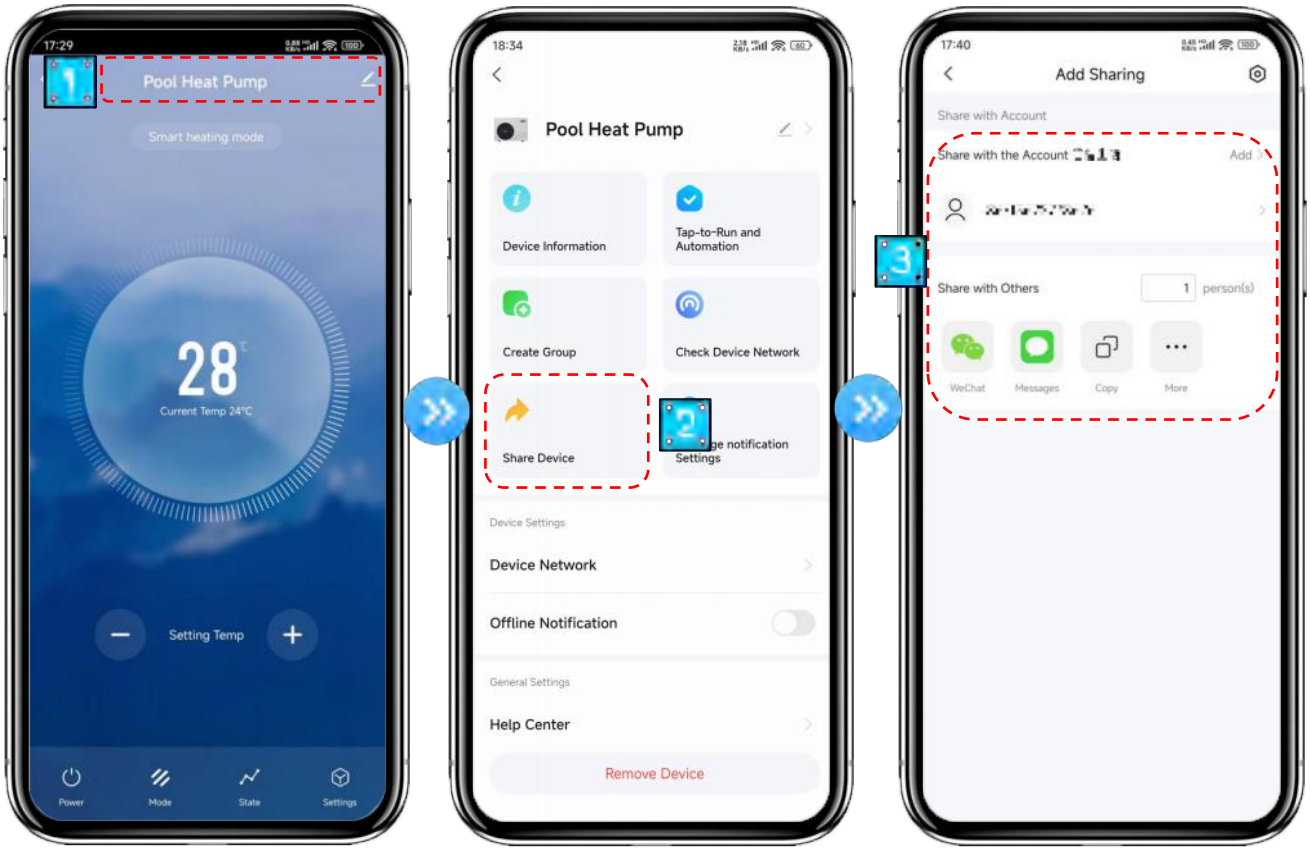
⑨ Setting: Switch between Fahrenheit and Celsius, and timer functions

Modify Device Name

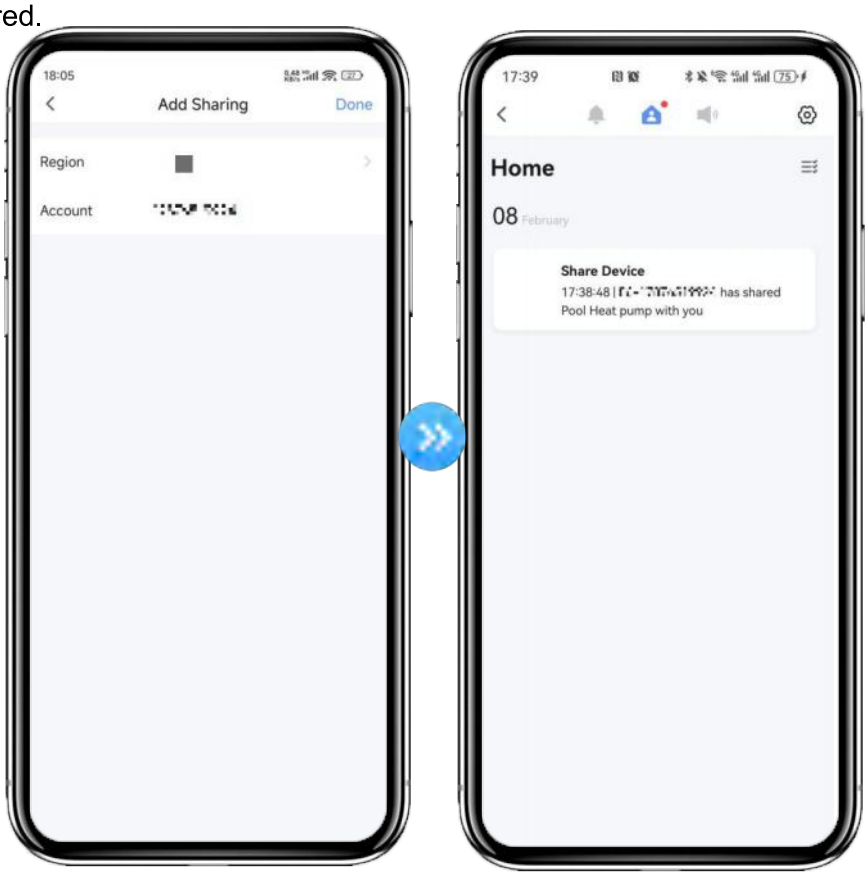
Click in the following order to enter device details, and click "Device Name" to rename the device.

Device Sharing

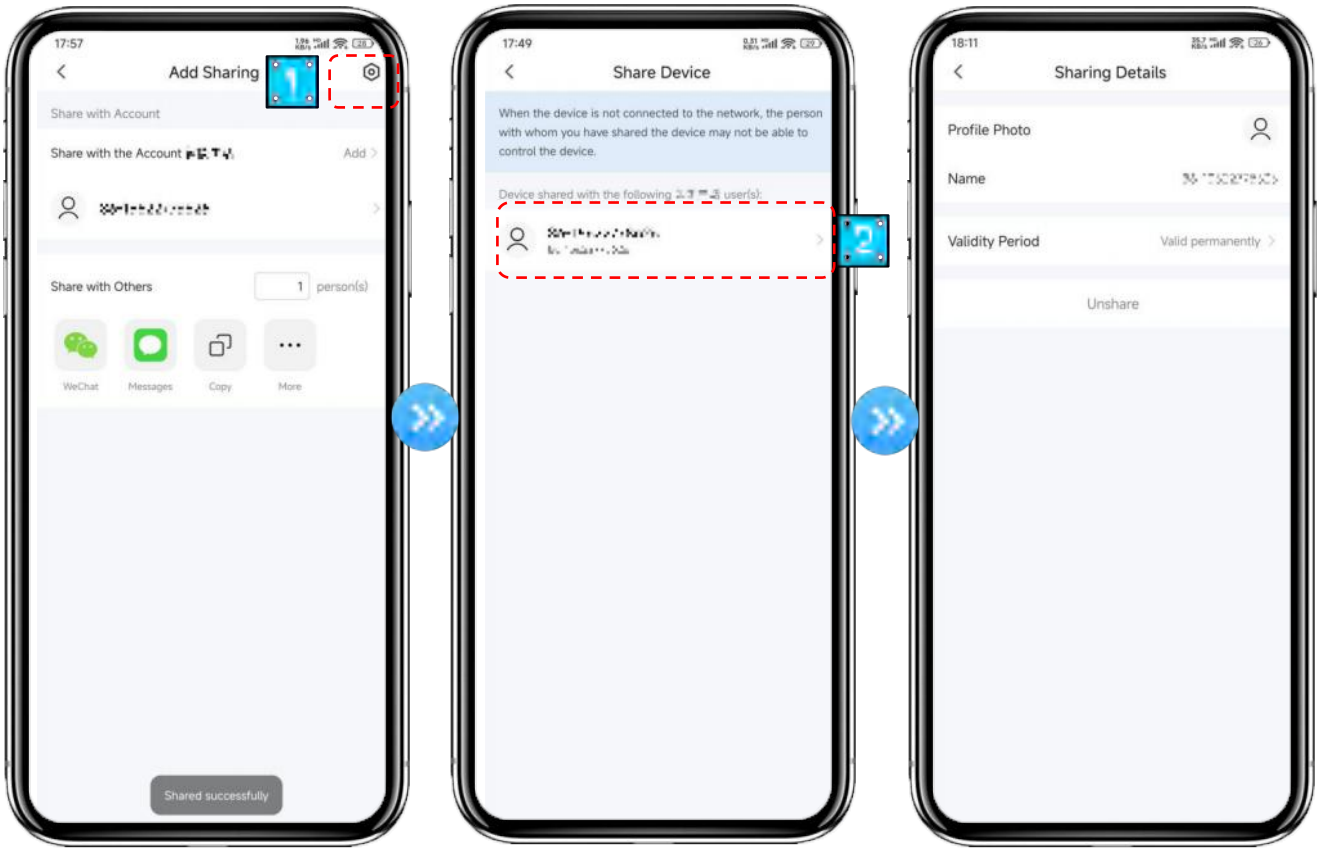
- To share a bound device, the user should do so in the following order.
- After successful sharing, the list will be added to show the person shared.
- You can manage the access permissions of shared devices.
- The user interface is as follows.



◆ Enter the account of the shared, click "Done", the person to be shared will receive the successfully shared device, and the share success list shows the newly added account of the shared.

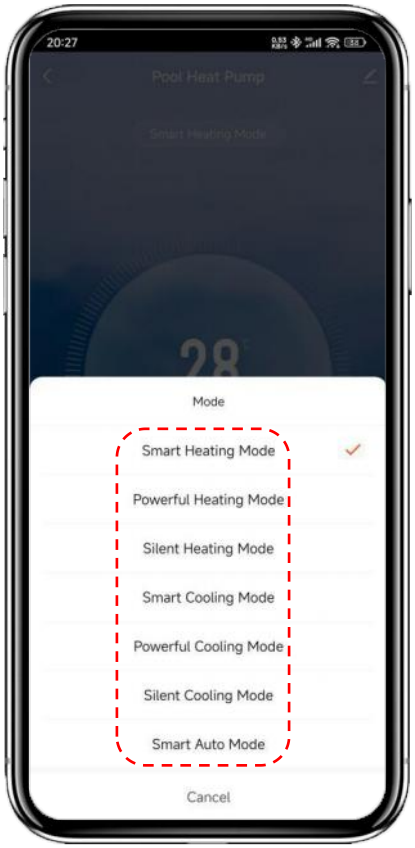


◆ Click on the settings in the upper right corner to manage the user.



Mode Settings

Click “ ” on the main interface to switch modes, select what you need.



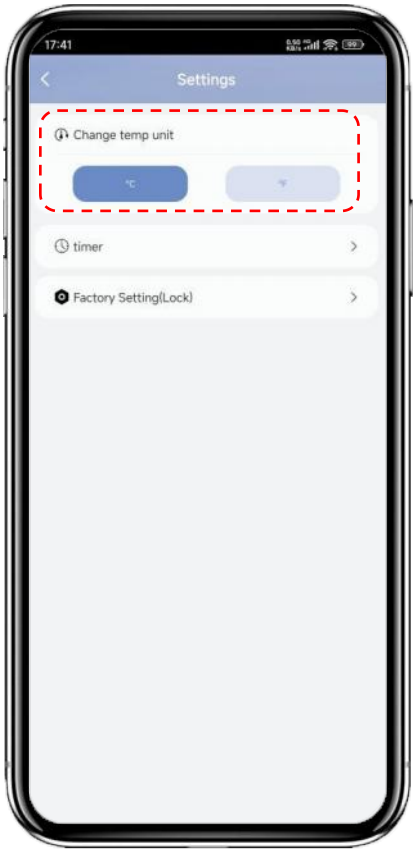
State

Click “ ” on the main interface to check the system parameters of the device.

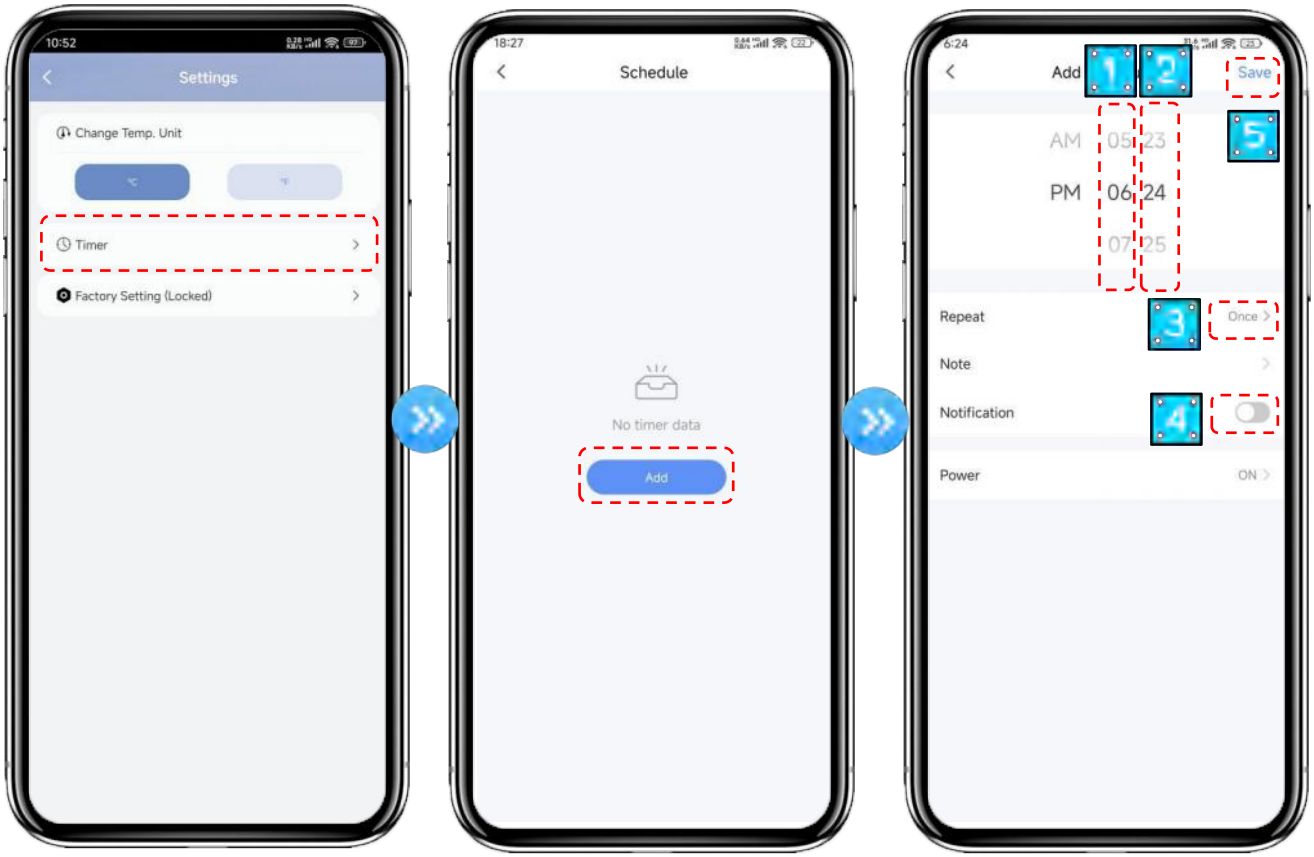
Setting

Click “ ” on the main interface to enter setting interface, as shown below.

1. Switch between Fahrenheit and Celsius.



2. Click to add timer. After entering timer setting, swipe up/down to set timer, set up repetition 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

4.6.5. Device Removal

Click “ ” on the top right corner of the main interface to enter the device details interface, and click “device removal” to delete the device. The specific operations are shown as follows.

5. MAINTENANCE AND WINTERZING

5.1. Maintenance

⚠ **WARNING:** Before undertaking maintenance work on the device, ensure that you have disconnected the electrical power supply.

5.1.1. Cleaning

a. The device's casing must be cleaned with a damp cloth. The use of detergents or other household products could damage the surface of the casing and affect its properties.

b. The evaporator at the rear of the device must be carefully cleaned with a vacuum cleaner and soft brush attachment.

5.1.2. Annual maintenance

The following operations must be undertaken by a qualified person at least once a year.

a. Carry out safety checks.

b. Check the integrity of the electrical wiring.

c. Check the earthing connections.

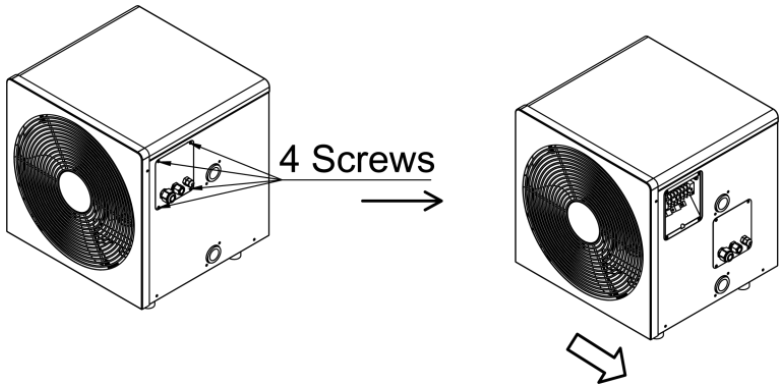
d. Check the refrigerant pressure.

5.2. Disassembly Guidelines

Step 1: Remove the junction box cover

① Remove the screws from the junction box cover;

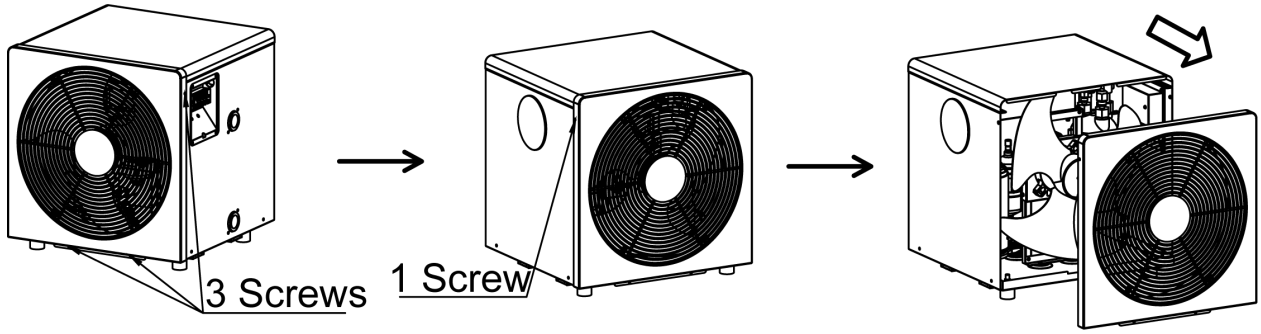
② Take out the junction box cover in the direction of the arrow.



Step 2: Remove the front plate

① Remove the front plate screws;

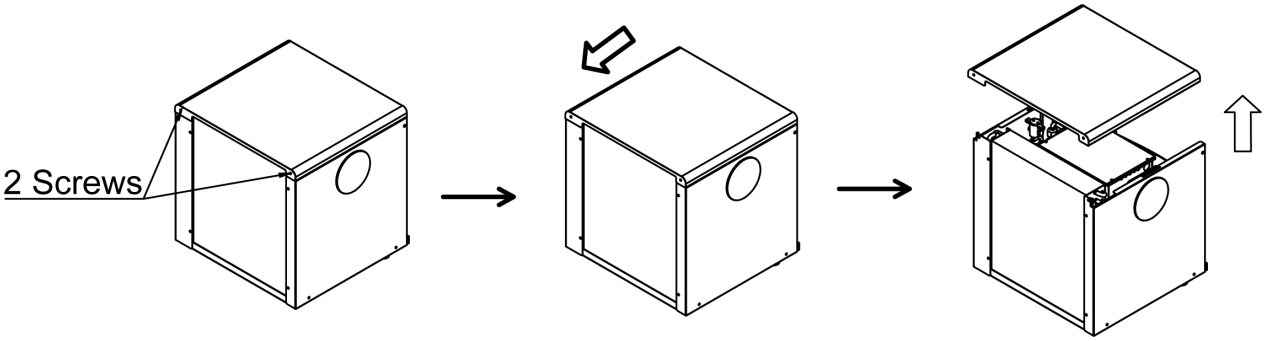
② Take out the front plate in the direction of the arrow.



Step 3: Remove the top cover

① Remove the top cover screws;

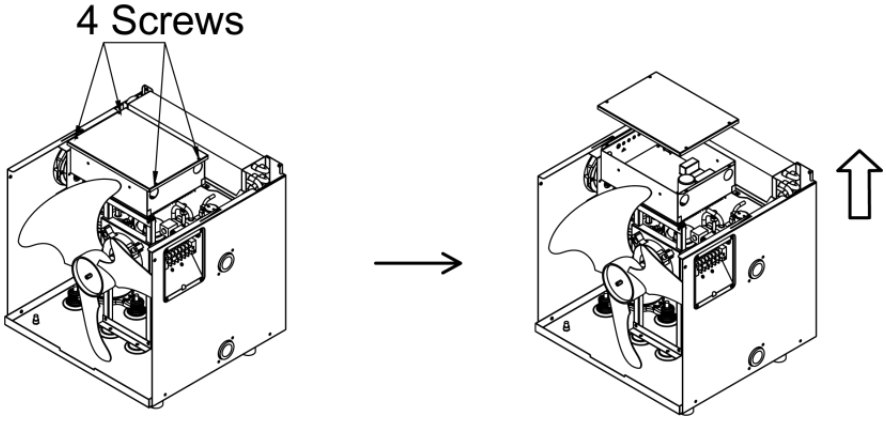
② Take out the top cover in the direction of the arrow.



Step 4: Remove the the electrical box cover

① Remove the electrical box cover screws;

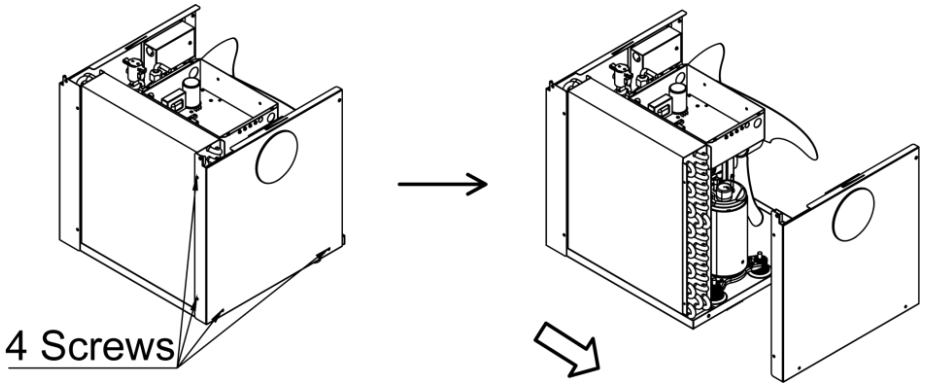
② Take out the electrical box in the direction of the arrow.



Step 5: Remove the left plate

① Remove the left plate screws;

② Take out the left plate in the direction of the arrow.

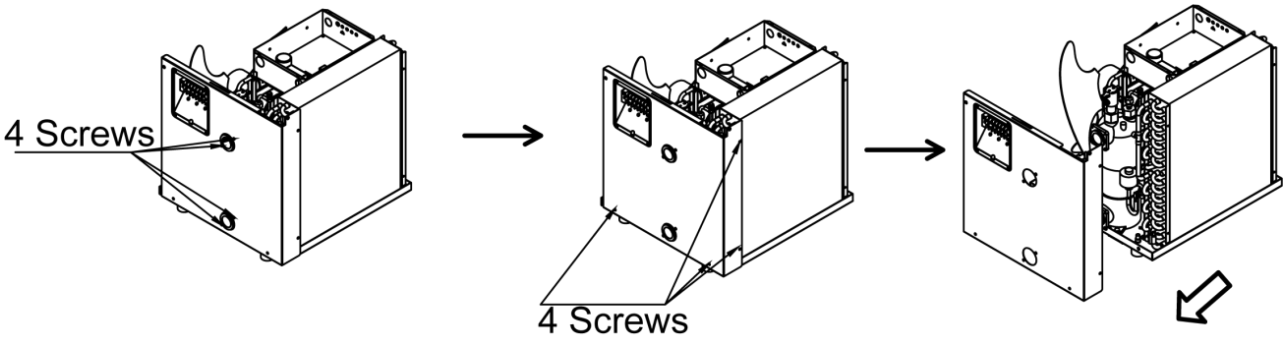


Step 6: Remove the right plate

① Remove the nozzle joint screws;

② Remove the right plate screws;

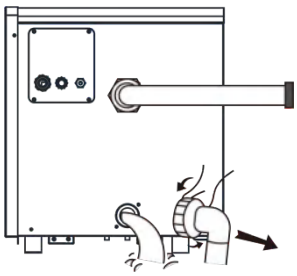
③ Take out the right plate in the direction of the arrow.



5.3. Winterizing

In winter season when you don't use device:

- Cut off power supply to prevent damage to the device.
- Drain water clear of the device.



!! IMPORTANT:

Unscrew the water nozzle of inlet pipe to let the water flow out. When the water in machine freezes in winter season, the titanium heat exchanger may be damaged.

- Keep the device covered when not in use for long periods of time.