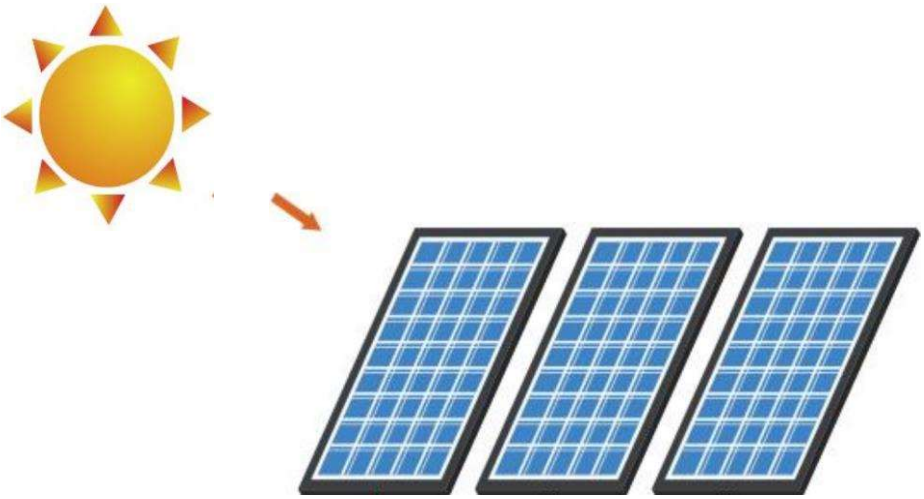
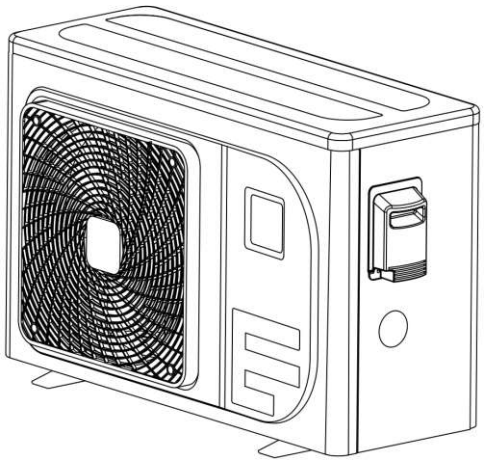
Installation & User's Manual

Solar Air Source Heat Pump for Swimming Pool





- Installation work should be done by professionals.
- For your convenience, please read this manual carefully and follow the steps in the manual.
- Please keep the manual properly for easy reference

CONTENTS

1. Preface

- In order to provide our customers with quality, reliability and versatility, this product has been made to strict production standards. This manual includes all the necessary information about installation, debugging, discharging and maintenance. Please read this manual carefully before you open or maintain the unit. The manufacture of this product will not be held responsible if someone is injured or the unit is damaged, as a result of improper installation, debugging, or unnecessary maintenance. It is vital that the instructions within this manual are adhered to at all time. The unit must be installed by qualified personnel.
- The unit can only be repaired by qualified installer centre, personnel or an authorized dealer.
- Maintenance and operation must be carried out according to the recommended time and frequency, as stated in this manual.
- Use genuine standard spare parts only.
  Failure to comply with these recommendations will invalidate the warranty.
- Swimming Pool Heat Pump Unit heats the swimming pool water and keeps the temperature constant. For split type unit, The indoor unit can be Discretely hidden or semi-hidden to suit a luxury house.
- Our heat pump has following characteristics:

1) Self-sufficient in electricity
   Advanced photovoltaic direct drive technology is adopted to make the power consumption characteristics of the unit consistent with photovoltaic power generation characteristics, so as to ensure the preferential utilization of photovoltaic energy, which is supplemented by the grid Combined with dynamic load tracking MPPT technology to maximize the real-time utilization of photovoltaic energy.
2) AC/DC hybrid technology
   Through the AC/DC hybrid control technology, the intelligent seamless switch of "pure photovoltaic, pure commercial power, photovoltaic commercial power hybrid" is realized (switching time < 10ms). Even if the sunshine conditions or the power grid changes dramatically, the unit still runs stably.
3) Full DC frequency conversion technology
   Through the efficient DC inverter compressor and DC fan, the full DC control system is used to achieve the best dynamic matching of motor speed, so that the unit runs in the most energy saving state.
4) Intelligent WIFI control
   WIF function allows fully control, and can real-time monitor the respective AC and DC power consumption and the working state of the unit.
5) Wide voltage operation
   Grid AC: 150V~260V; PV DC: 80~380V.
   The unit can be started in the above wide voltage range and run stably, and low frequency start, small starting current, small impact on the power grid.
6) Reliable operation
   The heat exchanger is made of PVC &Titanium tube which can withstand prolonged exposure to swimming pool water. In case of abnormal situation or failure, it can provide self-

protection in time and operate safely and reliably.

7) Precise water temperature control

The system adopts electronic expansion valve throttling and PID control to ensure the stability and reliability of the system, thus ensuring the stability of the end water temperature, and improving the user's comfort experience.

- 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,

Appliance shall be installed, operated and stored in a room with a floor area larger than $30m^{2.}$
NOTE The manufacturer may provide other suitable examples or may provide additional information about the refrigerant odour.

- This appliance can be used by children aged from 8 years and above and person with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- The appliance shall be installed in accordance with national wiring regulations.
- Do not operate your air conditioner in a wet room such as a bathroom or laundry room.
- Before obtaining access to terminals, all supply circuits must be disconnected.
- 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.
- 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.
- Appliance shall be installed, operated and stored in a room with floor area larger than $30m^2$.
  Be aware that refrigerants may not contain an odour
  The installation of pipe-work shall be kept to a minimum 30 m^2.

Spaces where refrigerant pipes shall be compliance with national gas regulations.
Servicing shall be performed only as recommended by the manufacturer.
The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation

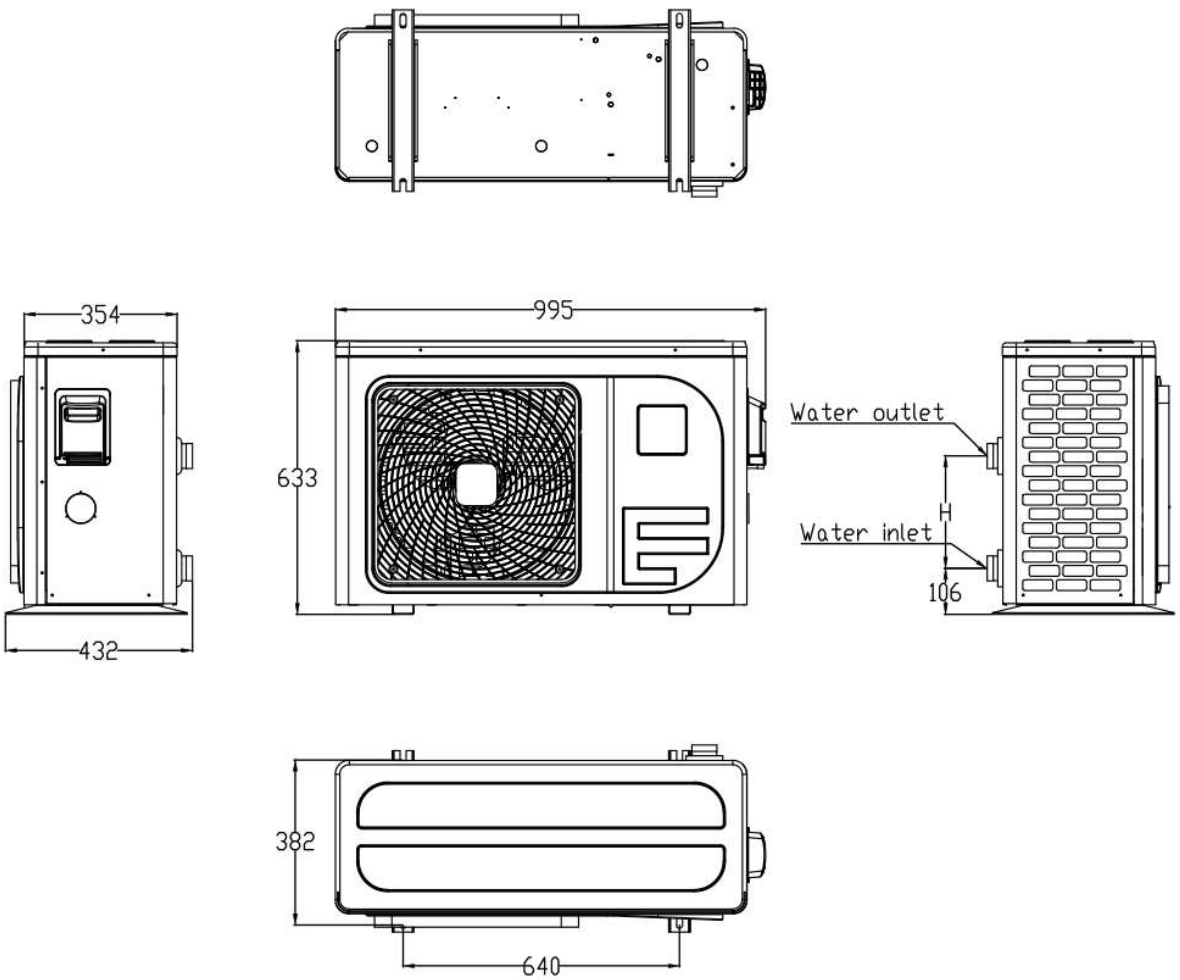
All working procedure that affects safety means shall only be carried by competent persons.

- Transport of equipment containing flammable refrigerants.
  Compliance with the transport regulations.
  Marking of equipment using signs.
  Compliance with local regulations.
  Disposal of equipment using flammable refrigerants.
  Compliance with national regulations.
  Storage of equipment/appliances.
  The storage of equipment should be in accordance with the manufacturer's instructions.
  Storage of packed(unsold)equipment.
  Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.
  The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

2. Specifications

2.1. Dimensions of Swimming Pool Heat Pump Unit

Model: 10KW, 11KW, 13kW, 15kW, 17kW unit: mm

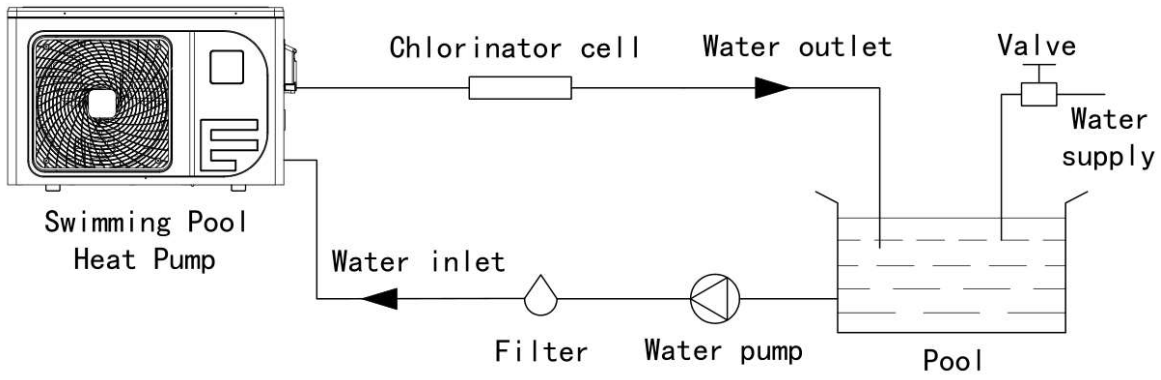


The unmarked dimensions in the figure above are as follows:

Dimension	Model	
	10KW/11KW	13KW/15KW/17KW
H (mm)	260	300

3. Installation and Connection

3.1. Installation illustration



Installation items:

The factory only provides the main unit and the water unit; the other items in the illustration are necessary spare parts for the water system, that provided by users or the installer.

Attention:

Please follow these steps when using for the first time

1) Open valve and charge water.
2) Make sure that the pump and the water-in pipe have been filled with water.
3) Close the valve and start the unit.

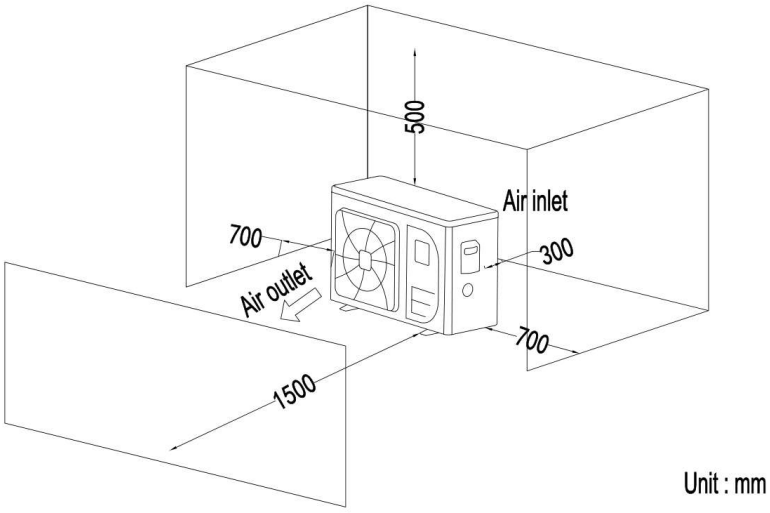
ATTN: It is necessary that the water-in pipe is higher than the pool surface.

3.2. Swimming Pool Heat Pumps Location

The unit will perform well in any outdoor location provided that the following three factors are presented:

1.Fresh Air; 2. Electricity; 3. Pool filter piping

The unit may be installed virtually anywhere outdoors. For indoor pools please consult the supplier. Unlike a gas heater, it has no draft or pilot light problem in a windy area.
DO NOT place the unit in an enclosed area with a limited air volume, where the units discharge air will be re-circulated.
DO NOT place the unit to shrubs which can block air inlet. These locations deny the unit of a continuous source of fresh air which reduces it efficiency and may prevent adequate heat delivery.



3.3. How Close to Your Pool?

Normally, the pool heat pump is installed within 7.5 metres of the pool. The longer the distance from the pool, the greater the heat loss from the piping. For the most part, the piping is buried. Therefore, the heatless is minimal for runs of up to 15 meters (15 meters to and from the pump =30 meters total), unless the ground is wet or the water table is high. A very rough estimate of heat loss per 30 meters is 0.6 kw-hour, (2000BTU) for every 5℃ difference in temperature between the pool water and the ground surrounding the pipe, which translates to about 3% to 5% increase in run time.

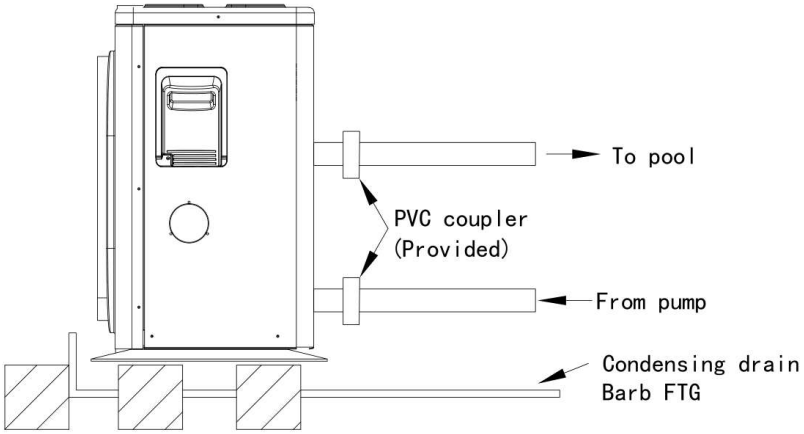
3.4. Swimming Pool Heat Pumps Plumbing

The Swimming Pool Heat Pumps exclusive rated flow titanium heat exchanger requires no special plumbing arrangements except bypass(please set the flow rate according to the nameplate). The water pressure drops less than 10KPa at max. Flow rate. Since there is no residual heat or flame Temperatures. The unit does not need cooper heat sink piping. PVC pipe can be run straight into the unit.

Location: Connect the unit in the pool pump discharge (return) line downstream of all filter and pool pumps and upstream of any chlorinators, ozonators or chemical pumps.

Standard model has slip glue fittings which accept 32mm or 50 mm PVC pipe for connection to the pool or spa filtration piping. By using a 50NB to 40NB you can plumb 40NB.

Give serious consideration to adding a quick coupler fitting at the unit inlet and outlet to allow easy draining of unit for winterizing and to provide easier access should servicing be required.



Condensation: Since the Heat pump cools down the air about 4-5℃, water may condense on the fins of the horseshoe shaped evaporator. If the relative humidity is very high, this could be as much as several litres an hour. The water will run down the fins into the basepan and drain out through the barbed plastic condensation drain fitting on the side of the basepan. This fitting is designed to accept 20mm clear vinyl tubing which can be pushed on by hand and run to a suitable drain, It is easy to mistake the condensation for a water leak inside the unit.

NB: A quick way to verify that the water is condensation is to shutoff the unit and keep the pool pump running. If the water stops running out of the basepan, it is condensation. ANEVEN QUICKER WAYIS to TEST THE DRAIN WATER FOR CHLORINE- if the is no chlorine present, then it's condensation.

3.5. Swimming Pool Heat Pumps Electrical Wiring

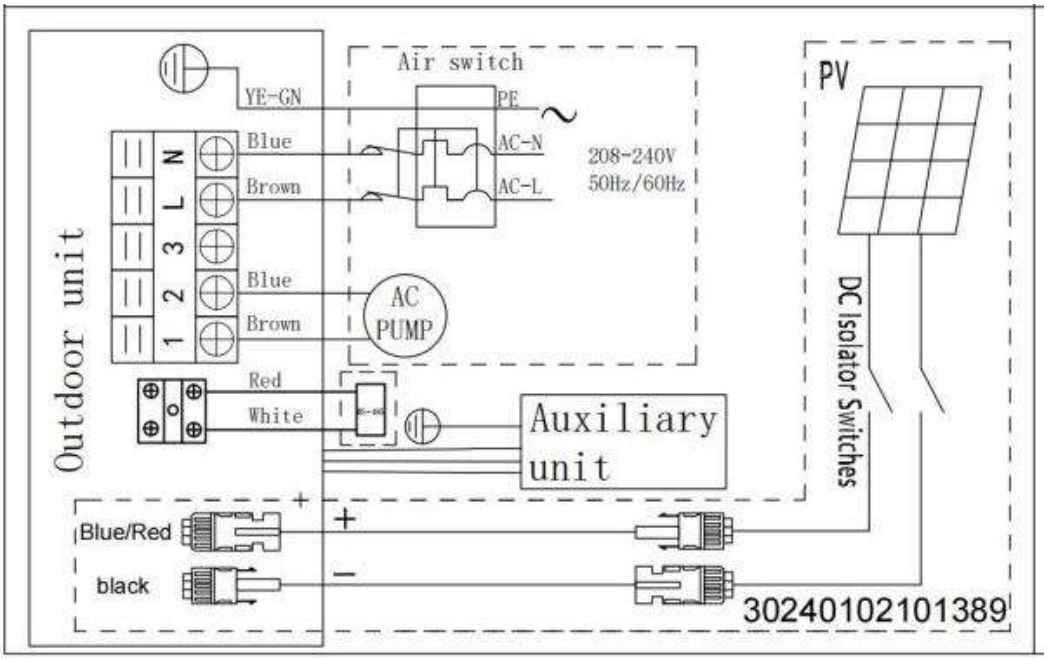
NOTE: Although the unit heat exchanger is electrically isolated from the rest of the unit, it simply prevents the flow of electricity to or from the pool water. Grounding the unit is still required to protect you against short circuits inside the unit. Bonding is also required.

The unit has a separate molded-in junction box with a standard electrical conduit nipple already in place. Just remove the screws and the right plastic handle, feed your supply lines in through the conduit nipple and wire-nut the electric supply wires to the three connections already in the junction box (four connections if three phase). To complete electrical hookup connect Heat Pump by electrical conduit, UF cable or other suitable means as specified (as permitted by local electrical authorities) to a dedicated AC power supply branch circuit equipped with the proper circuit breaker, disconnect or time delay fuse protection.

Disconnect-A disconnect means (circuit breaker, fused or un-fused switch) should be located

within sight of and readily accessible from the unit. This is common practice on commercial and residential air conditioners and heat pumps. It prevents remotely-energizing unattended equipment and permits turning off power at the unit while the unit is being serviced.

Electrical wiring:



Note: if there is any change due to product improvement, the unit's internal label shall prevail.

3.6. Initial Start-up of the Unit

NOTE: In order for the unit to heat the pool or spa, the filter pump must be running to circulate water through the heat exchanger.

Start-up procedure: After installation is completed, you should follow these steps:

1. Turn on your filter pump. Check for water leaks and verify flow to and from the pool.
2. Turn on the electrical power supply to the unit, then press the key ON/OFF of wire controller, It should start in several seconds.
3. After running a few minutes, make sure the air leaving the top (side) of the unit is cooler.
4. With the unit operating turn the filter pump off. The unit should also turn off automatically.
5. Allow the unit and pool pump to run 24 hours per day until desired pool water temperature is reached. When the water-in temperature rises more then 1.5℃ above this setting, the unit will slow down for a period of time, if the temperature is maintained for 60 minutes the unit will turn off. The unit will now automatically restart (as long as your pool pump is running) when the pool temperature drops below set temperature.

Time Delay- The unit is equipped with a 3-minute built-in solid state restart delay included to protect control circuit components and to eliminate restart cycling and contactor chatter.
This time delay will automatically restart the unit approximately 3 minutes after each control circuit interruption. Even a brief power interruption will activate the solid state 3-minute restart

delay and prevent the unit from starting until the 3-minute countdown is completed.

3.7. Installation of Solar Photovoltaic Modules

Installation of Solar Modules

Solar Modules must be installed in accordance with all applicable codes. Some of them are the local building codes, the Building Code of Australia, AS/NZS 4777 and AS /5033. They must be installed by a licenced, competent person.

Solar Array Maximum Voltage

The maximum Voltage Open Circuit (VOC) must be calculated to account for low temperature voltage rise. Failure to do may damage the equipment and void warranty.
For guidance see AS/NZS 5033 4.2 PV array maximum voltage.
The maximum Voltage Open Circuit for this equipment is 380 Vdc.
For example, if the lowest recorded temperature is 4 to 0 degrees C and the VOC of a module is 44.2 Vdc, one would multiply 44.2 by 1.1 equalling 4.42 volts.
Adding 44.2 and 4.42 equals the low temperature VOC of 48.62
Dividing the maximum VOC input of 380 Vdc by 48.62 yields the maximum number of solar modules 7.81. Rounding down yields 7 modules max at that low temperature.

VOLTAGE CORRECTION FACTORS FOR CRYSTALLINE AND MULTI-CRYSTALLINE SILICON PV MODULES

Lowest expected operating temperature ℃	Correction factor
24 to 20	1.02
19 to 15	1.04
14 to 10	1.06
9 to 5	1.08
4 to 0	1.10
-1 to -5	1.12
-6 to -10	1.14
-11 to -15	1.16
-16 to -20	1.18
-21 to -25	1.20
-26 to -30	1.21
-31 to -35	1.23
-36 to -40	1.25

Solar Array Maximum Current

Paralleling of the solar array is not recommended as the maximum rated Array Short circuit current is 12 amps.

Galvanic Considerations Outdoor Unit

The outdoor unit is to be treated as a non-galvanically isolated regulator. The solar isolation switches must be rated for the full array voltage and current. If connected to the AC supply, the outdoor unit must be connected to the 230-volt AC distribution board via a type A or B residual current and overcurrent device

Solar Module Installation

This manual contains information regarding the installation and safe handling of solar photovoltaic module(s). All instructions should be read and understood before attempting to install. If there are any questions, please contact our sales department for further explanation. The installer should conform to all safety precautions listed in this guide when installing the modules. Local codes and regulations must be followed.

This manual does not describe specific structures and installation procedures.

An approved solar technician must be consulted to determine the following:

- The specifications of the solar photovoltaic system
- Cable material
- Connecting components
- Bracket and support
- Supporting parts
- Switching and circuit protection

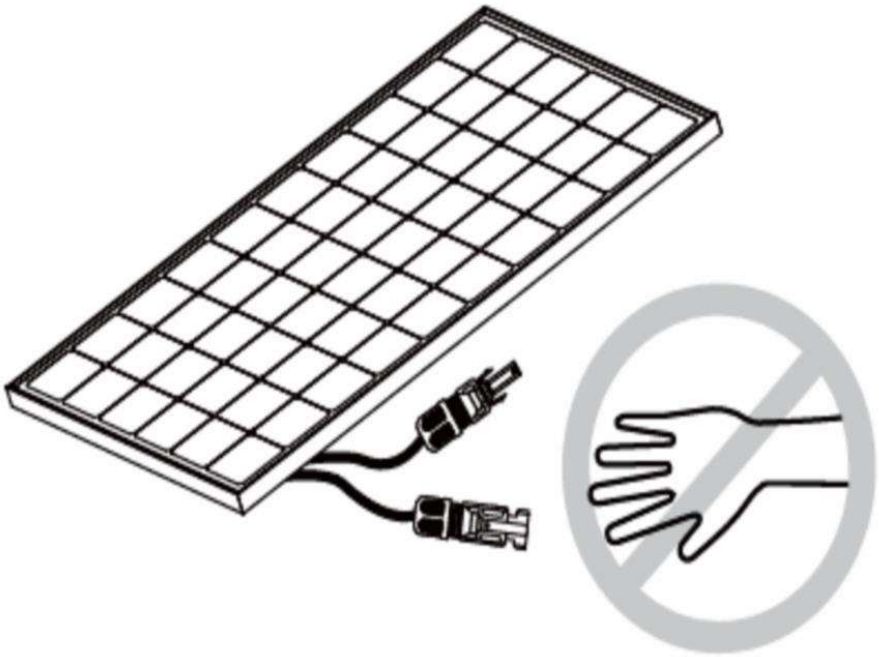
Solar modules are large and require careful handling. Only a qualified technician should install Solar Modules. Solar arrays are current limited sources. Use appropriate protection measures when working on them. They contain hazardous DC voltages.

Installation of Solar Modules should be performed only by qualified persons, who are familiar with the mechanical and electrical requirements.

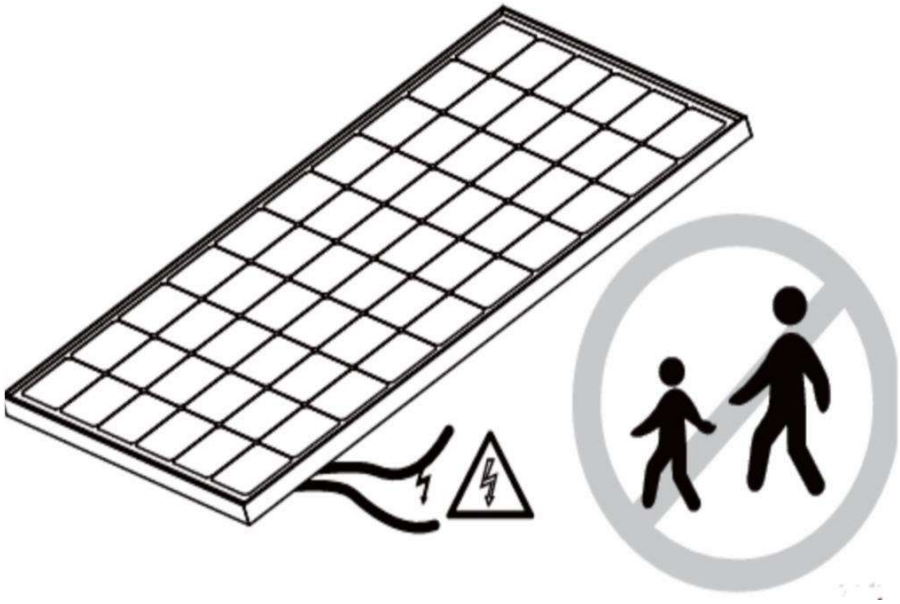
All electrical connections should be made with approved MC-4 type connectors, and from the same manufacturer. (AS/NZS 5033 clause 4.3.7 (k)

One individual solar module generates DC voltage greater than 30V when exposed to sunlight. Contact with a DC voltage of 30V or more is potentially hazardous. Do not touch the contacts of electrical terminals.

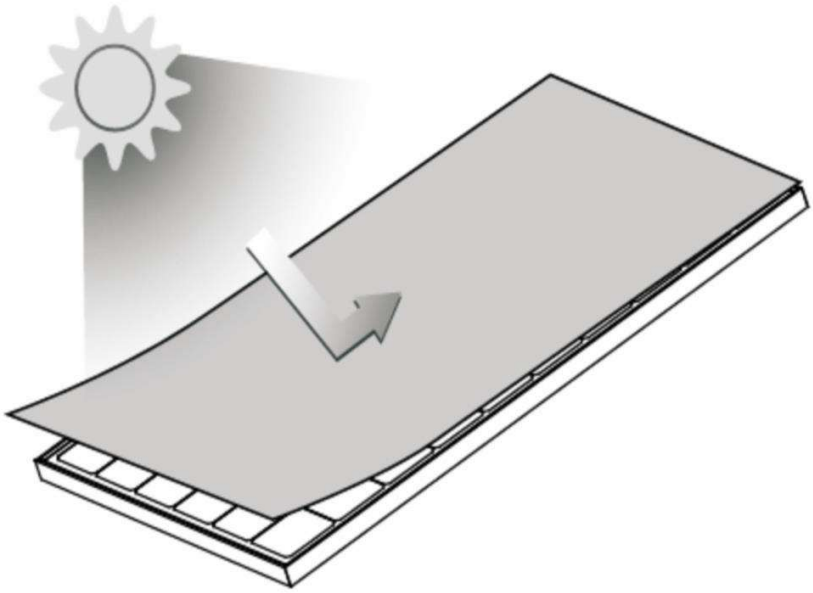
Do not touch the module contacts.



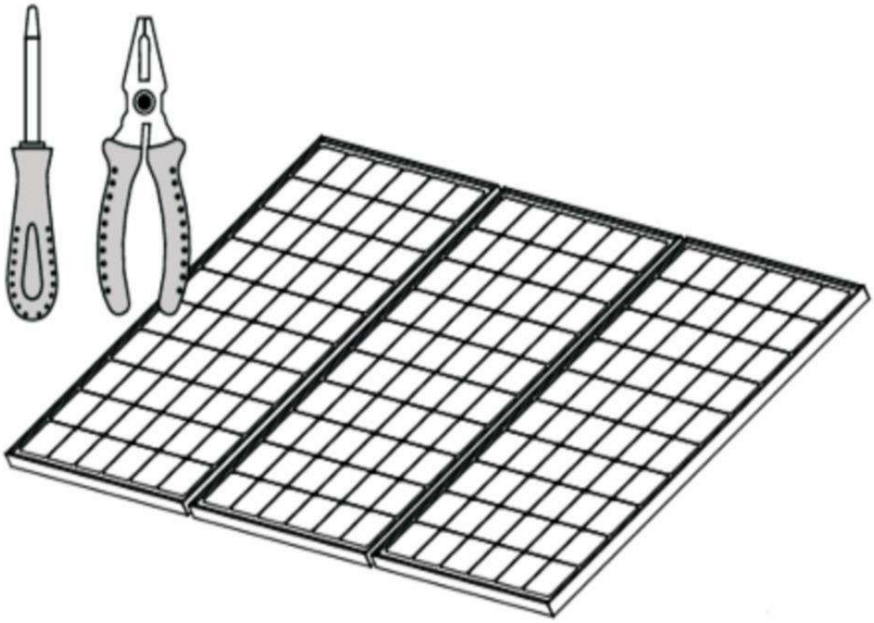
Keep children away from the system while transport and installing mechanical and electrical components.



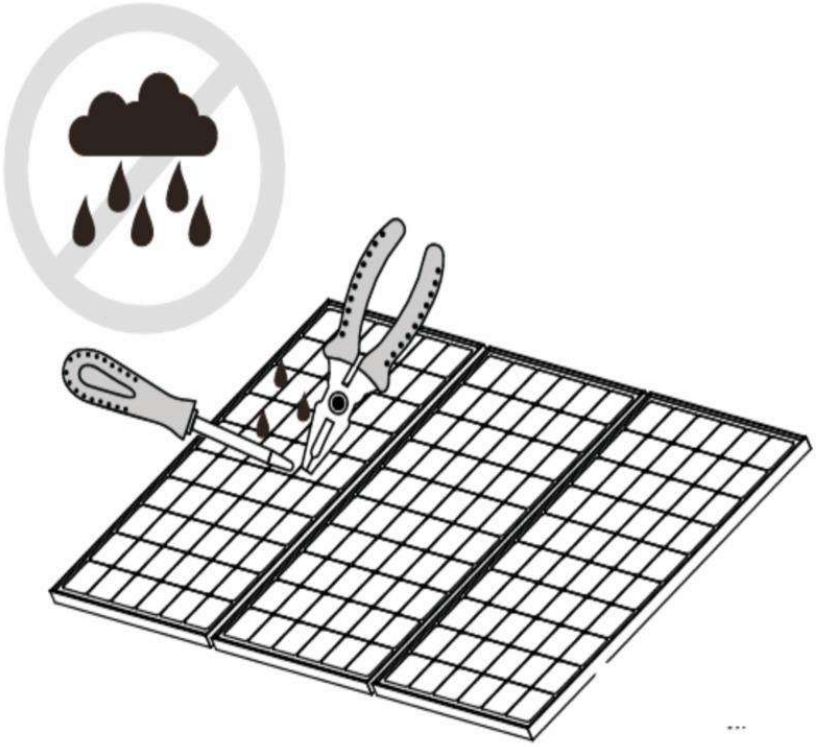
Completely cover the module with an opaque material during installation to keep electricity from being generated. Do not touch the ends of live wires. Do not wear metallic rings, watchbands, ear, nose lip rings or other metallic devices while installing or troubleshooting photovoltaic systems.



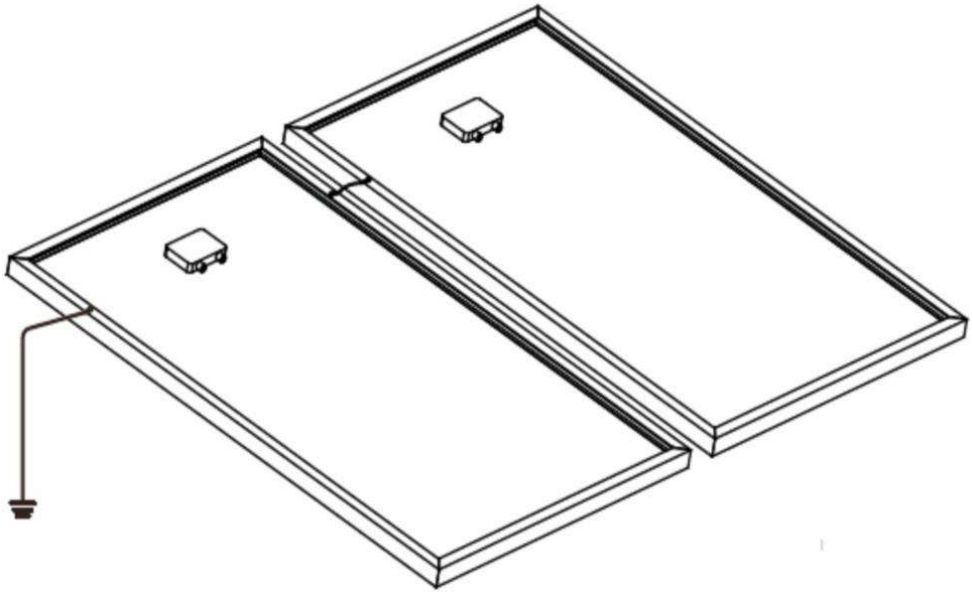
Use only insulated tools that are approved for electrical installations.



Do not work on solar modules in wet conditions.



The module frame must be properly earthed. Removal on any one module must not interrupt the earthing of the remaining modules.



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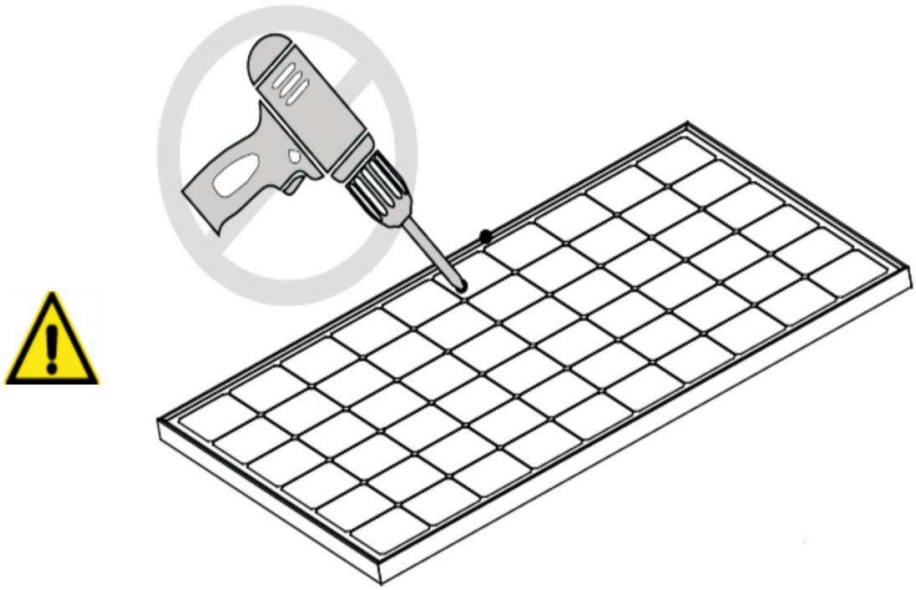
Solar Array Mechanical installation

Selecting an installation place:

- Select a suitable place for installation of the solar modules. The modules should not be shaded during the solar window part of the day.
- The module should be facing north in the southern latitudes for best power generation.
- An approved solar technician should be consulted to determine the best orientation of the solar panels.

Selecting the proper support frame:

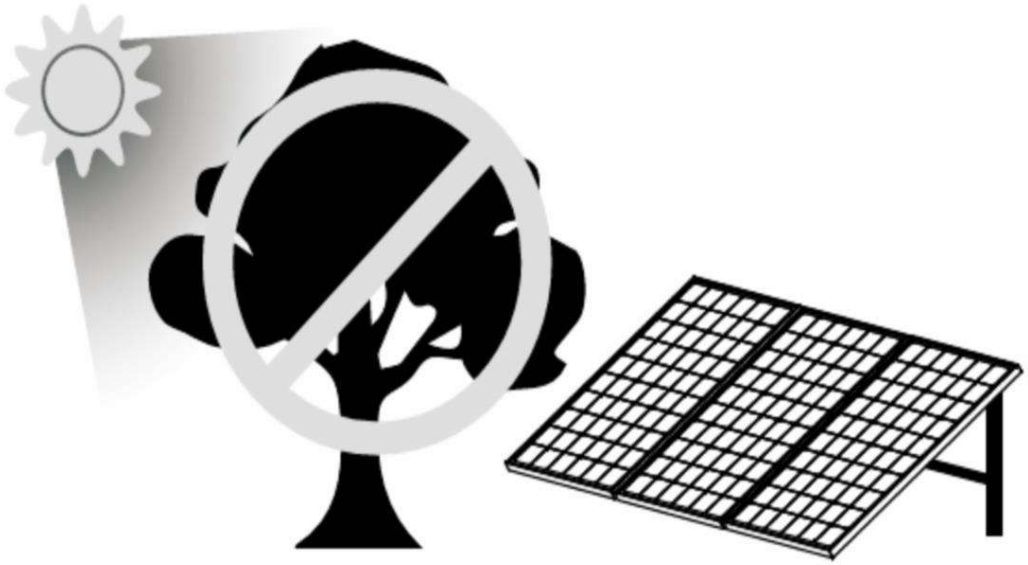
- Always observe the instructions and safety precautions included with the support frame to be used with the modules.
- Never attempt to drill holes in the glass surface of the module. It will void the warranty.
- Do not drill additional mounting holes in the frame of the module. It will void the warranty.



- Modules must be securely attached to the mounting structure using four mounting points for normal installation. If additional wind or snow loads are considered for the installation additional mounting points should also be used.
- The support frame must be made of durable, corrosion resistant and UV resistant material.
- The heat expansion and cold contraction of the support frame should have no effect on its usage and performance.

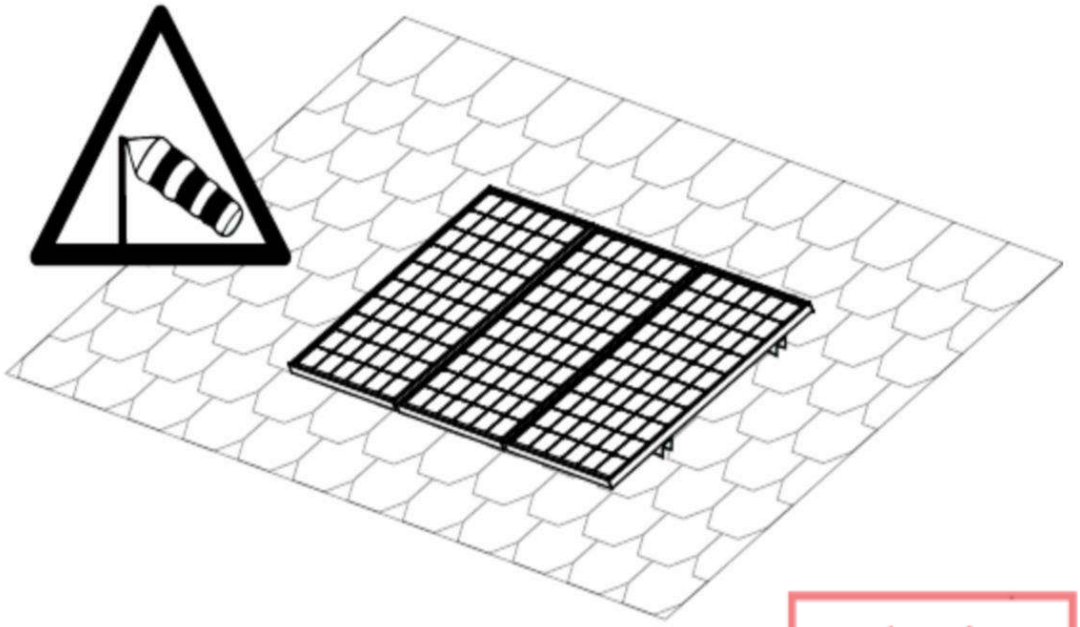
Ground mounting:

- Select the height of the mounting system to prevent the lowest edge of the module from being covered by snow in winter in areas the experience heavy snowfalls. In addition, assure the lowest portion of the module is placed high enough that it is not shaded by plants or trees and is free from the effects of sand and stone driven by wind.

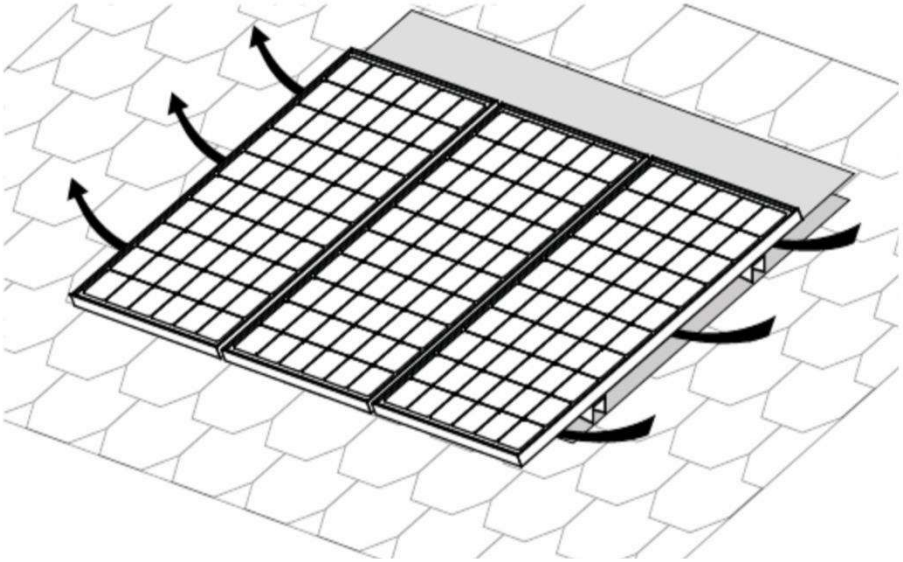


Roof Mounting:

- When installing the modules on a roof ensure that they are securely fastened and cannot fall because of wind or snow loads.
- When installing on a roof, ensure that the roof construction is suitable. In addition, any roof penetration required to mount the module must be properly sealed to prevent leaks.
- The roof installation of solar modules may affect the fireproofing of the house construction and it may be necessary to use an earth ground fault circuit breaker.

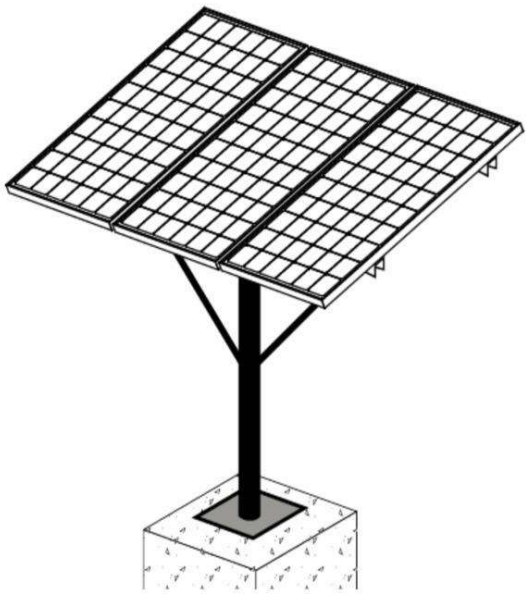


- Provide adequate ventilation under a module for cooling. 50 mm minimum between the module and the mounting surface.



Pole mounting:

- When installing the modules on a pole, choose a pole and module mounting structure that will withstand anticipated winds for the area. The pole must have a solid foundation.



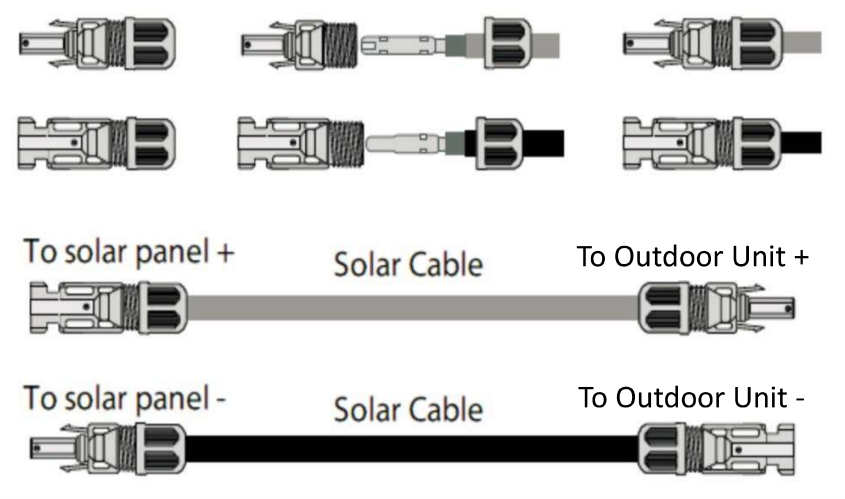
Solar Array Wiring

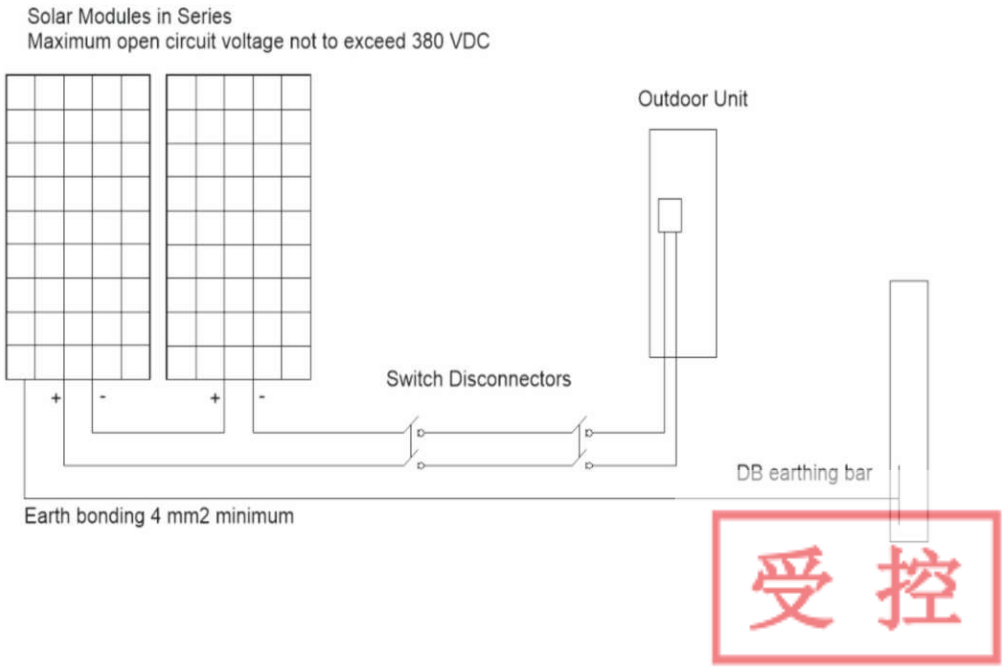
The array is formed of modules in series. The switch disconnector must be approved for disconnecting solar DC under load.
The MC-4 connectors must be approved and from the same manufacturer at each join. Mismatching connectors can cause failure and possible fire.

General installation:

- Do not use modules of different configurations in the same system.

- The solar photovoltaic array consists of a maximum of 10 modules of 270 watts or 8 modules of 370 watts.
- The solar array total system voltage must not exceed 380 volts DC open circuit. If installed in an area that experiences temperatures lower than 20 degrees C the Voltage open circuit will rise and a calculation must be done by a qualified technician.
- Both sides of an MC 4 type connection must be of the same type and manufacturer.
- Multistrand solar wire, having a minimum cross section of 2.5 sq mm or larger must be used.
- Cable installation must comply with all local and national codes and regulations.
- A switch disconnector rated for DC must be used between the array and the outdoor unit. If not adjacent to the array a separate switch must be installed at the array.





Earth Fault Protection Solar DC

Roof mounted DC PV arrays located on dwellings must be provided with DC earth fault protection per US Electrical code NEC 2005 Article 690.5. Earth fault protection isolates the Neutral conductor. (in DC this is usually the negative wire) from earth when a ground fault occurs.

Solar Disclaimer

Because the use of this manual and conditions or methods of installation, operation, use and maintenance of the photovoltaic (PV) product are beyond our control, we do not take any responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with such installation, operation use or maintenance. Nor responsibility is assumed by us for any infringement of patents or other rights of third parties, which may result by using the PV product. No license is granted by modification or otherwise under any patent or patent rights.

The information in this manual is based on company knowledge and experience and is believed to be reliable, but such information including product specification (without limitations) and suggestions do not constitute a warranty, expressed or implied.

We reserve the right to change the manual, the PV product, the specifications, or product data sheets without prior notice.

Signage

Additional Solar signage to be posted on the outdoor unit.

Warning Multiple Supplies
Isolate all supplies before working on this Pool Heater

To be posted adjacent to the AC and DC isolating Switches.

Pool Heater
AC supply

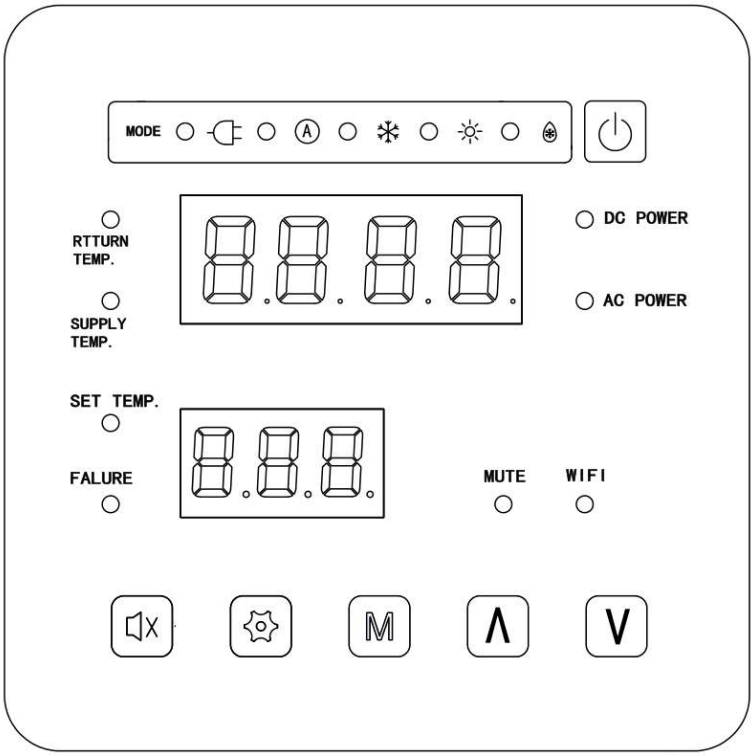
Pool Heater
DC isolater

Emergency Pool Heater Shutdown
Call service phone

1. If possible, turn off the DC isolator.
2. If possible, turn off the AC isolator.
3. Turn off all remaining DC and AC circuit breakers and switches in any order.

4. Use and Operation Instruction of Wire Controller

4.1. Interface Display



4.1.1 Display area Description

1) Main display area：
   - ① Under the main interface, the water inlet temperature, water outlet temperature, AC power and DC power are displayed circularly (interval: 5 seconds).
   - ② In the process of anti-freezing or forced operation of water pump, the corresponding code flash (interval of 2 seconds).
2) Auxiliary display area
   - ① In shutdown state, it shows OFF.
   - ② After the unit is started, the set temperature is always displayed when there is no fault.
   - ③ If there is a fault, the current fault code will be displayed (interval 1 second).
3) Other instructions
   - ① When parameter selection is involved, parameter items are displayed in the auxiliary display area and parameter volues are displayed in the main display area.
   - ② When querying status parameters, parameter serial number is displayed in the auxiliary display area and parameter volue is displayed in the main display area.

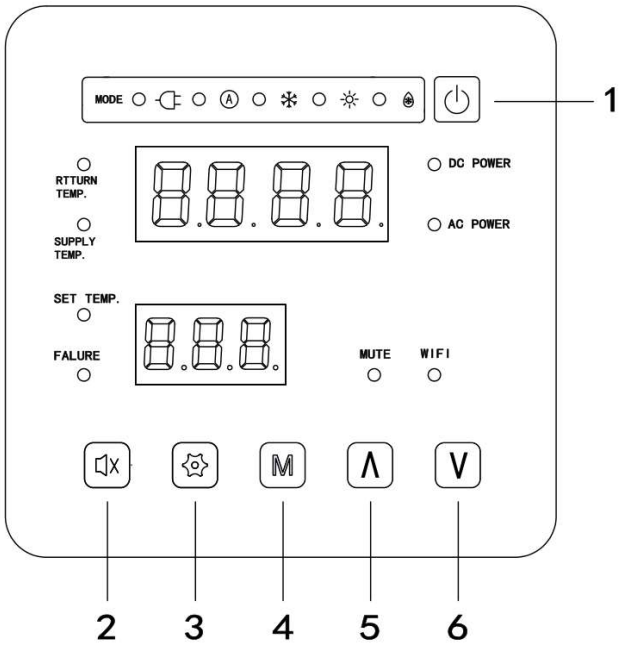
4.1.2 Function Code Description

Function code comparison table：

Function	Parameters of the code	Display code
WIFI configured	UU	/
Clock setting	CL	/
Status Parameter Query	PA	/
Forced frost	FD	/
Power Limiting operation	LE	/
Pump forced operation	PF	2222
Freeze protection operation	FP	1111

4.2. Key and Icon Function Instruction

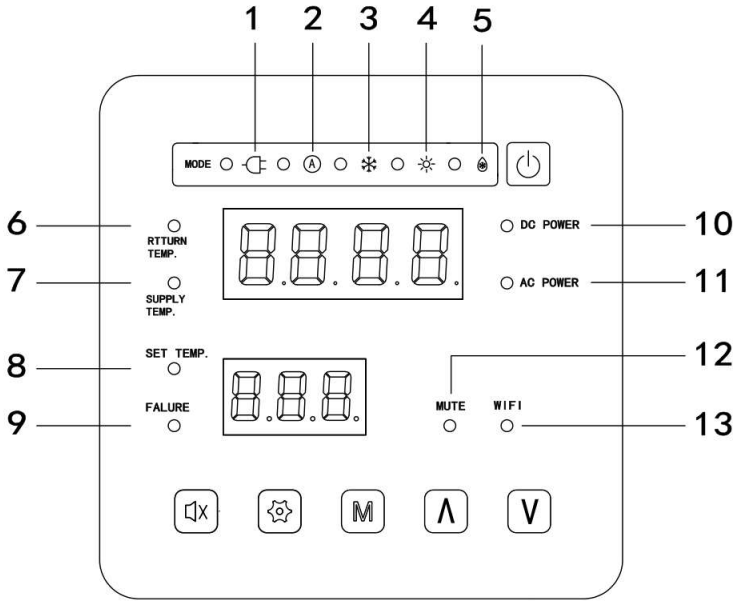
4.2.1 Key Function Instruction



No.	designation	function
1	On-off key	■ Main interface: Long press for 0.5 seconds to turn on/off. ■ Main interface: Long press for 5 seconds to lock/unlock the screen. ■ Other interface: Short press to cancel the current operation and return to the previous operation.
2	Mute key	■ Main interface: Short press to enter or exit the one-button mute function. ■ Main interface: Long press for 5 seconds to enter the timer mute setting.
3	Setting key	■ Main interface: Short press to enter user setting selection. ■ Main interface: Long press for 5 seconds to enter or exit the one-click power limiting function. ■ Other interface: Short press to set parameters, function Settings and save.

4	Mode key	■ Main interface: Short press to switch mode. ■ Main interface: Long press for 5 seconds to set timing.
5	Up key	■ It is used to increase or decrease variable volue. ■ Main interface: Long press "up" and "Down" keys for 3 seconds to enter special function setting selection.
6	Down key	

4.2.2 Icon Function Instruction



No.	designation	function
1	Power limiting symbol	When The power limiting function is enabled, the light is on
2	Automatic symbol	It will display under the automatic mode
3	Cooling symbol	It will display during cooling
4	Heating symbol	It will display during heating
5	Defrosting symbol	It will display in the defrosting process of the unit
6	Water inlet symbol	When the main display area displays the water inlet temperature, the light is on
7	Water outlet symbol	When the main display area displays the water outlet temperature, the light is on
8	Setting symbol	When the auxiliary display area displays the water setting temperature, the light is on. When the parameter is adjustable , it is on.
9	Fault symbol	In case of unit fault ,it is on
10	DC power symbol	When the main display area displays the Real-time DC power, it is on
11	AC power symbol	When the main display area displays the Real-time AC power, it is on
12	Mute symbol	When it is in mute state, the light is on
13	WIFI symbol	When the WIFI is successfully configured, the light is on (The light blinks during the WIFI configuration)

4.3. Startup & Shutdown

In the main interface, keep long press of " ⏻ " for 0.5 seconds to enter ON/OFF interface.
When there is no operation within 1 minute, the screen is automatically extinguished. When it displays full screen off, click any key for returning to ON/OFF main interface.

Notes:

- Startup & shutdown operation can only be conducted in the main interface.
- When linkage control function is enabled (factory Settings, disabled by default):
  1) When the linkage switch is disconnected, the secondary display screen displays "LFF".
  2) When the linkage switch is closed, the sub-display screen will display normally. (the startup state will display the set temperature, and the shutdown state will display "OFF")

4.4. Mode Switch

Under the main interface, Short press " M " to switch the unit among heating, cooling and automatic mode.
Operation descriptions:

- Mode switch operation can only be conducted in the main interface.
- When the unit is under the defrosting state, the system automatically returns to the predefrosting mode after the defrosting is finished.
- During the defrosting, mode switch is available. And when switching the mode, the unit won't work under a new mode until defrosting is completed.

4.5. Temperature Setting

The unit adopts backwater temperature control, and the corresponding target setting temperature default volue and adjustable range in each mode are as follows:

Mode	Default volue	Adjustable range
Cooling	27℃	10~35℃
Heating	27℃	15~35℃
Automatic	27℃	10~35℃

In the main interface, press " ∧ " or " ∨ " for entering the temperature setting interface, and the temperature setting icon blinks → press " ∧ " or " ∨ " to increase or decrease the temperature setting volue→ press " ⚙ " to save the setting and return to the previous interface.

Notes: Under the temperature setting interface, if short press " ⏻ " the system will return to the main interface without any changes saved; If there is no operation for 5 seconds, the system will automatically memorize user's setting, and return to the main interface.

4.6. Setting of Timing ON/OFF

At present, the wire controller can only realize the timing setting of one time period in one day. Users can set the opening or closing time as well as the opening and closing time for each period according to their own requirements.

Setting steps: volue

1. Long press " M " for 5 seconds. the timer setting interface is displayed. Short press " Λ " or " V " to select parameters between v03-V08.
2. After selecting a parameter, short press " ⚙ " to enter the hour/minute or timer switch enablement setting (the corresponding parameter blinks), Short press " Λ " or " V " to adjust the setting volue.
3. Click " ⚙ " Save settings, click " ⏻ " for returning to the main interface.

Notes: If there is no operation for 20 seconds, the system will automatically memorize user's setting, and return to the main interface.

Parameter No.	Parameter meaning	Parameter range
V03	Hour bit of timing boot 1	0-23
V04	Minute bit of timing boot 1	00/10/20/30/40/50
V05	Whether to enable timed boot 1	Not enable,1- enable
V06	Hour bit of timed shutdown 1	0-23
V07	Minute bit of timed shutdown 1	00/10/20/30/40/50
V08	Whether to enable timed shutdown 1	0- Not enable,1- enable

4.7. Mute Setting

4.7.1 Setting and Cancellation of Timing Mute

Setting steps:

1. Long press " 🔇 " for 5 seconds. The mute setting interface is displayed. Short press" Λ " or " V " to select parameters between F14-F18.
2. After selecting a parameter, short press " ⚙ " to enter the start/end or enable setting of timing mute, then short press " Λ " or " V " to adjust the setting volue.
3. Click " ⚙ " Save settings, click " ⏻ " for returning to the main interface.

Notes: If there is no operation for 20 seconds, the system will automatically memorize user's setting, and return to the main interface.

Parameter No.	Parameter meaning	Parameter range
F14	Timing mute start time (hour)	0-23
F15	Timing mute start time (minute)	00/10/20/30/40/50
F16	Timed mute end time (hour)	0-23

F17	Timing mute end time (minute)	00/10/20/30/40/50
F18	Whether to enable timed mute	0-Not enable, 1- enable

4.7.2 One-click Mute

In the main interface, shore press " " to enter or exit the one-button mute setting.

Notes: At night or the rest time, user can start one-click mute or timing mute function to reduce the noise.

4.8. Clock Setting

Setting steps:

1. In the main interface, short press " " for entering user setting interface.
2. Short press " Λ " or " V " to select parameter "CL", then short press " " for entering clock setting interface.
3. Short press " Λ " or " V " to select parameters between V01-V02.
4. After selecting a parameter, short press " " to enter the hour/minute setting, Short press " Λ " or " V " to adjust the setting volue.
5. Click " " Save settings, click " " for returning to the main interface.

Notes: If there is no operation for 20 seconds, the system will automatically memorize user's setting, and return to the main interface.

Parameter No.	Parameter meaning	Parameter range
V01	Hour bit of clock	0-23
V02	Minute bit of clock	0-59

4.9. Keyboard Lock

To avoid others' misoperation, please lock the wire controller after completing the setting.
Keep long press of " " for 5 seconds to lock or unlock the screen.

Notes:

- Under the locked screen interface, only unlocking operation is available, and the screen will be lighten after other operations conducted.
- Under the OFF interface, locking operation is available, and the operation method is the same as locking screen under the ON interface.
- After the key is locked, the screen displays the time by default. (The auxiliary display area shows hour and the main display shows minute)
- After the key is locked, in the case of failure, the auxiliary display area shows failure code, the main display is off.

4.10. Forced Frost

During heating operation, long press " ∧ " and " ∨ " for 3 seconds at the same time in the main interface to enter the function selection interface. After selecting parameter group "FD" by short pressing " ∧ " or " ∨ ", click " ⚙ " to enter the forced defrosting interface (if manual defrosting conditions are met).

Note:

- Forced defrosting can only be entered if the entry conditions for mandatory defrosting are met.
- When the exit conditions are met, the defrosting will exit automatically.

4.11. Pump Forced Operation

In shutdown state, long press " ∧ " and " ∨ " for 3 seconds at the same time in the main interface to enter the function selection interface. After selecting parameter group "PF" by short pressing " ∧ " or " ∨ ", click " ⚙ " to start or cancel the forced operation of the pump.

4.12. Power Limiting Operation

There are two ways to enable or disable the power limiting function.

A. On the main interface, long press " ⚙ " for 5 seconds to enable or disable the one-click power limiting function.
B. In startup state, long press " ∧ " and " ∨ " for 3 seconds at the same time in the main interface to enter the function selection interface. After selecting parameter group "LE" by short pressing " ∧ " or " ∨ ", click " ⚙ " to enable or disable the power limiting function.

Note:

- Way B has a higher priority than way A. That is, one-click power limiting takes effect only when the power limiting function is disables by way B.
- The Settings of way A will be remembered when power is off, but way B will not.

4.13. WIFI Configuration Operation

4.13.1 installation

Please scan the following QR code to download Smart Life App. (Its icon is shown bellow on the right).

Note: Smart Life App is a third-party smart device management tool, through which you can control and manage devices in your home, experience smart life.

4.13.2 Account Login

1. To use the App for the first time, you should register via email or mobile phone number firstly just as follows. (Fig.1~Fig.4)

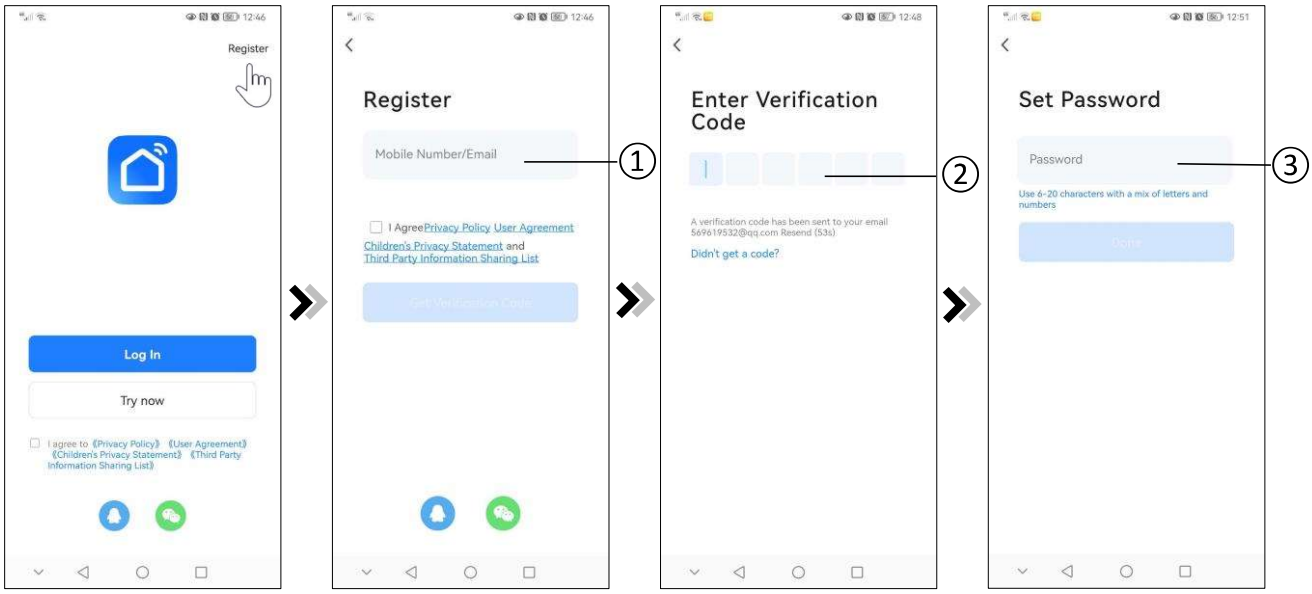


Fig.1 Home page Fig.2 Enter account Fig.3 Enter verification code Fig.4 Set password

2. After registration, you can log in to the App entering the account you just registered and the corresponding password. Check the agree check box and click <Log In>. Then click <go to App> after the first login is successful. The App homepage is displayed, indicating that no device exists. (Fig.5~Fig.8)

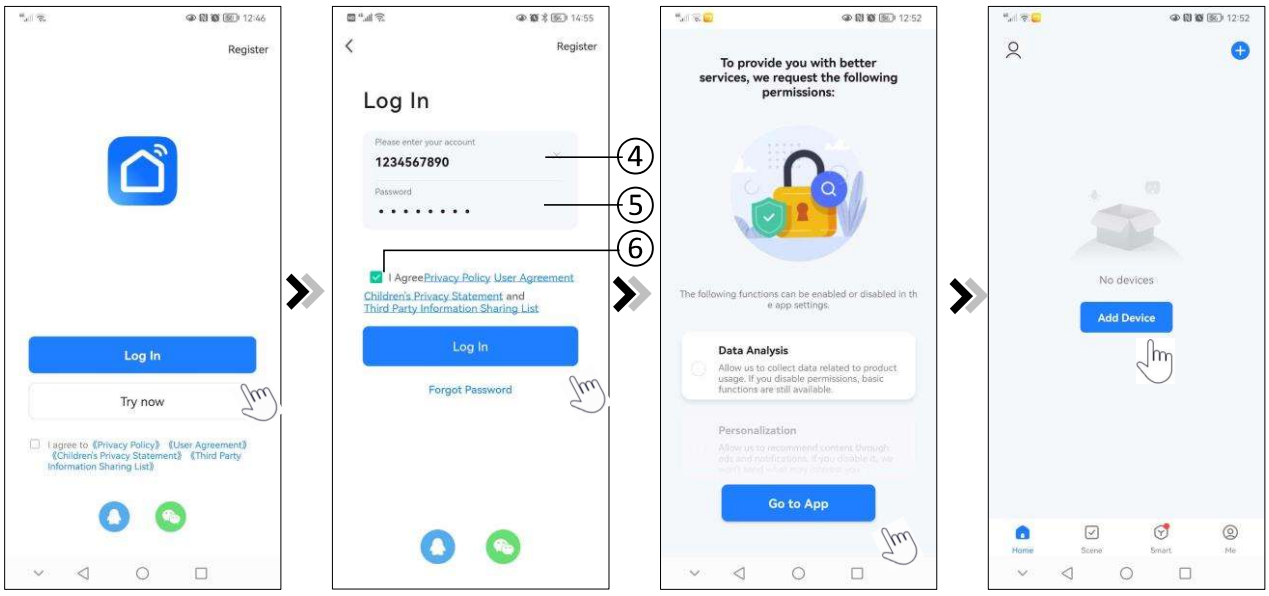


Fig.5 Home page　　Fig.6 Login interface　　Fig.7 Enter interface　　Fig.8 App homepage

Note: You can also log in to the APP through third-party program authorization (supported programs are shown in the lower part of the home page).

4.13.3 Add Device

1. Operate the controllor of the heat pump to trigger the network configuration; (Please refer to the Installation Manual for more information)

   Setting steps:

   ① In the main interface, short press " ⚙ " for entering the user setting interface. After selecting parameter group "UU" by short pressing " Λ " or " V ", click " ⚙ " to enter WIFI network function,while the WIFI indicator blinking(Fig.9~11);

   ② In the interface of network configuration selection, long press " M " for a long time. When the wire controller automatically jumps to the main interface, release the button(Fig. 12).

   Note: Restart the networking mode if the device fails to connect within 3 minutes.

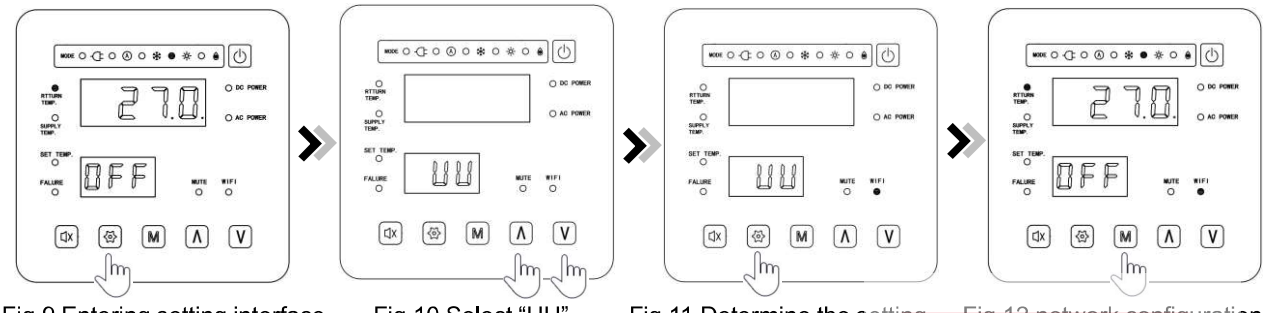


Fig.9 Entering setting interface　　Fig.10 Select "UU"　　Fig.11 Determine the setting　　Fig.12 network configuration

2. Turn on bluetooth on your phone;
3. Open the App and click <Add device> on the home page (Fig.8). If bluetooth is not enabled on your phone, the system will prompt you to enable Bluetooth first;
4. After that, the system automatically searches for nearby devices. Click the <Add> button to add the device (Fig.13);

5. The device that will be added is displayed in the list. Click "+" next to the device t you want to add (Fig.14). It will enter the WIFI setting interface;
6. Select the WIFI where the device works and enter the correct password. Then click <Next> to proceed to the next step (Fig.15);
7. The system starts to connect to the device and the connection progress bar will be displayed on the right (Fig.16);
8. Note: If the connection times out, reset the device as prompted and add the device again.
9. After the network configuration is complete, click <Done> in the upper right corner of the page (Fig.17). The device is added successfully;
10. The added device is displayed in the device list (Fig.18).

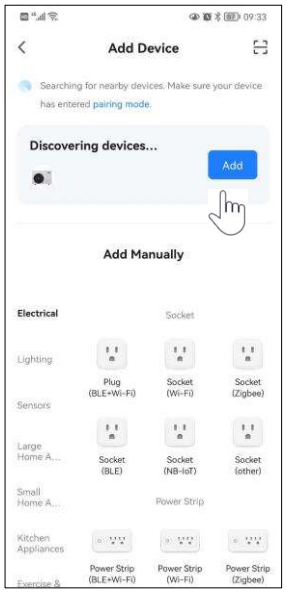


Fig.13 Searching for devices

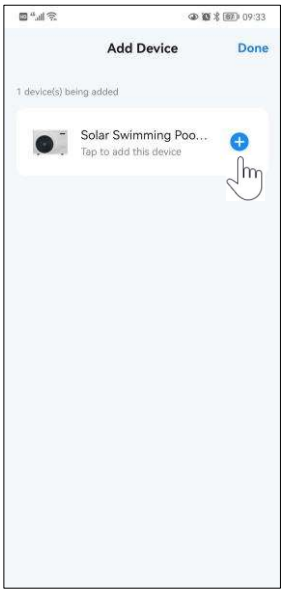


Fig.14 Select device

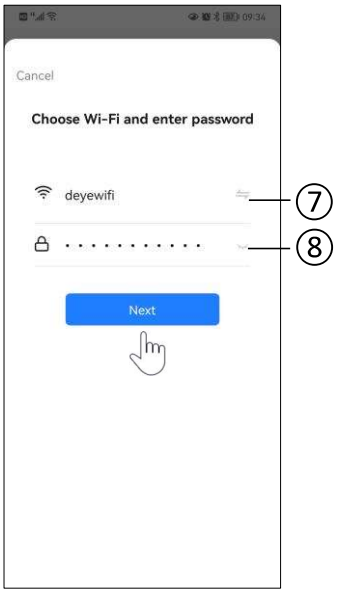


Fig.15 Connect specified WIFI

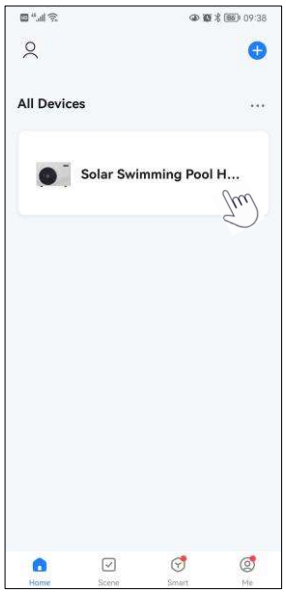


Fig.18 Added device list

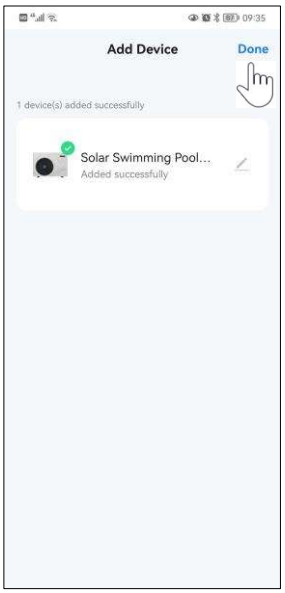


Fig.17 Device added successfully

Fig.16 Connecting device

4.13.4 Device Management

11. Click the device in the list to enter the main interface of the device, and the device management operations are as follows:

Fig.20 Mode changing interface

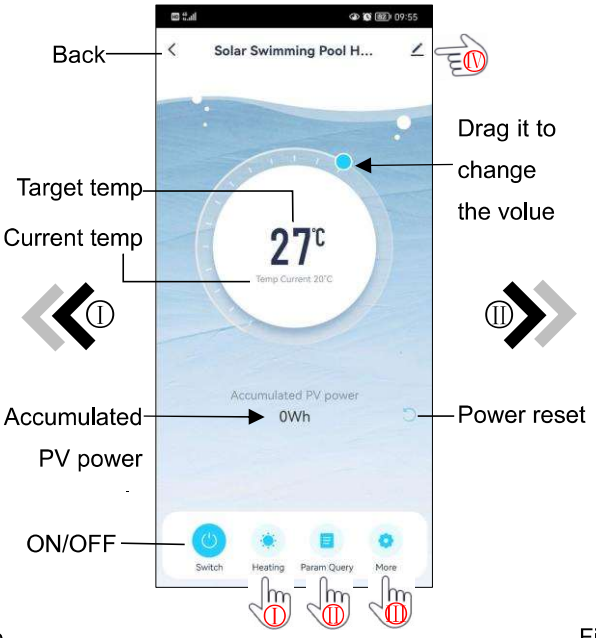


Fig.19 Device main interface

Fig.21 Parameter Query intreface

Fig.23 Troubleshooting tips

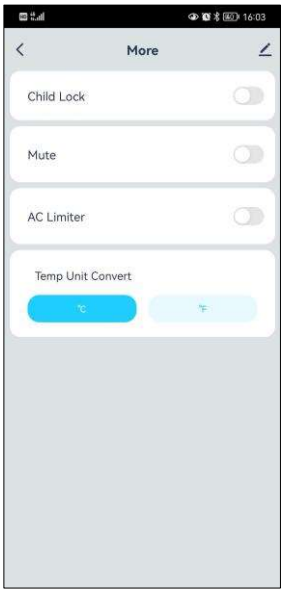


Fig.22 Functions setting interface

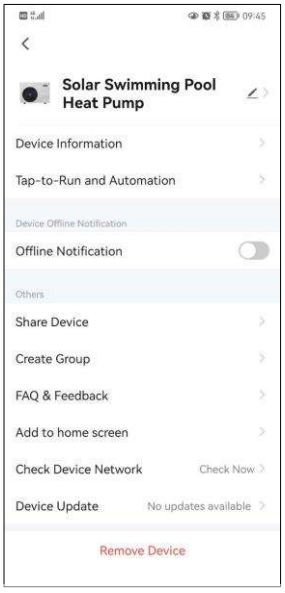


Fig.24 Device setting interface

- The volue shown in the center of the circle is the target inlet water temperature, which can be changed by dragging the position of the outer ring point. The volue directly below the set temperature is the current inlet water temperature (Fig.19).
  Note: The volue can only be set when the unit is powered on.

- You can switch the unit among heating, cooling and automatic mode under mode changing interface. And the home page will display the icon corresponding to the selected mode (Fig.20). Note: Mode switch operation is invalid in shutdown state.

- In the parameter query interface, you can view the operating status and parameters of the unit (Fig.21) as follows:

Parameter	Function
Ambient temp	It shows the ambient temperature
Inlet temp	It shows the inlet water temperature
Outlet temp	It shows the oulet water temperature
Compressor state	It displays ON when the compressre runs, and OFF otherwise
Fan state	It displays ON when the outerdoor fan runs, and OFF otherwise
Pump state	It displays ON when the water pump runs, and OFF otherwise
Defrost state	It displays ON when in the defrosting state, and OFF otherwise
PV input	It represents the real-time PV input power
AC input	It represents the real-time AC grid input power
Accumulated PV power	It shows the accumulated PV power supply
Total power	It shows the accumulated PV and AC power supply

- The functions displayed under the settings interface (Fig.22) are listed as follows:

Description	Function
Child Lock	Click it to lock or unlock the keyboard of the unit. (All operations other than unlocking are invalid with the device)
Mute	Click it to switch on/off the muting mode.(It is valid when the unit is powered on)
AC Limiter	Click it to switch on/off the power limiting function
Temp Unit Convert	You can switch between Celsius and Fahrenheit scales

- If a fault occurs during the operation of the unit, the fault code will be displayed at the top of the interface (Fig.23) and will disappear automatically after the fault is removed. For specific faults, please refer to section 4.14 <Fault list > of the Installation Manual;
- When the child lock is locked, the corresponding icon will display in the main interface (Fig.23). Of course, you can unlock it by clicking the icon.

- You can change the device's name, set the offline reminder, share devices and delete the device, ect. (Fig.24).

- When you want to clear the accumulated PV power supply, you can click the " " icon under the main interface, and the system will automatically pop up the following prompt (Fig.25), If you select <confirm>, the accumulated PV power supply will be reset to zero.

Fig.25 Clearing power date

- The symbols and corresponding functions in the device control interface are described as follows:

Icon	Description	Function
	ON/OFF Switch	Click it to turn on/off the unit
	Heating	Display heating mode
	Cooling	Display cooling mode
	Auto	Display auto mode
	Parameter Query	Click it to enter the parameter query interface
	More (Functions)	Click it to enter the interface for setting other functions
	Back	Click it to return up to previous page
	Setting	Click it to enter device setting interface
	Power Reset	Click it to reset the Accumulated PV power supply to zero
	Child Lock	When child lock is locked, the icon lights up. Tap it to unlock

Note:
Restart the networking mode if the device fails to connect to the internet within 3 minutes.If the network configuration fails for several times and the cloud cannot be connected, checkwhether the Wlfl password is correct, the Wlfl network is 2.4 G, and the networkcommunication is normal.
if some models fail to connect to the internet, unplug the device for five seconds and then plugit in again and try again.

4.14. Fault Interface

When the unit fails, the current fault code will be displayed in the auxiliary display area of the wire controller according to the fault reason. Refer to the fault table for the specific definition of the fault codes.

Protect/fault	Code	Reason	Elimination methods
Indoor EEPROM Error warn	01	MCU error	Check whether the chip is damaged . Replace the chip
Internal and external communication failure	03	Communication failure between Internal and external mainboard	check the connection between internal and external mainboard
Outdoor EEPROM Error warn	05	MCU error	Check whether the chip is damaged . Replace the chip
Flow switch protection	11	No water/little water in water system	Check the pipe water flow and water pump
Inlet and outlet water temp. too big	12	Water flow is not enough and low differential pressure	Check the pipe water flow and whether water system is jammed or not
Inlet water temp. too low (cooling)	13	Inlet water temp.is too low	
Outlet water temp. too high (cooling)	14	Outlet water temp.is too high	
Water flow switch against short circuit protection	15	The flow switch is short-circuited	Check the water flow switch
Inner coil temp. too high	20	Inner coil temp.is too high	
External coil temp. too high	21	External coil temp. is too high	
Exhaust air over temp prot.	22	The compressor is overload	Check whether the system of compressor running normally
Anti-freezing prot.	23	Water flow is not enough	Check the pipe water flow and whether water system is jammed or not
High pressure prot.	24	The high-pressure switch is broken	Check the pressure switch and cold circuit
Low pressure prot.	25	Low pressure 1 protection	Check the pressure switch and cold circuit
Inter temp. sensor fault	31	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Outler temp. sensor fault	32	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor

Inner coil temp. sensor fault	33	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Ambient temp. sensor fault	35	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
External coil temp. sensor fault	36	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Discharge temp. sensor fault	37	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
DC fan fault	58	Motor current feedback open circuit or short circuit	check whether current return wires connected motor
Overcurrent protection	73	The compressor is overload	Check whether the system of compressor running normally
Compressor stall failure	93		
IPM Overcurrent	95		
Oil return failure protection	98		
Compressor low speed protection	99	In the pure photovoltaic state, the light is not enough	

5. Maintenance and Inspection

- Check the water supply device and the release often. You should avoid the condition of no water or air entering into system, as this will influence unit's performance and reliability.
  You should clear the pool/spa filter regularly to avoid damage to the unit as a result of the dirty of clogged filter.

- The area around the unit should be dry, clean and well ventilated. Clean the side heating exchanger regularly to maintain good heat exchange as conserve energy.

- The operation pressure of the refrigerant system should only be serviced by a certified technician.

- Check the power supply and cable connection often. Should the unit begin to operate abnormally, switch it off and contact the qualified technician.

- Discharge all water in the water pump and water system, so that freezing of the water in the pump or water system does not occur. You should discharge the water at the bottom of water pump if the unit will not be used for an extended period of time. You should check the unit thoroughly and fill the system with water fully before using it for the first time after a prolonged period of no usage.
- Checks to the area
  Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

- Work procedure

  Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapour 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. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

- 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.

- Presence of fire extinguisher

  If any hot work is to be conducted on the refrigeration equipment or any associated parts appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 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 an 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. Prolonged period of no usage.

- 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 to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
5) 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.

- 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:

  1) That capacitors are discharged: this shall be done in a safe manner to avoid possibility of Sparking.
  2) That there no live electrical components and wiring are exposed while charging recovering or purging the system.
  3) 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 absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
  2) Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
  3) Ensure that apparatus is mounted securely.
  4) Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

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

- 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.

- 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. 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 pipe-

work are to take place.

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

- 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 is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

  The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition Before using the recovery machine, check that itis 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.

- Decommissioning

  Before carrying out this procedure, itis 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 cylinder is situated on the scales before recovery takes place.
7) Start the recovery machine and operate in accordance with 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 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.

- 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 ordines shall be as short as possible to minimize the amount of refrigerant contained in them.
2) Cylinders shall be kept upright.
3) Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
4) Label the system when charging is complete (if not already).
5) 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.

- The safety wire model is 5*20_5A/250VAC, and must meet the explosion-proof requirements.

- Maintenance of photovoltaic panels

1) Clean the glass surface of the component if it is dirty. Clean with a soft sponge dipped in water.
2) Perform mechanical and electrical inspection every 6 months to ensure that the components are clean and connected reliably.
3) If there is any doubt, please have qualified personnel check.
4) Observe the maintenance instructions for all components used in the system, such as bracket, charging rectifier, inverter, battery, etc.
5) If there is snow, use a brush with soft bristles to clean the surface of the component.

6. Appendix

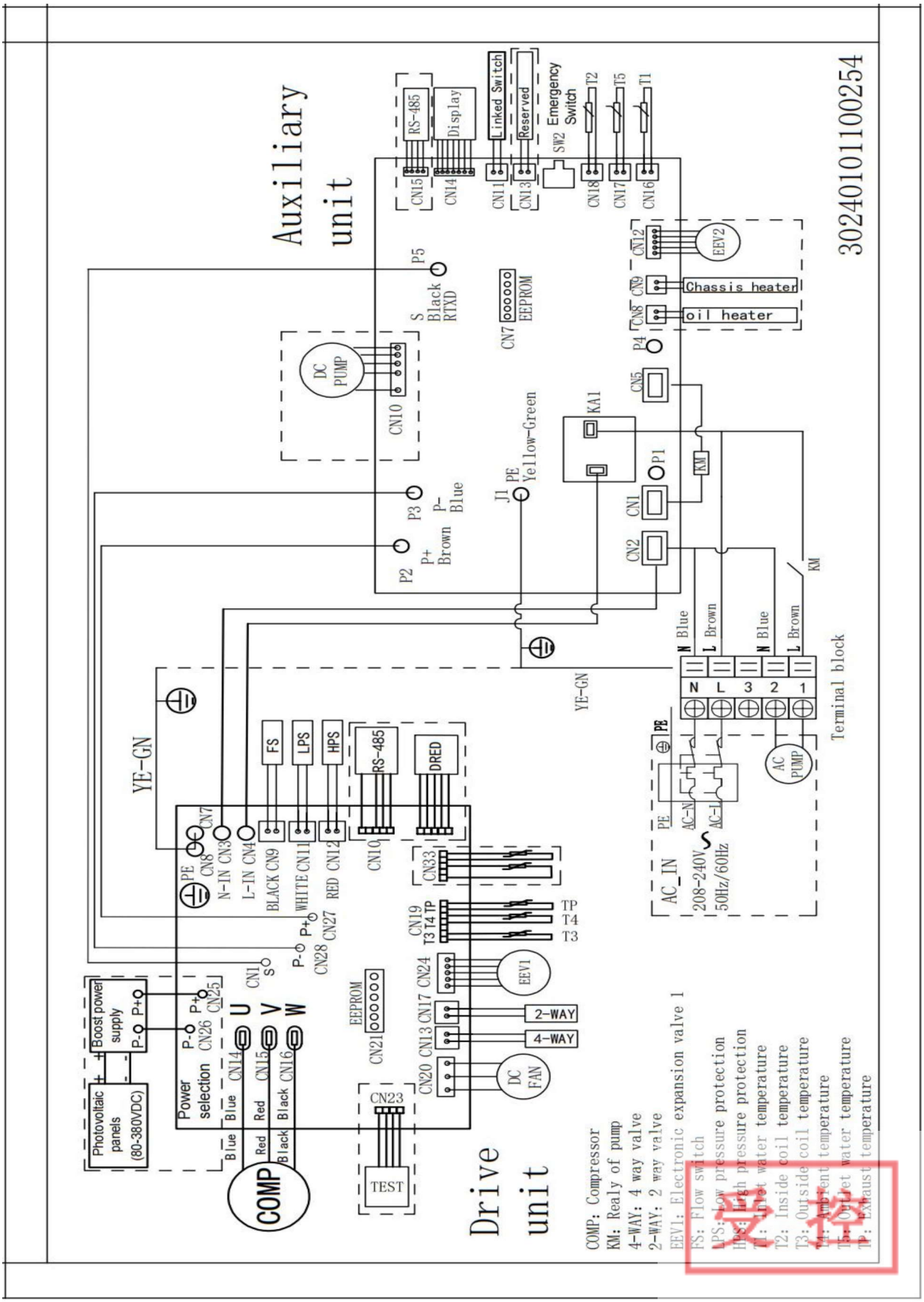
6.1. Caution & Warning

- The unit can only be repaired by qualified installer centre personnel or an authorized dealer.
- This appliance is not intended for use by persons (including children) with reduced physical sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
  Children should be supervised to ensure that they do not play with the appliance.
- Please make sure that the unit and power connection have good earthing, otherwise may cause electrical shock.
- If the supply cord is damaged, it must be replaced by the manufacturer or our service agent or similarly qualified person in order to avoid a hazard.
- Directive 2002/96/EC (WEEE):
  The symbol depicting a crossed-out waste bin that is underneath the appliance indicates that this product, at the end of its useful life, must be handled separately from domestic waste, must be taken to recycling centre for electric and electronic devices or handed back to the dealer when purchasing an equivalent appliance
- Directive 2002/95/EC(ROHS): This product is compliant with directive 2002/95/EC (ROHS concerning restrictions for the use of harmful substances in electric and electronic devices.
- The unit cannot be installed near the flammable gas. Once there is any leakage of the gas, fire can be occur.
- Make sure that there is circuit breaker for the unit, lack of circuit breaker can lead to electrical shock of fire.
- The heat pump located inside the unit is equipped with an over-load protection system. It does not allow for the unit to start for at least 3 minutes from a previous stoppage.
- The unit can only be repaired by the qualified personnel of an installer centre or an authorized dealer.
- Installation must be performed by authorized person only.
- Use supply wires suitable for 75℃.
- Single wall heat exchanger is not suitable for potable water connection.

6.2. Cable Specification

Nameplate maximum current	Phase line	Earth line	MCB	Creepage protector	Signal line
< 10A	2×1.5mm^2	1.5mm^2	20A	30mA less than 0.1 sec	0.5 mm^2
10-16A	2×2.5mm^2	2.5 mm^2	32A	30mA less than 0.1 sec	
16-25A	2×4mm^2	4 mm^2	40A	30mA less than 0.1 sec	
25-32A	2×6mm^2	6 mm^2	40A	30mA less than 0.1 sec	

6.3. Internal Electrical Wiring Diagram



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