Installation and Operation Manual

MPPT SOLAR WATER HEATING CONTROLLER

Model:SWHC-2K-E

This device is only for indoor installation.

1. IMPORTANT SAFETY INSTRUCTIONS

To ensure your safety, please read the installation and operation manual carefully before installing and using the MPPT solar electric heating controller, and keep this manual for future use.

The following symbols are used in this manual to indicate potentially hazardous conditions or to mark important safety items.

WARNING!
When trying to perform a marked operation, this symbol indicates that there is a danger.

CAUTION!
This mark indicates the key operation steps to ensure the safe operation of the controller.

NOTE!
This mark indicates the safe operation and correct operation procedures of the controller.

Security Information.
● Read the instructions and precautions in this manual carefully before starting the installation.
● It is not allowed to disassemble the controller for private maintenance.
● Before installing or moving the controller, be sure to disconnect all power supplies connected to the controller.
● Install indoors to prevent chemicals and water from contacting the controller.
● During the operation of the controller, heat will be emitted inside the body, which may cause skin burns. The controller should be installed in a location that is not easy to touch.
● Use insulated tools when connecting the power cord.
● Do not wear jewelry when installing the controller.
● The power cord connection must be fastened to prevent the power connector from overheating to catching fire due to the loose power cord.
● Use wires and circuit breakers of appropriate specifications.

About this manual
This manual provides detailed installation and operating instructions for the MPPT solar electric heating controller. The installer of the controller should have qualified electrical skills and be familiar with the design and wiring rules of the solar system.

Overview

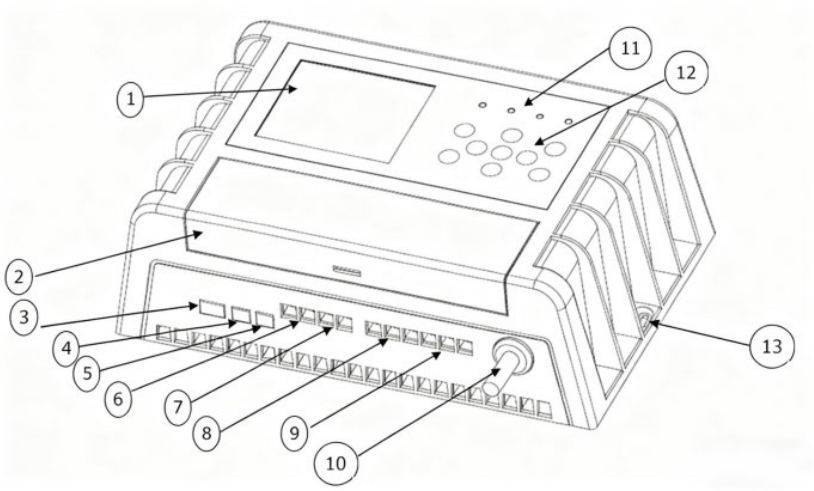
Thank you for choosing our MPPT Solar Electric Heating Controller. The MPPT Solar Electric Heating Controller (hereinafter referred to as the controller) delivers electrical energy generated by solar panels to the electric heating element with maximum efficiency through MPPT technology, thereby heating the water in the storage tank.

The controller is equipped with intelligent control functions and offers multiple customizable operating modes, including solar heating, simultaneous solar and AC heating, intelligent switching between solar and AC power, and heat preservation, among others.

Please read this operation manual carefully and familiarize yourself with the controller data sheet. Doing so will help you fully utilize the controller's capabilities and establish an optimal solar photovoltaic electric heating system.

Appearance feature

The appearance characteristics of the controller and the function description of each part are shown in the figure below



1. LCD display: Shows the working status of the controller
2. Wiring cover: Wiring terminal protection cover
3. Water level detector interface
4. Water temperature detection probe interface
5. Emergency power off terminal interface
6. PV input terminal
   + Connect PV positive (+)
   -Connect to PV negative (-)
7. Solar heating element interface
8. Water dispenser terminal interface
   L: connect to water heater L wire
   N: connect water dispenser N wire
   PE: ground wire for water dispenser
9. AC heating element interface
   L: connect to AC heating element L wire
   N: connect to AC heating element N wire
   PE: connect to AC heating element ground wire
10. AC input plug
11. LED indicator Indicate the current working status of the controller
12. Button Parameter setting and function selection
13. Wall hole (one on each side): Pass the controller through the wall hole and fasten it vertically on the installation wall.

Installation Instructions

The installation environment is critical to the performance and service life of the controller. The controller is required to be installed in a dry environment and prevent water infiltration. It is best to ensure sufficient ventilation around the controller and sufficient air flow. Never install the controller in a sealed box.This controller cannot be used in parallel with multiple.

⚠ Caution: Risk of equipment damage!
If the controller is installed in a box, make sure that there is sufficient ventilation inside and outside the box. A closed environment will cause the temperature of the controller to rise too high and reduce the service life of the controller.

Please read all installation instructions carefully before installing the controller, and operate strictly according to the requirements. Any inappropriate operation behavior may cause damage to the controller and affect normal use.

2. Installation

2.1 Wire diameter selection

It is very important to choose a suitable cable diameter for the controller. Generally, at least ensure that the voltage drop of the cable from the controller to the solar panel, the controller to the heating rod, and the controller to the water dispenser is less than 2% of the system voltage.

The following table 3-2 provides the minimum wire diameter requirements at an ambient temperature of 45 degrees Celsius:

Items	Maximum current	Cable material	Recommended wire diameter	Minimum required wire diameter
Between controller and photovoltaic panel	20A	copper	4.0mm2	2.5mm2
Between controller and DC element	20A	copper	4.0mm2	2.5mm2
Between controller and AC element	13A	copper	2.5mm2	1 .5mm2

Heating element selection

Solar output: heating element power is not more than110V/2000W
AC output: heating element power is not higher than 230V/2000W

Wall mount installation

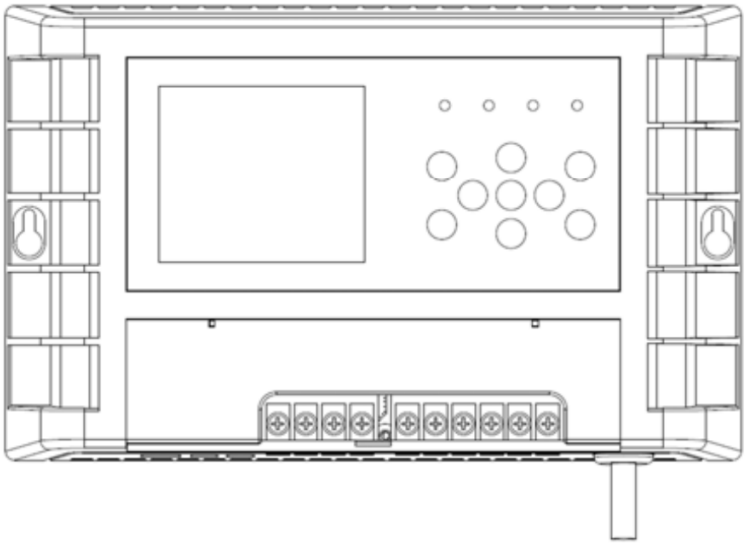
Caution: Wall-mounted installation is tight! The wall or mounting frame on which the controller is installed must be able to bear the weight of the controller to prevent personal injury and machine damage caused by the controller falling off!

The controller is required to be perpendicular to the mounting surface, If the installation angle deviates from the vertical direction by more than 45 degrees, it will cause poor heat dissipation of the controller, which may affect the power output of the controller.

Remove the wiring cover

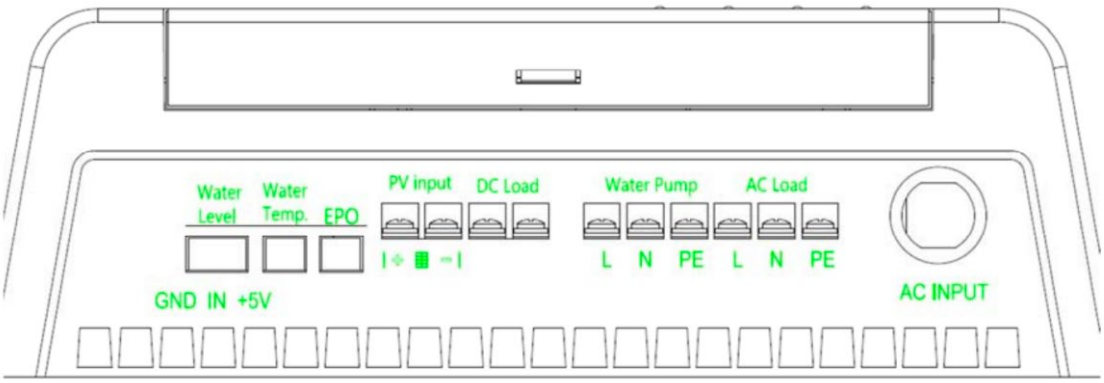
Warning: Electricity, danger!
Before removing the wiring cover, please make sure that the controller is disconnected from all power sources, and let the controller stand for more than 5 minutes to ensure that the residual power inside the controller is discharged to a safe level. Any live operation will put the operator in a dangerous situation and may cause damage to the controller.

Remove the wiring cover as shown in the figure below：



Warning: Risk of electric shock!

The maximum open circuit voltage of the solar panel array should not exceed the maximum value of 150VDC specified by the controller. Before installation, make sure that the solar panel and the cable are disconnected.

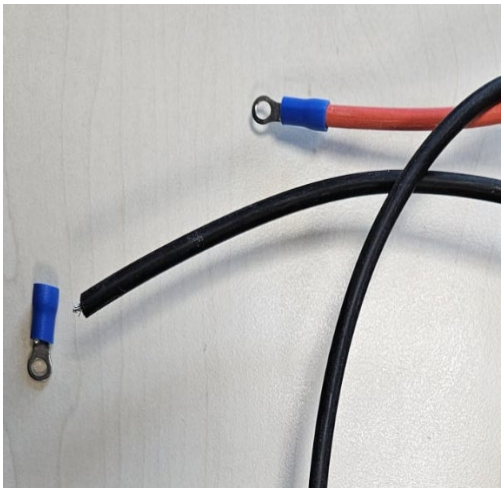


2.2 Connection

Follow the steps below to connect the terminals shown in the figure above:

a) Before wiring, make sure that all the power switches connected to the controller are in the off state, and there is no power switch inside the controller.

b) Place the OT terminals connectors (from package kit) to the DC and AC power cords of the water heater. Place the OT terminals on the wire, then crimp it to secure.



Warning! Note that the positive and negative poles of the solar panel cannot be reversed!

Warning! Note that it must be ensured that the ground wire is in good contact, and that the ground wire is not well connected, which will affect the leakage protection function of the controller and be dangerous to the user!

Warning! Note that if you choose a heating rod that exceeds the rated power, the controller will be damaged!

c) Solar panels connection:

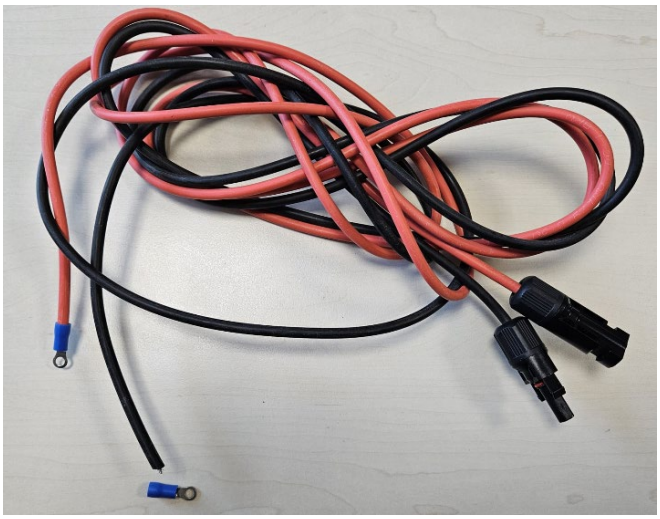
Connect the solar panel + (positive) wire to the “PV input +” terminal on the controller.
Connect the solar panel - (negative) wire to the “PV input -” terminal on the controller.

d) DC heating element connection:

1. Connect MC4 cable from MPPT package kit to the DC wire (MC4) of the water heater.

2. On the other end of the cable, place and electrically secure with OT terminals.

3. Connect the DC element wire to the “DC(PV) Load” terminal of the controller. Please select the DC heating element with the correct power.



DC heating element power is not more than 110V/2000W.
Some versions of the controllers this terminal is marked as “PV Load”

e) AC heating element connection:

1. Put OT terminals on the wire.

2. Connect the AC element L wire (brown) to the “AC Load L” terminal on the controller.

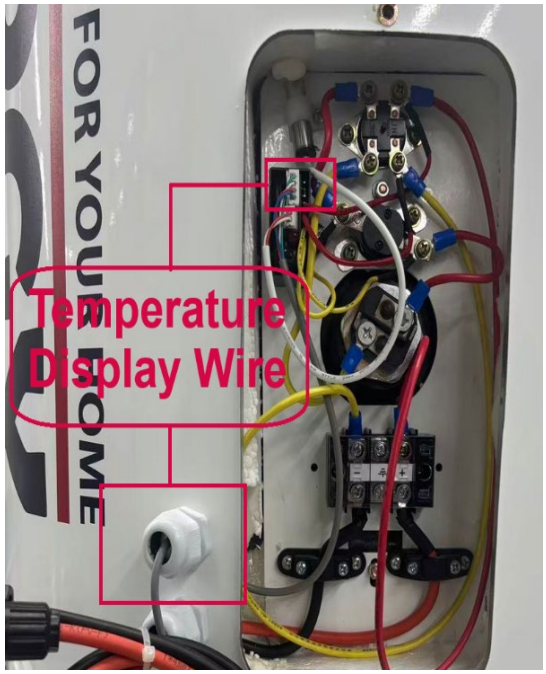
3. Connect the AC element N wire (blue) to the “AC Load N” terminal on the controller.

4. Connect the AC element PE wire (yellow green) to the “AC Load PE” terminal on the controller.

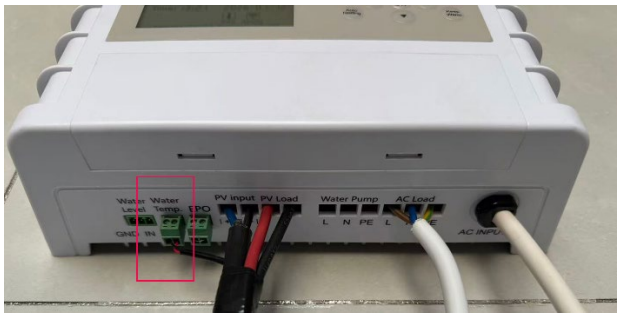
AC Element max. power 230v/2000w

f) Water temperature sensor connection:

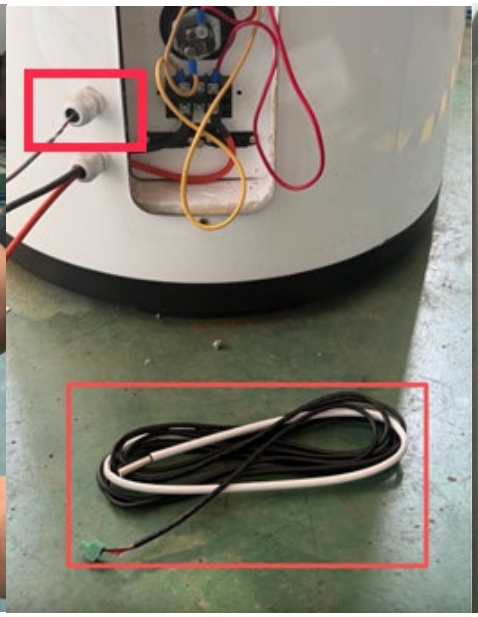
1. Remove Temperature Display Wire

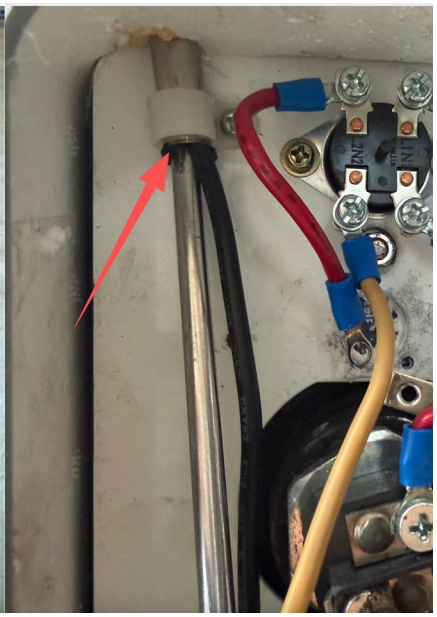


2. Insert the water temperature probe end with terminal into the “Water Temp.” on the controller.
The water temperature sensor is included in the MPPT controller kit.



3. Put the water temperature probe (metallic end) into the water temperature detection hole of the water storage tank (lower service hatch)
See clause 5. Step 3

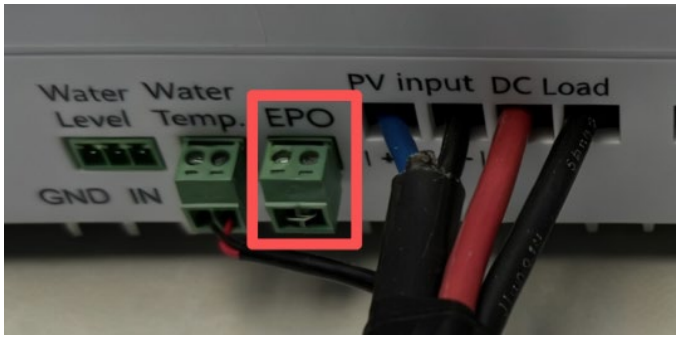




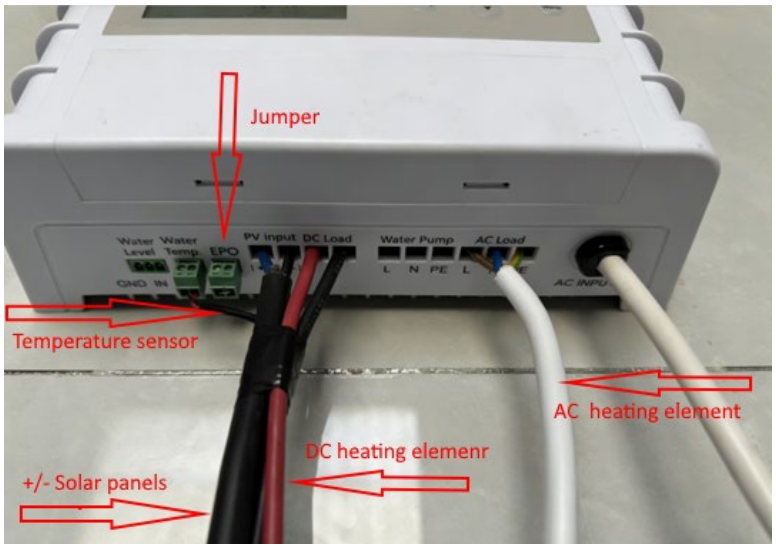
Water heaters marked **“MPPT”** are already equipped with a temperature sensor installed in the water heater body.
In this case, simply connect the wire from the terminal exiting the **top socket** (located above the solar panel input socket) to the **“Water Temp.”** terminal on the MPPT adapter.

Note: if the water temperature probe is not connected, the controller will not be able to output power normally.

g) Insert the jumper (included) into the EPO terminal.



3.The wires connecting diagram



4.Operation instructions

After the MPPT controller is installed, you need to set the operating mode.

4.1 Working modes:

1. **DC mode** only DC heating element operates.

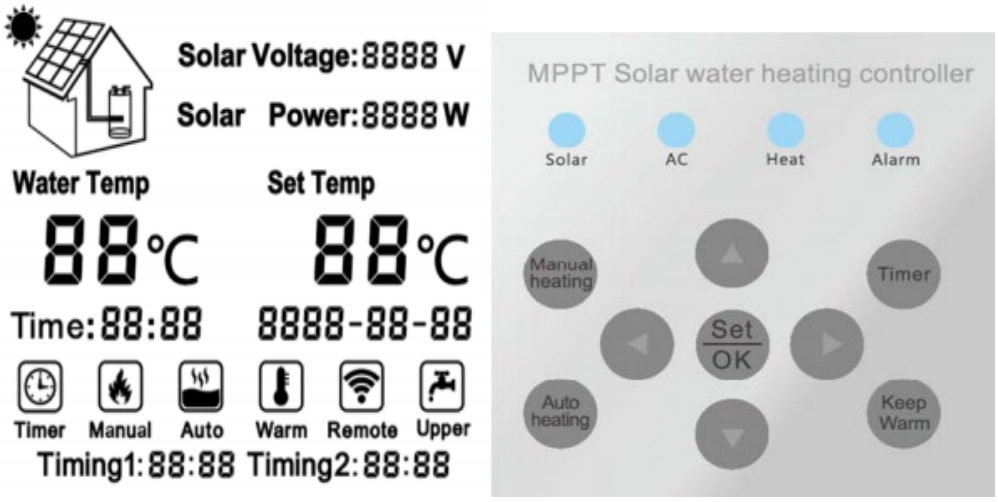
2. **AC mode** only the AC heating element operates. After the set water temperature is reached, the system switches to DC mode to maintain the temperature.

3. **Hybrid mode** both DC and AC heating elements are active at the same time to provide combined heating.

4.**Timer mode** only the AC heating element operates according to the timer settings.

Working mode setting – cl.4.2.2

4.2 Control panel



4.2.1 Temperature setting

● Press “ Set OK ” first and then press “ ▲ ”or“ ▼ ”to set the temperature and adjust temperature.

4.2.2 Working mode setting

● Press “ Auto heating ” and When“ Auto ”is displayed, It’s DC mode. Only DC heating element works.

● Press “ Manual heating ” and When“ Manual ”is displayed, It’s AC mode. Only AC heating element works, but it will switch to DC mode automatically after reaching the set water temperature.

● Press “Keep Warm” and When“Warm”is displayed, It’s Hybrid mode. Both DC and AC heating elements work together.

● Press “Timer” and When“Timer”is displayed, It’s Timer mode. Only AC heating element works.

4.2.3 Time and Date setting

● Press “Set OK” first and then press “◀”or“▶”to set the time and date by “▲”or“▼”.

4.2.4 Timing setting

● Press “Set OK” first and then press “◀”or“▶”to set the timing 1 and timing 2 by “▲”or“▼”.

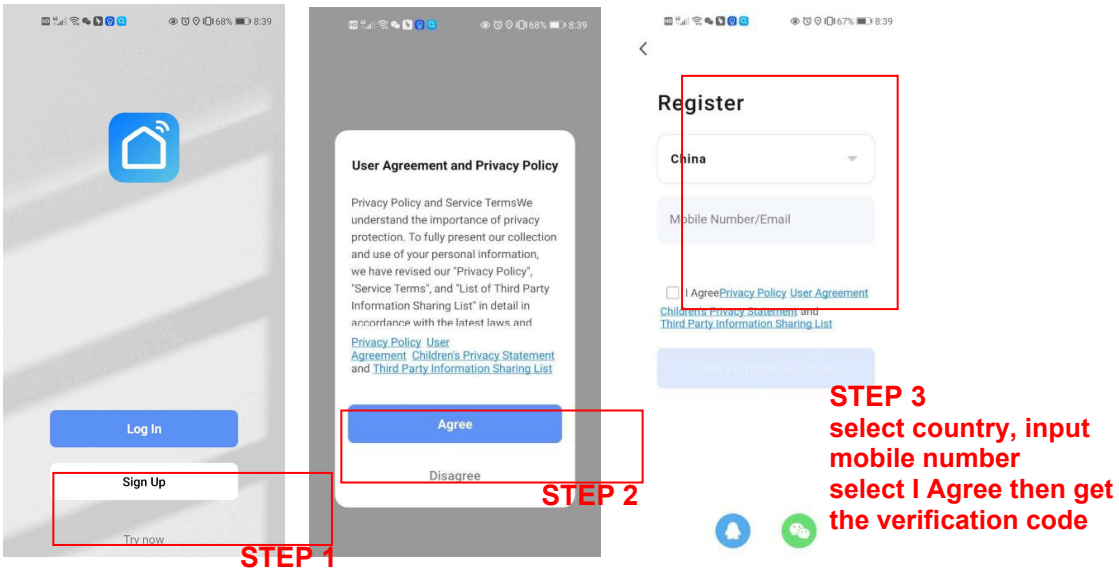
4.3 WiFi function

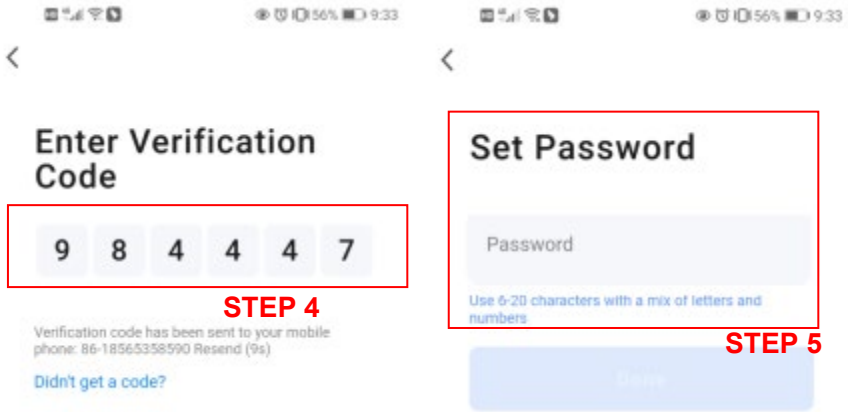
Download and Install the App

1. Scan the QR code to download the "Smart Life" application, or download the application in the app. store by mobile phone, and then install the application. (available for Android and iOS system)

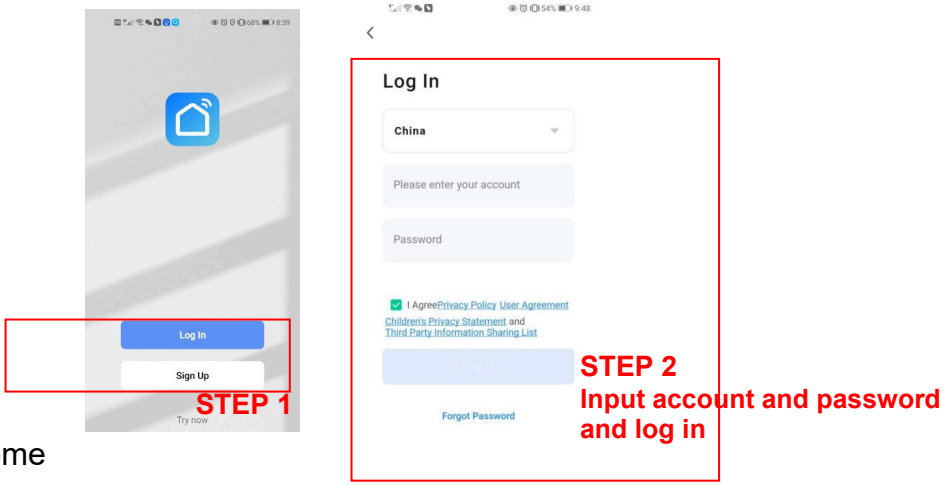
2. Sign up

After installation, press the " " icon and open the Smart Life app, sign up, refer to following steps:





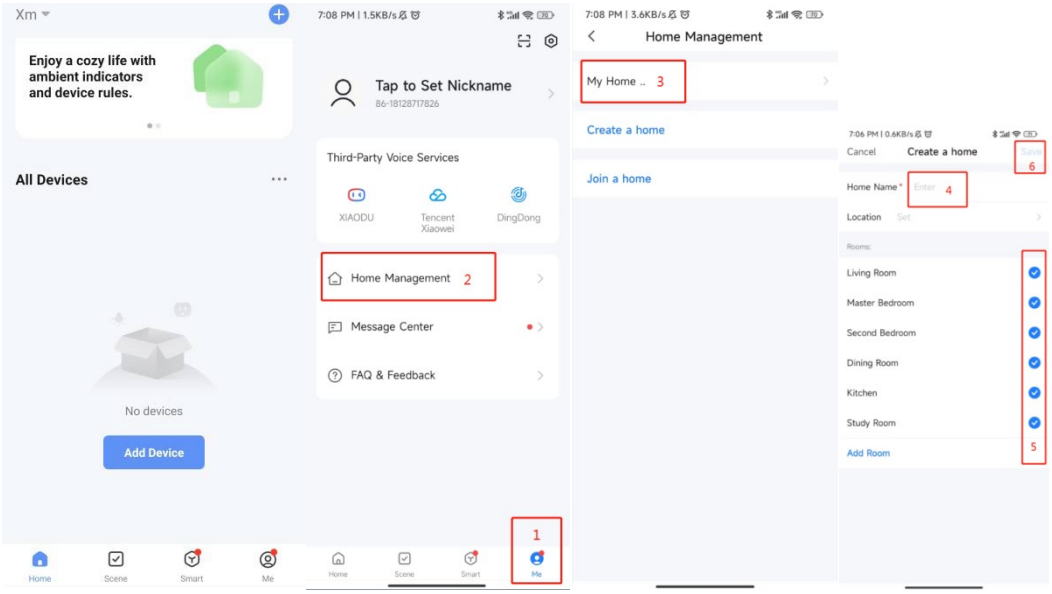
3. Log in, refer to following steps:



4. Create a Home

After signing up, should create " home ", refer to following process:

Home Management → Set home name → Set location → Add room →Save



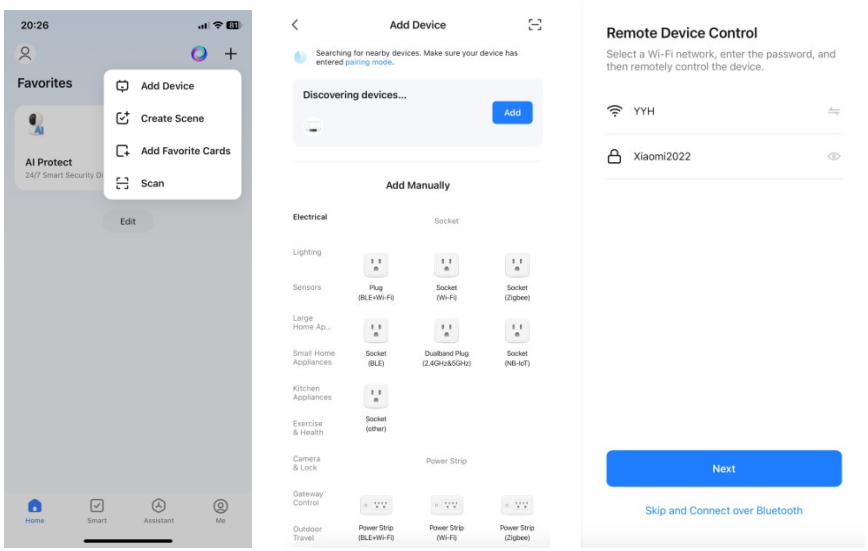
● Connect to the WIFI

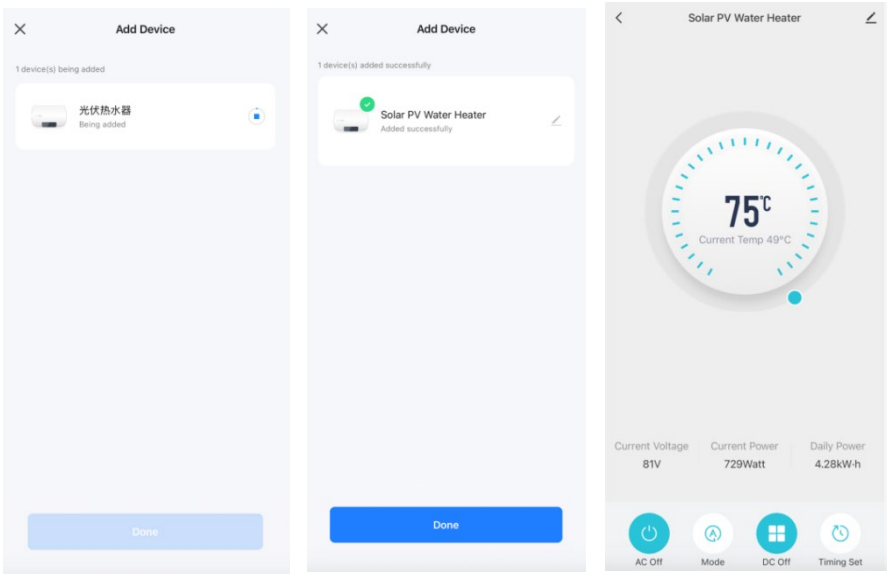
1. Press and hold the two keys  and  for 5s, enter into manual intelligent distribution network connection, within 3 minutes, wait for connecting, the symbol "  " will flash, after three minutes, exit connecting automatically if failed in connecting.

2. Connect the mobile phone to a Wi-Fi hotspot. Ensure the hotspot has internet access.

2.1 Open the app Smart Life and log in,

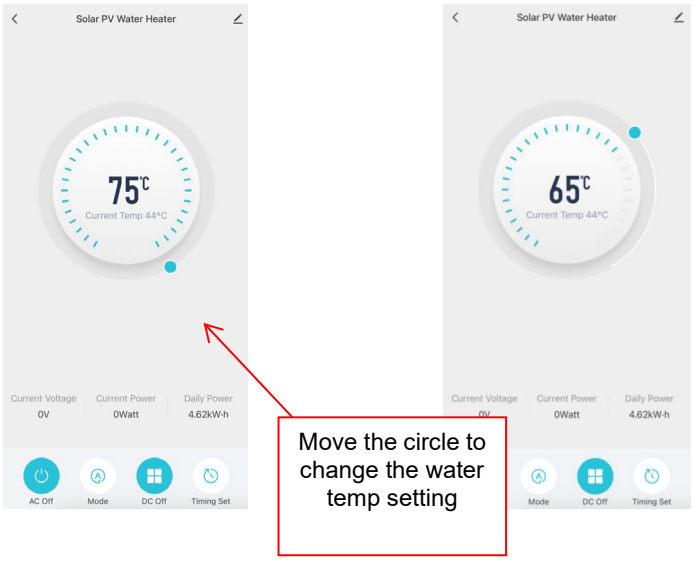
press the icon " + ", or press " Add Device " → find " discovering devices " → press "Add" → enter into WIFI connecting interface, input the WIFI password (WIFI account must be same as the WIFI which mobile phone connected), → press " next " → Wait for adding the device → press " Done " to add the device.



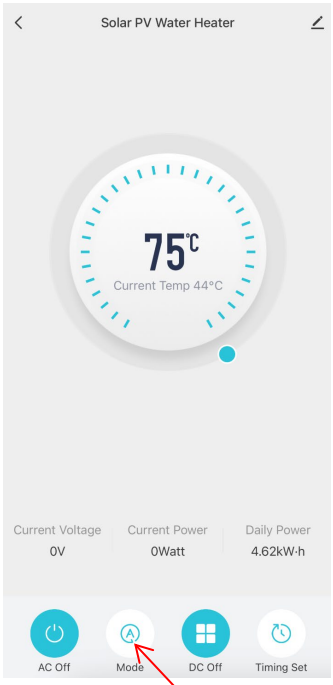


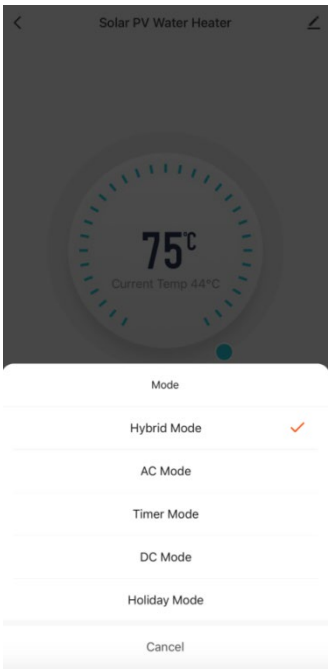
● Operation

1. Set water temperature

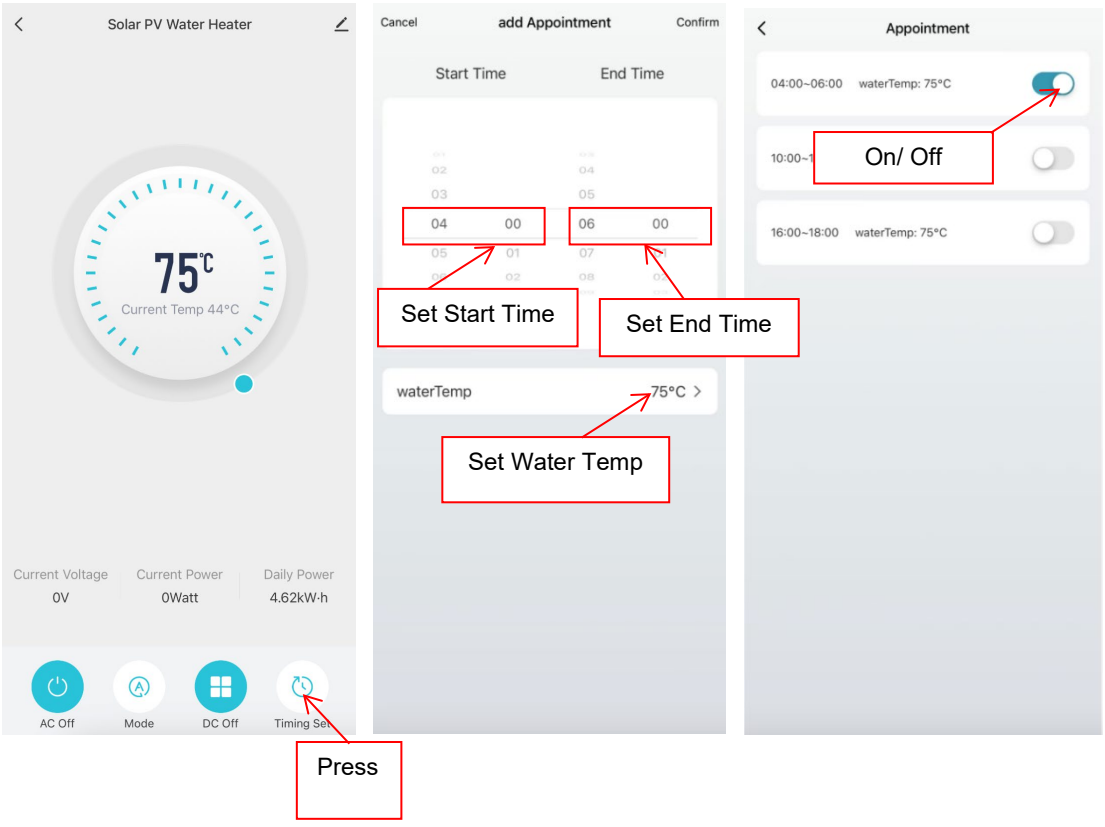


2. Mode changes



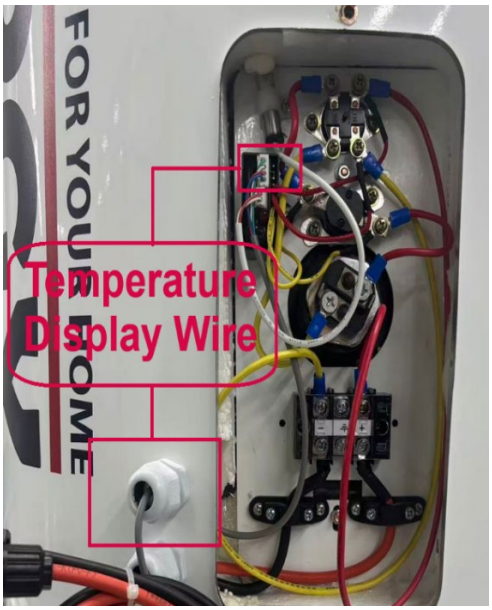


3. Set a timer

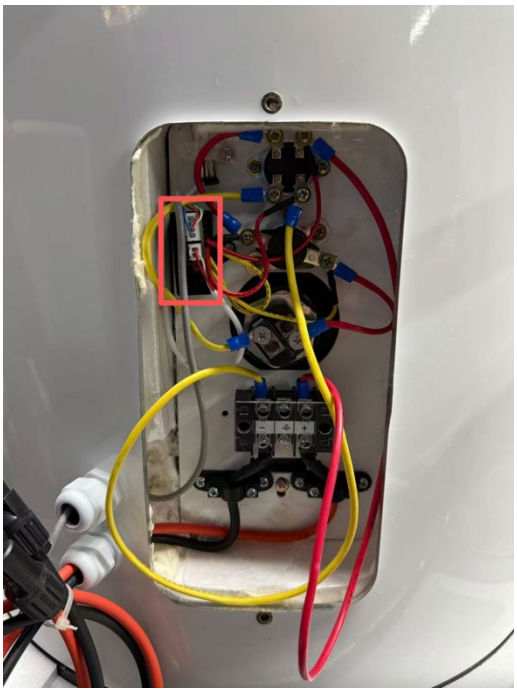


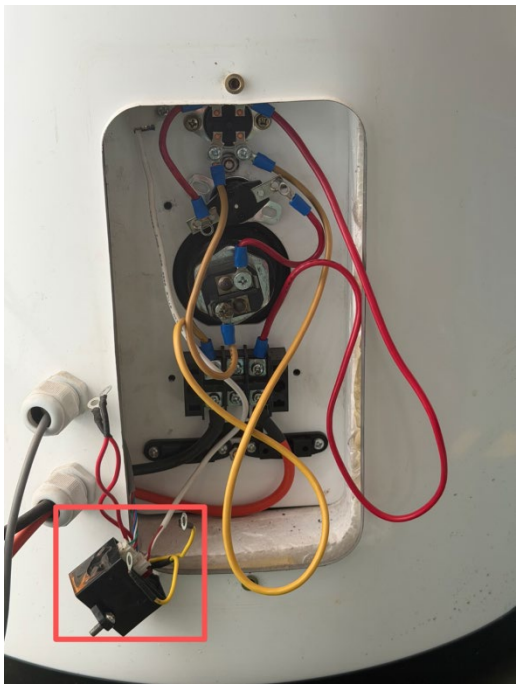
5. How to Adapt a Solar (PV) Water Heater for Use with an MPPT Controller

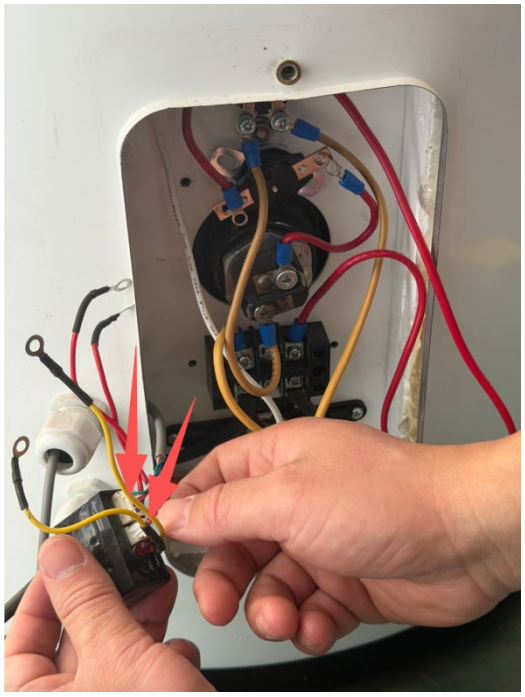
Step1: Remove the DC electric element cover, then remove Temperature Display wire

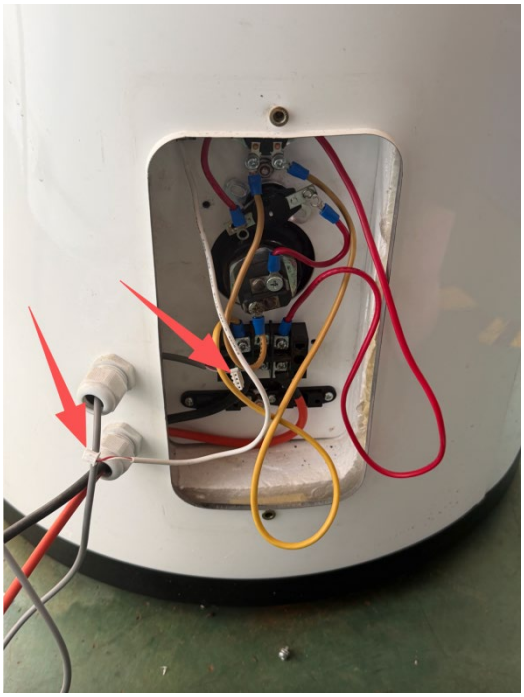


Step2: Remove the black thermostat protector including all connection wires

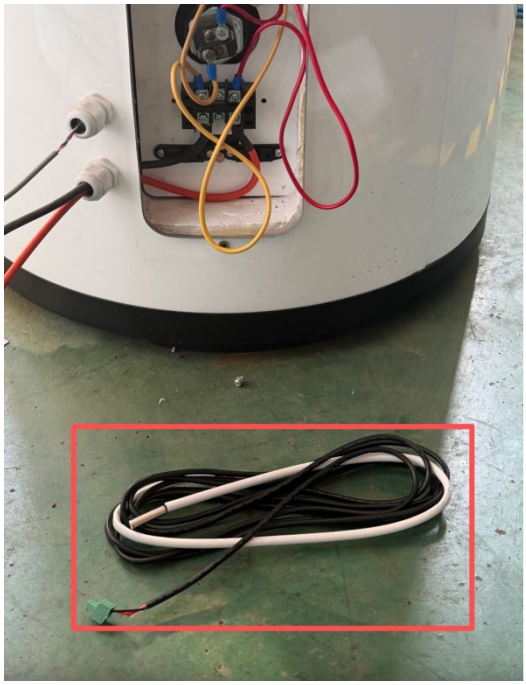


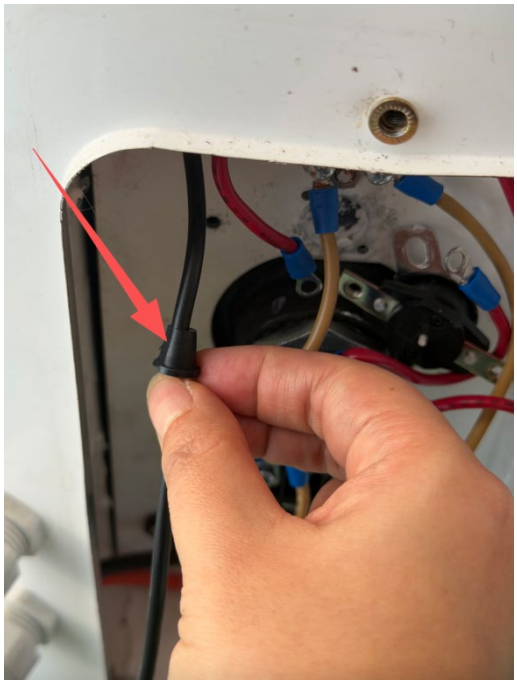


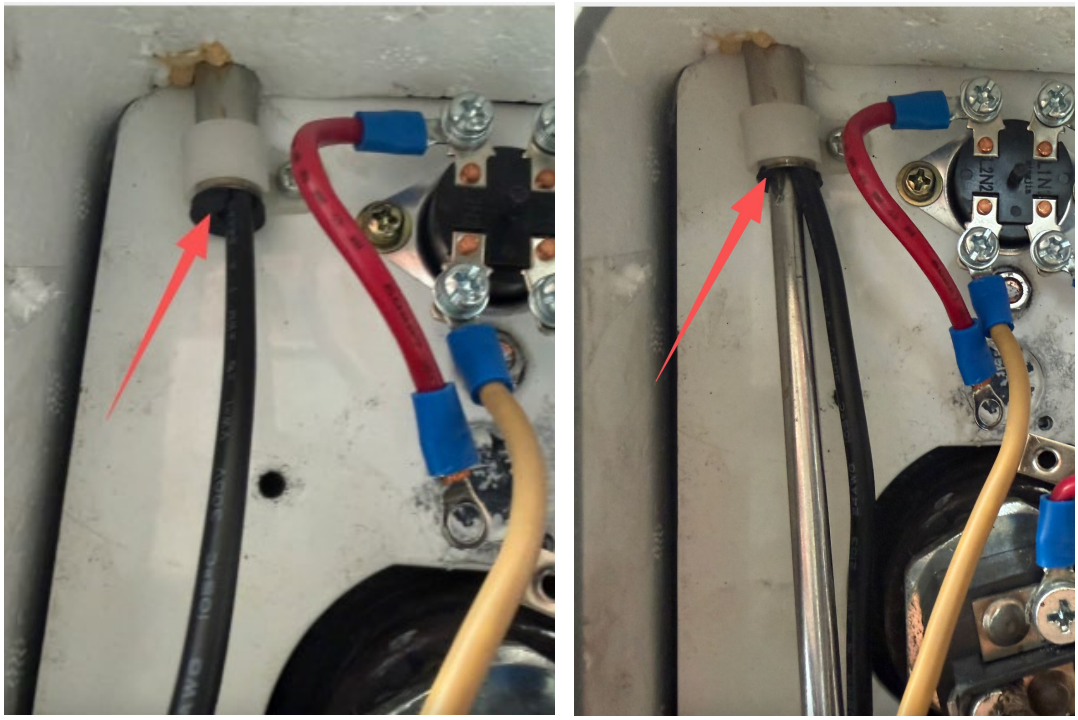




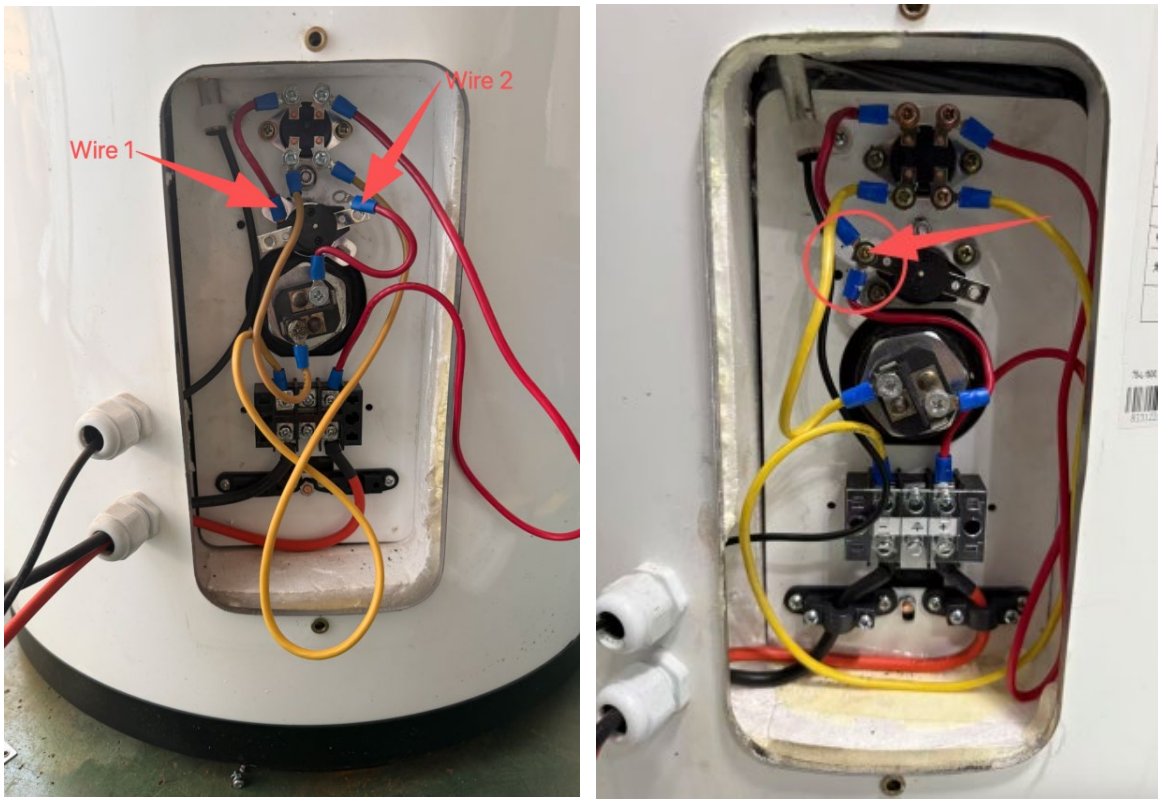
Step3: Pass the wire with the temperature sensor connector (from the MPPT kit) first through the plastic cable gland from the DC compartment, then, in the upper left corner, insert the sensor itself into the stainless steel tube until it reaches the top of the tube. Next, secure it firmly with a rubber stopper using a screwdriver to prevent the wire from sliding downward; otherwise, the temperature displayed on the MPPT will be incorrect.







Step4: Fix wire1 and wire2 by a screwdriver together.



6. COMMON TROUBLESHOOTING

Fault 1: There is no LCD and LED display, and the controller appears to have no electrical connection and does not turn on.

Solution: Use a multimeter to measure the voltage across the terminals of the photovoltaic panel of the controller. The voltage of the photovoltaic panel terminal must be above 30 V for the controller to be lit. If the voltage at both ends of the photovoltaic panel terminal of the controller is between 30V and 150V, and there is no LED or LCD display, please contact your local dealer. Use a multimeter to measure the voltage between the AC socket L-N and the AC voltage range. The voltage must be above AC180V. If the voltage between the AC socket L-N is between AC180V and 270V, check whether the AC plug is properly inserted, if the plug is in good contact. There is no LED or LCD display, please contact your local dealer. If no voltage is measured at both ends of the photovoltaic panel wiring terminals of the controller, please check whether the photovoltaic cable is in good condition, and whether there is a fuse or circuit breaker on the circuit. If the AC socket does not measure the voltage, please check whether the AC is normal.

Fault 2: The controller has no output.

Solution:
Check whether the LCD display is normal, check whether the solar panel voltage is within the specification range, check whether the EPO terminal is short- circuited, check whether the water temperature detection terminal is in good contact, whether the water temperature display is normal, and whether the fault light is light.

Fault 3: The mobile APP cannot be connected.

Solution:
Check whether the icon on the controller is light, and check whether the WIFI address connected to the mobile phone is set correctly. Ensure that the WIFI signal between the mobile phone and the controller is good.

7. WARRANTY

Warranty Service Regulations

The controller is covered by a two-year warranty from the date of purchase. During this period, any failure caused by manufacturing defects or non-human factors will be repaired or replaced under warranty.
For warranty service, please contact your local authorized dealer.

Non-Warranty Conditions

The following situations are not covered by the warranty:

- Damage caused by accidents, negligence, improper installation, or improper use.
- Damage resulting from solar panel voltage, power, or load current exceeding the rated specifications.
- Damage caused by the use of over-rated or incompatible heating elements.
- Unauthorized modification or repair of the product.

- Damage incurred during transportation.
- Damage caused by natural disasters, including lightning and extreme weather.

Damage caused by force majeure events such as fire or flooding.
It is specially stated that the scope of use of the controller defined in the specification is unique, and any over-range application promise without the authorization of the manufacturer will not be recognized by the manufacturer.

CONTACT ELIX NEW ENERGY:

ASK METAL Ltd | Ventspils 63b, Riga, LV-1046 | export@elix.lv |